In the concluding part of this endeavour, a brief recapitulation of what has been sought to be done will be presented, as is the usual practice. In appropriate places, however, an attempt will be made to explain, in illustrative way, implications of some of the earlier observations, specially where practical applications of empirical findings can be indicated.

A study of this nature, in its introductory comment, has naturally pointed out that the limitation of the traditional investment appraisal techniques lies in their failure to provide adequate description of the risk element inherent in most investment proposal and to make explicit provision for the same in the evaluative procedures. It has been emphasised that the need for a body of positive micro-economic theory dealing with risk had long been felt by the academic community and the practitioners alike. Harry Markowitz's Portfolio Selection Model dealing with the rules for optimal portfolio choice has been described by W.F. Sharpe as 'normative (prescriptive)' and his own CAPM as 'positive (descriptive)'
theories in financial economics. These two, taken together, are robust enough to serve the purposes of a rational investor.

In the first chapter of this study, an attempt has been made to provide a brief account of these two path-breaking models along with their critical evaluations. Of course, models subsequently developed, mainly by relaxing one or more, in turn, of the restrictive assumptions, have also been briefly examined to present a more or less comprehensive view of the asset pricing theories.

In chapter II, issues relevant to the estimation of the risk parameter 'beta' have been dealt with and some tests on the

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1 William F. Sharpe, "Capital Asset Prices with and without Negative Holdings", Finance India, Vol.V, No.4, December, 1991, p.470. The researcher feels tempted to quote from Markowitz' Nobel Memorial lecture (Reprinted in Finance India, Vol.V, No.3, Sept. 1991) about the claim of Portfolio Theory as a part of Economics: He says "I would like to add a comment concerning portfolio theory as a part of microeconomics of action under uncertainty. It has not always been considered so. For example, when I defended my dissertation as a student in the Economics Department of the University of Chicago, Professor Milton Friedman argued that portfolio theory was not Economics, and that they could not award me a Ph.D. degree in Economics. I assume that he was only half serious, since they did award me the degree without long debate. As to the merits of his arguments, at this point I am quite willing to concede: at the time I defended my dissertation, portfolio theory was not part of Economics. But now it is".
empirical validity of the CAPM have been taken up - in both cases under the Indian stock conditions. For the estimation of beta, equity shares of 110 companies (belonging to all the important industries) actively traded in either or more of the four major stock exchanges (Calcutta, Bombay, Delhi and Madras) have been included in the sample. As surrogate for market index, regional equity price indices of RBI have been employed. The 15-year time frame has been divided into five sub-periods of three year length each. In a sizable section of the sample, beta values were found significant and the alpha values were found not significantly different from zero and thus the regression model stood the test of goodness of fit. While testing normality of the distributions of returns on equity shares different methods were used. The test based on $b_1$ and $b_2$ values (for normal distribution, $b_1 = 0$ and $b_2 = 3$) gave more or less encouraging results. The results of other tests were not that encouraging. On the whole, both symmetric and asymmetric distributions were found. The linearity assumption in case of risk-return relationship was more or less corroborated excepting in one or two sub-periods. As in the case of other characteristics, the results of the test concerning beta stability were not very uniform for the data of all the stock exchanges. While the changes in beta values from one sub-period to the other were found statistically not significant in case of Bombay Stock Exchange data, the same could not be said for Calcutta Exchange. The relatively short time frame of reference taken
and the unresolved question of an appropriate period might have affected the results and thus very definite conclusions of the tests could not be reached.

In Chapter III, an attempt has been made to examine and analyse relevant studies which seek to establish the theoretical relationship between systematic risk (beta) and the major financial management decisions like, investment decisions, financing decisions and dividend decisions. The risk-return equilibrium relationship given in CAPM which provides a more scientific and rational approach, can be used for finding solution to important issues. Instead of viewing investment proposals in isolation, consideration of all investment projects simultaneously which an investor holds and the change in the risk complexion brought about by a proposed investment helps in project selection in the context of the risk-return trade off function of the investor. It has also been noted while evaluating the studies linking financing decision and equity risk that leverage is positively related with the earnings on equity and its risk, measured by beta. Earlier research showing theoretical basis as well as empirical evidence of positive relationship between the overall and systematic risk of a firm and its operating leverage has been analysed. However, no theoretical relationship between dividend policy and risk has been developed in earlier studies. The notion that there is inverse relation between beta and dividend payout has not been supported by most of the
empirical findings. Finally, the importance of financial accounting report, or more specifically, the role of the accounting numbers in investors' risk perception has been identified.

In Chapter IV, the expected relationship between the accounting numbers which are the results of various financial management decisions and the equity risk of the firm has been empirically tested. In other words empirical determinants of beta have been sought to be identified. Various relevant accounting variables, like asset size, asset growth, liquidity, leverage and dividend payout have been examined in an attempt to see whether they have some relation with corporate risk complexion. Consistently significant relationship could not be found for all the variables. At portfolio level, asset growth and leverage seemed to have some relationship with equity risk. Further, combination of two or more variables for finding multiple correlation yielded some good results.

Some Overall Observations

In the Capital Asset Pricing Model, the systematic risk denoted by 'beta' is considered as the only relevant measure of an asset's risk. According to this model, an investor, depending on his attitude towards risk, can create a well-diversified portfolio so as to reach his targeted level of utility. But the applicability of the model is conditional upon the
fulfilment of the assumption relating to the capital market efficiency. Hence, an enquiry into the capital market efficiency in the context of the Indian capital market is a prerequisite before suggesting on the models' applicability in India.

In the present study, the model has been applied to estimate the security risk 'beta' and some popular tests have been performed to examine the validity of some of the basic assumptions of the model. But owing to a very limited frame of reference, the study has not examined the assumption of capital market efficiency in the Indian context. However, reference can be made of a few studies which provide evidences on the randomness of the changes of the prices of equity shares.


These studies conclude that the Indian Stock Market should be carefully considered. The most important feature is that the Indian Capital Market is dominated mainly by the institutional investors which include some public sector undertakings such as commercial banks and other financial institutions. As a result, those institutional investors enjoy almost a monopoly power in the market.

Moreover, the practice of holding the securities for a fairly long period of time by those investors does not allow the securities acquired to enjoy adequately the frequent trading facility in the market. And, hence, this adds sufficiently to the market imperfections.

Besides, the very thin trading of a large number of non-cleared securities is also a significant contributor to the imperfect nature of the Indian capital market.

In addition to that, the 1992 stock market scam can be considered a very strong evidence against the capital market efficiency in India. Inspite of that the empirical findings presented in the present study can be considered useful and relevent as the present venture has been conducted on the basis of actively traded equity shares only.

The emergence of 'beta' concept as a measure of security risk is the most remarkable feature of the CAPM. Though the tests performed in the present study, on the empirical validity of the model fail to provide any direct and definite
conclusion, the usefulness of 'beta' to measure the security risk can not be overruled, since the CAPM is an expectational model and the evidences of this study are not sufficient to identify it as 'misspecified' or 'inadequate'. The applicability of the model in the real-world situation can not, therefore, be denied.

Beta As A Tool For Practical Investment Management

In practice, the CAPM's definition of risk measured in terms of 'beta' can be used as a guiding factor for the purposes of security analysis, identifying strategies for portfolio selection and measuring the portfolio performance.

Security Analysis: Depending on the beta values, securities can be called as defensive or aggressive. The securities which have high specific risk or are less sensitive to the market require greater skill of the analysts. Because, the returns of those securities are affected largely by the specific factors attached to each of them. Hence, a very careful study of the impact of each of those specific factors is a prerequisite for the analysis of the attractiveness of a security. On the other hand, the task of security analysis becomes very easy in case of highly market sensitive securities. Because, in that case, the analysis of the capital market movements or the general economic trends will be considered sufficient.
Moreover, an analysis of the performance of the individual securities can be made on the basis of the realised risk-premium. It is expected that for the securities having equivalent risk characteristics (i.e., belonging to the same risk-class), the risk-premiums should be approximately the same - where 'beta' can be used to specify the risk characteristics. For example, during the first sub-period (1974-76), altogether ten companies had almost the same beta values of 1.1 (see table - 2). Of them, for nine securities the risk-premiums were less than the risk-free rate and thus were less attractive.

On the other hand, the security identified as C-13, shows risk-premium which being higher than the risk-free rate is more attractive.

Identification of Strategy: Beta can also be used to develop portfolio selection strategy. For a bullish market, the investment in 'high beta' securities is more profitable, but in case of downward swing (bearish tendency) in the market, the selection of the low beta securities can be a good strategy. If 'beta' can be used to identify the desired level of risk for an investor, the composition of the portfolio commensurate with his targeted beta level, can be determined by (i) changing the proportion of the non-market related securities; or, (ii) carefully selecting the risky securities on the basis of the state of the market; or, (iii) adopting both of the
above two strategies.

In the present study, the formation of efficient portfolio in the Indian context has not been considered. However, some examples relating to the above strategies can be presented briefly as under:

Case - I (All Equity Portfolio)

<table>
<thead>
<tr>
<th>Code no. of shares</th>
<th>Beta value</th>
</tr>
</thead>
<tbody>
<tr>
<td>B - 60</td>
<td>...</td>
</tr>
<tr>
<td>B - 83</td>
<td>...</td>
</tr>
<tr>
<td>B - 30</td>
<td>...</td>
</tr>
<tr>
<td>B - 5</td>
<td>...</td>
</tr>
<tr>
<td>C - 7</td>
<td>...</td>
</tr>
<tr>
<td>Portfolio Beta</td>
<td>...</td>
</tr>
</tbody>
</table>

This is an example of a moderately aggressive portfolio. In constructing this portfolio, it is assumed that equal amount is invested in each of these shares. It is expected that during a bullish capital market condition, the investor can gain moderately from this portfolio. Alternatively, one can reconstruct his portfolio by switching over to a higher beta level as under:
The above is an example of a highly aggressive portfolio which has been constructed by combining relatively highly market sensitive securities. The investor will be able to earn higher rate of return (portfolio) by investing his funds in the above manner as compared to the securities included in the former (Case-I) portfolio. For example, if the market premium per unit of risk is 20 per cent, this portfolio is expected to release a return of 36 (1.8 x 20) per cent, while the expected return on the former portfolio is approximately 27 (1.37 x 20) per cent which is clearly far less than that of the latter (Case-II).

Therefore, depending on the market situation, the practical portfolio selection technique calls for the judicious adjustment of the targeted beta level by the investor.

Accordingly, one can construct a relatively defensive portfolio when the capital market is expected to exhibit a
downward swing. An example of a defensive portfolio of equity shares and riskfree security can be demonstrated as in Case-III, below:

<table>
<thead>
<tr>
<th>Case - III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code no. of shares</td>
</tr>
<tr>
<td>B - 5</td>
</tr>
<tr>
<td>B - 30</td>
</tr>
<tr>
<td>B - 60</td>
</tr>
<tr>
<td>B - 71</td>
</tr>
<tr>
<td>Risk-free Asset</td>
</tr>
<tr>
<td>Portfolio Beta</td>
</tr>
</tbody>
</table>

The risk of this portfolio is approximately equal to that of the market portfolio (theoretically, $M = 1$). And, therefore, it is expected to provide return similar to that of the market rate of return and will be able to avoid dramatic fall of the portfolio return in the event of any disaster in the capital market. Hence, the investor is defended from any unfavourable swings in the economy.

Similarly, an 'all equity defensive portfolio' can be constructed in the following manner:
In the above example, the portfolio is made up with both the highly aggressive and the extremely defensive stocks. By making such combinations, the investor can defend himself from the vagaries that may arise due to downward swing of the market.

On the whole, the application of the portfolio selection strategies largely depends on the ability of the investor to adjust his beta level frequently with the market movement and his efficiency to construct well diversified portfolios by way of selecting shares and securities in a judicious manner. It is also very important to consider carefully the transaction costs involved in bunching in or out of the securities.

Lastly, the performance of a managed portfolio can be measured in different ways. The present study does not consider
this issue. However, according to Cohen, Zinberg and Zeikel\textsuperscript{3} and Treynor\textsuperscript{4} undermentioned techniques are useful for this purpose:

1. According to Cohen, Zinberg and Zeikel, the performance of a managed portfolio can be measured by regression the portfolio risk-premiums on the market premium for risk. They suggest to use 'alpha' i.e., the intercept of the regression equation as a measure of the portfolio performance. As the intercept represents the difference between the two risk-premiums (portfolio and the market), a positive value of 'alpha' indicates the efficiency of the managed portfolio to beat the market. On the other hand, a negative value of the same proves the inability of the investor to select appropriate securities in proper time and that the shifting of the beta level has been made in an unjust manner. And the


value of 'alpha' equal to zero (or not significantly different from zero) can be regarded as an evidence in favour of the capital market efficiency. Because, in an efficient market an investor may not be able to 'beat it' by means of investing in profitable securities at different market timings. In such a situation when any new information is instantly translated into the prices of securities, the reconstruction of investment portfolios will ultimately result in the increment of the transaction costs which in turn will reduce the portfolio rate of return.

This modest test of the portfolio performance is undoubtedly very easy but at the same time is considered as insufficient. Because according to this technique, the portfolio performance appraisal is made on the basis of a single parameter - 'alpha' only. The other important aspect - 'slope' of the regression estimate has been completely ignored and, hence, the measurement of portfolio performance on the basis of this technique can not be relied upon.

2. A more powerful technique has been suggested by Tryner. According to him, the relative measure using both the slope and the intercept of the regression equation can be effectively used for examining the portfolio performance. Because, there is no reason to believe that the slopes for the two regression equations for two different investment portfolios will be equal. Hence, a reciprocal of these two parameters i.e., the risk-adjusted differential return can provide
better comparisons.

The difference between these two techniques can be presented with the help of an arbitrary example as under:

<table>
<thead>
<tr>
<th>Performance Appraisal on the basis of 'alpha'</th>
<th>Performance Appraisal using relative measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio</td>
<td>A</td>
</tr>
<tr>
<td>'alpha' value</td>
<td>10%</td>
</tr>
<tr>
<td>Comment: Both the portfolios performed well and are equally efficient.</td>
<td>'beta' value</td>
</tr>
<tr>
<td>Risk-adjusted differential premium: 'alpha'/'beta'</td>
<td>4%</td>
</tr>
</tbody>
</table>

From the above example it is evident that 'alpha-technique' is inadequate for the purpose of measuring portfolio performance. Alternatively, the technique of the 'risk-adjusted differential premium' can be used as a more appropriate criterion for this purpose.

Lastly, the basic single period Capital Asset Pricing Model has been criticised for several reasons. Consequently, a number of adaptation models have been developed by several authors; but none of them has so far been proved as a better substitute.

And, finally, inspite of some serious defects, the model has
been widely accepted and applied by the investors or the practitioners for solving the practical portfolio selection problem.

Future Research Under Indian Conditions

The CAPM is probably the most important theoretical construct which has attracted large number of researchers during the last few decades. But reference can be made of a very few studies relating to this theory in the context of the Indian capital market. Of late, the indications of increasing interests are seen among the academicians and researchers of this country.

The present study is one of the maiden attempts to explore the empirical validity of the basic CAPM in the context of the Indian stock market conditions and also to examine the relationship between beta and a number of important aspects such as accounting and major financial management decisions at the firm level. Much more efforts are required to investigate into several other aspects of the capital market theories along with their effects on the areas of corporation finance. As the present study uses a very small set of data, the issues that have already been considered in the present venture, also require further research using an extensive sample and a longer study period.

However, a brief outline of the important areas for future
research can be presented as under:

1. Efforts are required to examine the nature of the Indian capital market (perfect or imperfect) - especially in the context of the new economic policy declared by the Government of India in the year 1991.

2. Investigation can be made to examine how far the risk-return relationship is influenced by the factors like - price level changes, dominance by the institutional investors, influence of the middle men (share brokers) in the Indian capital market.

3. The effect of the government policies relating to the corporate and other taxes, import and export etc. on the prices of securities belonging to different industry groups and consequently, their effect on the investors' portfolio or the process of diversification.

4. The role of mutual funds in the Indian capital market.

5. The impact of policy relating to capital gains tax exemption on the security market.

6. The impact of government policy of allowing private enterprises to form mutual funds on the capital market efficiency.

7. Appraisal of performance of investors' portfolio comprising equity shares, debentures etc.
8. The association between the market and the accounting beta and consideration of more accounting variables as determinants of risk.

As has been pointed out at the appropriate places, the constraints under which the present study has been conducted have contributed to its limitation. Even a replication of what has been done here with additional data input spread over a longer time horizon will be a more meaningful contribution to the existing literature on the subject in Indian context.

The incalculable loss in monetary terms caused by the security scam to the Indian economy and the scandalous scar left by it on the otherwise sober (of course underdeveloped) capital market notwithstanding, even the remnants of the interest and enthusiasm created by it have resulted in remarkable improvement in the status of information flow which will undoubtedly spare future researchers in related fields the hardship suffered by their predecessors. The maturity of the Indian Capital Market may itself be a potential area of investigation.