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MARKET VARYING CONDITIONAL RISK-RETURN RELATIONSHIP

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Unlike previous studies conducted on Pakistan, this article attempts to test the validity of conditional relationship between beta and cross-sectional returns of individual securities listed in Karachi Stock Exchange (KSE), wherein the up and down market periods are separated. The risk-return relationship is also tested using the conventional CAPM to compare the results of both models. The return on market portfolio and risk free asset is proxied by KSE-100 share index return and three months T-bill. Fama and McBeth (1973) and Pettengill, et al. (1995) methods are used to test conventional and conditional risk-return relationship, respectively. The analysis is performed on individual stocks of thirty companies over the period 2004 to 2012. Findings indicate a consistent and significant positive risk-return relationship in up market periods where market excess returns are positive; whereas, an inverse risk-return relationship is not proved in down market periods where market excess returns are negative. Furthermore, the study finds no support for symmetry between up and down market periods. The major implication of the analysis is that beta can be a useful measure of risk only in up markets periods.

I. Introduction

The risk-return relationship has been one of the most debatable and important concepts in finance. This crucial inter-relationship possesses the paramount importance for investors and portfolio managers, who would wish to estimate the returns and given risk for various investments [Theriou, et al. (2004)].

The Capital Asset Pricing Model (CAPM) is the renowned model used to understand linear relationship between systematic risk (beta) and expected return on assets [Horne (2004), Javid (2010)]. It was formulated simultaneously by Sharpe (1964), Treynor (1962), Lintner (1965a, b) and Mossin (1966).

The equation Conventional CAPM used to predict risk-return relationship is:

$$ER_X = R_{rf} + \beta_X (ER_m - R_{rf}) \tag{1}$$

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where,

ER_X = expected return on security X,

R_{rf} = risk free rate of return,

ER_m = expected return on market portfolio,

β_X = measure of systematic risk or market sensitivity parameter.

$$\beta_X = Cov_{x,m} / \sigma_m^2 \tag{2}$$

where,

$Cov_{x,m}$ = the covariance of any security "x" return with market return,

σ_m^2 = variance of market return.

A great number of previous studies documented poor empirical support to the conventional version of CAPM including Douglas (1969) and Lintner (1965a), Miller and Scholes (1972), Tinic and West (1984), Groenewold and Fraser (1997), Fruk and Huljak (2004), Michailidis, et al. (2006),Trifan (2009),Basu and Chawla (2010), Choudhary and Choudhary (2010),Dzaja and Aljinovic (2013). Some of the similar studies conducted in Pakistan include Rizwan, et al. (2013), Khan, et al. (2012), Zubairi and Farooq (2011), Hanif (2010), Hanif and Bhatti (2010), Javid (2009), Javid and Ahmad (2008) and Iqbal and Brooks (2007).

Fama and French (1998) also quoted that equity markets of developed countries have almost evinced a weak risk return trade-off. The reason behind these findings is the persistence of an inverse relationship between beta and returns in markets where the lower market return persists [Nurjannah, et al.(2012)]. This phenomenon is empirically evinced in several capital markets including Karachi Stock Market - KSE (Pakistan) by Javid and Ahmad (2008), New York Stock Exchange - NYSE (USA) by Fama and French [(1992), (1993) and (1996)], and Korean market by Bark (1991) which is the major impediment to risk-return relationship. The prominent reason behind the frequent occurrence of these negative market excess returns observed in emerging markets is the higher volatility [Zhang and Wihlborg (2010)]. Moreover, in this study the matter is not concerned with the reasons of negative market excess returns, therefore, it will not determine the volatility, and will report on how the risk return relationship changes with the market conditions. The inverse risk-return relationship in some periods will result in inaccurate predictions of future returns and thus loss to investors. This phenomenon is also evinced in Pakistani capital market by Javid and Ahmad (2008) which may result in loss to local and international investors of Pakistan. This phenomenon has never been addressed by previous researchers.

To solve this problem Pettengill, et al. (1995) introduced a new methodology to test the risk return relationship for capital markets by considering separately, the periods of positive and negative market excess return. Their methodology has been employed by many researchers in several capital markets where encouraging results have been obtained. Some of those studies include Nimal and Fernando (2010) in Tokyo and Colombo stock exchanges, Sriyalatha (2010) in Colombo stock exchange, Theriou, et al. (2010) in Athens stock exchange, Sandoval and Saens (2004) in different stock markets of Latin American countries like, Argentina, Brazil, Chile, and Mexico, Lam (2001) in Honk Kong stock exchange, Hodoshima et al. (2000) in Tokyo stock market, Fletcher (1997) in UK capital market, and Fletcher (2000) in18 developed market of Europe.

Pettengill, et al.'s (1995) methodology is important to be applied in Pakistani capital market, since the negative market excess return has been observed, as mentioned above. To observe conditional risk and return relationship Pettengill, et al.'s (1995) test has never been employed in the case of Pakistani capital market. This gap in literature has encouraged us to study the conditional risk-return relationship in Pakistan by applying the Pettengill et al. (1995) approach.

Hopefully, this study would provide a pragmatic solution to the aforementioned problems and prove instrumental for the current and prospective, local and international investors in making sound investment decisions for finance managers in deciding the cost of capital, and for portfolio managers in designing efficient portfolios.

II. Literature Review

Investors are risk averse; they demand higher returns for assuming higher risk. Therefore, the persistence of consistent cross sectional return behavior is of particular interest [Theriou, et al. (2010)]. However, most of the previous studies presented weak or no credence to meaningful risk-return relationship.

1. Studies on Conventional CAPM

Some of the recent studies include Dzaja and Aljinovic (2013) who examined the risk-return relationship for nine countries of Central and South-East including the Czech Republic, Hungary, Poland, Romania and Bulgaria, Croatia and Turkey, Serbia and Bosnia Herzegovina, from January 2006 to December 2010. They concluded that higher beta does not necessarily yield higher return. In Bombay stock market, the main capital market of India, Choudhary and Choudhary (2010) bolstered the assumption of CAPM that no variable other than beta affects the portfolio returns; although the study found credence on linearity of risk return relationship as predicted by CAPM. The data comprised of monthly adjusted closing stock prices, BSE SENSEX Share index as market proxy and 91 days T-bill rate as risk free asset. They formed portfolios of stocks of 278 companies listed on Bombay stock exchange from 1996 to 2009 and analyzed them by employing Black et al., (1972) approach. Similarly, Trifan (2009) refuted beta as a complete measure of risk and the sole determinant of return in Romanian capital market, after analyzing 24 companies listed in Bucharest stock exchange from 2003 to 2009. BET-C composite index and average interest rate of government bonds served as proxy to market portfolio and RFR. The validity of CAPM also got refuted in the emerging market of Greek [Michailidis, et al. (2006)]. They studied 100 stocks listed in Athens stock market. The 3-month Greek T-bill rate was used as the Risk Free Rate (RFR) and Athens stock exchange Composite Share Index proxied the market portfolio. The study covered a period of five years from 1998 to 2002. They came to the conclusion that higher risk securities do not yield higher return. Besides, the study supported the hypothesis of linear structure of risk-return relationship. The intercept was not found equal to zero and they concluded no impact of residual risk on returns. In earlier days, Fama and McBeth (1973) introduced a 'three-step' methodology by testing CAPM in New York stock exchange from 1926 to 1968. The period under study was divided into nine overlapping analysis periods. Each analysis period contained three sub-periods: (1) Portfolio formation period (2) Beta Estimation Period and (3) Testing Period. In the first step, 20 portfolios were formed by ranking betas of individual securities. In the second step, betas were re-estimated for the portfolios formed in step one. The third step comprised of regression of the portfolio returns against their betas calculated in the estimation period. Findings concluded presence of efficient capital market and a positive trade-off between the risk-return relationships.

Number of studies have been conducted in Pakistani perspective to test the risk-return relationship through conventional CAPM by taking different samples at various time periods. Some studies supported the theory, while others have totally rejected it. One study in this perspective is by Rizwan, et al. (2013) who investigated the applicability of CAPM on the Cement sector of Pakistan from 2004 to 2009. The results elucidated that CAPM is not a reliable tool for accurate forecasting returns in the cement industry of Pakistan. They also revealed that the expected portfolio returns remained unaffected by the residual risk. Khan, et al. (2012) also concluded limited applicability of CAPM in Pakistan by taking a sample of 10 companies listed in KSE for a period of six years from 2006 to 2010. National Savings Certificate and KSE-100 Index served as proxy for risk free asset and market portfolio. Raza, et al. (2011) after analyzing the monthly, quarterly and semi-annual returns of 387 companies belonging to 30 different sectors of KSE from 2004 to 2011 concluded inapplicability of CAPM in Pakistan.Zubairi and Farooq (2011), compared the explanatory power of CAPM and Arbitrage Pricing Theory in KSE. For the aforesaid purpose, the data comprising of quarterly returns of stocks of 17 oil, gas and fertilizer companies were taken over the period January 2004 to December 2009. KSE 100 Index and KIBOR (Karachi Interbank Offshore Rate) served as benchmark for market portfolio and risk free asset respectively. The findings conclude that neither of the theory proved valid, the predicting stock returns. Similarly, Hanif (2010) also rejected CAPM in Pakistan by analyzing the tobacco sector companies listed in KSE from 2004 to 2007. They concluded that Securities are not fairly priced as demanded by the model. Hanif and Bhatti (2010), who studied the institutional framework of Pakistan from 2003 to 2008, also rejected the basic CAPM. Results showed that only 28 companies out of 360 supported the CAPM theory and concluded that it does not give accurate risk return relationship, in Pakistani institutional framework. The conventional CAPM and Fama French Three Factor Model in unconditional and conditional setting were tested by Javid and Ahmad (2008) in case of Pakistan. They applied Fama and McBeth (1973) methodology on a sample of 49 companies listed in KSE covering period from 1993 to 2004. The empirical findings contradicted the risk return relationship as predicted by conventional CAPM, implied that the residual risk had significant effect on security prices.

2. Studies on Conditional CAPM

Pettengill, et al. (1995) attempted to overcome an important issue encountered while testing the validity of CAPM in several capital markets by proposing conditional relationship between beta and return. They used the CRSP equally weighted Index and 3 months T-bill rate as proxy to market portfolio and RFR. After observing 280 negative market excess returns in a data of total 660 they decided to divide the sample period in Up Market and Down Market. The Fama and McBeth (1973) three-step methodology was employed but separately on Up and Down Market periods. Pettengill, et al. (1995) modified the last step by applying the test separately for the Up and Down Market periods. The empirical results confirmed that beta and ex-ante return are positively related when the ex-post market return was higher RFR. However, a negative relationship revealed when the ex-post market excess return was lower. The study also revealed a positive risk return trade-off and supported the continued use of beta as a measure of systematic risk.

Pettengill, et al. (1995) methodology has been employed by numerous researches and significant results have been observed. One of them, Nimal and Fernando (2010) tested whether the risk-return relationship is conditional on the ex-post market premium in Tokyo and Colombo stock exchanges. The data comprised of montly closing prices of stocks of first section of the TSE and 100 most frequently traded stocks of CSE from Januuary 1952 to December 2003. The stock returns data was adjusted for dividends, stock splits, and right issues. The total sample stocks were used to +calculate the market proxies. Besides, the RFR were proxied by call money rate for Japanese equity market and T-bill rate for Srilankan market. Twenty portfolios were formed by using Fama and Mcbeth (1973) approach. The empirical tests concluded a systematic risk-return relationship in portfolio, which confirmed the use of beta as a true measure of market risk. Similarly, Sriyalatha (2010) found conditional relationship, a leading approach to test risk-return relationship in portfolios. He applied the Pettengill, et al. (1995) conditional cross-sectional approach to empirically test the conditional model in Colombo stock Exchange. A sample of closing prices of 237 stocks was taken for the period of February 1994 to December 2006. The value weighted All Share Price Index was used as proxy to market portfolio. He used a two-step modified version of Fama and MacBeth (1973) approach, developed by Kunimura (2008) and Pettengill, et al. (1995) approach for unconditional and conditional testing, respectively. Results concluded that the conditional model is a better fit than the unconditional one in Colombo stock exchange which is consistent. In the Athens stock exchange (ASE), Theriou, et al. (2010) examined the risk-return relationship using Pettengill, et al. (1995) approach on portfolios. The period under study covered twelve years from 1991 to 2002; divided into six sub-periods. The data included all stocks traded in the ASE. The market portfolio and risk free asset were proxied by ASE Composite Share Price Index and excess returns on the market and individual securities over 3 months T-Bill rate, respectively. The investigators tried to verify whether a conditional risk-return relationship persists and if beta is significant measure of risk. They searched for the symmetry between return and beta is in Up Market and Down Market periods. The evidence supported the conditional relationship hypothesis in ASE. Moreover, like earlier studies they also found unconditional risk-return relationship to be flatter than the conditional one. Sandoval and Saens (2004) compared the conditional and unconditional relationship between portfolio betas and returns in different stock markets of Latin American countries like; Argentina, Brazil, Chile, and Mexico. The Pettengill, et al. (1995) approach was applied to test the model, empirically. The data comprised to weekly returns of stocks in U.S. Dollars from first week of January 1990 to last week of December 2002. The stock market indexes and the government bond rates for each country were taken as proxy to market portfolio and RFR, respectively. Results elucidated that the conditional CAPM is a leading approach than unconditional one in predicting beta-return relationship. However, statistically significant asymmetries were discovered between the MRPs of Up Market and Down Market. Lam (2001) identified a strong conditional positive (negative) risk-return relationship in the Honk Kong exchange market. They used Pettengill, et al.'s (1995) methodology to examine the relationship by taking a sample comprising of returns of 132 stocks for a period of 15 years from 1980 to 1995. He formed 10 portfolios on the basis on mean negative and positive MRPs. He found that the estimated Security Market Line (SML) is flatter in a rising market and steeper in a falling market. Findings concluded that conventional CAPM does not work in Honk Kong exchange market. Hodoshima, et al. (2000) investigated the beta-return in Tokyo stock market of Japan by using cross-sectional regression method. The pettengill, et al.'s (1995) approach was employed for empirical testing by including other variables like size, book to market equity ratio as control variables in the model. The sample comprised of all stocks in the first section of Tokyo stock exchange (TSE) covering a period of 1956 -1995. The collateralized next day call money rate and Japanese Securities Research Institute and Equally Weighted Index were used as proxy to RFR and market portfolios, respectively. Twenty portfolios were formed by ranking securities with respect to betas. They concluded that test performed without separating the periods of Up Market and Down Market yielded a flatter relationship between beta and return; while consideration of separated MRPs produced a significant conditional beta-return relationship. Furthermore, this relationship was found better fit in terms of goodness of fit measure and standard error equation when the market excess return was negative. Fletcher (2000) incorporated Pettengill, et al. (1995) approach on a sample of 18 developed markets of Europe for which monthly stock returns were taken from January 1970 to July 1998. Morgan Stanley Capital International (MSCI) equity index dollar returns of 18 countries and the MSCI World index was adopted as proxy for market portfolio. Similar to earlier studies, Fletcher (2000) also found a flatter risk-return relationship in unconditional settings. Besides, the conditional approach resulted in strong positive and negative risk-return relationship in Up Market and Down Market, respectively; a January effect was revealed in these markets in terms of conditional risk-return relationship.

Manifestation of inspiring results from other emerging markets after the application of Pettengill, et al. (1995) methodology induced the researcher to conduct this study.

III. Hypotheses

Following hypotheses are established from the Pettengill, et al.'s (1995) study and will be tested using parameters estimated through regression analysis of the models.

H_1 = There is positive relationship between beta and return in un segmented market or $\bar{\hat{\gamma}}_{1t} > 0$.

H_2 = The relationship between beta and return is positive in up market or $\bar{\hat{\lambda}}_{1t} > 0$.

H_3 = The relationship between beta and return is negative in down market or $\bar{\hat{\lambda}}_{2t} < 0$.

H_4 = The market excess returns in up market and down market is symmetrical or $(\bar{\hat{\lambda}}_{1t} - \bar{\hat{\lambda}}_{2t} \neq 0)$.

IV. The Methodologies

1. Sample and Sampling Technique

The study covers a period of eight years from July 2004 to December 2012. A sample of 30 firms listed on the Karachi Stock Market (KSE) has been selected for the purpose of this study. Purposive sampling technique has been used to draw the sample that followed two-fold criteria: (1) Companies must have continuous listing in the stock market for the entire sample period, (2) Stocks must be actively traded over the sample period. The KSE-100 Index is used as proxy for market portfolio. The Nominal three months T-bill Auction Rate is used as proxy for risk free rate.

2. Data Collection and Transformation

The data on month-ended closing prices of 30 securities and closing points KSE-100 Index are collected from the Karachi Stock Exchange. The data on monthly three months T-bill Auction Rate are sourced from the official website of State Bank of Pakistan, respectively.

The continuously compounded return of stocks and KSE-100 index are obtained by using the natural log approximation formula. The logarithmic returns are mostly normally distributed and thus fit in assumptions of the standard statistical techniques [Strong (1992)].

$$R_{x,t} = lnP_{x,t} - lnP_{x,t-1} \quad (3)$$

where,

$R_{x,t}$ = return on security *"x"* at time *"t"*,

$P_{x,t}$ = closing price of security *"x"* at time *"t"*,

$P_{x,t-1}$ = closing price of security *"x"* at time *"t-1"*.

Fama and McBeth (1973) and Pettengill, et al. (1995) methodologies are employed to test the unconditional and conditional risk-return relationship, respectively. The methodologies comprise of a combination of time series and cross sectional regression. The econometric technique employed to carry out regression is the Ordinary Least Square (OLS) regression analysis. To address the problem of heteroskedasticity present in return series, the White Heteroskedasticity-Consistent Standard Errors and Covariance is used. Besides, the serial correlation in error terms is removed by adding the appropriate number of ARMA terms in estimation [Akbar, et al, (2012)]. The statistical software e-views 6 is used for data analysis. At most a 4-year period must be used for estimation of beta, therefore the sample period is divided into two sub-periods, the Beta Estimation Period (July 2004 to June 2008) and the Model Testing Period (January 2009 to December 2012). The period of June 2008 to December 2008 which may influence the results is not included due to trading rule imposed in the market.

3. Fama and McBeth's Approach to Test Conventional CAPM

The empirical validity of unconditional risk-return relationship is analyzed by testing CAPM through a modified form of Fama and McBeth (1973) two-step regression procedure.

In the beta estimation period, time series regression is run to estimate beta coefficients of each of the 30 securities. The beta coefficients for individual securities are estimated by regressing excess return on respective security against market excess return. The formula used for the above estimation is as under:

$$(R_{xt} - R^*_{ft}) = \hat{\alpha} + \hat{\beta}_x (R_{mt} - R^*_{ft}) + \varepsilon_x \tag{4}$$

where,

R_{xt} = ex-post return on any asset *"x"* at time *"t"*,
R^*_{ft} = ex-post real risk free rate of return at time *"t"*,
$(R_{xt}–R^*_{ft})$ = ex-post excess return on any security *"x"* at time *"t"*,
R_{mt} = ex-post return on market portfolio at time *"t"*,
$(R_{mt}–R^*_{ft})$ = ex-post market excess return at time *"t"*,
$\hat{\alpha}$ = estimated intercept term,
$\hat{\beta}_x$ = estimated measure of systematic risk,
ε_x = random error term.

In the Model Testing Period, monthly cross sectional regression is run to estimate the coefficient to test risk-return relationship. The monthly excess returns on all sample securities serve as response variable and estimated betas as predictor variable. The specification is followed as under:

$$(R_{xt} - R^*_{ft}) = \hat{\gamma}_{0t} + \hat{\gamma}_{1t} \beta_x + \varepsilon_{xt} \tag{5}$$

where,

R_{xt} = ex-post return on any asset *"x"* at time *"t"*,
R^*_{ft} = ex-post real risk free rate of return at time *"t"*,
$(R_{xt}–R^*_{ft})$ = ex-post excess return on any security *"x"* at time *"t"*,

$\hat{\gamma}_{0t}$ = estimated intercept term at time *"t"*,
$\hat{\gamma}_{1t}$ = estimated market excess return at time *"t"*,
β_x = beta of asset *"x"* estimated from Equation (4),
ε_{xt} = random error term at time *"t"*.

Finally, average of the cross sectional estimated market excess returns $\overline{\hat{\gamma}_{1t}}$ is calculated and tested using one independent sample t-test. To prove positive risk-return trade-off $\overline{\hat{\gamma}_{1t}} > 0$ and statistically significant.

4. *Pettengill et al.'s Approach to Test Conditional CAPM*

The conditional risk return relationship is tested using Pettengill et al. (1995) approach. They followed Fama and McBeth (1973) procedure specified earlier with modification of second step to account for the conditional risk-return relationship.

In the Model Testing Period, the monthly cross sectional regression is run to estimate the coefficient to test risk-return relationship. The monthly excess returns on all sample securities serve as response variable and estimated betas as predictor variable. The coefficient $\hat{\lambda}_{1t}$ is the estimated market excess return for Up Market periods. Besides, $\hat{\lambda}_{2t}$ is the market excess return for Down Market. The estimation is made using the following specification:

$$(R_{xt} - R^*_{ft}) = \hat{\lambda}_{0t} + \hat{\lambda}_{1t}\delta\beta_x + \hat{\lambda}_{2t}(1 - \delta)\beta_x + \varepsilon_{xt} \tag{6}$$

where,

R_{xt} = ex-post return on any asset *"x"* at time *"t"*,
R^*_{ft} = ex-post real risk free rate of return at time *"t"*,
$(R_{xt} - R^*_{ft})$ = ex-post excess return on any security *"x"* at time *"t"*,
$\hat{\lambda}_{0t}$ = estimated intercept term at time *"t"*,
$\hat{\lambda}_{1t}$ = estimated market excess return for Up Marekt at time *"t"*,
$\hat{\lambda}_{2t}$ = estimated market excess return for Down Market at time *"t"*,
β_x = beta of asset *"x"* estimated from Equation (4),
δ = dummy variable, $\delta=1$ in Up Market, where $(R_{mt} - R_f) > 0$ and $\delta=0$ in Down Market, where $(R_{mt} - R_f) < 0$,
ε_{xt} = random error term at time "t".

Finally, the average of cross sectional estimated market excess returns for Up market $\overline{\hat{\lambda}_{1t}}$ and down market $\overline{\hat{\lambda}_{2t}}$ are calculated and tested for being significantly different from zero using one independent sample t-test. To prove systematic conditional risk-return relationship, two conditions need to be satisfied: (1) the estimated market excess return in Up Market should be positive or $\hat{\lambda}_{1t} > 0$ and statistically significant; (2) the estimated market excess return in Down Market should be negative or $\hat{\lambda}_{2t} < 0$ and statistically significant.

Furthermore, Pettengill, et al. (1995) argued that the systematic conditional risk-return relationship does not guarantee an overall positive risk-return trade-off. In order to prove the positive risk-return trade-off, the market excess return during Up and Down Market periods should be symmetrical. To test for symmetry, the market excess return in Up Market ($\hat{\lambda}_{1t}$) will be compared with market excess return in Down Market ($\hat{\lambda}_{2t}$) using two population t-test. To facilitate the direct comparison, while preserving effect of slopes, the sign for ($\hat{\lambda}_{2t}$) are reversed and the average is re-estimated. It is worth noting that unlike developing capital markets, negative estimated market excess return is also observed in up market periods for the period under study. The sign of those market excess returns ($\hat{\lambda}_{1t}$) are reversed and average is re-estimated. To prove symmetry between Up Market ($\hat{\lambda}_{1t}$) and Down Market periods ($\hat{\lambda}_{2t}$), the average estimated market excess return in up market must not equal the average estimated market excess return in down market or ($\bar{\hat{\lambda}}_{1t} - \bar{\hat{\lambda}}_{2t} \neq 0$) and statistically significant.

V. Results

1. *Descriptive Statistics*

The statistics in Table 1 give some insight of the characteristics of up and down market periods, during the 96 months testing period of the study. It is observed that market rewards 6.25 per cent per month for bearing market risk in Up market periods. Similarly, -4.58 per cent per month is rewarded in Down market periods.

TABLE 1

Descriptive Statistics for Ex-Post Market Excess Return

Periods	Observations		Mean	t-statistics	P-Value	Std. Dev.
	Count	Percentage				
Positive	65	67.71	0.0625	10.7541	0.0000	0.0468
Negative	31	32.29	-0.0458	-5.8245	0.0000	0.0438
Total	96	100.00	0.0275	3.9413	0.0002	0.0683

TABLE 2

Estimated Betas

$$(R_{xt} - R^*_{ft}) = \hat{\alpha} + \hat{\beta}_x (R_{mt} - R^*_{ft}) + \varepsilon_x$$

Stocks	Beta	t-Statistic	Prob.	R^2	F-statistic	Prob.
ABOT	0.7551	4.5102	0.0000	0.3066	20.3417	0.0000
AICL	1.1988	6.0756	0.0000	0.4452	36.9126	0.0004
AHCL	0.7113	3.5085	0.0010	0.2111	12.3096	0.0010
ACBL	0.9752	6.6907	0.0000	0.4932	44.7656	0.0004
ATRL	1.0391	3.8597	0.0004	0.2446	14.8972	0.0004
BAFL	1.1767	6.8535	0.0000	0.5052	46.9703	0.0000
BAHL	0.7136	5.2856	0.0000	0.3779	27.9371	0.0000
BOP	1.3729	7.0622	0.0000	0.6073	71.1296	0.0000
DGCK	1.1784	9.2486	0.0000	0.6503	85.5363	0.0000
ENGRO	0.6144	7.7091	0.0000	0.5637	59.4299	0.0000
FFBL	0.9376	25.7369	0.0000	0.9351	662.3871	0.0000
FCCL	0.7395	7.3734	0.0000	0.5417	54.3669	0.0000
FFC	0.6377	6.8056	0.0000	0.5017	46.3157	0.0000
HUBC	0.5335	3.6852	0.0006	0.3240	22.0492	0.0000
ICI	1.0021	6.8069	0.0000	0.5018	46.3337	0.0000
JSCL	0.7968	3.6784	0.0006	0.1934	5.2751	0.0088
KESC	0.8785	4.0038	0.0002	0.2443	14.8670	0.0004
LUCK	1.1760	6.9328	0.0000	0.5003	46.0612	0.0000
MCB	1.1646	8.4516	0.0000	0.5981	68.4539	0.0000
MLCF	0.9414	5.2170	0.0000	0.3717	27.2174	0.0000
NBP	1.5172	12.5757	0.0000	0.7747	158.1478	0.0000
NCL	1.4121	5.8011	0.0000	0.4225	33.6524	0.0000
NML	1.0997	10.3600	0.0000	0.6910	102.8584	0.0000
NRL	0.9279	5.6399	0.0000	0.4088	31.8087	0.0000
OGDCL	1.1269	12.1831	0.0000	0.7556	142.2427	0.0000
PIAA	0.8133	3.8416	0.0004	0.2429	14.7581	0.0004
POL	0.9217	6.5296	0.0000	0.4810	42.6360	0.0000
PPL	1.3590	7.4865	0.0000	0.5387	53.7121	0.0000
PSO	0.8596	8.1477	0.0000	0.5907	66.3857	0.0000
PTC	0.9342	6.4262	0.0000	0.4731	41.2958	0.0000

This implies that the relationship between beta and ex-post return is conditional on market situations. The evidence also indicates a marginal compensation of 2.75 per cent per month for holding the market portfolio during all the 96 months of under study. Besides, the table reports that the negative ex-post market excess return occurred in more than 30 per cent of the test period. The existence of such a large per cent of negative market excess return period proposes that using an unconditional approach to find a positive risk-return trade-off will lead to bias. Therefore, Pettengill, et al. (1995) segmentation procedure should be employed to test conditional relationship between beta and ex-post return.

2. Regression Analysis and Results

The previous studies tested for a positive linear relationship between risk and return using Fama and Mcbeth methodology. For comparative purpose, we first tested the risk return relationship through conventional CAPM by the following literature.

First, betas of sample stocks are estimated using time series regression. The results are presented in Table 2.

Table 3 presents the results of cross sectional regression carried out to test the unconditional risk-return relationship. The average of the cross sectional monthly estimated market excess return is calculated and tested for being greater than zero using one tailed independent sample t-test.

TABLE 3

Average of Slope Coefficient Estimate from
Unconditional Cross-Sectional Regression

$$(R_{xt} - R^*_{ft}) = \hat{\gamma}_{0t} + \hat{\gamma}_{1t}\beta_x + \varepsilon_{xt}$$

Variables	$\overline{\hat{\gamma}_{1t}}$
Average	0.0679
Std. Deviation	0.0703
t –Statistic	0.6257
Prob.	0.5345

The main purpose of this study is to search for systematic conditional relationship between beta and return. For the aforesaid purpose, the monthly cross sectional regression is carried out. Then, the average of cross sectional estimated market excess return are calculated separately for periods of up and down market and tested for being significantly different from zero using one-tailed independent sample t-test. Table 4 exhibits the results for conditional risk-return trade-off.

TABLE 4

Average of Slope Coefficient Estimate from
Conditional Cross-Sectional Regression

$$(R_{xt} - R^*_{ft}) = \hat{\lambda}_{0t} + \hat{\lambda}_{1t}\delta\beta_x + \hat{\lambda}_{2t}(1 - \delta)\beta_x + \varepsilon_{xt}$$

	Up Market	Down Market
Variables	$\overline{\hat{\lambda}}_{1t}$	$\overline{\hat{\lambda}}_{2t}$
Average	0.0510	-0.01684
Std. Deviation	0.0447	0.07540
t -Statistic	6.5583	-0.86450
Prob.	0.0000	0.40190

According to Pettengill, et al. (1995), the systematic conditional risk-return relationship does not guarantee a positive risk-return trade-off. Therefore, we test for symmetry of market excess return in up market and down market periods or ($\overline{\hat{\lambda}}_{1t} - \overline{\hat{\lambda}}_{2t} \neq 0$). The results are shown in the second last row of Table 5.

TABLE 5

Test Symmetry of Risk-Return Relationship
in Up and Down Market Periods

$\overline{\hat{\lambda}}_{1t} - \overline{\hat{\lambda}}_{2t} \neq 0$	
Variables	Values
t -Statistic	0.4029
Prob.	0.6901

VI. Discussion

The test of unconditional risk-return relationship is presented in Table 3. Results show that high beta stocks does not yield higher return. The value of average estimated market excess return, as expected, is not different from zero. Thus, a positive risk-return trade-off cannot be proved. This inadequacy is attributed to market inefficiency, undiversified portfolios of local investors and short study period under consideration, and statistical bias induced by infrequent trading of small firms. Findings are consistent with Dzaja and Aljinovic (2013), Choudhary and Choudhary (2010), Trifan (2009), Michailidis, et al. (2006), Fama and MacBeth (1973), Khan, et al. (2012), Zubairi and Farooq (2011), Hanif (2010), Hanif and Bhatti (2010), Javid and Ahmad (2008), Iqbal and Brooks (2007). Based on the results obtained, the null hypothesis, “There is no relation between beta and return in un-segmented market or $\overline{\hat{\lambda}}_{1t} = 0$” cannot be rejected.

The test of risk-return relationship conducted in segmented market revealed that high beta stocks receive positive returns in up market periods when the market excess return is positive. However, in down market periods with negative market excess return, high beta stocks do not yield lower returns. Table 4 exhibits the results for conditional risk-return trade-off. The mean value of the market excess return $\hat{\lambda}_{1t}$ in up market periods is statistically different from zero at 5 per cent level. Besides, the mean value of the market excess return $\hat{\lambda}_{2t}$ in down market periods is not significantly different from zero. The findings are inconsistent with previous studies; pettengill et al. (1995), Sriyalatha (2010), Theriou et al. (2010), Lam (2001), Hodoshima, et al. (2000), and Fletcher (2000). Hence, the hypothesis “The relationship between beta and return is positive in up market or $\overline{\hat{\lambda}}_{1t} = 0$” is accepted by rejecting the null hypothesis. Moreover, the null hypothesis "The relationship between beta and return is not negative in down market or $\overline{\hat{\lambda}}_{2t} = 0$” cannot be rejected.

The test for symmetry of risk-return relationship in up market and down market yields inconclusive results. The symmetry is tested using two-population t-test. The findings presented in Table 5 conclude no significant difference between the two means. Thus, the null hypothesis “The market excess returns in up market and down market is not symmetrical or $(\overline{\hat{\lambda}}_{1t} - \overline{\hat{\lambda}}_{2t} = 0)$” cannot be rejected. Findings are consistent with Sandoval and Saens (2004).

VII. Conclusion

This study attempted to test the unconditional and conditional risk-return relationship in Pakistan by studying a sample of individual securities of 30 firms listed in the Karachi Stock Exchange from July 2004 to December 2012. After the analysis, it has been found that unconditional risk-return relationship does not exist in Pakistan. When the risk-return relationship was tested in segmented up and down market periods, significant positive relationship was evinced in up market but no relationship was obtained in down market; suggesting to include other variables in the conditional model to identify the reason of such results. Furthermore, the study could not conclude symmetry of market excess returns between up and down market periods. The major implication of the study is that beta is a useful measure of risk only in up markets periods.

Further studies may consider a detailed study of conditional risk-return relationship in developed and developing markets of Asia. More sophisticated tools like GARCH, GMM and GLS can be used to obtain more precise results. It is recommended to the investors, finance, and portfolio managers that the basic CAPM is dead and might lead to over or underestimation of individual securities or portfolio returns, especially in down market periods. Moreover, they should also consider the conditionality of risk-return relationship while estimating the returns on investment.

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