

Relative Influence of Market Volatility, Economic Changes and Company Fundamentals on Equity Returns in India: A Study

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ABSTRACT

The ability of corporate sector to mobilise funds through capital markets depends on Efficient functioning of the stock exchanges. The extent of which security prices would truly represent the real worth and potentiality of companies issuing efficient scrips reflects the Market Efficiency. Efficient pricing calls for a parity between the expected returns and the risks associated with every tradable investment. The present study is primarily focussed at identifying the priced risk variables, while devoting to investigate the risk return relationship envisaged in Modern Investment and portfolio management studies. Various risk factors which emanate from market fluctuations (one line of CAPM), economic forces (similar to APT factors) and company fundamentals are given due consideration.

THE SCENERIO OF economic progress and productive efficiency of an economy is governed to a large extent by the effective mobilisation and distribution of savings' into productive channels of investment.¹ The securities market, by providing fair and active prices to diverse types of instruments to suit to varying notions and whims of a vast majority of savers about liquidity, profitability and risk elements in their investments, plays a pivotal role in this direction and thereby reflects the economic progress of any economy².

The ability of the corporate sector to mobilise funds through capital markets depends on efficient functioning of the stock exchanges³. The extent to which security prices would truly reflect the real worth and potentiality of companies issuing scrips reflects the market efficiency. The securities are said to be efficiently priced if the expected return on such investments are in proportion to the risk to be borne by the investors. The present study is an attempt to explore into the existence of risk-return parity in equity shares in India, which would be of interest to Investors, Portfolio analysts, Investment consultants in their pursuit to design efficient strategies.

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The Upsurge in Indian Capital Market

The Indian capital market is said to have come of age.⁵ The dynamic upsurge evidenced since mid-1980s with so many changes like broad-banding of FERA company shares, adopting the policy of deregulation, decontrol and delicensing to give fill up to private sector to expand, diversify and modernise with active spate of rights and new issues, free pricing, abolition of CCI, establishment of SEBI, emergence of OTCEI, disinvestments in PSUs and entry of FIIs into Indian markets.⁶ Between 1980 and 1992 the number of stock exchanges went upto 20, the number of listed companies gone up from 1203 in 1970 to over 6500 in 1991. The market capitalisation rose from Rs. 2600 crores to Rs. 200,000 crores during the same period.⁷ The recent opening up of the economy has given rise to hopes of bright economic future. The emerging challenges and competition made Indian Industry to plan for diversification and expansion with necessary tapping of resources from primary market. The year 1993 recorded resources from primary market, the year records phenomenal growth in primary market with issues worth over Rs.21,500 crores (It is just Rs, 236 crores in 1980)⁸. The growth in capital market necessitated the establishment of SEBI⁹, Credit Rating Agencies¹⁰ to bring regulatory framework institutions and instruments. The development of the market has its trail led problems like excessive free pricing premiums, preponderance of speculative trading, lack of transparency transactions, insider trading such alike. The dominance of these weaknesses in Indian capital market lead to inefficient functioning and prices fell in disfavour of a consensus estimate of intrinsic values many a time. A vibrant market cannot afford to these distortions, hence requires corrective strategies from policy makers and market players. The present study is in the said direction to examine the size and role of fundamentals.

Theoretical Background

An efficient market is best represented by the existence of equilibrium in asset pricing through positive risk-return relationships.¹¹ While the risk of a security is nothing but the likelihood of the return turning out to be more or less than the expected, the total risk of an asset may be perceived as being the sum of several different contributing risk factors like interest rate fluctuations, market cyclicals, purchasing power instability and so on.¹² However, Harry Markowitz Asset selection model shows that not all the security's total risk is relevant in the market, since much of it can be diversified away in a portfolio context.¹³ The risk unique to an individual security can be removed by diversification is called unsystematic risk which arises due to company specific or industry specific reasons. The systematic risk, non-diversifiable risk is due to common market or economic influences across all industries.¹⁴ In an attempt to find out an 'equilibrium market price' for risk and the appropriate measure of risk for a single asset, Sharpe (1964), has developed a 'market model' wherein the sensitivity of return of an individual security to the market return is captured through 'beta' coefficient.¹⁵ The celebrated theoretical model developed almost simultaneously by Sharpe (1964)¹⁶ and Treynor (1961)¹⁷ and developed it further by Mossin (1966).¹⁸ Lintner (1965)¹⁹

and Black (1972)²⁰ is the Capital Asset Pricing Model (CAPM) which establishes that equilibrium rates of return on all risky assets are a function of their covariance with the market portfolio. The CAPM asserts based on restrictive assumptions like investors having quadratic utility functions, distribution of returns being normal and existence of a market portfolio, that the required rates of return on any asset $E(R_i)$ is equal to the Risk free rate of return (R_f) plus a risk premium being the price for quantity of specific (systematic) risk that security carries.

$$E(R_i) = R_f + \frac{E(R_m - R_f) \sigma_{im}}{\sigma_m^2}$$

where,

- $E(R_i)$ = Expected return on an investment
- $E(R_m)$ = Expected return on mean-variance efficient Market portfolio
- R_f = Risk free rate of return
- σ_{im} = Covariance of with market portfolio
- σ_m^2 = Variance of market portfolio

While a review of empirical tests conducted on CAPM generally provide support for the theory, the studies conducted by Basu, (1977)²² Banz, (1981)²³, Reinganum (1981)²⁴ Lizenberger and Ramaswamy (1979)²⁵ explain that factors other than 'beta' are successful in explaining a portion of security returns not captured by beta. The Black-Jensen-Scholes (1971) study, on the other hand, finds the 'alpha' term being significant, Roll (1977)²⁶ criticized the empirical tests and the usefulness of the model due to its dependence on a true market portfolio of risky assets which is not actually available. Against these criticisms Ross (1976)²⁷ has suggested an alternative asset pricing theory, with limited assumptions, called Arbitrage Pricing Theory (APT) which assumes that the process of generating rates of return on assets can be represented as a k-factor model of the form

$$R_i = E(R_i) + b_{i1} F_1 + \dots + b_{ik} F_k + e_i$$

where,

- R_i = Return on asset 'i' during a specified time period
- $E(R_i)$ = Expected rate of return on i^{th} asset
- b_{ik} = Sensitivity of the i^{th} assets return on k^{th} factor
- F_k = Mean zero k^{th} factor common to the returns of all assets under consideration
- e_i = A unique effect on assets i's return which by assumption, is completely diversifiable in large portfolios and has a mean of zero

APT asserts that multiple factors are expected to have impact on the returns of all assets. Roll and Ross (1980, 1984)²⁸ even able to establish that an assets long term rate of return is directly related to its sensitivity to

factors like unanticipated changes in economic conditions like inflation, industrial production, risk premiums, term structure of interest rates. In such a case, the assets, even if they have same CAPM beta, will have different patterns of sensitivities to these systematic factors. However, the use of Factor Analysis, identification of delineated factors frustrated the financial analysts to use APT model in studying the security prices.²⁹

Empirical researchers have started identifying an alternative of APT like model to develop risk factors exogenously³⁰ based on the theoretical support from economic theory. While macro economic theory has helped to develop risk factors like interest rate risk, purchasing power risk, market risk and such alike; the theory of the firm helped in delineating factors like firm's cash dividend yield, beta coefficient as a numeric surrogates for security's quality rating, This is the area where the present work focusses on.

Objectives of the Study

The main focus of the present study is to identify the priced risk variables in building a risk-return relationship on equities in India on export basis. More specifically the study is devoted to investigate the association as envisaged in Modern Investment and Portfolio Management studies between equities returns and various risk factors which emanate from market and economic forces as well as company specific fundamentals. Particularly, the study is intended to answer underneath specific queries of risk-return relationships.

- (i) Do market risk influences (established by CAPM) the relative differences in share prices in India and if so, how far? ;
- (ii) Do security returns reflect economic vacillations (some thing similar to APT Factors) and if so do they present any deterministic patterns?; and
- (iii) Do security markets properly discount corporate fundamentals (Earnings information) to enable the share prices to represent intrinsic value?

While answering the above specific questions, the present study thus intended to find the relative roles of systematic risk, economic risk and financial risk in determining the equilibrium levels of rates of return in Indian stock markets with appropriate pricing mechanism in secondary market.

Methodology and Tools of Analysis:

Since the study is principally intended to examine the explanatory power of different risk variables on security returns, a sample of 71 companies, whose scrips are actively traded, belonging to different industry categories during the period 1975 to 1991 has been considered. In order to identifying the influence of exogenous variables of economy and market in security prices, information on different indices like Industrial Production Index, Wholesale price Index (WPI), Money Supply (M3), Balance of Trade Statistics, Foreign Exchange Reserves Aggregate Deposits with Commerical Banks, Inter-Bank Call Money Rate, Total Small Savings with Government on current

and non-current accounts and Bombay Stock Exchange Sensitive (SENSEX) Index on month-to-month basis for the said period constituted the data base. The company fundamentals and monthly share prices for 17 years of study period supported the conduct of the present study.

As it goes without saying, the tools used for establishment of the size of market risk factor (beta) and identification of it's role in changing equity returns, traditionally used methodology has been adopted for empirically testing the single-period CAPM. It includes the first pass Time Series Regression between individual asset's monthly returns and the return on a market index; and a second pass Cross Sectional Regression equation between the assets' average rate of return and the size of 'beta' for establishing the linear security market line. But the study of the impact of economic variables covering a wide range of monetary and non-monetary fluctuations has been attempted after identifying the prominent factors by using Principal Component Analysis. On the otherhand, eleven groups of 24 financial ratios capturing the Size, Dividend Policy, Leverage, Productivity, Liquidity, Profitability, Earnings Variability, P/E ratios and Certain Growth Variables constituted the company specific fundamentals of financial risk variables. The estimation of 'Accounting Beta' (the ratio of EPS of a firm in relation to the average EPS of all firms), Growth in Assets, Sales, Earnings have been measured as linear growth rates the testing period of most recent five year period. Therefore, the testing period is ultimately limited for ten year period of 1981 to 1991. The variable selection multiple regression analysis with step-wise variable selection has become the widely used statistical tool throughout the study,

The Model and Variables

Based upon a homogeneous mean-variance perservance structure and an equilibrium market, a risk-return relation-ship has been defined under CAPM as linear positive function of riskfree return being the price for time plus the market price for assets' systematic covariance risk. In order to empirically test the influence of Market risk variables on returns we have adopted the following ex-post equations

$$R_{it} = R_{ft} + (R_{mt} - R_{ft}) B_i + e_{it}$$

In a portfolio context, the model is

$$R_{pt} = \lambda_0 + \lambda_1 B_p + e_{pt}$$

Where the coefficient of λ_0 to represent risk free rate λ_1 should be equal to $R_{mt} - R_{ft}$.

Following similar logic of linear additive K-factor return generating process of APT, with Factors being Orthogonal, the second-phase of the study has tried to establish the relationship between stock returns and economy variables through the estimates of return sensitivity (Economy beta) with select Principal Components.

$$R_{it} = \lambda_0 + \lambda_1 E_{b_{i1}} + \lambda_2 E_{b_{i2}} + \dots + e_{it}$$

- where R_{it} = One-period rate of return from i th asset i^{th} in time 't'.
 λ_0 = Expected rate of return if all economy risk factors have a value of zero.
 E_{bi} = Sensitivity of security returns to changes in economy factor (principle component)
 e_{it} = random error due to unexplained residual return.

In case of portfolios of assets suitable modifications have been carried out. Based on logical explanatory variables that one can derive from the theory of firm, often termed as fundamentals, financial risk variables have been incorporated in addition to third-phase of the study. Various studies have independently suggested different risk measures that have significant impact on security prices, For example, size variable by Basu (1973), Reinganum (1981), Operating Leverage and Financial Earnings by Leverage by Lucy Huffman (1983), Growth by Marc Nerlove (1965), Liquidity by James E Townsend (1975), Profitability by Robert Jacobson (1987), Accounting Beta by Beaver, Kettler and Scholes (1970), Earning multiplier by Haskel Banishay (1961), Market beta by Friend and Blume (1973) and so on. Considering many of these additional risk variables, our study has developed a linear relationship with equity returns, in addition to already observed macro-economic variables, The general model is

$$R_{it} = a_0 + B_1 S_{it} + B_2 Div_{it} + B_3 Lev_{it} + B_4 Py_{it} + B_5 G^5_{it} + B_6 Liq_{it} + B_7 Pr_{it} + B_8 A^b_{it} + B_9 gE^5_{it} + B_{10} SD^5_{EPS} + B_{11} P/E_{it}$$

Where,

- R_{it} = Average Rate of return on i th security
 S_{it} = 'Size' measured in terms of log of Total Assets/ log of Sales/log of Network.
 Div_{it} = Dividend measured in terms of either dividend yield or payout or their first differences.
 Lev_{it} = Financial leverage measured in terms of Debt/Equity ratio.
 Py_{it} = Productivity measure of Input-Output relationship
 G^5_{it} = Growth in Assets/Sales measured as Five-Year Linear Growth Rate.
 Liq_{it} = Cashflow position measured in terms of traditional Liquidity Ratios.
 Pr_{it} = Profitability measure of total operating and non-operating profits to network .
 A^b_{it} = Accounting beta measured as a ratio of EPS of i th firm in relation to others.
 gE^5_{it} = Earning growth measured as Five Year Linear Trend in EPS.

- SD_{EPS}^5 = Earning instability index computed as Five Year
S.D of firms' EPS.
P/E = Price Earning Ratio.
 B_{it} = Sensitivity coefficient for the given financial risk
variable.

Results and Discussion:

Since the primary objective of the present study is to put together the theoretical and empirical risk factors together in order to evaluate their explanatory power as description of equity returns, the results have been analysed and presented under three broad Sections. In Section I, the analysis is focussed on the measurement of market risk factor and establishing its relationship on lines of celebrated CAPM. The co-movement of assets prices prevalent in any stage of economy suggest the presence of the influence of exogenous State variables. Identification of stock return sensitivity to such macro economic variables and exploration of multi-beta relationships has been the direction in section II. The real determinants of stock prices are often mysterious and calls for a careful search for clues in investment fundamentals at firm level. In essence, the section III aims at examining the earnings expectations against corporate variables, in the presence of market and economy factors.

SECTION I

Market Risk and Equity Returns

Risk and return are inextricably intertwined and are analogous to the two sides of the same coin in investment management. The contribution of Markowitz (1952), envisages a mean-variance comprehensive efficient frontier concept, later simplified by Sharpe (1964) Lintner (1965) and Tobin 1958³¹ into Capital Asset Pricing Model CAPM, which establishes a linear relationship between the expected returns on a security and that security's contribution to portfolio risk. The CAPM revolves around the canon that the security's total risk is not relevant and only systematic risk as measured by the 'beta' coefficient is relevant. The studies conducted by Black, Jensen and Scholes (1972), Friend and Blume (1973), Jacob (1971),³² Miller and Scholes (1972),³³ Cheng F Lee (1976),³⁴ Blume and Hosick (1973)³⁵ Fama and Macbeth (1979)³⁶ support the goodness of fit of the linear model in the expected direction between 'beta' and return on a portfolio. In Indian context, the studies conducted by Yalawar (1988),³⁷ Srinivasan (1988),³⁸ Rao and Lakshmi (1991)³⁹ indicate that the spirit of CAPM holds good in Indian markets.

The present study has examined the above said issue by carrying out a careful analysis on a sample of 71 scrips' month-end prices for the period of June 1979 to December 1991, after adjusting the 'returns' for bonus and right issues (based on the methodology suggested by L.C. Gupta). The Bombay Stock Exchange Sensitive Index is considered to represent Market Portfolio while calculating the first pass 'beta', a measure of systematic risk, for each individual company. The size of beta found to be significant (data not shown) in case of 62 out of 71 companies. But the extent of relationship between the

behaviour of individual scrips and the market portfolio as indicated by R value is around 10 to 30 percent, upholding the general notion that Indian investors are not taking full cognizance of the risk factors and they act on a 'hit-or-miss' basis, in defiance to rationality. This market irrationality appears to be due to the preponderance of speculative influences over investment fundamentals.

In order to examine the celebrated relationship established by CAPM, a second pass simple linear regression equation has been fitted between portfolio rates of return and the portfolio systematic risk for different portfolio sizes. The estimated equally weighted portfolios of different sizes (see Table 1) lend total support to the applicability of CAPM in Indian context, The size of the explanatory power (R^2 value) of these estimated relationships vary between 12 per cent (in case of individual scrips 50 to 60 per cent in case of portfolios with more than one scrip size. It confirms the fact that the systematic risk is a good explanatory variable when assets are considered in portfolios. This result lends support to the argument that anything more than 'one' is appropriate and the assets held in isolation and investing in only one security as suicidal. But one frustrating result that one can easily identify at the table is that the Constant term being significant all through the exercise.⁴⁰ If one goes carefully at the size of this coefficient it is clear that the risk free rate works out to the extent of 1.6 to 2.2 per cent per month, which distorts the very saying of 'there is no free lunch'. Even against a conservative estimate of inflation rate of 10 to 12 per cent during the study period, the risk free rate is working out to 7 to 14 per cent in excess of the inflation rate. Whether this observation explains the excessive speculative trends in Indian capital markets and consequent inefficiency in pricing the secondary markets or it is due to non suitability of linear CAPM frame work to Indian conditions? It is an issue for further careful analysis.

SECTION II

Economic Forces and Equity Returns

Modern Finance Theory suggest that Macro economic variables should systematically affect stock returns. But there exists a gap in theoretical and empirical research findings as to the identity of such 'State variables'. The co-movement in asset prices suggest the presence of underlying exogenous influence. In an attempt to model equity returns as function of Macro variables, Ross (1976) has developed an alternative to a non-generalised form of equilibrium relationship such as the one found in CAPM. Ross proposed a factor return generating function which is similar to CAPM if there is only one factor.⁴¹ Roll and Ross (1980) argue that the market factor might serve as a substitute for one of the factors. In their empirical studies on APT, they observed that three or four factors essentially needed to determine capital asset prices. These factors may be attributes of economic variables like industrial production, oil prices, etc, Roll and Ross tests, have been validated by Dhrymes(1984),⁴² Freind and Gultekin(1984),⁴³ Elton and Gruber(1984).⁴⁴ In the absence of proper economic meaning for Factors used in APT, the

recent study of Kim and Wu (1987)⁴⁵ reports that industrial production, productivity, money supply and unemployment rates are consistently influencing the share returns, Chen et. al., (1986)⁴⁶ proposes that the unexpected inflation, industrial production, changes in risk premiums, etc., are crucial in Asset pricing. In a recent study Chen and Jorden (1993)⁴⁷ finds inflation, interest rates on government bonds, industrial production, oil prices, etc., are germane in asset prices. In Indian environment, the study conducted by Rajan Mookerjee (1988)⁴⁸ observes weak linkages between changes in GDP and stock prices, Malathy Prabhakaran, (1989),⁴⁹ Rao and Bhole (1990),⁵⁰ Choudhari (1988)⁵¹ and others studied the impact of inflation on stock prices and report conflicting results. A comprehensive study on these Economic variables is awaited in Indian context.

The present study has explored into the above said necessity and tried to estimate a multi - beta, APT type model, to capture all predictable changes in returns that are not due to market inefficiencies. The important variables considered in the study are monthly data on Industrial Production Index, Wholesale Price Index, Aggregate Deposits of Commercial Banks, Total Small Savings with Government on Current and Non Current Accounts, Balance of Trade, Foreign Exchange Reserves, Money Supply (M3) and Inter - Bank Call Money Rate.⁵² Since it is intended to examine the role of important economic influences on share prices, the study has categorised all the above said economic variables into three Principal Components before the Economic 'Betas' are estimated. The derived Principal Components could broadly be titled as Industry Factor (P_1) Inflation Factor (P_2) and Savings Factor (P_3) based on the size of Factor Loadings of these Principal Components. The Loadings can be seen in Table 2,

The range of 'economy beta' values for each company over the study period (results not provided), expected to indicate the size of the influence that the economy Factors exert on share prices, found to be very poor in their significance (189 out of 213 coefficients are not significant) and the R^2 value found ranging only upto 4 percent. It raises the doubts on the very usability of Economy Betas for further analysis. A further enquiry reveals that the signs of the three factors are positive indicating the direction of changes in equity returns in response to economy level changes.

In the next pass an 'Economy CAPM' is estimated with the help of above said beta coefficients. Considering equal weightages for all parameters the study has estimated the Security Market Lines between Portfolio Rates of Return and Economy Betas for portfolio sizes of one, two, three and upto five. It is expected that the portfolio betas are more stable than individual common stock betas as much of the variation in individual firms' betas cancels out in large portfolios. The Table 3 shows the results in this regard. The results show explanatory power of the economy betas is substantial (R^2 value is above 0.75) indicating the relative influence of economy level changes, (what ever little sensitivity one can observe) are substantial and significant. This adds to the explanation already observed with the market risk variable.

Further, among the three Principal Components, the coefficient of Savings Factor is found significant at one per cent level followed by the others at five per cent level of significance. The significance of 'alpha' coefficient is sizable, expressing the doubts on the size of risk - free rate of return in Indian environment or the errors in measurement of this Model as well.

SECTION III

Equity Return and Fundamentals

The motivation of holding a risky investment is to earn a premium return. All rational investment decisions of buy, hold or sell are expected to revolve around three elements of expected rate of return, uncertainty of returns and expected intrinsic values.⁵⁴ These three elements are systematically integrated into practical present value model by John Burr Williams⁵⁵ and Nicholas Molodvsky.⁵⁶ The value (V) of any investment can be shown as

$$V = \frac{e_1}{(1+i)^1} + \frac{e_2}{(1+i)^2} + \frac{e_3}{(1+i)^3} + \dots + \frac{e_n}{(1+i)^n}$$

where, e_1, e_2, e_3 represents the earnings made on investment either in the form of cash dividends or in other forms $i =$ the discounting factor.

But the most important puzzle that a security analyst confronts with the above model is the unexpected nature of equity returns and yearly cash inflows which cannot be calculated precisely. Oflate, the estimate of intrinsic value of a security is attempted alternatively by multiplying the i th stocks normalised earnings per share denoted by ' e_{it} ' for the t^{th} period, times of earning it multiplier (m_{it}) frequently referred to as Price-earnings it ratio.⁵⁷

$$P_{it} = e_{it} \cdot m_{it}$$

where, $P =$ the intrinsic value of the stock

Fama⁵⁸ suggests through a careful study of the fundamental factors, an analyst should in principle be able to determine whether the actual price of a security is above or below the intrinsic value. Different studies have made attempts to identify various qualitative fundamentals on which a security analyst can relay on. Arditty (1967)⁵⁹ classifies risk variables into those that are directly associated with distribution of returns of firm stock and those which arises from the financial policies of the firm. He identifies that the investors like high dividend payouts. Marc Nerlove (1968)⁶⁰, in his pioneering work, reckoned that variables like, rate of growth of sales, earnings available to stock holders, average dividends and retained earnings per dollar of total assets, average inventory turnover, reciprocal of leverage as good fundamentals. Beaver, Kettler and Scholes (1970)⁶¹ oriented his study to identify the determinants of beta, measure of risk. He identifies that the leverage, accounting beta, earnings variability and payouts as significant fundamentals in addition to size of the company. In Indian context, Prasanna Chandra (1977)⁶² has picked up different measures of returns, growth, risk, leverage and corporate size and observed that the company size, dividends were strong, leverage

turned out to be superfluous in its relationship with stock prices and growth has a positive but weak correlation. Sharma (1989)⁶³ also supports that the growth, dividend payout and size possess statistically significant positive sign. In a recent study conducted by Zahir (1992)⁶⁴ with corporate variables like growth, DPS, EPS, Book value, size and External variables such as money supply, market index observes that Bonus issues, DPS, EPS yield and share price Index are significant more specifically in case of highly volatile scrips.

Considering the identified variables in above said studies, the present study has examined the relationship between expected rates of return and company fundamentals (Financial risk variables), market factors (beta), Economic variables (Economy betas) through step-wise regression models for the years of 1981 to 1991. The yearly equations are presented in Table 4. The estimated coefficients indicate the following results.

- (i) Size of a firm is an important fundamental which is largely taken into consideration by many shareholders in estimating the value of the scrip. Empirical studies conducted by Banz (1981), Reinganum (1981),⁶⁵ Beaver, Kettler and Scholes (1970) Sharma, Rattan K (1989), Joseph Lakonishok (1980),⁶⁶ Martin Jay Gruber (1987)⁶⁷ observes that size represents the omitted risk variables in a valuation model. The present study observes that size possess positive sign and it is significant (in majority of cases).
- (ii) Dividend Policy of a company is considered important aspect in the eyes of investors. Although there is no unanimity over its impact, a company having a consistent track record of dividend payment is, of course, reckoned by investors. The present study observes that dividend payout to be a statistically significant variable with a negative sign. Negative sign is consistent with the argument that market prefers dividend payment. This observation gains support from the studies of Haskel Banishay (1961),⁶⁸ Arditti (1967), Sharma (1989), Zahir (1992), Marc Nerlove (1968), Meghnad Desai (1965)⁶⁹ and Prasanna Chandra (1977).
- (iii) Leverage Ratio is an indicator of Financial risk. Increasing debt in capital structure is supposed to increase the financial and bankruptcy risks of equity holders and hence it should have a positive sign. Such an argument is validated by Martin Jay Gruber (1966), Sharma and Rao (1969), Beaver, Kettler and Scholes (1970), Babcock Guilford (1967)⁷⁰. The present study observes that the financial leverage possesses a positive sign but found its presence felt only in case of two years out of 11 years of study.
- (iv) Productivity can be defined as the value added by manufacturing enterprise. Increasing productivity is expected to result in increased profitability and should reduce the risk of a firm, The study observes that the productivity measure is found rarely incorporated into the valuation model. The empirical coefficient seems to possess a negative sign. This may be either due to proven inefficiency of Indian Capital Market

to discount the pertinent fundamental factor or due to lack of information on the said measure. The feeble influence of productivity measure is consistent with the studies conducted by Bao and Bao (1989)⁷¹ and contradictory to Garai (1989).⁷²

- (v) The empirical works of Marc Nerlove (1968), Sharma (1989), Beaver, Kettler and Scholes (1970), Weston (1963)⁷³ and others substantiate that growth is a positive indicator of the capacity to generate earnings. Our empirical observations support the positive coefficient in three out of five cases but it is significant only once. The negative sign possibly indicate that the Indian Investors' failure to reckon this fundamental while fighting for survival among the much mighty bull and bear pressures.
- (vi) Liquidity Ratio is considered as a true test on the fund management efficiency of a firm. It is like striking a balance between Paucity and superfluity. Beaver, Kettler and Scholes (1970), Marc Nerlove (1968) and others included this variable to ascertain the response of Share prices. Our results show that this variable is found place only twice in the final models. The presence of negative and positive signs in almost equal number of times indicate the poor explanatory power of this corporate variable. However, this observation is consistent with above said studies.
- (vii) Profitability is very important variable having influence in share returns. This variable measures the overall efficiency of a firm in generating returns to equity holders. This variable highlights the competitive vitality of the firm to survive in the face of business vicissitudes. Our empirical testing is found that this variable, contrary to expectation, showed a very poor explanation and entered into final model only once during the entire period of analysis. The justification for the triviality of this variable again reminds the inefficiency of Indian Stock Market to discount accurately the fundamental factors.
- (viii) Accounting beta is a measure of the sensitivity of accounting return of a firm to a broad based index of Industry average returns. It is an important variable in the empirical studies conducted by Beaver, Kettler and Scholes (1970), Gonedes (1973)⁷⁴ and others. A positive sign is expected to this coefficient as relatively higher earnings of a firm compared to the Industry average will have definitely a positive relationship with share returns. The present study identified this variable to be of moderate importance. Out of eleven years of study in four years this variable is entered into the final model with positive sign. It highlights the reasonable explanatory power to this fundamental variable.
- (ix) Earning growth and Earning variability indicators are two important measures of importance. While the former provides a clue on the future earnings trend the later presents the earnings instability index. The investigation reveals that these two variables are not seriously

considered by investors in Indian conditions. A negative sign to growth variable expresses doubts in the minds of investors on its continuation in future. The negative role to earnings instability index indicates the preponderance of speculative trading where fortune seekers hunt for high volatile scrips to make abnormal gains.

- (x) Price-Earnings Ratio (P/E ratio) is an important fundamental measure of risk-return relationship. P/E ratio indicates volatility of market prices and high P/E is a measure of high risk. Therefore, a negative sign is expected for its coefficient. The present study observes that this variable, although much talked at, found to possess a feeble relationship and its presence is marginally felt only twice in the study. It supports the accusation that Indian Investor hunts for high P/E securities defying the fundamental rules of investment game.

The market and economy beta factors which are included along with fundamentals stands to support the celebrated risk-return relationship observed by modern portfolio theory. The consistency in their presence in all equations with significant coefficients shows the robustness of CAPM and APT models in Indian environment. The low explanatory power of almost all equations, however, expresses the large scale inefficiency in Indian Capital Market. Therefore, any attempt to develop a workable, predictive model requires a coverage of large number of exogenous variables in the explanation of security price differentials in India.

Table 1
Estimated Security Market Lines Across Different Portfolio Sizes

Equation No.	Number of scrips ineach	Coefficients of		R ²	F
		Constant	'Beta'		
		**	**		
1.1	One	1.0224 (120.11)	0.7851 (3.04)	0.1180	9.229
		**	**		
1.2	Two	1.0166 (128.40)	1.7608 (7.59)	0.6290	57.65
		**	**		
1.3	Three	1.0182 (153.86)	1.0987 (5.36)	0.5665	28.75
		**	**		
1.4	Four	1.0193	0.9810	0.5199	17.33
		**	**		
1.5	Five	1.0216 (123.76)	1.2026 (4.68)	0.6280	21.95

Figures in parentheses are 't' ratios

** significant at 1 per cent level.

Table 2
Factor Loadings of Selected Economic Variables

Variable No.	Name of the Economic Variable	Factor Loading		
		P ₁	P ₂	P ₃
E ₁	Industrial Production Index	<u>0.5738</u>	0.3493	0.2564
E ₂	Wholesale Price Index	0.3432	<u>0.6583</u>	0.1330
E ₃	Agg. Deposits of commercial banks	0.0733	-0.1525	0.287
E ₄	Money supply (M	-0.2615	-0.4368	-0.3754
E ₅	Inter-bank call money rate	-0.2406	<u>0.6563</u>	<u>-0.4113</u>
E ₆	Foreign Exchange reserves	<u>0.7360</u>	0.0477	-0.0370
E ₇	Balance of Trade	-0.0021	0.3717	-0.2554
E ₈	Small Savings with Govt. on current and non-current accounts	0.0577	-0.0861	<u>0.7314</u>

Table 3
Security Market Lines for Different Portfolios using Economy Betas

Eq. No.	Portfolio Size	Coefficients of				R ⁻²	F
		Constant	Beta of (P ₁)	Beta of (P ₂)	Beta of (P ₃)		
3.1	1	** 1.0230 (214.63)	** 1.0803 (7.70)	* 0.6878 (2.28)	** 1.9858 (8.84)	0.7543	68.57
3.2	2	** 1.0286 (154.54)	** 0.9673 (3.10)	* 1.4878 (2.69)	** 2.4680 (5.05)	0.8766	75.76
3.3	3	** 1.0273 (160.53)	** 0.9108 (2.36)	* 1.4563 (2.69)	** 2.352 (5.05)	0.8089	28.22
3.4	4	** 1.0296 (96.25)	** 0.7068 (0.42)	* 1.8478 (2.01)	** 2.4319 (3.04)	0.7753	16.10
3.5	5	** 1.0283 (100.72)	** 0.8429 (1.36)	* 1.6601 (0.97)	** 2.8972 (3.27)	0.8627	23.03

** Significant at 1 per cent level

* Significant at 5 per cent level

Table 4
Coefficients for selected sub-set regression equations of Rates of Return as dependent on different economy, market and fundamental risk variables during 1981-1991.

Variables	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Constant	0.6883* (3.68)	-56.31* (2.81)	2.6725 (1.68)	2.168 (1.23)	-31.88 (1.90)	1.2398 (1.56)	-16.03* (2.58)	-28.21* (2.49)	0.786 (35.97)	9.18 (1.89)	0.726 (1.66)
Size	1.0788* (2.05)	0.0025 (1.35)	0.6666 (1.02)	--	--	--	--	--	0.0051* (2.19)	--	--
Div.	--	-0.0016 (1.98)	*-0.00494* (4.41)	0.0026 (2.12)	*.01108 (1.54)	--	-2.4611** (2.698)	-3.251* (2.32)	--	--	--
Payout	--	--	--	--	3.459* (1.96)	--	--	--	--	9.43* (1.96)	--
Leverage	--	--	--	--	--	--	--	--	--	--	--
Productivity	--	--	--	-0.3510* (1.98)	--	--	--	0.0896 (2.14)	--	--	--
Growth	--	0.0417 (1.49)	-0.2653 (1.91)	0.0468 (0.82)	--	-0.1965** (3.03)	--	0.1655* (2.09)	--	--	--
Liquidity	--	--	--	--	0.0072* (1.96)	--	--	--	--	0.0187* (2.11)	--
Profitability	--	0.5211* (2.73)	--	0.824 (1.60)	--	--	--	--	--	--	--
A/c Beta	--	--	0.2325** (3.68)	0.0475 (0.66)	0.2158* (2.29)	0.37** (3.68)	--	--	--	--	--

Notes and References

1. Paul M Van Arsdell, '*Corporation Finance*', The Ronald Press Co., Limited, New York, 1986, p.807.
2. Narayana,S.L, 'Dimensions of Capital Markets Growth:Part I' *Facts for you*, Vol.11, No,4, October 1989, p.48.
3. Lassiter, B, Phillip, 'Capital Markets and Economic Development', *The Banker*, July 1981, pp.16-20.
4. Eugene Fama is first to give the name 'Efficient Markets' in which prices fluctuate randomly around their intrinsic value in a narrow range, Eugene Fama, 'The Behaviour of Stock Market Prices', *Journal of Business*, Jan, 1955 p.36,
5. Jhaveri, N,J., 'Capital Markets : Momentous Developments'. *The Hindu Survey of Indian Industry*, 1993, p.37.
6. Mayya, M,R., 'Recent Trends in Securities Market'. *The Chartered Accountant*, March 1990, pp.706-712.
7. Damayanty, '1992 : Stock Market Developments', *PNB Monthly Review*, Feb 1993, p.113.
8. Dayakar,C., 'Trends in Capital Markets,' *Financial Express*, Feb 23, 1994 p.6.
9. For a Detailed Discussion on SEBI See: Pandya N,H, SEBI-Its Role, Powers and Activities', *The Chartered Secretary*, September 1992, pp.783-787 and Praful Sanghani, 'SEBI An Overview', *The Chartered Accountant*, April 1991, pp.979-981.
10. For Details See: Sankar T.L., 'Credit Rating: A New Concept in Security Analysis in India', *The Chartered Secretary*, May 1992, pp.412-415.
11. See J,C, Francis and S,H, Archer, '*Portfolio Analysis*', Prentice Hall, Englewood Cliffs, N.J., 1971, (Chap.11).
12. Francis, Jack Clark, '*Investments: Analysis and Management*', McGrawHill, NY, 1987, p.210.
13. Hary Markowitz, '*Portfolio Selection*' Wiley, NY, 1959.
14. Evans J., and S.H., Archer, 'Diversification and Reduction of Dispersion : An Empirical Analysis', *Journal of Finance*, December 1968, pp.761-7; and W.H., Wagner and S. Lau, 'The Effect of Diversification on Risk', *Financial Analysts Journal*, November-December 1971, pp.48-63.
15. Sharpe W.F., 'A Simplified Model for Portfolio Analysis', *Management Science*, Vol. 9, No. 2, pp. 277-293.
16. Sharpe, W.F., 'Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk', *Journal of Finance*, September 1964, Voll 9, No. 3, pp. 425-442.
17. Jack L. Treynor, '*Towards a Theory of Market Value of Risky Assets*', Unpublished Manuscript, 1961.
18. Mossin, J., 'Equilibrium in Capital Asset Market', *Econometrica*, October 1966, pp. 768-783.
19. Lintner, J., 'The Valuation of Risky assets and the selection of Risky investments in Stock portfolios and Capital Budgets', '*The Review of Economics and Statistics*', February 1965, pp. 13-37.
20. Black, F., 'Capital Market Equilibrium with Restricted Borrowing' *Journal of*

Business, July 1972, p. 444-455.

21. Black, F., M.C., Jensen and M. Scholes, 'The Capital Asset Pricing Model, Some Empirical Tests' in M.C. Jensen (ed.) *Studies in Theory of Capital Markets*, Praeger, New York, 1972, M Blume and I. Friend, 'A New Look at Capital Asset Pricing Model: *Journal of Finance*, March 1973, pp.19-34; Review papers by Michael C. Jensen, 'Capital Markets: Theory and Evidence', *Bell Journal of Economics and Management Science*, Vol. 3, No. 2, Autumn 1972, pp.357-398; Stephen A. Ross, 'The Current Status of Capital Asset Pricing Model (CAPM)', *Journal of Finance*, Vol. 33, No. 3, July 1978, pp. 885-890.
22. Basu, S., 'Investment Performance of Common Stocks in Relation to Their Price-Earnings Ratios : A Test of Efficient Market Hypothesis', *Journal of Finance*, June 1977, pp.663-682.
23. Banz, R.W. 'The relationship between Return and Market Value of Common Stocks', *Journal of Financial Economics*, March 1981, pp.3-18.
24. Reinganum, M.R., 'Misspecification of Capital Asset Pricing: Empirical Anomalies based on Earnings Yields and Market Values'. *Journal of Financial Economics*, March 1981, pp.19-46.
25. Litzenberger, T. and K. Ramaswamy, 'The Effect of Personal Taxes on Dividends and Capital Asset Prices: Theory and Empirical Evidence'. *Journal of Financial Economics*, June 1979, pp.163-195.
26. Richard Roll, 'A Critique of the Asset Pricing Theory's Tests', *Journal of Financial Economics*, March 1977, pp.129-176.
27. Ross, S.A., 'The Arbitrage Pricing Theory of Capital Asset Pricing'. *Journal of Economic Theory*, December 1976, pp.344-360.
28. Richard Roll and Stephen A Ross, 'An Empirical Investigation of the Arbitrage Pricing Theory', *Journal of Finance*, December 1980, Vol,35, No,5, pp.1073-1103; Richard Roll and Stephen A Ross, 'The Arbitrage Pricing Theory Approach to Strategic Portfolio Planning', *Financial Analysts Journal*, May-June 1984, p.14.
29. Jay Shaken, 'The Arbitrage Pricing Theory: Is it Testable?' *Journal of Finance*, December 1982, Vol,37, No,5, pp.1129-1140; M.Reinganum, 'The Arbitrage Pricing Theory: Some Empirical Results', *Journal of Finance*, May 1981, Vol,36, pp.313-321.
30. Russell Fogler H, Kose John and James Tipton, 'Three Factors, Interest rate differentials and Stock Groups', *Journal of Finance*, May 1981, Vol,36, No,2, pp,323-335; Lawrence Kryzanowski and Minh Chau To. 'General Factor Models and Structure of Security Returns', *Journal of Financial and Quantitative Analysis*, March 1983) Vol,18, No,1, pp,48-49; Kim, Moon and Wu, Chunchi, 'Macro Economic Factors and Stock Returns', *Journal of Financial Research*, Summer 1987, pp.87-98.
31. Tobin, J., 'Liquidity Preference and Behaviour Towards Risk', *The Review of Economics and Statistics*, 1958, February pp.65-86.
32. Jacob, Nancy, 'The Measurement of Systematic risk for Security and Portfolios: Some Empirical Results', *Journal of Financial and Quantitative Analysis*, Vol.vi, March 1972, pp.815-834.
33. Miller, Merton H., and Scholes, Myron S., 'Rates of Returns in Relation to Risk: A Re-examination of Recent Findings', Published in Michael Jensen (ed.) *Studies in the Theory of Capital Markets*, Praeger, New York T-972-pp.47-78.

34. Cheng F. Lee, 'Investment Horizon and Functional Form of Capital Asset Pricing Model', *Review of Economics and Statistics*, No.3, 1976, pp.336-361.
35. Blume M., and Hosick F., 'Price, Beta and Exchange Listing', *Journal of Finance*, May 1973, pp.283-299.
36. Fama E., and Macbeth J., 'Risk-Return and Equilibrium: Empirical Tests'. *Journal of Financial Economics*, June 1979) pp.163-195.
37. Yalwar B. Yalaguresh, 'Bombay Stock Exchange : Rates of Return and Efficiency', *Indian Economic Journal*, April/ June 1988, pp.68-119.
38. Srinivasan, S., 'Testing of Capital Asset Pricing Model in Indian Environment', *Decision*, January-March 19882 pp.51-59.
39. Rao K., Chandrasekhara and Lakshmi, T. Venkatal, 'Equity Pricing : An Application of Capital Asset Pricing Model (CAPM) in Indian Environment', *Research Bulletin*, Vol,X, No,122, January/July 1991, pp.51-58.
40. Similar Observations are made in some of the Earlier Studies conducted by Yalawar (1988), Rao and Lakshmi (1991).
41. Same View is expressed by Robert Jarrow and Rudd, 'A Comparison of the APT and CAPM', *Journal of Banking and Finance*, June 1983, pp.295-303.
42. Dhrymes J, Phoebus, 'Arbitrage Pricing Theory', *Journal of Portfolio Management*, Summer 1984, pp.35-44.
43. Friend and Gultekin, 'A Critical re-examination of the Empirical Evidence on the Arbitrage Pricing Theory'. *Journal of Finance*, June 1984, pp.323-346.
44. Elton and Gruber, 'On the Robustness of the Roll and Ross Arbitrage Pricing Theory', *Journal of Financial and Quantitative Analysis*, March 1980, pp.1-10.
45. Kim, Moon K., and Wu., Chunchi, Moon Kol and Wu., Chunchi., 'Macro Economic Factors and Stock Returns', *Journal of Financial Research*, Summer 1987, pp.87-97.
46. Chen, N., Roll, R., and Ross S., 'Economic Forces and Stock Market', *Journal of Business*, July 1986, pp.503-403.
47. Chen and Jordan B.D., 'Some Empirical Tests on the Arbitrage Pricing Theory : Macro-Variables Vs Derived Factors'. *Journal of Banking and Finance*, Vol.1, No,17, 1993) pp.65-89.
48. Rajan Mookerjee, 'The Stock Market and the Economy : The Indian Experience - 1949-1981'. *Indian Economic Journal*, Vol.36, Octomber-December 1988,
49. Malathy Prabhakaran, 'Do Equities act as a hedge against Inflation?' *Economic and Political Weekly*, 25 February 1989, pp.m24-26.
50. Rao, Narayana and Bhole, L.M., 'Inflation and Equity Returns', *Economic and Political Weekly*, 26 May 1990, pp.m91-m96.
51. Chaudari, S.K., 'Equity as Inflation Hedge - International Evidence' *The Economic Times*, 4 January 1988, p.10.
52. For lists of Variables considered in different studies, See E, Burmeister and E., McElroy, 'Arbitrage Pricing Theory as a Restricted non-linear Multivariate Regression Model', *Journal of Business and Economic Statistics*, Vol.6, 1988, pp.29-42; E.Fama and K.French, 'Business Conditions and Expected Stock Returns', *Journal of Financial Economics*, Vol.25 1989, pp.23-50; Wayne E Ferson and Compbell R. Harvey) 'Sources of Pre-dictability of Portfolio Returns'. *Financial Analysts Journal*, May-June 1999, pp.49-56.

53. For Similar Evidence, See Chan, K.C., and N. Chen, 'An Unconditional Asset Pricing Test and the Role of Firm Size as an Instrumental Variable for Risk', *Journal of Finance*, Vol.43, 1988, pp.309-326; Ball, and S.Kothari, 'Non-stationary Expected Returns: Implication for Test of Market Efficiency and Serial Correlation in Return', *Journal of Financial Economics*, Vol25, 1989, pp.51-74.
54. Bowman, Scott,, 'Evaluation of Perspective Investment Performance', *Journal of Finance*, May 1968, pp,276-279; Bowman, Scott, 'Investment Returns and Present Values', *Financial Analysts Journal*, November-December 1969, p.107.
55. John Burr Williams, '*The Theory of Investment Value*' North Holland Pub. Co., Armsterdam, 1938,
56. Nicholas Molodovsky, 'Valuation of Common Stocks', *Financial Analysts Journal*, 1959, pp.23-44.
57. Similar Valuation Model has been developed by Malkiel,B.G., 'Equity Yields, Growth and Structure of Share Prices', *American Economic Review*, December 1963, pp.1004-1031.
58. Fama, Eugene F., 'Random Walk in Stock Market Prices', *Financial Analysts Journal*, September-October 1965, p.56.
59. Arditti, Fred, D., 'Risk and Required rates of return an Equity', *Journal of Finance*, March 1967, pp.19-36.
60. Marc Nerlove, 'Factors affecting Differences among rates of return on Investments in Individual Common Stocks'. *Review of Economics and Statistics*, August 1968, p.312.
61. Beaver, W.H., Kettler P. and M, Scholes, 'The Association Between Market determined and Accounting determined risk variables', *Accounting Reveiw*, XLV, October 1970, pp.654-682.
62. Prasanna Chandra, '*Valuation of Equity Shares in India*' Sultan Chand & Co., New Delhi-1977,
63. Sharma, K, Rattan, 'Factors Affecting Relative Prices in Equity Shares : An Empirical Analysis', *The Chartered Accountant*, August 1989, pp,110-114,
64. Zahir, M,H., 'Factors Affecting Equity Prices in India', *The Chartered Accountant*, March 1992, pp.743-748.
65. Reinganum, M.R., 'Mis-specification of Capital Asset Pricing: Empirical Anomalics based on Earnings Yields and Market Values', *Journal of Financial Economics*, March 1981, pp.19-46.
66. Josef Lakonishok, 'Systematic Risk, Total Risk and Size as determinants of Stock Market Returns', *Journal of Banking and Finance*, vol,10, 1986, pp.115-132.
67. Martin Jay Gruber, 'Determinants of Common Stock Prices', *Journal of Finance*, December 1986, p.42.
68. Haskel Banishay, 'Variability in E/P ratios of Corporate Equities'*American Economic Review*, March 1961,pp.81-94.
69. Meghnad Desai, 'Stock Prices, Earnings and Dividends in India: A Quantitative Analysis', *Indian Economic Journal*, April-June 1965, pp.43-436.
70. Babcock Guilford, 'The Roots of Risk and Return' *Financial Analysts Journal*, January-February 1969, pp.56-63.

71. Ben-Hsien Bao and Da Hsien Bao 'An Empirical Investigation of Association between Productivity and Firm Value', *Journal of Finance and Accounting*, Vol,16, No.5, Winter 1989, pp.699-715.
72. Garai, S., 'Corporate Overall Performance as Judged by Investors : A Cononical Correlation Analysis of Indian . Engineering Industrial Units', *Decision*, January-March 1989, pp.53-65.
73. Weston W.J., 'A Test of Cost of Capital Proportions' *Southern Economic Journal*, October 1963, pp.105-112.
74. Gonedes J.J., 'Evidence of the Information content of Accounting Numbers : Accounting based and Market based estimates of systematic risks' *Journal of Financial and Quantitative Analysis*, June 1973, pp.407-44.