Capital Asset Price Model Empirical Evidence from Karachi Stock Exchange

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ABSTRACT:*CAPM is the first risk and return theory that widely use by analysts, investors, and corporations. CAPM model basically using to find out the market risk (beta) and determine the investor risk and return on the behalf of market risk Beta. CAPM suggest that systematic risk cannot be eliminated and the unsystematic risk can be eliminated through some techniques and for high return investor will be accepting high risk.The top 15 listed companies are taken from the Karachi stock exchange and all companies are divided into three portfolios. In first portfolio finds return of firms and their beta. In the second portfolio finds beta and average beta. Third portfolio finds Regress portfolio returns on their period 2 betas cross section-ally in each of the period and Collect coefficients of betas and their standard errors.*
The two step of FamaMacBeth (1973) was used that was forming pre ranking beta and the second was tested for post ranking beta portfolios. The aim of the study to test two things in KSE (Karachi Stock Exchange) first was find association among the non- diversifiable beta and return.The second was test equilibrium, positive beta and return for long run.
The intercept term all none zero values but these estimates are statistically insignificant (P values > 0.05). The study concludes that beta was directly related to cross sectional return. Therefore this study concludes that CAPM model is valid in case of Karachi Stock Exchange.

List of Acronyms and Abbreviations
CAPM   Capital Asset Pricing Model
KSE   Karachi Stock Exchange
E(R)   Expected Return
RF   Risk free rate
SML   Security Market Line
BCI   Buyer Cost Indicator
PVM   Present Value Model
KLSE   Kuala Lumpur Stock Exchange
NYSE   New York Stock Exchange
BSE   Bombay Stock Exchange
Rm   Market Return

I.   INTRODUCTION

This section discusses the introduction of this study. It also highlights the contribution made by this study towards the literature along with the organization of this study.

1.1 Introduction To The Study

This section discusses the introduction of this study. It also highlights the contribution made by this study towards the literature along with the organization of this study. Capital asset pricing model (CAPM) plays an important role in efficient market. CAPM is the first risk and return theory that widely used by analysts, investors, and corporations. It is use to determine risk and expected return in market. Capital asset pricing model give direction to investors to find out new opportunities for their investment ,wealth maximize and to improve country economy (Campbell JY & R, 1988).CAPM perform important role to define the risk and expected return in the equilibrium market(Laubscher & E.R., 2002).

Capital Asset pricing Model (CAPM) fully agree with the theory of Finance that bring change in the thinking of investors and corporations(D.R.Harrington & R.A. Korajczyk, 1993). Capital Asset Pricing Model theory has many scholars developed,but the first work done by Sharpe (1964),then Bradfield ,Barr and Afflock-Graves(1988).After these scholars the Linter(1965) and Black (1972) also done their best effort to developed the CAPM. The research study basically connected with the KSE (Karachi Stock Exchange) market to apply Capital Asset Pricing Model to determine the risk and estimated return relationship in the context of Pakistani Market. The using of CAPM model basically doing to find out the market risk (beta) and to determine the investor risk and expected return on the behalf of market risk Beta.

There are also some others models that measure the risk and return of the market. (1) Modigliani-Miller's "Dividend Irrelevance Theorem" (2) Markowitz's risk-averse portfolio optimization model (3) Arbitrage Pricing Theory (APT) (4) Fama-French model.

The most famous and widely Asset pricing model is the Capital Asset pricing Model (CAPM).it is the best and attractive model that relate only one risk factor and investor have the power to understand and to use widely very well in the form of investment(J. L. Davis & Eugene, 2000). In Black(1972)determined the zero beta for risk free security. The three associations occur from the CAPM model. The first one is that E(R) is related with beta and if beta increase so return will be increasing. The second is that beta premium will be positive andE(R) will be greater than the security return. The third is that portfolio is uncorrelated so the estimated profit will be equal to Rf security, and beta premium will be equal to E(R) minus Rf.

The beta has uncertain covariance of security return, the market portfolio divide to uncertain risk of market portfolio. The main purpose is providing a frame work for conditional security price for the existence knowledge variables. The conditional CAPM for economy is the time series of beta. In economy the business situation is more uncertain for their conditional earning of their variables.

1.2 Research Gap Of The Study

Capital Asset Pricing Model does not explain properly possibility between the risk and expected return in the Karachi Stock Exchange (Javid & ahmad, 2008). CAPM does not predict the expected return accurately through because of one risk factor. There are some others factors in market that affect the expected return. These factors in the form of Firm size, financial ratios, economic condition, firm value, inflation and etc. Capital Asset Pricing Model cannot be tested empirically. The reason is that we cannot test the investor expectation. Risk free rate is not in actual risk free return. And market risk (Beta) based on past data and not consider that what will be happen in future (expected return). It's based on only random and professional guess.

The purpose of the analysis is to study the CAPM model on KSE listed cement sector firms that to find out the ability of model that give accurate outcome or not. The outcome show that the model was not suitable for listed cement firms and cannot give full accurate E(R) to securities.The CAPM model was not best for Pakistani Cement industry to determine the risk and E(R) relationship(Sohail Rizwan, Feb. 2013).

CAPM have different argument. All the security of portfolio is same, but in practical it is not possible. CAPM explain only one major factor of risk but in practical there have a lot of factors that affect the expected return.The main purposes of the study to check the CAPM model on KSE, which it give right result or not. The result showed that CAPM are not given the accurate result. The conclusion of the study is that CAPM was not helpful for Pakistani market(Muhammad Ibrahim Khan & Sanaullah, 2012).

CAPM is insufficient for Pakistani equity market and it has the important role to define the E(R) empirically. The significant form of CAPM is to define the positive and equilibrium risk and expected return. But CAPM model rejected this information.

First the analysis finds the most of sign in the market risk premium negative. The second is scrap beta acting on some risky securities. Capital asset pricing model is exercise for finding the risk and return association. The outcomes not supportto CAPM model in the case of individual firm and portfolio and conclude that CAPM is not best model for Bangladeshi market. The result indicates that CAPM liner association is satisfactory that explain return generating process. the result explains that investor is compensating for accepting the risk in a security but not compensating for unique risk(hasan, 2011).

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1.3 Objective Of The Study

The important purpose of the study to check CAPM model empirically in Karachi stock exchange (KSE-100 index) and find thatmodel gives positive response or negative response. Andcompare the performance of Capital asset pricing model with other models.CAPM deals with the prediction about future period. And does not suppose that the expectation or the indirect relations with them and established over the time(Brav Alon, 2005). The important aspect of the study is to find out empirically CAPM model of Sharpe (1964), lintner (1966) that explain risk and expected return in Karachi stock exchange in Pakistan.CAPM model gives useful information to investors that bring change in their estimating and updating their means, variance and covariance of the security return for new time period. Because expected return on a security exceeding time to time and time affect on systematic risk and risk price. Capital Asset Pricing Model is most favorable approach for explaining the German stock market (Sauer & Murphy, 1992).

The central point relates with CAPM model withered model is empirically interrelated with market risk and return. CAPM model determine reward the investor by two ways. One is to compensate by time value of money (Rf) and the second way to give reward for accepting the additional risk in a security(Fahim, 2011).The investors are active and bring change time to time in their investment knowledge and the basis of that market knowledge measure the standard deviation and covariance for the security return for every period. Mean that E(R) affects all the systematic risk information time to time.

The empirical analysis was done for 278 firms and for their monthly profit. CAPM result was not support to their theoretical work that for high risk associated high return. Empirical analysis main objective was to find out that either CAPM capture all the significant part of the reality and the residual variance of the security. The analysis was doing for the period of Jan 1996 to Dec 2009 and result was not fully rejected. CAPM model conclusion from the analysis was that beta was not effectively explain the E(R) on stocks portfolio(Choudhary, 2010).

1.4 Research Question Of The Study

The test of CAPM model is arising some questions that determine risk and expected return relationship for a security. The first one CAPM model have some unreal assumptions like Rf rate is existence, identical hope about E(R),stocks profit is normally distributed. The second one is the model has single period, mean model check return at the end of year. Third is CAPM cannot be testing statistically because the investor belief cannot be test. The fourth one CAPM has only one risk factor that is market beta, but there have more than one risk factor that can affect the stock return.

1.5 Significance Of The Study

The theory of Capital Asset Pricing Model is not explaining every side of the real world. Mean all assumptions of CAPM are not on real basis. The theory is missing real world. But on the basis of some points we cannot reject the CAPM theory (Banz, 1981).The Capital Asset pricing model is idea that tell us that risk should not influence every time on propertybalance. Securities are unrelated directly with each other. Therefore covariance of non-Systematic part of the one security with another security the non-systematic part will be equal tozero.

Capital Asset Pricing Model providing equilibrium point between risk and theexpected return.KSE is not equilibrium place and investors findup and down in security prices. This reason KSE has not same risk and expected return contact, andinvestors find out that market was rise and down unexpectedly in last few periods. Uppol(1998) Find out that Pakistani market profit sharing move away starting the regularity. The word "stock market" gives direction to that market which capable for commerce of business stocks combined shares, extra safety and investment safety. The standard deviation is high so it's mean high return show the reliability in security price in different sectors that are listed in KSE. According to J. Davis(2006) that most favorite model is CAPM model because it have only one risk factor involved that easily understand the investors and financial managers.

CAPM model have some assumption.First one is Capital market will be equilibrium, and for small risk will be small return and for high risk will be high return. Second assumption is that all stocks will be consisting in all markets, and some stocks have not included, mean market portfolio will be limited. The third assumption on the basis of equal time period for all the investors, mean after taking investment decision will be not changing during the period. The fourth assumption that investors borrow and lend at the fixed Rf rate over time period. Investor will be rewarded for extra premium that accepts extra risk on a security. Therefore CAPM has only one variable that is risk premium on the market to predict return on a stock.

CAPM was taken as a standard model that finds out statistical result for Pakistani market. That model was worked effectively in stocks or not. The result finds out more than one risk factor in the stock. The main concern of the study with two issues related with CAPM. The regular stock return hypothesis and single time

period for stock return. In the case of Pakistani market investor want high profit and they accepting high risk in security(Ahmad, 2008).

1.6 Organization Of Study
      In this research, chapter one is about the introduction of the calendar effect in Pakistan stock market and explain that how January and Monday affect on the stock market. Second chapter presents the literature review on the topic after critical review after reading the research work done by different authors. In third chapter, the methodology of the study is discussed highlighting sample of the study, source of collected data, model of the study, variables and hypothesis of the study. Chapter fourth presents analysis and findings in results of the study. Last chapter is about the conclusion of the research.

II.   LITERATURE REVIEW
      This section presents a discussion on the theoretical models on the subject of optimal capital structure and relevant literature review, in light of which hypotheses are drawn.

2.1   Literature ReviewOf The Study
      Capital asset pricing model is the most important and perfect model in finance. It is use to determine risk and return in market and it gives direction to investors to collect high profit from the market. Ansari &naeem (2005) find out that according to CAPM model market effort is threat relevance, since people are generally risk taker. According to Capital asset pricing model, reward is just capable for risk relevance. The main and important aim of Capm model was to discover beta (risk) of business and profit (return) of the business and to maximize the wealth of the investors. The CAPM deals with prediction about a future period and does not suppose that expectation or indirect relations with them and established over time (Brav Alon, 2005).
      According to G.W.Douglas(1969)that continuing beta was more than that Rf and then multiple for valid risk will be not importance. According to capital asset pricing model (CAPM) it is assuming that its give right direction for investor's to obtain opportunities and to invest their investment in the right place. Moreover securities expected profit is the Rf rate and add to best on systematic risk of the security.
      The researchers are searching to find the best model that help to finance manager to calculate the risky security and to find out the return on these risky securities. The most important risk factor is the un-diversifiable beta for security that investor wants to calculate un-diversifiable risk for security and to calculate expected return. And general view is that for high risk will be paying high return. One of the most famous model (CAPM) Capital Asset Pricing Model developed by William Sharpe in 1964 and Lintner in 1965. The model determines that high risk (beta) lead to high expected return for a security. It has most widely using model in different market of the world for determine risk and expected return relationship.
      The used of risk we were able to determine up and down in the share price and also comparative movement of stock portfolio to the market portfolio(Jones, 1998).The risk is rising during the investment time and also that time that wewere finding the beta for stock(Blume, 1993) .The study was check that investor used CAPM model that can beat market. The purpose of the study arises because the use of CAPM model does not give the amazing profit for security to investor.
      The used of CAPM model was checking to find out the investor wither he can beat the market beta (risk) and getting high return then market return for taking CAPM choice. The aim of the study to check those stocks that are out of the securities market line (SML) and those stocks that are above the SML will be best level indicate beta because it have undervalued and those stocks that are below the SML will opposite occurring and normal investor picking the undervalued stocks. According to Ansari(2005) CAPM is the market rewards threat relevance and most of individuals are normally risk unfavorable. The risk quality on behalf of the combination of all unsafe moneys necessity is helpful to encourage public to embrace total amount of unsafe assets in an economic structure.
      Banz (1981) investigated and notice that situation to Small range business have high mean of profits than big range business on the base of valid beta, signifying the lack of ability of the Capital asset pricing model to control the profits of little stocks. Seventy five percent of the professors preferred to used the CAPM model for selection of project(Welch, 2008). A survey analysis explained that seventy three percentfinancial executives used CAPM model(Graham, 2001). The risk (beta) of CAPM model clarifies eighty one percent of the cross sectional variation in the mean of return in portfolio and beta (un-diversifiable) was increasing from actual option linked with project.
      Keogh(1994) find out up and down in risk (beta) and risk of CAPM have not positively affecting in South Africa. In study of Bradfield(1988)find out the supportive result for CAPM model and suggest that CAPM ismeaning full model.

CAPM model have different argument. All securities ofportfolio are same, but in practical it cannot possible. CAPM explain only one major risk factor but in practical there have a lot of risk factors that affected return. CAPM model was tested in British Stock market to determine that model give accurate result or not , the outcome of the model showed that result was rejected because CAPM model do not predict risk and expected return on a stock(Nikolaos, 2009).

CAPM model statistical analysis is not give efficient result, mean CAPM theory and empirical work have find a lot of difference in stock. CAPM was insufficient for Pakistani equity market and it had important role to define E(R) empirically. CAPM was not full model to explain the risk and expected return relationship in a security ,meal model have involve some weakness and according to CAPM hypothical investors normally give preference to low and hgh risk in a security.Diwani(2010)checked CAPM model in the BSE (Bombay stock exchange) and the outcome explain that Model does not hold in BSE and model could not determine accuratly the required rate of return.

The model is was not suitable for KSE listed cement firms and cannot give full accurate E(R) to securities. CAPM model was not best model for Pakistani Cement industry to determine the risk and return relationship(Sohail Rizwan, 2013).CAPM does not predict the expected return accurately through only measure of one risk factor. Because there are some others factors in market that affects the expected return. These factors in the form of Firm size, financial ratios, economic condition, firm value, inflation and etc. The purpose of the analysis to study CAPM model on KSE listed firms that to find out the ability of the model that give accurate outcome or not in Karachi Stock Market.

III. METHODOLOGY

This section discusses the methodology adopted in this research study. It highlights the source of data collection and different models used to confirm or reject the hypothesis of the study.

3.1 Methodology Of The Study
3.1.1 Time period of the study
The time period for data is selected from 2000 to 2006 to test the CAPM model in KSE. That to find out the relation between Expected return and beta. The seven years data are selecting for the study to determine the expected return and their beta.

3.1.2 Source of the data
The study data is taken from the KSE (Karachi stock exchange) website and the Business recorder websites. The market return is taken from the business recorder.

3.1.3 List of sample for the study
The sample is KSE- 15 index selected for the study to determine the expected return and their beta. The top 15 companies are taken from the Karachi stock exchange and compare their return with market return.

Table 3.1.3: list of selected companies

S. No	Company
1	ICI Pakistan Ltd
2	Pakistan telecommunication Ltd
3	Hub power Co Ltd
4	Pakistan State oil Co ltd
5	Sui Northern Gas Pipelines Co
6	Rafhan Maize Products Ltd
7	Adamjee Insurance Co Ltd
8	Karachi Electric Supply Corp Ltd
9	Fauji Fertilizer Co LTD
10	Al-Ghazi Tractors Ltd
11	Javed Omer Vohra & Co Ltd
12	Gul Ahmed Textile Mills Ltd
13	Dewan Textile Mills Ltd
14	Engro Corporation Ltd
15	Suraj Cotton mills Ltd

3.1.4 Portfolio for the study
There are three portfolio selected for the study to determine the expected return and their beta. All the firms are divided into three portfolios. In first portfolio find the return of the firms and their betas. In the second portfolio find the beta and the average beta. Third portfolio finding Regress portfolio returns on their period 2 betas cross section ally in each of the period and Collect the coefficients of betas and their standard errors.

3.1.5 Variable of the study

There are two variable of the study the dependent variable and the independent variable. The dependent variable of the study is expected return and independent variable is beta (risk).

3.1.6 Steps Involved In Portfolio Construction

The most important process is to test the CAPM model using theFamaMacBeth method (1973) process. The two step of FamaMacBeth is using that is forming pre ranking beta and the second is testing for post ranking beta portfolios. The aim of the study to test two things in KSE (Karachi Stock Exchange), the first is to find the association among the non diversifiable beta and return. And the second is to test equilibrium and positive beta and return for long run. The testing of non-diversifiable association using a customized description of the three step portfolio approach that used by FamaMacBethmethod(1973). The FamaMacBeth process is divided into three steps. The first one is the Portfolio formation second is the beta for portfolio and the third is the testing period.

The first step is the portfolio construction stage. In this stage the beta for individual stock for sampleis predicted through regressing stock return and the market returns. The base on the comparative ranking of the predictive beta, stock is divided into three periods. And stocks with the low beta were located into first portfolio then next low were be in the second and so on.And the highest beta was putting in the last portfolio. The second step is to predict the portfolio beta and for every associate section (subsample). Regress the portfolio profits beside the market profits and find weighted mean of beta. In the third step the association among portfolio beta and return was testing and customized to account of the conditional association among beta and actual returns. The portfolio return was regressing for the period of month or weeks for beta cross sectional for every period. The coefficient of the beta and their standard errors was collected.

The market realizes return is higher than the risk free rate of return, the return and portfolio risk (betas) was positively correlated. And if the realize market return is lower than Rf (risk free rate), so the return and portfolio risk (beta) was opposite correlated.

IV.   ANALYSIS AND FINDINGS

4.1 ResutlsOf The Study

The following table 4.1 shows the results of the study using the FamaMcbeth method in order to test validity of CAPM Model.

Table 4.1: Results from FamaMcbeth Method

Portfolio time period	beta	intercept	Std error	t.value	P.value
Sep,30,2004	0.4316468	-0.4025332	0.1762294	-2.44158	0.247473
Oct,29,2004	-0.095226	0.12922267	0.0388781	3.552892	0.174665
Nov,30,2004	0.0329825	0.02164363	0.0134658	1.71809	0.335569
Dec,31,2004	-0.091857	0.14704098	0.0375025	4.191084	0.149111
Jan,31,2005	-0.9888	1.00335862	0.4036995	2.656725	0.229183
Feb,28,2005	0.4205218	-0.4586015	0.1716874	-2.85526	0.214465
Mar,31,2005	0.3066768	-0.3341916	0.1252076	-2.85308	0.214617
Apr,29,2005	-0.396633	0.30138488	0.1619344	1.989441	0.296517
May,31,2005	-0.306744	0.26919755	0.1252349	2.297707	0.261327
Jan,31,2005	0.2152669	-0.1822953	0.0878875	-2.21716	0.269741
Jan,29,2005	-0.232879	0.26389686	0.0950778	2.966906	0.206961
Apr,31,2005	0.7932546	-0.6638558	0.3238638	-2.19109	0.272574
Sep,30,2004	-0.142177	0.12357246	0.058047	2.275571	0.26359
Oct,31,2005	0.7294691	-0.5401735	0.2978219	-1.93877	0.303159
Nov,30,2005	-0.306604	0.27174965	0.1251779	2.320546	0.259031
Dec,30,2005	0.5711921	-0.3585731	0.2332019	-1.64359	0.34797
Jan,31,2006	-0.371737	0.33628896	0.15177	2.368512	0.254331
Feb,28,2006	0.1958489	-0.2291696	0.0799597	-3.06362	0.200859
Mar,31,2006	0.6902155	-0.6792015	0.2817958	-2.5764	0.235702
Apr,31,2006	-0.384583	0.23956615	0.1570145	1.630927	0.350161
May,31,2006	-0.179361	0.18034695	0.073228	2.632573	0.231107
Jun,30,2006	0.3886989	-0.3393733	0.158695	-2.28593	0.262526
Jul,30,2006	-0.116377	0.09457016	0.0475133	2.127588	0.279714
Aug,31,2006	0.0031568	-0.0233378	0.0012888	-19.3559	0.032861
Sep,29,2006	0.2445365	-0.1970122	0.0998374	-2.10935	0.28183
Oct,31,2006	-0.133314	0.09597854	0.0544284	1.884939	0.310521

Nov.30,2006	-0.344874	0.32842739	0.1408025	2.493319	0.242826
Dec,28,2006	0.2936247	-0.2752736	0.1198788	-2.45454	0.2462928

4.2 Analysis Of The Study

The intercept term all none zero values but these estimates are statistically insignificant (P values > 0.05). therefore it taken are zero and the important fact in validation of CAPM model which states the expected return are determine only by systematic risk and nothing else.

An average basis T-values in case of each time period has been greater than 2 and on average beta coefficient is positive. Therefore the study concludesthat beta isdirectly related to cross sectional return.Therefore this study finds that CAPM model is valid in case of `Karachi Stock Exchange.

V. CONCLUSION

5.1 Conclusion To The Study

Capital asset pricing model (CAPM) plays an important role in efficient market. CAPM was the first risk and return theory that widely used by analysts, investors, and corporation andit was used to determine risk and expected return in market. Capital asset pricing model give direction to investors to finding out new opportunities for their investment and to get wealth maximize and to improve country economy. The research study basically associated with KSE (Karachi Stock Exchange) market and applied Capital Asset Pricing Model in context of Pakistani Market.CAPM does not predict expected return accurately through only measure of one risk factor. Because there have some others factors in market that affects the expected return. These factors in the form of Firm size, financial ratios, economic condition, firm value, inflation and etc. CAPM is sufficient for Pakistani equity market and it has the important role to define the E(R) empirically. The significant form of CAPM is to define positive and equilibrium risk and return. Capital Asset Pricing Model provides the equilibrium point between the risk and the expected return.

The time period for data was tested from 2000 to 2006 to test the CAPM model in KSE. The study data was taken from the KSE (Karachi stock exchange) website and Business recorder websites. The top 15 companies were tested that collected from Karachi stock exchange and compare their return with market return. All the firms are divided into three portfolios. First portfolio finds out return of the firm and their beta. Second portfolio finds out beta and the average beta. Third portfolio find out Regress portfolio returns on their period to betas cross section ally in each of the period and Collect the coefficients of betas and their standard errors.

The intercept term all none zero values but these estimates are statistically insignificant (P values > 0.05). Average basis T-values in case of each time period has been greater than 2 and on average beta coefficient is positive. The analysis concludes that beta is directly related to cross sectional return. Therefore this study finds that CAPM model is valid in case of `Karachi Stock Exchange.

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