CAPM VS DCAPM: AN EMPIRICAL STUDY OF PAKISTAN STOCK EXCHANGE

ABSTRACT

Title: CAPM VS DCAPM: An Empirical Study on Pakistan Stock Exchange

This study investigates applicability of Capital Asset Pricing Model and Downside Capital Asset Pricing model in Pakistani Stock Exchange. The second reason for conducting the study is to dig out a better performing model in Pakistan. CAPM is used as a tool for the valuation of investment in Stock Market with the relationship of Excess Stock Return and risk on Stocks. The study is conducted in Pakistan Stock Exchange as the main and the only stock Market in Pakistan. The analysis is done by taking 60 companies which were randomly selected from the market. The weekly returns are taken for each of the company. Beta for every company was calculated individually. The market returns were regressed with the individual company return individually for both CAPM and Downside CAPM. Later on the portfolios were constructed on the basis of beta. The portfolios were then regressed with the market return. The results suggested that testing CAPM on individual company base perform better than the Downside CAPM but on the other hand, portfolio base results suggested that Downside CAPM perform better than the CAPM. The results of the investigation are in accordance with alternate studies conducted in Pakistan Stock Exchange however with different time and test measure.

Keywords: Capital Asset Pricing Model, Downside Capital Asset Pricing Model.

CHAPTER 1

Introduction

1.1. **Background**

Researchers, readers and investors are striving to test various pricing models in developed as well as emerging markets all over the world. The basic purpose of empirical testing asset pricing is to investigate the risk and return of the assets individually as well as the markets as a whole. There is a plenty of work already done on the risk related to assets in a portfolio but specifically stocks related to systematic risk and downside risk are evaluated in both the emerging markets and the developed markets. The theoretical and practical importance of the systematic risk is that it is pertinent to enquire about its determinants. Myers (1975) suggested that the systematic risk of stock is related some of the important variables like, leverage, earning, growth and a beta which is the calculation of covariance between the variations of a single firm in relationship with the overall economy.

Individuals invest in different type of assets to get rewards in the long run or in the short run. These rewards are associated with risk. An individual is thought to be rational in this type of conduct, which means that the individual would like to stay away from loss and move towards expected return. An individual has difference choices in the in the financial system present in the world. These choices can be divided in two types. The first

one is real estate, and the second is the financial resources. In the case of financial resources, we have stocks, bonds, and treasury bills.

Stocks, which are considered as common stock traded in the stock exchange. These stock represent the ownership of an individual in a company. Individual investors are the fully qualified for the company's dividend. They take active part in the company's decision making about the company's asset. But on the other hand not all of the companies pay premium to their investors. The company's leaders invest the same profit in other projects or extension of the firm's value. The financial experts of the company make such decision and convince the stock-holders to retain their investment. In retaining the share-holder's investment the firm will grow faster. The faster growth of the firm will lead to the increase the value of their stock held by shareholders.

1.2. **Risk and Return**

In the field of finance, risk and return has its own importance for individual investors and financial experts. The risk and return both lie in the future. An investor always tries to balance the expected risk and expected return. Risk can be divided into different types but it can be summarized in two main forms. The risk associated with the individual investor. The risk associated with the whole market. In the case of individual risk, it effects the individual investor or company.

Return on the stock is everything that an investor is looking for. An individual investor invests in a stock or company for the purpose of return. It is opposite to the risk. The return on a stock is generated form two things mainly. The first one is the capital gains and the second is from dividend. The capital gains are the increase in the value of the share held by individual investors. The risk and return are explained below:

1.2.1. Risk

Risk is considered as the chances of bad events and a measure for the consequences. Knight (1921) defined risk as the measure of uncertainty. Risk can be simply defined as, the combination of probability and the magnitude of consequences Ale (2002). It can also be considered as the positive or negative effect of uncertainty on the objectives ISO (2009). But on the other hand, risk is defined by the Dörr and Häring (2006, 2008) and Felder and

Mayrhofer (2010), that risk need a possibility which can arise at any time and effect a single asset or the whole firm. The same definition was borrowed from the Blaise Pascel (1623-1662) who said that risk can be measured by the probability of the consequences of the event. In simple words, risk is an uncertainty that can arise at any time and it consequences can be costly or lucrative respectively. Risk is also known as uncertainty in terms of business and uncertainty has its own type which can be either diversified or not. In finance, the basic idea is the relationship between the risk and return. The greater the amount of risk, the investors are willing to take, there are chances of high returns or can sustain heavy losses.

1.2.2. Different Types of Risk

Risk is further classified into different types which are as follows:

1.2.3. Unsystematic Risk

Unsystematic risk is a type of risk that is due to the influence of internal factors that are being produced inside the company. In certain situation these factors can be controlled by the company. These types of risk are at lower level and it can affect the whole organization or some part of the organization Hotvedt and Tedder (1987). In other words, this is a type of risk that can only effect single asset of the organization.

Unsystematic risk is explained as the volatility of returns due to factors specific to a given firm. The source of volatility is attributable to conditions unique to a firm and may include things such as labor strikes, production problems, law suites, loss of contracts, management changes, poor management decisions, etc. These conditions can affect only one firm not the entire market. Hence, the impact of firm's-specific risk can be eliminated by creating a portfolio diversified across different firms and sectors. This type of risk is also considered as a type of risk which can be diversified.

Unsystematic risk is a small part out of total risk. It is unique in its kind to a firm or the whole industry above and beyond which effect the securities market overall. In other words, unsystematic risk can be explained as the risk of change in the price due to the unique circumstances, as opposed to the overall market. This kind of risk is influenced by

factors which includes the capabilities of management, preferences of consumer, labor strike, advertising campaigns and lawsuits.

Unsystematic risk can be classified into three main types:

1.2.3.1. ***Business Risk***

The type of unsystematic risk in which the company's low profit is created by the internal or the external factors.

1.2.3.2. ***Financial Risk***

The type of unsystematic risk in which a change in capital structure of the firm connected with the company's financing activities.

1.2.3.3. ***Operational Risk***

The type of unsystematic risk which is originated from the internal management of company, and it is the result from breaking down in operating process, e.g. internal procedure, people, policy, and system.

1.2.4. Systematic Risk

Systematic risk is types of risk that is due to the influence of external factors. The external factor means the factor that are being produced out the company. These factors are not in the control of company like earth quick or any major political change in the country Hotvedt and Tedder (1987). This type of risk is at huge level and it can affect many company at one time.

Systemic risk turned out to be the formation of many types of risk. It is not the composition of only type of risk which is effecting the companies. The other types of risk like credit risk, liquidity risk, operational risk, etc. can be directly affiliated to a specific institution. Systemic risk can only be affiliated indirectly. Before the financial crisis those types of risk were usually considered individually to a single firm or a specific industry or in some cases to the whole market. However, the interaction between the types of risk would tend to have undesired and unexpected results. This would happen when all of the types were combined to systemic risk. Systemic risk evolves along with the development

of financial markets, regulations and collective behavior of market participants, and it may be prompted by regulatory arbitrage.

Systemic risk shows a significant difference among other types of risk. It consists of a wide range of features. It means that the financial instruments, institutions, market, market infrastructure, or segment of the financial system may be the source of systemic risk. It also means that their transmitters are also affected by it. Since in the turbulent period it is not easy to find out that whether the scale of an event is systemic or not. Assessing to which extent it affects other parts of the system. Which part may be subject to dynamic changes and the assessment may be prone to an underestimation bias Smaga (2014). Systemic risk can have its causes inside or outside the financial system. It can result from the inter-connectedness of particular financial institutions and financial markets and their exposure to the real economy (Szpunar, 2012).

Systematic Risk can be classified into three main classes which are defined as following:

1.2.4.1. ***Interest Rate Risk***

The type of systematic risk is about the change of interest rate from time to time, which will affect the security's fixed rate of return.

1.2.4.2. ***Market Risk***

The type of systematic risk that occurs due to the fluctuation or volatility of market price.

1.2.4.3. ***Inflation Risk***

The type of systematic risk in which the purchasing power of investors is affected badly.

1.2.5. Upside Risk

A short forward position taken without an offsetting long physical position in the underlying commodity is said to have upside risk. It means the stock holders are expecting that the price of the share which are held by them will pay less than their expectation. Upside risk mainly focuses on unexpected positive returns rather than negative returns.

Hence, upside risk, while a measure of unusualness of the degree of additions, is not a risk in the sense of a plausibility of unfavorable results.

1.2.6. Downside Risk

Downside risk means, if a single asset starts to move downward in a falling market more than it move upward in a growing market. So it can be considered as an unattractive asset for shareholder to keep. Such asset tends to have very low payoffs exactly when the wealth of investors is low. Stakeholders who are moderate to downside losses, relative to upside gains, require a premium for holding assets that co-vary strongly with the market when the market declines Ang et. al (2005). Hence, in an economy where manager's focus on downside risk rather than upside gains. Assets which are highly sensitivities to downside market have high average returns.

1.2.7. Idiosyncratic Risk

Idiosyncratic risk is a type of risk that can effect one or a limited number of the assets such as stock but not the whole investment. It is considered as a unique risk that can be caused by any specific circumstances. It can be reduced due to the diversification in the portfolio of a variety of assets. It is a kind of risk that is unpredictable. There is relationship between the individual investors and Idiosyncratic risk. Some of the researchers suggest that it has a significant relationship with individual investors. There are a few investigations which shows that the idiosyncratic risk can be divided into two main directions. The first direction explains the relationship between an average market idiosyncratic risk and cumulative market index (Goyal and Clara, 2003). The second directions show the role of idiosyncratic risk in the cross-section of returns (Tinic and West, 1986).

1.3. Returns

Returns, in its simple terms are known as a financial reward. It is also known as the gain or loss from an investment. A return can also be expressed as the change in the value of an investment over a period of time. A return can be expressed as a percentage derived from the ratio of profit to investment. Moreover, profit is the backup yield of profit for the benefit, and it can be paid or not founded on the organization direction. To assess the gainfulness of particular speculation, financial specialists generally utilize capital pick up

as their base of estimation. There are a few kinds of rate of return including ex-post (Actual return), and ex-risk return (expected return), required rate of return that will be clarified purely in this area.

1.3.1. Historical Returns

Historical return, also known as actual return or real return. It is the arrival of speculation from the past up to the concerned time, and it is utilized for looking at furthermore, assessing speculation execution amid the specific time frames Reilly and Brown (2009). It can incorporate the profit paid or not as specified before in light of the organization rules. The ex-post return can be negative, or positive outcomes that reflects the pick up or misfortune of speculation.

1.3.2. Expected Return

Expected return shows how much financial specialists need to infer later on return. To do this, speculator needs to dole out the likelihood incentive to all conceivable returns. The likelihood will be processed based on the chronicled execution or on the other hand comparable speculation altered by financial specialist's desire later on Reilly and Brown (2009).

1.3.3. Required Rate of Return

Required rate of return is a type of return that an investor is expecting from an investment. It is used as the base rate of return which is expected to be paid to investor for the investment that the investor has in a specific company or project. It includes time estimation of cash within the period of risk. A normal rate of expansion within the period. This also includes risk, Reilly and Brown (2009). The method to calculate the required rate of return is very impulsive. It is intensely impacted by the practices of market for some period of time due following reasons. Right off the bat, the arrival of specific resource is regularly changed. Besides, there is a great deal of accessible rates for elective venture determination at whenever. The spread of every return is adjusted after some time. So it is difficult to set a base for assessment of specific capitals. All in all, the required rate of return can be controlled by three factors: the open risk free rate, which is the long haul open expansion rate of financial; factors affecting the ostensive risk free rate, which

comprises of the passing impacts in the Stock Exchange and the normal rate of swelling; and the risk premium in venture.

1.4. **Risk and Return Relationship**

Earlier, it has been recognized clearly the relationship between risk and return. There are different types of risk and return. There are different approaches to quantify both of them. This portion of the study will explain about the risk and return and their relationship.

It has been stated by many authors, scholars, researcher and thinkers that the more risk the more return. It is the essential that financial guideline in each financial specialist's mentality. The changes in risk clearly effect the changes in the return. By using Security Market Line, it shows the direct relationship of risk and return. It shows how it effects each other.

The connection amongst risk and return can be changed in three different ways:

On the other hand, the development along the Security Market Line clarifies that the expanding. On the other hand, reducing the risk will prompt the upwards slope or downwards slope of expected return. The Security Market Line by and large shows the blend of risk and return relationship on elective speculation. Depending upon the risk inclination of speculator, the investor will choose normal return.

Besides, the slant change of Security Market Line mirrors financial specialist's state of mind toward risk and the adjustment in risk premium. Such an adjustment in financial specialist's state of mind exhibits that speculators need to higher or bring down return at a similar risk rate. Thusly, the market risk will be modified, influencing in reverse to the degree incline of Security Market Line and prompting change the connection amongst risk and return.

Thirdly, the adjustment in ostensible risk free rate prompts the move of Security Market Line mirroring the change in expected genuine development. Such a change again will influence all ventures. Subsequently, the normal return and risk will be impacted as a specific outcome, and with a similar risk we will have higher return for this situation.

1.5. **Capital Asset Pricing Model**

The CAPM is the most broadly utilized resource valuing model in money related financial aspects, serving organizations everywhere throughout the world as a basic leadership device. It is mostly used for the purpose of valuation, risk choices or investment planning. This model is connected to decide the expenses of value. This is considered as a key contribution to the discount rate utilized as a part of organization valuation or budgetary basic leadership. The exact computation of the cost of value is thusly an essential motivating force to each business.

The CAPM was first presented by Treynor (1962). This was the first models which helps in finding the relationship between risk and expected return. Apart from the fact that his work was cited by finance experts and economists, who progress with expansion of the same asset pricing model and some of them even observed Treynor's model as the first for asset pricing (Black 1981), his paper was not formally considered as the primary foundation of the Capital Asset Pricing model. Similarly, Sharpe (1964), Lintner (1965) and Mossin (1966) have established the concept of Capital Asset Pricing model, which was just like Treynor's model. Which was inspired from Markowitz (1952, 1959) and Tobin (1958) theoretical frameworks about diversification and modern portfolio theory, which have become the base of the theory of Capital Asset Pricing model.

During the early years, the asset pricing model has gone through different changes, such as reduction of some norms, for example the effects of taxes (Brennan 1970) Furthermore, Mayers (1972) restricted trading of risky assets, transaction costs and information asymmetries, whereas Rubistein (1973) added moments into model and as well as Mayers (1972) created Capital Asset Pricing model, where no risk less assets occurred. Black (1972) considered assumption of unrestricted risk free lending and borrowing as unrealistic, and created model without this assumption and by this change proved that market portfolio is mean-variance-efficient under different assumption. The only difference between Sharpe-Lintner and Black CAPM is the way they define expected return on asset.

In the course of the most recent two decades investigates have invested a lot of energy in assessing the execution of the CAPM by testing how well the model fits the information. The experimental confirmation on the legitimacy of the CAPM is blended.

While a few investigations have presumed that the model is miss specified, others have discovered help for the expectations of the model. Notwithstanding, a considerable lot of these examinations have experienced genuine and troublesome issues in their endeavors to give the "best" observational trial of the model Akdeniz, (2000)

In addition, some economists argue that CAPM model, even though it is powerful and provides satisfying expectations how to measure risk and its relation to expected returns, is not a very good empirical tool. Fama/French (2004) found the possible reason for this empirical failure" of CAPM in the simplifying of the assumptions or invalidity of testing the model. Another problem, which was considered by Fama and French (2004) was the misinterpretation of couple of definitions, such as market portfolio.

1.5.1. Limitations of the CAPM

The CAPM display overs a straight connection between the methodical risk furthermore, expected return for resources. The accessibility of the sources of info and its unique effortlessness make the CAPM an appealing and all around acknowledged instrument for evaluating the normal return of securities. The way that the model considers the deliberate risk is one of its incredible perspectives. In particular, efficient risk is an imperative factor since it frequently can't be totally eased. Regardless, the CAPM makes some non-inconsequential proposes that drive to numerous disadvantages in reality.

The CAPM accept the presence of a flawless financial showcase, where there are no limitations on interests as far as pay charges, exchange costs and so on. Clearly, this is a long way from reality. This absence of a great market may actuate an extra risk to the financial specialists when they knock into showcase directions. The CAPM model accept boundless obtaining what's more, loaning of the risk free proportion r_f, and furthermore that r_f has same rate for all speculators. Truly singular speculators are not permitted to obtain and loan with an indistinguishable rate from the administration. The pustule may prompt major issues in the valuation. Past the difficulties to appraise another issue of the CAPM is identified with the arrival of the market. Truth be told, an issue emerges when the market return at a given time has a negative esteem. Moreover, the return of the market is certainly not an appropriate portrayal of a future market return. To amend these

disadvantages, a lot of research have been directed furthermore, a few important upgrades of the CAPM have been proposed in the writing.

1.5.2. Assumptions of Capital Asset Pricing model

In what ends the survey the assumptions behind the CAPM system.

1. The financial markets are focused
2. All financial specialists intend to contribute over a similar time skyline
3. There is no distortionary charges or exchange costs (markets are frictionless) The speculations are restricted to trade on an open market resources with boundless acquiring and loaning at the risk free rate and the market portfolio comprises of all traded on an open market resources.
5. All financial specialists like generally speaking portfolio compensate (expected return) and abhorrence by and large portfolio risk (difference or standard deviation of return)
6. Everybody either has quadratic utility or has homogeneous convictions concerning the dispersion of security returns.

From these suspicions, one unmistakably observes that the CAPM is worked under a consummate rivalry presumption of microeconomics. The cost of benefits is unaffected by the exchanges of financial specialists which hold a little riches thought about to the aggregate gift everything being equal. We additionally watch that the aggregate return of any financial specialist's portfolio is a summation from two segments: the risk free assets and the risky market resources. This is because of the likelihood of loaning and acquiring at the free rate. Besides, all the data is accessible in the meantime to all financial specialists. Other than its commonsense utilize, we take note of that the CAPM has numerous unlikely suppositions. For example, the ideal rivalry suspicion of microeconomics does not hold, the powers of free market activity decide the costs of benefit in actuality amongst purchasers and merchants. Since speculations are restricted to a universe of traded on an open market financial resources, this supposition discounts numerous sorts of speculations. Also, we realize that speculators are in different charge sections and this may oversee the kind of advantages in which they contribute. In different terms, normally, there is no

homogeneous desires or convictions between financial specialists. Be that as it may, this suspicions are significant in the CAPM since on the off risk that the financial specialists don't have comparative desires there will be no homogeneity in their origination. Another profoundly impossible presumption is the way that speculators ought to have indistinguishable time skylines, which clearly is not the situation. This presumption is a result of the CAPM being a solitary period model. As an option, constant time models are utilized to get over the above difficulty of single periods. In synopsis, we may state that these suspicions speak to an extremely simplified and glorified world, by and by they are urgent to land at the first and fundamental type of the CAPM as expressed in the following hypothesis.

1.5.3. Criticism

The CAPM which was proposed by Sharpe (1964) has been addressed in terms of its basic presumptions. It also has its observational application as explained by Merton (1973). It was also explained by Fama/French (2004). The other important thing brought by Roll (1977) was that giving the hypothetical market portfolio has not been recognized. The model could not be surveyed observationally. The Arbitrage Pricing Theory (Here after ATP) of Ross (1976) defeats the same issue. As it was demonstrated by Roll and Ross (1980) in their study. They brought the attention to that APT does not require the market portfolio. They stated that it is observationally testable. On the other hand, McElroy and Burmeister (1988) found out that the factor of risk in ATP could be either based in economic components or based on facts. They also, found that the last has the advantage of similar stock. It comes back to the more extensive economy. Moreover, Priestley (1996) opposes to the statement that, the primary course needs financial meaning.

As specified before, Merton (1973) alludes to the hypothetical shortcomings of the CAPM. He also brought to light that its fixed nature is not sensible. Merton (1973) built up an Intertemporal CAPM model and shows that it is imperative as it represents the future speculation openings' days of work that are overlooked by the Capital Asset Pricing model.

In any case, Breeden (1979) brings up that while this intertemporal perspective of the Intertemporal CAPM is critical. The model is relevant is faulty as it measures risk with multi-betas. These multi betas are related with obscure state factors. He built up another

utilization resource which helps in evaluating display. He contends that this model defeats the vagueness with respect to the risk factors. As it is replaced by multi betas with a single use of beta. The remaining of this model is portrayed by Cochrane (2001). He brought the attention to the fact that the utilization resource estimating model is flawless hypothetically. Its poor experimental execution prompts the requirement for different models. The study of Cochrane (1996) founds that the utilization based display performs unacceptably in the experimental applications. This could be caused by addition to other things. Also with the issues with utilization information. The study of Campbell (1993) likewise indicates utilization information issue.

In the early 1990's Fama and French has demonstrated that the normal CAPM is not adequate in clarifying normal stock returns (Fama and French, 1992 and 1993). In their study, Fama and French present two extra risk factors. The two factors are specifically size and book-to-market. These two components end up being more precise in clarifying normal stock returns. They propose that little organizations and in addition organizations with a high book-to-market value proportion yield by and large higher returns than their opponents. The model is usually known as the Fama/French 3 factor Model.

In research point of view, Campbell (2000) shows the observational financial inconsistencies that challenge which CAPM incorporate. He brings up that the potential reasons for such discoveries that have been such advanced in writing to this date incorporate. The disappointment of market intermediary, misleading discoveries, botches and mental inclinations. His remarks facilitate that these discoveries could likewise be clarified in a levelheaded multifaceted model such Fama and French (1993) three-factor show or the Intertemporal CAPM of Merton (1973).

1.6. **Downside Capital Asset Pricing Model**

Downside risk measures have been disregarded for long and began picking up their prevalence just over the most recent 10 years and particularly after the financial crisis of 2007-2008, where the issue of lopsided dispersions were distinguished in resource estimating as well as in credit risk. Right now, there are various measures, for example, semi-variance, expected deficit and as of late presented acknowledged semi-variance

Nielsen, Kinne brock and Shephard, (2010) that are generally talked about in scholastic writing as other options to conventional devices.

The primary compelling work toward this path inside resource estimating was composed by Roy (1952), who contended that Safety-First Rule (from here after SF-administer) plays the key significance to the appraisal of the risk of the portfolio. The fundamental claim of his approach depended on the restrictions of customary Mean-Variance Behavior, which appointed equivalent weights to Downside and upside developments. Despite the fact that Markowitz (1959) considered Downside risk in his original book, featuring that semi-variance delivers more proficient portfolios than the standard deviation. The choice was made towards the conventional risk measures because of computational multifaceted nature.

The principal testing of downside risk measures concentrated on predominance of semi-variance over standard change. Quirk and Saposnik (1962), Mao (1970), and Ang and Chua (1979) have demonstrated that semi-variance (both mean and target) displays express favorable circumstances over basic fluctuation. Notwithstanding, around then there was a constraint in the pertinence of these discoveries as there was no technique to evaluate stochastic strength, which was one of the fundamental apparatuses used to gauge semi-variance. The leap forward has been accomplished by Bawa (1975), who has summed up the semi-variance risk measure in his Lower Partial Moment (LPM) hypothesis. Later in 1977, Fishburn has stretched out this exploration to fuse the greater part of the financial specialists – risk disinclined, risk chasing and risk nonpartisan.

The most persuasive works identified with change of CAPM structure in light of the security fund manager are Hogan and Warren (1974), Bawa and Lindenberg (1977), Harlow and Rao (1989) and Estrada (2002) and Estrada and Serra (2005). So, the fundamental conclusions come to by the greater part of the papers expresses that Downside CAPM is both hypothetically and exactly better than CAPM. So it can be stated that, in any case, this does not invalidate the significance of CAPM as it could be viewed as a particular form of Downside CAPM when there is an ordinary dispersion.

Nevertheless, one key topic that the majority of this study share, the Downside risk definition shifted from author to author. The principal show recommended by Hogan and

Warren (1974) called E&S display, proposed to utilize semi deviation. In this model, a single security would add to the risk of a portfolio just if its profits fell underneath risk free rate. Along these lines, the benchmark for estimation of Downside developments was sans risk rate not the mean return. Bawa and Lindenberg (1977), who have summed up this approach in their Mean-Lower Partial Moment model has kept this meaning of semi-deviation, while Harlow and Rao (1977) propose supplanting risk free rate with any discretionary benchmark return.

In the most ebb and flow explore, Estrada (2002) stretched out this plan to consolidating risk measure called Downside beta concerning mean returns or then again to any benchmark. In his ongoing papers (Estrada 2000, 2001, 2004b) he guarantees that contradicted to past measures, Downside beta is a measure of orderly Downside risk, which is comparable to customary beta and therefore supports its rationale. In this exploration paper, will center around testing of semi-deviation as recommended by Harlow and Rao (1977) and Downside beta received by Estrada (2000).

1.7. **Problem Statement**

There have been studies on beta and downside beta which focus that weather the beta can explain the cross-section of stock return. The past studies of Estrada (2002a, b, c and 2005a) focuses on the downside beta and CAPM from both empirical and theoretical point of view. Estrada (2002a) showed mean variance for the CAPM and mean semi variance for the Downside CAPM which focuses on the calculation of the systematic risk. The systematic can calculated on CAPM is the overall systematic risk. On the other hand, the systematic risk calculated on the Downside CAPM is the downside risk. The downside risk is a type risk which shows the loss to the investors. In today's world where the investor care more about their loss rather than their earning Markowtiz (1959). Systematic risk is very important in investors point of view. The main reason is that it is not in the control of the company. Systematic risk exists in almost every market. For this reason, researchers have conducted different studies to find out the systematic risk and downside risk all over the world.

There have been studies on the systematic risk and downside risk in Pakistan. Researchers have been studying risk in different time periods and for different time periods.

The time periods consist of the bullish and the bearish trends Attiya Javed and Eatzaz Ahmad (2011). Which are important trends of the stock market. The main reason for conducting these studies were to find the relationship between risk and find out that weather a risk can explain the cross section of return. as it is known that risk is one of the complex study and especially in the Pakistani stock market Which is an emerging market. the important factor of emerging market is that it is not a fully developed market and the stock exchange show too much bullish and bearish trend Barket et al (1998).

The first reason for conducting this study to find out the relationship between systematic risk and return in Pakistani stock exchange. The second reason for conducting this study is to find out the relationship between the downside risk and return. The third reason for conducting this study is to compare the systematic risk and downside risk.

1.8. **Objectives**

The objectives of this study are as follows:

1. To investigate the relationship between the systematic risk and returns.
2. To investigate the relationship between downside risk and returns.
3. To compare the Systematic risk and downside risk in PSX.

1.9. **Significance**

In the modern era investors strive to increase their return from their investment. But on the other hand investors are facing risk in the market these risk have always affected investors with huge losses. These losses have a huge impact on the investors in market specially in financial crisis of 2007-2008 which effect the whole market not a single investor. This uncertainty in the market have affected the investor's confidence specially in the emerging market of Pakistan.

This study will help in finding out the risks associated with the investments in the Pakistan market by using the standard model of CAPM and DCAPM. These models can help in find the risk/returns This study will finally help the investors and portfolio manager to identify and evaluate their investment and risks associated with it and find a solution to make their investment more secure in the market.

CHAPTER 2

Literature Review

There have been studies on CAPM and Downside CAPM both which are of equal importance. These evidences showed the importance of both CAPM and Downside CAPM form theoretical and empirical point of view.

The CAPM is by a widely used and the most famous asset pricing model. It is broadly used furthermore, examined both in theoretical and practically. There have been studies on the CAPM to test the relationship between the risk and return. There are studies which have been conducted by different researcher in different market. The main reason of these studies to find out whether CAPM is good model or not. Some of the studies have been on favor of the Capital Asset Pricing model. In all these studies CAPM has the ability to explain the relationship between risk and return. CAPM is generally utilized as a part of assessing expense of value capital. CAPM depends on related information to assess beta which is along these lines used to compute ex-stake returns. Researchers have featured peculiarities with CAPM and have proposed different models that catch these peculiarities.

Jenson and Scholes (1972) conducted a study to find the relationship between the risk and return. they used data from the New York Stock exchange. The sample period in their study was all common stocks which are traded on the New York Stock Exchange. They used monthly data of these firms to test the CAPM. Their time period was from 1926-1966. They used beta as coefficient. They made portfolios on the basis of Beta. These portfolios were then arranged from higher to lower. Which conclude to a period of ten years and 35 portfolios. Then they calculated the parameter on the basis of Ordinary Least Square method. And finally they applied all the data on the time series regression of Capital Asset

Pricing model. The results obtained from the time series regressions for portfolio returns on the market portfolio returns showed that high beta of securities had significantly adverse intercepts. On the other hand, low-beta securities had significantly constructive intercepts. In contradiction to the predictions of the traditional form of the model. They also attempted to make a time series of returns on the basis of beta. In order to obtain an efficient and significant results of mean and variance.

Chui and Wei (1998) tested the CAPM and Fama/French Three Factor Model in the five Pacific-Basin developing markets. The Pacific Basin developing markets include Hong-Kong, Korea, Malaysia, Taiwan, and Thailand. They found out that the CAPM does not adequately clarify expected returns in these locations. The Book-to-market rate ends up being huge in the business sectors of three countries out of four which are Hong-Kong, Korea and Malaysia. The size of a company can clarify expected returns in all business sectors barring Taiwan out of the rest of the countries. This is in accordance with the Fama/French research from 1992. It shows that market beta is not adequate in clarifying expected stock returns. There is a strong connection between expected returns and two extra risk factors which are size and book-to-market.

Blanco (2012) investigated the American market for NYSE. The main reason for the study was to test CAPM and the Fama/French Three Factor Model in the American market. He builds six distinct portfolios as indicated by size and book-to-market value. Blanco utilizes a broad informational collection from July 1926 to January 2006, bringing about 955 months to month perceptions. In his study he applies time series data to test the model. He discovers that the Fama and French Three Factor Model performs exactly better in contrast with the CAPM in the dissected market. He underlines that the outcomes change contingent upon the way the portfolios are made. This ought to be considered while deciphering the outcomes.

Guant (2004) conducted a study in the Australian Market. the time period was from 1991 to 2000. The model used in the study was CAPM and Fama/French Three factor model. He found out that the Fama and French Three Factor Model gives altogether better logical power contrasted with the CAPM in the Australian market. He utilized a dataset containing of monthly stock returns and bookkeeping information. The time period used in

the study was from 1991 to 2000. In the wake of changing the information, he winds up with 108 monthly returns for 25 estimated Book to Market portfolios. Emaciated utilizations an aggregate example of 6,814 organizations. The most modest number of organizations is 531 which is from 1992. On the other hand, the biggest number of organizations is 876 which are from 1997. He finds that concerning the Capital Asset Pricing model, the beta risk is higher for littler organizations and for organizations with bring down book-to-market proportions. This discovery is in accordance with the discoveries of Fama and French (1993). Withered further finds that despite the fact that the littlest stock portfolio creates huge positive irregular returns, they are not factually noteworthy. Regardless of this astonishing outcome, he discovers slight proof that the size impact holds for whatever remains of the five quantiles. Moreover, he proposes a little sign of a book-to-market impact, with anomalous returns expanding monotonically while moving from least to most astounding book-to-market portfolios. This finding is additionally in accordance with Fama and French (1993). He condenses that his examination demonstrates that the Fama and French Three Factor Model contributes with a higher illustrative power for Australian stock returns than the CAPM. Though Fama and French (1993) find that in the U.S. both extra risk factors contribute strikingly to the model. He states that in the Australian market the vast majority of the prevalent illustrative intensity of the Fama and French Three Factor Model is disclosed because of the size factor.

Post and Vliet (2006) conducted a study to find out the relationship between downside risk and return. They discover the intermediary for market portfolio is wasteful in view of mean change control yet it is the third arranging stochastic strength productive and this mean difference wastefulness could be clarified by downside risk. It was also stated that case for the mean variance administer to be substituted with general run. It was originated from the discoveries of the non-typical profits on stocks dissemination. It also includes the mental proof of risk recognition. Moreover, their study includes the facts that the issue of mean variance wastefulness can be represented by other conceivable clarifications. It is still a downside risk based summed up CAPM can catch a number of economic irregularities.

Price et al. (1982) investigated the risk and return relationship. They investigated a non-normality in return and risk. They conducted on a type of risk measure that depends

on fluctuations. It will be equivalent just for stocks with normal methodical risk. However, for stocks with high systematic risk the previous will be higher than the last mentioned. They found out that experimental contrasts between the two types of measures for risk in the last two meetings of stocks. Their study also includes the discovering that supports the model of Bawa and Lindenberg. The study of Kim and Zumwalt (1979) created dual beta which was known as two-beta model. Their study brought up a model which divides the systematic risk into two parts. The two parts of the model consists of the downside systematic risk and upside systematic risk. They also reported that downside beta is remunerated with positive risk premium. On the other hand, upside beta has a negative cost of risk. Their study also helped in the translation to the financial specialists. The financial specialists are prepared to pay for going for broke. They require for Downside risk a positive premium.

Chen (1982) conducted a study on Kim and Zumwalt's (1979) model. The main reason for the study was experiences heteroscedasticity. There were outcomes from time shifting betas and from multi-collinearity. These issues can be overwhelmed by Bayesian time shifting beta model. He found out that the two-beta model is as yet substantial under time-changing betas. He reports that the discovers this time-shifting beta model's discoveries affirm those of Kim and Zumwalt (1979). The speculators request a positive premium for downside risk. While acknowledge a negative premium for upside risk. Besides that, he also found out that Downside beta is a preferred risk measure over the single market beta.

Huang et al. (2012) conducted a study on the USA stock market. They wanted to test the relationship of risk-return. They suggested a measure of risk which is associated with the catastrophic changes in the returns. Their studied consists of downside risk which is associated to returns on the basis of the cross-section. Their data was form the New York Stock Exchange, and American Stock Exchange. They collected the data for the period of July 1963 to June 2009. They collected all of the common stock traded on the above listed markets. They wanted to test the extreme downside risk and return relationship. By using the four factor model. They only used the abnormal returns for each stock. They used the ARCH/GARCH model for the estimation of mean and volatility. They

find out that there is a significant relationship between both the risk and return. Even after controlling the size, book-to-market ratio, momentum and liquidity effects.

Hodoshima et al. (2004) examined the Japanese stock market. They used the monthly data for their analysis. They analyzed the data from the period of January 1956 to December 1995. They used the data of the first section companies in the Japanese stock market. The first section companies are the typically the bigger companies on the stock exchange. They collected the data from different sources like the stock prices were taken from the Toyo Keizai and the risk free rate Nikkei NEEDS database. The accounting information for the non-financial firms was collected from the Japanese Development Bank. They used CAPM as their model for testing the data. They wanted to test the relationship between the return and risk. They found out in the absence of significance and linear relation between the Beta (Risk) and the return. Where beta is considered as the explanatory variable. In the extended model the variables add with Beta, Book-to-Market Equity ratio and size as the explanatory variables. Then relationship was flat between beta and return. The only significant results shown to them were the cross section regression to test the difference between the positive and negative market excess return produces the relationship between the Beta and return. At last the run a test to find out the good fitness of the model. The test shows the conditional relationship is in general better.

Tan (2004) studied the Australian real estate market. The study consists of the effect of administration structure on the performance of Australian Listed Property Trusts where the outcomes showed that Australian Listed Property Trusts utilizing an inner management structure outflank externally oversaw Australian Listed Property Trusts. The outcomes have additionally offered indirect proof about the impact of management structure on systematic risk in which externally managed Australian Listed Property Trusts demonstrate higher systematic risk.

Gyuorko and Nelling (1996) investigated the systematic risk of Real Estate Investment Trusts. Their sample period consists from 1988 to 1992. They found out that there is significant and positive relationship between size and systematic risk. In accordance to Australian Listed Property Trusts, Tan (2004) gave indirect confirmation to show that large size Australian Listed Property Trusts has a higher systematic risk. On the

other hand, Litt et. al (1999) studied alternate period from 1993 to 1997 for the US Real Estate Investment Trusts market and he found opposite result.

Delcoure and Dickens (2004) investigation the US Real Estate Investment Trusts. They expanded their study by utilizing a large sample size of U.S. Real Estate Investment Trusts. The findings showed that business risk is altogether and unfavorably famous for the Real Estate Investment Trusts. Systematic risk can be found in all models while there are no comparative notable outcomes for marketability and agency variables. Moreover, they found an inverse relationship between Real Estate Investment Trusts and systematic risk and here and now and variable-rate financing. They found a positive and measurably huge connection between long term debt and Real Estate Investment Trusts systematic risk.

Plessis and Ward (2009) tried to apply the Markowitz hypothesis to the Johannesburg Security Exchange. They build up an ideal portfolio can be recognized and utilized as a viable exchanging standard. In their study they used weekly information covering 11 years on the best 40 JSE organizations. They examined to develop Markowitz mean change advanced portfolios utilizing ex-risk information. The ideal portfolio was then chosen and rebalanced intermittently, and the profits thought about against JSE 40 list. The investigation found that the exchanging technique essentially beat the market in the period under audit.

Estrada (2002) investigated the systematic risk of 27 emerging markets. The time period for which the data was analyzed was from 1988 to 2001. The model used to analyze the risk was CAPM and DCAPM. Their findings explained that down side beta shows a significant variability in cross section of return in developing markets. He also found DCAPM generates average required of return is higher than generated by Capital Asset Pricing model. Estrada 2005 investigated 27 developing and 23 developed market from the period 1988 to 2001 by using the same old model as applied by Estrada (2002) his findings were; downside risk generates higher required rate of return in emerging market than develop market he also found that, higher the Capital Asset Pricing model, higher the required rate of return on equity.

Estrada and Serra (2005) investigated the family business in emerging markets. They analyze the data from Standard and Poor emerging markets with monthly sample of

over 16 hundred firms in 30 countries between the time period 1976 and 2001. They used Fama & Mcbeth (1973) model for their analysis of risk and return. They used panel data for their study. They found out that total risk and size are the only variable for which high risk portfolio outperforms low risk portfolios in few scenarios were found to be imbalance. They also found that the global downside risk that is beta is a variable that has the largest impact on portfolios return.

Harvey (2000) investigated the emerging markets and the developed markets. The study was to compare the emerging market and the developed market on the basis of risk. The sample in the study was 47 countries. Which consists of the 28 emerging markets. The rest of 19 consists of the developed markets. There were a number of risk matrix used to calculate risk. There were a total of 18 measures of risk. Which consists of the major measure like One-Factor Market Model, Spread, Semi-deviation, Downside Beta Measure, Value at Risk, Skewness, Spread, Political and Country risk. The results of the study were that investor

Paudel (2006) researched the utilizations of the Markowitz and Sharpe models in the Nepalese Stock Exchange. His go for the investigation was to test whether the two models of portfolio choice offer any better speculation other options to the Nepalese financial specialists. The model used to analyze the risk was CAPM and DCAPM. Their findings explained that down side beta shows a significant variability in cross section of return in emerging markets. With an example of 30 stocks exchanged on the Nepalese securities exchange, the investigation finds that, the use of these models offer better choices for settling on choice in the decision of ideal portfolios in the Nepalese market.

Maharakkhaka (2011) assessed the execution of the mean difference effective guess to boost expected utility. By expecting that there are three classes of benefit in the portfolio, in particular; Security Exchange of Thailand Index. The Thai venture review corporate security Index, and Thai government Treasury charge. The model used to analyze the risk was CAPM and DCAPM. He utilized month to month returns of these resources for look at most extreme expected utility of the mean difference effective portfolio to greatest expected utility got from coordinate improvement. The discoveries demonstrate that, however picking the portfolio based on the mean difference criteria does not prompt most

extreme expected utility, but rather the mean fluctuation show is as yet pertinent to Thailand Security Market. The execution of the mean fluctuation estimation appeared in the examination was very little not quite the same as choosing guileless portfolio where speculators effortlessly put level with extent of venture on every advantage in their portfolio. Also, financial specialists with different utility capacities are found to require huge enhancement premium to raise their welfare to the level accomplished by holding expected utility augmentation portfolio.

Qamar and Shah (2013) investigated the Karachi stock exchange. The purpose of their study was to check the risk and return relationship in the Pakistan Stock Exchange. They took 10 good performing companies form 100 index. They took one good performing company from each sector. They analyzed the data for the five years from 2006-2010. Monthly data was taken for these companies. They applied systematic sampling on the population. They used CAPM as a standard model for the analysis of the risk and return relationship. They used the expected return as an independent variable. Their independent variables were the risk free rate which was derived from the government set Treasury bills, other independent variables were the Beta which denotes the systematic risk. They estimated the market return from the previous year's return. They found a significant difference between both the actual return and the expected return. But in some cases their results showed a little variation in the actual return and the expected return. They concluded that CAPM is partially applicable in the Pakistan market.

Hussain and Shah (2017) studied the investors sentiments and its effect on the systematic downside risk. Their study was conducted in Pakistani stock markets. They used the data for 230 non-financial firms. These firms were form different sectors. They include only financial firms because the financial firms have different regulatory frame work. They used panel data for their analysis. They took the data form the period of 2003-2014. Which is a total of 11 years. The model used to analyze the risk was CAPM and DCAPM. Their findings explained that down side beta shows a significant variability in cross section of return in emerging markets. They tested the downside systematic risk with the help of DCAPM. The main statistical model used in their study was Arellano-Bond Dynamic Data-Estimation regression. There findings were, that the investors sentiments index is

significantly effecting the firms systematic risk. They also proposed that the presence of the investors sentiments can increase the systematic risk for a firm.

Aguenaou et al. (2011) investigated the Moroccan securities exchange. The main reason for their study was to see whether there are indications of the unavoidable size, market, and esteem factors in the market. Utilizing a month to month informational collection of forty-eight stocks. They used the data for over a five-year time frame from 2005 to 2009. They discover proof of huge esteem and market risk factors which exists in this specific market. In accordance with Fama and French Three Factor Model. It was understanding that for the Moroccan securities exchange, the higher book-to-market stocks perform better in contrast with lower book-to-market stocks. They additionally bolster the Fama and French discoveries. Nonetheless, it was additionally found that organizations which are littler in size don't procure higher returns than their greater companions, implying that the greater firms encountered a positive size premium. This finding is not in accordance with the Fama and French Three Factor Model, and the analysts reason that the model does not totally hold in the Moroccan securities exchange. They propel this irregularity with the way that the Moroccan securities exchange is illiquid with regards to little top stocks. The scientists specify that when taking a gander at the outcomes in the developing markets, it is imperative to remember that these business sectors are regularly portrayed by wasteful aspects, for example, liquidity issues, high instability and low exchanging volumes that could influence the aftereffects of benefit estimating models.

Eraslan (2013) considers the Fama and French Three Factor Model on the Istanbul Stock Exchange utilizing month to month securities exchange perceptions from 2003 to 2010. He develops nine portfolios to research the minor departure from abundance portfolio returns utilizing the market risk factor, the size factor and the esteem factor as the illustrative factors. He finds that despite the fact that the Fama and French Three Factor Model can clarify the varieties in the portfolio comes back to some extent. The market risk factor has more firm impact on the portfolios returns than the firm size risk factor and esteem risk factor. He states that components, for example, the day and age, number of portfolios, and the financial emergency which hit Turkey in 2001. This could be the main reason that makes the outcomes of this study more demonstrate feeble proof for the Fama and French Three Factor Model when contrasting with past research led in the same market.

Loughran (1997) investigated the Fama and French in a developed market. The study was conducted in the American Market. The time period for the study was from 1963 to 1995. He assessed returns for the book-to-market factor crosswise over firm size and diverse seasons. His example incorporates returns for the vast majority of the organizations recorded on New York Stock Exchange, American Stock Exchange and NASDAQ. His underlying examination question covers the discoveries from Malkiel (1995), that profits from development assets are not fundamentally not the same as returns for esteem reserves. In his research, he also discovers that the book-to-market factor in the Fama and French research can be decreased to initially to greatly low normal returns by little development stocks amid months barring January, and besides a regularity impact for high book-to-market firms in January. Furthermore, it was discovered by his that the firms in the higher size quintiles which contain more than 90% of market capitalization, book-to-market has no informative power. Since reserve directors for the most part put resources into expansive firms, there is no noteworthy contrast as reasonable exchanges for esteem and development reserves. He proposes that it is just conceivable to abuse an esteem system while focusing on the organizations in the little size quintiles. This, in any case, is accomplishable for reserve chiefs with couple of advantages under administration and hence not regularly relevant.

Knez and Ready (1997) broaden the study of Fama and French Three Factor Model by including strong relapse estimators and by concentrating on the vigor of the evaluated risk premiums for book-to-market and size. In their paper, they endeavor to see if the appraisals are driven by a little subset of firms or months, contending that utilizing a powerful relapse strategy called least Trimmed squares would enable them to catch these perceptions, when contrasting them and the outcomes from the minimum squares relapses. The dataset in their examination comprises of month to month perceptions from July 1963 to December 1990 bringing about 330 months to month perceptions. They utilized size and book-to-market as indicators. They persuade this decision by the achievement of these factors in the Fama and French (1992) think about. They found a negative relationship between the firm size and normal return is essentially caused by two or three outrageous returns that happened amid the months being referred to. They call attention to, that when just a single percent of every month's outrageous qualities are discounted, they locate a

critical positive connection between the firm size and normal returns. They close, that the distinction in the outcomes acquired by the vigorous Fama-MacBeth method. They utilized the ordinary minimum squares relapses can be clarified by the positive skewness in the arrival circulation. The scientists express this is especially apparent for little youthful firms, as the financial specialists in these organizations are as a rule expecting a misfortune, while a little bit of these ventures prompt noteworthy benefits.

Chui and Wei (1998) additionally discover a January impact of substantial firms in Hong-Kong and little firms in Korea. The other way of the size impact in these two areas is clarified by the structure of financial specialists in the two nations, i.e. principally institutional financial specialists in Hong-Kong and primarily singular speculators in Korea. As the two gatherings tend to purchase high measures of stocks in January, the interest weight expands the profits of these stocks. They found book-to-market is huge for all months with the exception of January.

Kim (1995) investigated the CAPM and the size factor in the wake of controlling for the errors in-factors issue. He propels that the two-advance estimation strategy for Fama and French prompt the errors in factor issue, i.e. an underestimation of the beta coefficient and an overestimation of the other relapse coefficients e.g. size and book-to-market. He brought up the essentials to clear up if the frail connection between expected returns and market beta. The cross-sectional relapse is a result of the model itself or in view of the EIV predisposition. He finds that with no errors in factor remedy. The connection between expected returns and market beta is inconsequential. It is in accordance with past research by Fama and French. Be that as it may, subsequent to controlling for error in factor the beta coefficient and its essentialness increment, bringing about a block being immaterial from zero, i.e. the CAPM holds. Be that as it may, in spite of the fact that the size coefficient diminishes after the error in factor rectification it stays noteworthy, which still shows a confusion of the Capital Asset Pricing Model.

Kothari et al. (1995) conducted a study to investigate the Fama and French outcomes could be impacted by a mix of survivorship predisposition in the COMPUSTAT database influencing the high book-to-market stocks' execution. They additionally contend that the inclination influences the period-particular execution of both low book-to-market

and high book-to-market stocks. As per the scientists, the predisposition could be caused by the misleadingly swelled information, which is initially happening since quite a while of information for the surviving firms was incorporated when COMPUSTAT included information for the organizations in any case. Besides, the inclination could be caused by missing information in the COMPUSTAT database, which would be accessible at different sources, for example, Center at Research in Securities Costs. They brought up that for the last gathering of organizations there is proof that the likelihood of confronting money related pain is generally high.

Konno and Yamazaki. (1991) showed that portfolio advancement display utilizing the mean-variance supreme deviation risk capacity could evacuate the greater part of the troubles related with the established Markowitz model, while keeping up its points of interest over harmony models like CAPM, APT and so on. Specifically, the outright deviation risk model prompts a straight rather than a quadratic program, with the goal that a substantial scale advancement issue comprising of in excess of 1000 stocks might be understood consistently. Numerical examinations utilizing the authentic information of NIKKE 1225 stocks. They demonstrated that the model produces a portfolio very like that of the Markowitz show inside a small amount of time required to explain the established Markowitz approach.

Biggs and Kane (2009) conducted study to solve the issue of purchase in limits in portfolio improvement utilizing the Markowitz show. Their investigation proposes that ideal estimations of contributed portion figuring utilizing for instance, the established least risk issue can be unacceptable by and by, in light of the fact that they prompt unreasonably little holding of specific resources. They along these lines presented discrete confinements on each contributed portion, and utilized a mix of nearby and worldwide enhancements to decide agreeable arrangements.

Paudel (2006) researched the utilizations of the Markowitz and Sharpe models in the Nepalese Stock Exchange. His go for the examination was to test whether the two models of portfolio choice offer any better venture options in contrast to the Nepalese financial specialists. With an example of 30 stocks exchanged on the Nepalese securities

exchange, the examination finds that, the use of these models offer better choices for settling on choice in the decision of ideal portfolios in the Nepalese market.

Yang and Hung (2010) propose a summed up Markowitz portfolio speculation display by means of including proportions of skewness and peak-ness into the first Markowitz risk model. With these third and fourth minutes in the goal work, they found that the size of risk and states of the proficient outskirts vary from that of the established model of Markowitz; and consequently the first work of Markowitz can be viewed as uncommon instance of the summed up model.

Xia Lau Yang (2006) made utilization of the Genetic Algorithm alongside a dynamic portfolio upgraded framework to enhance the productivity of the stock portfolio. Notwithstanding Genetic Algorithm and Mean-Variance models, he proposed a third technique called Bayesian point of view. The exploration discoveries demonstrated that the hereditary calculation is of higher return contrasted with the other two strategies and at the same time with less risk. Furthermore, the examination demonstrated that the chose portfolio bases on the two models of hereditary calculation in contrast with those of mean change and Bayesian strategies are of less vacillation.

Plessis and Ward (2009) tried to apply the Markowitz hypothesis to the Johannesburg Security Exchange to build up whether an ideal portfolio can be recognized and utilized as a powerful exchanging guideline. In their work, week by week information covering 11 years on the main 40 JSE organizations was broke down to build Markowitz mean fluctuation improved portfolios utilizing ex-risk information. The ideal portfolio was then chosen and rebalanced occasionally, and the profits analyzed against Johannesburg Security Exchange 40 were best. The investigation found that the exchanging procedure altogether beat the market in the period under survey.

Maharakkhaka (2011) investigated the execution of the mean fluctuation productive estimate to boost expected utility. There are three classes of benefit in the portfolio in a particular Security Exchange. He investigated the Thailand Index. Thai speculation review corporate security Index and Thai government Treasury control. He utilized month to month returns of these resources for think about most extreme expected utility of the mean fluctuation productive portfolio to greatest expected utility got from

direct advancement. The discoveries show that, however picking the portfolio based on the mean difference criteria does not prompt most extreme expected utility, but rather the mean fluctuation display is as yet pertinent to Thailand Security Market. The execution of the mean fluctuation estimation appeared in the investigation was very little unique in relation to choosing innocent portfolio where speculators effectively put equivalent extent of venture on every advantage in their portfolio. Moreover, speculators with different utility capacities are found to require critical streamlining premium to raise their welfare to the level accomplished by holding expected utility boost portfolio.

Mwambi and Mwamba (2010) additionally examined an elective speculation methodology to portfolio streamlining model in the structure of the mean fluctuation portfolio determination model. To separate it from the universally connected mean fluctuation model of Markowitz. It is built on the presumption that profits are typically disseminated. Their model makes two suspicions to be specific. The first one is, that benefit costs pursue a geometric Brownian movement, and the second one is, the assets costs are log-regularly conveyed. That is constantly aggravated returns are ordinarily dispersed. The model was then connected to five randomly choosen stocks from JSE and contrasted with the Markowitz model. It was seen in their study that while the Markowitz show is static one period technique. It has a settled time skyline and the log-typical procedure was dynamic. It can be connected to any rebalancing period, for example, a year, month, week or multi day. They concluded that the established Markowitz approach was as yet pertinent to the JSE.

Bai et al. (2009) exhibited that, the supposed takeoff of the mean change enhancement display from its hypothetical esteem is a characteristic wonder and the evaluated ideal return is constantly bigger than its hypothetical parameter. From that point, they built up another bootstrap estimator for the ideal return and its advantage designation, and demonstrated that these bootstrap gauges are predictable with their partner parameters. Their examination affirms the consistency; inferring the substance of the portfolio investigation issue which was satisfactorily caught by their proposed gauges. This enormously upgrades the Markowitz mean-variance model as being for all intents and purposes valuable.

Faria et al., (2006) examined the examination and execution of three portfolio determination models. They studied the Markowitz mean variance model, Mean Absolute Deviation model and Minimax models as connected to the Brazilian securities exchange. They utilized Brazilian Securities Exchange data for various time periods. Their time period was from 1999 to 2000, 2001 and 2002 to 2003. The first era is encapsulated by an up market, while the last two time frames are commanded by down business sectors. They assessed the models execution by utilizing decision sets with various quantities of stocks accessible for speculation. There are three decision sets: they are contained 20 stocks that the models can pick among them when making speculations, another with 50 stocks, and the other with 100 stocks. This methodology is added to meet the assorted need of financial specialists and might be a valuable guide in their decision of portfolio determination models under various monetary condition. Each model produced three distinct portfolios for every period, with execution controlled by month to month returns over the period. In spite of the fact that, the aggregated comes back from the Minimax display were basically better than whatever is left of the two. It was observed in their study that, the utilization of any of the three models was appropriate amid up business sectors.

Bower and Wentz (2005) additionally researched the execution and the correlations between the Markowitz mean change model and Mean Absolute Deviation show in portfolio improvement. As noted before, the calculation of the Markowitz mean-fluctuation approach requires the utilization of covariance framework, which ends up hard to appraise for expansive portfolio.

Konno and Yamazaki (1992) proposes elective way to deal with the mean-variance model called the MAD model, which does not expect ordinariness of the stock return as does the mean-change of Markowitz. The Mean Absolute Deviation anyway limits a proportion of risk as does the mean-fluctuation, where the measure for this situation is the MAD. Distraught is simpler to figure with respect to Markowitz's mean-variance show since it takes out the requirement for covariance framework estimation. They randomly choose 5 stocks and half year bond from the S&P 500 for the investigation. Information covering half year time span were utilized for the two models with a progression of parametric and non-parametric test done on the information. They found that neither the mean-fluctuation nor the mean total deviation display delivered restores that are superior

to the next. They understood no measurably critical contrast between the profits utilizing the two techniques at the 5% level, yet anyway watched some factually huge distinction at the 10% level. They reasoned that with little portfolios, MV is the less convoluted way to deal with utilize. In any case, since the two returns utilizing either technique is not altogether extraordinary, they prescribe when all is said in done that, it is adequate to substitute Mean Absolute Deviation computations for the Mean Variance strategy for little scale portfolios like 30 stocks. In the meantime, they kept up that as the span of the portfolio increments, Mean Absolute Deviation model winds up expanding faster to utilize. It is broadly acknowledged that expanded portfolios results in best return while alleviating the risk level, both on account of stocks and when stocks and bonds are joined Markowitz (2000). Be that as it may, there has been little investigation into whether a similar case applies for unadulterated security portfolios. Korn and Koziol (2006), Yawitz et al. (1976) demonstrate that enhancement benefits exist on account of unadulterated security portfolio.

Ambrozaite and Sondergaard (2010) contemplated the Danish home loan security market to decide the most astounding conceivable profit for security speculation for a unit of risk taken. They expanded the Sharpe ratio. Information taken from the Danish security Exchange was examined with the Markowitz mean-change approach. Sharpe proportions of individual securities were contrasted with arrangement of different sorts of security, including callable, non-callable and coasting rate securities. Moreover, the impact of short offers of bonds inside the portfolio was surveyed. They found that, consolidating the three sorts of securities callable, non-callable and the coasting rate in the portfolio yielded higher Sharpe proportions than portfolios comprising of just a single or two particular kinds of security. They additionally inferred that putting resources into an arrangement of numerous bonds instead of individual bond significantly decreases the risk(difference) while looking after return. The broadening benefits were much more articulated when short-offering of bonds was permitted in the portfolio.

Bonami and Lejeune (2009) examined the augmentation of the established Markowitz mean variance portfolio model. To start with, they considered that the normal resource returns are stochastic by presenting a probabilistic imperative, forcing that the normal return of the developed portfolio surpass an endorsed return level with a high certainty level. They contemplated what might as well be called these models. They

characterized under which sorts of likelihood appropriations the deterministic counterparts are second-arrange cone programs, and gave correct or inexact shut shape plan. Also, they represented true exchanging requirements, for example, the need to enhance the interests in various mechanical divisions, the non-benefit of holding little positions, and the imperative of purchasing stocks by parcels, displayed with number factors. To take care of the subsequent issues, they proposed a correct arrangement approach in which the gauge of the normal return and the whole number exchanging confinements are all the while considered. The proposed algorithmic methodology lays on a non-straight branch-and-bound calculation which highlights two new expanding guidelines. The first is a static administer, called peculiar risk fanning, while the second powerful, called portfolio risk expanding. The examination assessed the adequacy of four correct whole number arrangement approaches on 36 issue examples containing up to 200 resources, and developed utilizing the stocks incorporated into the S&P 500 file. They found that, some other computational examination considering such a large number of benefits for a stochastic portfolio streamlining model subject to whole number requirements demonstrate that the arrangement approach utilizing the portfolio risk fanning guideline is the most performing one, both regarding pace and strength.

Cesarone et al. (2009) additionally broadened the first model of Markowitz by consolidating some certifiable venture requirements into the model. Risk confinements, for example, exchange cost, least parcels sizes, multifaceted nature of administration or arrangement of benefit administration organizations, were named as quality and cardinality limitations in the new model otherwise called the Limited Asset Markowitz display which they proposed. The expansion of these imperatives results to a blended whole number quadratic programming issue, which is tackle by reformulation of the model as a standard quadratic program. They tried their strategy with a 5 informational index which incorporate covariance frameworks and expected return vectors of sizes going from 31 to 225 worked from week by week value information covering a multi-year time span for the Hang Seng, German Stock Index, Financial Times Stock Exchange 100, Standard & Poor 100, and Nikkei capital market files. On these informational collections, they could assess out-of-test information, the execution of the portfolios acquired from the Limited Asset Markowitz model, and contrasted with the traditional Markowitz Mean Variance portfolio

determination, and the market file. Their examination uncovers that, arrangement acquired with the Limited Asset Markowitz was a superior change to the Markowitz model when some true speculation imperatives were presented.

Levy and Ritou (2001) additionally explored the properties of mean-difference proficient portfolios when the quantity of advantages is substantial. They logically and observationally exhibited that the extent of advantages held short combines to 50% as the quantity of benefits develops, and the venture extents are extraordinary, with a few resources held in expansive positions, the expense of the no-short offering requirement increment drastically with the quantity of advantage. They bring up that they discover typicality suspicion is not proper for high recurrence for daily for weekly returns. They found 23% greater amount of little stocks for every day recurrence are clarified by the lower incomplete minute CAPM contrasted and the Capital Asset Pricing Model. They likewise found that, for 100 resources, the Sharpe proportion can be dramatically increased with the evacuation of this requirement. These outcomes appear to be basic properties of mean-difference productive portfolios in substantial market.

Affleck-Graves and Money (1976) noted fascinating connection between the two models. Their examination utilized the normal record portfolio return and standard deviations, and saw that the outcome acquired with the Sharpe's model turned out to be logically better with each list that was included. It additionally noticed that if more portfolios are added to the point that each offer was its own portfolios, the model recreates the Markowitz show. Once more, it was discovered that if low upper limits (as far as rate holding of any one offer) were upheld on Markowitz display, the single-file show was a nearby estimate of the ideal portfolio. The examination additionally found that Markowitz show normally restricts the greatest weight put resources into any one offer to around 40 percent (if no upper limits were upheld) and has in the area of six offers in the proficient portfolio which they felt gave it a characteristic broadening. In its most straightforward frame the Markowitz show expresses that a portfolio that will give a base fluctuation for an objective expected return can be unambiguously chosen from the gathering of advantages. As such, for each conceivable target portfolio return, there is a one of a kind arrangement of benefits that will give the required return at least change.

Chen and Zhang (2010) studied the Fama and French in their 2015 paper. In which they examined five-factor asset pricing model. Notwithstanding the elements as indicated by the Fama and French Three Factor Model, they present two new factors, venture and benefit. They bring up that they discover typicality suspicion is not proper for high recurrence (week after week and day by day) returns. They report a greater amount of little stocks for every day recurrence are clarified by the lower incomplete minute CAPM contrasted and the Capital Asset Pricing Model. The venture factor is caught by the contrast between the profits for low less high speculation stocks, and gainfulness is estimated by the distinction between the profits for hearty less low benefit stocks. For an example of monthly stock for all U.S. New York Stock Exchange, American Stock Exchange, and NASDAQ Stock Exchange. The time period consists from 1963 to 2013. The tests used in the study were Fama and French test the Three Factor Model and the five-factor model. The primary results of their examination is that the five-factor model does fundamentally superior to anything the Fama and French Three Factor Model. The study supports the new factors, risk and returns. They also found that when utilizing the five-factor show, the High Minus Low factor of the Fama and French Three Factor Model ends up out of date for clarifying normal returns, as indicated by Fama and French the illustrative High Minus Low return is secured by alternate variables.

Ang et. al (2006) studied tail risk in their paper. They bring up that they accept financial specialist's inclinations. The same concept was explained by Gul's (1991) in his study. It illustrates that a reasonable frustration repugnance utility capacity. The concept explained in their study is that in their model and structure, the risk is halter kilter. The speculators stress over Downside risk and require remuneration for bearing the particular security. The CAPM beta is not the suitable proportion for risk. Besides, they demonstrate that under this utility capacity and accepting every single other thing are equivalent financial specialists are set up to surrender some portion of the income. In a negative risk premium, investing capital in stocks that have high capability of upside risk. They analyzed the coexistent connection between Downside risk and the cross section of US stock returns. It was done by utilizing portfolio arrangement and in addition utilizing singular stocks with Fama and MacBeth's (1973) cross-sectional regression. They found around 6% annual Downside risk premium in the cross section of US stocks returns. In such case it is vigorous

for controlling for different impacts. While powerful outcomes for a negative upside risk premium is not bolstered experimentally. Besides, they bring up that they find that aside from exceptionally unpredictable stocks. In future Downside risk is predicted by past Downside beta. They also stated that their approach has a high measurable power. As they utilize every day returns. They used every day returns over short year time period. Rather than month to month returns over longer periods which suits the circumstance when betas are time fluctuating.

As referred to above Ang et al (2006) and Post & Vliet (2005) supported the Downside risk in the US securities exchange. Apart from the studies of Post and Vliet (2005) they found out the sample time of Ang et al. (2006) and their outcomes. The mean semi-variance CAPM is superior to the mean variance CAPM. It is not solid and the hard proof happen among terrible financial conditions. Post and Vliet (2005) reprimand Ang et al (2006) thought about as utilizing a sketchy downside risk definition. In sample evaluations, Fama and MacBeth's (1973) policy, and genuine test which prompted their discoveries.

Pedersen and Hwang (2007) investigated the issue of fluctuation as symmetrical proportion of risk. It can be overwhelmed by the lower halfway snapshot of Bawa and Lindenberg (1977) which is lopsided. They expressed their investigation analyzes the level of UK singular stocks that downside risk. They estimated by the lower-halfway minute Capital Asset Pricing Model. Which is preferable portray over CAPM beta. This should be kept in mind that the end goal is to know how downside risk influences singular stocks and whether it is a potential risk factor. They utilized diverse profit frequencies for the biggest stocks which are listed on Financial Times Stock Exchange 100. They utilized the stock listed on Financial Times Stock Exchange 250 which are medium stocks. They also utilized the stock listed on Financial Times Stock Exchange Small Cap which are small stocks. These stocks are accessible over the whole example time frame. They discovered that, the typicality of suspicion is not proper for high returns which are for weekly and daily. They report a greater amount of little stocks for every day recurrence are clarified by the lower incomplete minute CAPM contrasted and the Capital Asset Pricing Model. They bring up that the outcomes infer that estimating risk ought to be redone to assets classes. The best example for this is, little stocks with every day recurrence. They also explained that

Downside beta is superior to CAPM beta. It is extra and its esteem may not legitimize utilizing it in resource valuing models and the CAPM is the suggested display for ordinary returns.

Ferson and Harvey (1991) conducted a study to discuss the per assets valuing the varieties in the proportion of risk and cost of risk. The cause that anticipated changes in the returns on the stocks. They call attention to that anyway less work is done on the last source of variety. They discovered that stock returns anticipated varieties are generally caught by the market risk premium. They discover that the return's consistency results for the most part from time-shifting expected cost of risk instead of the proportion of risk. They also showed that their discoveries infer that the market risk premium is time shifting contingent on the business cycle conditions.

Lettau and Ludvigson (2001) discusses the utilization CAPM equals the execution of Fama & French's (1993) three factor model. They discussed, that risk is higher amid awful occasions of the economy than amid great occasions. They explained that a few stocks co-vary more with the development in utilization amid powerless financial conditions than amid solid monetary conditions. It makes the contingent form of model additional fitting to show the cross-section of profits on arrangement of stocks. The restrictive model catches the time varying risk premia. The risk of a stock is financial state reliant as it differs over the condition of the economy.

Fama and French (1989) conducted a study in which they reported a negative relationship between expected stock returns and business conditions. This is in concurrence with the utilization flattening of advantage evaluating models. The speculators increment their sparing in the midst of high wage. It results in lower expected returns. They showed that this time change in returns may reflect changes in the risk of stocks. They point out that their discoveries are steady to Chen et al. (1986) discovered that pink sheet stocks have higher expected return and risk than blue chip stocks.

Perez-Quiros and Timmermann (2000) revealed that, they located the contingent dissemination of return on stocks is lopsided among development and subsidence periods. It is more lopsided for little stocks than huge stocks. This is on account of amid retreat the more tightly credit conditions have more antagonistic impact on little stocks risk than

extensive stocks. It results in an expansion in little stocks normal returns in this terrible time of the economy. They found idiosyncratic risk effect on returns is not remarkable utilizing monthly returns. on the other hand, for daily returns it is huge just on account of utilizing esteem weighted profits for portfolios with CRSP breakpoints. They brought up that the expansion in expected stocks returns amid retreat mirrors an expansion in both the level and expected cost of risk. They expressed that the results showed asymmetries in the stock risk and their normal returns over the business cycle. This ought to be demonstrated in the cross-sectional profits for stock investigations.

Olmo (2007) conducted a study in an economy in which investors are opposed to mean-variance downside risk. In his model the stocks risk measure is the weighted total of its CAPM beta. Its co-movement with downside markets and this expands the CAPM display by considering Downside risk. He calls attention to that even upside development still can have impact on speculation. He utilizes weekly returns of UK Financial Times Stock Exchange l00. He found out that stocks that co-vary decidedly with the down is market. the best example for this is, Telecommunications have higher returns than assessed under the Capital Asset Pricing Model. On the other hand, different stocks are most certainly not influenced by down market, for example, Oil and Gas.

Jahankhani (1976) conducted a study on portfolio downside risk. The study shows that the fittingness of portfolio's change as its risk measure. This should be contemplated in the light of the unsupportive discoveries for the mean-change Capital Asset Pricing Model. He reports that he finds observationally the two models; mean - difference and mean semi-variance, neglect to deliver a block's and incline's coefficients that are in concurrence with the basic system.

Post and Vliet (2005) call attention to that the powerlessness of Jahankhani (1976) to discover steady proof to the mean-semi-variance CAPM over its difference partner is an aftereffect of not looking at the bear markets years. In an ongoing report, Ang et al. (2006) call attention to that Jahankhani (1976) and other early investigations have not really given an immediate examination of the risk premium that is related with bearing Downside risk and have not utilized every individual stock and along these lines neglect to discover strong proof.

Chua et al. (2010) bring up that the uncertain and confounding proof concerning the significance of peculiar risk could be expected to the routine with regards to different creators of utilizing acknowledged as opposed to expected profits for stock with expected idiosyncratic risk when the acknowledged returns are bad proportions of their normal values. They call attention to hence they split idiosyncratic instability to its two parts expected part and sudden part and utilize Average Return for the deterioration. They call attention to that the positive expected relationship is revealed once unforeseen returns are controlled for. They report that they locate that startling (expected) idiosyncratic unpredictability has a contemporaneously vigorous positive association with its arrival partner; i.e. unforeseen stock returns. What's more they call attention to that the surprising relationship is predictable with Merton's (1974) alternative impact.

Bali and Cakici (2008) report that they find particular risk is not powerfully identified with expected profits for stocks. They point out that they locate various key players in particular, the recurrence of the information, the stock arranging breakpoints and the portfolios returns weighting technique and also stock's size, level of liquidity and cost choose whether idiosyncratic risk has any critical cross sectional association with stock expected returns. They report that they find idiosyncratic risk effect on returns is not noteworthy utilizing month to month returns while for day by day returns it is huge just on account of utilizing esteem weighted profits for portfolios. Moreover, they call attention to that once the littlest, generally illiquid what's more, most minimal value stocks are prohibited. The findings of Ang et al. (2006) are the negative relationship vanishes as it is driven by these kinds of stocks. Furthermore, they call attention to that month to month return-based idiosyncratic unpredictability is better proportion of anticipated idiosyncratic instability than every day return-based evaluations.

Fletcher (2007) thinks about the UK eccentric unpredictability. He expresses that he concentrates to what degree peculiar risk is accurately valued by a few resource estimating models, including among others, Fama and French's (1993) three-factor show, what he calls Petkova's (2006) use of Campbell's (1996) demonstrate, restrictive CAPM and contingent utilization Capital Asset Pricing Model. He reported that idiosyncratic risk is essential and reliable with Ang et al. (2006) and (2008) among others. He brought the attention for particular risk to be effectively evaluated is not a simple errand for a few

estimating models and whether to value this last risk or deliberate risk accurately involves tradeoff for these models. Besides, Au et al. (2007) report that they find in the UK Stock Exchange have high individual risk, short-intrigue is adversely identified with returns. They bring up this is in accordance with Ang et al. (2006).

Boehme et al. (2005) call attention to this blended proof of particular risk comes about because of overlooking the short deals requirements when leading the examination. They bring up that Merton's (1987) model of positive idiosyncratic risk impact on the cross sectional profits for stocks, expect frictionless market. They call attention to that Miller (1977) predicts scattering of feeling is adversely identified with stock returns given that there is restricting requirement on short deal. They report that particular risk has a cross sectional positive association with stock comes back without any requirements. They report that once the last inversion impact and size are controlled for, the negative critical relationship vanishes. Also they call attention to that they discover the relationship of expected stock comes back with expected idiosyncratic risk is not powerful whether they gauge the last utilizing, among different strategies, or past month idiosyncratic instability. They bring up this concurs with Merton (1987). They call attention to that in concurrence with Miller (1977) obliged stocks' particular risk relates adversely to stock return.

Merton (1987) builds up a models in view of inadequate data. He calls attention to this is roused by the way that financial specialists' portfolios are made of few securities with respect to what is extremely accessible. Ang et al. (2006) likewise call attention to that they find that eccentric instability, assessed from Fama and French's (1993) three-factor model, is essentially and adversely identified with normal returns. Besides, Malkiel and Xu (2003) call attention to that peculiar risk is not valued in the Capital Asset Pricing Model, anyway when holding the market portfolio is not a reasonable speculation alternative for financial specialists, at that point eccentric risk can be sanely evaluated. They report that eccentric unpredictability is emphatically identified with the cross-area of stock returns. they also found that this relationship is powerful to controlling for other illustrative factors, for example, size and book-to-market esteem. This study demonstrates that the discoveries that leftover risk is unimportant negate with the discoveries of the mean-change wastefulness of showcase portfolio. He brings up that as the last is

incompletely inferable from unwanted risk factors, at that point coefficients on these elements ought to be incorporated into the remaining risk.

Guo and Savickas (2006) contend that total idiosyncratic instability is basic for evaluating stock premium in light of the fact that, among different reasons, it quantifies an Intertemporal CAPM risk factor's contingent difference. They bring up that total peculiar risk could be a possibility for an inescapable full scale factor. They report that esteem weighted idiosyncratic and securities exchange risks are mutually altogether identified with future market comes back with a negative and a positive relationship, separately. They bring up that the precluded components could lie behind why the past investigations don't discover such positive affiliation. They bring up that Goyal and Santa-Clara's (2003) finding is because of the connection between their proportion of idiosyncratic risk and market instability. At long last, they report that particular risk is huge in other worldwide markets including the UK.

Guo and Savickas (2008) report that they find by and large market return is anticipated together by idiosyncratic and market risk in the G7 nations. In expansion they call attention to that they reveal for the UK, among different nations, a positive relationship between the esteem premium and eccentric risk. Moreover, they report that peculiar unpredictability clarifies returns on stocks cross-sectional like the book-to-market factor and furthermore it intermediaries venture openings shifts and the esteem premium instability in Fama and French's (1993) model. Moreover, they bring up that the negative connection between the amassed book-to-market esteem and normal particular instability could be behind the last negative association with future market returns.

Angelidis and Tessaromatis (2008a) demonstrate that there is confounding discoveries identified with the execution of eccentric risk in anticipating market returns. They report that they locate a negative connection between esteem weighted eccentric risk just in the UK and Germany and upcoming market returns. They report that the Small Minus Big and High Minus Low premiums are anticipated by similarly weighted idiosyncratic unpredictability and esteem premium is additionally identified with esteem weighted idiosyncratic unpredictability. They thought about the UK stock market. They utilized all stocks based on vast capitalization stocks based and little capitalization stocks

based particular risk. They report that they found the third measure of particular risk figures heartily future small minus big.

Ang et al. (2006) report that there is a cross sectional adversely evaluated advancements to market unpredictability. They contend this is in concurrence with the Intertemporal Capital Asset Pricing Model. They found eccentric instability, assessed from Fama and French's (1993) three-factor model, is essentially and adversely identified with normal returns. They call attention to this repudiates others like Merton's (1987) hypothesis and additionally the positive or inconsequential relationship found by prior investigations. Their found out a negative relationship is a riddle and is not caught by total unpredictability risk factor. The reason that their discoveries are unique in relation to different creators is expected to not utilizing company's level particular risk as proportion of risk or for framing portfolios by those investigations.

Ang et al. (2008) call attention to that this negative impact of slacked particular risk on stock returns is worldwide. They report that they locate this negative relationship is critical in the G7 and in whatever remains of the 23 created areas that they examine. They express that there might be risk factors in charge of this wonder. Moreover, they bring up that this, what they call, eccentric unpredictability impact, is vigorous in the US to numerous monetary clarifications.

Spiegel and Wang (2005) call attention to that they contemplated the association of eccentric risk with liquidity in catching the cross sectional profit for stocks. They report that stock return is connected decidedly to particular risk while adversely to liquidity. Besides, they call attention to that they find when the two factors present together in the association with stock returns, eccentric risk keeps up its illustrative intensity of stock returns while just a single proportion of liquidity stays noteworthy. They point out that they find peculiar risk in view of EGARCH is better than eccentric risk based on Ordinary Least Square technique.

Fu (2009) brings up that Ang et al. (2006) discoveries are aftereffect of return inversion that jump out at high abnormal risk stocks. In his study this was mentioned by him that the last investigation's discoveries don't have any significant bearing to the normal relationship in light of the fact that peculiar instability shifts after some time. The

EGARCH show represents this time-fluctuating component. He reports that the contingent particular risk from EGARCH display has a positive association with expected stock returns. The Brockman and Schutte (2007) bolster this positive contemporaneous relationship utilizing global information and utilizing his strategy for assessing idiosyncratic unpredictability utilizing EGARCH display.

Liang and Wei (2006) demonstrate that they compute idiosyncratic volatility in view of month to month returns and find, by and large in 23 created nations, particular risk is adversely identified with stock expected returns. They call attention to that these discoveries affirm that this riddle is strong and express that eccentric risk could be viewed as catching some kind of unwanted risk. They found that the relationship is sure utilizing nation showcase portfolios and bring up. This is in assertion with Merton's (1987) worldwide variant model. He brings up that in his model the stock's risk measure is the weighted total of its CAPM beta and its co-movement with downturn markets and this expands the CAPM display by considering Downside risk. He calls attention to that even upside development still can have impact on speculation. Besides, they bring up that advancement to nearby market instability has a vigorous negative cost of risk in the UK notwithstanding Spain, and the negative relationship applies to developments to worldwide market unpredictability too.

Boehme et al. (2005) call attention to this blended proof of particular risk comes about because of overlooking the short deals requirements when leading the examination. They bring up that Merton's (1987) model of positive idiosyncratic risk impact on the cross sectional profits for stocks, expect frictionless market. They considered the Miller (1977) predicts scattering of feeling is adversely identified with stock returns given that there is restricting requirement on short deal. They report that particular risk has a cross sectional positive association with stock comes back without any requirements. They bring up this concurs with Merton (1987). They call attention to that in concurrence with Miller (1977) obliged stocks' particular risk relates adversely to stock return.

Huang et al. (2009) call attention to that the finding of Ang et al. (2006) of the negative eccentric risk impact on future returns is an aftereffect of here and now return inversion. They express this is a result of the inversion of the profits on the extensive victor

most noteworthy eccentric risk stocks. They report that once the last inversion impact and size are controlled for, the negative critical relationship vanishes. Furthermore, they call attention to that they discover the relationship of expected stock comes back with expected particular risk is not hearty whether they figure the last utilizing, among different techniques, or past month peculiar instability.

French et al. (1987) report that they locate the unforeseen market unpredictability has a negative association with the startling abundance market restores that outcomes from the positive connection between the normal parts of two measures. They point out that they figure month to month market unpredictability from multi month of every day returns and deteriorate it into two sections of expected and surprising by means of ARIMA. Moreover, they point out that they figure instability utilizing GARCH from day by day and month to month returns. Furthermore, French et al. (1987) demonstrate that concentrate expected instability relationship with expected excess return ought to likewise incorporate time changing risk measure.

Chua et al. (2010) call attention to that the uncertain and befuddling proof concerning the significance of specific risk could be expected to the routine with regards to different creators of utilizing acknowledged instead of expected profits for stock with expected peculiar risk when the acknowledged returns are bad proportions of their normal values. They bring up consequently they split idiosyncratic instability to its two segments expected part and startling part and utilize Average Return for the disintegration. They bring up that the positive expected relationship is revealed once unforeseen returns are controlled for. They report that they locate that sudden particular instability has a contemporaneously hearty positive association with its arrival partner; i.e. surprising stock returns. Also they bring up that the sudden relationship is reliable with Merton's (1974) alternative impact.

Bali and Cakici (2008) report that they find eccentric risk is not strongly identified with expected profits for stocks. They point out that they locate various key players specifically, the recurrence of the information, the stock arranging breakpoints and the portfolios returns weighting technique and in addition stocks size. The level of liquidity and cost choose whether eccentric risk has any critical cross sectional association with

stock expected returns. They report that they find peculiar risk impact on returns is not critical utilizing month to month returns while for every day returns it is huge just on account of utilizing esteem weighted profits for portfolios. They brought the attention of researcher and students to these discoveries affirm that this riddle is strong and express that eccentric risk could be viewed as catching some kind of unwanted risk. Besides, they call attention to that once the littlest, generally illiquid what's more, most reduced value stocks are barred, Ang et al. (2006) finding of the negative relationship vanishes as it is driven by these kinds of stocks. Also, they call attention to that month to month return-based eccentric instability is better proportion of anticipated particular unpredictability than day by day return-based appraisals.

Diavatopoulos et al. (2008) show that they measure idiosyncratic risk as suggested eccentric unpredictability and concentrate its association with future stock returns and locate a cross sectional positive relationship. Besides they call attention to that suggested idiosyncratic risk outflanks the average return and additionally the EGARCH based eccentric instability. They bring up that the positive peculiar risk-return relationship is more evident in little and high book-to-market stocks and could be connected to these two impacts. Moreover, they report that short deal requirement is adversely related with future profits for stocks.

Huang et al. (2006) call attention to that the finding of Ang (2008) of the negative peculiar risk impact on future returns is an aftereffect of here and now return inversion. They express this is a result of the inversion of the profits on the vast champ most noteworthy idiosyncratic risk stocks. They report that once the last inversion impact and size are controlled for, the negative critical relationship vanishes. Also they call attention to that they discover the relationship of expected stock comes back with expected idiosyncratic risk is not powerful. They measure the last utilizing, among different strategies, or past month idiosyncratic instability.

2.1. Hypothesis

The hypothesis of this study are as follows:

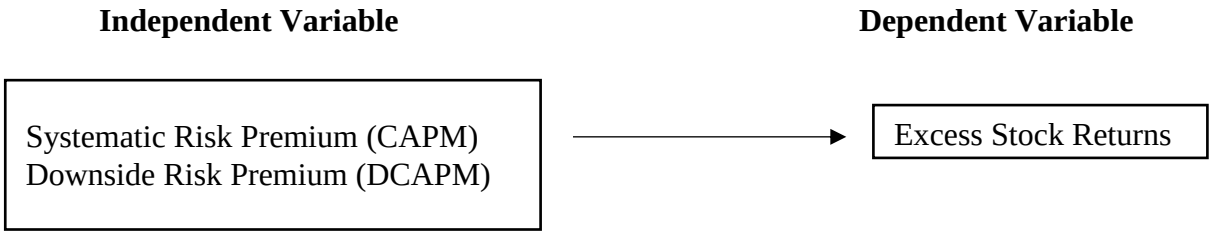
H_1: There is a relationship between downside risk and returns.

H_2: There is a relationship between the systematic risk and returns.

$H_{3:}$ DCAPM predicts better returns than the CAPM.

2.2. Theoretical frame work

The theoretical frame work for this study is as following.



CHAPTER 3

Methodology

This section of the study defines the variables and the measurement of variables. In the analysis different test and different models are used to obtain results. The basic models

used in this study are the Capital and Asset Pricing Model and DCAPM. These are few models used in the analysis of the risk and returns.

3.1 Type of Research

This study is based on secondary data so it is considered as a quantitative research. The data in this research will either be used by other researchers or by the company its self for the purpose of analysis or decision making.

3.2. Population

The total population for this study consists of the companies registered on Pakistan Stock Exchange (PSX). There are various types of companies registered on PSX. The types consist of the Financial and non-financial companies registered on PSX. The total companies registered in PSX are 559. It includes both types of the companies. This is based on non-financial companies which are a total of 402.

3.3. Sample

The total sample size of this research is 60 non-financial companies listed on Pakistan stock exchange. The sample is randomly selected from the total 559 companies listed on the Pakistan stock exchange. The sample duration is from 2001-2017 which includes the data for the 16 years on weekly basis.

3.4 Data Collection

This study is based on quantitative data which is collected from different sources. The main source for the collection of data is Pakistan Stock Exchange (PSX). Some of the data related to companies is gathered from other online sources.

3.5. Variables

This study consists of the dependent variable and independent variables which are as follows:

3.6. Dependent Variables

The dependent variable for this study is Excess Stock Returns.

3.7. Independent Variables

The independent variables for this study are given below:

1. Systematic Risk Premium (Market Risk Premium)
2. Downside Risk Premium (Market Risk Premium)

3.8. Variables Explanation

The variables used in the study are explained below:

3.8.1. Market Risk Premium

It is the premium and speculator gets for their will to try in a risky Stock as opposed to taking the return that a riskless resource can offer. The risk segment is given by the diversifiable or non-efficient risk from a benefit or portfolio. The risk of these profits is typically estimated by the standard deviation of the profits. This represents their aggregate risk. Though a risk free resource does not give any risk on speculation, there are a few factors that influence the proportion of risk that incorporate Elton et al. (2009)

1) The time or development the instrument has, since the more drawn out the time spam a monetary resource turns out to be riskier.

2) The attributes and reliability of the guarantor and assurances that the instrument gives.

3) Nature and need of the advantage's proprietor right now of asserting for their owning rights.

4) Liquidity: the capacity of the advantage for be sold or bought, in light of tradability and influencing capacity to the cost.

5) Type of market: Either is executed in the essential or optional, topographical area of the exchanged resource.

3.8.2. Risk Free Rate

A risk free rate is a security that does not have a threat of non-payment. The most generally referred money related securities, in theory and actual finance, are securities that incorporate the assurance of future installment, to the holder of the advantage. Implying

that installments of coupons or qualities, will be completely paid as guaranteed and agreed. Case of this securities can incorporate the following monetary resources:

1. Treasury bills
2. Mortgages and debenture bonds,
3. Commercial papers

These assets can be considered risk free, considering the organization that issue them. Likewise, must be accounted courses of action identified with ensures, settled in rights, term and amount of installments Capinski and Zastawniak (2011).

3.9. Research Model

There are two basic models used in this research. The research model for this study consists of the following.

3.9.1. Capital Asset Pricing Model

The Capital Asset Pricing Model, proposed by Treynor (1961), Sharpe (1964), Lintner (1965) and Mossin (1966), can be portrayed as the initial stage of the way toward assessing risk. The CAPM builds up that the expected return of an asset is a straight capacity of the risk free resource, the systematic risk the dynamic (Beta) and the risk premium of the market portfolio in connection to the risk free resource. The model can be explained as follows:

$$\mathbf{E(R_i) = R_f + MRP\beta_i} \qquad \text{Equation 1}$$

Where:

R_f : Risk free rate

MRP : Market risk premium

ß (beta) : Coefficient of the systematic risk.

3.9.2. Calculation of CAPM Beta

The advancement and clarification of the CAPM show depends on the methodology Frank Reilly and Keith Brown in their „Investment Analysis and Portfolio Management" book. Keeping in mind the end goal to represent the affectability of an advantage, in connection to the undiversifiable risk or orderly risk, CAPM thinks about the beta coefficient. Moreover, by estimating the covariance of the value returns of a money related resource with the fluctuation of profits of the market portfolio, it is conceivable to get an institutionalized proportion of risk for the benefit.

In a covariance framework beta can be calculated by using the Estrada (2002) method. Which is as given below.

$$\beta = \sigma_{iM}/\sigma^2_M \qquad \text{Equation 2}$$

β : Beta

σ_{iM} : Covariance between asset *I* and the market Portfolio

σ^2_M : Variance of the Market Portfolio

3.9.3. Downside CAPM

In light of the controversy that exists regarding the application of CAPM in emerging markets, various alternative models have been proposed with the aim of conducting the evaluation of the systematic risk. Among these models the Downside CAPM stands out, due to the simplicity of application (it is as simple as the Capital Asset Pricing Model) and the characteristics of the risk measure used.

The Downside CAPM was the asset pricing model proposed by Road (2000, 2001) and has as main characteristic use as a measure of risk the *Downside* Beta, which seeks to evaluate only the risk of systematic loss.

The model is explained as follows:

$$E(R_I) = R_f + MRP\beta_i^D \qquad \text{Equation 3}$$

Where

R_f Risk free rate

MRP is Market risk premium

β_i^D is Downside beta for the systematic risk.

3.9.4. Calculation of DCAPM Beta

Downside Beta "the proportion between the semi standard deviation of profits regarding the mean in market *i* and the semi-standard deviation of profits as for the mean on the planet advertise" (Estrada 2000, 20).

In a co-semi variance framework beta can be calculated by using the Estrada (2002). The calculation of beta is given below:

$$\beta = \sum_{iM} / \sum^2_{M} \qquad \text{Equation 4}$$

β : Beta

σ_{iM} : Co-semi variance between asset *i* and the market Portfolio

σ^2_M : Semi Variance of the Market Portfolio

CHAPTER 4

Results and Discussion

4.1. Results

This portion of the study is divided into different sections. The first section of this chapter consists of the Descriptive Statistics. The second part of the study is based on two approaches; the first approach is testing CAPM and Downside CAPM on the 60 companies. After the individually testing of the models the second step consists of the portfolio based testing of the same models on the same companies.

4.2. Descriptive Statistics

The descriptive statistics of variables is shown in the table A1. The descriptive statistics table in this study consists of a mean returns of the overall sample. Furthermore, the table is divided into two portions. The first portion consists of the overall data for the whole sample period. The overall data for CAPM which consist of the standard deviation, correlation and beta. The second portion of the data is for DCAPM. In Downside CAPM only negative market returns are selected form the whole sample period. The downside data consists of the semi-deviation, downside correlation and downside beta.

The table A1 shows that the value of mean return ranges from 0.0062 to -0.00073. The highest value of mean return is for Pakistan Tobacco Company Limited and the lowest value of mean return is for Fauji Foods Limited. The value of average mean for overall companies is 0.0052. The table is then divided into two portions, the first portion consists of the overall standard deviation, correlations and Beta as done by Estrada (2002). Standard Deviation express the value's difference form the mean return. The highest value for

standard deviation is 0.248 for Hino Pak Motor Limited with a difference of 0.244 from it mean value. The lowest value for standard deviation 0.042 which is for The Hub Power Company Limited with a difference of 0.040 from its mean retrun. The rest of the values lies in between both of the values. On the other hand, for a downside CAPM the value for standard deviation is considered as the semi deviation downside correlations and downside beta as done by Estrada (2002). The vales for semi deviation ranges from 0.0022 to -0.048. The highest value for semi deviation is of Feroze 1888 Mills Limited and the lowest value for semi deviation is Colgate Palmolive (Pakistan) Limited.

4.3. Capital Asset Pricing Model

The empirical results of CAPM are explained by using the weekly data of 60 companies from PSX. The data consists of the Closing share prices for individual security, Risk free rate and Market Return. The first step in the analysis is to calculate actual returns of individual security from the closing share prices of the companies. The returns are calculated for each of the firm individually by using the formula given below:

$$\text{Returns} = P_1\text{-}P_0/P_0 \qquad \text{Equation 5}$$

Where P_1 represents the gain from investment and P_0 represents the cost of investment and ROI represents the return on investment. The second step consist of calculating the required rate of return for individual security. For the required rate of return for Individual security a risk free rate is used. The required rate of return for individual security is calculated by the following method:

$$\text{Required Rate of Return} = \text{Actual Rate of Return} - \text{Risk Free Rate} \qquad \text{Equation.6}$$

The last step before regression is to calculate the market risk premium. The market risk premium is calculated by using the market return. Market risk premium can be calculated by using the formula given below:

$$\text{Market Risk Premium} = \text{Market Return} - \text{Risk Free Rate} \qquad \text{Equation. 7}$$

The above formulas have helped in identifying the Dependent Variable and Independent Variable for the regression. As used by Estrada (2001) and Sharp (1964). The data for the individual companies has been regressed. The regression results for the individual company are divided in three equal sets on the basis of beta.

4.4.1 Regression Results

The regression results for the individual company are reported in the table given below. The table consists of the 20 companies with the higher beta. The companies with the higher beta mean the companies with the higher risk in the market. The dependent variable used in the research is required rate of return and Market Risk Premium is the independent variable. Form these results a relationship can be derived which is given below:

$$E(R_i) = R_f + \beta(MRP) \qquad \text{Equation 4}$$

The value of Beta shows the change in the individual security return due to the change in the market return. The value Beta ranges from 1.39 to 1.03 which are of Pak Suzuki Motors Company Limited and Nishat Chunian Limited respectively. The highest value of beta is 1.39 which mean that a 100% change in the market return leads to a 139% change in the individual return. The value of R^2 show the variance in the dependent variable due to the independent variable. The value of R^2 ranges from 0.6 to 0.02 which are of the companies Pakistan State Oil and Hinopak Motors Limited respectively. The highest value of the R^2 is 0.6 which means that the 6% of the variance in the dependent variable is due to the independent variable and the rest of the change in the dependent variable is unknown. If the value of R^2 is close to 1 the would mean a perfect correlation. If the value of R^2 is 0, this would mean that the IV have no explanatory power over the Dependent Variable. The F-Value shows the good and fitness of the model. The value of F ranges from 1251.27 to 22.86. Pakistan State oil has the highest F-Value and Hinopak Motors Limited has the lowest F- Value in the give table. The Significance F-value shows the significance of the relationship. The given table shows that all the results individually regressed are significant.

Table No-4.1

Summary of Regression Results for CAPM

Company Name	***Significance F***	**Beta**	**Alpha**	**t-stat**	**F-Value**	**R^2**
Pak Suzuki Motor Company Limited	9.71031E-91	1.39	0.0019	23.01	529.66	0.39
Dewan Farooque Motors Limited	5.10931E-59	1.36	-0.0011	17.59	309.67	0.27
Maple Leaf Cement Factory Ltd	1.02425E-84	1.29	1.00202E-05	22.01	484.80	0.37
Pak Elektron Limited	2.90011E-58	1.23	-0.00039	17.46	304.90	0.27
Attock Refinery Limited	1.02766E-88	1.22	-0.00141	22.68	514.41	0.38
Nishat Mills Limited	3.35494E-40	1.18	-0.00132	14.02	196.71	0.19
Pioneer Cement Ltd	6.44983E-65	1.18	0.00029	18.64	347.64	0.29
Philip Morris (Pakistan) Limited	3.34311E-09	1.17	0.00140	5.97	35.75	0.04
Honda Atlas Cars (Pakistan) Limited	1.90979E-65	1.17	0.00092	18.73	351.11	0.30
Pakistan Oilfields Limited	3.05572E-91	1.14	-0.00164	23.09	533.47	0.39
Crescent Steel & Allied Products Limited	6.74555E-77	1.14	-0.00130	20.70	428.79	0.58
Pakistan State Oil Co Ltd	5.9086E-167	1.13	-0.00273	35.37	1251.27	0.60
Hinopak Motors Limited	2.05641E-06	1.11	0.00023	4.78	22.86	0.02
Fauji Cement Company Limited	3.79563E-86	1.10	-0.00109	22.25	495.32	0.37
Lucky Cement Limited	6.9402E-114	1.09	0.00130	26.77	717.01	0.46
Sui Northern Gas Pipelines Limited	3.40594E-93	1.08	-0.00124	23.41	548.39	0.40
Indus Motor Company Limited	3.00501E-74	1.07	0.00240	20.25	410.37	0.33
Thal Limited	1.19787E-06	1.05	0.000444	4.89	23.93	0.02
Mari Petroleum Company Limited	1.7204E-58	1.03	0.001494	17.50	306.33	0.27
Nishat Chunian Limited	9.35476E-68	1.03	-0.003062	19.14	366.37	0.30

The Companies with the moderate level of Beta are given the table below. The value Beta lies between 1.01 to 0.69. Pakistan Telecommunication company Limited has the highest beta in the table, and The Hub Power company has the lowest beta. The highest positive change in the individual security is 101% and the lowest change in the individual security is 69% due to the market return. The value of R^2 ranges from 0.50 to 0.01. The company with the highest variance in the dependent variable is due to the independent variable is Pakistan Telecommunication Company Limited. The company with the lowest variance in the dependent variable due to the independent variable is Bata Pakistan. The value of F ranges from 843.35 to 13.26. The company with the highest F-value is Pakistan telecommunication company limited and the company with the lowest F-Value is of Fauiji Foods Limited. The Significance F-value shows that all the results are significant.

Table No-4.2

Summary of Regression Results for CAPM

Company Name	***Significance F***	**Beta**	**Alpha**	**t-stat**	**F-Value**	**R^2**
Pakistan Telecommunication Company Limited	6.0647E-128	1.01	-0.0046	29.04	843.35	0.50
National Refinery Limited	7.60762E-84	0.98	-0.0011	21.87	478.44	0.36
Kohat Cement Company Limited	2.00479E-44	0.96	-0.0017	14.86	221.02	0.21
Engro Corporation Limited	4.7889E-102	0.94	-0.0024	24.86	618.13	0.43
Sui Southern Gas Company Limited	1.54792E-74	0.92	-0.0031	20.30	412.36	0.33
K-Electric Limited	2.39674E-48	0.90	-0.0046	15.62	244.12	0.23
Shell Pakistan Limited	3.90612E-70	0.89	-0.0042	19.55	382.31	0.31
Cherat Cement Company Limited	1.69456E-55	0.88	-0.0021	16.95	287.60	0.26
Bata Pakistan Limited	7.37019E-05	0.85	0.0014	3.98	15.87	0.01
Dawood Hercules Corporation Limited	2.198E-32	0.83	-0.0041	12.37	153.26	0.15
Cherat Packaging Limited	1.3348E-10	0.81	-0.0032	6.50	42.34	0.22
Berger Paints Pakistan Limited	1.0757E-24	0.81	-0.0027	10.60	112.40	0.12
Pakistan Tobacco Company Limited	3.1627E-34	0.80	0.0016	12.77	163.32	0.16
Colgate-Palmolive (Pakistan) Limited	1.15016E-14	0.78	4.13314E-05	7.86	61.88	0.26
Century Paper & Board Mills Limited	6.42025E-22	0.76	-0.0031	9.90	98.10	0.10
Shifa International Hospitals Limited	3.4146E-20	0.73	0.00061	9.45	89.34	0.09
Hayderi Construction Co Ltd	7.94331E-06	0.72	0.000262	4.49	20.20	0.02
Packages Limited	6.59138E-08	0.71	-0.0023	5.45	29.72	0.03
Fauji Foods Limited	0.000288132	0.71	-0.0056	3.64	13.26	0.01
The Hub Power Company Limited	1.54272E-82	0.69	-0.0031	21.65	468.95	0.36

The results for the rest of the 20 company are reported in the table below. These are the companies with less risk in the market. The highest value of Beta is 0.68 and the lowest value of Beta is -0.01. The company with the highest is Tri-Pak Films Limited which a 68% positive change in the individual security due to the market return. The highest value of R^2 ranges 0.29. It means that there is 29% variance in the dependent variable due to the independent variable. The rest of the variance is unknown. The value of F ranges from 347.27 to 4.2186. The company with the highest F-value is Tri-Pak Films Limited and the company with the lowest F-Value is of Feroze 1888 Mills Limited. The rest of the companies have lower F-Value which means that the model is not a good fitted model for these companies. The Significance F-value shows that only 13 companies have significant relationship. The rest of the 7 companies' insignificant relationship.

The companies with the insignificant relationship have a higher significance F-value than the rule of thumb. The rule of thumb for the Significance F-Value is less than or equal to 0.05. These companies have a higher value then rule of thumb which means that their insignificant relationship. The F-value for only two companies if lower than the rule of thumb. The rule of thumb for F-Value is greater than or equal to 4. In the below table there are only two companies which have lower F-value. The companies with the lower F-value are Fateh Industries Limited and Kohat Textile Mills.

Table No-4.3

Summary Regression Results for CAPM

Company Name	***Significance F***	**Beta**	**Alpha**	**t-stat**	**F-Value**	**R^2**
Tri-Pack Films Limited	3.7292E-43	0.68	-0.003276773	14.61	213.65	0.20
Noon Sugar Mills Limited	1.03221E-18	0.68	-0.003861037	9.04	81.89	0.09
Gadoon Textile Mills Limited	1.28791E-12	0.66	-0.002887298	7.20	51.96	0.05
The Searle Company Limited	2.56486E-10	0.66	-0.001420752	6.40	41	0.04
Fauji Fertilizer Company Limited	7.34978E-65	0.64	-0.004298207	18.63	347.27	0.29
Ghani Glass Limited	6.52944E-08	0.64	-0.00380751	5.45	29.74	0.03
Crescent Textile Mills Limited	4.39589E-06	0.61	-0.00466337	4.62	21.37	0.02
Highnoon Laboratories Limited	3.83896E-13	0.61	-0.000992218	7.38	54.49	0.06
Ibrahim Fibres Limited	3.70246E-13	0.60	-0.003956117	7.38	54.57	0.06
Abbott Laboratories (Pakistan) Limited	2.11172E-05	0.54	-0.001974885	4.27	101.54	0.02
Exide Pakistan Limited	0.002638956	0.50	-0.002351023	3.01	18.298	0.01
Ferozsons Laboratories Limited	1.04396E-22	0.47	-0.002584544	10.10	9.0974	0.11
Millat Tractors Limited	1.92963E-08	0.46	-0.005505454	5.67	102.14	0.03
Saif Textile Mills Limited	0.093717156	0.39	-0.000576317	1.67	32.201	0.003
Nestle Pakistan Limited	0.173726018	0.25	-0.002764462	1.36	2.8158	0.002
Murree Brewery Company Limited	0.085030008	0.21	-0.005283147	10.07	1.8537	0.003
Unity Foods Limited	0.085030008	0.21	-0.005283147	1.72	2.9732	0.003
Feroze1888 Mills Limited	0.040299803	0.12	-0.00470605	2.05	4.2186	0.005
Fateh Industries Limited	0.344202072	0.06	-0.00530051	0.94	0.8957	0.001
Kohat Textile Mills Limited	0.936145012	-0.01	-0.005625257	-0.08	0.0064	7.86105E-06

4.5. Downside CAPM

The results for Downside CAPM are explained by using the same data and time period from PSX. In downside CAPM every step is the same as CAPM except the negative returns form market Index. In Downside CAPM only negative market returns are taken form the market index to calculate market risk premium. The data consists of the Closing stock prices for each of the security, Risk free rate and Negative Market Return. The first step in the analysis is to calculate returns of individual security from the closing share prices of the companies as done in the previous section of the Capital Asset Pricing Model. The returns are calculated for each of the firm individually by using the Equation No 5. In the next step required rate of return is calculated for every single company individually. For the required rate of return for Individual security a risk free rate is used. The required rate of return for individual security is calculated by the using Equation No 6. The last step before regression is to calculate the market risk premium. The market risk premium is calculated by using the negative market return. Market risk premium can be calculated by using the Equation No 7. The above formulas have helped in identifying the dependent Variable and Independent Variable for the regression. The data for the individual companies has been regressed. The regression results for the individual company are divided in three equal sets on the basis of beta.

4.5.1. Regression Results for DCAPM

The summary of regression results for the individual company are reported in the table given below. The table is composition of the 20 companies with a higher beta. The companies with the higher beta mean the companies with the higher risk in the market. The dependent variable used in the research is required rate of return and market risk premium is the independent variable. Form these results a relationship can be derived which is given below:

$$E(R_i) = R_f + \beta_D(MRP) \qquad \text{Eq. No.5}$$

The value of Downside Beta shows the negative change in the individual security return due to the change in the market return. The value Downside Beta varies from 1.44 to 0.54. The company with the highest Downside beta is Nestle Pakistan Limited. It is observed form the regression results of the same company that, there is an insignificant

relationship and the model tested was not a good fitted model. The lowest value of downside beta shown in the table is 0.54 which related to Dewan Farooque Motors Limited. From the regression results it is derived that the overall model is a good fitted and significant. From beta it can be stated that, there is a 54% positive change in the individual security return due to the market return. There are only a five companies with a good fitted model and a significant relationship. The value of R^2 show the variance in the dependent variable due to the independent variable. The value of R^2 for these five companies ranges from 0.25 to 0.01. The highest value of the R^2 is 0.25 which means that the 25% of the variance in the dependent variable is due to the independent variable and the rest of the change in the dependent variable is unknown. The lowest variance in the dependent variable due to the known variable is 1% which for Crescent Textile Mills Limited. The value of F ranges from 110.68 to 4.036. Dewan Farooque Motors Limited has the highest F-Value and Crescent Textile Mills Limited has the lowest F- Value in the give table. The Significance F-value shows there are only five companies with a significant relationship. The rest of the 15 companies in the table has insignificant relationship and the tested model was not a good fitted model.

The companies with the insignificant results are only two in the table below. The model tested was also not a good fitted model. The companies with the insignificant results are Fateh Industies Limited and Ibrahim Fiber Limited.

Table No-4.4

Summary Regression Results for Downside CAPM

Company Name	***Significance F***	**Beta**	**Alpha**	**t-stat**	**F-Value**	**R^2**
Nestle Pakistan Limited	0.759309676	1.44	-0.036	-0.30	0.094	0.000295
Hinopak Motors Limited	0.812316124	1.41	-0.012	0.23	0.056	0.00017
Bata Pakistan Limited	0.749933215	1.32	-0.025	0.31	0.101	0.00031
Thal Limited	0.297746685	1.31	0.0059	1.04	1.087	0.0034
Fauji Foods Limited	0.806655949	1.26	-0.018	0.24	0.059	0.00018
Philip Morris (Pakistan) Limited	0.945788845	1.20	-0.028	-0.06	0.0046	1.45619E-05
Murree Brewery Company Limited	0.483163575	1.17	-0.018	0.70	0.492	0.001547
Kohat Textile Mills Limited	0.620521256	1.16	-0.0081	0.49	0.245	0.00077
Ferozsons Laboratories Limited	0.957189302	1.04	-0.028	0.05	0.0028	9.07602E-06
Hayderi Construction Co Ltd	0.000363639	0.90	-0.00054	3.60	12.98	0.039241
Unity Foods Limited	0.534339737	0.89	-0.0098	0.62	0.386	0.001215
Crescent Textile Mills Limited	0.045363687	0.84	-0.018	2.00	4.036	0.012535
Packages Limited	0.048203686	0.82	-0.015	1.98	3.933	0.01221
Cherat Packaging Limited	0.055707642	0.82	-0.0064	1.92	3.687	0.01146376
Exide Pakistan Limited	0.079370728	0.79	0.00068	1.75	3.097	0.00964681
Ghani Glass Limited	0.165940391	0.75	-0.018	1.38	1.928	0.006026
Colgate-Palmolive (Pakistan) Limited	0.016723612	0.65	-0.058	-2.40	5.788	0.018565
Nishat Mills Limited	5.02259E-08	0.60	-0.00041	5.58	31.19	0.08932
Gadoon Textile Mills Limited	0.071995335	0.58	-0.023	1.80	3.258	0.01014
Dewan Farooque Motors Limited	2.0716E-22	0.54	0.010	10.52	110.68	0.25819

The Companies with the medium level of Beta are shown in the table below. The value Beta lies between 0.53 for Highnoon Laboratories Limited and 0.40 for Crescent Steel & Allied Products Limited. The highest positive change in the individual security is 53% and the lowest positive change in the individual security is 40% due to the market return. The value of R^2 ranges from 0.30 to 0.0003. The company with the highest variance in the dependent variable is due to the independent variable is Pakistan Telecommunication Company Limited. The company with the lowest variance in the dependent variable due to the independent variable is Bata Pakistan. The value of F ranges from 142.6 to 4.28. The company with the highest F-value is Attock Refinery limited and the company with the lowest F-Value is of Shifa International Hospitals Limited. The Significance F-value shows that all the results are significant.

Table No-4.5

Summary Regression Result for DCAPM

Company Name	***Significance F***	**Beta**	**Alpha**	**t-Stat**	**F-Value**	**R^2**
Highnoon Laboratories Limited	0.000191641	0.53	-0.0083	3.77	14.24	0.042
Dawood Hercules Corporation Limited	0.00193859	0.53	-0.020	3.12	9.76	0.029
Ibrahim Fibres Limited	0.128843738	0.51	-0.016	1.52	2.31	0.007
Berger Paints Pakistan Limited	2.87088E-05	0.51	-0.0065	4.24	18.02	0.053
Saif Textile Mills Limited	0.000168856	0.51	-0.0063	3.80	14.49	0.043
Century Paper & Board Mills Limited	0.005002416	0.50	-0.014	2.82	7.98	0.024
Noon Sugar Mills Limited	0.001990524	0.49	-0.0094	3.11	9.71	0.029
Fateh Industries Limited	0.742525674	0.48	-0.0075	0.32	0.10	0.00033
Pak Elektron Limited	1.83776E-08	0.47	-0.0091	5.77	33.34	0.094
Shifa International Hospitals Limited	0.039344116	0.46	-0.0072	2.06	4.28	0.013
Honda Atlas Cars (Pakistan) Limited	8.48241E-15	0.45	0.0056	8.14	66.41	0.172
Maple Leaf Cement Factory Ltd	1.84548E-27	0.44	0.0037	11.9	142.95	0.31
Kohat Cement Company Limited	9.01361E-12	0.44	-0.0065	7.08	50.19	0.13
Pakistan Oilfields Limited	2.00222E-15	0.44	0.0013	8.35	69.86	0.18
Mari Petroleum Company Limited	1.12839E-21	0.43	0.0018	10.30	106.18	0.25
Attock Refinery Limited	2.02195E-27	0.43	0.0046	11.94	142.69	0.30
Pioneer Cement Ltd	1.19424E-17	0.43	-0.0081	9.07	82.40	0.20
Nishat Chunian Limited	2.72887E-23	0.41	-0.0019	10.77	116.13	0.26
K-Electric Limited	3.03048E-19	0.41	-0.00046	9.57	91.65	0.22
Crescent Steel & Allied Products Limited	1.81718E-18	0.40	-0.0020	9.33	87.12	0.21

The table below consists of the companies with the least risk in the market. the companies in the table are those which have lowest beta in comparison to the rest of the companies. The riskiest company in the table is Fauji Cement Company Limited. There is a 39% positive change in the returns if the company due the market return. On the other hand, the least risky company has 26% positive change in the security return due to the market return. The highest variance in dependent Variable due to known variable is 43% and lowest variance is 0.72. the company with the highest variance is Lucky Cement Limited and the company with the least variance in the dependent Variable is Feroze1888 Mills Limited. The F-Value and Significance F-value shows that all of the companies have significant results and the model is a good fitted model except two companies.

Table No-4.6

Summary of Regression Results

Company Name	***Significance F***	**Beta**	**Alpha**	**t-stat**	**F-Value**	**R^2**
Fauji Cement Company Limited	4.35043E-26	0.39	-0.00523	11.57348	133.94	0.29
Pak Suzuki Motor Company Limited	2.06792E-14	0.38	-0.00352	8.018423	64.29	0.16
Cherat Cement Company Limited	5.32218E-13	0.37	-0.00868	7.528964	56.68	0.15
Pakistan Tobacco Company Limited	1.31876E-05	0.37	-0.00182	4.426373	19.59	0.05
Sui Northern Gas Pipelines Limited	4.20074E-20	0.36	-0.00125	9.835145	96.73	0.23
Abbott Laboratories (Pakistan) Limited	1.76965E-13	0.36	-0.00123	7.697167	59.24	0.15
Sui Southern Gas Company Limited	6.44584E-25	0.36	0.003136	11.24294	126.40	0.28
Feroze1888 Mills Limited	0.12849245	0.36	0.001403	1.524040	2.32	0.007
Lucky Cement Limited	3.0953E-41	0.36	0.002156	15.62489	244.13	0.43
Engro Corporation Limited	3.34082E-31	0.34	-0.00286	12.97913	168.45	0.34
Millat Tractors Limited	1.96574E-11	0.34	7.90556E-05	6.958845	48.42	0.13
National Refinery Limited	2.66859E-21	0.34	-0.00162	10.19371	103.91	0.24
Shell Pakistan Limited	5.71705E-14	0.34	-0.00682	7.867305	61.89	0.16
Pakistan Telecommunication Company Ltd	3.24179E-40	0.34	-0.00617	15.35993	235.92	0.42
Tri-Pack Films Limited	3.19895E-09	0.33	-0.01071	6.093065	37.12	0.10
Pakistan State Oil Co Ltd	1.91821E-38	0.32	-0.00201	14.89806	221.95	0.41
Indus Motor Company Limited	4.94908E-13	0.31	0.000641	7.540143	56.85	0.15
Fauji Fertilizer Company Limited	3.8456E-17	0.30	-0.00566	8.916578	79.50	0.20
The Hub Power Company Limited	2.51566E-16	0.26	-0.00768	8.654192	74.89	0.19
The Searle Company Limited	0.086961634	0.26	-0.01742	1.716951	2.94	0.009

4.6. Portfolio Base CAPM and DCAPM

In order to check the rigidness of the results the companies were divided into three portfolios. The division of the companies were equal weighted and on the basis of beta and downside beta. The calculation of beta was on the basis of equation No. 2 and downside beta was based on Equation No. 4. The portfolios were formed for both CAPM and DCAPM. The next step consists of the regression of each portfolio with the market return. The regression results for each of the portfolio are explained below:

4.6.1. CAPM Portfolio

The portfolios for CAPM were formed on the basis of the Beta. The beta for every single company was calculated using equation No 2. The companies were then divided into equally three portfolios. Every portfolio consists of 20 companies. Portfolio 1 consists of the companies with a higher beta and portfolio 3 consists of the companies with the lower beta. The second step in the portfolio is the calculation of average returns for each of the portfolio. The average of the returns for each the portfolio were calculated on weekly basis. The purpose of the return average is to regress portfolios return with the market returns.

4.6.1.1. Regression Results for Portfolio Base CAPM

The regression results shown in the table are for Capital Asset Pricing Model. Each of the portfolio consists of the 20 companies. The companies with the highest beta are placed in portfolio No.1 and the companies with the lowest beta are placed in portfolio are placed in Portfolio No. 3. The remaining companies are placed in portfolio No. 2. The value of Beta in the table is taken from the regression.

Table No-4.7

Summary Portfolio Regression Results

Portfolios	***Significance F***	**Beta**	**Alpha**	**t-stat**	**F-Value**	**R^2**
No. 1 (High Beta)	2.6E-145	1.13	-0.00138	31.84	1013.9	0.55
No. 2 (Medium Beta)	4.55E-93	0.83	-0.00107	23.39	547.4	0.40
No. 3 (Low Beta)	1.04E-19	0.48	0.00026	9.32	86.9	0.09

The summary of regression results for each of the portfolio are given in the table above. The value of Beta ranges from 1.13 to 0.48. The highest positive change in the portfolio return is 113% due to the change in the market return. The lowest positive change in the portfolio return is 48% due to the change in the market return. The beta for the highest portfolio is 65% higher than the beta of the lowest portfolio. The value of R^2 lies between 0.553 and 0.0961. The highest value of R^2 0.553 which for portfolio No 1 and the lowest value is 0.0961 which is portfolio No. 3. It shows that the highest variance due to known variable is 55.3% and the lowest variance in 9.6%. The F-Value for all of the three portfolios shows that the model tested are good and fitted. The Significance F-value shows the significance of the relationship.

The second portfolio consists of the companies with the medium risk in the market. The list of the companies in the portfolio are shown in Table No 2. From the regression results it is shown that there is an 83% positive change in the portfolio return due to the market return. The known variance the portfolio is 40% which is shown by the R^2. The overall results of the portfolio are significant and the model tested is a good fitted model.

4.7.2. DCAPM Portfolio

The portfolios for Downside CAPM were formed on the basis of the downside Beta. The downside beta for every single company was calculated using equation 4. The companies were then divided into equally three portfolios. Every portfolio consists of 20 companies. Portfolio 1 consists of the companies with a higher beta and portfolio 3 consists of the companies with the lower beta. The second step in the portfolio is the calculation of average returns for each of the portfolio. The average of the returns for each the portfolio were calculated on weekly basis. The purpose of the return average is to regress portfolios return with the market returns.

4.7.2.1. *Regression Results for Portfolio Base DCAPM*

The table above consists of the summary of regression results for DCAPM. Each of the portfolio consists of the 20 companies. The companies with the highest beta are placed in portfolio No.1 and the companies with the lowest beta are placed in portfolio are placed in Portfolio No 3. The remaining companies are placed in portfolio No 2. The value of Beta placed in the table below is a regression output.

Table No-4.8

Summary of Portfolio Regression Results

Portfolios	***Significance F***	**Beta**	**Alpha**	**t-stat**	**F-Value**	**R^2**
No. 1 (High Beta)	1.01232E-17	0.71	3.46216E-05	8.77	76.9	0.08
No. 2 (Medium Beta)	1.1E-154	0.91	-0.00139	33.36	1113.1	0.57
No. 3 (Low Beta)	4.2875E-281	0.85	-0.00084	55.83	3117.3	0.79

The summary of regression results for each of the portfolio are given in the table above. The highest positive change in the portfolio return is 91% due to the market return. the highest value of beta is for Portfolio No 2. The lowest positive change portfolio return is 71% as shown in the table. There is a difference of 20% in the value Beta form the highest value to the lowest Beta. The variance explained by R^2 is 79.2%. The highest value of R^2 0.792 which for portfolio No 3. The lowest variance is 8.6% which is portfolio No 1. The F-Value for all of the three portfolios shows that the model tested are good and fitted. The Significance F-value shows the significance of the relationship.

The third portfolio consists of the companies with the lower risk in the market. The list of the companies in the portfolio are shown in Table No 2. From the regression results it is shown that there is an 85% positive change in the portfolio return due to the market return. The known variance the portfolio is 79% which is shown by the R^2. The overall results of the portfolio are significant and the model tested is a good fitted model.

4.8. Comparison of CAPM and DCAPM

To compare the required of return on equity which is generated form CAPM and DCAPM. The required of return is based on beta and downside respectively. In the both the cases the risk

free rate and the market risk premium are used as the same. The risk free rate is used as the same in both cases. The risk free rate is 0.007. the market risk premium is used as the same in the both cases. The market risk premium is -0.003. The risk free rate and the Market Risk Premium are the average of the overall period for both.

The value of Beta ranges from a positive 139% to a negative 1%. The highest portfolio is for Pak Suzuki Motors Company Limited and the lowest Beta is for Kohat Textile Mills Limited. The required rate of return for CAPM on high beta is 0.0027 and on lower beta the required rate of return is 0.0071. The value of downside beta lies between 144% for Nestle Pakistan Limited to 26% for The Searle Company Limited. The required rate of return for Downside CAPM the Nestle Pakistan Limited is 0.0026 and for The Searle Company Limited is 0.0062.

The required of return are calculated on both the models Downside CAPM and CAPM by using equation No (1) and (3). The highest required of return on Downside CAPM is 0.0062 for The Hub Power Company Limited which has 69% beta and 26% downside beta with a difference of 43%. The Required rate of return for The Hub Power company Limited calculated on CAPM is 0.0049 with a difference of -0.00132. The lowest required rate of return on DCAPM is 0.0026 for Nestle Pakistan Limited. The beta for Nestle Pakistan Limited is 39% and the downside beta is 144% which shows a difference of 105% of difference. The required rate of return calculated on CAPM for Nestle Pakistan Limited is 0.0058 with a difference of 0.00322. On the other hand, the highest required rate of return calculated on CAPM is 0.0071 which for Kohat Textile Mills Limited. The beta and downside beta for the Kohat Textile Mills Limited is -1% and 116% respectively with a difference of 115%. The required rate of return, using Downside CAPM for the company is also calculated which is 0.0035 with a difference of 0.0036. the lowest required rate of return calculated on CAPM is 0.0027 which is Pak Suzuki Motors Company Limited. The beta and downside beta of the company are 139% and 38% which shows a difference of 101%. The required rate of return calculated on Downside CAPM is 0.0059. the difference between both of the return calculated is -0.0031.

The overall results showed that the value of average beta is 82% on the other hand the value of downside beta is 59%. Which shows that the beta is higher than the downside beta and has a difference of 22%. But as long as the Required Rate of Return is concerned Downside CAPM is higher than the Capital Asset Pricing Model. The required rate of return calculated by CAPM is

0.4% and Downside CAPM is 0.5%. It means that Downside CAPM has good explanatory power than CAPM. The difference between both of the results is 0.06%. It shows us that the Downside CAPM is 0.06% higher than the CAPM in terms of explaining the stock returns.

4.9. Discussion

The CAPM evidences are based on the normality and the Downside CAPM evidences are based on the non-normality. There have been numerous studies on the both the model. In almost every market, the evidences which have been done in developed market using CAPM shows a non-normality Estrada (1997).

The empirical test that have been done on the CAPM to test the normality of stock return which shows that there is normality in the stock returns. Estrada and Aparicio (1997) investigated the Scandinavian Market. They wanted to test different models for risk and return. in their study they wanted to know about the best model in explaining stock return. They used the daily stock return for their test. They found out that the market had high up and deep downs. It means that the market too much bullish and bearish. Davis and Desai (1998) conducted a study for two reasons. The first reason was to find a relationship between risk and return. The second purpose of the study was to find out the return and firm size relationship in three different market conditions. The market conditions that were used in the study were bullish, bearish and flat market conditions. They concluded that beta is a higher measure of downside risk. On the other hand, firm size in positive on stable market. This was also confirmed by Iqbal and Brooks (2007) that the performance of CAPM is not good as compared to Fama and French three factor model.

In a developed market like USA Ang et al. (2002) conducted a study to test the betas. They split the risk in two. The upside risk and the downside risk. The main purpose for the study was to test the risk in different market conditions. They found out that conditional betas split up this way to exhibit little asymmetric relation to conditional correlation. In the next step they turn to downside correlation for the measurement of asymmetric risk.

Additionally, if investors point of view is observed, they don’t like the downside risk. The reason behind the downside risk is losses. And investors do not like losses. They are more worried about their downside risk rather than their upside gains. Estrada (2000,2002, and 2007) studied the emerging markets. The main reason for the study was to find the investors behavior. The findings were that investors care more about their downside risk rather their upside gains. He also finds out

that means returns are sensitive to changes in downside beta. Post and Levy (2005) focuses that if investors behavior changes when the market changes, then the investors must be paid premium for keep the stock in bearish trend.

This study was conducted in Pakistani to investigated 60 stocks for a period of 16 years. The findings of the study were that when the beta is high the company provides high return. On the other hand, if downside beta is higher the company will be also pay a good return. The concluded that testing both the models in Pakistani market and the best model which shows a good return is the downside CAPM. In testing both the models it was found out that DCAPM is a model for those investors who are investing in a portfolio. In contradiction to that CAPM is good model in explaining the stock for individual stock return.

It is concluded that, downside risk has a positive relationship with stock returns for the stock traded in Pakistan stock exchange. These results of this study are in line with Estrada (2000), (2002), (2005), Jenson and Scholes (1972), Post and Vliet (2006), Tan (2004), Gyuorko and Nelling (1996), Delcoure and Dickens (2004), Harvey (2000), Qamar and Shah (2013), Hussain and Shah (2017), Kim (1995), Raza (2018).

CHAPTER 5

Conclusion

5.1. Conclusion

Systematic risk has been the most studied and controversial topic so far. Most of the researchers and students have been studying this because of its nature. The nature of this type is risk is that it is not in the control of the company. Downside risk is type of systematic risk which means the risk of getting loss. Most of the investor are worried about their downside risk rather than their upside gains. There were two basic models to find out the relationship between the risk and return. the two models are CAPM and DCAPM. CAPM helps in finding the relationship

overall systematic risk and return. Downside CAPM helps in finding the relationship between downside risk and return. In an emerging market like Pakistan investors are always worried about their downside losses rather than their upside gains.

The study was conducted to test CAPM and DCAPM. The sample for the study was 60 companies listed on the Pakistan Stock Exchange. The time period form which the data was taken is 2001 to 2017. The main reason for conducting the study was to find out the relationship between risk and return.

In the above discussed results that were generated by the both the model CAPM and DCAPM. The results found out that both the models exist in Pakistan. For a few companies these models do not exist which has given an insignificant result. From the above study we can conclude that, both the CAPM and the Downside CAPM exist in the emerging market of Pakistani. The individual company based study suggested that CAPM exists stronger than the DCAPM. In testing both the model, the findings were that in most of the companies CAPM results were significant. There were a few companies which gives insignificant results. In CAPM there were only five companies with insignificant results.

In testing the DCAPM, the results were also significant but the ratio of insignificance was higher as compared to the results of Capital Asset Pricing Model. The companies which shows insignificant results were nineteen in total. While comparing both the models the findings were a little different. In comparison the results were, that when Capital Asset Pricing Model's beta was higher the downside return was higher and vice versa. on the other hand, in average results the findings were when the average Capital Asset Pricing Model's Beta is higher than average downside Beta. Which means that overall risk is higher than the downside risk. The return calculated by CAPM are lower than the DCAPM. Which shows that opposite relationship between them.

5.2. Limitations

There were few limitations while performing the study. The first limitations for this study was the availability of data. There were some missing values in the data which was collected form the PSX website. The second limitations for the study was the trusting on the data because in some cases the companies have window dressed their statement in order to attract the investors. The reason for not trusting the data was in some cases the companies may have fabricated their financial

statement in order to pay less tax. The last limitations of this study was to highlight the traditional methods of testing the asset pricing models but there are more sophisticated models that would potentially be of higher relevance.

5.3. Recommendation

This study has focused on the relationship of systematic risk, downside risk and stock returns in Pakistan stock market. Time series data set is taken for this study. The investigation is done by using CAPM and Downside CAPM model on weekly data from January 2001 to December 2017. The result of this thesis showed the positive relationship between risk and stock returns.

The empirical results of this investigation are demonstrative for further empirical work. In this study, only one proxy of risk is used, which is the risk free rate. However, there are other proxies that can be used to find out the relationship between risk and return. The other proxies which can be used to find out the relationship between risk and return. The other proxies which can be used in future studies are discount rate under both the mean variance and mean semi variance frame work.

There are a few recommendations for future researchers after conducting this study. The most important recommendation is to use alternate proxies with risk free rate. The other recommendation is use three sets of data that is, daily, weekly and monthly to check robustness in the results. The last recommendation is to use alternate risk factors such as industry risk, exchange rate risk, and country default risk to find out better results.

References

Affleck-Graves, J. F., & Money, A. H. (1976). A comparison of two portfolio selection models. *Investment Analysts Journal*, *5*(7), 35-40.

Aguenaou, S., Abrache, J., & El Kadiri, B. (2011). Testing The Fama French Three Factor Model In The Moroccan Stock Market. *International Journal of Business, Accounting, and Finance*, *5*(2), 57-66.

Ale, B. J. M. (2002). Risk assessment practices in The Netherlands. *Safety Science*, *40*(1), 105-126.

Ambrozaite, R., & Sondergaard, L. (2010). *Danish Mortgage bond portfolio optimization using the mean-variance approach* (Doctoral dissertation, Master's thesis, Copenhagen Business School).Bai, Z., Liu, H., & Wong, W. K. (2009). On the Markowitz mean–variance analysis of self-financing portfolios. *Risk and Decision Analysis*, *1*(1), 35-42.

Ang, A., Chen, J., & Xing, Y. (2006). Downside risk. *The Review of Financial Studies*, *19*(4), 1191-1239.

Ang, J. S., & Chua, J. H. (1979). Composite measures for the evaluation of investment performance. *Journal of Financial and Quantitative Analysis*, *14*(2), 361-384.

Angelidis, T., & Tessaromatis, N. (2008). Idiosyncratic volatility and equity returns: UK evidence. *International Review of Financial Analysis*, *17*(3), 539-556.

Ang, A., Hodrick, R. J., Xing, Y., & Zhang, X. (2006). The cross-section of volatility and expected returns. *The Journal of Finance*, *61*(1), 259-299.

Bali, T. G., & Cakici, N. (2008). Idiosyncratic volatility and the cross section of expected returns. *Journal of Financial and Quantitative Analysis*, *43*(1), 29-58.

Bartholomew-Biggs, M. C., & Kane, S. J. (2009). A global optimization problem in portfolio selection. *Computational Management Science*, *6*(3), 329-345.

Bawa, V. S. (1975). Optimal rules for ordering uncertain prospects. *Journal of Financial Economics*, *2*(1), 95-121.

Bawa, V. S., & Lindenberg, E. B. (1977). Capital market equilibrium in a mean-lower partial moment framework. *Journal of Financial Economics*, *5*(2), 189-200.

Bekaert, G., Hodrick, R. J., & Marshall, D. A. (1997). The implications of first-order risk aversion for asset market risk premiums. *Journal of Monetary Economics*, *40*(1), 3-39.

Bernstein, P. L., & Bernstein, P. L. (1996). *Against the gods: The remarkable story of risk* (pp. 1269-1275). New York: Wiley.

Blanco, B. (2012). The use of CAPM and Fama and French Three Factor Model: portfolios selection. *Public and Municipal Finance*, *1*(2), 61-70.

Boehme, R. D., Kumar, P., Danielsen, B. R., & Sorescu, S. M. (2005). Idiosyncratic risk and the cross-section of stock returns: Merton (1987) meets Miller (1977).

Bonami, P., & Lejeune, M. A. (2009). An exact solution approach for portfolio optimization problems under stochastic and integer constraints. *Operations research*, *57*(3), 650-670.

Bower, B., & Wentz, P. (2005). Portfolio Optimization: MAD vs. Markowitz. *Rose-Hulman Undergraduate Mathematics Journal*, *6*(2), 3.

Breeden, D. T. (2005). An intertemporal asset pricing model with stochastic consumption and investment opportunities. In *Theory Of Valuation* (pp. 53-96).

Brockman, P., Schutte, M., & Yu, W. (2007). Is idiosyncratic volatility priced? The international evidence. *Unpublished working paper. University of Missouri U Columbia*.

Burmeister, E., & McElroy, M. B. (1988). Joint estimation of factor sensitivities and risk premia for the arbitrage pricing theory. *The Journal of Finance*, *43*(3), 721-733.

Campbell, J. Y., & Mei, J. (1993). Where do betas come from? Asset price dynamics and the sources of systematic risk. *The Review of Financial Studies*, *6*(3), 567-592.

Campbell, J. Y. (2000). Asset pricing at the millennium. *The Journal of Finance*, *55*(4), 1515-1567.

Cesarone, F., Scozzari, A., & Tardella, F. (2009). Efficient algorithms for mean-variance portfolio optimization with hard real-world constraints. *Giornale dell'Istituto Italiano degli Attuari*, *72*, 37-56.

Chen, S. N. (1982). An examination of risk-return relationship in bull and bear markets using time-varying betas. *Journal of Financial and Quantitative Analysis*, *17*(2), 265-286.

Chen, L., & Zhang, L. (2010). A better three-factor model that explains more anomalies. *Journal of Finance*, *65*(2), 563-595.

Chui, A. C., & Wei, K. J. (1998). Book-to-market, firm size, and the turn-of-the-year effect: Evidence from Pacific-Basin emerging markets. *Pacific-Basin finance journal*, *6*(3-4), 275-293.

Chua, C. T., Goh, J., & Zhang, Z. (2010). Expected volatility, unexpected volatility, and the cross-section of stock returns. *Journal of Financial Research*, *33*(2), 103-123.

Cochrane, J. H. (2001). Long-term debt and optimal policy in the fiscal theory of the price level. *Econometrica*, *69*(1), 69-116.

Cochrane, J. H. (1996). A cross-sectional test of an investment-based asset pricing model. *Journal of Political Economy*, *104*(3), 572-621.

Conover, M. C., Friday, H. S., & Howton, S. W. (2000). An Analysis of the Cross Section of Returns for EREITs Using a Varying-Risk Beta Model. *Real estate economics*, *28*(1), 141-163.

De Faria, E. L., Albuquerque, M. P., Gonzalez, J. L., Cavalcante, J. T. P., & Albuquerque, M. P. (2009). Predicting the Brazilian stock market through neural networks and adaptive exponential smoothing methods. *Expert Systems with Applications*, *36*(10), 12506-12509.

Delcoure, N., & Dickens, R. (2004). REIT and REOC systematic risk sensitivity. *Journal of Real Estate Research*, *26*(3), 237-254.

Diavatopoulos, D., Doran, J. S., & Peterson, D. R. (2008). The information content in implied idiosyncratic volatility and the cross-section of stock returns: Evidence from the option markets. *Journal of Futures Markets: Futures, Options, and Other Derivative Products*, *28*(11), 1013-1039.

Dörr, A., & Häring, I. (2006). Einführung in die Gefährdungs-und Risikoanalyse. 2. In *Workshop BAU-PROTECT, Sicherheit der baulichen Infrastruktur vor außergewöhnlichen Einwirkungen* (Vol. 1, pp. 9-22).

Doukas, J. A., Au, A. S., & Onayev, Z. M. (2007). Daily short interest, idiosyncratic risk, and stock returns.

Du Plessis, A. J., & Ward, M. (2009). A note on applying the Markowitz portfolio selection model as a passive investment strategy on the JSE. *Investment Analysts Journal*, *38*(69), 39-45.

Eraslan, V. (2013). Fama and french three-factor model: Evidence from Istanbul stock exchange. *Business and Economics Research Journal*, *4*(2), 11.

Estrada, J. (2002). Systematic risk in emerging markets: The D-CAPM. *Emerging Markets Review*, *3*(4), 365-379.

Estrada, J., & Serra, A. P. (2005). Risk and return in emerging markets: family matters. *Journal of Multinational Financial Management*, *15*(3), 257-272.

Fama, E. F., & MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. *Journal of political economy*, *81*(3), 607-636.

Fama, E. F., & French, K. R. (1989). Business conditions and expected returns on stocks and bonds. *Journal of financial economics*, *25*(1), 23-49.

Felder, S., & Mayrhofer, T. (2014). Risk preferences: consequences for test and treatment thresholds and optimal cutoffs. *Medical Decision Making*, *34*(1), 33-41.

Ferson, W. E., & Harvey, C. R. (1991). Sources of predictability in portfolio returns. *Financial Analysts Journal*, 49-56.

Fishburn, P. C. (1977). Mean-risk analysis with risk associated with below-target returns. *The American Economic Review*, *67*(2), 116-126.

Fletcher, J. (2007). Can asset pricing models price idiosyncratic risk in UK stock returns?. *Financial Review*, *42*(4), 507-535.

French, K. R., Schwert, G. W., & Stambaugh, R. F. (1987). Expected stock returns and volatility. *Journal of financial Economics*, *19*(1), 3-29.

French, C. W. (2003). The Treynor capital asset pricing model. *Journal of Investment Management*, *1*(2), 60-72.

Fu, F. (2009). Idiosyncratic risk and the cross-section of expected stock returns. *Journal of financial Economics*, *91*(1), 24-37.

Galagedera, D. U. (2009). An analytical framework for explaining relative performance of CAPM beta and downside beta. *International Journal of Theoretical and Applied Finance*, *12*(03), 341-358.

Galagedera, D. U., & Brooks, R. D. (2007). Is co-skewness a better measure of risk in the downside than downside beta?: Evidence in emerging market data. *Journal of Multinational Financial Management*, *17*(3), 214-230.

Goyal, A., & Santa-Clara, P. (2003). Idiosyncratic risk matters!. *The Journal of Finance*, *58*(3), 975-1007.

Gul, F. (1991). A theory of disappointment aversion. *Econometrica: Journal of the Econometric Society*, 667-686.

Guo, H., & Savickas, R. (2006). Idiosyncratic volatility, stock market volatility, and expected stock returns. *Journal of Business & Economic Statistics*, *24*(1), 43-56.

Guo, H., & Savickas, R. (2008). Average idiosyncratic volatility in G7 countries. *The Review of Financial Studies*, *21*(3), 1259-1296.

Guo, H., & Savickas, R. (2008). Forecasting foreign exchange rates using idiosyncratic volatility. *Journal of Banking & Finance*, *32*(7), 1322-1332.

Gyourko, J., & Nelling, E. (1996). Systematic risk and diversification in the equity REIT market. *Real Estate Economics*, *24*(4), 493-515.

Harvey, C. R. (1995). Predictable risk and returns in emerging markets. *The review of financial studies*, *8*(3), 773-816.

Harvey, C. R. (2000). The drivers of expected returns in international markets.

Harlow, W. V., & Rao, R. K. (1989). Asset pricing in a generalized mean-lower partial moment framework: Theory and evidence. *Journal of financial and quantitative analysis*, *24*(3), 285-311.

Hogan, W. W., & Warren, J. M. (1974). Toward the development of an equilibrium capital-market model based on semivariance. *Journal of Financial and Quantitative Analysis*, *9*(1), 1-11.

Hotvedt, J. E., & Tedder, P. L. (1978). Systematic and unsystematic risk of rates of return associated with selected forest products companies. *Journal of Agricultural and Applied Economics*, *10*(1), 135-138.

Huang, W., Liu, Q., Rhee, S. G., & Zhang, L. (2009). Another look at idiosyncratic volatility and expected returns.

ISO, I. (2009). 31000: 2009 Risk management–Principles and guidelines. *International Organization for Standardization, Geneva, Switzerland*.

Jahankhani, A. (1976). EV and ES capital asset pricing models: some empirical tests. *Journal of Financial and Quantitative Analysis*, *11*(4), 513-528.

Jensen, M. C., Black, F., & Scholes, M. S. (1972). The capital asset pricing model: Some empirical tests.

Kadan, O., Liu, F., & Liu, S. (2016). Generalized systematic risk. *American Economic Journal: Microeconomics*, *8*(2), 86-127.

Kim, M. K., & Zumwalt, J. K. (1979). An analysis of risk in bull and bear markets. *Journal of Financial and Quantitative analysis*, *14*(5), 1015-1025.

Kim, D. (1995). The errors in the variables problem in the cross-section of expected stock returns. *The Journal of Finance*, *50*(5), 1605-1634.

Knez, P. J., & Ready, M. J. (1997). On the robustness of size and book-to-market in cross-sectional regressions. *The Journal of Finance*, *52*(4), 1355-1382.

Kothari, S. P., Shanken, J., & Sloan, R. G. (1995). Another look at the cross-section of expected stock returns. *The journal of finance*, *50*(1), 185-224.

Konno, H., & Yamazaki, H. (1991). Mean-absolute deviation portfolio optimization model and its applications to Tokyo stock market. *Management science*, *37*(5), 519-531.

Konno, H., Shirakawa, H., & Yamazaki, H. (1993). A mean-absolute deviation-skewness portfolio optimization model. *Annals of Operations Research*, *45*(1), 205-220.

Korn, O., & Koziol, C. (2006). *Bond portfolio optimization: A risk-return approach* (No. 06-03). CFR Working Paper.

Lee, C. L., Robinson, J., & Reed, R. (2007, January). Downside systematic risk in Australian listed property trusts. In *PRRES 2007: Proceedings of the 13th Annual Conference of the Pacific Rim Real Estate Society* (pp. 1-28). Pacific Rim Real Estate Society.

Lehmann, B. N. (1990). Residual risk revisited. *Journal of Econometrics*, *45*(1-2), 71-97.

Lettau, M., & Ludvigson, S. (2001). Resurrecting the (C) CAPM: A cross-sectional test when risk premia are time-varying. *Journal of Political Economy*, *109*(6), 1238-1287.

Lintner, J. (1965). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. *The review of economics and statistics*, 13-37.

Loughran, T. (1997). Book-to-market across firm size, exchange, and seasonality: Is there an effect?. *Journal of financial and quantitative analysis*, *32*(3), 249-268.

Maharakkhaka, B. (2011). The performance of mean-variance portfolio selection and its opportunity cost: the case of Thai securities. In *International Conference on Economics and Finance Research. Retrieved from www. ipedr. org on* (Vol. 3, No. 2, p. 13).

Mao, J. C. (1970). Survey of capital budgeting: Theory and practice. *The Journal of Finance*, *25*(2), 349-360.

Merton, R. C. (1973). Theory of rational option pricing. *The Bell Journal of economics and management science*, 141-183.

Miller, E. M. (1977). Risk, uncertainty, and divergence of opinion. *The Journal of finance*, *32*(4), 1151-1168.

Mossin, J. (1966). Equilibrium in a capital asset market. *Econometrica: Journal of the econometric society*, 768-783.

Mwamba, M., & Suteni, M. (2010). An alternative to portfolio selection problem beyond Markowitz's: Log Optimal Growth Portfolio. *University of Johannesburg*.

Myers, S. C. (1975). A Note on the Determinents of Corporate Debt Capacity. *Unpublished manuscript*.

Myers, S. C., & Turnbull, S. M. (1977). Capital budgeting and the capital asset pricing model: Good news and bad news. *The Journal of Finance*, *32*(2), 321-333.

Olmo, J. (2007). An asset pricing model for mean-variance-downside-risk averse investors.

Patel, R. C., & Olsen, R. A. (1984). Financial determinants of systematic risk in real estate investment trusts. *Journal of Business Research*, *12*(4), 481-491.

Paudel, R. B., & Koirala, S. (2006). Application of Markowitz and Sharpe Models in Nepalese Stock. *Journal of Nepalese Business Studies*, *3*(1), 18-35.

Pedersen, C. S., & Hwang, S. (2007). Does downside beta matter in asset pricing?. *Applied Financial Economics*, *17*(12), 961-978.

Perez-Quiros, G., & Timmermann, A. (2000). Firm size and cyclical variations in stock returns. *The Journal of Finance*, *55*(3), 1229-1262.

Petkova, R. (2006). Do the Fama–French factors proxy for innovations in predictive variables?. *The Journal of Finance*, *61*(2), 581-612.

Post, T., & Van Vliet, P. (2006). Downside risk and asset pricing. *Journal of Banking & Finance*, *30*(3), 823-849.

Price, K., Price, B., & Nantell, T. J. (1982). Variance and lower partial moment measures of systematic risk: some analytical and empirical results. *The Journal of Finance*, *37*(3), 843-855.

Priestley, R. (1996). The arbitrage pricing theory, macroeconomic and financial factors, and expectations generating processes. *Journal of Banking & Finance*, *20*(5), 869-890.

Quirk, J. P., & Saposnik, R. (1962). Admissibility and measurable utility functions. *The Review of Economic Studies*, *29*(2), 140-146.

Raza, H. (2018). Is D-CAPM Superior to CAPM? The Case of Pakistan Stock Exchange.Reilly, F. K., & Brown, K. C. (2011). *Investment analysis and portfolio management*. Cengage Learning.

Roll, R. (1977). A critique of the asset pricing theory's tests Part I: On past and potential testability of the theory. *Journal of financial economics*, *4*(2), 129-176.

Ross, S. A. (2013). The arbitrage theory of capital asset pricing. In *HANDBOOK OF THE FUNDAMENTALS OF FINANCIAL DECISION MAKING: Part I* (pp. 11-30).

Smaga, P. (2014). The concept of systemic risk. ESRC (Economic & Social Research Council) *SRC Special Paper* No.5 P. 1-29

Spiegel, M., & Wang, X. (2005). Cross-sectional variation in stock returns: Liquidity and idiosyncratic risk.

Stevenson, R. E., Allen, W. P., Pai, G. S., Best, R., Seaver, L. H., Dean, J., & Thompson, S. (2000). Decline in prevalence of neural tube defects in a high-risk region of the United States. *Pediatrics*, *106*(4), 677-683.

Szpunar, P. J., & Głogowski, A. (2012). Lending in foreign currencies as a systemic risk. *Macro-prudential Commentaries, European Systemic Risk Board, Issue*, (4).

Tahir, M., Abbas, Q., Sargana, S. M., Ayub, U., & Saeed, S. K. (2013). An investigation of beta and downside beta based CAPM-case study of Karachi Stock Exchange.

Tinic, S. M., & West, R. R. (1986). Risk, return, and equilibrium: A revisit. *Journal of Political Economy*, *94*(1), 126-147.

Treynor, J. L. (1961). Toward a theory of market value of risky assets. *Unpublished manuscript*, *6*.

Wen, X., Wei, Y., & Huang, D. (2012). Measuring contagion between energy market and stock market during financial crisis: A copula approach. *Energy Economics*, *34*(5), 1435-1446.

Xu, Y., & Malkiel, B. G. (2003). Investigating the behavior of idiosyncratic volatility. *The Journal of Business*, *76*(4), 613-645.

Yawitz, J. B., Hempel, G. H., & Marshall, W. J. (1976). A risk-return approach to the selection of optimal government bond portfolios. *Financial Management*, 36-45

Appendix A

Table (A1) Descriptive Statistics

Company Name and Over all Mean Return		CAPM			DCAPM		
Company	**M.R**	**S.D**	**Cor.**	**β**	**S.D**	**β_D**	**D. Cor.**
Abbott Laboratories (Pakistan) Limited	0.0032	0.06	0.33	0.55	-0.01	0.36	0.39
Attock Refinery Limited	0.0019	0.07	0.62	1.22	-0.03	0.43	0.55
Bata Pakistan Limited	0.0059	0.22	0.13	0.85	-0.02	1.32	0.017
Berger Paints Pakistan Limited	0.0018	0.08	0.34	0.81	-0.01	0.51	0.23
Century Paper & Board Mills Limited	0.0015	0.08	0.32	0.76	-0.02	0.50	0.15
Cherat Cement Company Limited	0.0022	0.06	0.51	0.88	-0.02	0.37	0.38
Cherat Packaging Limited	0.0012	0.13	0.22	0.81	-0.02	0.82	0.10
Colgate-Palmolive (Pakistan) Limited	0.0047	0.10	0.26	0.78	-0.04	0.65	0.13
Crescent Steel & Allied Products Limited	0.0022	0.07	0.58	1.14	-0.02	0.40	0.46
Crescent Textile Mills Limited	0.0005	0.14	0.15	0.61	-0.02	0.84	0.11
Dawood Hercules Corporation Limited	0.0003	0.07	0.39	0.83	-0.03	0.53	0.17
Dewan Farooque Motors Limited	0.0017	0.09	0.52	1.36	-0.03	0.54	0.50
Engro Corporation Limited	0.0016	0.05	0.65	0.94	-0.02	0.34	0.58

Exide Pakistan Limited	0.0034	0.13	0.14	0.54	-0.01	0.79	0.09
Fateh Industries Limited	0.0015	0.07	0.03	0.06	-0.001	0.48	0.01
Fauji Cement Company Limited	0.0026	0.06	0.61	1.10	-0.03	0.39	0.54
Fauji Fertilizer Company Limited	0.0008	0.04	0.54	0.64	-0.01	0.30	0.44
Fauji Foods Limited	-0.0007	0.20	0.12	0.71	-0.01	1.26	0.01
Feroze1888 Mills Limited	0.0019	0.06	0.07	0.12	0.002	0.36	0.08
Ferozsons Laboratories Limited	0.0031	0.17	0.10	0.50	-0.02	1.04	0.003
Gadoon Textile Mills Limited	0.0021	0.10	0.24	0.66	-0.02	0.58	0.10
Ghani Glass Limited	0.0013	0.12	0.18	0.64	-0.02	0.75	0.07
Hayderi Construction Co Ltd	0.0051	0.17	0.15	0.72	-0.02	0.90	0.19
Highnoon Laboratories Limited	0.0042	0.09	0.25	0.61	-0.02	0.53	0.20
Hinopak Motors Limited	0.0039	0.24	0.16	1.11	-0.01	1.41	0.01
Honda Atlas Cars (Pakistan) Limited	0.0044	0.07	0.54	1.17	-0.02	0.45	0.41
Ibrahim Fibres Limited	0.0012	0.08	0.25	0.60	-0.01	0.51	0.08
Indus Motor Company Limited	0.0061	0.06	0.57	1.07	-0.01	0.311	0.38
K-Electric Limited	-0.0003	0.06	0.47	0.90	-0.02	0.41	0.47
Kohat Cement Company Limited	0.0023	0.07	0.46	0.96	-0.02	0.44	0.36
Kohat Textile Mills Limited	0.0015	0.20	0.002	-0.01	-0.006	1.16	0.02
Lucky Cement Limited	0.0050	0.05	0.68	1.09	-0.03	0.36	0.65
Maple Leaf Cement Factory Ltd	0.0031	0.07	0.61	1.29	-0.03	0.44	0.55
Mari Petroleum Company Limited	0.0054	0.07	0.52	1.03	-0.02	0.43	0.50
Millat Tractors Limited	0.0030	0.05	0.33	0.47	-0.01	0.34	0.36
Murree Brewery Company Limited	0.0035	0.19	0.04	0.25	-0.01	1.17	0.03
National Refinery Limited	0.0028	0.05	0.60	0.98	-0.02	0.34	0.49
Nestle Pakistan Limited	0.0053	0.24	0.05	0.39	-0.02	1.44	0.01
Nishat Chunian Limited	0.0008	0.06	0.55	1.03	-0.02	0.41	0.51
Nishat Mills Limited	0.0021	0.09	0.44	1.18	-0.03	0.60	0.29
Noon Sugar Mills Limited	0.0011	0.08	0.30	0.68	-0.01	0.49	0.17
Packages Limited	0.0025	0.14	0.18	0.71	-0.02	0.82	0.11
Pak Elektron Limited	0.0028	0.08	0.52	1.23	-0.02	0.47	0.30
Pak Suzuki Motor Company Limited	0.0047	0.08	0.62	1.39	-0.02	0.38	0.41
Pakistan Oilfields Limited	0.0019	0.06	0.62	1.14	-0.02	0.44	0.42
Pakistan State Oil Co Ltd	0.0008	0.05	0.77	1.13	-0.02	0.32	0.64
Pakistan Telecommunication Company Limited	-0.0006	0.05	0.71	1.01	-0.03	0.34	0.65
Pakistan Tobacco Company Limited	0.0062	0.07	0.40	0.80	-0.01	0.37	0.24
Philip Morris (Pakistan) Limited	0.0048	0.21	0.20	1.17	-0.02	1.20	0.003
Pioneer Cement Ltd	0.0037	0.07	0.54	1.18	-0.03	0.43	0.45
Saif Textile Mills Limited	0.0001	0.08	0.19	0.46	-0.01	0.51	0.20
Shell Pakistan Limited	9.16195 E-05	0.05	0.56	0.89	-0.02	0.34	0.40
Shifa International Hospitals Limited	0.0054	0.08	0.31	0.73	-0.01	0.46	0.11
Sui Northern Gas Pipelines Limited	0.0025	0.06	0.63	1.08	-0.02	0.36	0.48
Sui Southern Gas Company Limited	0.0010	0.05	0.57	0.92	-0.02	0.36	0.53
Thal Limited	0.0042	0.23	0.16	1.05	-0.006	1.31	0.05
The Hub Power Company Limited	0.0018	0.04	0.60	0.69	-0.01	0.26	0.43

The Searle Company Limited	0.0036	0.11	0.21	0.66	-0.02	0.26	0.09
Tri-Pack Films Limited	0.0016	0.05	0.45	0.68	-0.02	0.33	0.32
Unity Foods Limited	0.0011	0.13	0.06	0.21	-0.009	0.89	0.03

Note: The above table shows the summary of Statistics. In the table MR stands for Mean Return, SD stands for Standard Deviation, Cor. stands for Correlation, β stands for Beta, SD stands for Semi Deviation, β_D Downside Beta, D. Cor. Downside Correlation.

Appendix B

Table (A2) CAPM Vs DCAPM

Company Name	β_D	β	CAPM	DCAPM	Difference
Abbott Laboratories (Pakistan) Limited	0.36	0.55	0.0053	0.0059	-0.00056
Attock Refinery Limited	0.43	1.22	0.0033	0.0057	-0.00241
Bata Pakistan Limited	1.32	0.85	0.0044	0.0030	0.00142
Berger Paints Pakistan Limited	0.51	0.81	0.0045	0.0054	-0.00090
Century Paper & Board Mills Limited	0.50	0.76	0.0047	0.0055	-0.00079
Cherat Cement Company Limited	0.37	0.88	0.0043	0.0059	-0.00154
Cherat Packaging Limited	0.82	0.81	0.0045	0.0045	1.34013E-05
Colgate-Palmolive (Pakistan) Limited	0.65	0.78	0.0046	0.0050	-0.00041
Crescent Steel & Allied Products Limited	0.40	1.14	0.0035	0.0058	-0.00226
Crescent Textile Mills Limited	0.84	0.61	0.0051	0.0045	0.00069
Dawood Hercules Corporation Limited	0.53	0.83	0.0045	0.0054	-0.00091
Dewan Farooque Motors Limited	0.54	1.36	0.0028	0.0054	-0.00252
Engro Corporation Limited	0.34	0.94	0.0041	0.0060	-0.00185
Exide Pakistan Limited	0.79	0.54	0.0054	0.0046	0.00076
Fateh Industries Limited	0.48	0.06	0.0068	0.0055	0.00129
Fauji Cement Company Limited	0.39	1.10	0.0037	0.0058	-0.00216
Fauji Fertilizer Company Limited	0.30	0.64	0.0050	0.0061	-0.00106
Fauji Foods Limited	1.26	0.71	0.0048	0.0032	0.00169
Feroze1888 Mills Limited	0.36	0.12	0.0066	0.0059	0.00071
Ferozsons Laboratories Limited	1.04	0.50	0.0055	0.0038	0.00164
Gadoon Textile Mills Limited	0.58	0.66	0.0050	0.0052	-0.00024
Ghani Glass Limited	0.75	0.64	0.0051	0.0047	0.00035
Hayderi Construction Co Ltd	0.90	0.72	0.0048	0.0043	0.00054
Highnoon Laboratories Limited	0.53	0.61	0.0052	0.0054	-0.00022
Hinopak Motors Limited	1.41	1.11	0.0036	0.0027	0.00091
Honda Atlas Cars (Pakistan) Limited	0.45	1.17	0.0034	0.0056	-0.00222
Ibrahim Fibres Limited	0.51	0.60	0.0052	0.0054	-0.00025
Indus Motor Company Limited	0.31	1.07	0.0037	0.0061	-0.00234
K-Electric Limited	0.41	0.90	0.0043	0.0058	-0.00150
Kohat Cement Company Limited	0.44	0.96	0.0041	0.0057	-0.00160
Kohat Textile Mills Limited	1.16	-0.01	0.0071	0.0035	0.00362
Lucky Cement Limited	0.36	1.09	0.0037	0.0059	-0.00225
Maple Leaf Cement Factory Ltd	0.44	1.29	0.0031	0.0057	-0.00259
Mari Petroleum Company Limited	0.43	1.03	0.0038	0.0057	-0.00184

Millat Tractors Limited	0.34	0.47	0.0056	0.0060	-0.00038
Murree Brewery Company Limited	1.17	0.25	0.0063	0.0034	0.00281
National Refinery Limited	0.34	0.98	0.0040	0.0060	-0.00196
Nestle Pakistan Limited	1.44	0.39	0.0058	0.0026	0.00322
Nishat Chunian Limited	0.41	1.03	0.0039	0.0058	-0.00190
Nishat Mills Limited	0.60	1.18	0.0034	0.0052	-0.00179
Noon Sugar Mills Limited	0.49	0.68	0.0049	0.0055	-0.00059
Packages Limited	0.82	0.71	0.0048	0.0045	0.00034
Pak Elektron Limited	0.47	1.23	0.0032	0.0056	-0.00234
Pak Suzuki Motor Company Limited	0.38	1.39	0.0027	0.0059	-0.00312
Pakistan Oilfields Limited	0.44	1.14	0.0035	0.0057	-0.00216
Pakistan State Oil Co Ltd	0.32	1.13	0.0036	0.0060	-0.00248
Pakistan Telecommunication Company Limited	0.34	1.01	0.0039	0.0060	-0.00207
Pakistan Tobacco Company Limited	0.37	0.80	0.0046	0.0059	-0.00133
Philip Morris (Pakistan) Limited	1.20	1.17	0.0034	0.0033	9.34472E-05
Pioneer Cement Ltd	0.43	1.18	0.0034	0.0057	-0.00229
Saif Textile Mills Limited	0.51	0.46	0.0056	0.0055	0.00014
Shell Pakistan Limited	0.34	0.89	0.0043	0.0060	-0.00169
Shifa International Hospitals Limited	0.46	0.73	0.0048	0.0056	-0.00085
Sui Northern Gas Pipelines Limited	0.36	1.08	0.0037	0.0059	-0.00219
Sui Southern Gas Company Limited	0.36	0.92	0.0042	0.0059	-0.00170
Thal Limited	1.31	1.05	0.0038	0.0030	0.00078
The Hub Power Company Limited	0.26	0.69	0.0049	0.0062	-0.00132
The Searle Company Limited	0.26	0.66	0.0050	0.0062	-0.00122
Tri-Pack Films Limited	0.33	0.68	0.0049	0.0060	-0.00109
Unity Foods Limited	0.89	0.21	0.0064	0.0043	0.00206
Average	**0.59**	**0.82**	**0.0045**	**0.0052**	**-0.00069**

Note: The above table shows the results generated by both CAPM and DCAPM. In the table, β_D stands for downside Beta, β stands for beta, CAPM shows the required rate of return calculated by using CAPM, DCAPM shows the required rate of return calculated by using the DCAPM, the last column shows the difference between both the DCAPM and DCAPM.