CHAPTER - II

SURVEY OF EXISTING LITERATURE RELEVANT TO THIS STUDY

The theoretical and empirical works done by some renowned researchers and the practices carried on so far are discussed in this chapter under the following heads:

1. Uses of Accounting Ratios and

The following two sections are devoted to the purpose. Some other studies are also discussed in the relevant chapters.

1. Uses of Accounting Ratios

Texts on management accounting, financial management and related areas express doubt about the utility of information revealed through accounting or financial ratios in financial statement analysis mainly due to the following three main types of limitations:

(i) The information is based on historical costs, i.e., not adjusted for general or specific price changes.

(ii) The information is based on different accounting techniques or methods adopted by different firms or in different years.

(iii) The information merely explains past results instead of indicating the future.

Nevertheless, the financial ratios are still widely used by academicians as well as by practitioners in spite of their limitations. Some of those uses are discussed in the succeeding pages.
A. Univariate Treatments of Accounting Ratios

In the treatise by Lev (1974) several univariate uses of the financial ratios are reported in Chapter THREE and early practices of multivariate ratio analysis methods in the form of indices are also discussed in that chapter. Practitioners, especially the bank officers, considered the ratios individually (e.g., the current ratio, the acid test ratio or the debt-equity ratio etc.) to judge the short-term or long-term liquidity position or the credit worthiness of a borrower. Matsumoto et al. (1991) also conducted a survey recently of bank officers about their perception of importance of various financial ratios in lending decisions.

A significant use of accounting ratios is for prediction of probable bankruptcy of a business unit sufficiently in advance, by using the ratios in discriminant analysis models. With the help of these ratios business units are classified into bankrupt and non-bankrupt categories. In the early ages of exploration of this area univariate uses of ratios were introduced (Beaver, 1967; Sen, 1979); Tamari (1966) used arbitrary weights to combine them. In a subsequent stage of research in this area, multivariate discriminant analysis technique was applied to solve classificatory issues.

In chapter 12 of the treatise by Westwick (1973) discussion on univariate use of ratios is made. In this book in the course of discussion about integrated control by ratios the author identified the main constituents of the whole business, viz., (a)
shareholder (individual), (b) the stock market, (c) financial policy, (d) major profit centres and (e) major departmental contributions. The ratios are treated, in that book, not as a weighted sum type of score but individually. In many other text books on management accounting or financial management, several uses of ratios by individual treatment are discussed.

Niederhoffer & Regan (1972) considered individually the ratio of earning change and market value of equity share to investigate into the relationship of stock prices and earnings. Chen et al. (1986) used Tobin's q (the ratio between market value of a firm and its capital employed) to assess market power of a firm.

B. Multivariate Treatments of Accounting Ratios

In a later stage of the research on the area of prediction of business failure, as mentioned earlier, multivariate discriminant analysis technique is being extensively used. There are ample references in the literature to the papers by Wilcox (1971), Joy & Tollefson (1975), Eisenbeis (1977), Ohlson (1980). Ohlson (1980) applied the multivariate linear econometric methods of conditional logit analysis (using accounting ratios) to get probability of failure of a business unit to avoid some fairly well known problems associated with multivariate discriminant analysis (MDA) technique applied on financial ratios. Wilcox (1971) used non-linear combination of ratios to estimate the probability of financial failure.

Using discriminant analysis technique Cheung & Ellis
(1993) examined the ability of financial ratios to predict takeovers in Hong Kong.

To study the leverage and dividend policy Brigham & Gordon (1968) used multivariate model taking debt-equity and dividend payout ratios into account. For Indian cement and automobiles companies Mittal & Singla (1992) applied the multivariate regression analysis technique. Using debt-equity mix as dependent variable and size, asset mix, business risk and growth rate as independent variables, they searched for the determinants of debt-equity mix.

Using classification theory, multivariate treatment of ratios was made by Williams & Goodman (1971) to classify corporations on the basis of their financial characteristics and by Kamaiah & Date (1987) to identify bank groups in India on the basis of earnings and expenditure ratios only. Attempts were also made to determine the optimum ratio of invested long-term capital-mix, i.e., the ratio of fixed capital to total capital employed, for some Indian industries, by using aggregated data in multivariate regression [Garai & Mallik (1988)].

Johnson (1979) used factor analysis to identify important financial ratios. Multivariate discriminant analysis technique was applied by Joshi & Ramani (1991) to determine the most relevant set of financial measures (ratios) to control the company level performance by taking the Indian paint industry as a case study.

Using stock market data for 56 companies of the USA, Benishay (1961) used multivariate regression technique to examine empirically the determinants of the differences in rates of return
on corporate equities (E/P-ratio). The dependent variable was regressed against some 'corrector' and 'risk' variables, most of which were accounting ratios. Whitbeck & Kisor Jr. (1963); on the other hand, performed regression analysis, using price-earning ratio as dependent variable and three other (ratios etc.) as independent variables for cross sectional data of 135 American stocks. Cross-sectional multiple regression study for 30 companies in Indian cotton textile industry was performed by Sharma (1989) to explain the variability in price-earning ratios with the help of six regressors (including leverage ratio and dividend pay-out ratio).

Hong (1977) empirically studied the inflationary effect on share price in micro level using different ratios in a multivariate model. Mear & Firth (1988) used nine company-specific variables (some of which are accounting ratios) and one industry variable to study the risk perception of stocks by financial analysts, taking the Brunswik lens model framework. Ou & Penman (1989) utilised the logit model to get probability of earning changes and simultaneously used 68 accounting variables (most of which were ratios) as descriptors. For predicting the perceived risk class of securities Capstaff (1992) used market data of the UK and tried to explain the risk perceptions by using a combination of three accounting variables (current ratio, asset size and variability of E/P-ratio) and the market beta, applying the multivariate discriminant analysis technique. To determine the factors affecting equity prices in India Zahir (1992) performed a regression analysis, the dependent variable for such regression being the average of high and low share prices and the independent varaibles
comprising seven internal ratio and other variables and four external variables.

C. Shortcomings in the Applications of Statistical Techniques Using Financial Ratios

The general limitations in the use of accounting ratios are specified in the beginning of the present section. While using financial ratios in statistical analyses, Lev & Sunder (1979) advised the practitioners and researchers to consider carefully (i) the industry way factors, (ii) the spurious correlation due to common denominator, (iii) the choice of an optimal firm size variable and (iv) the treatment of outlier observations.

Most statistical techniques (based on sampling theory) require the distribution of the variables to be (multivariate) normal for performing parametric tests. Though the study by Ricketts & Stover (1978) was not able to reject the normality hypothesis of accounting ratios for commercial banks in the USA, the studies by Bedingfield et al. (1985) and Kolari et al. (1989) rejected the said hypothesis on the same ratios of commercial banks in the same country but for different time periods. Kolari et al. (1989), instead of finding the normality even after exclusions of outliers, noticed other types of Pearsonian Shape of distributions.

Eisenbeis (1977) and Ohlson (1980) criticised the discriminant analysis technique using accounting ratios for predicting possible bankruptcy on technical considerations. They
also pointed out the problems arising out of the employment of the technique.

2. **Share Price Behaviour Studies**

The study of share price behaviour in the stock market is both a well cultivated and much confused area of research in financial economics and financial management. The behaviour of share price is depicted by different researchers in many different manners to explain such behaviour from different angles, even by comparing change of share prices with Brownian motion of statistical dynamics. The studies of share price behaviour undertaken so far are analogous to the perceptions of the shape of the proverbial elephant by some blind men. For this we can assert in the language of Graham & Dodd (1934, p.27):

> In other words, the market is not a weighing machine on which the value of each issue is recorded by an exact and impersonal mechanism, in accordance with its specific qualities. Rather should we say that the market is a voting machine, whereon countless individuals register choices which are the product partly of reason and partly of emotion.

However, the following different types of research works which are discussed in different sub-sections subsequently, may now be identified:

A. Studies on Capital Asset Pricing Model

B. Studies on Efficient Market Hypothesis

C. Studies on Relationship of Share Price with Economic Variables at Macro Level

D. Studies on Relationship of Share Price With Accounting and Other Variables at Micro Level
E. Use of Share Price in Other Studies, e.g., Effect on Share Price of Leverage, Dividend Policy, Change of Accounting Methods etc. and

F. Other Studies on Share Price or Share Market Behaviour.

A. Studies on Capital Asset Pricing Model

(a) The model and its developments, extensions, generalisations, tests and applications

This line of research works was started with the publication of the theoretical work by Markowitz (1952) on mean-variance approach to portfolio management. Afterwards, Sharpe (1962) developed Markowitz's mean-variance efficiency theory. On the basis of these works Sharpe (1964) and Lintner (1965) later developed the capital asset pricing model (CAPM) to ascertain the systematic risk, beta, of a security from the market portfolio. Sharpe first classified risks attached to a security into systematic and unsystematic and introduced the concept of security market line. In 1990 the Nobel Foundation Committee awarded the Nobel Prize in economic science to both Markowitz (1991) and Sharpe (1991) together with Merton H. Miller for pioneering contributions to portfolio theory. Miller (1991) was, however, awarded the prize for his valuable contributions towards 'Leverage'.

Umstead & Bergstrom (1979) tried to estimate portfolio betas in dynamic situation. Breeden (1979) developed Consumption CAPM in which inflation adjusted lifetime utility of consumption function was maximised. Afterwards, many other researchers further developed, extended, tested and applied this model to solve many practical issues. Cootner (1978) and Harris (1980)
extended the CAPM to general equilibrium framework. Chang & Pinegar (1987) estimated the effect of risk difference on the off documented negative relationship between stock returns and inflation. The risk related patterns of co-efficient on estimates were consistent with the hypothesis that future real output growth simultaneously helps to determine current stock returns and various measures of inflation.

Foster (1978) tested this model on New York Stock Exchange (NYSE) monthly data over the 1931 - 1974 period and supported the CAPM. Mackinlay & Richardson (1991) developed tests of unconditional mean-variance efficiency under weak distributional assumptions. They used a generalised method of moments framework taking returns for size based portfolios for the years 1926 to 1988. They concluded that the mean-variance efficiency of market indexes was sensitive to the test considered. Mackinlay (1987) performed multivariate tests for CAPM.

Mehta et al. (1980) incorporated policy variables in Sharpe-Lintner-Mossin CAPM. Using ordinary least square regression technique they supported the leverage irrelevance hypothesis but could not support the dividend policy irrelevance hypothesis. Chen et al. (1986), using Tobin's q, tried to measure the market power of a firm. Chung (1989) showed empirically that a significant portion of the cross-sectional variation in beta can be explained away by the cross-sectional differences in the demand beta which represents the intrinsic business risk of the firm in the output market, and the degrees of financial and operating
leverages. Sauer & Murphy (1992) established from data of German stock market that the original CAPM is the best explanatory model rather than Ross's (1976) Arbitrage Theory of Pricing (ATP) model and Consumption CAPM. CAPM is also used by several researchers as an event study methodology, some of those uses are discussed in the next sub-section.

(b) Criticisms, corrections and limitations of CAPM

Bar-Yosef & Kolodny (1976) pointed out that CAPM is biased as it does not incorporate dividend policy variable. Umstead (1977) pointed out the non-inclusion of dividend for a period to calculate the return of a stock in CAPM. Fabozzi & Francis (1978) complained that point estimates of ordinary least square beta is taken to be rigidly fixed over sample period of long run, though empirical results of their works followed that true beta experiences changes. Umstead & Bergstrom (1979) performed short and large sample period estimation of beta and found that long-period beta is able to predict future returns with less average absolute error.

Autocorrelation test of Brown (1979) demonstrated negative autocorrelations and this result suggested that 'it is naive to assume that capital markets are operationally perfect for all securities'. Ashton (1989) corrected CAPM formulation under the United Kingdom tax system. Allingham (1991) derived sufficient conditions for existence of equilibrium in CAPM.

Several shortcomings are also reported by different researchers on statistical grounds. Dowell & Grube (1978) used
three tests and concluded that the results provided little reason to expect that common stock returns are not-fat-tail and Gaussian, implying non-normality, and that the fat-tail distribution was not for combining normal distributions of unequal variances. Bey & Pinches (1980) found additional evidence for the presence of heteroscedasticity in ordinary least square estimate of beta which creates bias in the estimate. Jong et al. (1992) alleged that the return distributions are non-normal and neither the variance of error term nor the beta is constant. Using skewness, kurtosis and Wald's statistics Rechardson & Smith (1993) found that marginal and joint distributions of stock returns are significantly non-normal.

B. Studies on Efficient Market Hypothesis

The efficient market hypothesis in its general form considers the stock market to be efficient enough to reflect every information in the stock price reactions. With the testing of random walk hypothesis (that the time series stock returns are not autocorrelated) the efficient market hypothesis (EMH) emerged gradually. The most comprehensive work on EMH was by Fama (1965). In fact, Fama (1970, 1991) reviewed the literature in this line in detail for both theoretical and empirical works. In 1970 review he classified EMH in three distinct forms, viz., (i) the weak form, (ii) the semi-strong form and (iii) the strong form. In 1991 review the author changed the categories as (i) tests for return predictability, (ii) event studies and (iii) tests for private information respectively. In this latter article he also reviewed the CAPM as introduced by Sharpe, Lintner and Black (SLB-CAPM),
Ross's (1976) arbitrage pricing model and intertemporal asset pricing models. However, some of the research works (most of which have been done recently) are reviewed here following the classification of EMH given by Fama in his 1970 review article.

(a) Efficiency of market in weak form

Testing of efficiency of market in weak form is equivalent to random walk hypothesis testing. Here the answer for the question 'How well do past returns predict future returns?' is enquired into. Also the random walk model is concerned with the constant expected returns model of market equilibrium.

On study of 234 daily common stock prices and dividend data for eight European countries for March, 1966 to April, 1971 Solnik (1973) found that the deviation from random walk hypothesis was slightly more in those countries than that in the United States, though serial correlation coefficient was still very small. Using Box-Jenkins model, Praetz (1982) proved the validity of random walk hypothesis. Using a non-parametric distribution-free test procedure Ashley & Patterson (1986) established the serial independence of stock returns. Using modified Hurt-Mandelbrot rescaled range for dependence, Lo (1991) found little evidence of long-term memory in historical US stock prices. Using autoregression and rescaled range statistics Goetzmann (1993) studied the London stock exchange share price data for almost three centuries. He found evidence of persistence in raw returns greater than five years and of mean reversion in deviations from rolling 20-year averages. Similar patterns were also observed for the New York stock
exchange in the same study. However, they were not significant at traditional confidence level.

In his doctoral dissertation Gupta (1986) tested the market efficiency of Indian stocks. He found that weekly data of industry-wise indices lent support to random walk hypothesis and concluded that by and large Indian stock market is weakly efficient, on the basis of individual prices of 29 actively traded stocks. Rao and Jayarajan (1991) attempted to test the efficiency of Indian equity market under the weak form of EMH by examining the behaviour of equity share prices during the recent past. Principally, the study was aimed at the empirical testing of the applicability of random walk hypothesis to stock price movements, using the serial correlation analysis and runs test analysis. Gupta & Gupta (1991) reviewed the empirical studies in India on the tests of efficiency of Indian stock market. They opined that majority of studies supported the view that the random walk model is an adequate description of share price behaviour in a developing country like India.

(b) Efficiency of market in semi-strong form

As mentioned earlier, the tests conducted under this postulated form of efficiency of market is otherwise called 'event studies' or 'studies of information effect'. In this context definition of information given by Shannon & Weaver (1964) may be cited, "A message conveys information if it causes a change in the expectations of the receiver; the larger the change in expectations the larger the information content of the message". For
example, let the prior expectation about an event be denoted by $a$, which is changed to $b$ after receiving the message (note that $a$ and $b$ are probabilities), then the information content is measured as $(\ln b - \ln a)$ nits. As the expectations of the market participants are an unobservable phenomenon, to study 'the information effect' or more clearly speaking 'the information content effect', one has to examine, using indirect method of study, the reaction of the market through extraordinary share price movements on the occurrence of the event. On the basis of their results Fama et al. (1969) summarised that their study lent considerable support to the conclusion that the stock market is efficient in the sense that stock prices adjust very rapidly to new information. Reaction of the market through extraordinary share price movements on the occurrence of the events, i.e., release of publicly known information, is studied by a large number of researchers. For facilitating smooth discussion some of these studies are listed in a classified manner as under:

(i) Information effects for disclosure of accounting and other related information

Beaver (1968), Beaver et al. (1980) and Beaver et al. (1987) studied informational content of annual earnings announcement. Empirical studies in the US market by Brown & Kennelly (1972) for the period from 1951 to 1967 of 94 companies revealed that information content in quarterly earning per share reports is useful in that it can be used to predict the aggregate abnormal rates of return. However, Lev & Yahalom (1972) failed to detect any unusual volume reaction to the release of financial statements
of companies in Israeli stocks. Givoly & Lakonishok (1979) studied the information effect of publicly released analysts' forecast of earnings. Ohlson (1979) showed that disclosure leads to increased variability in stock price and risk and return parameters are essentially independent of changes in the disclosure environment. Laboratory experiment by Mear & Firth (1988) provided substantial evidence that publicly available accounting and financial data convey information relevant for security risk evaluation (by security analysts' judgements).

Using the US data O'Donnell (1965) and Kaplan & Roll (1972) studied the information effect for disclosure of manipulated earnings due to accounting method changes. They found no significant durable effect for such manipulation. Narayanaswamy (1989) studied the accounting earning disclosure by change of accounting methods — discretionary as well as mandatory, and tested the market efficiency.

(ii) Information effect of dividend announcement

Pettit (1972) found that most of the information implicit in the announcement of dividend is reflected in the security prices as of the end of the announcement period. This lent support to the proposition that the market is reasonably efficient on both monthly and daily basis.

(iii) Information (additional) effect of current cost accounting earnings disclosure

Darnell & Skerratt (1989) had shown empirically that SSAP 16 current cost information has incremental impact on share price over historical cost earnings disclosure.
(iv) Information effects of bonus issue and equity issue

The results of Sarma's (1990) study, in general, indicated that after bonus issue the prices do not increase significantly in relation to no-bonus issue.

Using refined model of Myers & Majluf it was shown by Cooney Jr. & Kalay (1993) that both positive and negative stock price responses concerning the new stock issues can be predicted.

(v) Information effects for debt-for-equity or equity-for-debt exchange offers and equity for debt swaps

Cornett & Travlos (1989) studied the debt-for-equity and equity-for-debt exchange offers. They found significant positive abnormal returns for the firms' stock holders in the former event and significant negative abnormal returns in the latter event. In addition, they found that non-convertible debt-holders experienced normal returns and convertible debt-holders earned significantly positive abnormal returns in the former event, whereas both non-convertible and convertible debt-holders experienced significant losses in the latter event.

Israel et al. (1989) demonstrated that analysts' revisions of forecasts of net operating income were positively correlated with the size of the stock price reaction to the swap announcement.

(vi) Information effect of index of economic indicator

Umstead (1977) utilised the Box-Jenkins methodology for building a transfer function model to test the efficiency of market. They studied the relation between Standard & Poor's 500
stock price index and the composite index of National Bureau of 
Economic Research, an economic indicator.

(vii) Information effect of performance plan/contract adoption

Results from the USA data of Gaver et al. (1992) implied that shareholders' meeting and not the performance plan adoption showed reaction in stock prices. However, Kumar & Sopariwala (1992) found significant positive excess return around the announcement of performance plan adoption.

(viii) Information effect of institutional trading of shares

Chan & Lakonishok (1993) observed that as a result of dealing by institutional stock traders a very small average effect of purchase (0.22%) and sale (0.14%) of New York stock exchange and AMEX stocks, was found. This was based on a study of 37 money management firms dealing from 1st July, 1986 to 30th December, 1988 (excluding October, 1987).

(ix) Information effects of acquisitions and mergers

Halpern (1983) reviewed the event studies of acquisitions. Haque & Harnhirun (1993) found that though there was significant positive relation between stock prices and merger, dramatic merger in Canada in 80's was due not only to stock market reactions but also to the special macro economic policies that was pursued by the government through the monetary policy, the free trade deal with the US and so on.
(x) Information effect of macro-policy announcement

Aggarwal & Schirm (1992) found that asset prices (including stock prices) were sensitive to news in trade balance announcement. This sensitivity was felt to have increased significantly in recent years with important implications for asset pricing models and economic policy.

(xi) Information effect for political events

Gemmill (1992) observed that though in the last week of the UK general election the option prices showed a gross inefficiency, there was a close relation between opinion poll for the said election and FTSE 100 share price index — the tests indicated a speculative bubble present in the options.

(xii) Effects of superstitions and customs

Chandy et al. (1991) performed investors' psychological studies using Hotelling's $T^2$ statistic for full or new moon influence on the New York, American and OTC stock markets over a long time period. They noticed no influence of these days and the result was conclusive, in their opinion. Hence, they reposed their faith in the efficiency of market. After an application of the event study methodology in a model incorporating the generalised autoregressive conditional heteroscedasticity (GARCH) model with t-distributed error and a time dependent beta, Jong et al. (1992) found significant weekend effect on Dutch daily stock returns.

(c) Efficiency of market in strong form

EMH in strong form version postulates the reactions and
adjustments of share price in the market not only for the public information but also for every information collected by investors privately. Direct test of the effect of private information is not possible and so indirectly the existence and influence of such type of information are inferred. Not much work has been conducted to test this form of EMH; therefore, there is an acute dearth of literature in this line.

Kraft & Kraft (1977) failed to identify any causal relation between Standard & Poor's common stock price indices on the one hand and some macro-economic variables (e.g., money supply etc.) on the other. They concluded that their results were consistent with the hypothesis that capital markets are efficient in the sense that prices fully reflect all available information, implying both public and private information. Fishman & Hagerty (1992) dealt with the insider trading and its effect on stock prices. By mathematical deductions they showed that rather requiring insiders to disclose their private information than banning them from trading leads to more efficient prices of stocks. Land et al. (1992) devised tests for empirical investigation that distinguished competitive (Walrasian, with or without uncertain supply) rational and noisy rational expectations equilibria around public information signals. These tests indicated the existence of significant amount of noise, so that, private information had value but not enough to obfuscate entirely the information content of price.
(d) Reviews, criticisms and limitations of EMH

As mentioned earlier in the beginning of the present section Fama (1970,1991) reviewed EMH together with CAMP in its different modified form. Narayanaswamy (1989) reviewed and criticised the EMH. Cochrane (1991) also reviewed the volatility tests of efficient market. In his review article on efficient market Lehmann (1991) finally suggested that the issue should be settled by empirical court.

As in event study methodology many researchers have taken recourse to the CAPM formulation in many of its modified form, the limitations of CAPM are also applicable to those cases. As regard to distribution of security return and heteroscedasticity there are many empirical tests establishing non-normality of return distribution and heteroscedasticity of error term variance of a regression equation formulation. Osborne (1959) and Praetz (1972) tried to provide alternative forms of distribution of returns by comparing these with actual stock return data. Dowell & Grube (1978) performed multivariate tests of common stock returns and they found neither normality of distributions nor any evidence to support that the fat-tail is due to combination of many normal distributions of unequal variances. Richardson & Smith (1993) found after sufficient tests that both marginal and joint distributions of common stock returns are non-normal.

Umstead (1977) suggested to take dividend also for calculating common stock return to get better result. McDonald (1987) commented upon the use of system methods in event studies.
Though systems methods incorporate interrelation between groups of securities experiencing the same event and though these methods have various characteristics that are amenable to event study applications, the premise of these methods is not supported by a variety of empirical tests. Questioning the practicability, Lal (1989) remarked that though EMH in semi-strong form is widely accepted and it is generally applicable to large widely traded companies, CAPM and EMH are not widely adopted by practitioners. De Long & Land (1992) criticised EMH in context to hypothesis testing with some other economic hypotheses.

From behavioural standpoint the EMH is also criticised. Using psychological Path model derived from the personal construct theory (PCT) and using data for 1963 and for 1979-1983 Hunter & Coggin (1988) were not able to support EMH. That is, the financial analysts, in making earnings forecasts, do not use EMH but PCT.

C. Studies on Relationship of Share Price with Economic Variables at Macro Level

For the study of relation of market price of share with macro-economic variables, in aggregative level, composite index of share prices is taken into account. In this line of study attempts are made to relate time series share price index for an economy with one or more macro-economic variable or variables characterising the state of the economy. Such type of studies was performed by Umstead (1977), Kraft & Kraft (1977), Chen et al. (1986), Asprem (1989) and Poon & Taylor (1991).

In Umstead's study quarterly variations of index were
considered and he attempted to forecast future trend following Box-Jenkins (1970) time-series transfer function model. The study undertook an extensive statistical investigation of the Standard and Poor's 500 Common Stocks indices and their relationship to a leading indicator of business activity (the National Bureau of Economic Research Leading Composite Index). The model was tested in a fifty quarter holdout sample and was found to be successful at forecasting stock price changes (including dividend element) one quarter ahead.

Study by Kraft & Kraft used regression model in aggregative level. The dependent variable, for this study, was taken either the level of Standard & Poor's index or percentage change of that index. The determinant of stock prices (indices) considered were money supply, Moody's AAA corporate bond rate for the risk rate of interest, the relative change in risk premium defined as the ratio of the risk rate to the US government long-term rate and the squared deviation of the risk spread. The results implied that the independent macro-economic variables did not lead movements in stock prices. The findings were consistent with the hypothesis that capital markets are efficient in the sense that prices fully reflect all available information.

In Asprem's study stock price index was related to macro-economic variables, e.g., employment, imports, inflation, measures of money etc., of ten European countries. The associations between stock price indices and macro-economic variables were shown to be strongest in Germany, the Netherlands, Switzerland and the U.K. In
several instances the stock prices were said to be related to historic value of economic variables indicating that predictive models can be constructed.

In the study of Chen, Roll & Ross on the basis of the data of the USA it was claimed that exogeneous economic factors have significant and systematic influence on pricing stocks (indices of size-based portfolios). But the study by Poon & Taylor revealed that on the basis of the data of the UK, macro-economic factors did not affect share prices in the manner described in the study by Chen et al.

D. Studies on Relationship of Share Price with Accounting and Other Variables at Micro Level

Using the results of earning changes (actual or estimated) as normalised through dividing by share prices, the study of Niederhoffer & Regan (1972) demonstrated that stock prices are strongly dependent on earning changes on both absolute and relative to analysts' estimates. Empirical researches establishing relationship between earning-price or price-earning ratio and accounting as well as other financial variables in cross-sectional multivariate regression analysis were conducted by Benishay (1961), Whitbeck & Kisor Jr. (1963) and Sharma (1989). The independent variables in Benishay's study were (1) growth in earnings, (2) growth in equity value, (3) average dividend payout ratio for three years, (4) stability of earnings after tax, (5) stability in equity value, (6) size variable and (7) debt-equity ratio. The growth variables were the regression co-efficients of
nine years divided by means and the stability variables were the reciprocal of the co-efficients of variations. Logarithmic conversion of values of some variables were also done. Study was performed for the years from 1954 to 1957 on cross-sectional data of 56 companies of the USA through multiple linear regression analysis, the dependent variable being the earning-price ratio. In the recent study by Sharma a similar relationship was hypothesised using the price-earning ratio as dependent variable and six independent variables comprising the exponential growth rate of equity share price and five other accounting variables almost similar to those of Benishay's study. The technique employed was a (multiplicative) multivariate cross-sectional linear regression on thirty companies in cotton textile industry of India for the years from 1976 to 1980. In the study by Whitbeck & Kisor Jr. only three independent variables, viz., (i) growth rate of earnings per share, (ii) dividend payout ratio and (iii) standard deviation of earnings per share, were taken into account and cross-sectional regression on 135 American stocks was performed, taking as dependent variable the price-earning ratio.

Darnell & Skerratt (1989) employed the regression technique for closing share price with historical earning and current cost earning extra to historical earning, after correcting for heteroscedasticity. They found incremental current cost information. Relation between stock price (return) with past and future accounting earnings was tested empirically by Lipe (1990) and he found significant relationship with alternative information signalling as a noise.
Zahir (1992) in his study attempted to compare the behaviour of more volatile shares with that of less volatile shares of twenty Indian companies in each category. The dependent variable in his regression analysis formulation was the average of high and low share prices. The independent set of variables comprised seven internal and four external variables (as per his classification) which were (1) bonus issue (a dummy variable), (2) size (net assets), (3) growth (annual rate of growth of net sales), (4) percentage of dividend per share, (5) earnings per share, (6) book value per share, (7) yield (dividend price ratio), (8) variability of market price, [(Average of high - Average of low) X 200 / (Average of high + Average of low)] of equity share price, (9) Reserve Bank of India Security Price Index, (10) money supply and (11) time factor. Dependent variable and all external variable values were those of the year subsequent to the analysis year. Regressions were performed taking (i) seven internal, (ii) four external or (iii) all eleven independent variables. The model was multivariate linear and the regressions were cross-sectional as well as for eight years at the same time, with 20 X 8 observations in each instance. The external variables except the RBI security index were not found to be significant even in combined equation whereas the RBI security index was found to be significant (at 1% level for only more volatile shares) in both the more volatile and less volatile series.

In the earlier studies of the present researcher (Garai, 1989a, 1989b) on corporate overall performance and its
relation with share price behaviour, it was hypothesised that different aspects of equity share price (viz., average price, fluctuation of price indicating risk attached to it and change of it) are dependent simultaneously upon a set of independent variables which are the different component forces indicating operating and financing effectiveness of the company in different areas of activity. In those studies time series as well as cross-sectional canonical correlation analyses between different aspects of equity share price and operating as well as financing efficiency expressed by some suitable accounting ratio-variables were performed. In most of the cases strong relations were found (where the data were free from serious abnormality). In the latter study it was also shown that different groups of investors (or in general, the market participants) of different companies consider different sub-sets of independent variables amongst a larger set of several accounting (ratio) variables. In some cases multiplicative relations were also found to be best fitted with the data. Again, the third dependent variable (viz., the change of the average share price in the subsequent year) was found to be almost redundant. In the same study attempts were also made to predict values of average share price and its relative dispersion where the correlations were strong enough. In another study [Garai (1990)] the relevance of current value based accounting ratios was tested together with application of the model in testing leverage irrelevance and dividend policy irrelevance hypotheses.
E. Use of Share Prices in Other Studies, e.g., Effect on Share Price of Leverage, Dividend Policy, Change of Accounting Methods etc.

Brigham & Gordon (1968) developed stock value models using equations for multivariate regression analysis to test the influence of leverage and dividend policy on stock price and cost of capital. In effect, in the regression equations either dividend-price (current price of common stock) ratio or natural logarithm of it was used as dependent variable. They concluded that the rate of return investors require on a share increases with the company's retention rate and the value of a company's stock depends on its financing policy. In the study by Sarma & Hanumantarao (1969) on the data of companies in engineering industry of India the authors concluded that the debt has non-tax advantages also and investors prefer corporate to personal leverage. They employed for this purpose M-M's valuation equation in which the tax advantage from the interest paid on debt was accounted for by incorporating it into the dependent variable itself. The authors preferred to introduce a debt variable along with the independent variables and to let the sample to determine the size of its co-efficient. Rao & Litzenberger (1971) questioned the findings of Sarma & Hanumantarao on the ground that Indian capital market is less efficient than the US capital market but in a reply to their comment Sarma & Hanumantarao (1971) did not agree with them as it was claimed that the selected shares were fairly actively traded.

With respect to studies about dividend policy and value of shares in a note Brennan (1971) upheld the argument of M-M about the dividend irrelevance
(without any empirical test) which is based under uncertainty of familiar arbitrage. This argument was derived from their assumption of symmetric market rationality. This requires first that every market participant behaves rationally in the sense of preferring more wealth to less and being indifferent to the form in which his wealth increment is received, and secondly that, in forming his expectations, he believes that every other market participant both behaves rationally and believes that all others also behave rationally. By use of an instrumental variable approach Mehta et al. (1980) applied the Sharpe-Lintner-Mossin CAPM introducing the systematic effects of corporate financial policies. They tested the dividend and leverage policies relevance on a sample of 55 electric utilities for the period from 1968 to 1972. After overcoming the biases in OLS estimates, on the basis of their empirical results they upheld the M-M's revised proposition for leverage irrelevance but found that investors did not exhibit indifference towards dividend distribution. According to Shiller (1989) the co-movements of real stock prices between the UK and the US appeared to be too large to be accounted for in terms of the co-movements of real dividends between the countries even after consideration of the information pooling. But when consideration was made of the co-movements of real interest rates between the countries, there was weaker evidence of excess co-movements of price. The paper by Jose & Stevens (1989) illustrated the use of multiple dimensions of dividend policy and their association with market valuation premiums, measured by Tobin's q ratio. The long run equilibrium approach with time series measures
was introduced as an alternative to the popular dividend announcement and short run abnormal return studies of dividend relevance. In addition, market valuation premium measure was introduced to dividend policy research as an alternative to risk-adjusted return methods. The findings suggested that market valuation premiums are associated with stable and positive dividends per share trends, irrespective of the payout ratio level.

O'Donnell (1965) and Kapian & Roll (1972) studied the effect on security prices for disclosure of inflated accounting earnings by changing accounting methods and found (as earlier mentioned) that no such durable effect could be possible.

Hong (1977) modelled the differential wealth transfer effects of inflation on a firm and tested hypotheses concerning their impact on share prices. The results, using cross-sectional regression of monthly returns, supported the hypothesis that inflation affects stock prices through additional tax burdens borne by firms, though these tax effects vary widely across firms due to different degrees of understating depreciation expenses and the cost of inventory withdrawals.

F. Other Studies on Share Price or Share Market Behaviour

Besides the lines of researches on share price behaviour discussed above other research works are also conducted by many other scholars with different view points either by comparing the movement of prices with other physical or social phenomena or by explaining such movement of prices in different fashions. These
research works are discussed in a classified manner as under:

(a) Share price movement compared to Markov process

Dryden (1969) first explored the theory of Markov process to the analysis of stock price movements. In his study aggregate data on the UK share prices were analysed with a Markovial framework. He concluded that it might be fruitful to apply the Markov model to more disaggregated data specifically to individual stock price data. In the opinion of Ryan (1973), Markov theory may be relevant to the analysis of stock prices in two ways, viz.,

1. as a useful tool for making probabilistic statements about future stock price levels which is an alternative to the more traditional regression forecasting techniques to which it is claimed to be superior in many ways and

2. as an extension of the random walk hypothesis.

It was shown in his article that under a fairly general partial adjustment model of stock price determination, price movements which do not display the random walk characteristic may be interpreted as following a Markov process. Data for 14 UK companies were analysed following the said model of Markovial process though the author acknowledged that the results presented were very rudimentary and should have been interpreted solely as illustrations.

(b) Share price changes compared to Brownian motion

Osborne (1959, 1962) opined that properties of share price
changes could be thought to be quite analogous to an ensemble of particles in statistical mechanics. The probability distribution for a particle in Brownian motion was applied by him to share price changes.

Praetz (1972) modified the Osborne's Brownian motion theory of share price changes to account for the changing variance of the share market. It produced a scaled t-distribution which was found to be an excellent fit to series of share price indices of Sydney stock market.

(c) Bayesian model for forecasting future security prices

Bayesian probabilistic approach was followed by Winkler (1973). Using mathematical symbolisation and without any empirical testing on the model, he discussed about

(i) forecasting future price movements of a set of securities,
(ii) extensions of the model to different situations (including incorporation of several variables besides price changes) and
(iii) implementation schemes.

(d) Determination of risk classes of securities

A significant step towards the actual prediction of risk was attempted by Capstaff (1992) by using discriminant analysis technique taking three accounting variables only, viz., current ratio, asset size (natural logarithm of the book value of total assets), earnings variability (standard deviation of earnings-price ratio for
the period 1983-1987), and one market related variable (the market beta). With the help of his method the author was able to place 20, out of total 24, securities in correct risk classes of three. The UK data were used for demonstrating his method.

(e) Logit model for prediction of stock returns from financial statement information

Ou & Penman (1989) introduced a financial statement analysis method that combined a large set of financial statement items (total 68 descriptors including ratios) into one summary measure which indicated the probability of direction of one-year-ahead earning changes (stock-returns). Their estimation technique was logit and in their model, the large array of financial statement items was combined into a scalar that mapped from the financial statements to the payoffs to securities. Data were taken from American industrial firms whose common stocks were traded on the New York stock exchange and AMEX stock exchange. In addition, they included a set of utilities and financial firms. Such prediction of stock returns in probabilistic term, using financial statement information was subsequently supported by Holthausen & Larcker (1992). In the same issue (CAPITAL MARKET ISSUE — Relation between Financial Statement Information and Prices) of the journal Accounting and Economics (Vol. 15, No. 2/3) several other scholars supported and criticised the procedure followed by Ou & Penman as described above, in four articles.

(f) Closed form stock price model

In contrast to normative stock price models Bierman, Jr.
et al. (1972) examined theoretically the closed form models with (i) constant growth rate, (ii) constant incremental dividend and (iii) decaying growth rate.

(g) Duration approach to common stock movement

Ariff (1989) attempted duration study of common stocks of Singapore following Macauley and Hicks. Nawalkha & Lacey (1990) derived a generalised duration model for bond portfolio of closed form of higher order alternatively.

As concluding remark of this section we may recollect the quotation from Graham & Dodd noted at the beginning of this section as, "... the market is a voting machine ...".