International Journal of Management, IT & Engineering
Vol. 8 Issue 8, August 2018,
ISSN: 2249-0558 Impact Factor: 7.119
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A

The Conditional Relationship between Systematic Risk and Return in Indian Equity Market

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Keywords:

Capital Asset Pricing Model;
Conditional Relationship;
Beta;
Emerging Market;
Indian Stock Market.

Abstract

One of the important conditions for the traditional CAPM to hold is that the expected market risk premium must be positive. However, the validity of the traditional CAPM model is tested on realized returns rather than on expected return and the realized returns may be positive or negative. The current study aims at developing the model which incorporates both rising and declining market and testing it for the Indian market. The results of the study show that realized returns vary directly (inversely) with beta during up (down) market. The results further indicate the asymmetric relationship between betas and return in up and down markets.

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1-Introduction

This paper aims at analyzing the conditional relationship between beta and return in the Indian equity market. The Capital Asset Pricing Model (CAPM) developed by Sharpe (1964), Lintner (1965) and Mossin (1966) assumes that beta (a measurement of market risk) of a stock is the sole determinant of the expected return on the stock. Early studies have supported the positive linear relationship between beta and return (Fama and Macbeth, 1973). However, numerous studies conducted since Fama and MacBeth (1973) failed to find consistent evidence of the existence of significant relationship between beta and return (Fama and French, 1992). Despite limitations, the CAPM is considered as the most accepted model by the financial analyst. We believe that researchers should critically examine the assumptions and limitation of the traditional CAPM model before empirically testing the validity of the model. The traditional CAPM model assumes given the positive expected risk premium there is a direct linear relationship between beta of a security and expected return on the security. However, the empirical validity of the traditional CAPM is tested on the realized returns (rather than on expected returns) and many times the realized market risk premiums are not positive. Since equity is a long-term source of investment, in the long run we may assume that expected market risk premium is positive. However, in the short run we may not always expect that market risk premium is positive. Thus, we believe that the traditional CAPM describes the long-run relationship between beta and expected return where the expected market risk premium is always positive. Here, we suggest a model which describes both short-run and long-run relationship between beta and expected return. That is, the model describes what kind of relationship is expected between beta and return when the expectation about the market is positive (expected market risk premium is positive), and what kind of relationship between beta and return is expected when the expectation about the market is negative (expected market risk premium is negative). This is what Pettengill, Sundaram and Mathur (1995) call conditional relationship between beta and return. According to Pettengill, Sundaram and Mathur (1995), if realized return are taken as a proxy for expected return, there is a (an) direct (inverse) relationship between beta and return if the realized market risk premium is positive (negative). This approach of investigating the relationship between beta and return further helps us to assess whether relationship between beta and return is symmetric during negative and positive markets.

The main objective of this paper is to assess the conditional relationship between beta and return during up and down markets separately in the Indian stock market. The up market has been defined as realized market return being more than the risk free rate (that is, market risk premium is positive) and down market has been defined as realized market return being less than the risk-free rate of return (that is, market risk premium is negative).This paper further investigates whether the relationship between beta and return is symmetric during up and down markets. The testing of symmetry of beta during up and down market is relevant and may make additional contribution in the existing literature of asset pricing as the traditional CAPM assumes that beta is symmetric during up and down market. The approach adopted in the current study is different from approaches adopted by Fama and Macbeth (1973) and Pettengill, Sundaram and Mathur (1995).Salazar and Lambert (2010) critically examined the Fama and Macbeth (1973) approach and observed that the Fama and Macbeth (1973) estimated 402 cross-sectional regression equations describing the relationship between the realized return of the portfolio and beta of the portfolio. These cross-sectional regressions were estimated for each of the 402 months covering the time period from January 1935 (t = 1) to June 1968 (t = 402). The estimated coefficients of beta in cross-sectional regressions came out to be highly time-variant and even negative in large number of cases. The coefficient of beta was negative for 185 months out of the total 402 months. This shows that there is an inverse relationship between beta and returns in these 185 months. To assess the long-run relationship between beta and expected return, Fama and Macbeth (1973) used mean value coefficient of the beta which has been computed as the average of the coefficients of beta of the portfolio estimated in the 402 regression equations (which also included 185 negative coefficients of beta). Similarly, they computed standard deviation of coefficients of beta by assuming that these 402 coefficients of beta are independent. To overcome the problem of negative coefficients of beta, Pettengill, Sundaram and Mathur(1995)estimated separate cross-sectional regression equations for up and down markets, which showed significant positive relationship between beta and returns during the up market and negative relationship between beta and return during the down market. However, to assess the long run relationship between beta and realized returns during up and down market, they use the same approach as adopted by Fama and Macbeth (1973). Thus the model suggested by Pettengill, Sundaram and Mathur (1995)also has one limitation, they also assumed that estimated coefficients of beta during up and down markets are independent. The approach adopted in the current study is the modified version of Pettengill, Sundaram and Mathur (1995) with one difference. The current study estimated one pooled regression (instead of each month cross-sectional regression for up and down markets separately) incorporating both up market and down market in one regression equation. Thus, to a great extent the model used in the current study is able to eliminate the limitations as found in Fama and Mac-Beth (1973) and Pettengill, Sundaram and Mathur (1995).

There are few studies which have investigated the conditional relationship between beta and return. Pettengill, Sundaram and Mathur (1995) investigated the conditional relationship between beta and return in the

context of US stock market. Fletchers (1997) examined the conditional relationship between beta and return for UK stock market. He also found a significant relationship between beta and return when the market was split into positive and negative periods. However, it was also observed in his study that relationship was stronger in months when the excess market returns were negative than when the excess returns were positive.Sandoval and Saens (2004) using the approach of Pettengill, Sundaram and Mathur (1995) analyzed the beta-risk and return relationship for the Argentinean, Brazilian, Chilean and Mexican stock markets. They also found conditional CAPM to be a dominant approach even after controlling for other risk factors such as size, book to market ratio and momentum. The results also showed statistically significant asymmetries in beta-risk premium in up and down markets. Ho, Strange and Piesse (2006) with Hong-Kong equity stock data have examined empirically the pricing effect of beta, firm size and book to market equity for conditional market situations and found a systematic relationship between beta and average returns. The other important studies using the same approach are of Elsas, Shaer and Theissen (2003) for the German Stock Market; Ocampo (2004) for the Philippine Equities Market; Theriou, Aggelidis, Maditinos and Sevic (2010) for Athens Stock Exchange of Greece Market; Zhang and Wihlborg (2010) for six European emerging capital markets, namely, Cyprus, Czech Republic, Hungary, Poland, Russia and Turkey. The results of these studies also showed significant relationship between beta and returns.

In the context of the Indian stock Market, there are mixed results regarding the beta as the determinant of expected returns. Yalwar (1988), Verma (1988) and Srinivasan (1988) supported the traditional CAPM and found beta to be a significant determinant of stock returns in the Indian stock market. On the other hand, Gupta and Sehgal (1993), Obaidullah (1994), Madhusoodan (1997), Sehgal (1997), Basu and Chawla (2010) and Choudhary and Choudhary (2010) did not support the validity of traditional CAPM in Indian Stock Market. As per CAPM, ex-ante, the market returns cannot be less than risk free rate. However, in actual market, the ex-post realized market return may be less than the risk free rate which may result in non-existence of relationship between risk and return as predicted by the traditional CAPM. When actual excess realized market returns are not positive, a reasonable inference may be drawn that returns for high beta portfolios will produce more negative returns as compared to the low beta portfolios. This is because high beta stocks are more sensitive to market returns. The presence of many negative market excess return periods implies that earlier studies were prejudiced against searching a systematic relationship while analyzing for an unconditional positive correlation between beta and realized returns. Further, Zhang and Wihlborg (2010) have emphasized that in emerging markets, where periods with negative realized market excess returns are expected to be observed repeatedly, distinction between up and down markets is essential for the study of relationship between beta and returns.

In the light of the fact that negative realized excess market returns are observed frequently in the emerging markets like India, the aim of the current study is to analyze the relationship between beta and returns during the up and the down markets separately in the Indian Equity Market. Unlike previous studies in the context of Indian Equity Market not supporting the applicability of traditional CAPM, this study, to the best of our knowledge, is the first work to account for the conditional relationship between beta and return in the Indian Equity market. Most of the asset pricing models have been empirically tested in the context of developed economies. In the context of emerging economies, this topic has not been researched intensively. Since the contextual framework of emerging economies may be significantly different from the developed economies, the results of this study may further contribute to the existing literature of asset pricing models.

The rest of the paper is organized as follows. Section 2 explains the empirical model. Section 3 deals with methodology and data base of the study. Section 4 analyzes the empirical results respectively while Section 5 gives concluding remarks.

2. Empirical Model

The traditional model developed by Sharpe (1964), Lintner (1965) and Mossin (1966) emphasizes that investors are compensated for bearing only systematic risk as the unsystematic risk can be eliminated through the diversification of the portfolio. The relationship between the expected return and systematic risk as per the traditional CAPM is expressed as follows

$$E(r_p) = r_f + \beta_p[E(r_m) - r_f)] \qquad (1)$$

Where:

$E(r_p)$ is the expected return on the portfolio.

r_f is the risk-free rate of interest.

β_p is the beta of the portfolio which is taken as a measure of systematic risk.

$E(r_m)$ is the expected market return.

Equation (1) describes the direct linear relationship between beta and expected return and assumes that the expected market return is always greater than the risk-free rate of interest. However, the researchers used the realized returns (instead of expected returns) to empirically test the validity of the traditional CAPM model. Since the realized market return may be less than risk-free rate of interest, we need to modify the traditional CAPM model to empirically assess the relationship between beta and return. Here, we construct the empirical

model which incorporates both up market (realized market return is greater than the risk-free rate) and down market (realized market return is less than the risk-free rate) in the same model to investigate the relationship between beta and return. The empirical model suggested in this study is different from Pettengill, Sundaram and Mathur (1995). Pettengill, Sundaram and Mathur (1995) suggested two regression models to assess the relationship between beta and return, one for the up market and another for the down market. They then used the Fama and Macbeth (1973) approach to estimate the coefficients of beta for up and down markets separately. Thus, their suggested model also suffers from the limitations of Fama and Macbeth (1973) approach. The current study uses the pooled regression model to assess the relationship for both up and down market and thus it does not require to use Fama and Macbeth approach. This study empirically tests both unconditional and conditional relationship between beta and return for the Indian market. The relationship has been tested both for individual securities as well as for the portfolios.

To test the unconditional relationship between beta and return the following two empirical regression models have been used.

$$r_{pt} - r_{ft} = \alpha_p + \beta_p(r_{mt} - r_{ft}) + u_{pt}\ , t = 1,2, \dots T. \qquad (2)$$

$$r_{pt} = \gamma_0 + \gamma_1\beta_p + u_{pt}^{'}\ , p = 1,2,..n; t = T_1, T_2, \dots, T_T; and\ T_1 > T \qquad (3)$$

The first regression model estimates the beta of the portfolio or individual security which is the time series regression model. The second model which is the pooled regression model tests the relationship between beta and return using the beta estimated from the first model. The time frames for the two models are different. For first time period (five-year period), the betas are estimated, and for the next time period (next five-year period), the relationship beta and return is assessed using the betas estimated from the first time period. There is no overlapping between the two time periods. The first period is called beta estimation period and the second period is called testing period.

If the estimated coefficient $\gamma_1$comes out to be positive and significant, it means there is a direct and unconditional relationship between beta and return which shows positive risk-return tradeoff. However, if the estimated coefficient γ_1 comes out to be negative and significant or insignificant, it means that the direct and unconditional relationship between beta and return does not hold. If beta is considered as a measurement of market risk, there must be a situation in which a portfolio which has a higher beta must earn the rate of return lower than a portfolio which has a lower beta, otherwise no investor will invest in low beta portfolios. As per equation (2), the relationship between beta and return depends upon the relationship between realized rate of market return and risk-free rate of return. According to equation (2), if the realized rate of market return is more than the risk-free rate of return, there is a direct relationship between beta and return (that is, high beta portfolios will earn the rate of return higher than the low beta portfolios). However, if the realized rate of market return is less than the risk-free, there is an inverse relationship between beta and return (that is, high beta portfolios will earn the rate of return lower than the low beta portfolios). Thus, the traditional CAPM model needs to be modified which incorporates the conditions of both up market and down market in the same model. This is what we call the conditional relationship between beta and return. To estimate the conditional relationship between beta and return, beta estimation model as specified in equation (2) remains the same. To estimate the conditional relationship between beta and return, the following testing model has been used.

$$r_{pt} = \gamma_0 + \gamma_1\beta_p + \gamma_2 D\beta_p + u_{pt}^{'}\ , p = 1,2,..n; t = T_1, T_2, \dots, T_T; and\ T_1 > T \qquad (4)$$

Where:

$D = 1$, if the realized market return is less than the risk-free rate; and

$D = 0$, if the realized market return is more than the risk-free rate.

As mentioned above, there is a (an) direct (inverse) relationship between beta and return during up (down) market. Thus, we expect positive sign of estimated coefficient of γ_1, and negative sign of estimated coefficient of $\gamma_1 + \gamma_2$. That is, we expect negative sign of estimated coefficient of γ_2 and further expect that the absolute value of γ_2 is greater than the absolute value of estimated coefficient of γ_1.

The current study also tests for the symmetric relationship between beta and return during up and down markets. This test will help us in assessing whether the impact of beta on realized return during up market is more or less than the impact of beta on realized return during down market. To test for symmetry of beta and finding out in which kind of market the impact of beta on return is more, the following hypothesis has been formulated.

Null Hypothesis Ho: $2\gamma_1+\gamma_2 = 0$, against

Alternative hypothesis Ha: $2\gamma_1+\gamma_2 \neq 0$

If the null hypothesis accepted, it means that there is symmetric relationship between beta and return during up and down market. However, if the null hypothesis is rejected in favour of an alternative hypothesis, it means the relationship between beta and return is not symmetric. The t-statistic has been used to test for the symmetric relationship between beta and return. If value of t-statistic comes out to be positive (negative) and significant, it means that the impact of beta on returns is higher during up (down) market than during down (up) market.

The above empirical models have been tested for the Indian stock market. The data base, methodology and analysis of empirical results of the current study are described in the following sections.

3.Data and Methodology

The sample period for this study extends from April 2000 to March 2015. The study has been carried out based on S&P BSE 500 Index companies that were part of the index from April 2000 to March 2015. Out of the total population of 500 companies in the S&P BSE 500 Index,270company'smonthly stock prices data were available for the entire sample period i.e. April 2000 to March 2015.In addition, there were 80 more companies whose monthly stock price data were available from April 2005 to March 2015. Thus 270 companies for the period from April 2000 to March 2005 and350 companies from April 2005 to March 2015 are considered for the current study.Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) are two leading stock exchanges of India. BSE is the oldest stock exchange of India and has more number of companies listed than NSE. Almost all these companies which have been taken on sample are also listed on NSE. The price difference of the securities in these two stock exchanges is negligible as trading in these two exchanges is done through electronic mode.

The Stock price returns are calculated using the formula:

$$r_{it} = \ln\left(\frac{P_{it}}{P_{i,t-1}}\right)$$

Where,
r_{it} = Return on stock *i*.
Pit = Price per share of stock *i*at the end of the month *t*.
Pi, t-1 = Price per share of stock *i*at the end of the month *t-1*.

The S&P BSE 500 index, a value weighted index, has been taken as proxy for market portfolio. It covers all major industries of the Indian Economy. It represents nearly 93% of the total market capitalization of total number of stocks listed in Bombay Stock Exchange (BSE).

The market returns are calculated as:

$$r_{mt} = \ln\left(\frac{P_{mt}}{P_{m,t-1}}\right)$$

Where,
r_{mt} = Monthly return on the market portfolio
P_{mt} = Value of the S&P BSE 500 Index at the end of the month *t*.
$P_{m,t-1}$= Value of the S&P BSE 500 Indexat the end of the month *t-1*.
The required data of all the sample stocks and index was obtained from Prowess, online database maintained by Centre for Monitoring of Indian Economy (CMIE).

The 91-days treasury bill rates (which has been taken as a proxy for the risk free rate) has been taken from the official website of Reserve Bank of India (RBI). Since in the RBI database the Treasury Bill Rates are quoted on annual basis, these rates are converted into monthly equivalents as per the following formula

$$r_{ft} = \sqrt[12]{1 + TBR} - 1$$

Where,
r_{ft} = Monthly rate of return on the risk-free asset.
TBR = Annual rate of return on 91-day Treasury Bills

The period from April 2000 to March 2015 reveals that 91- days T-Bill Rate exceeds the market return in 77 out of 180 total observations(42.77%).The presence of a large number of negative market excess return periods may result in non-existence of relationship between risk and return as predicted by the traditional CAPM.Thus the objective of the paper is to first test for a systematic, conditional relationship between beta and realized returns and secondly, to test for a positive long run trade-off between beta risk and return in the Indian Stock Market.

The steps involved in carrying out the research are explained as follows:

- For the market index (S&P BSE 500) and each of the stocks, monthly returns through natural logarithm of price relatives were calculated. Further, the excess stock returns and excess market returns were calculated.
- This was followed by estimating beta for each of the stocks by regressing the monthly excess stock returns on the monthly excess index returns. Beta has been estimated on the period of 5 years' data and then tested on next five years in phased manner in various sub-periods of one, two, three, four & five year respectively. First of all, the beta has been estimated from April 2000 to March 2005 and then tested for the time period

from April 2005 to March 2010. Similarly, betas are estimated from April 2005 to March 2010 and tested for the time period from April 2010 to March 2015 respectively.

- The testing of systematic, conditional relationship between beta and realized returns was carried through pooled regression analysis firstly on individual securities and then on portfolios formed. The stocks were arranged in descending order of beta and grouped into 27 and 35 portfolios. (for the time period from April 2000 to March 2005 and from April 2005 to March 2010 respectively) Each portfolio is constructed of 10 stocks each such that portfolio 1 contains the first 10 stocks representing the 10 highest beta values and the last portfolio representing 10 lowest beta values. This was done to achieve diversification and thus reduce any error that might occur due to the presence of unsystematic risk as done in AmanullahandKamaiah (1998).

4.Data Analysis & Findings

The regression model specified in the data and methodology section has been estimated to assess the conditional relationship between beta and realized returns. The results describing the relationship between beta and returns are shown in Table 1 through 8. The pooled regression equations describing the relationship between beta and returns have been estimated for individual securities as well as for the portfolios (the construction of which was described in the previous section). Before testing the conditional approach, we have also tested unconditional CAPM to assess whether the unconditional CAPM holds in Indian Equity Market.

Table 1

Beta Estimated from April 2000 to March 2005- Pooled Regression Analysis on Individual Securities data (Unconditional CAPM) ($r_{it} = \gamma_0 + \gamma_1\beta_i + u_{it}^{'}$)

Period	γ_0	γ_1	$\overline{R}^2$
April 2005-March 2006	0.0480 (7.8132)*	-0.0055 (-0.8994)	$-5.89*10^{-5}$
April 2005-March 2007	0.0119 (2.5792)*	0.0058 (1.2601)	$9.07*10^{-5}$
April 2005- March 2008	0.0112 (2.7401)*	0.0020 (0.4807)	$-7.91*10^{-5}$
April 2005- March 2009	-0.0001 (-0.0336)	-0.0056 (-1.4386)	$8.25*10^{-5}$
April 2005-March 2010	0.0115 (3.2875)*	-0.0010 (-0.2917)	$-5.64*10^{-5}$

Note Figures in ( ) indicate the value of t-statistics
*Significant at 1% level

Table 2

Beta Estimated from April 2005 to March 2010- Pooled Regression Analysis on Individual Securities data (Unconditional CAPM) ($r_{it} = \gamma_0 + \gamma_1\beta_i + u_{it}^{'}$)

Period	γ_0	γ_1	$\overline{R}^2$
April 2010-March 2011	0.0340 (6.4979)*	-0.0277 (-6.0284)*	0.0083
April 2010-March 2012	0.0221 (5.7075)*	-0.0242 (-7.1138)*	0.0059
April 2010- March 2013	0.0182 (5.9877)*	-0.0221 (-8.2416)*	0.0053
April 2010- March 2014	0.0165 (6.0082)*	-0.0162 (-6.7136)*	0.0026
April 2010-March 2015	0.0205 (8.1699)*	-0.0135 (-6.1353)*	0.0017

Note Figures in () indicate the value of t-statistics
*Significant at 1% level

Table 3

Beta Estimated from April 2000 to March 2005- Pooled Regression Analysis on Portfolio data (Unconditional CAPM) ($r_{pt} = \gamma_0 + \gamma_1\beta_p + u'_{pt}$)

Period	γ_0	γ_1	$\bar{R}^2$
April 2005-March 2006	0.0484 (4.4940)*	-0.0060 (-0.5526)	-0.0022
April 2005-March 2007	0.0112 (1.2609)	0.0066 (0.7407)	-0.0007
April 2005- March 2008	0.0107 (1.2621)	0.0025 (0.2885)	-0.0009
April 2005- March 2009	-0.0004 (-0.0449)	-0.0053 (-0.6010)	-0.0005
April 2005-March 2010	0.0112 (1.3727)	-0.0007 (-0.0803)	-0.0006

Note Figures in ( ) indicate the value of t-statistics
*Significant at 1% level

Table 4

Beta Estimated from April 2005 to March 2010- Pooled Regression Analysis on Portfolio data (Unconditional CAPM) ($r_{pt} = \gamma_0 + \gamma_1\beta_p + u'_{pt}$)

Period	γ_0	γ_1	$\bar{R}^2$
April 2010-March 2011	0.0347 (3.3611)*	-0.0284 (-3.1269)*	0.0205
April 2010-March 2012	0.0227 (2.7921)*	-0.0248 (-3.4654)*	0.0130
April 2010- March 2013	0.0187 (3.0384)*	-0.0225 (-4.1585)*	0.0128
April 2010- March 2014	0.0168 (3.1011)*	-0.0165 (-3.4611)*	0.0065
April 2010-March 2015	0.0237 (4.5367)*	-0.0165 (-3.5603)*	0.0055

Note Figures in ( ) indicate the value of t-statistics
*Significant at 1% level

The results shown in Tables 1 and 2 describe the unconditional relationship between returns and beta for individual securities. Table 1 (Table 2) shows the results pertaining to beta estimated for individual securities from April, 2000 to March, 2005 (April, 2005 to March, 2010) and tested for the unconditional relationship of these betas with returns of individual securities pertaining to time period from April, 2005 to March, 2010 (April, 2010 to March, 2015). For the testing period the relationship between beta and return is tested in phase manner in various sub-periods of one, two three, four and five years respectively. Similar to the individual

securities, the pooled regression equations describing the unconditional relationship between beta and realized return have also been estimated for the portfolio (the construction of which was described in data and methodology section). The pooled regression results describing the unconditional relationship between beta of the portfolio and realized returns of the portfolio are shown in Tables 3 and 4. The coefficient of beta has not come out to be significant in Table 1 and Table 3. Though the coefficient of beta in Table 2 and Table 4 are significant but negative. This contradicts the traditional theory of CAPM that there is a positive long term relationship between beta and expected returns. Thus the results describing the unconditional relationship for individual securities and portfolios show that the unconditional CAPM does not hold for both the time periods.

The main reason for the insignificant unconditional relationship between beta and realized returnsboth in cases of individual securities and portfolio may be that significant relationship between beta and returns holds only if the excess market returns during the period of the study of this relationship is significantly positive. However,during the time period covered in this study, the excess market return is not positively significant as indicated in Table 9.

Table 5

Beta Estimated from April 2000 to March 2005- Pooled Regression Analysis on Individual Securities data (For Up and Down Market) ($r_{it} = \gamma_0 + \gamma_1\beta_i + \gamma_2 D\beta_i + u'_{it}$)

Period	γ_0	γ_1	γ_2	$\bar{R}^2$
April 2005-March 2006	0.0480 (8.2544)*	0.0126 (2.1300)*	-0.1086 (-19.4165)*	0.1040
April 2005-March 2007	0.0119 (2.8441)*	0.0420 (9.7263)*	-0.1238 (-37.4086)*	0.1776
April 2005- March 2008	0.0112 (3.0727)*	0.0453 (12.0813)*	-0.1417 (-50.0402)*	0.2048
April 2005- March 2009	-0.0001 (-0.0392)	0.0575 (16.6419)*	-0.1681 (-68.3565)*	0.2650
April 2005-March 2010	0.0115 (3.7899)*	0.0594 (18.8558)*	-0.1649 (-73.0081)*	0.2475

Note Figures in ( ) indicate the value of t-statistics
*Significant at 1% level

Table 6

Beta Estimated from April 2005 to March 2010- Pooled Regression Analysis on Individual Securities data (For Up and Down Market) ($r_{it} = \gamma_0 + \gamma_1\beta_i + \gamma_2 D\beta_i + u'_{it}$)

Period	γ_0	γ_1	γ_2	$\bar{R}^2$
April 2010-March 2011	0.0340 (7.6643)*	0.0086 (2.1494)*	-0.1090 (-40.5385)*	0.2872
April 2010-March 2012	0.0221 (6.4793)*	0.0280 (8.7927)*	-0.0964 (-49.2528)*	0.2286
April 2010- March 2013	0.0183 (6.6345)*	0.0250 (9.7104)*	-0.0849 (-53.5665)*	0.1898
April 2010- March 2014	0.0165 (6.6203)*	0.0283 (12.2421)*	-0.0856 (-59.9816)*	0.1785
April 2010-March 2015	0.0205 (8.8533)*	0.0251 (11.8010)*	-0.0800 (-60.5058)*	0.1499

Note Figures in ( ) indicate the value of t-statistics
*Significant at 1% level

Table 7

Beta Estimated from April 2000 to March 2005- Pooled Regression Analysis on Portfolio data (For Up and Down Market) ($r_{pt} = \gamma_0 + \gamma_1\beta_p + \gamma_2 D\beta_p + u'_{pt}$)

Period	γ_0	γ_1	γ_2	$\bar{R}^2$
April 2005-March 2006	0.0484 (5.5756)*	0.0122 (1.3813)	-0.1090 (-13.2153)*	0.3489
April 2005-March 2007	0.0112 (1.7770)	0.0428 (6.5932)*	-0.1242 (-25.2617)*	0.4962
April 2005- March 2008	0.0107 (1.7618)	0.0458 (7.3050)*	-0.1420 (-30.3525)*	0.4864
April 2005- March 2009	-0.0004 (-0.0655)	0.0579 (9.2445)*	-0.1684 (-38.2987)*	0.5309
April 2005-March 2010	0.0112 (1.8902)	0.0600 (9.7645)*	-0.1653 (-38.0931)*	0.4723

Note Figures in ( ) indicate the value of t-statistics
*Significant at 1% level

Table 8

Beta Estimated from April 2005 to March 2010- Pooled Regression Analysis on Portfolio data (For Up and Down Market) ($r_{pt} = \gamma_0 + \gamma_1\beta_p + \gamma_2 D\beta_p + u'_{pt}$)

Period	γ_0	γ_1	γ_2	$\bar{R}^2$
April 2010-March 2011	0.0347 (6.4351)*	0.0079 (1.6295)	-0.1091 (-33.3948)*	0.7328
April 2010-March 2012	0.0227 (3.9968)*	0.0275 (5.1865)*	-0.0965 (-29.6668)*	0.5183
April 2010- March 2013	0.0187 (4.1292)*	0.0247 (5.8195)*	-0.0850 (-32.6568)*	0.4655
April 2010- March 2014	0.0168 (4.2068)*	0.0281 (7.5842)*	-0.0856 (-37.5629)*	0.4601
April 2010-March 2015	0.0208 (5.2038)*	0.0253 (6.8043)*	-0.0809 (-38.3926)*	0.4157

Note Figures in ( ) indicate the value of t-statistics
*Significant at 1% level

Table 9

Summary Results for a Test of the positive Risk-Return Trade off (First Condition)

Market Excess Returns	April 2000-March 2005	April 2005-March 2010	April 2010-March 2015	April 2000- March 2015
Monthly Mean Excess Returns	0.0009	0.0106	0.0012	0.0042
Monthly Standard Deviation	0.0856	0.0979	0.0497	0.080062
T Statistics	0.0773	0.8372	0.1867	0.7057

The pooled regression equation(4) describing theconditional relationshipbetween beta and returns have been estimated for individual securities as well as for the portfolios (the construction of which was described in the previous section). The results shown in Tables 5 and 6 describe the conditional relationship between returns and beta for individual securities. Table 5 (Table 6) shows the results pertaining to beta estimated for individual securities from April, 2000 to March, 2005 (April, 2005 to March, 2010) and tested for the conditional relationship of these betas with returns of individual securities pertaining to time period from April, 2005 to March, 2010 (April, 2010 to March, 2015). For the betas estimated from April, 2000 to March, 2005 the pooled regression equations describing the relationship between returns and beta have been estimated for the time periodApril, 2005to March, 2010.Similarly, for the betas estimated from April, 2005 to March 2010, the pooled regression describing the relationship between beta and return has been estimated for the time period April, 2010 to March, 2015. For the testing period the relationship between beta and return is tested in phase manner in various sub-periods of one, two three, four and five years respectively. The results describing the conditional relationship for individual securities show that there exists significant and positive relationship between beta and realized returns of individual securities during the up market and significant and negative relationship during the down markets for all the time periods. The coefficient of beta has come to be significant in all the time periods both for up markets and down markets.

Similar to the individual securities, the pooled regression equations describing the conditional relationship between beta and realized return have also been estimated for the portfolio (the construction of which was described in data and methodology section). The pooled regression results describing the conditional relationship between beta of the portfolio and realized returns of the portfolio are shown in Tables 7 and 8. Similarly, in case of the portfolio the results show that there is a significant and direct relationship between beta and realized returns of the portfolio during the up markets and significant and inverse relationship during the down markets for both the time periods. Even in case of portfolio, the coefficient of beta has come out to be significant in all the time periods both for up markets and down market. In case of portfolio, the explanatory power of beta in explaining the realized returns is more than the explanatory power of beta in explaining the realized returns in case of individual securities. The main reason for higher explanatory power of beta in explaining the realized returns in case of portfolio may be that in case of portfolio unsystematic risk might have been eliminated to a great extent because of benefit of diversification.

Table 10

Summary Results for a Test of the positive Risk-Return Trade off (Second Condition)

	April 2005-March 2006	April 2005-March 2007	April 2005-March 2008	April 2005-March 2009	April 2005-March 2010	April 2010-March 2011	April 2010-March 2012	April 2010-March 2013	April 2010-March 2014	April 2010-March 2015
T Statistics (on Individual Securities Data)	-14.604*	-4.3192*	-6.3877*	-7.2566*	-6.8703*	-10.8723*	-6.0719*	-6.4554*	-5.9599*	-6.6554*
T Statistics (on Portfolio Data)	-4.3435*	-2.7721*	-3.7546*	-3.9722*	-3.4849*	-9.0713*	-3.7469*	-4.0150*	-3.7914*	-3.9341*

*Significant at 1% level

The current study also tests for symmetry of beta during up and down markets. The t-test has been used to assess the symmetry of beta during up and down market. The results show that absolute value of coefficient of beta during the down market is significantly higher than the absolute value of coefficient of beta during the up market.(Table 10). This is inconsistent with Pettengill, Sundaram and Mathur (1995) but consistent with Fletcher (1997).Thus, the results show that there is a lack of symmetry in beta during the up and down markets. The results suggest that for the same beta, decline in returns of the portfolio due to 1% decline in excess market return is more than the increase in the returns of the portfolio due to 1% increase in excess market returns.

5-Conclusion:

The capital asset pricing model (CAPM) developed by Sharper (1964), Lintner (1965) and Mossin (1966) is one of the most important contributions in the field of financial economics. The traditional CAPM explains that the systematic risk of a security is only the relevant factor in explaining the expected returns of the security. However, except a few earlier studies (Fama and Macbeth, 1973), most of the studies have empirically rejected the validity of the traditional CAPM. Two of the most important requirements of the traditional CAPM to hold is that (i) excess market returns during the period of the study of this relationship must be positively significant; and (ii) beta should be symmetric during up (excess market return is positive) and down (excess market return is negative) markets. CAPM is considered as the one of the most important models by financial analysts despite of its many limitations. The empirical validity of the model is examined on the realized returns (rather than on the expected returns) and many times the realized market returns are negative.Thus, it requires some modifications in the tradition CAPM to assess the relationship between beta and returns which incorporates both rising market (realized return is more than the risk-free rate) and declining market (realized rate of return is less than the risk-free rate) in the same model. This is what is called conditional relationship between beta and return. The main objective of this paper is to assess the conditional relationship between systematic riskand return during up and down markets separately in the emerging market like India. The current study uses the approach adopted by Pettengill, Sundaram and Mathur (1995) with certain modifications. The conditional relationship between beta and return has been studied both for individual securities as well as for portfolio. The portfolios have been constructed on the basis of values of beta of individual securities. To empirically assess the conditional relationship between beta and realized return, the current study uses the data of the Indian stock market covering the time period from April, 2000 to March, 2015.

The empirical results of the current study indicate that there is a positive and significant relationship between beta and realized returns during the up market, both for individual securities and portfolios. During the down market, both for individual securities and portfolios, returns vary significantly inversely with beta. The explanatory power of beta in explaining realized returns is higher in case of portfolios than in case of individual securities. Regarding the symmetry of beta, the results explain that the beta risk premium is higher in down market than in up market. This study may be of relevance to the investors and portfolio managers in the sense

that they may rebalance their portfolio when the macroeconomic environment of a country moves from boom phase to recessionary phase and vice versa. This will help them to minimize the adverse impact of recessionary situation and to maximize the positive impact of expansionary situation on the returns of their portfolio.

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