Multifactor Analysis of Capital Asset Pricing Model in Indian Capital Market

(Kushankur Dey & Debasish Maitra, Doctoral Participant\textsuperscript{1}, IRMA)

Abstract

Investment theory in securities market pre-empts the study of the relationship between risk and returns. A review of studies conducted for various markets in the world that researchers have used a number of methodologies to test the validity of CAPM. While some studies have supported and agreed with the validity of CAPM, some others have reported that beta alone is not a suitable predictor of asset pricing and that a number of other factors could explain the cross-section of returns. The paper reiterates the importance of a multifactor model in the explanation of investor’s required rate of return of the portfolio in the Indian capital market.

The results show that intercept is significantly different from zero and the combination of size\textsubscript{i}, ln(ME/BE)\textsubscript{i}, (P/E\textsubscript{i} – P/E\textsubscript{m}) do not explain the variation in security returns under both percentage and log return series while (d\textsubscript{i} - R\textsubscript{f}) shows very dismal result. The combination of \(\beta\textsubscript{i}, ln(ME/BE)\textsubscript{i}, (P/E\textsubscript{i} – P/E\textsubscript{m}), size\textsubscript{i}, \) and \( (d\textsubscript{i} - R\textsubscript{f}) \) do not explain the variation in security returns when log return series is used and the combination of \( \beta\textsubscript{i}, ln(ME/BE)\textsubscript{i}, size\textsubscript{i}, \) also do not explain any variation in security returns when percentage return series is used. However, beta alone, when considered individually in two parameter regressions and also multi-factor model, does not explain the variation in security/portfolio returns. This casts doubt on the validity of extended and standard CAPM.

The empirical findings of this paper would be useful to financial analysts in the Indian capital market. From the researcher’s prerogative multifactor analysis would be more indicative one to include some macroeconomic factors, firm-specific factors and market factors to enlarge the understanding of modern finance and to unfold the dilemma of using CAPM model in asset-pricing.

Key words: multifactor model, CAPM, security returns, portfolio returns

\textsuperscript{1} First author is a third year doctoral participant of the Institute of Rural Management Anand, can be reached at f061@irma.ac.in . Second author is pursuing his course work of the second year of Fellow Programme (FPRM). He can be contacted at f071@irma.ac.in.
1. INTRODUCTION
Relationship between return and risk has been received a significant importance in realizing the optimal allocation of stocks or optimal investment strategy. More implicitly, this makes a choice to the investor to take a wise action or prudent inaction which, in turn, compels the investor to cogitate upon the risk-return embedded relationship on the asset. In real world, we try to measure the standard deviation as a proxy or surrogate to risk and investor attitudes toward portfolios depend exclusively upon expected return and risk (Markowitz, 1959). Since diversified portfolios reduce the occurrence of unsystematic risk, avoidance of systematic one is of huge challenge to the investor. As noted that the variance of returns on an asset is a measure of its total risk and variance can be halved into systematic and unsystematic risk, that is, \( \sigma^2_i = \beta^2 \sigma^2_m + \sigma^2_{\varepsilon_i} \), where \( \beta \) is systematic factor, \( \sigma^2_m \) denotes the systematic risk and \( \sigma^2_{\varepsilon} \) is unsystematic risk contained portfolio. Thus, it would be relevant to measure the correlation \( (r_{xy}) \) of the two or more stocks to the ratio of their individual standard deviation \( (\sigma_x, \sigma_y \text{ and } \sigma_i) \). This raises serious concerns to the investor that how much investment is required in each stock to form an optimal portfolio.

2. RATIONALE BEHIND THE PAPER
On the backdrop of this, simplified logical and elegant or a single-index model helps to measure the capital asset pricing. Theoretically we can say that capital market theory is a major extension of the portfolio theory of Markowitz (Sharpe, 1964). Portfolio theory is really a connotation of how rational investors should build efficient portfolios or frontiers. On the other hand, capital market theory pre-empts us how assets should be priced in the capital markets if, indeed, everyone behaved in the way portfolio theory suggests. So the capital asset pricing model (CAPM) is a relationship amplifying how assets should be priced in the capital market. The model simplifies the complexity of real world, tells us that a linear relationship exists between a security’s (stock) required
rate of return and its beta as investment theory suggests that beta is an approximate measure of risk for portfolios of securities that have been sufficiently diversified (Singh, 2008). Historically calculated beta and risk premium \((R_m-R_f)\) used to determine the required rate of return \((R_i)\) or expressed as \(R_i=R_f +\beta(R_m-R_f)\) or \(R_i=a+b\beta +\epsilon_i\) on the investor’s portfolio. The question is on whether we adopt the ex-ante or ex-post measures of beta to arrive at realistic return of the investor.

3. OBJECTIVES AND SCOPE OF THE PAPER

The two-factor or standard CAPM model has several limitations with respect to time dimension (two-period model), incorporation of less factors and lower explanatory power of regression coefficient \((R^2)\) or lower magnitude of variance explained by the factors. Multifactor models are of great significance in explaining the variance of the investor’s required rate of return or we can posit that more dynamic, realistic nature of model is employed. This model reiterates the importance of multi-period investing or financing and operating horizon (independent of each other) as mentioned by Fama and Miller (1972) with respect to beta \((\beta)\), size of the firm, price-earning ratio of individual security to market portfolio or index as a surrogate with respect to inflated covariance \((\rho\ [P/E_i -P/E_m])\), risk premium \((R_m - R_f)\), market value of equity to book value of equity \((ME/BE)\) and dividend yield in excess of risk-free return with respect to tax imposition or impact \([t(d_i-R_i)]\). The model would have an empirical generalization in the way of replication of Fama and French’s original work (1992). The index or SNP CNX NIFTY is considered in our study as market portfolio as it largely covers almost all the sectors (21) with about 35-36 percent capitalization (NSE, 2009). Our result is compared with bivariate analysis of \(\beta_i\) and size of the firm, \(\beta_i\) and \((R_m-R_f)\), \(\beta_i\) and \((P/E)_i\), \(\beta_i\) and \((BE/ME)_i\) etc.

The first section deals with an extant literature review on the standard CAPM and inter-temporal CAPM (ICAPM) and then looks at Multifactor models of CAPM. The second
section focuses on methodology and the third section examines results and analysis. The conclusion part focuses on further scope and improvement of the cross-section of expected stock returns of CAPM or multifactor models.

4. EXTANT LITERATURE REVIEW

Investment in securities market requires the study of the relationship between risk and returns (Manjunatha and Mallikarjunappa, 2009). According to Bodie, Kane and Marcus (2004), “The CAPM presupposes that the only relevant source of risk arises from variations in stock returns, and therefore a representative (market) portfolio can capture the entire risk. As a result, individual-stock risk can be defined by the contribution to overall portfolio risk…” (p. 312). Fama and French (1993, 1996) have shown that beta is not only explanatory variable in capturing the variance of individual’s portfolio return, others are size of the firm, (\(ME/BE\)) ratios, or \(ME\) and \(P/E\) ratios. The argument is put forward by them that multifactor model can improve on the descriptive power of the index model is that betas seem to vary over the business cycle. One of the multifactor examples is the seminal work of Chen, Roll and Ross (1986) which shows the consistency with the empirical study of Merton (1973) and Fama and French (1993). Inclusion of five-factor in the model of Chen, Roll and Ross (1986), namely, IP or percentage change in industrial production, EI or percentage change in expected inflation, UI or percent change in unanticipated inflation, CG or excess return of long-term corporate bonds over long-term government bonds and GB or excess return of long-term government bonds over T-bills, estimates the excess returns (\(R_{it}\), \(t\) is the holding period of portfolio of securities) of the stock in each period on the mentioned macroeconomic factors by employing multiple regression and the residual variance captures the firm-specific risk. An alternative approach proposed by Fama and French (1996) in resuscitating asset pricing anomalies shows that market index (\(R_m\)) does play a role and is expected to capture systematic risk stemming from macroeconomic factors. The study also elucidates that two firm-characteristic variables chosen, viz., SMB or
small minus big\textsuperscript{2} and HML or high minus low\textsuperscript{3} because of corporate capitalization (firm size) and (BE/ME) ratios seem to be predictors on average stock returns, and therefore risk premiums. Fama and French (1996) propose this model on empirical ground by arguing that while SMB and HML are not obvious predictors for relevant risk factors, these may acts as surrogate to more fundamental variables, yet to be identified. For instance, small sized firms have high returns for low (BE/ME) ratios and conversely, large sized firms have low returns for high (BE/ME) ratios. This indicates clearly that with high (BE/ME) ratios, firms are more likely to be in “financial distress” and that small firms may be sensitive to changes in business conditions, hence, these variables may capture sensitivity to risk factors in real world.

Sharpe (1964), Linter (1965), and Mossin (1968) have independently developed form of CAPM. The studies conducted by Black, Jensen, and Scholes (1972), Black (1972, 1993), Fama and MacBeth (1973), and Terregrossa (2001) have largely been supportive of the standard form of CAPM or two-factor model. After 1970s, CAPM came under attack as striking anomalies were reported by Reinganum (1981), Elton and Gruber (1984), Bark (1981), and Harris et al. (2003). Further studies on the fundamental factors of securities such as size effect of Banz (1981), book to market equity (BE/ME), earnings-price (E/P) ratio of Ball (1978) and Basu (1983), and studies of CAPM models by Fama and French (1992; 1993; 1996; 1998; 2002; 2004 and 2006), Davis, Fama and French (2000) show that CAPM’s beta is not a good determinant of the expected return of securities/portfolios. As their argument is substantiated and put forward by earlier work of Rosenberg and Guy (1976) in predicting betas as a function of past beta, firm size, debt to asset ratio etc. They also identify some other variables to help predict betas, namely, variance of earnings, growth in earnings per share (EPS), dividend yield and variance of cash flow.

\textsuperscript{2} The return of a portfolio of small stocks in excess of the return on a portfolio of large stocks

\textsuperscript{3} The return of a portfolio of stocks with high ratios of book value to market value in excess of the return on a portfolio of stocks with low book-to-market ratios
Afterwards, studies by Kothari and Shanken (1995), and Kothari, Shanken, and Sloan (1995) argue in defense of inter-temporal CAPM. Guo and Withtelaw (2006) develop and estimate an empirical model based on the inter-temporal capital asset pricing model (ICAPM) that separately identifies the two components of expected returns, namely, the risk component and the component due to the desire to hedge changes in investment opportunities. The estimated coefficient of relative risk aversion is positive, statistically significant, and reasonable in magnitude. They show that expected returns are driven primarily by the hedge component arguing that omission of this component is partly responsible for the existing contradiction in results. Theoret and Racicot (2007) use a new set of instruments based on higher statistical moments to discard the specification errors that might be present in the Fama and French (1992, 1993, and 1997) model. They show that the usual instruments perform quite poorly in comparison to higher moments. They estimate the Fama and French (1992, 1993, and 1997) model on a sample and show that specification error exists for the loadings of the market premium and the factor SMB (small minus big) which seem understated. Daniel and Titman (1997) argue that it is the characteristics rather than the covariance structure of returns that appear to explain the cross-sectional variation in stock returns. According to study by Cooper et al. (2008), a firm’s annual asset growth rate emerges as an economically and statistically significant predictor of the US stock returns. Liu and Zhang (2008) show that the growth rate of industrial production is priced risk factor in standard asset pricing tests. In many specifications, this macroeconomic risk factor explains more than half of the momentum profits. Their evidence also suggests that the expected growth risk is priced and that the expected growth risk plays an important role in driving momentum profits. Studies by Kothari, Shanken and Sloan (1995) show that excess market returns (\(R_m-R_f\)) explains the variation of security or portfolio returns.

While many studies have been conducted on CAPM in the Western countries, there are a few studies in the Indian context reported by the researchers. Still, there are some
empirical studies are conducted to put forward the argument of CAPM as a robust technique in risk-based asset pricing theory. In case of equity and risk premium measures, India has earlier followed the U.S. based models. After 1996-97, the exact measures of risk premium incorporated in standard CAPM is a scholastic contribution to the financial economics. Studies by Varma (1988), Yalwar (1988), and Srinivasan (1988) have generally supported the CAPM theory in India. Gupta and Sehgal (1993), Vaidyanathan (1995), Madhusoodanan (1997), Sehgal (1997), Ansari (2000), Rao (2004) and Manjunatha et al. (2006; 2007) have questioned validity of CAPM in Indian markets. Ansari (2000) has opined that the studies of CAPM on the Indian markets are scanty and no robust conclusions exist on this model. Mohanty (1998; 2002), Sehgal (2003), Connon and Sehgal (2003) have supported the Factors model. Connon and Sehgal (2003) have shown that the Factors model better than the single factor CAPM in the context of Indian capital market. Manjunatha and Mallikarjunappa (2006) have used five univariate variables (beta, size of the firm, BE/ME ratio, EPS/Price (E/P) ratio, and $R_{m}-R_{f}$) to test the extent of the influence of these variables on the security/portfolio returns and have found that none of the univariate variables significantly explained the variance of security/portfolio returns with the exception of beta and excess market returns ($R_{m}-R_{f}$) in certain cases. Manjunatha and Mallikarjunappa (2009) has tried to capture the variation of returns using bivariate or two parameters test including beta and size, beta and BE/ME, beta and EPS/Price, beta and $R_{m}-R_{f}$ etc.

5. METHODOLOGY

Unlike the effect of single-factor or two-factor model on asset pricing, that is, $\beta_i$ and $(R_{m}-R_{f})$ in explaining the variance of the investor’s expected rate of return on the said portfolio of securities, some additional variables are used to approximate or correctly measure the expected return from a security, what is known as the extended CAPM. Of the variables incorporated to extend the CAPM, size and ($P/E$) ratios or (ME/BE) ratios, (one or the other) have been found to be most consistent and significant in their effect.
The dividend yield is the most controversial as reported by Horne (2002). Hence, for multiple variables, the illustrated model is represented below:

\[
R_j = R_f + b\beta_j + c (\text{variable } 2)_t + d (\text{variable } 3)_t + e (\text{variable } 4)_t + f (\text{variable } 5)_t + \varepsilon_{it}
\]

(1)

Where, again, \(R_f\) is the risk-free rate, \(b, c, d, e\) and \(f\) are coefficients reflecting the relative importance of the variables involved and \(t\) is the holding period of securities as a function of explanatory variables. When variables other than beta are added, a better data fit would have obtained. We define the mentioned variables in the specified model as below:

(a) \(c (\text{variable } 2)_t : t (d_j - R_f)\)

(2)

Where, \(t\) = coefficient indicating the relative importance of the tax effect,

\(d_j = \text{dividend yield on security } j\)

Therefore, incorporating the above in eqn. (1) we get

\[
R_j = R_f + b\beta_j + t (d_j - R_f)
\]

(3)

This equation tells us that the higher the dividend yield, \(d_j\), the higher the expected before-tax return that investors require. If \(t\) was 0.1 and the dividend yield was to rise by 1.0 percent, the expected return would have to increase by .1 percent to make the stock attractive to investors. In another way we can say that the market trade off would be Rs.1.00 of dividends for Rs.0.90 of capital gains (Rs. 1-0.1). Considering the systematic bias in favour of capital gains, the expected return on a stock would depend on its \(\beta\) and its dividend yield. On the corollary, we can say that the use of trade-off between tax effect and capital gains to investors.

(b) \(d (\text{variable } 3)_t : \text{market capitalization as size}\)

(4)

Our equation is therefore,

\[
R_j = R_f + b\beta_j + t (d_j - R_f) + d \text{ (size)}
\]

(5)
The extension of the equation tells us that size as measured by the market capitalization of a company relative to that for other companies, for instance, equal weightage given to NIFTY indexed-50 companies. Market capitalization is simply the number of shares outstanding multiplied by the share price. From time to time, a “small stock effect” appears, where small capitalization stocks give a higher return than large ones, holding other variables constant. It is presumed that small stocks provide less utility to the investor and require a higher return. Often the size variable is treated as the decile or out of total hundred percentage in which the company’s market capitalization falls relative to the market capitalizations of other companies in total, for instance, ACC has ‘x’ crore market capitalization on NIFTY index of total ‘y’ crore, then the size for ACC is expressed as ‘x’/‘y’ X100 or as equal weightage given to all indexed companies.

\[ (c) \, e \, (variable \, 4): \, \rho \, (P/E_j - P/E_m) \]  

At certain times, a price-earnings ratio effect has been observed to a greater extent. Holding constant beta and other incorporated variables, observed returns tend to be higher for low P/E ratio stocks and lower for high P/E ratio stocks. Put in different way we can say that, low P/E ratio stocks earn excess returns above what the CAPM would predict and conversely, high P/E ratio stocks earn less than what the CAPM would explain or predict. This is a form of mean reversion, and it adds explanatory power to the CAPM. With only this variable added to the illustrated model, it becomes

\[ R_j = R_f + \beta_j \beta + \rho (P/E_j - P/E_m) \]  

Where, \( \rho \) is a coefficient akin to \( e \) mentioned in the first equation, reflecting the relative importance of a security’s price-earnings ratio, \( (P/E)_j \) and weighted average of market portfolio’s price-earnings ratio, \( (P/E)_m \). Similar to the use of the price-earnings ratio, the ratio of market-to-book value \( (ME/BE) \) has been used to explain security returns. We propose that either one ratio or the other is employed in our model, not both, unlikely to Fama and French (1993) model. The \( (ME/BE) \) ratio is the market value of all claims on a company, including those of stockholders, divided by the book value of its assets. Holding beta and other variables constant, observed returns would tend to be higher.
for low (ME/BE) or low (P/E) ratio stocks than for high (ME/BE) or high (P/E) ratio stocks. Hence, in the model we use P/E as surrogate or which is proxied for M/B ratio.

(d) $f (\text{variable 5})$: $i$ (inflation covariance $/\sigma_i^2$) or $i \{\text{Cov} (R, i) / \sigma_i^2\}$

Incorporating unanticipated changes in inflation, this implies that the market does not anticipate changes that occur in the rate of inflation. Whether uncertain inflation is good or bad for a stock depends on the covariance of this uncertainty with that of return on stock, that is, $R_j^r = R_j - p$

Where, $R_j^r$ is the return for security j in real terms, $R_j$ is the return for security j in nominal terms and $p$ is the inflation during the period, say, 2000 to 2008. If inflation is highly predictable, investors simply would add an inflation premium on to the real return they would require and markets would equilibrate. In the other case where inflation causes unanticipated changes in expected rate of return, which implies that if the return on a stock increases with unanticipated increases in inflation, this desirable property reduces the systematic bias of the stock in real terms and provides a hedge and conversely opposite to the other situation.

Hence, we would expect that the greater the covariance of the return of a stock with unanticipated changes in inflation, the lower the expected nominal return the market would require. If this is so, one could express the expected nominal return of a stock as a positive function of its beta and a negative function of its covariance with unanticipated inflation. We can define the notation, as $i$ is a coefficient indicating the relative importance of a security’s covariance with inflation, $\sigma_i^2$ is the variance of inflation and the other variables are the same as defined in equation (7). Therefore, the new one we can get

$$R_j = R_j + \beta_j t + \varepsilon_{it}$$

and, the final model would be, $E(R_j) = R_j + \beta_j t - i \{\text{Cov} (R, i) / \sigma_i^2\}$

The above illustration shows the incorporation of four-factor would expect a better explanation of variance in the investor’s expected rate of return of the portfolio. We formulate a hypothesis below which is tested employing multiple regressions technique.
and a comparison is also drawn against the two-factor model in terms of the explanatory power of the test, that is, $R^2$.

$H_1$: Multifactor models have a better explanatory power on the expected rate of return of investor’s portfolio of securities in Indian capital market.

$H_2$: Multifactor models are robust and parsimonious in showing consistency with other existing model of extended CAPM and thus, superior over the two-factor model of standard CAPM.

**Data and Sample: Phase-I**

The study is based on 50 S&P CNX NIFTY companies that were part of the index from 1999 to March 31, 2009. However, for the purpose of study the data are used from 1999-00 to 2008-09 and since then same 50 companies are the part of this index. NIFTY capital market segment’s market capitalization is around 37% (36.674), while SENSEX excluding BSE-100, BSE-500, BSE-IPO, MIDCAP, SMLCAP and other sectoral indices is 63.326% as reported on October 30, 2009. In case of free-float market capitalization index, NIFTY (54.17%) is ahead of SENSEX (45.82%) other than BSE-100. S&P CNX NIFTY is taken as market proxy and the average yields of Government of India (GOI) securities are used as risk-free rate of returns of the respective years. 365 days average of closing price, yearly return on securities, market capitalization, price-to-earnings of index and individual company, dividend yield of each company, Market value of equity (Market price of security times number outstanding shares) and Book value of equity (Book value of share times number of outstanding shares) from 1999-00 to 2008-09 are used for the study. The data were collected from Centre of Monitoring Indian Economy (CMIE-Prowess database), BSE, NSE, RBI, SEBI websites.
6. RESULTS AND ANALYSIS

Cross-Sectional Analysis: Average Ten Years Regression (Phase-II)

In order to get ten years effects of independent variables on individual security return, observations of all the years were averaged of each parameter.

TABLE-1: Average Ten Years Cross Sectional Regression Results of Percentage Returns-Case of Combination of β and Firm-specific Factors

<table>
<thead>
<tr>
<th>Year</th>
<th>β &amp; Size Co-eff</th>
<th>β &amp; ln(ME/BE) Co-eff</th>
<th>β &amp; (P/Ej-P/em) Co-eff</th>
<th>β &amp; (d-Rj) Co-eff</th>
<th>β , Size ln (ME/BE), (P/Ej-P/em) &amp; (d-Rj) Co-eff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ten Years Average</td>
<td>α</td>
<td>β</td>
<td>Size</td>
<td>α</td>
<td>β</td>
</tr>
<tr>
<td></td>
<td>0.31</td>
<td>0.06</td>
<td>-1.63</td>
<td>0.22</td>
<td>0.085</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.33)</td>
<td>(0.10)</td>
<td>(0.03)</td>
<td>(0.25)</td>
</tr>
<tr>
<td></td>
<td>R²=0.077, F Sig.-0.15</td>
<td>R²=0.029, F Sig.-0.51</td>
<td>R²=0.038, F Sig.-0.40</td>
<td>R²=0.056, F Sig.-0.26</td>
<td>R²=0.16, F Sig.-0.17</td>
</tr>
</tbody>
</table>

Data in parenthesis shows individual p value at 5% level of significance.

The study has been conducted by using combination of β, size, ln (ME/BE), (P/Ej-P/em), (d-Rj) and also all the variables together to get the influence of these variables on security returns. The outputs of different risk factors along with their co-efficient are shown in the Table-1. The intercept and slope co-efficient are tested using t-test and the overall goodness-of-fit of the regression is tested using analysis of variance (ANOVA F-test). In this analysis one intercept and 2 slopes co-efficient are obtained for each combination of β and other firm specific factors. But when all the independent variables are taken together, then one intercept and 5 slopes co-efficient are obtained. Table-1 shows that in every case α (intercept) values are significant at 5% level of significance. None of the
combination of $\beta$ and other factors shows significant results as their significance value of $F$-statistics is more than 0.05. Goodness-of-fit ($R^2$) is very low. When $\beta$ and firm size are taken together, $R^2$ value is not able to explain 93% of the variation. This it rejects the chances of the fact that $\beta$ and size are significant determinant of security returns (percentage). The $p$-values of slope of $\beta$ and $\ln (\text{ME/BE})$ are more than 0.05 and $F$-test indicates that the regression is not fit. $R^2$ value is not able to explain 97.1% of the variation. Therefore it also rejects the chances that the combination of $\beta$ and $\ln (\text{ME/BE})$ do explain the variation in security returns. The similar result is also found in the combination of $\beta$ and $(\text{P/E}_j-\text{P/E}_m)$. The individual $p$-value of the coefficient is also more than 0.05 with goodness-of-fit only 3.8%. Same result is also obtained in the combination of $\beta$ and $(\text{d-R}_j)$. This is also unfit for explaining the variation upto 94.4% which is enough to reject the chances of determining the variation of security returns. To overcome this limitation all the factors are taken together along with $\beta$ to get the extent of effects caused by these variables on security returns. But similar result is observed. The $F$-significance is much more than 0.05. Though values of is found to be higher than other cases, but it is due to increased number of independent variables. None of the slopes is having with $P$-value lower than 0.05. So, this is also unfit to explain the variation on security returns.

**CHART-1: Comparison of Actual Return, Predicted Return and Residual.**
Chart 1 shows that both the predicted and actual values are following each other but in some cases it is deviating from actual value to a great extent. Residuals or unexplained variations are also very high. Predicted line is not capable enough to capture the variations which are left as residuals without being explained.

**TABLE-2: Combined Years Cross Sectional Regression Results of Log Returns-Case of Combination of β and Firm-specific Factors**

<table>
<thead>
<tr>
<th>Year</th>
<th>β &amp; Size Co-eff</th>
<th>β &amp; ln(ME/BE) Co-eff</th>
<th>β &amp; (P/Ej-P/em) Co-eff</th>
<th>β &amp; (d-Rj) Co-eff</th>
<th>β, Size ln (ME/BE), (P/Ej-P/em) &amp; (d-Rj) Co-eff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>α</td>
<td>β</td>
<td>ln(ME/BE)</td>
<td>α</td>
<td>β</td>
</tr>
<tr>
<td>Combined</td>
<td>1.26</td>
<td>0.17</td>
<td>0.003</td>
<td>-1.39</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.46)</td>
<td>(0.98)</td>
<td>(0.00)</td>
<td>(0.45)</td>
</tr>
<tr>
<td>R²</td>
<td>0.063, F Sig.-0.22</td>
<td>R²-0.015, F Sig.-0.71</td>
<td>R²-0.04, F Sig.-0.39</td>
<td>R²-0.061, F Sig.-0.23</td>
<td>R²-0.15, F Sig.-0.21</td>
</tr>
</tbody>
</table>

**Factors**

Data is parenthesis shows individual p-value at 5% level of significance.

The study has also been conducted by using combination of β, size, ln (ME/BE), (P/Ej-P/em), (d-Rj) and also all the variables together to get the influence of these variables on logarithmic security returns. The outputs of different risk factors along with their co-efficient are shown in the Table-2. The intercept and slope co-efficient are tested using t-test and the overall goodness-of-fit of the regression is tested using analysis of variance (ANOVA F-test). In this analysis one intercept and 2 slopes co-efficient are obtained for each combination of β and other firm specific factors. But when all the independent variables are tested together, then one intercept and 5 slopes co-efficient are obtained. Table-2 shows that in every case α (intercept) values are significant at 5% level of significance. None of the combination of β and other factors
shows significant results as their significance value of F-statistics is more than 0.05. Goodness-of-fit (R²) is very low. When β and firm size are taken together, R² value is not able to explain 93.7% of the variation. This it rejects the chances of the fact that β and size are significant determinant of security returns (percentage). The p-values of slope of β and ln (ME/BE) are more than 0.05 and F-test indicates that the regression is not fit. R² value is not able to explain 97.1% of the variation. Therefore it also rejects the chances that the combination of β and ln (ME/BE) do explain the variation in security returns. The similar result is also found in the combination of β and (P/Ej-P/Em). The individual p-value of the coefficient is also more than 0.05 with goodness-of-fit only 3.8%. Same result is also obtained in the combination of β and (d-Rj). This is also unfit for explaining the variation upto 94.4% which is enough to reject the chances of determining the variation of security returns. To overcome this limitation all the factors are taken together along with β to get the extent of effects caused by these variables on security returns. But similar result is observed. The F-significance is much more than 0.05. Though values of is found to be higher than other cases, but it is due to increased number of independent variables. None of the slopes is having with P-value lower than 0.05. So, this is also unfit to explain the variation on security returns.

**Cross-Sectional Analysis:** Year wise Cross Sectional Regression Results of Percentage Returns-Case of Combination of β and Firm-specific Factors

Capturing the explained variation on individual securities’ rate of rerun on the basis of averaging of 10 years does not prove significant. In order to see the trends of significance over the years, year wise regression is run to test the influence of independent variables on security’s return. But not impressive result is observed. Similar technique using combination of β, size, ln (ME/BE), (P/Ej-P/Em), (d-Rj) and also all the variables together are used to get the influence of these variables on logarithmic security returns. The slopes of every independent variable come with p-value more than 0.05.
But, it is also evident from the Table-2 (Appendix-I) that size is trying to capture the variation. The R2 is ranging from 2% to 12% which does not suffice to explain the variation. In all the cases the F-significance is much more than 0.05.

**Cross-Sectional Analysis: Year wise Cross Sectional Regression Results of Log Returns-Case of Combination of \( \beta \) and Firm-specific Factors**

The study has also been conducted by using combination of \( \beta \), size, \( \ln (\text{ME}/\text{BE}) \), \( (P/E_j-P/E_m) \), \( (d-R_j) \) and also all the variables together to get the influence of these variables on logarithmic security returns. But again similar output is obtained. The slopes of every independent variable come with \( p \)-value more than 0.05. But, it is also evident from the Table-3 (Appendix-II) that size is not able to capture the variation as opposed to regression results of percentage returns on security. The R2 is ranging from 1.9% to 23% which does not suffice to explain the variation. In all the cases the F-significance is much more than 0.05.
7. SUMMARY AND CONCLUSION

The present study has not only entailed different combination of two factors but also included multi-factor together to test the CAPM. $\beta$ and size, $\beta$ and ln (ME/BE), $\beta$ and $(P/E_j-P/E_m)$, $\beta$ and $(d-R_i)$ and $\beta$, size, ln (ME/BE), $(P/E_j-P/E_m)$, $(d-R_i)$ together are used on Indian stock market (S&P CNX NIFTY). The overall summary of the findings are as follows:

- The intercept is coming significantly different from zero as its $p$-value is more than 0.05. But overall $F$-significance is also higher than 0.05 which rejects the validity of the model. The result shows that $\beta$ and size $\beta$ and ln (ME/BE), $\beta$ and $(P/E_j-P/E_m)$, $\beta$ and $(d-R_i)$ and $\beta$, size, ln (ME/BE), $(P/E_j-P/E_m)$, $(d-R_i)$ together are not capable enough to explain the variation in both the cases of percentage security return and log return when average of every parameters are used.

- Again the result also shows that $\beta$ and size $\beta$ and ln (ME/BE), $\beta$ and $(P/E_j-P/E_m)$, $\beta_i$ and $(d_j-R_i)$ and $\beta_i$, size, ln(ME/BE), $(P/E_j-P/E_m)$, $(d_j-R_i)$ together are not significantly capturing the variation both in the cases of percentage of returns and log returns when individual year (1999-00 to 2008-09) is considered.

Hence, it is ostensible from the study that both the model rejects the alternative hypothesis saying that Multifactor CAPM is better to capture variation of the investors the required rate of return and is more robust than the two-factor CAPM. Results of our study partially corroborate to the study of Fama and French (1992, 1993,1996,1998,2003 and 2004) and Manjunatha and Malikajunappa (2009).

On the posterity of financial maelstrom in continued globalised economy, serious concern raises on the utility of the extended CAPM to unfold the asset-pricing anomalies. “Data snooping” which is noted by Merton and put forward the argument that researchers many a times try to identify the best explanatory variable to predict and explain maximum variance of the investor’s portfolio return or individual security’s required rate of return.

Few caveats revealed in this paper could be that beta, which we have taken directly from the market or historical beta instead of doing estimation and avoidance of employing time-series regression and daily return (instead of 365 days average return) or to capture the lag effect on the combination of parameters on the dependent variable or individual securities and portfolio return. Another would be incorporation of equity risk premium, which often is employed in bivariate analysis (Manjunatha and
Mallikarjunappa, 2009). In effect, investor’s required rate of return would pose a threat on whether the model would have a better fit in explanation or two-factor model would have a better explanatory power. Result shows that multi-factor model has relatively a better fit over the two-factor model, but in sense we cannot say that both the model would predicate the subject, that is, investor’s return in a better and elegant way. Hence, should we continue with the insignificant test-result to unravel the riddle and ramifications of CAPM puzzle in a significant way?

****

References


Websites


http://www.nseindia.com/business growth in CM segment/S&PCNXNIFTY.

### Appendix-I

**Table-3: Cross-sectional Regression Result of Percentage Returns—Case of Combination of β & Firm-specific Factors**

<table>
<thead>
<tr>
<th>Year</th>
<th>β &amp; Size Co-eff</th>
<th>β &amp; ln(ME/BE) Co-eff</th>
<th>β &amp; (P/E_j-P/E_m) Co-eff</th>
<th>β &amp; (d-R_j) Co-eff</th>
<th>β, Size ln (ME/BE), (P/E_j-P/E_m) &amp; (d-R_j) Co-eff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>α   β</td>
<td>Size</td>
<td>α   β</td>
<td>ln(ME/BE)</td>
<td>α   β</td>
</tr>
<tr>
<td>1999-00</td>
<td>0.29 0.039</td>
<td>1.566 (0.12)</td>
<td>0.15 0.083 (0.25)</td>
<td>0.047 0.012 (0.18)</td>
<td>0.25 0.04 (0.01)</td>
</tr>
<tr>
<td></td>
<td>(0.00) (0.54)</td>
<td>(0.14) (0.25)</td>
<td>(0.012) (0.18)</td>
<td>(0.012) (0.18)</td>
<td>(0.012) (0.18)</td>
</tr>
<tr>
<td></td>
<td>0.18 0.075</td>
<td>1.455 (0.15)</td>
<td>0.032 0.039 (0.00)</td>
<td>0.400 0.306 (0.037)</td>
<td>0.27 0.04 (0.01)</td>
</tr>
<tr>
<td></td>
<td>(0.07) (0.70)</td>
<td>(0.039) (0.00)</td>
<td>(0.306) (0.037)</td>
<td>(0.306) (0.037)</td>
<td>(0.306) (0.037)</td>
</tr>
<tr>
<td></td>
<td>R²=0.0599, F Sig.-0.237</td>
<td>R²=0.042, F Sig.-0.361</td>
<td>R²=0.0199, F Sig.-0.62</td>
<td>R²=0.03, F Sig.-0.43</td>
<td>R²=0.179, F Sig.-0.109</td>
</tr>
<tr>
<td>2000-01</td>
<td>0.29 0.04</td>
<td>1.455 (0.15)</td>
<td>0.18 0.075 (0.00)</td>
<td>0.032 0.039 (0.00)</td>
<td>0.25 0.04 (0.01)</td>
</tr>
<tr>
<td></td>
<td>(0.00) (0.50)</td>
<td>(0.07) (0.30)</td>
<td>(0.039) (0.00)</td>
<td>(0.039) (0.00)</td>
<td>(0.039) (0.00)</td>
</tr>
<tr>
<td></td>
<td>R²=0.054, F Sig.-0.261</td>
<td>R²=0.02, F Sig.-0.52</td>
<td>R²=0.028, F Sig.-0.50</td>
<td>R²=0.02, F Sig.-0.61</td>
<td>R²=0.10, F Sig.-0.432</td>
</tr>
<tr>
<td>2001-02</td>
<td>0.29 0.06</td>
<td>-1.40 (0.16)</td>
<td>0.19 0.09 (0.21)</td>
<td>0.031 0.040 (0.040)</td>
<td>0.26 0.06 (0.00)</td>
</tr>
<tr>
<td></td>
<td>(0.00) (0.36)</td>
<td>(0.06) (0.21)</td>
<td>(0.040) (0.040)</td>
<td>(0.040) (0.040)</td>
<td>(0.040) (0.040)</td>
</tr>
<tr>
<td></td>
<td>R²=0.06, F Sig.-0.235</td>
<td>R²=0.035, F Sig.-0.43</td>
<td>R²=0.03, F Sig.-0.42</td>
<td>R²=0.02, F Sig.-0.56</td>
<td>R²=0.10, F Sig.-0.432</td>
</tr>
<tr>
<td>2002-03</td>
<td>0.28 0.071</td>
<td>-1.52 (0.14)</td>
<td>0.17 0.10 (0.21)</td>
<td>0.035 0.035 (0.035)</td>
<td>0.24 0.07 (0.013)</td>
</tr>
<tr>
<td></td>
<td>(0.00) (0.29)</td>
<td>(0.10) (0.21)</td>
<td>(0.035) (0.035)</td>
<td>(0.035) (0.035)</td>
<td>(0.035) (0.035)</td>
</tr>
<tr>
<td></td>
<td>R²=0.07, F Sig.-0.17</td>
<td>R²=0.04, F Sig.-0.34</td>
<td>R²=0.037, F Sig.-0.40</td>
<td>R²=0.02, F Sig.-0.52</td>
<td>R²=0.10, F Sig.-0.39</td>
</tr>
</tbody>
</table>

Kushankur Dey and Debasish Maitra, Fellow Participant, IRMA (Oct-2009)
<table>
<thead>
<tr>
<th>Year</th>
<th>Beta 1</th>
<th>Beta 2</th>
<th>Beta 3</th>
<th>Beta 4</th>
<th>Beta 5</th>
<th>Beta 6</th>
<th>Beta 7</th>
<th>Beta 8</th>
<th>Beta 9</th>
<th>Beta 10</th>
<th>F Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003-04</td>
<td>0.27 (0.00)</td>
<td>0.06 (0.32)</td>
<td>-1.50 (0.12)</td>
<td>0.24 (0.00)</td>
<td>0.06 (0.35)</td>
<td>-0.001 (0.80)</td>
<td>0.23 (0.00)</td>
<td>0.06 (0.30)</td>
<td>0.00 (0.54)</td>
<td>0.23 (0.00)</td>
<td>0.05 (0.41)</td>
</tr>
<tr>
<td>2004-05</td>
<td>0.29 (0.00)</td>
<td>0.05 (0.36)</td>
<td>-1.55 (0.11)</td>
<td>0.23 (0.026)</td>
<td>0.07 (0.30)</td>
<td>0.011 (0.76)</td>
<td>0.25 (0.06)</td>
<td>0.06 (0.35)</td>
<td>0.00 (0.44)</td>
<td>0.24 (0.01)</td>
<td>0.06 (0.34)</td>
</tr>
<tr>
<td>2005-06</td>
<td>0.30 (0.00)</td>
<td>0.07 (0.25)</td>
<td>-1.81 (0.08)</td>
<td>0.25 (0.025)</td>
<td>0.13 (0.095)</td>
<td>0.012 (0.755)</td>
<td>0.27 (0.00)</td>
<td>0.11 (0.12)</td>
<td>0.00 (0.37)</td>
<td>0.28 (0.00)</td>
<td>0.12 (0.12)</td>
</tr>
<tr>
<td>2006-07</td>
<td>0.32 (0.00)</td>
<td>0.00 (0.11)</td>
<td>-1.84 (0.079)</td>
<td>0.25 (0.025)</td>
<td>0.13 (0.095)</td>
<td>0.012 (0.755)</td>
<td>0.27 (0.00)</td>
<td>0.11 (0.11)</td>
<td>0.00 (0.37)</td>
<td>0.28 (0.00)</td>
<td>0.12 (0.12)</td>
</tr>
<tr>
<td>2007-08</td>
<td>0.37 (0.00)</td>
<td>0.06 (0.35)</td>
<td>-1.88 (0.08)</td>
<td>0.28 (0.012)</td>
<td>0.09 (0.26)</td>
<td>0.019 (0.60)</td>
<td>0.32 (0.00)</td>
<td>0.06 (0.34)</td>
<td>0.00 (0.30)</td>
<td>0.27 (0.02)</td>
<td>0.06 (0.42)</td>
</tr>
</tbody>
</table>

Kushankur Dey and Debasish Maitra, Fellow Participant, IRMA (Oct-2009)
Data in parenthesis shows p-value at 5% level of significance

### Appendix-II

Table-4: Cross-sectional Regression Result of Log Returns-Case of Combination of β & Firm-specific Factors

<table>
<thead>
<tr>
<th>Year</th>
<th>β &amp;Size Co-eff</th>
<th>β &amp; ln(ME/BE) Co-eff</th>
<th>β &amp; (P/Ej-P/Em) Co-eff</th>
<th>β &amp; (d-Rj) Co-eff</th>
<th>β, Size ln(ME/BE), (P/Ej-P/Em) &amp; (d-Rj) Co-eff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>α</td>
<td>β</td>
<td>Size</td>
<td>α</td>
<td>β</td>
</tr>
<tr>
<td>2008-09</td>
<td>0.34 (0.00)</td>
<td>0.05 (0.42)</td>
<td>-1.73 (0.09)</td>
<td>0.25 (0.02)</td>
<td>0.08 (0.28)</td>
</tr>
<tr>
<td>R²-0.085, F Sig-0.13</td>
<td>R²-0.085, F Sig-0.13</td>
<td>R²-0.085, F Sig-0.13</td>
<td>R²-0.085, F Sig-0.13</td>
<td>R²-0.085, F Sig-0.13</td>
<td></td>
</tr>
</tbody>
</table>

Kushankur Dey and Debasish Maitra, Fellow Participant, IRMA (Oct-2009)
<table>
<thead>
<tr>
<th>Year</th>
<th>Beta</th>
<th>Alpha</th>
<th>SDR</th>
<th>EMM</th>
<th>HML</th>
<th>SMB</th>
<th>EEM</th>
<th>EM</th>
<th>FAM</th>
<th>R²</th>
<th>F Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-02</td>
<td>-1.31 (0.00)</td>
<td>0.17 (0.45)</td>
<td>-4.61 (0.20)</td>
<td>-1.49 (0.00)</td>
<td>0.22 (0.39)</td>
<td>0.038 (0.77)</td>
<td>-1.41 (0.00)</td>
<td>0.18 (0.46)</td>
<td>0.00 (0.27)</td>
<td>-1.34 (0.00)</td>
<td>0.22 (0.37)</td>
</tr>
<tr>
<td>R²: 0.048, F Sig.: 0.311</td>
<td>R²: 0.016, F Sig.: 0.69</td>
<td>R²: 0.039, F Sig.: 0.39</td>
<td>R²: 0.036, F Sig.: 0.43</td>
<td>R²: 0.11, F Sig.: 0.41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002-03</td>
<td>-1.33 (0.00)</td>
<td>0.17 (0.53)</td>
<td>-5.86 (0.16)</td>
<td>-1.58 (0.00)</td>
<td>0.24 (0.42)</td>
<td>0.06 (0.72)</td>
<td>-1.46 (0.00)</td>
<td>0.18 (0.51)</td>
<td>0.00 (0.31)</td>
<td>-1.34 (0.00)</td>
<td>0.23 (0.40)</td>
</tr>
<tr>
<td>R²: 0.053, F Sig.: 0.28</td>
<td>R²: 0.014, F Sig.: 0.72</td>
<td>R²: 0.033, F Sig.: 0.45</td>
<td>R²: 0.029, F Sig.: 0.49</td>
<td>R²: 0.11, F Sig.: 0.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003-04</td>
<td>-1.42 (0.00)</td>
<td>0.21 (0.44)</td>
<td>-6.23 (0.12)</td>
<td>-1.36 (0.00)</td>
<td>0.14 (0.62)</td>
<td>-0.026 (0.33)</td>
<td>-1.56 (0.00)</td>
<td>0.22 (0.42)</td>
<td>0.001 (0.40)</td>
<td>-1.44 (0.00)</td>
<td>0.27 (0.32)</td>
</tr>
<tr>
<td>R²: 0.065, F Sig.: 0.21</td>
<td>R²: 0.036, F Sig.: 0.42</td>
<td>R²: 0.032, F Sig.: 0.48</td>
<td>R²: 0.026, F Sig.: 0.54</td>
<td>R²: 0.11, F Sig.: 0.36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004-05</td>
<td>-1.26 (0.00)</td>
<td>0.19 (0.40)</td>
<td>-5.44 (0.11)</td>
<td>-1.35 (0.00)</td>
<td>0.20 (0.42)</td>
<td>-0.02 (0.87)</td>
<td>-1.38 (0.00)</td>
<td>0.20 (0.88)</td>
<td>0.00 (0.31)</td>
<td>-1.19 (0.00)</td>
<td>0.29 (0.23)</td>
</tr>
<tr>
<td>R²: 0.054, F Sig.: 0.27</td>
<td>R²: 0.016, F Sig.: 0.69</td>
<td>R²: 0.034, F Sig.: 0.44</td>
<td>R²: 0.014, F Sig.: 0.71</td>
<td>R²: 0.088, F Sig.: 0.53</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005-06</td>
<td>-1.26 (0.00)</td>
<td>0.19 (0.40)</td>
<td>-5.44 (0.11)</td>
<td>-1.35 (0.00)</td>
<td>0.20 (0.42)</td>
<td>-0.02 (0.87)</td>
<td>-1.38 (0.00)</td>
<td>0.20 (0.88)</td>
<td>0.00 (0.31)</td>
<td>-1.19 (0.00)</td>
<td>0.29 (0.23)</td>
</tr>
<tr>
<td>Year</td>
<td>R² (p-value)</td>
<td>F Sig. (p-value)</td>
<td>Year</td>
<td>R² (p-value)</td>
<td>F Sig. (p-value)</td>
<td>Year</td>
<td>R² (p-value)</td>
<td>F Sig. (p-value)</td>
<td>Year</td>
<td>R² (p-value)</td>
<td>F Sig. (p-value)</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>-----------------</td>
<td>--------</td>
<td>-------------</td>
<td>-----------------</td>
<td>--------</td>
<td>-------------</td>
<td>-----------------</td>
<td>--------</td>
<td>-------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>2006-07</td>
<td>-1.16 (0.00)</td>
<td>0.23 (0.24)</td>
<td>-4.52 (0.13)</td>
<td>-1.24 (0.00)</td>
<td>0.24 (0.27)</td>
<td>-0.19 (0.86)</td>
<td>-1.27 (0.00)</td>
<td>0.23 (0.23)</td>
<td>0.00 (0.24)</td>
<td>-1.26 (0.00)</td>
<td>0.26 (0.93)</td>
</tr>
<tr>
<td></td>
<td>0.071, F Sig. -0.18</td>
<td>R²</td>
<td>-1.16 (0.00)</td>
<td>0.23 (0.24)</td>
<td>-4.52 (0.13)</td>
<td>-1.24 (0.00)</td>
<td>0.24 (0.27)</td>
<td>-0.19 (0.86)</td>
<td>-1.27 (0.00)</td>
<td>0.23 (0.23)</td>
<td>0.00 (0.24)</td>
</tr>
<tr>
<td>2007-08</td>
<td>-1.09 (0.00)</td>
<td>0.17 (0.40)</td>
<td>-5.15 (0.08)</td>
<td>-1.32 (0.00)</td>
<td>0.23 (0.30)</td>
<td>0.049 (0.65)</td>
<td>-1.22 (0.00)</td>
<td>0.17 (0.39)</td>
<td>0.00 (0.22)</td>
<td>-1.22 (0.00)</td>
<td>0.19 (0.37)</td>
</tr>
<tr>
<td></td>
<td>0.080, F Sig. -0.14</td>
<td>R²</td>
<td>-1.09 (0.00)</td>
<td>0.17 (0.40)</td>
<td>-5.15 (0.08)</td>
<td>-1.32 (0.00)</td>
<td>0.23 (0.30)</td>
<td>0.049 (0.65)</td>
<td>-1.22 (0.00)</td>
<td>0.17 (0.39)</td>
<td>0.00 (0.22)</td>
</tr>
<tr>
<td>2008-09</td>
<td>-1.81 (0.00)</td>
<td>0.16 (0.45)</td>
<td>-5.27 (0.11)</td>
<td>-1.48 (0.00)</td>
<td>0.25 (0.30)</td>
<td>0.09 (0.46)</td>
<td>-1.31 (0.00)</td>
<td>0.17 (0.44)</td>
<td>0.00 (0.23)</td>
<td>-0.64 (0.13)</td>
<td>0.244 (0.06)</td>
</tr>
<tr>
<td></td>
<td>0.068, F Sig. -0.19</td>
<td>R²</td>
<td>-1.81 (0.00)</td>
<td>0.16 (0.45)</td>
<td>-5.27 (0.11)</td>
<td>-1.48 (0.00)</td>
<td>0.25 (0.30)</td>
<td>0.09 (0.46)</td>
<td>-1.31 (0.00)</td>
<td>0.17 (0.44)</td>
<td>0.00 (0.23)</td>
</tr>
</tbody>
</table>

Data in parenthesis shows p-value at 5% level of significance