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Technique to Choose Best Portfolio on The Basis of Companies' Performance

The construction of portfolios on the basis of CAPM beta becomes difficult if Capital Asset Pricing Model (CAPM) fails to explain returns. A test of CAPM on Karachi Stocks Exchange (KSE) shows a negative linear relationship between stocks beta and its returns for the period July 2007 to June 2013 and no relationship for July 2010 to June 2013. However, Jensen's alpha has a positive linear relationship between its values and returns. Furthermore, alpha coefficient is a better representative of risk coefficient instead of CAPM beta. It is observed that the portfolio of poor performed or risky stocks gives higher return in future. The research inferred that poor performed securities (likely to survive in future) could be chosen in a portfolio for best future return.

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■ Introduction

In finance, the term portfolio refers to investment in a verity of assets. The reduction in risk is a basic purpose of portfolio investment. This study developed a technique of portfolio construction on the basis of Jensen's alpha risk coefficient. Traditionally portfolios are constructed on the basis of beta risk calculated by Capital Assets Pricing Model (CAPM). In this study it is observed that higher values of CAPM beta are not associated with higher returns as CAPM predicts. It means that beta is not an appropriate measure of risk coefficient. It has also been observed that beta coefficient is instable with time. It is observed that alpha coefficient is better representative of risk coefficient instead of beta risk coefficient and it can be used for the construction of portfolios.

According to CAPM theory the higher values of CAPM beta indicates a riskier asset, low value indicates more secure asset and zero value indicates asset return equal to risk free rate of return. CAPM postulates that the expected return on an asset above the risk-free rate is linearly related to the non-diversifiable risk as measured by the asset's beta. The derivation of the CAPM starts by assuming that all assets are stochastic and follow normal distribution. Risk coefficient beta and variance of the return in case of non-normal distribution are inappropriate measures of risk factors. The CAPM was introduced in the early 1960s by Sharpe (1964), Lintner (1965). Black, et al. (1972) and, Fama & McBeth (1973) give evidence in favour of CAPM theory that higher

beta risk is associated with higher returns. Fama & French (1992) give contradictive results and show that firm size and book-to-market ratio are associated with returns instead of CAPM beta. Michailidis, et al. (2006) results for Greek Securities Market for the period of January 1998 to December 2002 and Javid (2008) for KSE for the period 1993-2004 give evidences against CAPM. Khan et al. (2012), and Rizwan et al. (2013) are also reported about poor performance of CAPM on KSE stocks.

■ Purpose and Significance

This research will facilitate investors and companies for making better investment decisions, portfolio selection and checking performance of the stocks in better form. The research highlights the technique to choose stocks for best portfolio. The validity of the CAPM on KSE data is also discussed.

■ Literature Review

Markowitz (1952) kept the foundation of modern portfolio theory and postulated the investor's portfolio selection problem in terms of the expected return and the variance of the return. Sharpe (1964) established the equilibrium between the prices of capital assets and different types of risk under the following assumptions: the common rate of interest for borrower or lender and the homogeneous expectations of every investor about securities. The research indicated a simple linear relationship between the expected return and standard deviation for efficient combinations of risky assets under the conditions of equilibrium. Lintner (1965) discussed

linearity of risky assets in terms of their expected return, variance and covariance in competitive markets under idealized conditions. He divided the total risk of a security in sum of its own variance and covariance of its return with all other securities in the market. The CAPM was introduced in the early 1960s by Sharpe (1964), Lintner (1965) and Black (1972), on the basis of the work carried out by Markowitz (1959). CAPM is defined as:

$$E(R_i) = R_f + \beta_i [\, E(R_M) - R_f \,] \quad \text{where} \quad \beta_i = \frac{\text{Covariance}(R_i, R_M)}{\text{Variance}(R_M)} \quad (1)$$

The coefficient β_i is the sensitivity of the return of assets i (R_i) to the movements of the return of the market (R_M), and defined as the normalized covariance between the return of the risky asset and the return of the market portfolio. It is non-diversifiable/systematic/market risk. CAPM is only valid within a special set of assumptions:

- Investors are risk averse.
- Every investor has the same information at any moment of time without any fee.
- Distribution of asset returns is normal.
- Investors can borrow or lend any amount at any time at fixed and risk-free rate.
- There is no market commission, taxes, or restrictions on selling and purchasing of assets.
- There is a portfolio where every asset in the economy is included, proportional to its market value, and by definition, its β is 1.0.

Jensen (1968) gave favorable evidence about CAPM while Douglas (1969) and Miller and Scholes (1972) did not completely agree to this evidence. Black et al. (1972)

discussed the CAPM, its foundation and proposed some empirical tests to check the validity of the capital asset pricing model. They suggested following cross-sectional tests. Mean excess return for a set of securities over a time interval

$$= \overline{r_i} = \gamma_0 + \gamma_1 \ \beta_i + u_i$$

It was found that γ_0 was not significantly equivalent to zero and γ_1 also found different from average market excess return($\overline{r_M}$). Black (1972) discussed CAPM model under restriction of no risk-free asset and also discussed under restriction of risk-free assets with consideration of only long term borrowing. In both cases, expected return on any risky asset shown as a linear function of its β. The model in which borrowing was restricted found consistent with the empirical findings reported earlier by Black et al. (1972). Fama and MacBeth (1973) tested the relationship between average return and risk for New York Stock Exchange common stocks and concluded a favorable decision about CAPM. They performed cross-sectional test to check linearity, no systematic effects of non-beta risk, and positive expected return-risk tradeoff using the following model.

$$r_{it} = \gamma_{ot} + \gamma_{1t}\beta_i + \gamma_{2t}\beta_i^2 + \gamma_{3t}s_i + \eta_{it}$$

r_{it} is the one period percentage return on security i from time
t-1 to t.
s_i is standard deviation of ith security returns.

γ_{ot} should equal to zero, γ_{1t} positive value indicates market of risk-averse investors, γ_{2t} should be zero for linearity

condition, and γ_{3t} meant that some measure of risk of security i is not fully related to beta. Roll (1977) criticized that the CAPM will hold only if the market proxy that is used is Mean-variance efficient otherwise relationship between expected return of a security and β will not hold. Furthermore, since the market portfolio is not identifiable so CAPM could not be really testable. Banz (1981) found that smaller firms have given more returns than average and larger firms and called it size-effect on the basis of 40 years data taken from NYSE common stocks. Graves and Mcdonald (1989) found non-normality in monthly data over a series of five-year intervals. Fama and French (1993) presented three factors model, and observed that stocks having small capital and high book-to-market ratio performed better than the overall market. Michailidis et al. (2006) tested the Capital Asset Pricing Model at Greek stock market by taking five years weekly data and concluded that higher risk (beta) was not associated with higher levels of return. Javid (2008) pointed out that CAPM is inapplicable by taking the data from Karachi stock exchange for the period 1993 to 2004. The assets returns are also found non-normal. However, the use of higher moment model shown that investors have been rewarded for co-skewness risk.

■ Methodology

After collection of stocks data from KSE website, it is adjusted for dividends and bonus issue shares to clarify the actual returns as per CAPM requirements. This study discusses the validity of CAPM for the periods of July 2007 to June 2013. As discussed earlier CAPM is defined as:

$$E(R_i) = R_f + \beta_i [E(R_M) - R_f] \quad (1)$$

Where the value of standard beta coefficient is:

$$\beta_i = \frac{\text{Covariance}(R_i, R_M)}{\text{Variance}(R_M)}$$

Here: R_i stands for return on asset i
R_f stands for return on the risk-free asset
R_M stands for return on the market portfolio

In excess return form CAPM equation can be written as:

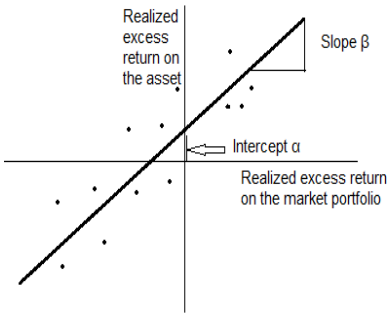
$$E[r_i] = \beta_i E[r_M] \quad (2)$$

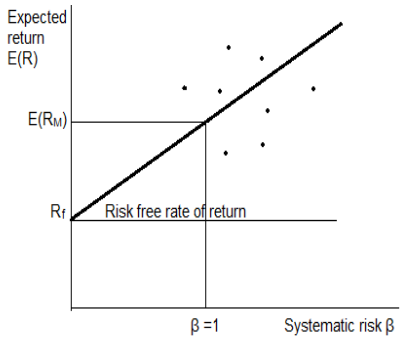
Where: $r_i = R_i - R_f$ is the excess return on asset i

$r_M = R_M - R_f$ is the excess return on market portfolio or market risk premium

The Security Characteristic Line (SCL) is helpful in estimation of CAPM and Security Market Line (SML) is helpful to understand CAPM. The Security Characteristic Line shows performance of a particular security/ portfolio against market portfolio at every point in time. In general X-axis shows the excess return of the market over the risk free return and Y-axis shows the excess return of particular security as shown in Figure 1. Security Market Line describes the CAPM relationship between expected rates of return of an individual security versus its β.

Figure 1 Security Characteristic Line **Figure 2 Security Market Line (CAPM)**





Jensen's alpha α and CAPM beta are usually calculated by using the following regression equation known as Security Characteristic Line (SCL):

$$R_{i,t} - R_f = \alpha_i + \beta_i(R_{M,t} - R_f) + \epsilon_{i,t} \quad (3)$$

Where $\beta_i(R_{M,t} - R_f)$ is non-diversifiable or systematic risk

$\epsilon_{i,t}$ is diversifiable, non-systematic or idiosyncratic risk

$$\beta_i = \frac{\text{Covariance}(R_i - R_f, R_M - R_f)}{\text{Variance}(R_M - R_f)} = \frac{\text{Covariance}(r_i, r_M)}{\text{Variance}(r_M)} = \frac{\sigma_{i,M}}{\sigma_M^2} \quad (4)$$

Here σ_i is the relative volatility of the i^{th} security, and σ_M is the volatility of the market.

Jensen (1968) introduced Jensen's alpha and used it as a measure in the evaluation of mutual fund managers. The relative performance of a company is measured by Jensen's alpha as:

$\alpha = \gamma - [R_f (1 - \beta)]$

if $R_i = \gamma + \beta (R_m) + \varepsilon$ where $\beta_i = \frac{\text{Covariance}(R_i, R_M)}{\text{Variance}(R_M)}$

In both of the above methods the value of beta and Jensen's alpha are very close to each other. The relationship of both methods, assuming values of R_f are relatively close to each other, is illustrated here:

If $R_i = \gamma + \beta (R_m) + \varepsilon$

$R_i - R_f = \gamma + \beta (R_m) - R_f + \varepsilon$

(Subtracting R_f from both sides)

$R_i - R_f = \gamma + \beta (R_m) + \beta (R_f) - \beta (R_f) - R_f + \varepsilon$

(Adding and subtracting $\beta(R_f)$)

$R_i - R_f = \gamma - [R_f (1 - \beta)] + \beta (R_m - R_f) + \varepsilon$

$(R_i - R_f) = \alpha + \beta (R_m - R_f) + \varepsilon$

For efficient market α_i is zero. Actually, α_i indicates performance of an investment after accounting for the risk it involved. If

$\alpha_i < 0$ it means that investment has earned too little to the risk involved in it

$\alpha_i = 0$ it means that investment has earned according to the risk involved in it

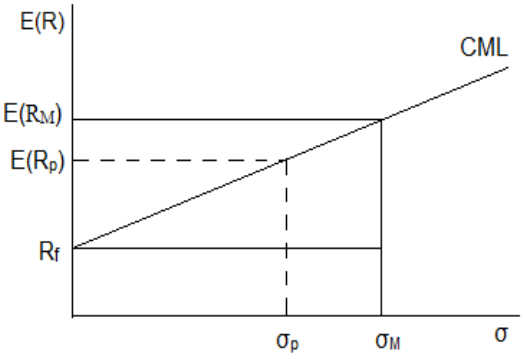
$\alpha_i > 0$ it means that investment has earned in excess of the reward for its risk

Risk that is common for all securities in the market is known as systematic risk or market risk while the risk associated with individual assets is called unsystematic risk or firm specific risk. Unsystematic risk can be reduced by investing in a variety of assets known as portfolio such a reduction in risk is known as diversification. The CAPM assumes that lowest possible level of risk can be obtained by choosing optimal portfolio. Economic idea of utility theory in diversification assumes that investors prefer low risk and higher return but

practically higher return is usually associated with higher risk and lower return is associated with lower risk.

The Capital Market Line (CML) shows the highest returns for each level of risk in a portfolio, containing risky and risk-free assets i.e. all efficient portfolios lies on this line. The risk of an efficient frontier portfolio is its standard deviation. It shows trade-off between portfolio risk and return.

Figure 3 Capital Market Line



All of the portfolios on the CML have the same Sharpe ratio as that of the market portfolio, i.e. Slope of the CML:

$$\frac{E[R_p] - R_f}{\sigma_p} = \frac{E[R_M] - R_f}{\sigma_M}$$

CML:

$$E[R_p] = R_f + \sigma_p \frac{E[R_M] - R_f}{\sigma_M}$$

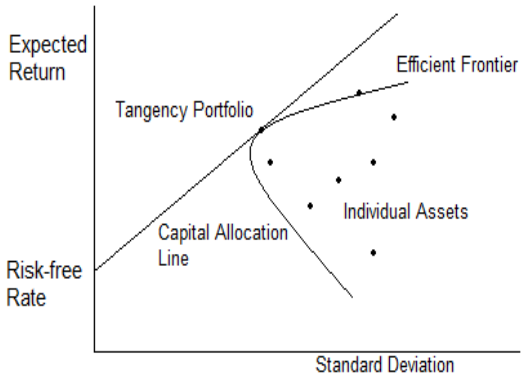
Capital Allocation Line (CAL) is used to measure the risk of risky and risk-free assets. It is represented by straight line which has the following equation:

$$E[R_c] = R_f + \sigma_c \frac{E[R_p] - R_f}{\sigma_p}$$

Where: R_c is return on portfolio formed by combination of risky and risk-free assets. R_f is risk free rate of return and R_p is return on risky portfolio.

The efficient frontier is a curve showing the maximum expected return for a given level of risk. According to Markowitz (1952) for any point on efficient frontier there is at least one portfolio that has the expected return and risk corresponding to that point.

Figure 4 The (Markowitz) Efficient Frontier



To test CAPM, portfolios are constructed on the basis of CAPM beta risk coefficients. The stability of beta is also tested. Due to the instability of CAPM beta, a method of portfolios construction on the basis of Jensen's alpha is introduced. The basic test statistics used in the study are consulted from the book '*Basic Econometrics*', written by Gujarati (2004) and '*Basic Econometrics' by* Greene (2009).

■ Data Selection & Adjustments

The study uses monthly returns data of 28 selected companies listed in Karachi Stock Exchange (KSE) for the most recent period from July 2007 to June 2013. These 28 companies are picked from the list of 30 companies included

in KSE30 index. Two companies were dropped out from the list of 30 companies due to incomplete data set. The data are obtained from KSE database. KSE100 index is used as a proxy for the market portfolio. Market portfolio is defined as the weighted sum of every asset in the market. Three Months Government Treasury bill (TB) rates are used as a proxy for the risk-free asset since TB has no risk and is paid at fixed rate of interest. The TB rates were obtained from the State Bank of Pakistan.

Most of the companies distribute a portion of their profits to their shareholders, which is called dividend. Dividend has some effects on the company stock price. For the adjustment, the pre-dividend data are multiplied by factor:

$$F = 1 - \frac{Amount\ of\ dividend}{Trading\ price\ before\ ex - date}$$

A company may increase or decrease its number of outstanding shares by a stock split and the market capitalization of the company is not changed by this action. However, the stock price is changed depending on the split ratio. For example, if a company stock price is P and the company issues a 2-1 (2-for-1) stock split i.e. 100% bonus shares, then the stock price became half by multiplying factor 0.5. On issuance of right shares on discount price existing shareholders can increase their shares by investing more money on purchasing more right shares at discount rate. On issuance of right share, previous prices are multiplied by factor R.

$$R = \frac{(Ratio\ of\ old\ shares\ \times ex - stock\ price\ + Ratio\ of\ new\ shares\ \times offer\ price)}{(Sum\ of\ old\ and\ new\ shares\ ratio) \times\ ex - stock\ price}$$

If the price of stock at time t is P_t and its previous Price is P_{t-1} then Simple Rate of Return is:

$$R = \frac{(P_t - P_{t-1})}{P_{t-1}} = \frac{P_t}{P_{t-1}} - 1 = e^{R_c} - 1$$

Hence $$1 + R = \frac{P_t}{P_{t-1}}$$

Logarithmic return or Continuously Compounded Returns R_c is defined as:

$$R_c = \ln(1 + R) = \ln(\frac{P_t}{P_{t-1}}) = \ln(P_t) - \ln(P_{t-1})$$

where in is an abbreviation of natural logarithm. If R_A is annual Treasurary bill rate, then simple monthly rate of return is equals to $(1 + R_A)^{1/12} - 1$. The annual rates can also be converted into continuously compounded return as $\frac{\ln(1+R_A)}{12}$. For calculation of averages and standard deviations continuously compounded returns are simple to manipulate and give more accurate results since simple arithmetic mean of logarithmic return has a close relation to geometric mean of simple returns. These are the reasons that continuously compounded returns are generally used in CAPM. In case of small values of weekly and monthly returns, there is no considerable difference between simple and continuously compounded rate of return.

■ Analysis of Data

Data analysis section consists upon four parts. In first two parts validity of the CAPM is tested on KSE by using monthly

excess socks return data for the periods of July 2007 to June 2013 and July 2010 to June 2013. In third and fourth parts portfolios are constructed on the basis of CAPM beta and Jensen's alpha by using the period of July 2007 to June 2010 and future returns are analyzed for the period of July 2010 to June 2013.

■ Test of CAPM on KSE Using Monthly Excess Stocks Return Data

To test CAPM, first of all each security excess returns, is regressed on market excess returns by Least Square method. The graphical relationship between CAPM betas and average returns using KSE monthly excess return data for the period July 2007 to June 2013 are shown in Figures 5 and 6.

Figure 5 Beta Versus Average Return 2007-13

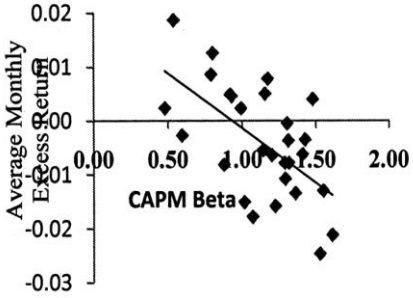
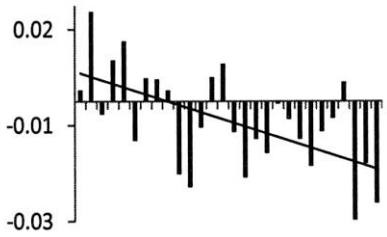


Figure 6 Stocks Returns According to ranked Values of Beta



The Figures 5 and 6 indicate that higher values of beta are not associated with higher risk as CAPM predicts. However an inverse linear relationship is seen between beta risk and rates of return. The next step in CAPM is to construct portfolios to diversify the unsystematic risk. Seven equally weighted portfolios are constructed on the basis of ascending values of betas coefficient such that each portfolio

consists of four stocks. The average portfolio excess returns are computed and regressed against market portfolio. The portfolio average excess returns are calculated using arithmetic mean of returns as:

$$r_{pt} = \frac{\sum_{i=1}^{4} r_{it}}{4}$$

The results of the CAPM portfolios estimated coefficients along with t-values after estimated coefficients, mean (average excess returns), standard deviation of excess returns and the values of R^2 are shown in the Table 1.

Table-1: Portfolio CAPM Results by using KSE Stocks Excess Return for the Period July 2007 – June 2013

Port-folio	Alpha	t-value	Beta	t-value	Mean	SD	R^2
P1	0.0087	1.73	0.6007	10.23	0.0067	0.067	0.60
P2	0.0063	1.04	0.8820	12.36	0.0034	0.092	0.69
P3	-0.0056	-0.97	1.0560	15.62	-0.0091	0.103	0.78
P4	0.0015	0.34	1.1895	22.35	-0.0024	0.109	0.88
P5	-0.0014	-0.23	1.2994	17.31	-0.0057	0.124	0.81
P6	-0.0032	-0.69	1.3834	25.28	-0.0069	0.125	0.91
P7	-0.0088	-0.83	1.5432	12.52	-0.0139	0.159	0.69

The statistics of Table 1 indicate that all portfolio beta coefficients are significant at 5% level of significance and all alpha coefficients are insignificant at 5% level of significance. Statistics shows that portfolio selection diversified unsystematic risk and resulting in higher value of coefficient

of determination: R^2. The ex-post Security Market Line (SML) is obtained by regressing average portfolio returns; r_p against portfolio betas; β_p. The cross sectional test of CAPM is used to check that expected returns and betas are linearly related, beta premium is positive and its intercept is zero in excess return form. Results indicate that the estimated equation is significant and shows a linear relationship between beta risk and returns. Cross section test shows that CAPM do not hold. Non-linearity test indicates that the coefficient of beta square is statistically insignificant so there is no issue of non-linearity between portfolio risk and returns. The test of residual variance indicates no significant effect of residual variance on portfolio returns.

The CAPM predicts that all investors hold portfolios that are efficient. Therefore, the Market Portfolio is efficient. To test it, we must test that there is a positive linear relationship exists between portfolio beta and its return.

Figure 7 Portfolio Beta Versus Returns for 2007 – 13

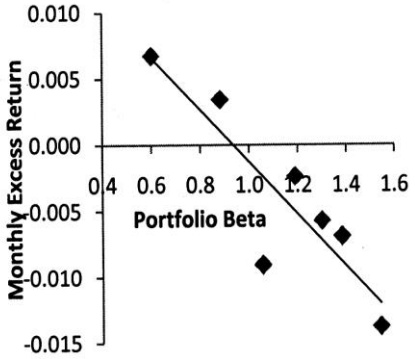
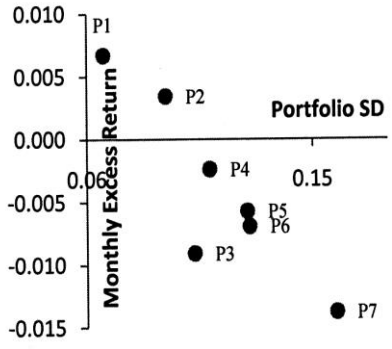


Figure 8 Portfolio SD Versus Average Returns 2007 – 13



The Figure 7 indicates that relationship between portfolio beta and its return is linear but not positive. Hence CAPM do not hold on KSE monthly data for the period July 2007 to June 2013. According to the theory of Capital Market Line and the (Markowitz) Efficient Frontier higher value of standard deviation should be associated with higher return that is not observed in Figure 8.

Karachi stock market was collapsed almost 55% in four months after April 2008 and the overall market performance was also negative for the previously selected period of July 2007 to June 2013. So CAPM is again tested on KSE stocks excess return data for the period July 2010 to June 2013. The graphical relationship between CAPM betas and average returns using KSE monthly excess return data for the period July 2010 to June 2013 is shown in Figure 9.

Figure 9 Beta Versus Average Return 2010 -13

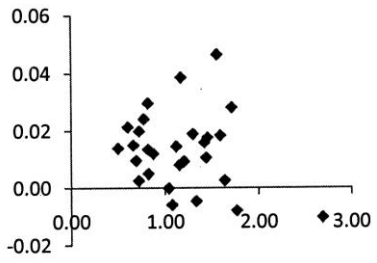
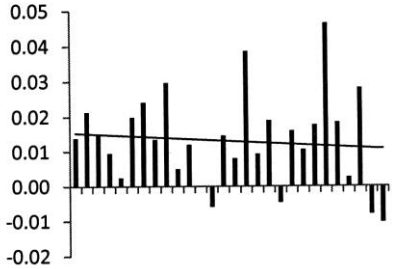


Figure 10 Stocks Returns According to Ranked Values of Beta



The Figure 9 indicates no relationship exists between betas and average excess returns. Figure 10 indicates some of the higher beta stocks are more risky and can give higher return but no excess reward is seen at average. Seven equally weighted portfolios are constructed on the basis of ascending values of betas coefficient such that each portfolio consists of four stocks. The results of portfolios constructed

on the basis of ascending values of beta using monthly excess returns for the period July 2010 to June 2013 are shown in Table 2.

Table-2: Portfolio CAPM Results by using KSE Stocks Excess Return for the Period July 2010 – June 2013

Port-folio	Alpha	t-value	Beta	t-value	Mean	SD	R-sq
P1	0.0072	1.26	0.6131	5.36	0.0148	0.045	0.46
P2	0.0054	1.14	0.7584	7.97	0.0148	0.046	0.65
P3	0.0005	0.08	0.8880	6.96	0.0115	0.057	0.59
P4	-0.0004	-0.04	1.1288	5.87	0.0136	0.078	0.50
P5	-0.0065	-0.78	1.3120	7.92	0.0098	0.080	0.65
P6	0.0042	0.41	1.5082	7.31	0.0229	0.095	0.61
P7	-0.0211	-1.73	1.9501	8.01	0.0029	0.119	0.65

The statistics given in Table 2 indicate that all portfolio beta coefficients are significant at 5% level of significance, and all alpha coefficients are insignificant at 5% level of significance. Cross sectional test suggests that there is no linear relationship exists between portfolio betas and portfolio average excess returns. The graphical relationship between portfolio beta and average return is shown in Figure 11.

Figure 11 Portfolio Beta Versus Average Returns 2010 –13

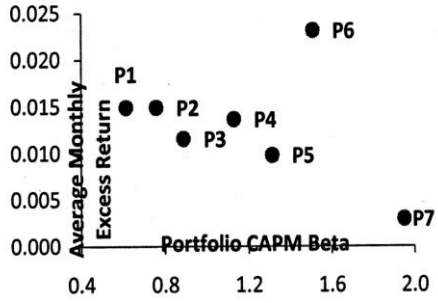
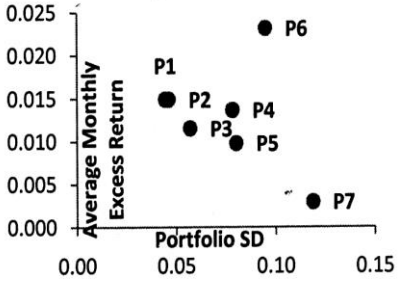


Figure 12 Portfolio SD Versus Average Returns 2010 –13



The Figure 11 indicates no positive linear relationship between portfolio betas and its returns. Figure 12 indicates that portfolio P1 gives good return with lowest standard deviation.

■ Portfolio Construction for Future Investment on the basis of CAPM Beta

Practically portfolio investment decisions based upon past and existing conditions of the stocks. To clarify the future returns pattern, previous period data should be compared with next period data. To investigate how to select best portfolio, we have divided the previously considered period of July 2007 to June 2013 in two parts i.e., July 2007 to June 2010 & July 2010 to June 2013. In this section the period of July 2007 to June 2010 is utilized for the purpose of portfolio construction on the basis of CAPM beta values to see future changes in the portfolios returns. For this purpose the seven equally weighted portfolios of 4 securities have been constructed on the basis of ascending values of the CAPM beta for the period of July 2007 to June 2010 as indicated in Table 3.

Table-3: Portfolio Construction on the Basis of CAPM Beta using KSE Stocks Monthly Excess Returns for July 2007–June 2010

Stock	Beta	Port-folio	Excess Return	Stock	Beta	Port-folio	Excess Return
KAPCO	0.4648	P1	0.0011	POL	1.2611	P5	-0.0222
MTL	0.5097			UBL	1.2691		
BAHL	0.5822			NBP	1.3201		
HUBC	0.8282			PSO	1.3552		
NCL	0.8307	P2	-0.0206	LUCK	1.3782	P6	-0.0275
FFC	0.8325			NML	1.3974		
FCCL	0.8529			JSCL	1.4360		
DAWH	0.8687			MCB	1.4467		

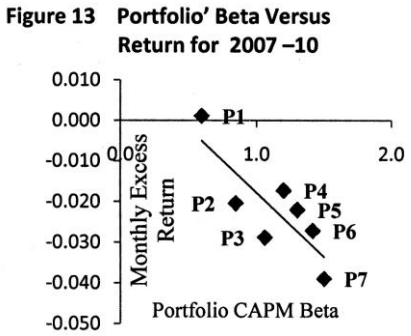
PPL	0.9556	**P3**	**-0.0292**	HBL	1.4564	**P7**	**-0.0397**
FFBL	1.0684			DGKC	1.4752		
PTC	1.0757			AICL	1.4995		
MLCF	1.1427			ATRL	1.5857		
BAFL	1.1536	**P4**	**-0.0174**				
OGDC	1.1964						
ENGRO	1.2224						
NRL	1.2283						

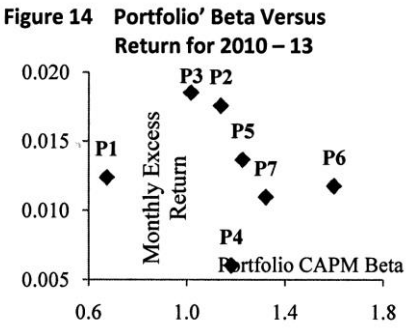
CAPM portfolio results for the period July 2010 to June 2013 on the basis of portfolios constructed on the basis of CAPM beta for previous period are reported in Table 4.

Table-4: CAPM Portfolio Results for July 2010 – June 2013 on the Basis of Same Stocks as taken Previously in Portfolios

Port-folio	Alpha	t-value	Beta	t-value	Mean	SD	R-sq
P1	0.0040	1.01	0.6738	8.61	0.0123	0.040	0.69
P2	0.0033	0.38	1.1386	6.50	0.0174	0.075	0.55
P3	0.0058	0.75	1.0181	6.62	0.0184	0.067	0.56
P4	-0.0086	-1.31	1.1812	9.02	0.0060	0.069	0.71
P5	-0.0016	-0.34	1.2270	13.02	0.0136	0.066	0.83
P6	-0.0081	-0.69	1.5985	6.89	0.0117	0.103	0.58
P7	-0.0054	-0.79	1.3214	9.65	0.0109	0.076	0.73

In table 4 all portfolio alpha coefficients are found insignificant while all portfolio beta coefficients are found significant at 5% level of significance. The relationships of portfolio betas values with its returns for the period of July 2007 – June 2010 and for the period of July 2010 – June 2013 are shown in Figures 13 and 14 respectively.





The Figure 13 indicates a negative linear relationship between portfolio beta and the average monthly excess return for the period July 2007 to June 2010. The Figure 14 indicates no relationship between portfolio beta and average monthly excess return for the period July 2010 to June 2013. The graphical comparison of the portfolios average excess returns for past period of July 2007 – June 2010 with future period of July 2010 – June 2013 is shown in Figure 15.

Figure-15: Comparison of Portfolio Returns on the basis of Beta Values

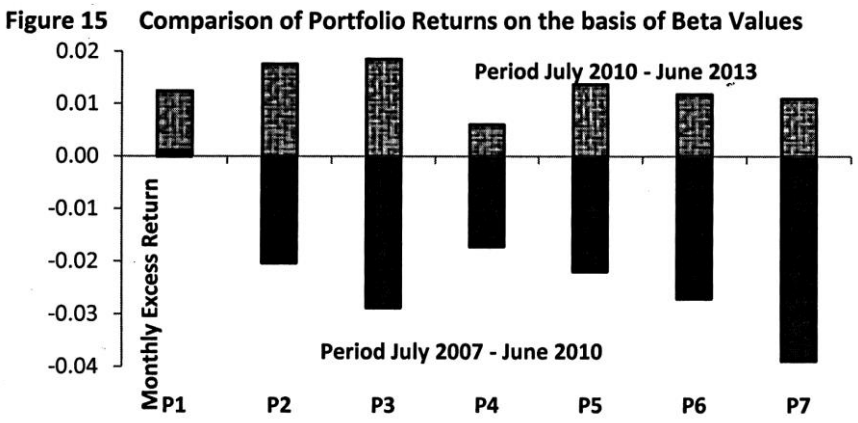


Figure 15 indicates that the portfolios P1, P2 and P3 with smaller values of CAPM beta show better performance in the

next period, that is the failure of CAPM which postulates that higher beta is associated with higher return.

■ Portfolio Construction for Future Investment on the basis of Jensen's Alpha

The period of July 2007 to June 2010 is utilized for the purpose of portfolio construction on the basis of Jensen's alpha values to see future changes in the portfolios returns. The seven equally weighted portfolios of 4 securities have been constructed on the basis of ascending values of the Jensen's alpha for the period of July 2007 to June 2010 as indicated in Table 5.

Table-5: Portfolio Construction on the Basis of Jensen's Alpha Risk by Using KSE Stocks Monthly Excess Returns for the Period July 2007 – June 2010

Stock	Jensen's Alpha	Port-folio	Excess Return	Stock	Jensen's Alpha	Port-folio	Excess Return
MLCF	-0.0454	P1	-0.053	NRL	0.0075	P5	-0.015
FCCL	-0.0325			PSO	0.0091		
DGKC	-0.0259			FFBL	0.0099		
BAFL	-0.0259			MCB	0.0100		
PTC	-0.0155	P2	-0.035	HUBC	0.0117	P6	-0.006
AICL	-0.0135			PPL	0.0145		
NCL	-0.0129			ENGRO	0.0150		
UBL	-0.0104			POL	0.0157		
JSCL	-0.0051	P3	-0.030	FFC	0.0211	P7	0.007
NBP	-0.0047			ATRL	0.0237		
LUCK	-0.0041			OGDC	0.0248		
NML	-0.0035			MTL	0.0348		
KAPCO	-0.0002	P4	-0.013				
HBL	0.0010						

BAHL	0.0032			
DAWH	0.0059			

The relationships between alpha coefficient and return are shown in Figures 16 and 17.

Figure 16 Alpha Versus Stocks Return for 2007-10

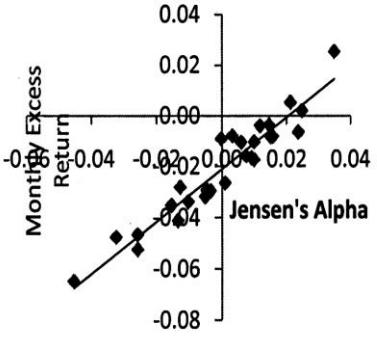
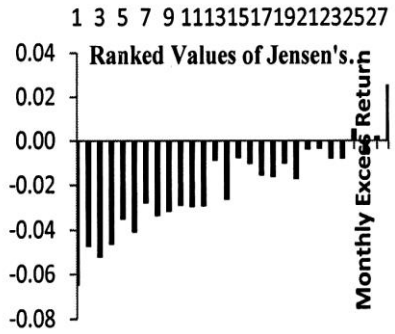


Figure 17 Ranked Values of Alpha Versus Return 2007-10



The Figures 16 and 17 indicate the existence of linear relationship between alpha intercept and rate of returns. CAPM portfolio results of the monthly stocks returns data for the period July 2010 to June 2013 on the basis of portfolios indicated in Table 5 are shown in Table 6.

Table-6: CAPM Portfolio Results for July 2010 – June 2013 using Portfolios based upon Jensen's alpha values of the Previous Period July 2007 – June 2010

Stock	Alpha	t-value	Beta	t-value	Mean	SD	R-sq
P1	0.0074	0.58	1.5686	6.16	0.0267	0.106	0.53
P2	-0.0042	-0.56	1.3175	8.78	0.0121	0.078	0.69
P3	-0.0107	-0.89	1.6483	6.93	0.0097	0.106	0.59
P4	-0.0043	-0.73	0.7460	6.36	0.0049	0.050	0.54
P5	-0.0028	-0.41	1.0304	7.35	0.0099	0.065	0.61

P6	0.0025	0.37	0.8813	6.47	0.0134	0.058	0.55
P7	0.0015	0.22	0.9668	6.94	0.0135	0.062	0.59

Table 6 indicates that all portfolio alpha coefficients are insignificant & portfolio beta coefficients are significant at 5% level of significance. The relationship of Jensen's alpha and beta coefficients with portfolio returns for the next period of July 2010 to June 2013 using previously constructed portfolios on the basis of Jensen's alpha are shown in Figures 18 and 19.

Figure 18 Portfolio' Alpha Versus Return for 2010-13

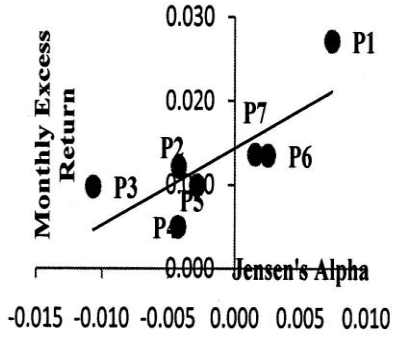
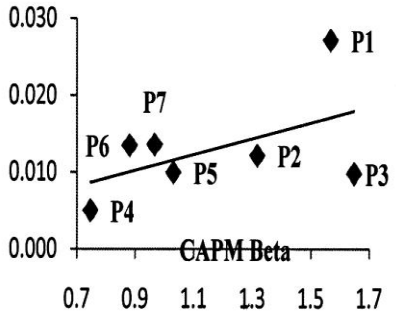


Figure 19 Portfolio' Beta Versus Return for 2010-13

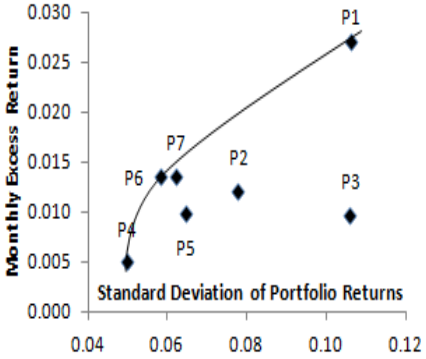


The Figure 18 indicates positive linear relationship between portfolio alpha and the average monthly excess return for the period July 2010 to June 2013. The Figure 19 indicates positive linear relationship between portfolio beta and average monthly excess return. The portfolio P1 was constructed on the basis of poor performed or risky companies at the previous selected period of July 2007 to June 2010 whereas portfolio P7 was constructed on the basis of well performed companies during the previous

selected period. The Figure 19 indicates that the risky portfolios P1 shown higher returns in future.

The Figure 20 indicates that for the period of July 2010 to June 2013 the portfolio P1 gives maximum return for maximum standard deviation. P1 is also observed to have higher beta value (Figure 19) and higher level of risk at previous period.

Figure 20: The Efficient Frontier for the Period July 2010 – June 2013



The figures 19 and 20 have some relations with CAPM theory that postulates that higher return is associated with higher risk but here portfolios are constructed on the basis of Jensen's alpha values of the previous period. It's meant that Jensen's alpha is a better representative of risk coefficient than CAPM beta. The graphical comparison of the portfolios average excess returns for past period of July 2007 to June 2010 with future period of July 2010 to June 2013 on the basis of Jensen's alpha portfolios is shown in Figure 21.

Figure 21 Comparison of Portfolio Returns on the basis of Jensen's Alpha

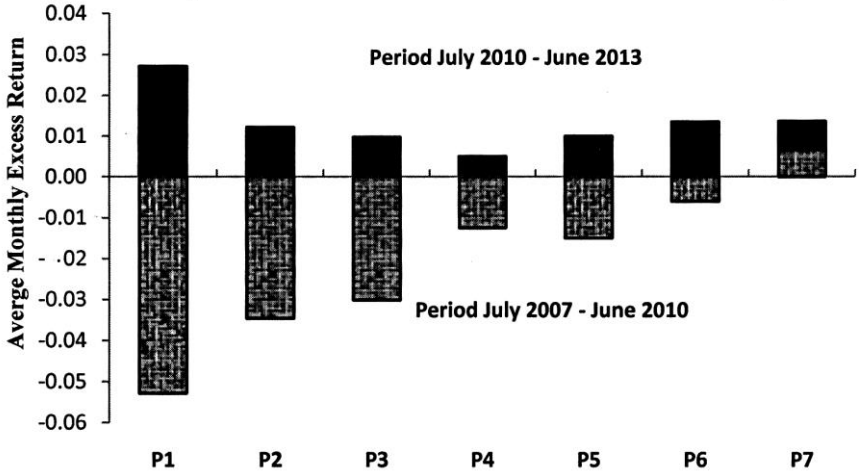


Figure 21 indicates that the securities that have worse negative excess returns show much better performance in the next prosperity period. Average securities remain average in the next period with positive excess returns. The portfolio P1 of risky securities (on the basis of Jensen's alpha value) gives highest return as compared to any other portfolio either constructed by Jensen's alpha or CAPM beta values.

■ Conclusions

Initially CAPM is tested on KSE by using monthly data for the period July 2007 to June 2013. The findings of the study do not support CAPM hypothesis of higher beta risk associated with higher return. However, negative linear relationship is observed between security returns and market portfolio in both individual and portfolio CAPM relationships. For the period of July 2010 to June 2013 the higher beta values were not associated with higher returns. Portfolio analysis rejects

the existence of positive linear relationship between beta risk and return for this period. CAPM postulates that intercept alpha should be zero that is not observed. The estimated values of beta for the periods July 2007 - June 2013 and July 2010 – June 2013 indicate instability of CAPM beta coefficients for many stocks. Its mean that estimated values of beta very with time. Iqbal et al. (2010) also realized the prediction problems in emerging markets. Michailidis, et al. (2006) results on Greek Securities Market for the period of January 1998 to December 2002, Javid (2008), Khan et al. (2012), and Rizwan et al. (2013) results on KSE data also indicate poor performance of CAPM.

Construction of portfolios for future investment on the basis of CAPM beta indicates that the portfolios with smaller values of CAPM beta gives relatively better return in the future. The portfolios with higher values of beta coefficient were not associated with higher return in the future too. The analysis of returns indicates that CAPM beta could not be considered a good measure of risk coefficient.

Jensen's alpha is used to measure the performance of a company. This study observed a positive linear relationship between the values of Jensen's alpha coefficients and rate of returns. It means that poor performed stocks are associated with lower returns and well performed stocks are associated with higher returns for the current estimated period. A higher value of Jensen's alpha indicates good performance of a stock and lower value indicates poor performance of a stock. The portfolios constructed on the basis of Jensen's alpha values for the period July 2007 to June 2010 to see future changes in the returns for the period of July 2010 to June 2013 indicates that the portfolio of poor performed securities gives highest return in future. It is observed that

alpha coefficient is better representative of risk coefficient instead of CAPM beta. The research inferred that poor performed securities (likely to survive in future) on the basis of lower values of alpha coefficient could be chosen in a portfolio for best future return.

NAME OF SELECTED COMPANIES FROM KSE

Symbol	Company Name
AICL	Adamjee Insurance Company Limited
ATRL	Attock Refinery Limited
BAFL	Bank Al-Falah Limited
BAHL	Bank Al-Habib Limited
DAWH	Dawood Hercules Corporation Limited
DGKC	D.G. Khan Cement Company Limited
ENGRO	Engro Corporation Limited
FCCL	Fauji Cement Company Limited
FFBL	Fauji Fertilizer Bin Qasim Limited
FFC	Fauji Fertilizer Company Limited
HBL	Habib Bank Limited
HUBC	Hub Power Company Limited
JSCL	Jahangir Siddiqui Company Limited
KAPCO	Kot Addu Power Company Limited
LUCK	Lucky Cement Limited
MCB	MCB Bank Limited
MLCF	Maple Leaf Cement Factory Limited

MTL	Millat Tractors Limited
NBP	National Bank of Pakistan
NCL	Nishat Chunian Limited
NML	Nishat Mills Limited
NRL	National Refinery Limited
OGDC	Oil and Gas Development Company Limited
POL	Pakistan Oilfields Limited
PPL	Pakistan Petroleum Limited
PSO	Pakistan State Oil Company Limited
PTC	Pakistan Telecommunication Company Limited
UBL	United Bank Limited

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