CHAPTER II
PORTFOLIO SELECTION AND EVALUATION -
THEORETICAL ANALYSIS AND REVIEW OF RELATED STUDIES

2.1 INTRODUCTION

The recent developments in Indian capital market have exhibited a great measure of dynamism due to liberalisation of industrial, fiscal and monetary policies. Apart from the institutional investors there has been an increasing amount of interest shown by the household sector. Therefore the growing demand for equities in this decade necessitates the study on share returns behaviour and portfolio management. Apart from studying the returns behaviour, increasing awareness in the area of portfolio construction and management motivates further study in this area.

The behaviour of equity returns and determinants of equity prices are discussed. It is followed by risk-return concept, portfolio theory, diversification and portfolio models. Portfolio construction and evaluation are also discussed. The second part of this chapter deals with review of related empirical studies.

2.2 BEHAVIOUR OF EQUITY RETURNS

Equities dominate this decade due to the new policy initiatives of the Government of India and growth of international investment. The behaviour of equity prices causes great concern among investors. Based on the rapidity with which security prices adjust to informations, the market is said to be efficient or inefficient. Empirical evidence support the Efficient Market Hypothesis (EMH) or Random Walk Hypothesis (RWH), which states that future stock returns cannot be predicted based on historical data. All the new informations are already reflected in the share prices.

Of late, the non-predictability of returns is questioned\(^1\). The existence of various anomalies in the market such as January Effect, Monthly Effect,
Weekend Effect assert that the share market returns follow a said pattern. Prof. Fama, who formalised EMH in 1965, revised his views due to the improvement in capital market research. The debate goes on to say the efficiency or inefficiency of the market. Few studies undertaken in India suggest that the Indian Capital Market is in the weak form of efficiency. However, in a recent study it was concluded that Random Walk Hypothesis cannot describe the price behaviour of the Indian Stock Market.

2.3 DETERMINANTS OF EQUITY PRICES

The Random Walk Hypothesis states that the equity prices cannot be predictable based on previous data. Further, it states that in an efficient market the movement of share prices is random. But the existence of various anomalies in the stock market questions the validity of randomness in the share returns behaviour. Therefore, determinants of equity prices need careful analysis. In this study, an attempt is made to analyse the effect of earnings per share, dividend per share and book value per share on market price. Recent studies indicate that earnings and dividends have an impact on share returns behaviour.

The profitability of a firm from the point of view of the ordinary shareholders is the earnings per share. An investor makes references to the price earnings ratio of a stock before investment decisions are made. The investor uses price earnings ratio to identify possible winners in the stock market. Similarly, a knowledge of the the impact of dividends on current price is a matter of considerable importance to the investors in portfolio selection.

2.4 MEASURES OF RISK AND RETURN

2.4.1 RISK

Risk elements contribute to the variations in return. Risk is defined as the variability of return caused by the market forces. Risk element could be segregated into systematic and unsystematic risk. Systematic risk
results from factors which are external and uncontrollable that affect the entire business environment and it is common to all industries, whereas unsystematic risk is that portion of risk which is controllable, internal in nature and is peculiar to a particular industry alone.

Systematic risk includes market risk, interest rate risk and purchasing power risk. Market risk reflects changes in investors attitudes towards equities such as expectations towards lower profits and over reactions to over expected profits and thereby selling the securities. In case of interest rate risk and purchasing power risk, changes in the price of money and goods and services might result in adverse effects. Increase in the interest rate will reduce the securities price and purchasing power is affected adversely due to rise in security prices. The systematic risk factor of a stock is given by the beta of a security. High beta securities consists of high risk securities. Securities with a beta coefficient larger than one are more volatile than the market and vice versa.

The sources of unsystematic risk are business risk and financial risk. Business risk refers to the environmental changes of the firm and its adaption towards them; whereas, financial risk relates to the debt equity mix. The business risk depends on the extent to which the firm employs the leverage. There are a number of other factors that can contribute to risk in addition to the above factors.

Risk of an investment can be determined by the dispersion of returns and range of the distribution. Statistically risk is measured by the standard deviation of the return and the variance.

\[
\text{Variance } (\sigma^2) = \sum \text{(Probability) (Possible Return - Expected Return)}^2
\]

\[
= \sum (P_i) \ [R_i - E(R_i)]^2.
\]
Everything remaining constant, when variance is larger, the greater the dispersion of expectations and the greater the risk of the investment. In some cases, when there are major differences in the expected rate of return, risk per unit of return is calculated using co-efficient of variation.

\[
\text{Co-efficient of variation} = \frac{\text{Standard deviation of return}}{\text{Expected rate of return}}
\]

\[
ev = \frac{\sigma_i}{E(R_i)}
\]

2.4.2. RETURN

Return is the benefit arising out of an investment. The rate of return measures the rate at which the investors wealth increases or decreases. An investment's single period rate of return is termed as "r" and is given as follows:

\[
r = \frac{\text{Ending wealth} - \text{Beginning wealth}}{\text{Beginning wealth}}
\]

Since the investment decision relates to the future, the expected rate of return is calculated for an asset. It is the weighted average rate of return, using the probability of each rate of return as the weights. It is calculated by summing the products of rates of return and their respective probabilities as given below:

\[
E(r) = \sum_{t=1}^{T} P_t r_t
\]

Since the required rate of return differs substantially among alternative investments, and there are changes in the same investment over time, the factors that influence the expected rate of returns must be considered. The rate of return is affected by the following factors: 1. Risk free rate of return (RFR); 2. Factors that affect the market rate on
risk free investments and risk premium. The economy's risk free rate of return is influenced by investment opportunities in the economy whereas the variables that affect the market risk free rate of return include short-run activities of capital market and inflation. Risk premium on investment is influenced by the variables of systematic risk namely, business risk, financial risk, liquidity risk and exchange rate.

Investment is a commitment which requires higher rate of return in case of higher risk class, since investors basically dislike risk. Thus there exists a positive relationship between expected rate of return and risk. This is known as risk-return trade off. This relationship between the risk and return could be quantified. The total variance of the rate of return on a stock is affected by the attributes to the market or systematic risk and the remaining portion is associated with the unsystematic factors.

\[ R_s = \alpha + \beta_s (R_m) \]

2.4.3. PORTFOLIO RISK AND RETURN

Harry Markowitz made an observation in his pioneering work on Portfolio Theory in 1952 that investors are concerned with both return and risk. The return for a portfolio is the weighted average of the returns of the securities in the portfolios. He emphasised that diversification can eliminate most, if not all, of the unsystematic risk of individual securities, leaving the portfolio with only market-related risk.

2.5. PORTFOLIO THEORY

An investment portfolio is a group of assets. Portfolio may contain any number of assets such as common stocks, bonds, options, future contracts, real estate, diamonds, cash, gold, savings account and other assets. This study concentrates on common stock alone, since equity plays a predominant role in the Indian Capital Market. Diversification leads to
spreading up of risk and minimisation of risk. Securities that have risk-
return characteristics in combination make up a portfolio. Portfolio analysis
thus takes the blending effects of combining securities. Portfolio analysis
begins with the collection of expected rate of returns and risk statistics for
the stocks. The selection of securities in the portfolio can be made with
securities with high returns. The securities with least risk could be
added to the portfolio at the same time if the expected rate of return
should be highest in the same risk class. The portfolio analysis takes a
new turn after the development of modern portfolio theory.

The traditional portfolio planning called for the selection of those
securities that satisfy the personal requirement of the investors. For an
example, when the investor depends on the returns for his livelihood he
would be advised to purchase stocks providing stable returns.

Modern portfolio theory suggests that it provides optimum results
when compared to the traditional approach. Modern portfolio theory
emphasises scientific approach. It is based on estimated risk and return
of the security and the attitudes of the investors towards the risk return
trade off from the analysis of individual securities.

2.5.1 PORTFOLIO OPTIMISATION

Portfolio Analysis consists of two main objectives namely 1) maximum
expected return and 2) minimum risk of its class. With these objectives the
portfolio management is to analyse different individual assets and delinate
efficient frontier. These set of efficient portfolios comprises the efficient
frontier. At this point in risk-return space one can have the maximum
return at each risk class. Thus a portfolio is said to be efficient when it
has maximum expected rate of return for its risk class and conversely
minimum level of risk at same level of expected rate of return.
An investor should choose a portfolio that maximises his utility function. The optimum portfolio is found at the point of tangency between the efficient frontier and a utility indifference curve. This point represents the highest level of utility the investor can reach. Thus, the portfolio selection differs from investor to investor.

2.5.2 DIVERSIFICATION

Diversification means spreading up of risk in the context of portfolio management. Diversification of securities may be simple, across industries, superfluous or Markowitz diversification; whatever may be the model, it seeks to minimise the risk.

SIMPLE DIVERSIFICATION

Simple diversification means selecting different stocks randomly, irrelevant of any criteria to reduce portfolio risk. This is the most common form of diversification. Stocks selected randomly will reduce the unsystematic portion of the total risk to minimum.

In case of simple diversification the analysis reveals that nearly 15 stocks prove to be adequate in constructing an efficient portfolio because of the operation of law of diminishing marginal utility. But when more stocks are added irrespective of the above number, then the portfolio is said to be superfluously diversified. Such kind of diversification is not beneficial in total. It involves certain problems like high research costs, inadequacy of information, less returns and high transaction cost.

DIVERSIFICATION ACROSS INDUSTRIES

Diversification across industries refers to the selection of securities from different industrial groups instead of concentrating in a particular industry. This diversification do result in risk reduction. But some analysis reveals that there is no considerable difference between
diversification across industries and simple diversification. They yield the same amount of risk reduction.

MARKOWITZ DIVERSIFICATION

Markowitz Diversification is a scientific process rather than simple diversification since it considers the securities' correlation coefficient. He states that an efficient portfolio could be constructed by selecting stocks that are not less than perfectly positively correlated. This diversification leads to the maximum risk reduction. But negative correlation among securities are difficult to be found and securities which are lesser positively correlated can be used to construct portfolio. Markowitz portfolio involves numerous calculations and when large number of assets are included the procedure becomes tedious.

2.6 PORTFOLIO MODELS

There are different models developed for the forecasting correlation structure between stock in the portfolio analysis. They are index models and averaging techniques. The most widely used index models are as follows:

2.6.1 SINGLE INDEX MODEL

This model is widely used and it assumes that the covariance between stocks is due to a single common influence or index. In general when the market rises, the security prices tend to move up and when market moves down, security prices come down. Hence its relationship between security prices and market index could be correlated to obtain the return.

\[ R_i = \alpha_i + \beta_i I + e_i \]

where, \( R_i \) = expected return on security \( i \)

\( \alpha_i \) = alpha coefficient or a random variable

\( \beta_i \) = beta coefficient

\( I \) = expected return on market index

\( e_i \) = error with Mean = 0 and standard deviation is constant
Beta is the measure of a security's systematic risk. The use of the single index model calls for the estimation of beta for each security. Blume and Levy have done extensive research on the Beta's performance over the period of time. Changes in betas will differ from security to security. These changes will be cancelled out in a portfolio when compared with the individual stocks. Betas could be calculated either based on historical data or as fundamental betas. In case of beta based on historical data, the covariance of each stock is measured whereas, fundamental beta provides for the quickest changes in the company.

Both these methods suffer from certain drawbacks. Historical betas take longer time to reflect changes in company activities and fundamental betas assume that all the betas respond to the fundamental variables. Barr Rosenberg in his research combined these two types to eliminate their drawbacks and this proves to be more successful in forecasting the future betas.

2.6.2 MULTI INDEX MODEL

The multi index model includes even the non market influences that cause securities to move together. There are some set of economic factors as industrial groups that account for common movement of stock prices. Multi-index models introduce extra indices in order to acquire additional informations. Apart from predicting the correlation coefficients, this model is used to study the return distribution of a portfolio to the specific needs of an investor and also as a method of portfolio performance evaluator. There are two different forms in the multi index models. General index model is one which includes risk and return, in addition to the return on the market, changes in level of interest rates and set of industry indices.

In case of industrial index models, the basic assumption is that a firm's return is affected by the market plus general industries. With the
single index model, additions of indices to capture industry effects are made to arrive at the industry index models.

Elton and Gruber$^{12}$ found the utility of multi index model. They concluded that additions of indices to the single index models led to a decrease in performance, though they provide better explanation for the historical data. Farrell$^{13}$ in his study concluded that his multi index model based on homogeneous groups outperformed the single index model. Though there are contraversial views over the multi index model, it has a specific application in certain areas.

Averaging techniques are smoothing the additions of indices to the correlation matrix on an attempt to reduce the items and thereby producing better forecasts. There is a chance of missing real information in the averaging process. They may take the form of mixed models or fundamental multi index models.

2.7 PORTFOLIO CONSTRUCTION

Portfolio construction involves setting up of portfolio objectives and framing of investment strategy. Portfolio objectives mainly revolve around the four major principals namely 1. Stability of investment, 2. Income, 3. Growth of income and 4. Capital appreciation. The investors differ in their objectives. Therefore, the portfolio selection also differs widely. To suit the requirements of investors the portfolios are constructed on different basis in keeping the above objectives in mind.

Portfolios are categorised based on the homogeneity, beta, volatility, price-earnings ratio, earnings per share and market capitalisation. In case an investor has stability as his foremost objective, he can select the portfolio with stable stocks. Similarly, based on different objectives portfolio choice can be made.
The performance of the portfolios are noted based on the investment strategies. There are two main strategies of the investment namely, Active and Passive strategy.

In the active strategy the securities in the portfolio are purchased and sold at frequent intervals. For example, portfolios constructed during January are disposed in December of the same year. In case of the passive strategy the portfolios purchased at any point of time are held till the end of the specified period. For example, portfolios purchased in January 1985 or 86 or 87 are disposed only in December 1994. The active strategy aims at realising quick returns when compared to the passive strategy. In the latter case, the earnings are calculated for the entire period for which the portfolio is held by the investor.

Once again the investor has to choose the strategy according to his needs and expectations. Investor selects the suitable portfolio at the first juncture and also selects the investment strategy to satisfy his needs. Detailed discussions about the categorisation of stocks to portfolios and investment strategies are presented in Chapter V.

2.8 PORTFOLIO MANAGEMENT

Portfolio management includes the portfolio revision and evaluation. Once the portfolio is constructed, it requires constant management. Investors can evaluate the performance to analyse the efficiency of portfolios. Revision can be done to enhance the performance of the portfolios. Revision of portfolios may be done by either changing the proportion of investment of each stock or by changing the stocks to the portfolio.

Evaluation is done to record the performance of the securities in the portfolio. Portfolio performance can be compared with benchmark portfolio ie., the market portfolio to analyse the performance. Evaluation of portfolio
is based on the models developed by Treynor, Sharpe and Jenson. Treynor's performance measure is based on the beta coefficient. Sharpe takes into account the standard deviation of the portfolio in evaluating the portfolio performance whereas Jenson's portfolio performance measure is based on the capital asset pricing model. The results of all these models are complementary to each other.

2.9 REVIEW OF RELATED EMPirical WORKS

The foundation for portfolio theory can be traced to the doctoral dissertation of Harry Markowitz in the year 1952. The basic portfolio model developed by him applied existing statistical theory to investments. He stated that efficient portfolio construction is possible by combining assets which are less than perfectly positively correlated in order to reduce portfolio risk without sacrificing portfolio returns.

The Markowitz model is based on several assumptions regarding investor behaviour.

1. All investors maximise one-period expected utility and exhibit diminishing marginal utility of wealth.
2. Investors' risk estimates are proportional to the variability of the expected returns.
3. Investors are willing to take their decisions solely on the basis of expected return and risk and
4. For a given level of risk, investors prefer higher returns to lower returns.

These simple assumptions are strong, but they are disputed by many traditionalists. Markowitz used 1. expected return for the holding period 2. expected risk and 3. expected covariance for each pair of stock in construction of portfolios.
His calculations require a total of \[N(N+3)/2\] separate pieces of information before efficient portfolios can be calculated and identified. His model remains to be the basic model upon which further studies in portfolio management were built up. But his model is extremely demanding in its data and computational requirements.

William Sharpe (1963)\(^{18}\) who among others have tried to simplify the process of data inputs, tabulation and reaching a solution. He has developed a simplified variant of the Markowitz model that reduces substantially the data and computational requirements.

The simplified model assumed that security price fluctuates not only on the characteristic of the two stocks but it also includes general business conditions. Then the covariance data requirement is reduced considerably. Data are required for the expected return and variance of indices of economic activity under this model. Sharpe's single index model suggested simplification to consider the return for each security to be represented by alpha, beta coefficient and expected return on market index.

Treynor (1965)\(^{19}\) proposed that the performance of a portfolio should be measured by the reward earned per unit of risk. He used the beta as the measure of risk. The characteristic line used by Treynor relates the market return to a specific portfolio return without any direct adjustment for risk. The Treynor index measures the risk premium of the portfolio, where risk premium equals the difference between the return of the portfolio and riskless rate. Thus it sums up the risk and return of a portfolio in a single number, while categorising the portfolio performance.

Sharpe (1966)\(^{20}\) also conceived a portfolio performance measure to evaluate the portfolio of mutual funds. His measure properly adjusts performance for risk. He adopted the standard deviation as the measure of
risk. Sharpe assumes that the portfolio performance under consideration is the risk premium earned per unit of total risk.

In practice the Sharpe and Treynor measures of performance produce very similar rankings of portfolio. But those two measures are ratios. Another method developed by Jenson (1968) was able to provide interpretations based on superior performance. He framed the measure of absolute performance on a risk adjusted basis i.e., a definite standard against which performances of various funds can be measured. This standard is based on measuring the portfolio manager's predictive ability.

Irwin Friend and Marshall Blume (1970) framed 200 random portfolios from 788 common stocks listed on the New York Stock Exchange throughout the period of 1960 to June 1968 in analysing the market-line theory and discussed the different one-parameter measures of performance. They examined the adequacy of one-parameter measures performance by measuring empirically the relationship between measures and risk.

Black and Scholes (1974) suggested in their study that expected return on high yield common stocks differ from the expected returns on low yield common stocks either before or after taxes. They stated that a taxable investor and tax exempt investor who concentrate his portfolio in low and high yield securities respectively cannot tell from the data whether he is increasing or decreasing his expected return.

Farrell (1975) documented that the common stocks tend to group naturally, according to their price behaviour. These groupings have important implications for portfolio management. He also discussed the implications of portfolio construction, performance measures and revision technique through group rotation. A sample of 100 stocks was selected for analysis over a period from 1961 to 1969. He used monthly returns for 108
months in calculating the coefficient of correlation between every possible pair of sample stocks.

In a pioneering research on beta, Barr Resenberg and James Guy (1976)\textsuperscript{25} stressed the importance in beta prediction from investment fundamentals. The prediction of beta eventually predicts the future risk of a diversified portfolio, hence its influence on portfolio beta is one of the key considerations in any investment decisions. They also developed alternative methods of estimating and predicting beta from a fundamental prospective, in which beta is seen as the consequence of economic variables.

Sharpe and Sosin (1976)\textsuperscript{26} in their study included the yield (capital gains or losses) along with the risk and return on common stocks. Predicted yield, actual yield and actual total return were calculated for a period from 1928 to 1969. They grouped the stocks into portfolios based on the predicted dividend yield. The yield, total return and risk of each of these groups will be compared with the yield, total return and risk of a market portfolio constructed to obtain a high degree of diversification.

In a research study, Elton, Gruber and Padberg (1976)\textsuperscript{27} have attempted to simplify Markowitz's process of constructing capital portfolios. They developed decision rules that allow one to reach optimal solutions to realistic portfolio problems without even solving a mathematical programming problem. Their simple rules permit one to determine easily which securities to include in an optimal portfolio and how much to invest in each.

Fama (1976)\textsuperscript{28} emphasising the importance of covariance in the portfolio analysis illustrated this results in his study. He selected randomly 50 securities listed on the New York Stock Exchange and calculated their standard deviations using monthly data from July 1963 to June 1968. He selected a security randomly and added to it another to form an equally
weighted portfolio of two securities. Its standard deviation is lowered. Addition of securities are made until all 50 securities are included. Almost all of the diversifications are obtained after the first 10-15 securities. The portfolio standard deviation quickly approached a limit which is roughly equal to the average covariance of all securities. Thus he concluded that the most of the benefit of diversification can be achieved with fewer than 15 stocks.

William Beaner and Dale Morse (1978)²⁹ in their study grouped common stocks into portfolios on the basis of price-earnings ratio and tried to predict future growth. They found that the initial P/E differences among the portfolios persist upto 14 year and price-earnings ratios correlate negatively with growth in the year of portfolio's formation, but positively with earnings growth in subsequent year, suggested that investors are forecasting only short-lined earnings distortions. Risk also does not supply the explanation for their differences. They concluded that the difference in accounting method is the explanation of the price-earnings ratio and it is not growth or risk which cause such differences.

Again in the series of research articles that came in 1978, Elton, Gruber and Padberg³⁰ showed how the assumption of the existence of a risk free asset can be relaxed and the simple technique used to generate the full efficient frontier. They also demonstrated how to find the efficient frontier in the case of single index model and a model assuming the correlation coefficient between all stocks is identical.

Gupta L.C, (1981)³¹ in his pioneering study in India has thrown light on the long term rates of return on investment in equity securities, held in portfolios. His findings suggest that markets' evaluation processes work haphazardly mainly because of preponderance of speculative influence over investment influences. The analysis is based on the 16 year span 1960-76 including 36 sub periods.
Son-nan Chen and Brown (1983) showed that by using the single index model for the return generating process that the simple decision rules for optimal portfolio selection derived by Eton, Gruber and Padberg are not identical under the Bayesian and the traditional methods of analysis. In the case where short sales are not allowed the number of securities in an optimal portfolio under the Bayesian approach can be considerably smaller than the traditional method. The results of their study demonstrate that estimation risk must be properly reflected in the process of optimal portfolio selection.

For the risk averse investor, consideration of estimation risk is important in selecting an expected-utility-maximising portfolio. When the full covariance model is used the tangency portfolio is unaffected by the recognition of estimation risk. Alexander and Resnick (1985) state that the estimation of risk in the market model will not be as substantive as previously believed and in many situations it can be safely ignored. The study reviews the algorithm of Elton Gruber and Padberg for determining the composition of the tangency portfolio when estimation risk is ignored and corrects the Bayesian revision of the algorithm developed by Chen and Brown.

Burgers and Bay (1988) investigate the problem of combining individual security risk and return estimates into optimal portfolios by using the simple ranking criteria suggested by Elton, Gruber and Padberg (EGP). The empirical results indicate that the EGP procedure is effective in estimating Markowitz efficient portfolios and can be an effective screening procedure for large number of securities. The study period covers from January 1980 to June 1985, monthly returns including dividends.
Brealey (1989) illustrated the view that the portfolio theory had been misinterpreted or ignored in some cases. In this paper he proves to see the differences in portfolio theory and portfolio practice.

Samuelson (1989) emphasised the importance of indexing, timing and long horizon effects on efficient portfolio management.

Leibowitz and Henriksson (1989) described the problem associated with return dispersion that is expressed as shortfall constraint. The confidence limit approach may provide a more meaningful description of risk for many investment situations. He further stated that the portfolio optimisation process can then be limited to portfolios that have a given probability of not under-performing benchmark by more than a specified amount. This constrained optimisation may be especially helpful for investors who are subject to multiple and potentially conflicting objectives.

Michand (1989) in his article focuses on limitation of MV optimisation procedure. He stated that equal weighting can be shown to be superior to MV optimisation in some cases. The new techniques address some of the limitations of traditional MV optimisers improving the practical investment value of portfolio optimisation.

Specdell, Miller and Ullman (1989) discussed about the portfolio optimisation by combining stocks in different groups whose price moves tend to complement one another. An optimiser can thus build a portfolio that offers the highest level of return for each level of risk. In order to get a long term perspective on the portfolios they created a 75 years stimulation of returns with a normal distribution over one, three and five year periods.

The relationship between characteristics of the investor and attributes of the chosen portfolio is analysed by Krebiel and Patrick McCarthy.
(1989)^* They obtained data from 911 individual investors regarding their
demographics and security market information. The random-utility
maximisation model is used to accommodate unobserved attributes of the
investor that affect the choice process.

Frank furter and Vertes (1990)^1 studied the validity of market
trend weights and equal weights. They concluded that the risk is inversely
related to size and this market value weights understate risk for randomly
selected portfolios. These results complement findings of others who report
inferior characteristics of market value - weighted portfolios via a vis equal
weights portfolios.

Markowitz (1990)^2 in his study on normative portfolio anlaysis
studied the trends in past and future. He concluded that the market
portfolio is an efficient portfolio, and that there is a linear relationship
between the expected return of each security and its covariance with the
market portfolio.

Frankfuter (1990)^3 said that role of normative theory is to dictate
behaviour in order to attain the highest level of satisfaction. He further
stated the Markowitz model solves a non-existent problem - one in which
input variables in the presence of programming as known with certainty.

Remnie and Cowbey (1990)^4 stated the successful use of benchmark
portfolios. They allowed for more meaningful evaluation of portfolio
performance because they separate the results of investment style from
those of investment decision-making. Benchmark portfolios could be
combined with performance attribution analysis to examine the effects of
market timing and sector, industry and security selection in the portfolio.

Pulley and Epps (1990)^5 have compared the procedures for
implementing the growth-optimal strategy for managing portfolios. They
used a single-factor structure on the logs of returns in addition to a non

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parameteric approach. The study of the performance of six version of growth-optimal policy provides relatively simple methods for carrying out the growth optimal programme work as well as methods that are computationally hard.

Haugen and Baker (1990)\textsuperscript{46} in their paper showed that the Markowitz model can also be used to construct dedicated stock portfolios. These portfolios are dedicated to a mission of risk management such as hedging against inflation or against unexpected changes in interest rates which may dramatically increase the present value of the liabilities of pension funds. 1500 stocks from interactive data corporation are analysed for 12 years from 1976 to 1988.

In their research Carter and Van Auken (1990)\textsuperscript{47} studied the findings of a survey of investment managers concerning their present practices in the areas of security analysis and portfolio management. And they also identified the practices that may have occurred as a result of October 1987 Stock Market Crash.

Lin and Chen (1990)\textsuperscript{48} in their study examined the pricing of securities and investment horizon namely, the length of the investment horizon, the sensitivity of the beta and the horizon estimates. The analysis employs monthly returns of 75 stocks and 15 portfolios. They use constant elasticity of substitution type of the capital asset pricing model in their study.

Obaidullah (1991)\textsuperscript{49} in his paper sought to examine whether the investment performance of securities was related to their price earnings ratios. The study considers a sample of 118 companies chosen in a random manner. The empirical results indicate that stock price adjustments to earnings information is biased and inaccurate.
Evi Kaplanis and Schaefer (1991)\textsuperscript{50} in their study found that through international diversification in equity and bond portfolios does not show substantial opportunities for risk reduction in recent years since exchange rate variability has been much larger. They stated that the internationally diversified portfolios that do not hedge currency risk may be riskier than the domestic portfolios. Monthly returns over the period of February 1978 to June 1987 on equities and bonds of 8 countries are used in the analysis.

Brinson, Singer and Beebower (1991)\textsuperscript{51} presented a framework for determining the contribution of different aspects of investment management process to the total return of investment portfolios. 10 years of quality data from December 1977 to December 1987 for 82 pension plans are analysed in this study. They concluded that both in terms of selection and timings, did little to improve performance over the 10 year period.

Ferson and Harney (1991)\textsuperscript{52} in their study used multi-beta asset pricing model using risk factors related to stock market, unexpected inflation, consumers expenditures and interest rates indicate that most of the predictable variation in asset returns can be explained by shifts in the asset betas and risk premiums. It further indicated that the market premium is the most important factor in predicting equity portfolio returns. Monthly data from 1959 to 1986 period of common stock and fixed income portfolios formed from New York Stock Exchange are used in the study.

Kothari, Jayshankan and Sloan (1992)\textsuperscript{53} in their research reexamined whether beta explains cross sectional variation in average return over the post 1940 period as well as the longer post 1926 period. And also whether book-to-market equity captures cross-sectional variation in average returns over a longer 1947-87 period using a different data set. One of their conclusion is, when annual returns are employed in the estimation of beta-and-beta ranked portfolios are formed, there is substantial expost
compensation for beta risk over the 1941-90 period as well as the 1927-90 period.

Philippi Jarion (1992)\textsuperscript{54} provided for a simple simulation approach that can provide insight into the distribution of optimal portfolio weights. It helps in measuring the error on optimal portfolio allocation of the classical mean-variance analysis. The study compared an ex-post optimal portfolio of US and foreign bonds with two benchmarks - a world bond index and a US bond index for a period of 10 years (1978 to 1988). The ex-post mean variance analysis systematically overstates the possible gains from going international.

Ankrim E.M (1992)\textsuperscript{55} in his study classified the portfolio performance attribution systems into three categories, an allocation effect, a selection effect and a cross-product effect. He provided for a simple risk adjustment procedure that can compensate for the distortion in each of the attributes. He thus separated the performance attributed from normal expected returns to risk. Small sample is used in the study and is restricted to equities.

Grinold (1993)\textsuperscript{56} in his research, Is beta dead again, stated the beta's primary role in the capital asset pricing model (CAPM), which said that the expected residual returns should be zero, that makes beta controversial. He proceeded the research with US equity market - monthly returns from January 1973 to July 1992. He concluded that beta plays multiple roles such as the measure of risk and co-movement for portfolios and further states that beta is alive and acts as a risk control device.

Chan and Josef Lakonishok (1993)\textsuperscript{57} in their research examined whether the constantly changing environment generating stock returns permits statements about the importance of beta. By examining the entire history of returns, they also stated the sensitivity of the results to the choice of time period and beta serving as reliable measure of exposure to
market movements. Monthly data from 1926 to 1991 are considered in framing portfolios on the basis of estimated betas.

Chopra and Zieemba (1993) indicated through their analysis that the bulk of investors resources should be spent on obtaining the best estimates of expected returns of the asset classes under consideration. The optimisation then focuses on minimising portfolio variance and does not suffer from the error-in-means problem. They proved that good mean forecasts are critical to the mean variance framework. The data consists of monthly observations from January 1980 to December 1989 on ten randomly selected Dow Jones Industrial Average (DJIK) securities.

In an article Kenneth Winston (1993) explored the best way of predicting efficiency and the efficient index (EI) results due to portfolio efficiency. He used different covariance matrix estimation method in testing the efficiency. The period of study is from 1976 to 1991.

2.10 CONCLUSION

All the above studies reviewed relate to the foreign capital markets either in Portfolio construction, revision or evaluation. Only few studies have been conducted earlier regarding these areas in the Indian Capital Market. Hence an attempt is made in this work to study the Portfolio construction, revision and evaluation in the Indian context.
NOTES AND REFERENCES:


2. Fama E.F. 1991, op. cited,


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