PROSPECT THEORY AND CAPITAL INVESTMENT DECISIONS:

An EMPIRICAL EVIDENCE FROM PAKISTAN

(A doctoral dissertation)

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Faculty of Management Sciences

INTERNATIONAL ISLAMIC UNIVERSITY

- Investments
- Capital management

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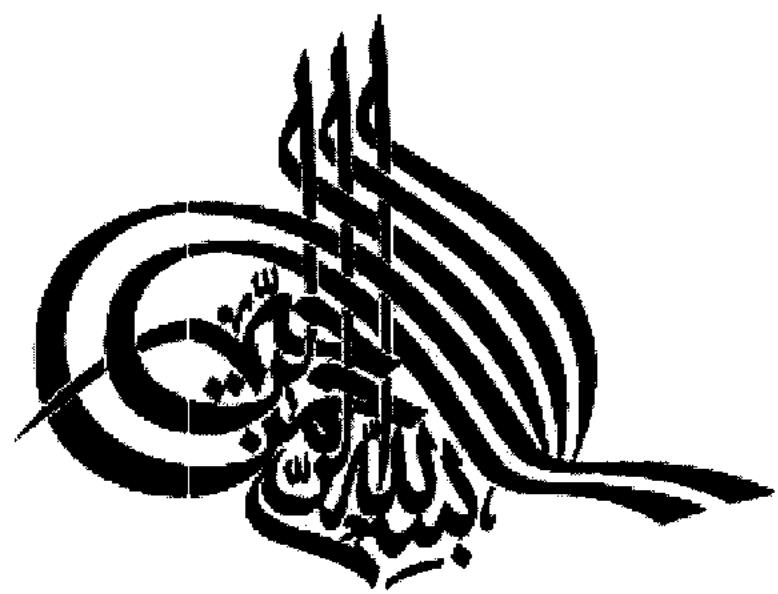
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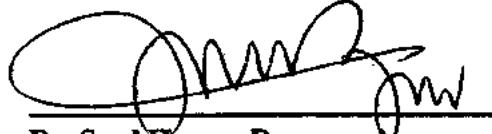
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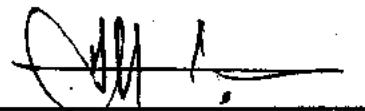
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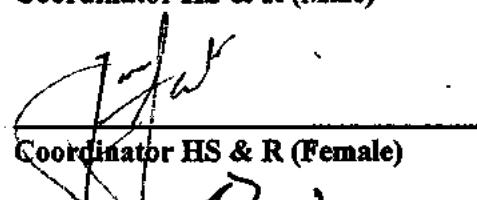
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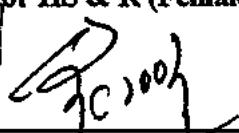
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Sciences with specialization in Finance has been completed under my guidance and supervision.

After receiving two reports from foreign evaluators, required changes have been incorporated.

The suggestions advised by internal and external examiners have been incorporated. I am

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                                                Name : <u>Syed Zulfiqar Ali Shah</u>

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DECLARATION

I hereby declare that this thesis, neither as a whole nor as a part thereof, has been copied out from any source. It is further declared that I have prepared this thesis entirely on the basis of my personal efforts made under the sincere guidance of my supervisors. No portion of the work, presented in this thesis, has been submitted in support of any application for any degree or qualification of this or any other university or institute of learning.

Iqbal Mahmood

PhD Scholar

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To

All helping hands especially my teacher, parents & family

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ABSTRACT

Expected Utility Theory had been considered as a standard normative theory which described the choices of individuals in risky situation very well for a long time, but later on violation of its axioms in real situation was commonly found which created a need for the development of another theory which could accommodate the behavior of individuals very well. Ultimately Prospect theory was proposed by Kahneman and Tversky (1979) as an alternative of Expected Utility Theory in order to provide remedy against descriptive failure of this theory. Later on, an advanced version of this theory was also presented by them named as Cumulative Prospect Theory (1992). This theory incorporated the behavioral aspects of individuals while making decisions in an uncertain environment. Application of Prospect Theory was very commonly found in various areas of economics and finance, but its application in the field of capital investment decisions of companies which is an area of corporate finance is yet very rare. Implications of this theory state that investors are risk averse in their behavior when they make their decisions in the domain of gain and are risk seeking in their attitude when they make their decisions in the domain of loss. This gain or loss is calculated relative to a reference point. This phenomenon implicates that risk and return are negatively correlated. Moreover, risk averse attitude in gain is equivalent to risk seeking attitude of same magnitude in the loss domain. This phenomenon is known as Reflection Effect. Likewise, they also own loss averse attitude i.e., sensitivity of loss is felt by them more than the sensitivity of gain. Such a behavior of investor which is based on parameters of Prospect Theory has been characterized as an irrational behavior. This study has been conducted to examine whether or not this irrational behavior prevail in capital investment decisions of companies as well. For this purpose, two phase value function of Prospect Theory has been used as an empirical model of this study. First phase

applies to gain situation and the second phase applies to loss situation. Change in capital investment ratio has been used as a dependent variable and financial performance of companies i.e., ROA and then ROE has been used as independent variable. Firstly, impact of ROA on change in capital investment has been checked and later on impact of ROE on the same dependent variable has been checked. Once, existence of Prospect Theory behavior was found, we applied two control variables i.e., financial constraints of firms and corporate governance mechanism in order to observe whether this behavior is abated by these variables. Financial constraints are measured by Debt Equity ratio (DER), Operating Cash Flow to Sales (OCF), Free Cash Flow to Sales (FCF), Dividend Payout ratio (DPO) and Fixed Assets ratio (FAR). While corporate governance has been measured through Board Size (BSI), Board Independence (IND), CEO-Chairman Duality (DUA), Audit Committee Independence (ACI), Shareholders Activism (ACT), Institutional Ownership (IO) and Ownership Concentration (CON). Annual data regarding KSE listed companies was used in this study for the period of 1996-2011. This data was obtained from Balance Sheet Analysis published by SBP, KSE website and Annual Reports of companies. Regression analysis and factor analysis technique was used in this study. After analyzing secondary data, application of Prospect Theory behavior in Pakistan was also checked through primary data with the help of a survey questionnaire which was distributed among the same 139 companies which were part of the secondary data analysis. Results have indicated that application of Prospect Theory is not at the same level all the time due to variations in human attitude over time. Existence of Prospect Theory behavior among companies is found in situation of gain i.e., they are risk averse in gain. These results are consistent on both primary and secondary data. Indications regarding their risk seeking behavior in loss are also found. Existence of reflection effect is also found. Companies are also found loss averse. Joint role of

financial constraints of companies and corporate governance mechanism is important in controlling their risk averse and risk seeking behavior. Moreover, evidence is found regarding existence of negative relationship between risk and return of companies.

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INTRODUCTION

Rationality of decision makers is assumed in all economic models including Expected Utility Theory, but it has been observed through study of behavioral finance that behavior of decision makers is not all the time rational. While making decisions, their cognitive process gets biased due to many biases. This behavioral biasness often leads them towards making of irrational decisions. This shift of paradigm from rationality to irrationality of decision makers created a need for developing a more descriptive instead of normative model for decision making under uncertainty, which should be capable of explaining the real world decision making phenomena in an assertive manner. Ultimately, two psychologists succeeded in presenting a theory called Prospect Theory which was based on irrationality of decision makers. This theory replaced an already existing theory of decision making under uncertainty which was based on concept of decision makers' rationality. Thus, journey of Expected Utility Theory (EUT) which was started in 1942 came to an end in 1979 with the introduction of Prospect Theory (PT).

Expected Utility Theory (EUT) had been recognized as foundation for most of the modern theories relating to decision making under risk and uncertainty (Reiger, M.O. & Wang, M. 2006). This theory was considered a standard or normative theory of individual choice (Starmer, C., 2000). Models of this theory explained the behavior of investors in the financial market very well for many decades (Oslen, 1997). This theory served the purpose of explaining the behavior of individuals in risky situations. It was a normative theory which emphasized on describing how the behavior of a rational individual ought to be. But with the passage of time, it was observed that actual behavior of individuals in risky choices normally deviates the axioms of this theory.

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This systematic violation of principles of the Expected Utility Theory (EUT) led to the development of Prospect Theory (PT) (Kahneman and Tversky, 1979) and an advanced version of it, known as Cumulative Prospect Theory (CPT) (Kahneman and Tversky ,1992) as a substitute of EUT (Gurevich, Kliger, Levy, 2009). Expected Utility Theory (EUT) assumes that whenever individuals are facing the problems of diminishing marginal utility, they will have to confront with the situation of being risk averse in their attitude (Davies, G.B., Satchell, S.E., 2007).

Risk aversion of individuals has been described as one of the basic tenets on which Expected Utility Theory (EUT) is based. According to Kahneman and Tversky (1979), utility function of EUT is concave and this concavity is described as equivalent to the concept of risk aversion. The same phenomenon has also been observed by Kliger, & Tsur (2011) in their study. They declared that risk aversion of individuals in their behavior has basic assumption of Expected Utility Theory which implicated a positive risk- return relationship.

Expected Utility Theory (EUT) laid down foundation for most of the present theories relating to decision making under risk. It was the dominant theory for many decades as a standard, normative and descriptive theory of decision making under risk in various areas of economics and finance (Reiger & Wang 2006). Its main application was observed in decision making under risk or uncertainty. It served as a main tool of research in risk - return trade off studies (Kliger, D., Tsur, I. 2011). This theory states that individuals are risk averse in their risky decisions because people are confronted with the problem of diminishing marginal utility. The risk aversion of an individual depends on the curvature of utility function (Dyer and Sarin, 1982; Davies, 2006).

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In an effort to remedy the descriptive failure of Expected Utility Theory (EUT), Kahneman and Tversky (1979) proposed Prospect Theory (PT) as a psychologically related alternative of EUT. This theory incorporates the behavioral aspects related to investment decisions of investors which are likely to be made in risky and uncertain environment. Later on, an extended model of this theory was presented by Kahneman and Tversky 1992 which was named as "Cumulative Prospect Theory" (CPT). The original version of prospect theory (PT) and its extended version both are recognized as valid descriptive models for decision making in choice related problems. Prospect Theory proved through experimental studies that investors attitude varies relative to a target or reference point. They are risk averse in their attitude when they are in the gain domain and they are risk seeker in their attitude when they are in the loss domain.

This theory presented the concept that utility of an outcome or prospect in financial decisions should be seen in terms of change from a reference point, not in terms of final level of wealth. This theory also deals with the concept of loss aversion of decision maker (Davis, Satchell. 2007). It served as a link between standard finance and investment management by managers due to its more plausible assumption regarding behavior of investment and corporate managers. This theory is also having close connections with Expected Utility Theory (EUT). Large violations of expected utility theory are sufficiently explained by the Prospect Theory. These violations relate to matters of choice between risky prospects having small number of outcomes.

The application of Prospect Theory (PT) has been widely accepted and found in various areas of finance and economics (Bernasconi,1998; Rieger & Wang,2006; Bromiley & McNamara, 1999). This theory has its wider application in investment decisions of investors in stock market, where it has been applied at individual level decisions. Its importance for corporate managers has also been documented at the organizational level which is heart of this study. Although, Prospect

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Theory is applicable at the individual as well as the organizational level decision making, its application in corporate finance is yet a growing area for researchers. (Wen,Y-F., 2010).

Capital investment decisions of organizations relate to their investment in long term or fixed assets. According to principles of finance, all the long term investment projects should be evaluated on the basis of their net present values (NPV). But, it has been observed that such investment projects are affected due to behavioral aspects of managers involved in this type of decision making and these behavioral implications of managers lead towards the making of irrational decisions.

When Prospect Theory (PT) is applied in long term investment decisions of managers, it implies that the performance of such projects is evaluated relative to a target or reference point. A firm with earnings more than its reference point will be regarded as a firm in gain domain and a firm having earnings less than its reference point will be regarded as a firm in the loss domain. So for as reference point is concerned, it may be the current level of wealth. A firm will have a "risk averse" attitude about its investment in long term assets in the gain domain, while it will have "risk seeking" attitude about such investments in its loss domain. A risk averse firm will be considered as a firm which will prefer a certain prospect "A" over a risky prospect or alternative providing an expected value of "A". For example, if a firm has been given the option to invest rupees 150,000/ in any one of the two prospects or alternatives. Prospect one will provide sure return of rupees 20,000 while the second prospect will have 50% probability of providing rupees 40,000/. Although, expected value of prospect two is equal to the certain value of prospect one i.e., rupees 20,000/, "risk aversion" in attitude of firm entails that the firm will prefer prospect one over prospect two (Kahneman & Tversky,1979).

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It is implied from the above explanation of Kahneman and Tversky that Prospect Theory favors negative risk–return relationship, because when a firm will earn lower return than its target return or reference point, its mangers will take more risk due to their "risk seeking" attitude in the loss domain and when the same firm will earn return higher than its target return or reference point, the managers will take less risk due to their attitude of risk aversion in the gain domain. There are many studies which have documented this negative relationship between risk and return (Laughhunn, Payne, & Crum, 1980).

Prospect Theory (PT) also explains that individuals are loss averse by their behaviors. They feel pain of loss more than the pleasure of gain. This phenomenon is labeled as "loss aversion". This feature of loss averse behavior of investors can also be found at organizational level. It has been empirically tested that pain of loss is found to be more than double the pleasure of gain (Kahneman & Tversky, 1992).

Although, there are some studies regarding applications of Prospect Theory (PT) at the organizational level, studies which enrich the topic of behavioral corporate finance by connecting behavioral finance and corporate finance are very rare. Particularly, the application of behavioral finance in long term investment decisions of corporate firms has not been investigated extensively so far. Prospect Theory (PT) is a behavioral theory which comes within the scope of behavioral finance. Applications of its risk averse, risk seeking and loss averse behaviors have not yet been examined with reference to capital investment decisions of firms particularly with reference to Pakistan. Moreover, negative risk – return relationship favored by the same Prospect Theory (PT) has also not yet been investigated within the corporate context of Pakistan. Thus, there is a gap in the existing literature regarding application of behavioral aspects of this theory in the long term investment decisions of firms.

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According to standard finance, those investment projects should be selected for making investment which provides positive net present value to the investors, but literature indicates that corporate managers are influenced by their biases while making investment decisions. These biases become the cause of existing irrational behavior among them. Presence of irrational behaviors in capital investment decisions of firms result in the selection of investment projects ignoring the principles of standard finance which ultimately provide outcomes other than those expected by firms. Sometimes, it may become the cause of total failure of project. Although, behavioral aspects prevail everywhere, yet its chances in countries like Pakistan are much more due to absence of well established corporate culture in these countries.

The aim of this study is to investigate whether these irrational attitudes i.e., risk aversion, risk seeking and loss aversion described by Prospect Theory (PT) are reflected in the investment decisions of firms in Pakistan. This study also seeks to determine whether financial limitations and good corporate governance abate or control the phenomenon, if it exists. Moreover, exploring the existence of the negative risk - return relation is also intended in this study.

The application of behavioral finance in corporate finance decisions commonly behavioral corporate finance is an emerging field of study for researchers. Very few studies have been conducted on this topic. It is perhaps the first study on this topic in Pakistan which addresses the issue of prevailing prospect theory behavior and its implications. There are some factors which are important for controlling this Prospect Theory (PT) behavior. These factors have also been investigated in this study. Another very important and distinct concept which has been investigated in this study is the existence of negative relationship between risk and return. This concept is entirely against the principles of standard finance.

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1.1. Problem Statement

Presence of irrational behaviors described by the Prospect Theory (PT) may affect the subsequent performance and output of long term investment projects of firms. It may lead to disturbances in the national investment environment. When few firms will fall short of the desired return from their investment, it encourages other firms to refrain from investing in long term projects. Although investment decisions of firms will be influenced by behavioral aspects, their managers may be unaware of it. Ignorance of managers regarding the influence of behavioral aspects in decision making will shake investor confidence as well. As a company is collection of individuals, thus behavioral aspects in capital investment decision of companies may be different from those observed in stock market decisions taken by individual investors.

1.2. Research Questions

The following research questions are dealt with in this study:

Q. 1:   Does the risk averse and risk seeking behavior of investors exist in long term investment decisions of companies?

Q. 2:   Does the loss averse attitude of investors examined in the stock market also prevail in long term investment decisions taken in organizational context?

Q. 3:   Do financial constraints of companies affect risk averse and risk seeking behavior proposed by the Prospect Theory?

Q. 4:   Does the mechanism of good corporate governance affect the behavior described under Prospect Theory?

Q. 5:   Does a negative risk-return relationship exist in companies?

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1.3. Research Objectives of Study

Major research objective of this study is to test the application of Prospect Theory (PT) in Pakistan including the following objectives:

i. *To find whether the behavioral phenomenon of investors' risk aversion in the gain domain and risk seeking in the loss domain as explained by the Prospect Theory, prevails when organizations make their investment decisions.*

ii. *To examine the existence of "loss aversion" in the investment decisions of firms.*

iii. *To determine the importance of financial constraints of companies in abating risk averse and risk seeking behavior regarding their investment decisions within the behavioral perspective of prospect theory.*

iv. *To investigate whether good corporate governance affects the risk averse and risk seeking behavior described by the Prospect Theory.*

v. *To investigate whether financial constraints of firms and corporate governance mechanism collectively affect their risk averse and risk seeking behaviors.*

vi. *To investigate the negative risk-return relationship depicted by the Prospect Theory.*

This study enriches the existing literature on corporate finance decisions and behavioral implications of companies or their managers in many aspects. Firstly, it examines the application of behavioral implications of corporate managers in their capital investment related decisions which is the key concept of this study. Thus, a link is developed between standard finance and behavioral corporate finance through application of behavioral implications in corporate finance decisions. Secondly, it has explored the concept that feeling of loss is more unpleasant for investors than the feeling of pleasure in similar sized gain. Thirdly, this study reveals the impact

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of financial constraints and mechanism of good corporate governance in controlling irrational behavior of investing firms described under Prospect Theory (PT). Lastly, it measures the negative relationship between the risk and return within a behavioral context.

For achieving the above mentioned research objectives, this study includes the use of primary as well as secondary data. With regard to secondary data, it has been collected for 139 non-financial companies listed on Karachi Stock Exchange during the years 1995-2011. Year of 1995 is used as base for calculating various figures, so data analysis of this study has been mentioned from 1996 onward. Financial data has been collected from annual balance sheet analyses published by the State Bank of Pakistan and data relating to corporate governance has been collected from annual reports of companies. So for as primary data for testing various parameters of prospect theory is concerned, it has been collected with the help of a survey questionnaire which was distributed among the same companies which were included in the secondary data analysis. Regression analysis, factor analysis, Combach's Alpha, descriptive statistics and correlation matrix have been used as data analysis tools, while MS Excel and Stata 10 have been used as computational tools in this study.

Results of the study indicate that application of Prospect Theory (PT) exists in Pakistan because strong evidence is found regarding risk averse behavior of companies in their gain domain. There is substantial evidence of existing risk seeking attitude of companies in the loss domain as well. Moreover, existence of loss averse attitude is found in companies. The collective role of financial constraints and corporate governance is found to be more helpful in eliminating irrational behavior of Prospect Theory (PT) as compared to their individual impact on such behavior. Results have also proved the existence of negative relationship between risk and return of companies in Pakistan. All objectives of this study regarding prevalence of irrational behavior in

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managerial decisions as depicted by the Prospect Theory as well as existence of negative relationship between risk and return have been achieved empirically.

1.4. Significance of Study

This study enriches the existing literature on corporate finance in the following ways:

1. To investigate the application of Prospect Theory (PT) from another perspective of long term investment decision of firms as compared to its present application in stock market investment decisions.

2. To develop a linkage between standard finance and behavioral corporate finance through the application of behavioral implications in corporate finance decisions.

3. To enrich the existing literature on the risk-return relationship by presenting an alternative view regarding this relationship in behavioral context.

4. To evaluate the sensitivity of the above mentioned relationship between standard finance and behavioral corporate finance to the influence of some other factors.

This study is equally helpful for academicians and corporate managers of Pakistan because it presents a new perspective with implications for future study as well as corporate investment decisions. Policy makers in financial institutions and the government may be benefitted from this study when framing and implementing future policies regarding corporate sector.

The rest of the study has been organized as under:

Chapter 2 provides theoretical framework of this study by explaining the relationship between expected utility theory and prospect theory. Chapter 3 is related to review of literature regarding expected utility theory , its various axioms, application of prospect theory, risk aversion and risk seeking attitudes, behavior of loss aversion, capital investments, role of financial constraints and

corporate governance mechanism in controlling irrational behavior and finally the negative relationship between risk and return,. Chapter 4 encompasses the data and methodology used for data analysis in this study. Chapter 5 deals with empirical results and discussion regarding various aspects of data analysis and lastly chapter 6 discusses findings and conclusion of the study.

CHAPTER 2

COMPARATIVE STUDY OF EXPECTED UTILITY THEORY (EUT) AND PROSPECT THEORY (PT)

This chapter explains the evolution of expected utility theory, its various axioms and violations of these axioms by individuals due to their behavioral aspects which leads to the development of prospect theory. S-shaped value function of prospect theory procreated the development of two phase value function in an advance version of this theory known as Cumulative Prospect Theory (CPT). The chapter also deals with comparative study of expected utility theory and prospect theory.

2.1. Expected Utility Theory (EUT)

Origin of Expected Utility Theory (EUT) is traced back to 18th century in 1738 by the work of Daniel Bernoulli in an attempt to solve the puzzle regarding optimum level of price which should be paid by a gambler before entering into a gamble (Stearns, C.S., 2000). Initially, it was considered that the objective of investors is to maximize their return, but it was found later on that this assumption of maximizing return was not the right objective; rather maximizing the expected value of utility of returns should be the right objective. Research in area of finance has taken very important turn from maximization of returns to maximization of expected utility of returns since 1944 with the publication of Von Neumann and Morgenstern's "the theory of games and economic behavior". The literature was further strengthened by publication of "portfolio selection" by Markowitz in 1959. The behavior of the stock market was interpreted in these studies with the presentations of various models of expected utility (Oslen, R.A.., 1997).

This theory gained no importance in the area of finance research till World War-II. After that, it gained importance as normative theory of decision making under risk and certain axioms of this theory were also set by Von Neumann and Morgenstern in 1947. These axioms are as follows:

2.1.1. Preference Order Axiom

It assumes that if certain prospects or alternatives are available to a subject, the subject should be in a position to rank these alternatives or pair of alternatives. It means that a prospect will be preferred over the other, if it is better than that at least by one aspect. Suppose, two prospects a and b are available to an individual and these are equal to each other, except that prospect a is better than b with regard to one aspect. *Dominance* provides that prospect a will be preferred or dominate over prospect b. Preference order axiom says that there should be completeness and transitivity regarding alternatives on the basis of which alternatives should be ranked. Completeness explains that if two alternatives known as a and b are available to an individual, either alternative a will be greater than or given preference over alternative b i.e. $a > b$ or alternative b will be greater than or given preference over alternative a i.e., $b > a$ or both alternatives will be equal to each other, $a = b$. For example, if a firm has been given an opportunity to invest one million rupees in any one of the two projects available, the firm will rank these investment opportunities on the bases of utility of returns expected from these alternatives. Either project I will provide higher utility than project II or project II will provide higher utility of returns than project I. Expected utility of both the projects may be equal to each other.

Transitivity under preference order axiom entails that if three investment alternatives a, b, and c are available to an investor and utility of investing in alternative a is greater than utility of investing in alternative b and utility of investing in alternative b is greater than the utility of

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investing in alternative c, it will be implied that utility of investing in a will also be greater than utility of investing in c i.e., $a > b$ and $b > c$, then $a > c$. For example if three investment projects a, b and c will provide utility of 1500, 1300 and 1100 respectively, the above mentioned feature of transitivity will be fulfilled because in this case, utility of project a will be greater than utility of project c.

2.1.2. Continuity Axiom

It requires that if there are three prospects or alternatives a, b and c available to an individual, where $a > b$ and $b > c$. it entails that some "p" exists there for which $(a, p; c, 1-p) > b$. It entails from $(a, p; c, 1-p)$ that a compound prospect will result in "a" with probability "p" and "c" with probability "$1-p$". For example, a firm has an opportunity of investing Rs. 200,000 in any one of three investment projects a, b and c. Utility of investing in these projects is expected to be 2000, 1500 and 1300 respectively. Probability of project's a utility "p" is 0.6 and probability of project's "c" utility is "$1-p$" i.e., 0.4, then compound prospect mentioned above will give the following impression:

$$2000*0.6 + 1300*(1-0.6) > 1500,$$

$$1200 + 520 > 1500. \text{ i.e., } 1720 > 1500$$

It is implied from both above axioms that there is some function in order to represent preferences of subjects over prospects available. This function is called value function which is represented by v (.). It will represent preferences of subjects that $v(a) \geq v(b)$. It means that subjects will prefer prospect a over b if and only if value assigned to "a" by value function is greater than value assigned to "b".

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2.1.3. Independence Axiom

The independence axiom entails that if three alternatives namely a, b and c are available to an individual and if $a \geq b$, then $(a, p; c, 1-p) \geq (b, p; c, 1-p)$ for all p. If, the example mentioned in continuity axiom is applied on the compound prospects of independent axiom, the following impressions are found:

$$2000*0.6 + 1300*0.4 \geq 1500*0.6 + 1300*0.4$$

$$1200 + 520 \geq 900 + 520 \text{ i.e., } 1720 \geq 1420.$$

It can also be expressed in another way as well. Suppose, three prospects x, y and z are available to an individual and prospect x is preferred by him over prospect y. In this situation, an individual having an even chance of getting prospect x or prospect z and an even chance of getting prospect y or z will prefer the first choice. This phenomenon is also known as *substitution* in the literature.

Moreover, independent axiom entails that presentation order of constituent elements of a compound prospect is irrelevant. It means that choice preferences of individuals are not dependent upon the presentation order of prospects or constituent elements of prospects. Thus, their choice preferences are *invariant* and remain constant. For example, if a compound prospect $(a, p; b, 1-p)$ is applied in this perspective, it shows that $(a, p; b, 1-p) = (b, 1-p; a, p)$. For example, if utility of prospect a is 2000 with probability "p" of 0.7 and utility of prospect b is 1800 with probability "$1-p$" of 0.3, irrelevance of presentation order can be expressed as under:

$$a\,p + (1-p)\,b = (1-p)\,b + a\,p$$

$$2000*0.7 + (1-0.7)*1800 = (1-0.7)*1800 + 2000*0.7, \text{ i.e., } 1400 + 540 = 540 + 1400.$$

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This axiom is known as the most influential and important axiom because most of the empirical work of expected utility theory is given content by this axiom. However, in most of the alternative theories, this axiom is violated or relaxed by researchers.

These axioms provided guidelines in order to develop a frame work for testing mathematically the behaviors of individuals in risky environments and opened doors for checking the validity of rational choice theory of consumers experimentally. It was assumed that individuals are rational in their behavior and no one is expected to violate these axioms because logic is incorporated mathematically in these principles (Anand, 1993). According to rational choice theory, a choice is said to be a rational if consumer expects that it will help in attaining his goals in the best possible way or help in maximizing his expected utility. Expected Utility Theory is considered as standard model of rational choice theory and it assumes a straight flow of individuals' rationality in his perceptions, preferences and process. This rationality has been explained by McFadden (1999) with the help of the following model:

Figure 2-1. McFadden Model of Perceptions and Belief (1999)
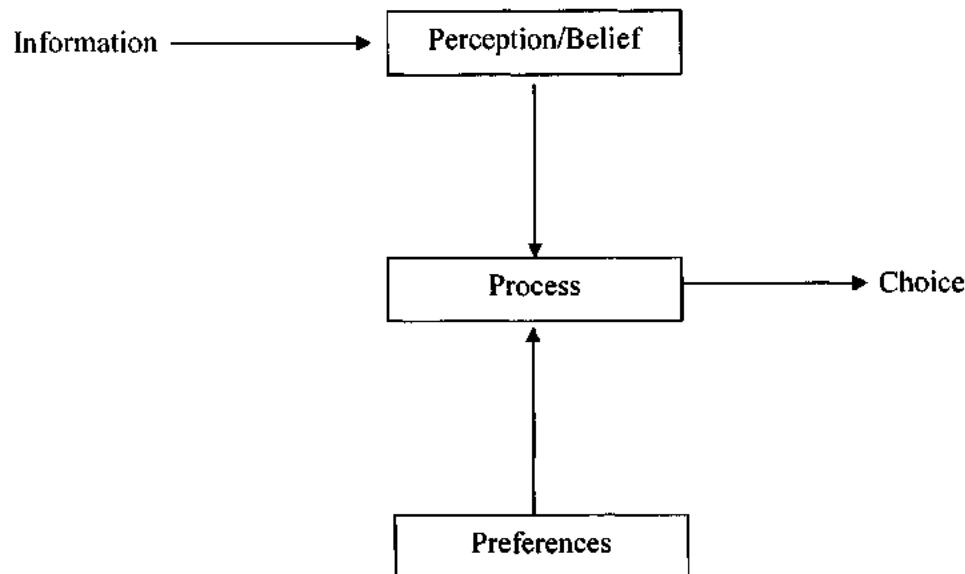
This model explains that individuals process available information to incorporate their perceptions and beliefs rationally into their cognitive process of maximizing preferences which will lead them directly to their specific choice. Importance of decision making process is just like a black box in this model.

Expected Utility Theory is applicable in a situation where individuals have to make a decision of selecting an outcome out of many available options providing utility and having degrees of occurrence of varying levels. As occurrence of outcomes of different alternatives are not certain, so they evaluate various options of alternative outcomes by combining estimated utility and corresponding subjective probability of various options. In the presence of EUT axioms, preferences of individuals may take the following form:

$$v\ (a)\ =\ \sum_i P_i\ .\ u\ (x_i)$$

Where "a" denotes prospect, $u(.)$ represents a utility function which is defined on set of consequences as "x" represents one of the consequences. It can be stated that if alternative "a" is preferred by individuals over alternative "b" then utility of "a" is necessarily greater than utility of alternative "b". The utility function estimates expected utility of a prospect which resembles with calculating the expected value of a gamble, because a gamble in decision theory has been explained as a situation which provides many outcomes of known probability with uncertainty of their occurrence. Expected Utility Theory thus takes into account the concept of "risk" which prevails in most of the economic decisions and in the presence of risk, it intends to resolve the issue of conflict between utility and probability. The risk has been explained in this model as it has already been explained in many economic models as probability of possible outcomes. It is assumed in this model that risk is known to individuals. Any decision making under risk theory

should incorporate both elements i.e., consequences of choices and probabilities associated with them. Expected Utility Theory combines these two elements into a single form value function. Intuitively, this theory appeals to a greater extent. (Starmer, C. 2000).

2.2. Prospect Theory (PT)

Expected Utility Theory has served as an important theory for making choice among risky alternatives. But sufficient level of empirical work later on revealed that individuals' choices are not sufficiently described by principles of this theory and axioms of this theory are therefore frequently violated by them while making risky investment decisions. The reasons behind these violations are that many of the behavioral assumptions and implications of this theory do not fit in the working environment of corporate managers and investors (Oslen, R.A., 1997). Therefore, many behavioral economists presented their view to revise this theory by presenting an alternative theory which could include behavioral factors into model building of theory of consumer choice because it has been seen by Raaj (1981) that inclusion of psychologically related variables into an economic model with economic variables will yield better results of predicting economic behavior. During the study of individuals' choices, economists have found that economic behaviors of individuals are not as simple as described in economic theories, rather it is a complex scenario in which attitude of human, their preferences, affects, expectations and perceptions also play a vital role. Therefore, need was felt to incorporate these elements into economic model of consumer choice.

Actual behavior of decision makers in risky situations has been poorly described by Expected Utility Theory which necessitated the revision of this theory into a more realistic and accommodative form to include the impact of behavioral implications into investment decision.

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Consequently, Kahneman & Tversky (1979) presented Prospect Theory as an alternative of Expected Utility Theory. Prospect theory incorporates the behavioral implications and aspects of investors or corporate managers into its frame work. This theory implicates that decisions taken by individuals in choice related situations are frequently biased by their behaviors. This theory has captured the effect of various attitudes of individuals in decision making under risk and uncertainty. It has been empirically found that there is choice related certain phenomena which violate the principles of theories of standard finance. These are explained as under:

2.2.1. Framing Issue

There is no variation in framing choice related issues under any rational theory of choice including Expected utility Theory. It means that framing options under Expected Utility Theory are invariant and are not sensitive to the way of presentation of various alternatives to the individuals. They make choices among alternatives on the bases of final value of their outcomes and not on the base whether that change is designated as a gain or loss. This scenario leads to consistency in preference order, whereas it has been empirically observed in studies that framing options are variant i.e. framing a problem in terms of gain and framing a problem in terms of loss. This variation with regard to framing issue causes differences or inconsistencies in preferences of individuals (Tversky & Kahneman, 1986).

2.2.2. Non-linear Relationship between Utility and Probability

Principles of Expected Utility Theory assume that there is a linear relationship between utility of an outcome and its probability. But it has been found that there are situations which predict that this linear relationship does not always prevail, rather it becomes non-linear. This principle has been challenged by Allais (1953). He pointed out that impact of difference between 99% and 100% probability to a decision maker will be different than difference between probability of

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10% and 11%. Non-linear relationship regarding choice preferences involving probable instead of some sure outcome has also been found (Camerer and Ho., 1991).

2.2.3. Source Dependent

When people bet on an event which is not certain, their bet will depend not only on uncertainty of that event but also on its "source", while mechanism of generating uncertainty is described as a "source" e.g., KSE 100 index after one week is a source of uncertainty and oil prices in Pakistan after one week is another source of uncertainty. It has been observed that different characteristics of individuals are exhibited for different sources of uncertainty. If people are given option to bet on a container which contains equal numbers of balls of red and green colors and another container containing red and green balls with unknown proportion of color. It has been found that their preference will be for the bet on a container containing known equal number of balls (Ellsberg, 1961). It has also been observed that in spite of known probability of a matched chance event, people prefer to bet in that area in which they have acquired competency although probability of such event is not clear. (Heath and Tversky,1991). While in Expected Utility Theory, all events contain one source of uncertainty, because of known probabilities of those events.

2.2.4. Risk Seeking Attitude

Phenomenon of risk aversion of decision maker has been described and discussed in all theories of economic decisions making under uncertainty. There are certain decision problems in which phenomenon of risk seeking has also been observed. For example, individuals prefer to win a greater prize even with very small probability of wining it over certain expected value of some prospect (Tversky and Kahneman,1979).

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2.2.5. Loss Aversion of Decision Maker

Individuals seem to be loss averse in the process of decision making under uncertain or risky situations. It means that impact of loss is felt more than impact of gains and this phenomenon has not been documented in Expected Utility Theory.

Role of utility function in EUT is replaced with role of value function in prospect theory. In prospect theory, model of choice is described as two phase process known as editing and evaluation. These two features of this theory make it distinguished from Expected Utility Theory. In editing phase, all prospects are preliminarily analyzed in order to get very simple representation of it. Prospects are edited with the help of various heuristics decisions. In editing, various operations are performed on prospects in order to transform their outcomes and associated probabilities into an organized form which can become more meaningful for subsequent phase of evaluation. When various edited prospects are available to individuals for making decisions, it will be very easy for them to evaluate each and every prospect in order to select prospect having the highest value. This evaluation of prospect is made relative to a reference point which serves as a bench mark against which performance of various prospects is evaluated (Kahneman & Tversky, 1979).

2.2.6. Value Function of Prospect Theory

The S-shaped value function of prospect theory is given below:

Figure 2-2. Value Function of Prospect Theory
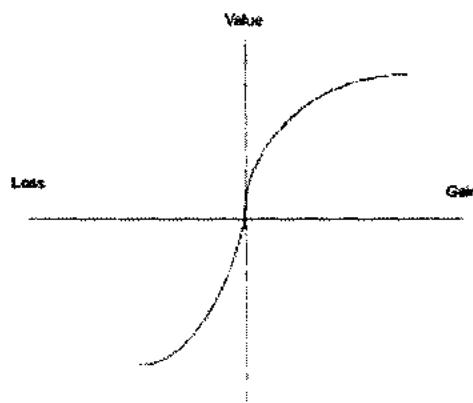
The following effects which have been observed in various empirical studies also strengthen the proposition of the Prospect Theory:

2.2.6.1. Certainty Effect

This notion is described in EUT that individuals weight outcomes utilities by the probabilities of these outcomes. But, it has been observed empirically that outcomes which are certain are weighted more by individuals than probable outcomes (Kahneman & Tversky,1979). This phenomenon becomes the cause of risk averse attitude among individuals.

2.2.6.2. Reflection Effect

Risk aversion of individuals in making decisions under risk which is reflected in the curvature of utility function has been described in EUT. But, it has been observed that attitude towards risk

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changes with regard to a reference point. If an individual is in the gain domain relative to a reference point, he will be risk averse and if he is in the loss domain, he will be risk seeker. This shift in the attitude of individuals with regard to risk is named as "reflection effect" (Tversky and Kahneman, 1979).

2.2.6.3. Isolation Effect

Inconsistencies in decision makers' preferences do occur when they confront with choice problem among various alternatives. It has been empirically found that individuals do not consider and give weight to those outcomes which are shared by various alternatives. Rather, they take into decision making process only those outcomes which are distinguished among various alternatives. There may be more than one ways to decompose various pairs of prospects, this difference of decomposition may lead to inconsistency in their preferences (Kahneman & Tversky, 1979). For example, if a firm wants to invest Rs. 100,000, it has two options available and any one out of these two options is to be selected. Option one provides the following pairs of outcomes-utility probabilities:

(100, 0.5; 300, 0.3; 500, 0.2) and

option two provides the following outcome-probability pairs:

(400, 0.4; 600, 0.3; 300, 0.3).

"Isolation effect" provides that whenever the firm will evaluate the above two options, it will base its investment decision on the distinguishing elements or components of two available investment opportunities and will discard the common elements during the evaluation phase. As the component of (300, 0.3) is common in above mentioned two investment outcome -

probability alternatives, so the firm will not consider this component during its investment decision process.

According to Prospect Theory, decisions are valued on the basis of gain or loss relative to a reference point, and not on the basis of final assets. In prospect theory, choice process consists of two distinguishing phases of framing and valuation. It means that outcomes of various prospects are framed by decision makers in terms of gain or loss and then prospects' value is assessed and chosen accordingly (Kahneman & Tversky, 1992). After some time, concept of rank dependant or cumulative functional was introduced as a novel representation whereby instead of individual probabilities, it transforms cumulative probabilities (Quiggin, 1982: Yaari, 1987).

The phenomena of framing problem, non-linear relationship between utility of outcomes and its probabilities, source dependence, risk seeking and loss averse attitude have been accommodated and properly weighted within the contextual framework of prospect theory.

2.3. Cumulative Prospect Theory (CPT)

Original version of prospect theory was based on decision weights (π p) of prospects and their outcomes. It was applicable to risky and uncertain prospects with small numbers of outcomes. Kahneman and Taversky made some advancement in their basic theory and presented new version of this theory in 1992, called Cumulative Prospect Theory (CPT). This new theory incorporated the cumulative functional which means that cumulative probabilities instead of individual probabilities were transformed. This theory is also extended to prospects with large number of outcomes. According to this theory, gains or losses are evaluated differently and risk or uncertainty is treated in a unified way (Kahneman and Tversky, 1992).

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In Expected Utility Theory, utility of risky prospects is the rank of utilities of outcomes which is weighted by their probability i.e., $U = p_1u(x_1) + p_2u(x_2) + p_3u(x_3)\ldots\ldots\ldots p_n.u(x_n)$. For example, a firm is interested in contemplating a capital investment project which is expected to provide the outcome-probability pairs as under:

Table 2-1. Outcome-Probability Pairs

OUTCOME	UTILITY	PROBABLITY
X1	2200	0.45
X2	1500	0.35
X3	1800	0.2

$U = 0.45(2200) + 0.35(1500) + 0.2(1800)$

$U = \quad 990 \quad + \quad 525 \quad + \quad 360$

$U = \quad \mathbf{1875}$

But, two changes in this theory were advised in various empirical studies. First, important thing to value is not the level of final wealth; rather it is gain or loss. Second, each outcome is valued by the weight of a decision not by additive probability. The value function of prospect theory may take the following form:

$$V(a, p ; b, q) = v(b) + \pi (p)[v(a) - v(b)]$$

Where,

V = Overall value of a prospect

a & b = outcomes

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p = Probability of receiving outcome a

q = Probability of receiving outcome b

π *(p)* = Decision Weight

v = value function assigning value to outcomes

In Prospect Theory, prospects are segregated into their riskless and risky components during the editing phase. A strictly positive or negative prospect will reflect its value by adding the value of riskless component and differential value of two outcomes multiplied by a decision weight i.e., weight associated with more extreme outcome. A prospect is called strictly positive, if all of its outcomes are positive and a prospect is called strictly negative, if all of its outcomes are negative. Moreover, $p + q$ =1 in strictly positive or strictly negative prospects. For example, if a firm has an opportunity to invest 0.3 million rupees in a project with an expectation to receive

V (500, 0.3 ; 100 , 0.7) amounts as outcomes of this opportunity, so after segregating this prospect into risky and riskless component, it may take the following form:

$$V (500 , 0.3 ; 100 , 0.7) = v (100) + \pi (0.3)[v(500) - v (100)$$

The above mentioned values can be solved numerically.

Original version of prospect theory faced problem that situation of being stochastically dominant were not always satisfied due to which decision weights could not be normalized and added to unity. Moreover, it was having the limitation of not being extendable readily to any finite number of outcomes. Solution of these two problems was presented in empirical study by Schmeidler, (1989) with the introduction of concept of rank dependent or cumulative functional. Transformation of complete cumulative distribution function is proposed in the model of this

theory instead of separate transformation of each probability. In Cumulative Prospect Theory, two phase cumulative value function has been described. One part of this function is applied in gain and the other in loss. In other words, this theory does not assign equal decision weights to gain and loss.

The value function of Cumulative Prospect Theory can be described as under:

$$v(x) = \begin{cases} x^\alpha & \text{if } x \geq 0 \\ -\lambda \, (-x)^\beta & \text{if } x < 0 \end{cases}$$

Three implications of the above mentioned value function have been noticed. Decision making individuals should be more concerned with amount of loss than with amount of gain. They are more sensitive regarding their loss. Pain of loss is felt by them more than pleasure of gain. It means that they are loss averse. This "loss aversion" will be reflected by the value function of CPT which becomes steeper in the loss domain than in the gain domain (Kahneman,1990; Oslen,1996; Shapira,1995; Cooley,1997). The value function also reflects diminishing marginal value for gain relative to a reference point indicating that decision making individuals should be risk averse in the gain area. The same phenomenon of diminishing marginal value should also be observed in the loss area which indicates that individuals should be risk seeking in the loss area. This phenomenon of risk averse behavior of individuals in the gain domain and risk seeking behavior of individuals in the loss domain has been labeled as "reflection effect". (March, 1992; Thaler, 1980; Laughhunn, 1980).

The value function also implicates "time diversification effect", which means that whenever an individual has finite time horizon for investment, he should accept investment of relatively large

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returns variability if his investment horizon is large. He should accept investment opportunity of relatively small return variability, if his investment horizon is of short duration. This phenomenon has also been confirmed in various studies (Benartzi & Thaler, 1993; Thorley, 1995). The value function hypothesis described by the prospect theory has also been studied by employing prospect stochastic dominance criterion. In prospect theory, subjects were asked to choose among the positive or negative prospects, but not among the prospect having mixed results. Prospects with the possibility of mixed outcomes and having no certainty effect are evaluated to find the support for S-shaped value function of prospect theory. They revealed that S-shaped value function is supported with the help of certainty equivalent analysis from those experiments which either contain positive or negative outcomes, but is not supported in case of those outcomes which have the possibility of mixed outcomes. The utility functions of the subjects with mixed outcome prospects may be different than S-shaped value function of prospect theory (Levy, H., Levy, M., 2002).

As prospect theory has its implications for determining the behavior of individuals in economic decision making, its value function is considered as an explanation of negative–feedback trading patterns of traders in the market. These patterns include their contrarian behavior in the short run i.e., they buy stocks after decrease in their prices and sell stocks after increase in their prices and disposition effect. But, some studies indicate that trading behavior of investors in the market as a whole does not follow a trading pattern consistent with value function of prospect theory and disposition effect. In order to understand the trading behavior of investors i.e., their response to a change in prices of stocks, Yao, J.& Li, D.(2013) have empirically analyzed the implications of components of prospect theory value function with the help of decomposition approach . It has been found that trading behavior adopted by investors or traders are not the outcome of their

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autonomous decision at individual level. Rather, their actions are outcomes of interaction between various participants of the market. Moreover, prospect theory preferences of reference dependence, risk aversion and loss aversion commonly referred to as risk aversion component in this study provides the existence of negative feedback trading pattern at the market interaction level. It does not provide existence of the same trading pattern at individual choice level.

S- shaped value function of prospect theory deals with prospects involving either loss or gain outcomes separately. This hypothesis does not deal with prospects providing mixed outcomes. This value function may also get biased due to presence of certainty effect and probability distortion. In order to make this value function testable for mixed outcomes having no certainty effect, Levy, H. & Levy, M. (2002) developed a prospect stochastic dominance criterion. They examined under the assumption that subjects do not distort moderate subjective probability; value function described by prospect theory is strongly rejected due to inconsistency of choices with preferences of this value function by more than75%. But if possible distortion of subjective probability is kept in view; the inconsistency of choices with regard to preferences of this value function will be more than 50%.

On the bases of above discussion, difference between Expected Utility Theory and Prospect Theory can be presented as summarized in the following table:

Table 2-2. Difference between Expected Utility Theory & Prospect Theory

Expected Utility Theory (EUT)	Prospect Theory (PT)
1. Utility of risky outcome is rank of utility of outcomes weighted by their probabilities	1. Outcome is valued by decision weight, not by additive probability.
2. In EUT, equal weight is assigned to prospect in situation of gain and loss	2. While in PT, unequal weights are given to situation of gain and loss i.e., gain prospects are weighted differently than loss prospects. Pain of loss is felt more by them than the pleasure of gain.
3. In EUT, it is assumed that there is linear relationship between utility of outcome and its probability	3. Utility of outcomes and its probability are non linearly related under prospect theory.
4. There is no variation in framing choice related issues i.e., framing options are invariant	4. While, prospect theory assumes that framing options are variant i.e. framing option in gain and framing option in loss
5. All rational theories of risky choice including EUT assume that individuals are risk averse in their investment related decision making	5. Prospect Theory assumes that investors are not all the time risk averse. They are risk averse in gain and risk seeking in loss and their state of being in gain and loss will be determined relative to a reference point.
6. EUT assumes a positive relationship between risk and return	6. It is implied under Prospect Theory that there is negative relationship between risk and return

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7. There is no concept of reflection effect discussed under expected utility theory	7. This theory assumes that situation of investors being in gain should be a mirror image of situation of investor in loss.
8. It deals no issue regarding selection of risky investment choice in view of investment time constraints	8. This theory deals with phenomenon of time diversification effect very well.

CHAPTER 3

LITERATURE REVIEW

This chapter provides review of literature regarding the application of Prospect Theory by studying the existence of risk averse and risk seeking attitude, loss aversion of investors, value function and parameters of Prospect Theory, behavior of investors while making capital investment, role of financial constraints and corporate governance in controlling prospect theory behavior. It also covers literature regarding the negative relationship between risk and return.

3.1. Risk Averse and Risk Seeking Attitude under Prospect Theory

Prospect Theory and more commonly Cumulative Prospect Theory (CPT) proved through experimental studies that investors attitude varied relative to a target or reference point. They were risk averse in their attitude when they were in gain domain and risk seeker in their attitude when they were in loss domain. Concavity of value function indicated their risk aversion and convexity of value function of prospect theory indicates their risk seeking attitude (Kahneman & Tversky, 1992). Investors became risk averse in their domain of gain and became risk seeker in their domain of loss due to diminishing marginal sensitivity feature inherent in their attitude. Li, Y., Yang, L.(2012) have empirically examined the relationship between diminishing sensitivity and the disposition effect and designed a general equilibrium model to examine whether the diminishing sensitivity feature of prospect theory leads to disposition effect . They found that disposition effect, momentum effect and co-movement of positive return volume were driven by the diminishing sensitivity. Their findings also revealed that diminishing sensitivity raised the

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equity premium and decreased the return volatility. The relationship of Prospect Theory with the disposition effect and then with price and volume is evident in the literature. Li, Y., Yang, L.(2013) developed a model in order to find the implications of prospect theory for trading volume, prices of assets and disposition effect. They observed that change in risk attitude over time is behind such relationship. Positive relationship between return and volume, reduced volatility of returns, price momentum and disposition effect were caused due to positive relationship between risk aversion of investors and stock returns. Kinked feature helped loss aversion attitude of individuals in determining their pattern of risk aversion which varied over time. Their model exhibited that whenever dividend process of stock was negatively skewed, the same was predicted by loss aversion as diminishing sensitivity and whenever such dividend process was non-skewed or positively skewed, a situation opposite to loss aversion was predicted.

Application of Prospect theory in various economic models has also been widely recognized in economics literature. In this perspective, Ciccarone, G., Marchetti, E.(2013) applied this theory on "Island" model of Lucas which was a known macroeconomic model of imperfect information. Prospect theory's application in this model was made in order to incorporate behavioral implications into it due to known importance of cognitive related distortions for financial and economic decision making. Prospect theory's parameters of reference dependence, diminishing sensitivity and loss aversion had been incorporated in this model in order to make it more feasible in the real world situation. It has been found that equilibrium supply of labor and level of output will be negatively affected through introduction of behavioral implications into this model. These behavioral implications also seemed to affect the welfare implication or effect of monetary policy. Level of potential output became at lower level than that which was in the

original model. Loss aversion parameter resulted in reducing output volatility and expected utility level of the agent. Moreover, increase in uncertainty of monetary policy resulted in paradoxical improvements in expected utility. Such paradoxical improvements would also be eliminated by introduction of loss aversion feature of prospect theory into the model.

Earning management is a technique which is used by those who are insiders in an organization. It is induced by making some alterations in reported financial results of that organization so as to mislead its stakeholders. This is done by insiders to escape from actions of outsiders against them. Implications of prospect theory have also been found in the field of earning management in organizations. In this perspective, Shen, H.C. & Chih, L.H.(2005) conducted a study in order to know incentives behind managing the earning of banks by using prospect theory. According to prospect theory, individuals were risk seeking below the reference point and were risk averse above the reference point which means that there was asymmetric risk return relationship i.e., negative below the reference point and positive above the reference point. When wealth increased, the value of such increase in wealth were likely to be maximum at the time of increase in wealth from loss to gain with reference to a target point, commonly called a reference point. It has been found that in banking sector, earning management by managers was strongly explained by the prospect theory.

Prospect theory has also been found helpful in explaining the impact of myopia on investment behavior of investors. The literature describes that relationship between myopia and evaluation of sequence of investment opportunities was of such type that it made a sequence of investment opportunities unattractive that would otherwise had been accepted as an attractive investment opportunities. Langer, T.& Weber, M.(2005) examined that relationship between these two was not as general as described in the literature, rather it was largely dependent upon risk profiles of

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various investment opportunities. There were certain situations in which application of prospect theory would increase willingness of investors to invest instead of decreasing this willingness because loss aversion was the only one of many aspects described in Prospect Theory. When all these aspects of prospect theory were incorporated, concept of myopic loss aversion was extended to the concept of myopic prospect theory.

Behaviors of individuals prescribed by the Expected Utility Theory contradicted with behaviors of individuals prescribed by the Prospect Theory. The first one took in to account the total wealth while the second took into account the change in wealth. Levy, H., Wiener, Z.(2013) resolved this contradiction by introducing the concept of permanent attitude towards risk (PATR) and temporary attitude towards risk (TATR). A model was developed in their study by merging paradigms of both of these theories. Moreover, a prospect stochastic dominance rule has also been established by them which specified the dominance conditions.

Gurevich, G. & Levy, O. (2009) tested the value function and probability weighting function of Cumulative Prospect Theory on options data and found that shape and properties of estimated value function were as per the main theme and principles of this theory. Tamura, H. (2008) described behavioral model of decision making for individuals in order to evaluate the sense of security provided by nursing care robots. He found his result to be consistent with actual preference of individuals. In comparison with Expected Utility Theory, his evaluation revealed Prospect Theory as the most suitable alternative to evaluate the security sense of robots. Ormaetxe, I., Ponte, G., Tomas, J & Ubeda, L. (2011) applied Prospect Theory in public goods and evaluated that framing biases are important in order to solve the problems of people. It had been empirically evaluated that preferences of individuals under disposition effect were also consistent with Prospect Theory.

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Marshall, R. et.al.(2011) have replicated the original Prospect Theory of Kehneman & Tversky by applying it cross culturally. They investigated the difference in risk attitude of individuals belonging to eastern and western cultural groups while making their economic decisions. Their findings strengthened the results of existing studies within the frame work of Prospect Theory by concluding that Easterners were having more positive attitude towards risk i.e., they were more risk takers during financial decision making process than the Westerners.

According to Prospect Theory, decision making individuals were risk averse in the domain of gain and risk seeking in the domain of loss. But, literature on behavioral finance explains that there was also a link between risk aversion level of subjects and monetary reward attached to a gamble. Markowitz (1952) explained after his observation for the first time that risk aversion level of individuals decreased as the monetary pay off attached to a phenomenon decreased. It is implied that in a situation of very small pay off, they became risk seekers. Moreover, their risk seeking level was high for gambles involving small monetary payoff as compared to those gambles involving high monetary payoff. This phenomenon of decrease in risk aversion level with decreasing monetary payoff has been described in literature as the "Peanut Effect" (Perlec & Loewenstein, 1991) and this effect has been explained by expected regret or disappointment of individuals.

Risk averse and risk seeking behavior of decision makers has also been observed by Kyle, A.S., Yang, H.O & Xing, W.(2006) in liquidating decisions of projects. They found that individuals tend to liquidate those projects which were having relatively superior Sharpe Ratio and tend to hold projects which were having an inferior Sharpe Ratio. The first attitude depicted their risk averse behavior and the latter depicted their risk seeking behavior. Moreover, findings of disposition effect were confirmed by the Prospect Theory. Trautmann, S.T., & Kuilen, G.V.d.

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(2012) emphasized that Prospect Theory was safe to apply in risky decisions of organizations. By comparing Prospect Theory with Construal level Theory, they investigated the impact of psychological effects which were modeled under Prospect Theory with psychological distance which was the result of Construal level Theory. They found the dominance of Prospect Theory over Construal level Theory. Kliger, D., Levy, O.(2009) have also strengthened the importance of behavioral variables to be incorporated in asset pricing models by finding that behaviors of investors had significant impact on the position of financial markets. They had also supported the attributes of Prospect Theory in their study. Their findings supported the phenomena of reference dependence of individuals, existence of their attitude of diminishing marginal sensitivity, their loss aversion and non- linear probability weighting function. The approach prescribed in this study was capable of evaluating the performance of three theories of choice under risk i.e., Expected Utility Theory, Rank Dependent Expected Utility Theory and Cumulative Prospect Theory.

Application of Prospect Theory in banking industry has also been examined by Shen, C-H. & Chin, H-L. (2005). Their findings revealed that tradeoff between risk and return was explained very well by the Prospect Theory and banks with level of earning higher than the threshold were seemed to be risk averse than those banks which were having earning less than their threshold level which have indicated their risk seeking attitude. There was no reason to reject the hypothesis that banks' motivation to manage their earning in order to exceed threshold level was well explained by the Prospect Theory.

Lot of applications of prospect theory has been checked with the help of laboratory experiments. In order to check its application on practical side, Abdellaoui, M., Bleichrodt, H., Kammoun, H. (2013) examined the behaviors of various fund managers and finance professionals working in

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private banks. They found that these professionals were used to systematically violate the axioms of utility maximization. Their utility curve was concave in the gain and convex in the loss which signified the attitude of being risk averse in gain and risk seeking in the loss. Overall, they were also found to be loss averse, but this loss aversion was less than usually assumed under Prospect Theory and behavioral finance. It was due to this reason that reasonable number of the subjects did not prove to be loss averse i.e., they behaved opposite to loss averse attitude. Their focus was mainly on gain i.e., they proved to be having gain seeking attitude. Possibility of loss was downplayed by them. Assumption of reflection effect i.e. curvature of utility for gain was equal to curvature of utility for loss commonly assumed in Prospect Theory was also not proved because utility of gain was substantially more curved than utility of loss.

Loss aversion of individuals may be greater than 2.25 value of coefficient of loss aversion described by Kehneman & Tversky (1992) in original version of CPT. It is commonly used in the finance literature. Hwang, S., Satchell, E.(2010) examined that coefficient of loss aversion might be greater than this value in US investors while investigating in financial markets of US and UK. It might be due to the reason that when investors selected those prospects which were of larger amounts and were risky in their nature, such prospects caused a change in their behavior and made them more loss averse. Moreover, their loss aversion was also dependent upon the market condition. Boom condition of the market made the investors more loss averse than the bear condition. Thus, coefficient of loss aversion during boom conditions would be greater than the coefficient of loss aversion during the bear market conditions. It indicated that when some investors were gaining in the market, others would be in a condition of more profound disutility for losses.

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Asset management industry commonly uses portfolio insurance strategies in order to safeguard against downside risk. Dichtl, H., Drobetz, W. (2011) applied Cumulative Prospect Theory for evaluating the outcomes of various portfolio insurance strategies. It has been found that Prospect Theory investors could get benefit by using most of the portfolio insurance strategies. An insight has also been provided in this study for designing the structure of capital guaranteed financial products as well as portfolio insurance strategies, more accurately for those investors who behaved within the theoretical framework of Prospect Theory. It means that Prospect Theory had very many obvious implications in this sector as well. Implications of this theory has also been found in multi-attribute decision making of individuals in the area of investment by Liu,P. et.al.(2011), because of direct link of this theory with behavioral aspects of decision makers. They have described a multi-attribute decision making method in their study which was very easy to apply. This method was based on multi-attribute in riskier decision making problems and helped in analyzing the impact of different reference points and parameters of the value function of prospect theory on the decision making of investment companies. Interval probability and linguistic variables have been used in order to take the values of different attributes.

Kaluszka, M., Krzeszowiec, M. (2012) have applied prospect theory for introducing insurance principle which wss applicable in insurance policies. Zero-utility principal, which was based on the assumption that whenever people made decision in uncertain and risky situations, probability of gain or loss could be evaluated by them correctly by using subjective value function.

But, this assumption was not true in reality because according to Cumulative Prospect Theory, people use a function by assigning virtual value to the outcomes of a prospect while making financial decisions under uncertain and risky situations. In this way, people take decisions regarding those outcomes which are identical and set a reference point. The outcome lower than

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that reference point is considered as loss whereas outcome higher than that reference point is considered as gain. Replacement of the utility function of expected utility theory with the value function has been suggested by the prospect theory. Based on this concept, zero utility principle was replaced and a modified premium principle was introduced after making some adjustments within the theoretical framework of prospect theory.

Time pressure had also some significance in determining the decision behavior, because this behavior of individuals was found to be affected in situations when they were faced with time pressure. Behavioral implications of Prospect Theory which dealt with fluctuations in risk taking attitude of individuals had also been examined for those decisions which were taken in time pressure. It had been analyzed that whenever outcomes of any gambles were in the form of only gain, weighting function gets elevated for those decisions which were taken by subjects in a situation of time pressure. It signified that risk factor became more attractive in this situation. Likewise, when the impact of time pressure in condition of loss-only prospects or gambles was examined, it had been found that there was no difference in probability weighting function of time pressure decisions and without time pressure decision (Young, L.D., Goodie, S.A., Hall, B.D., Wu, E.,2012).

Godlewski, C.J. (2004) has empirically investigated the risk averse and risk taking attitude of banks and revealed that banks which had advanced loans more than their target level exhibited risk averse attitude and banks which had advanced loans below than their target level exhibited risk taking attitude in emerging economies. Feigenbaum, A., Hart, S. & Schendel, D. (1996) had also pointed out during the process of developing a strategic reference point theory that attitude of individuals as well as firms both was risk averse above the reference point and risk seeking when they were below their reference point. Ding, D.K., Charoenwong, C., Seetoh, R.(2004)

applied Prospect Theory in explaining stock return and forecasting behaviors of analysts. Their study explained that the reaction of stock market as a result of surprise in earning announcement was asymmetric within the parameters of Prospect Theory. Positive earnings surprise resulted in strong reaction on stock market return, while impact of negative earnings surprise on such return was found insignificant. These results explain that investors were loss averse. They were reluctant to realize their loss and may prior the capital guaranteed products due to being loss averse. It had also been found that forecasting behavior of analysts was accurate during the span of positive earnings growth and highly optimistic during negative earnings growth period.

Risk averse and risk seeking behavior described by the Prospect Theory existed in managers of small business firms as well. When such business managers were dissatisfied with performance of their business, they became risk seekers and introduced such products which were of risky nature into such markets which were yet unfamiliar with those products and this strategy would require more resources of the firms (Simon, M., Houghton, S.M. & Savelli, S., 2003). Multi attribute risky choice behaviors of managers in United States firms have been examined by using Prospect Theory and multi attribute theory. Pairs of hypothetical capital budget were presented to these managers in this study with an option to choose between these budget pairs. The risk averse behaviors of these managers were found in situation of gain and risk seeking attitude of these manager were found in situation of loss. The study supported the existence of reference point as predicted by the Prospect Theory. However, common attributes were not coded out by the managers as it should happen under the Prospect Theory (Payne, Laughuna & Crum, 1984).

Kalayci, E., Basdas, U.(2010) examined the risk averse and risk seeking implications of Prospect Theory along with existence of " house money effect" in the power traders involved in spot and forward trading in the energy sector . They found that existence of reflection effect pronounced

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in the Prospect Theory and house money effects were ignored by the power traders and they were all the time risk averse irrespective of their past investment experience. However, effect of time diversification was found significant. Moreover, their findings revealed that young traders were more risk averse due to inexperience. But, Azevedo, M.E., Gottleib, D.(2012) reinforced the concept implied in Prospect Theory literature that the firms which were having risk-neutral attitude could earn relatively higher profits from their consumers either due to their willingness to pay a large amount of money for lottery like gambles which offered a probability of earning a large sum of money as prize, although probability of such earning was very small, or due to their willingness to accept such unimportant gambles as buying of a catastrophe insurance from an insurance company which might result in larger amount of loss, although probability of such loss was very small. They found that risk seeking attitude did not seem to prevail among individuals in their entire losses domain within the perspective of Prospect Theory. Payment of large amounts for lotteries which provided possibility to earn finite amount of prizes to individuals with very small probability was also found unlikely.

This conjecture is well known in the literature that risk averse attitude of individuals affects their economic well being. It means that poor remain poor in the society due to their impatience and risk averse attitude in accumulating resources required for their better living. Cardenas, C.J., Carpenter,J. (2013) conducted a study to prove whether there was any correlation between risk averse behavior of individuals and their economic well being. They found that the belief of relationship between these two variables was not true, because very meager relationship was found between these two variables. Anyhow, behavior of being ambiguity averse and loss averse was found to be correlated with economic betterment of individuals. It means that these attitudes were affecting the economic prosperity and betterment of individuals.

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It is implied that Expected Utility Theory deals with effect of change in individual's wealth because of his decision making in risky environment. It is not clear about behavior of a group of individuals involved in making decisions in risky environment particularly when outcomes of such decisions are linked with wealth. Bliss, T.R., Potter, T.M., Schwarz, C. (2012) conducted a study to know whether individuals made better decisions or decisions taken by groups were better. They found that decisions taken by groups in game show were significantly better than the decisions taken by individuals. When risky decisions have been taken by a group, impact of those decisions on the wealth of the whole group has been taken in to account by the members of that group instead of its impact on the wealth of individuals. The level of risk aversion in a situation of risky decisions taken in the form of group in aggregate has been similar to the level of risk aversion in decisions taken by individuals. It has also been found that choices of risk taking in decision making depends on the size of group and practically it was found to be more complicated than postured and assumed by EUT and CPT.

However, risk aversion level in risky decisions was also situation dependent i.e., whether risky decisions were being taken in group environment or at individual level. This attitude of individuals as well as groups, in case of uncertain decisions, has also been widely assessed with the help of game shows. Importance of such game shows has been recognized in the finance and economics literature. In this context, Bliss, T.R., Potter, E.M. & Schwarz, C .(2012) used a famous game show called "cash cab", in order to understand the level of risk aversion of individuals and groups of varying sizes. It has been examined that whenever individuals had to take risky decisions in groups, their goal was to maximize the prize money of the group and not the individual slice (in that prize money). It means that in uncertain decisions, group members gave consideration to the impact of their decision on the overall performance of that group

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instead of their individual benefits. Risky decisions were determined with reference to their impact on overall group's wealth, not on the wealth of individual members of that group. Individuals performing in groups based on their individual stake amounts were seemed to be more risk averse while taking risky decisions in an uncertain situation as compared to a situation of taking same decisions independently as an individual. It has been concluded that choices of risk taking were dependent upon the size of group and practically situation was more complicated than posited by the Prospect Theory.

Current position of investors regarding their gain or loss from investment also affected their risk attitude. It means that risk attitude of investors was not only time variant but are also influenced by the outcomes of their investment as well. There had been a strong correlation between risk aversion of investors and performance of their present investment. As their gain from present investment increased, they showed stronger risk averse attitude. Similarly, when they lost from their present investment, their risk aversion started decreasing. When investors showed risk averse behavior, it affected skewness of distribution of their return in the market i.e. it started decreasing. When they adopted risk seeking attitude in the market, it again affected skewness of their return distribution i.e., it started increasing. (Wen, F., Tao, M., He, Z., Chen, X., 2013).

Anyhow, the consumption based asset pricing model contended that a greater part of variation in stock return occurred due to the risk averse attitude of investors which was ultimately caused by a change in consumption. In a situation of sequential gain and loss, investors not only gained direct utility from consumption but also from fluctuations in their level of wealth, which means that they were risk averse over these changes. Their level of risk aversion was likely to depend upon the previous performance of their investment. If they have accumulated gain from their prior investment activity, it made them less risk averse and if previously they suffered loss, that

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would make them more risk averse. Although, this statement seemed contradictory with the basic concept of Prospect Theory, yet this result of study by Thaler & Johnson (1990) was based on rejection of important assumption behind Prospect Theory that investors were used to integrate the results of their successive investment activities with the results of their prior investment activities in order to calculate their gain or loss (Barberis, N., Huang, M. & Santos, T., 2001).

A contrary view has been found in the study of Zhang, W., Semmler, W.(2009) who examined the impact of previous gain and loss on the behavior of investors in perspective of Prospect Theory. They found that phenomena of " house money " effect and " break even" effect played their role in determining investment behavior of investors. The implication of "house money" effect was the situation that previous gain and loss was having its impact on investment decisions in the future. If investors have some gains today, they will become risk seekers tomorrow. However, some contradiction was found in case of investment decision in the situation of loss. The behavior of investors in situation of loss may show different patterns. People might also become risk seeker tomorrow in spite of having some loss today. That is, they might be willing to accept more risk tomorrow in an attempt to break even the loss of today. It was therefore concluded that although contrary to the Prospect Theory, house money effect was also evident in some studies. The difference between Prospect Theory and house money effect has been regarded as "contradiction" by Sitkin,S.E. & Weingart, L.R.(1995). Anyhow, risk seeking phenomena of Prospect Theory matched with break- even effect discussed in this study. Cumulative prospect theory has also been criticized on account of improper methodology, as this theory was derived from various experiments which were limited in several dimensions. Moreover, Cumulative Prospect Theory and Expected Utility Theory were found to be conceptually the same, because both of these were based on probability weighted summations of

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possible outcomes. Many other factors relating to psychology, legal environment and situation of investors were ignored by CPT. Importance of neuro-biological factors also needed to be highlighted in decision making process. Need for more realistic model than the model of Cumulative Prospect Theory was also recommended (Nwogugu, M., 2006).

A contrary view regarding CPT parameters has also been noticed in various studies. In this regard Erner, C.,Klos, A., Langer, T.(2013) conducted a study in order to analyze the applicability of these parameters in predicting an investor's willingness to pay for various structured investment products in a real situation. It was found that these parameters had very low predictive power in explaining the investors' willingness to pay. In other words, Cumulative Prospect Theory parameters were not in a position to properly assist investors in drawing conclusion regarding acceptability of various investment opportunities which were complex in their structure.

In order to examine the temporal stability of individuals' choices, stability of parameters of Cumulative Prospect Theory across time and ability of this theory to predict the risky choices of individuals, Glokner, A., Pachur, T.(2011) found that when Cumulative Prospect Theory was implemented with varying numbers of adjustable parameters, individual choice was predicted in a better way than a situation when cumulative prospect theory was implemented with fixed parameters. Moreover, during implementation of Cumulative Prospect Theory, stability of parameter estimates was found to be as good in a simple situation, as in a complex situation.

3.2. Capital Investment Behavior under Prospect Theory

The managers involved in making capital investment decisions on behalf of their firms came across various options and adopedt one or more of these available choices. There was varying

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degree of uncertainty or risk involved in such options which made the choice process difficult and complex. These complexities then became the cause of affecting the process of ultimate choice selection (Sawers, K.M.,2005).

The foundation used to construct neoclassical theory of investment by Jorgenson (1963) assumed that firms have to bear cost of capital in order to finance their investment opportunities by issuing stocks. This cost of capital might be paid to the stockholders of firms. According to this model, financial factors like profitability, leverage and liquidity were not important due to the reason that process of firm optimization was not dependent on these factors. Factors like change of tax policy and others which might have their impact on cost of capital of firms were also taken in to account. The theory assumed that both sources of finance internal as well as external were found to be a substitute of each other perfectly which means that availability of funds in order to finance investment activities of firms was very easy.

However, internal and external sources of financing were not perfect substitute of each other practically due to imperfections prevailing in the market. These market imperfections included information asymmetries, agency cost and transaction cost. Insiders and outsiders were not equally informed and thus internal and external sources of financing were not perfect substitutes. Due to information asymmetries, investors of a firm demanded premium for purchasing shares of that firm and external source of financing thus became expensive as compared to internal source (Myers & Majluf, 1984).

It has been observed in empirical studies that attitude of decision makers under Prospect Theory has its implications for investment decisions of firms as well. Kliger, D. (2011) reinforced the application of investors' behavior of being risk averse and risk seeking in their investment

decisions. He analyzed that whenever a firm was in the gain domain, the investment decision taken by that firm reflected the attitude of being risk averse. On the other hand whenever a firm was in loss domain, it reflected risk seeking attitude towards its investment decisions. The author also calculated reference point for each of the study year separately, instead of calculating an overall reference point for the whole study period. Wen, Y-F. (2010) empirically investigated the impact of risk averse, risk seeking and loss averse attitudes on corporate capital investment decisions taken under Prospect Theory. He used value function of Cumulative Prospect Theory as an empirical model in his study and found that a firm reflected risk averse attitude towards its capital investment, when that firm faced the situation of gain relative to a reference point, and reflected risk seeking attitude towards the same capital investment decision when it was suffering from loss relative to that reference point.

Application of Prospect Theory in investment decisions of investors in Nairobi Security Exchange has been examined by Mbaluka, P.,Muthama, C.,Kalunda, E.(2012). They tested the existence of framing effect and loss aversion in investment decisions of individuals in the market. Importance of framing effect was reinforced in the study by finding that investment decisions of individuals were influenced by their framing effect. Moreover, such decisions were also affected by their loss aversion attitude. Two well known theories of decision making under risk and uncertainty i.e. Expected Utility Theory and prospect theory have also been comparatively studied in order to describe choice behavior in strategic management decisions. Strategic management is basically involved in improving firm's performance and deals with two issues in this perspective. The first relates to corporate strategy i.e., where should a firm compete? and the second is how a firm should compete ? It has been examined that while making their strategic decisions, managers were found to be influenced by "framing effects".

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They often used to forecast boldly but did not opt bold and brave choices. Thus, there was a need for development of more sophisticated model of individual's decision making in order to minimize the negative effects of managers' decision framing. (Sebora,T.C.,Cornwall,R.,1995).

Statman, M. & Caidwell, D. (1987) have also investigated the impact of Prospect Theory mental accounting framework, self control and regret aversion biases of corporate firms on their investment projects. Their findings were that these behavioral biases became the cause of continuing a project for further one year which should otherwise have been liquidated one year earlier. The authors explained that risk seeking attitude of people was observed whenever they faced the situation of sure loss or gamble and the same phenomenon also worked in capital investment projects of companies. Principles of finance should be followed and projects should be evaluated on net present value basis. However, adverse impact of risk averse attitude of managers on their investment decisions, under condition of output demand uncertainty, have been tested empirically which indicated that whenever output demand was uncertain, it discouraged those firms to invest which were risk averse. While, firms having risk seeking attitude used to raise their investment in condition of higher level of output demand uncertainty. In order to know the response of managers towards output demand uncertainty, their attitude towards risk was of prime importance (Sterken, E. & Bo. H., 2007). Moreover, tendency of an agent to liquidate his investment at gain was found to be very high as compared to liquidating it at loss (Henderson, V., 2009).

Decision aids can also prove to be influential in reducing the risk aversion of individuals involved in making capital investment decisions of firms. Lyer, G., McBride, D., Reckers, P.(2012) investigated such implications and discussed about the circumstances in which decision tools were helpful. It has been found that importance of decision aids vary with varying

degree of ambiguity risk involved in capital investment decisions. While making capital investment decisions, these aids were however not found to be totally effective in overcoming the ambiguity averse choice behavior of individuals, rather these were found to be partially effective.

Investment behaviors of companies get influence from imperfections of capital market as well. Feichtinger,G.,Hartl,F.R.,Kort,M.P.,Veliov,M.V.(2008) observed that capital market imperfections and level of technological progress have simultaneous impact on investment behavior of the companies. They have studied the joint effect of these two variables and noticed the differing impact of embodied technological progress and disembodied technological progress on the productivity of capital goods. Productivity of only those capital goods which are built after the technological breakthrough was affected by the embodied technological progress, while productivity of all capital goods which have been installed was affected by the disembodied investment.

3.3. Financial Constraints & Capital Investment

The literature on the study of finance has sufficiently documented the role of financial constraints in affecting the capital investment decisions of companies. Financial hindrances, due to which firms are unable to have an access to external sources of finance, in order to cater the needs of their investment opportunities, are called financial constraints. Importance of internal sources of finance was undermined in the financial literature of earlier times. Study of Fazzari et. al. (1998) which shed light on importance of financial constraints of firms for their investment is considered as the first study on this topic. A study by Modigilani & Miller (1958) which gained importance in the field of finance is that investment of a firm is not related to its financial

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structure and one capital structure is as good as the other. According to them, financial structure of firms does not affect their market value and is not relevant to their investment related decisions. It is considered as one of the primary studies on the topic of financial structure and investment activities of firms.

Kalatzis,G.E.A., Castro,D.F.(2010) examined the impact of financial development on financial constraints and then the impact of financial constraints on investment activities of the firms. They found that investments by financially constrained firms were largely dependent upon and sensitive to their cash flow. Apart from the factors related with internal financial environment of firms, importance of various macroeconomic factors like level of financial development and interest rate of economy in turning the firms into financially constrained has also been recognized. Thus, role of the level of financial development for affecting investment activities of financially constrained firms became very clear.

In an attempt to know the impact of external sources of cash on financial policies of constrained and unconstrained firms, Almeida, Campello & Weisbach (2004) focused on sensitivity of cash to firm's cash flow instead of sensitivity firm's investment to its cash flow. According to them, financially constrained firms should have more tendency of saving large portion of their cash flow in the form of cash in order to cater their investment needs in future, as compared to financially unconstrained firms. Their results revealed that in firms which were in financial constraints, sensitivity of cash to firm's cash flow was positive.

Mixed results of these studies are evident of conflicts in the role of financial constrains in capital investment decisions. Financial constraints have been explained through cash flow in many studies. Whenever, there was no asymmetric level of information and no financial constraints

were there and market was also perfect, then cash flow of companies was not found as determinant of its capital investment decision. In such a situation, decision of capital investment was entirely dependent on investment opportunities. Wei, K.C.J., Zhang,Y.(2008) have also supported the overinvestment of cash flow hypothesis. It has been provided that cash flow has very well predicted investment decisions of firms' capital investment in real situation of the market. Positive relationship between cash flow and capital investment was found in studies but this relationship has been explained differently. Thus, investment of firms was affected by their financial factors i.e., financial constraints affect investment environment of firms. Existence of financial constraints in different economies was also found in the study of Cleary, S. (2006).

The impact of financial constraints on firms' investment has also been examined in Malaysian firms by Ismail, A.M. et al.(2010). They have concluded that firms suffering from constraints have to rely more on their internal financial resources to finance their investment opportunities. As investment of such firms was dependent mainly on their internal resources due to non availability of funds through external sources, so investment of such firms was used to fluctuate.

Moreover, the agency problem which became the cause of increase in agency cost was also found to be connected with an informational factor, as managers inside the firm were more informed than outside investors. Their personal interests were preferred by them over the interests of shareholders. In this situation of conflict in interests, management control was exercised in firms in order to safe guard the interests of outside investors. This practice raised agency cost in firms (Schiantarelli, 1996) and ultimately obtaining finance through external sources by such firms became costly. Besides costlier finance, access to such sources of finance by them also became limited. The firms then have to rely on their internal sources of finance for financing their future investment opportunities. This need of future investment through internal

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sources has to be met by curtailing dividend payments in the current year. Once, all funds through internal sources have been exhausted, the firms have to forego their further investment activities due to non availability of funds through external sources. As their investment activities have to become largely dependent upon and sensitive to internal sources of funds, such firms are called financially constrained firms.

The matter of overinvestment by managers, which is an agency problem, is often ignored in studies (Jensen & Meckling, 1976). It has been explained that large share holders have keen interest in increasing the share value of their firms, so they remain successful in dealing with conflicts between managers and stock holders. Jensen (1986) evaluated that positive relationship between these two variables is because of agency problem of managers. Managers of firms made capital investment of free cash flow on those projects as well which were not profitable. They did so for getting benefits of making this overinvestment. Free cash flow hypothesis has attributed this act of managers as "overinvestment symptom". But, Myers & Majluf (1984) explained this phenomenon in an alternative way. According to them, cost of internal funds available to managers for investment was too low than the cost of external funds and it happened due to asymmetric level of information. Thus, asymmetric information hypothesis explained that this positive relationship between cash flow and capital investment has been described as "underinvestment symptom", because a firm might lose to invest in some positive net present value projects due to availability of funds through external source at expensive rate.

However, in a diversified firm, capital investment decision of any one segment was found to be largely dependent upon the other segments' cash flow and because external sources of cash flow are costlier than cash flow from internal sources, so whenever a firm made decisions of its

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capital investment, financial constraints became an important factor playing role in such a decision (Lamont, 1997; Shien & Stulz, 1998).

Fazzari et al. (1988) investigated the role of financial constraints in capital investment decision of companies. They found that financially constrained companies have to largely depend on their internal cash flow for making their capital investment due to problems in getting cash from external sources. Whereas capital investment decisions in less financially constrained companies were largely dependent upon external cash flow. Hoshi et al. (1991) supported this argument of Fazzari et al (1988) through empirical evidence in their study. Many other studies have provided empirical support for the above studies of Fazzari et al. & Hoshi et al (1991). Firms have been classified in these studies on the basis of various characteristics like size, dividend payout and age etc. in order to identify their level of financial constraints.

Cleary, S. (2006) examined interrelationship between financial constraints and capital investment by firms. They found that relationship between cash flow and investment was more sensitive in those firms which were having stronger financial position. The same conclusion was drawn after controlling for dividend payout and size of firms. Likewise, the same relationship was found to be more sensitive in those firms whose dividend payout ratio was high. The results were the same after controlling firm size and its financial strength. However, contrary view was presented in other studies like Kaplan & Zingales (1997) who have found that relationship between investment and cash flow was the most sensitive to the external cash flow in those firms which were having higher financial constraints.

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3.4. Mechanism of Corporate Governance & Capital Investment

Improvement in corporate governance practices has helped in increasing the firm valuation significantly (Morey et al.,2009). It has been found that improvement in corporate governance mechanism in countries with poor laws of investors' protection helped in improving the performance and value of firms in those countries. Firms could make improvement in rights of their minority shareholders and environment for protection of their investors up to an extent independently, but these firm level reforms could not be a substitute of external governance mechanism in the form of country level reforms in legal infrastructure (Klapper,F.L., Love,I.,2002).

Studies on the worst financial crisis of 1997 which affected Thailand and most of its neighboring economies revealed that poor governance practices were the cause of poor investment and financing policies of the firms which ultimately led towards this horrible crisis. Connelly, T.J., Limpaphayom, P.& Nagarajan, J.N.(2012) have examined the relationship between corporate governance standard practices and value of firm in the business environment of Thai firms which have complex pyramidal ownership structure. They have found positive relationship between corporate governance and firm value as depicted by corporate governance index and Tobin q. While, the presence of pyramidal ownership structure would nullify the benefits which have indicated that whenever ownership structure of firms would not have been transparent, it could raise questions about effectiveness of the governance mechanism.

Li,X. W, Chen, C.C., French, J,J.(2012) studied the causal relationship between stock market liquidity, corporate governance and firm value in Russian market. They found that in a country where business was not controlled by a strong legal infrastructural framework, the involvement

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of state was at higher level, equity markets were underdeveloped and concentration of ownership was high, the improvement in governance level in such countries could significantly increase profits. They have concluded that increase in liquidity would positively affect corporate governance mechanism and improvement in corporate governance would ultimately increase the value of firm.

Guo, Z., KGA, K.U. (2012) have studied the impact of various corporate governance variables on performance of listed firms in Sri Lanka. Among these variables, impact of non-executive directors, board size and CEO duality on ROA and Tobin Q, as measures of firm performance, was checked. They concluded that there was a negative but insignificant relationship between non executive directors and firm performance. This view was contrary to other findings indicating a positive relationship between these two variables. Although, impact of CEO duality on firm performance was also having mixed view in the literature, yet this study has examined an insignificant relation between these two. Likewise, the relationship between board size and firm performance was also found to be negative indicating that large board was not recommended. In other words, the study has indicated that small board assists in improving the firm performance.

Institutional investors, board of director size, CEO duality, and independence of directors have also its implications regarding debt ratio of companies. Studies have indicated that level of corporate governance reforms was very important in framing the attitude of investors for making investment. Countries where corporate governance mechanism was weak, domestic investors hesitated in making investments. Anyhow, institutional investors made investments in such markets which were of emerging nature. Thus, the role of institutional investors in emerging markets has become very prominent. Pushner (1995) has examined in his study on companies

listed in Japan that institutional ownership has affected corporate leverage and he has found a negative relationship between institutional investors and financial leverage.

Effectiveness to separate management and decision control in an organization is widely accepted in the literature. Role of CEO duality in improving the organizational performance and ultimate value is of great importance. Agency theory and Stewardship theory described the conflicting role of CEO duality. According to Agency theory, managers may pursue their personal benefits and interests which depart from the interests of investors. Dual role of such managers may become the cause of inefficiency and decrease in the value of firm. While, Stewardship theory explains that role of executive managers who sit on the board chair as well helps in increasing the value of firm. Such managers may be in a position to implement strategic decisions of firm in an effective and faster style because of their dual role in an effort to become a good steward of assets of their firms.

A common view regarding CEO-Chairman duality found in academic debate is that in order to develop better leadership structure, position of CEO should be separated from position of chairman in organizational context because separating these positions will help in increasing the performance and value of firms. But Brickley, A.J. et al (1970) presented a contrary view in their study on US firms by challenging this traditional view. They conducted cost and benefit analysis of separating these two positions keeping in view the agency cost, cost of changing successive process and information cost involved in it and found that in large US firms, cost of separating these positions was greater than its benefits. Similarly, separation of CEO from chairman did not cause an increase in market price of shares owned by shareholders. Thus, combining the title of CEO and chairman in companies was found to be in the interest of shareholders.

Guillet,D.B. et al.(2013) examined the role of CEO duality in the perspective of Stewardship theory in the US restaurant industry. He found that CEO duality improved the firm performance in full service restaurants due to the intensiveness of labor and complex operations of such restaurants as compared to quick service restaurants. They explained that the role of restaurant type in moderating the relationship between CEO duality and firm value was of great importance. It has also been examined that CEO duality has resulted in eliminating information asymmetry which has ultimately led towards availability of more loans through external sources. Moreover, duality has reduced the problems which were associated with management and ownership separation (Fosberg, 2004).

Although board of director's size is very important in development of corporate governance mechanism, yet this issue has not been debated conclusively.

Role of outside directors to run an organization effectively was very obvious than the role of inside directors, because they had to work for their reputation (Weisbach, 1988). Firms which were owned by insiders often had to make capital investment which was entirely dependent upon their cash flow because management of such firms was not willing to lose its control due to dilution of their ownership position (Morck, Shliefer & Vishny, 1988). Importance of non executive directors in the board was increasing for evaluating the independence of the board. Role of such directors was very important as they have evaluated the performance of executive directors of the firm. Existence of more non-executive directors in the board has protected firms against uncertainties and became the cause of reducing frictions and conflicts between the management of firms and its owners (Arbor, 2007).

Importance of independent board of directors and its chairman had been recognized as a tool for improving governance, performance and controlling various scandals relating to trading activities of mutual funds in United States. In this perspective, SEC proposed that 75% of the directors on the board should be independent i.e., non executive directors. But Ferris, P.S., Yan, S.X. (2007) presented a contrary view in their study and found that independence of board and chairman both were not related with reducing scandals of late trading and market timing in mutual fund industry. In other words, these variables did not help in improving the governance and overall performance of mutual funds.

Ownership of firm by its managers was found to be positively related to firm value, indicating that internally owned firms have exhibited better performance (Chen et.al., 2003). Concentration of ownership was the cause of poor performance in companies. Thus, CEO – Chairman duality was negatively related to firm performance (Chen, Z et al., 2005). Study of Lin, C., Ma, Y.& Su, D. (2009) conducted on Chinese public listed firms provides that ownership and firm efficiency were found to be negatively related while positive relationship has been found between firm efficiency and public as well as employee sharing ownership firms in China. Moreover, ownership concentration and firm efficiency relationship has indicated the involvement of largest shareholder in Tunneling activities. Among different type of shareholders, the worst impact on efficiency was exerted by the state. Number of board meetings and existence of outside directors on the board has assisted in improving efficiency. Development of provincial markets as an indicator of checking the strength of mechanism for external governance had positive relationship with efficiency. It has also been found that state owned organizations have showed better efficiency after restructuring.

Xu. X., Wang, Y.(1999) have also investigated the impact of ownership structure on performance of listed firms in China. It has been examined that ownership structure in China was very much concentrated as there were three groups of shareholders i.e., state, individuals and institutions (legal persons). Each of them was holding approximately thirty percent of shares in a typical public listed firm. Consistent with findings of Claessens et al.(2002), ownership concentration was positively correlated with profitability of firms. Profitability was positively related with institutional segment of ownership which has indicated that institutional owners had strong incentive of increasing profitability by exercising good corporate governance mechanism in management affairs of firms. Findings have indicated that when mix of ownership and its concentration were both considered in analysis, the results became stronger, meaning thereby that both these variables had stronger impact on profitability.

In an attempt to examine the effect of ownership concentration on value of Indian firm within the analysis framework of agency problems between two block holders namely insiders and outsiders, Selarks, E. (2005) found a curvilinear U-Shaped relationship between market value of firm and fraction of shareholding by insiders till that point when ownership of this block reached at substantial level. It means that such shareholders have expropriated until their ownership reached at a higher level after which such incentive started decreasing due to the effect of the involvement of their personal wealth. In this situation of owning substantial level of shares in a firm by insiders, positive relationship was developed between ownership by insiders and market value of firm. So for as the impact of outsiders' ownership on value of firm was concerned, it has been found that when ownership by this block holders was at lower or higher level, it did not affect the value of firm. However, when ownership by these blocks holders was at moderate level, it has negatively affected the firm value.

It has been documented that whenever companies were controlled by large shareholders, they expropriated wealth of those companies in pursuit of seeking personal benefits. Actually, they did so at the cost of minority shareholders. Therefore, separation of management and controlwas recommended (La Porta, 1999). Positive relationship between cash flow ownership of large shareholders and firm value has also been observed. There should be a balance between cash flow rights and control rights of largest shareholders. If control rights of such shareholder were more than their cash flow rights, it would negatively affect the value of firm (Claessens et al. 2002). Leung.et al.,(2013) have also found a relationship between corporate governance and value of firm in Chinese listed firms. They found that ownership of largest shareholder in the case of state controlled listed firms of China and firm value exhibiedt a non linear relationship due to Tunneling effect through which such shareholders, governing the resources of these firms, used them for personal and political benefits at the cost of other shareholders.

However, expropriation of minority shareholders' interest by the controlling shareholders could be minimized by an effective board. But problem of influencing the board composition by controlling shareholders was again there, because influencing the election of board of directors and appointment of senior management of companies by the controlling family has been found very common (Claessens et al. 2000). Affiliation of board with controlling family would result in negative effect on value of firm (Yeh & Woidtke, 2005). If directors and managers in a company were appointed independently, they would try to make rational decisions in the best interest of the company and would ultimately improve its value. It means that they would make capital investment decisions rationally (Balbat et al. 2004).

A study on the topic of corporate governance and value of firm conducted by Ammann, M. .Oesh, D. & Schmid, M.M.(2011) used a data set of about twenty three hundred companies

from twenty two developed countries. A salient feature of this study was that it has investigated the impact of governance related social attributes like charges for political donations by companies and violations of workplace safety measures within the perspective of corporate social responsibility on the value of the firm along with impact of governance indices constructed from sixty four governance related attributes on firm value. It has been concluded in this study that cost of implementing corporate governance was relatively less than the benefits of its monitoring. It will ultimately lower the cost of firms' capital and increase cash flow of the firms' shareholders.

Independence of the audit committee has also implications for the quality of firms' earning as depicted by its accruals. If audit committee was independent, it would assist in selection of high quality accruals of a firm and if audit committee was not independent, accruals of low or poor quality would be selected. While, it has also been found that if CEO and chairman was the same person in the firm i.e., dual role was performed by one person, it would adversely affect the independence level of audit committee, in spite of the fact that all the directors in the audit committee were independent. It means CEO duality would have negative effect on audit committee independence. When independence level of the audit committee was low, it would affect the earning quality negatively. Moreover, it has also been investigated that although CEO-Chairman duality had not directly lessen the quality of earning, it would become the cause of affecting the relationship between audit committee independence and earning quality (Kamaruddin, A.K.,Ismail ,W.A.W., Samsuddin, E.M., 2012).

Research has also documented the impact of shareholders activism on performance and value of firms. Choi, Y.W., Cho, H.S. (2003) examined the impact of shareholders activism on performance of companies in Korea in comparison with shareholders activism in USA and found

that shareholders activism in Korea did not have negative impact on financial performance of companies and on wealth of shareholders. In comparison with US companies where shareholders activism was mainly led by institutional shareholders, activism of shareholders in Korea was led by NGO named People's Solidarity for Participatory Democracy. They found that outcomes of this NGO led activism of shareholders in Korea were less successful than the outcomes of shareholders activism in USA in improving the financial performance of companies.

3.5. Risk- Return Relationships under Prospect Theory

The value function of Cumulative Prospect Theory explains risk aversion of investors in the gain domain and risk seeking of investors in loss domain which implies that risk and return are negatively correlated. Bromiley. P. & McNamara, G. (1999) investigated this relationship with the help of two measures of return. They found that there was significant and positive relationship between risk and interest rate return, while a negative relationship between risk and risk adjusted expected return. Hence, it could be implied that the relationship between risk and return also depends upon the return measure.

Feigenbaum, A. & Thomas, H. (1988) have found that risk and return in firms having return below than their target level was negatively correlated and risk and return were positively correlated in firms having return above than their target level return which have indicated the sensitivity of this relationship to the target level return. However, positive relationship between ex- ante risk and ex- ante return, ex- post risk and ex- post return has been observed. While, negative risk return relationship between ex- post return and ex- ante risk as well as ex- ante return and ex- post risk has alsoexisted (Brockett, P. L. , Cooper, W. W. , Kown, K. H and Ruefli, T. W. , 2003).

Miller, K. D. & Leiblein, M. J. (1996) tested the hypothesized relation between risk and return as suggested by the behavioral & Prospect Theory by introducing an other measure of risk, i.e. , down side risk, and found a positive effect on the subsequent performance of companies, whereas they have found negative effect of performance on risk measures. Impact of diversification on risk has also been studied in the context of diversification strategies of firms and curvilinear relationship between risk and return has exhibited the behavior that whenever returns were higher, the managers had inducement to take more risk in the sense of safety felt at this higher level of return and whenever level of return was lower, it again induced them to take more risk having a feeling of gambling (Chang, Y. & Thomas, H., 1989). Sensitivity of risk-return relationship has also been found with reference to time period because Ruefli, T. W. (1990) has observed negative risk- return relationship during the period of instability in the market and positive relationship between these two variables during the period of stability in market conditions.

Johnson, H. J. (1994) has also evaluated the relationship between risk and return. He found that when data was analyzed in totality, there was no significant correlation coefficient between risk and return for above target banks and for below target banks, the said relationship was negative as well as significant. It indicates that Prospect Theory was supported for the below target level banks particularly when data was not divided into groups. When the same data of banks were classified on the basis of region, the results were even twice more stronger. Thus, Fishburn measure was the best measure of risk for below target firms. In another study on application of Prospect Theory in banking industry of emerging economies, Godlewski, C. J. (2004), examined that whenever volume of loans, relative to total assets of bank was above target level, the bank woul become risk averse and ultimately significant & negative correlation coefficient between

distance to target in terms of bank loan and standard deviation would exist and when distance to target in terms of bank loans relative to total assets was on the other side i.e., below target level indicating a loss, then bank attitude woul be in the style of risk seeking.

Jegers, M. (1991) observed relationship between risk and return in Belgian companies and concluded that risk and return was negative & significantly correlated when the performance of companies in terms of their return was below than the median return of industry. The analysis was conducted across industries and was also confirmed through negative association ratio of these companies. For above target level return, said relationship was found to be positive. Usefulness of Prospect Theory for explaining this relationship in the behavioral context was thus highly appreciable.

3.6. Gap Analysis

Kahneman & Tversky developed original version of Prospect Theory & Cumulative Prospect Theory for application in risky decisions made by individuals but later on its application was extended to decision making under risk or uncertainty at organizational level. Studies by Chang & Thomas (1989); Sinha (1994); Kliger et al (2011); Jegers (1991) and Gooding et al (1996) applied Prospect Theory at organizational level decisions. Prospect Theory has also been extensively used in various fields of economics, investment, and management (e.g., Bromiley, 1991; Reiger & Wang, 2006; & Shimizu, 2007). However, application of this theory in corporate finance decisions is very rare. The main theme of this study is to investigate the implications regarding application of this theory in investment decisions of organizations and negative relationship between risk and return. It is having substantial effect on investment climate of a country yet; this area is new for researchers. In this study, efforts are made to fill this gap

existing in the literature of behavioral corporate finance. Thus, this study is an addition to the literature regarding application of behavioral finance in the field of corporate finance.

3.7. Hypotheses

The following hypotheses have been developed and proposed for the purpose of testing them on the basis of the above review of literature:

H_1: Corporate firms have risk averse attitudes towards capital investment in the gain domain.

H_2: Corporate firms have risk seeking attitudes towards capital investment in the loss domain.

H_3: Financial limitations of firms do not affect their risk averse behavior in the gain domain.

H_4: Financial limitations of firms affect their risk seeking behavior in the loss domain.

H_5: Good corporate governance assists in eliminating the risk averse behavior of firms in gain domain.

H_6: Good corporate governance is helpful in eliminating the risk seeking behavior of firms in loss domain.

H_7: Financial limitations and good corporate governance collectively assist in eliminating risk averse behavior of firms in their gain domain.

H_8: Financial limitations and corporate governance collectively assist in eliminating risk seeking behavior of firms in their loss domain.

H_9: Negative correlation exists between risk and return of firms having return below their target level within and across the industry.

H_{10}: Positive correlation exists between risk and return of firms having return above their target level within and across the industry.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1. Introduction

This chapter deals with research methodology used in this study and it includes information about its population, sample size, variables, instruments, data collection methods, econometric models and data analysis tools used for processing data.

4.2. Population

Population of this study consists of 450 companies listed on Karachi Stock Exchange, excluding financial institutions.

4.3. Sample

Due to data availability problem, the purposive sample of this study consists of 139 non financial companies.

4.4. Variables of Study

Change in Capital Investment (ΔCI) represented through change in net fixed assets divided by sales, following Wen,Y-F., (2010) has been taken as dependent variable and financial performance of firms which has been explained through return on assets (ROA) net profit before tax divided by total assets, following Brealey, R., & Myers, S., (2007) and return on equity (ROE) net profit after tax divided by owners equity, following Brealey, R., & Myers, S., (2007) has been taken as independent variable.

Apart from these, two control variables have also been used in the study. These control variables consist of corporate governance and financial constraints of companies. So far as, measures of corporate governance are concerned, these consist of board size (BSI) natural log of total number of directors on the board, following Shah, Z.A.S (2009), CEO-Chairman duality (DUA) whether or not CEO and chairman are the same person, audit committee independence (IND) number of non executive directors in audit committee divided by total number of directors in audit committee, following Forkers, (1992), shareholders activism (ACT) number of meetings attended by more than 70% directors divided by total number of meetings, following Lin Chen et.al., (2008), institutional ownership (IO) number of shares held by institutional investors divided by total number of shares, following Lei Luo, (2005), ownership concentration (OC) shares held by top ten shareholders divided by total number of shares, following Lin Chen et.al., (2008) and board independence (IND) non executive directors on the board divided by total number of directors, following Kee et.al, (2003). While, measures of financial constraints consists of operating cash flow to sales (OCF) net profit after tax plus depreciation divided by sales, following Fazzari et.al., (1988), free cash flow to sales (FCF) operating cash flow plus after tax interest minus change in working capital and change in fixed assets divided by sales, following Brealey, R., & Myers, S., (1981), debt equity ratio (DER) total liabilities divided by owners equity, following Brealey, R., & Myers, S., (2001), dividend payout (DPO) total dividend divided by net profit after tax, following Brealey, R., & Myers, S., (2001) and fixed assets ratio (FAR) net fixed assets divided by total assets, following Wen, Y-F., (2010). All these variables have been summarized in the following table:

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Table 4-1. Definition of Variables

Variable Name	Type of Variable	Definition of Variable
Chang in Capital Investment (ΔCI)	Dependent variable	Change in gross fixed assets/sales
Return on Assets (ROA)	Independent variable	Net Profit before tax/Total assets
Return on Equity (ROE)	Independent variable	Net profit after tax/owners equity
Board size (BSI)	Control variable	Natural log of total number of directors in the board
CEO Duality (DUA)	Control variable	CEO and Chairman are the same individual
Audit committee Independence (ACI)	Control variable	No. of non-executive directors in audit committee/ Total No. of directors in audit committee
Shareholders Activism (ACT)	Control variable	No. of meetings attended by more than 70 percent directors/Total no. of meetings
Institutional Ownership (IO)	Control variable	No. of shares held by institutional investors/ Total No. of shares
Ownership Concentration (CON)	Control variable	Shares owned by top ten shareholders/ Total No. of shares
Board Independence (IND)	Control variable	Non-Executive directors in the board/ Total No. of directors
Operating cash flow to sales (OCF)	Control variable	Net profit after tax + Depreciation/sales
Free cash flow to sales (FCF)	Control variable	Operating cash flow + Interest (1-Tax Rate)- change in working capital- change in fixed assets/ sales
Debt equity ratio (DER)	Control variable	Total liabilities/ owners Equity
Dividend Pay Out (DPO)	Control variable	Total dividend/Net profit after tax
Fixed Assets Ratio (FAR)	Control variable	Net fixed assets/total assets

4.5. Instrument

In order to collect data for examining the practical implications of prospect theory in corporate sector of Pakistan, a questionnaire based on seven point Likert Scale was adopted. This questionnaire has been attached as "Appendix".

4.6. Data Collection

Data analysis period in this study was 1995- 2011. Investment projects of companies are decided on long term basis and are not changed frequently in the short run. Moreover, financial performance of companies is also evaluated on yearly basis more appropriately. So, annual data is used in this study. Moreover, data used are of two types i.e. secondary and primary.

4.6.1. Secondary Data

Secondary data were collected from various published sources like Balance Sheets Analyses by State Bank of Pakistan, annual reports of companies, web sites of Karachi Stock Exchange and Business Recorder. Certain implications of Prospect Theory i.e., loss aversion of finance managers in firms, their risk averse attitude in gain domain, risk seeking attitude in the loss domain and time diversification effect have been tested with the help of primary data as well in order to confirm the alignment of results presented by the primary and secondary data with regard to the application of prospect theory in capital investment decisions of companies in Pakistan.

4.6.2. Primary Data

A survey questionnaire was distributed to corporate managers involved in capital investment decisions of their firms. Their responses are then evaluated empirically to prove whether implications of Prospect theory existed in practical context of Pakistan or not. The questionnaire used in this study has been adopted from the study of Oslen (1997) with some minor changes. This questionnaire consists of three parts. First part is comprised of six questions relating to loss aversion of firms. It is evaluated through risk attributes or risk measures. As investment risk is attached with the possibility of down side returns, so loss averse attitude of corporate firms has been measured with the help of these attributes. All the questions of first part have been evaluated on 7 point Likert scale ranging from 1 (very important) to 7 (very unimportant). Second part of this questionnaire consists of two statement questions for measuring "reflection effect". One of these statement questions is related to risk aversion of firms in gain domain and the second question is related to risk seeking attitude of firms in loss domain. Third part of this questionnaire is related to a scenario which is helpful in measuring "time diversification effect" and has been evaluated on 3 point Likert scale.

This questionnaire has been attached as an "APPENDIX". Respondents of this questionnaire were persons who were involved in capital investment decisions of their companies. They were CFOs, CEOs and Managers of Finance and Accounts departments. This questionnaire was circulated among the same 139 companies which were included in secondary data analysis. Responses were received from 80 companies with a response rate of 57.14%.

4.7. Theoretical Background of Study Model

The value function of Cumulative Prospect Theory has been used as basic empirical model in this study. Capital investment of firms is taken as dependent variable and financial performance of firms which is explained through return on assets (ROA) and return on equity (ROE) has been taken as independent variable. Risk averse behavior of firms in making their capital investment decision is evaluated through value function in the gain domain and risk seeking behavior of firms in making their capital investment decision has been investigated through value function in the loss domain. Rationale for using capital investment as dependent variable is that investment decision of a firm is greatly influenced and depends upon its financial performance. The information about future profitability of a firm can be obtained from its capital investment which can be regarded as a variable reflecting value or utility obtained from financial performance. This utility from financial performance was represented through change in capital investment ratio, while financial performance represented gain or loss relative to a reference point. So, capital investment has been described here as dependent variable and financial performance as an independent variable in the basic model of this study.

4.8. Parameters Estimation under Cumulative Prospect Theory

According to Kahneman & Tversky, parameters of α and β described by two phase value function of CPT should be equal to each other because risk aversion in attitude of investors in the gain domain is equivalent to their risk seeking attitude of the same magnitude in the loss domain, a phenomenon commonly explained as "reflection effect". Not only α and β value should be equal to each other but these values should also be less than 1, because α value being

less than one indicates risk aversion of investors in the gain domain and β value being less than one indicates their risk seeking attitude in the loss domain. The value of λ coefficient should be greater than 1 in order to exhibit pattern of "loss aversion" of the decision maker as per the norms of this theory. Thus, the null hypothesis that $\lambda \leq 1$ is rejected. The value of γ should be ideally but not necessarily equal to 1. It makes difficult to reject the null hypothesis that $\gamma = 1$. Value of parameters α, β and coefficients of γ, λ have been estimated through iterative process by using regression equation 1 of this study for the gain and regression equation 2 for the loss domain. The K&T have estimated α and β values 0.88, λ value 2.25 and γ value 0.61 respectively in the original version of CPT.

4.9. Data Analysis

Data used in analysis of this study was initially comprised of panel data. All sample companies were first classified into five segments on the bases of their belongings to a particular sector of business. These sectors were textile, sugar, paper, cement and others. Companies of each sector were then arranged on the bases of measures of their financial performance i.e., ROA and ROE. This arrangement was made from smallest to the highest ROA and ROE of companies respectively. After this process, sequence of companies was changed from arrangement with respect to years to arrangement with respect to measure of financial performance. A company which earned gains in a year or years was located in the list of gain bearing companies in those years. The same company when sustained loss in any other year or years, its location was changed from gain bearing to loss sustaining companies in those years of losses. Presentation of each company in each sector was now showing a mixed pattern during the same data period. After that, the data was neither in the form of panel nor in the form of time series.

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As Prospect Theory is based on the notion of gain or loss calculations relative to a reference or target point, next step was to determine the reference point of companies belonging to each sector. In each sector, upper 40% companies with regard to their financial performance measure of ROA and then ROE were classified as gain domain companies and the lower 40% companies with regard to their same financial performance measures were classified as loss domain companies. It means that financial performance of middle 20% companies in each sector was set as reference point. Accordingly, the number of observations was reduced from 2224 to 1781. Number of companies in different years belonging to gain domain were 891 and belonging to loss domain were 890. Wen, F.W.(2010) has set reference point of middle 50% companies by classifying upper 25% companies in each sector as gain domain companies and lower 25% companies as loss domain companies. Arrangement of companies included in this study has been presented in the under mentioned table:

Table 4-2. Classification Of Companies Observations

Sr. #	Sector	No. of Observations before Reference point Setting	No. of Observations after Reference Point Setting
1	Textile	1168	936
2	Sugar	288	231
3	Paper	80	64
4	Cement	80	64
5	Others	608	486
Total		2224	1781

After setting reference point criteria and classifying companies belonging to gain domain and loss domain, this mixed data was to be rearranged on yearly bases from the years 1996 to 2011. As, there was no other option for making this data meaningful for analysis, so it was rearranged on this pattern. This rearrangement was done in order to find application of prospect theory in each of the analysis year. Thus, companies belonging to gain and loss domain were identified for each of this year, separately. Finally, technique of regression analysis was used on this yearly arranged data in order to find application of prospect theory in capital investment decisions of corporate sector in Pakistan. Although, we have calculated one reference point for the entire data period, it can also be calculated separately for each of the analysis year as calculated by Kliger, D. (2011).

4.10. Econometric Models for Hypotheses Testing

To test the first hypothesis i.e., risk averse attitude of firms for capital investment in the gain domain, the following regression model has been used:

$$\Delta CI_i = \gamma \ (Fin \ Per_i)^\alpha + \varepsilon_i \qquad (1)$$

Whereby,

ΔCI_i = Annual change in ratio of capital investment to sales.

γ = Co efficient for curvature of utility from financial performance.

Fin Per$_i$ = Financial performance of companies reflected through their return on assets (ROA) & return on equity (ROE) .i.e., gain or loss relative to a reference point.

α = exponent or power function used for reflecting condition of risk aversion in situation of gain.

ε_i = Error term

The following regression equation is applied to test the second hypothesis i.e., risk seeking attitude of corporate firms for capital investment in the loss domain:

$$\Delta CI_i = -\lambda \ (-Fin \ Per_i)^\beta + \varepsilon_i \qquad (2)$$

Whereby,

λ = Co- efficient of loss aversion

β = Exponent or power function used for reflecting condition of risk seeking in situation of loss.

While other notations have already been explained above in hypothesis 1

Third hypothesis (to know the impact of financial limitations of firms on their risk averse behavior) has been tested with the help of the following regression model:

$$\Delta\, CI_i = \gamma\; (Fin\, Per_i{}^{\alpha 1}\, .DER_i{}^{\alpha 2} .FCF_i{}^{\alpha 3} .OCF_i{}^{\alpha 4} .DPO_i{}^{\alpha 5} .FAR_i{}^{\alpha 6}) + \varepsilon_i \qquad (3)$$

Fourth hypothesis which relates to examining the impact of financial limitations of firms on their risk seeking attitude in their loss domain is tested with the following regression model:

$$\Delta\, CI_i = -\lambda [(-Fin\, Per_i){}^{\beta 1}\; (-DER_i){}^{\beta 2} (-FCF_i){}^{\beta 3} (-OCF_i){}^{\beta 4} (-DPO_i){}^{\beta 5} (-FAR_i){}^{\beta 6}] + \varepsilon_i \qquad (4)$$

The following regression model has been applied to evaluate fifth hypothesis i.e., to know the impact of corporate governance on risk averse attitude of firms in their domain of gain:

$$\Delta\, CI_i = \gamma\; (Fin\, Per_i{}^{\alpha 1} .BSI_i{}^{\alpha 2} .IND_i{}^{\alpha 3} .DUA_i{}^{\alpha 4} .ACT_i{}^{\alpha 5} ACI_i{}^{\alpha 6} IO_i{}^{\alpha 7} CON_i{}^{\alpha 8}) + \varepsilon_i$$

$$(5)$$

The sixth hypothesis i.e., to evaluate the impact of corporate governance on risk seeking attitude of firms in the domain of loss has been tested with the following regression equation:

$$\Delta\, CI_i = -\lambda\; [(-Fin\, Per_i){}^{\beta 1}\; (-BSI_i){}^{\beta 2} (-IND_i){}^{\beta 3} (-DUA_i){}^{\beta 4} (-ACT_i){}^{\beta 5}\; (-ACI_i){}^{\beta 6}\; (-IO_i){}^{\beta 7} (-CON_i){}^{\beta 8}] + \varepsilon_i \qquad (6)$$

In order to evaluate overall impact of financial limitations of firms and corporate governance mechanism on their risk averse attitude which has been specified as hypothesis seven in this study, the following regression models has been applied:

$$\Delta CI_i = \gamma (Fin\, Per_i{}^{\alpha 1} .DER_i{}^{\alpha 2} .FCF_i{}^{\alpha 3} .OCF_i{}^{\alpha 4} .DPO_i{}^{\alpha 5} .FAR_i{}^{\alpha 6} .BSI_i{}^{\alpha 7} .IND_i{}^{\alpha 8} .DUA_i{}^{\alpha 9} .ACT_i{}^{\alpha 10} .ACI_i{}^{\alpha 11} .IO_i{}^{\alpha 12} .CON_i{}^{\alpha 13}) + \varepsilon_i \qquad (7)$$

The following model has been applied for examining the overall impact of financial performance and corporate governance mechanism of firms on their risk seeking behavior in the loss domain which has been mentioned as hypothesis eight in this study:

$$\Delta\, C\, I_i = -\lambda\; [(-Fin\, Per_i){}^{\beta 1}\; (-DER_i){}^{\beta 2} (-FCF_i){}^{\beta 3} (-OCF_i){}^{\beta 4} (-DPO_i){}^{\beta 5} (-FAR_i){}^{\beta 6} (-BSI_i){}^{\beta 7}$$

$$(-IND_i){}^{\beta 8}\; (-DUA_i){}^{\beta 9} (-ACT_i){}^{\beta 10} (-ACI_i){}^{\beta 11}\; (-IO_i){}^{\beta 12} (-CON_i){}^{\beta 13}] + \varepsilon_i \qquad (8)$$

The above mentioned regression models have been applied for testing first eight hypotheses. While hypothesis 9 (negative relationship between risk and return in firms having below target level return) has been tested with the help of the following model:

$$\rho_{-\text{Fin Peri.}\sigma i} \quad = \quad -1 \leq \rho i \leq 0 \tag{9}$$

$\rho_{-\text{Fin Peri.}\sigma i}$ = Coefficient of correlation between return and risk of firms having below

target level return

σ = Standard deviation of financial performance i.e., measure of risk.

The last hypothesis i.e. hypothesis 10 has been tested with the following regression model:

$$\rho_{\text{Fin Peri.}\sigma i} \quad = \quad 0 \leq \rho i \leq 1 \tag{10}$$

$\rho_{\text{Fin Peri.}\sigma i}$ = Coefficient of correlation between return and risk in firms having above target

level return

CHAPTER FIVE

RESULTS AND DISCUSSION

This chapter covers detailed analysis of data regarding implications of prospect theory which include descriptive statistics, test of multicollinearity, regression analysis and factor analysis. MS Excel, SPSS and Stata 14.0 have been used for achieving results of this data analysis.

Data used in analysis of this study was longitudinal or panel data. Change in capital investment has been used as dependent variable and financial performance of companies has been used as an independent variable. ROE and ROA are used as measures of financial performance. Apart from it, financial constraints of companies and corporate governance have been taken as control variables. Financial constraints of companies are reflected through debt equity ratio (DER), dividend payout (DPO), fixed assets ratio (FAR), free cash flow to sales (FCF) and operating cash flow to sales (OCF). Whereas, audit committee independence (ACI), board independence (IND), board size (BSI), CEO-Chairman Duality (DUA), ownership concentration (CON), institutional ownership (IO) and shareholders activism (ACT) are used as variables of corporate governance. Data period of this study is 1995-2011, but implementation of code of corporate governance in Pakistan in 2002 made availability of data relating to corporate governance impossible for the entire data period. So, its data could be made available from 2006. Data was then split into two periods; first period is 1996-2005. Application of prospect theory in capital investment decisions of companies was first checked for this period and later on the impact of financial constraints as control variable on this prospect theory relationship and its allied

implications was checked for the same period. Second period is for years 2006-2011. Application of prospect theory in capital investment decisions of companies was first checked for this time period and later on, impact of financial constraints and corporate governance, as control variables, on this relationship and allied implications of Prospect Theory was checked for the same period.

5.1. Transformation of Basic Model Data

Two phase value function of prospect theory was used as basic empirical model of this study. First phase was related to gain domain companies and the second phase was related to loss domain companies. Nature of the study model was non-linear regression model with power function α for gain domain and β for loss domain. According to prospect theory, α and β values are necessarily less than 1 in order to reflect risk averse and risk seeking attitudes among investing companies in gain and loss domains, respectively. An interesting situation was observed during the data analysis phase when all the companies were divided into two categories of gain and loss domain companies. Values of dependent and independent variables in some years showed negative signs i.e., indicating losses. In order to regress a non-linear regression model, any computational software first converts a non-linear model into a linear model with the help of taking log on both sides of equation. First problem faced in dealing with the data was that taking log of negative values was not possible. Secondly, if a fraction value is the power function of any negative value, its solution will not be a real number. Our power function was also a fraction number. There was no apparent mathematical solution of these two problematic situations. In order to resolve these issues, negative values of dependent and independent variables were first converted into positive values. For this purpose, the highest negative value of

the variable was taken in the entire data period as if it was a positive value, then added 1 into it. This total was then added in all serial values of that variable. Suppose highest negative value in the column of dependent variable was -2.35. Adding 1 in to this value, as if it was a positive value, the total became 3.35 and this total value was then added in all values of the same dependent variable. Thus, all negative values were converted into positive values by following the same procedure in each year. This technique of data transformation is supported by Wicklin, R.(2010). Regression analysis was then applied on this transformed data.

Descriptive statistics and correlation matrix of two data periods of 1996-2005 and 2006-2011 are presented in the under mentioned tables:

TABLE 5-1. Correlation Matrix

ROE Independent Variable

2006-2011

	ACI	IND	BSI	ΔCI	DUA	DER	DPO	FAR	FCF	CON	IO	OCF	ACT	ROE
ACI	1													
IND	-0.54772	1												
BSI	0.001135	0.004521	1											
ΔCI	-0.04258	0.147085	-0.00549	1										
DUA	-0.01204	-0.02298	-0.01651	-0.49017	1									
DER	0.060459	0.081922	0.034597	-0.03677	-0.02106	1								
DPO	0.033669	-0.04409	-0.00136	0.146899	-0.01567	0.511255	1							
FAR	-0.09028	0.428346	0.003198	0.182735	-0.03748	0.147615	-0.00839	1						
FCF	-0.03742	0.061438	0.042534	0.094445	-0.00915	-0.00957	0.001415	0.056065	1					
CON	0.007497	0.006709	0.009834	-0.03035	0.045014	0.003742	-0.00928	0.003189	0.002297	1				
IO	-0.02076	-0.00496	0.057468	-0.05856	0.062737	-0.04919	-0.01797	-0.04394	-0.02776	-0.07785	1			
OCF	0.004763	0.004462	0.008562	-0.01715	0.011349	0.01194	0.007618	0.014547	0.060978	0.222552	-0.08925	1		
ACT	0.055893	-0.06303	0.04238	-0.00538	-0.02919	0.000238	0.010305	-0.01567	0.140943	-0.09927	-0.00136	-0.06282	1	
ROE	-0.01133	-0.01606	0.000175	0.214424	-0.03051	-0.28585	0.001689	0.08238	0.044386	-0.00548	-0.0045	-0.007	0.028487	1

This table shows the correlation matrix of all the variables used in this study for the period starting from 2006-2011. Change in capital investment has been used as dependent variable and return on equity as an independent variable along with twelve control measures relating to financial constraints and corporate governance of companies. It is depicted through this matrix that capital investment and return on equity are positively correlated. Positive correlation between audit committee independence and dividend payout indicates that if audit committee is independent, it encourages for paying more dividend. Moreover, the results reveal that audit committee independence is negatively correlated with free cash flow indicating that independence of this committee encourages more investment of funds instead of keeping them free. It is also evident from negative correlation of -0.00915 between CEO-Duality and free cash flow that as this value is not significantly different from zero, so these two variables are uncorrelated. There is no issue of multicollinearity among the regressors because coefficient of correlation among these regressors is substantially lower than unity.

Table 5-2. Descriptive Statistic

ROE Independent Variable

2006-2011

	ACI	IND	BSI	ΔCI	DUA	DER	DPO	FAR	FCF	CON	IO	OCF	ACT	ROE
Mean	0.579655	0.087055	328.0962	0.443257	129.2898	0.128763	0.718707	0.694565	2.03874	0.939385	0.26853	0.946325	0.628094	0.308231
Median	0.041669	0.021221	0.00981	0.02487	0.00797	0.058241	0	0.502615	1.94591	1	0	1	0.6943	0.0241
Maximum	388.5976	85.48	266883.8	369.7	4375.6	26.35455	472	47.47475	3.157015	1	1	1	1.243814	369.7
Minimum	-80.72	-33.3027	-31.7	-1420	-211.6	-10.5192	-15.4581	-16.9349	1.2451	0	0	0	0.002159	-1420
Std. Dev.	13.90865	3.235358	9302.896	70.12658	278.3416	1.222917	16.46229	2.874675	0.296415	0.214074	0.443464	0.219403	0.265098	70.09963
Skewness	26.19868	21.02786	28.63525	-13.2022	7.129277	15.34409	28.55913	12.26667	1.092988	-3.82392	1.044553	-4.00921	-0.6486	-13.212
Kurtosis	739.2209	604.9724	820.9854	244.2463	84.62456	322.3745	818.1194	174.7824	4.580449	16.51725	2.091092	17.30809	2.496751	244.5201

The above table reflects the results of descriptive analysis when change in capital investment is dependent variable and return on equity is independent variable with control variables relating to financial constraints and corporate governance of companies for data span of 2006-2011. Mean value of board size i.e., 328.0962 is the highest and of board independence 0.087055 is the lowest indicating that companies in Pakistan are paying attention on their board size and are thus maintaining fair size of their board of directors, but independence of this board of directors is at very low level. Mean value of CEO duality 129.2898 is also higher but is less than the board size. Mean values of all other variables are at very low level but are greater than the value of board independence.

It is also clear from the same descriptive analysis that value of standard deviation for board size is also the highest i.e. 9302.896 indicating maximum volatility of this variable, while the lowest value of standard deviation has been observed for ownership concentration indicating its lowest volatility. Standard deviation of CEO duality which is 278.3416 is higher than all other variables but less than the standard deviation of board size.

Skewness values indicate that change in capital investment, operating cash flow to sales, shareholders activism, ownership concentration and return on equity are negatively skewed indicating that deviations from mean values of these variables are negative, whereas Kurtosis values are low for CEO duality, free cash flow to sales, institutional ownership, ownership concentration, operating cash flow to sales and shareholders activism. These lower values of kurtosis indicate that greater part of the variance from mean are due to frequent and moderate size deviations.

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Table 5-3. Correlation Matrix

ROA Independent Variable

2006-2011

	ACI	IND	BSI	ΔCI	DUA	DER	DPO	FAR	FCF	CON	IO	OCF	ROA	ACT
ACI	1													
IND	-0.547728	1												
BSI	0.001124	0.004533	1											
ΔCI	-0.042581	0.147084	-0.00549	1										
DUA	-0.012181	-0.02281	-0.01642	-0.4899	1									
DER	0.060441	0.081939	0.034607	-0.03677	-0.0209	1								
DPO	0.03366	-0.04408	-0.00136	0.1469	-0.01562	0.511253	1							
FAR	-0.090288	0.428359	0.003208	0.182735	-0.03733	0.14763	-0.00838	1						
FCF	-0.037473	0.061651	0.042553	0.094352	-0.00826	-0.00943	0.001405	0.05621	1					
CON	0.007019	0.007188	0.009869	-0.02997	0.046432	0.003861	-0.00913	0.003715	0.005539	1				
IO	-0.020807	-0.00512	0.057342	-0.05842	0.062653	-0.04912	-0.01786	-0.04389	-0.02968	-0.07343	1			
OCF	0.004319	0.004967	0.008617	-0.01693	0.013205	0.011975	0.007575	0.014941	0.063479	0.240223	-0.08478	1		
ROA	0.050256	0.011378	-0.04202	0.022264	-0.05572	-0.0551	-0.03159	-2.08E-05	0.12139	-0.00874	-0.07721	0.001627	1	
ACT	0.055738	-0.06273	0.042354	-0.00537	-0.02876	0.00026	0.010275	-0.01546	0.142112	-0.09082	-0.00141	-0.05502	0.00425	1

Table 5-3 shows the correlation matrix of all the variables for the period starting from 2006-2011 when change in capital investment has been used as dependent variable and return on assets has been used as an independent variable along with twelve control measures of financial constraints and corporate governance. It is depicted through this matrix that there is no issue of multicollinearity among the regressors because coefficient of correlation among these regressors is substantially lower than one. Moreover, positive correlation of 0.022264 found between dependent variable and independent variable indicates that if financial performance of companies is good, it will encourage them to increase their long term investment. Negative correlation coefficient of -0.05572 between CEO-Chairman duality and return on assets indicate that duality affects the companies' financial performance adversely. Lastly, negative correlation between CEO-Chairman duality and audit committee independence is also supported by Kamaruddin, A.K., Ismail ,W.A.W., Samsuddin, E.M. (2012).

Table 5-4. Descriptive Statistics

ROA Independent Variable

2006-2011

	ACI	IND	BSI	ΔCI	DUA	DER	DPO	FAR	FCF	CON	IO	OCF	ROA	ACT
Mean	0.583974	0.085954	326.5093	0.441125	128.6644	0.128388	0.71715	0.693757	2.038182	0.938469	0.26844	0.945375	1.163964	0.628
Median	0.042558	0.021192	0.00981	0.02459	0.0071	0.058241	0	0.502615	1.94591	1	0	1	1	0.694
Maximum	388.5976	85.48	266883.8	369.7	4375.6	26.35455	472	47.47475	3.157015	1	1	1	2.5	1.244
Minimum	-80.72	-33.3027	-31.7	-1420	-211.6	-10.5192	-15.4581	-16.9349	1.2451	0	0	0	0	0.002
Std. Dev.	13.87511	3.227586	9280.371	69.95659	277.8119	1.219966	16.42241	2.867745	0.296024	0.216071	0.443416	0.221356	0.412554	0.265
Skewness	26.26035	21.07852	28.70501	-13.2342	7.141664	15.38174	28.62859	12.29679	1.09543	-3.7876	1.045068	-3.96685	0.282792	-0.65
Kurtosis	742.7438	607.8878	824.9853	245.4317	84.92298	323.9458	822.101	175.6362	4.593013	16.20662	2.092167	16.96111	3.032825	2.497

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Table 5-4 shows the results of descriptive statistics among dependent variable change in capital investment, independent variable return on assets, financial constraints and corporate governance related control measures. The table clearly indicates that board size has the highest mean value of 326.5093 with CEO duality having the second highest value of 128.6644, while board independence has the lowest mean value of 0.085954. Value of free cash flow to sales is also at the lower level but is relatively higher than other control variables.

The highest value of standard deviation for board size, which is 9280.371, shows the highest volatility of this variable while the lowest value of this standard deviation is for ownership concentration at 0.216071. Whereas, value of standard deviation of CEO duality at 277.8119 indicates that volatility of this variable is at moderate level.

All variables except change in capital investment, ownership concentration, operating cash flow to sales and shareholders activism are positively skewed. As the values of skewness for return on assets and shareholders activism are near to zero, they are skewed slightly. Higher values of kurtosis for board independence, audit committee independence, board size, debt equity ratio, dividend payout and change in capital investment indicate that larger part of the variance in distribution is due to irregular and extreme deviations and such deviations are not of frequent, regular and moderate type.

5.2. Prospect Theory and Capital Investment Decisions

Prospect Theory explains that behavior of individual investor is risk averse while making his investment decision in the situation of gain and is risk seeking when he is making investment decision in the situation of loss. Moreover, his gain or loss is calculated relative to a reference point or target (Kahneman & Tversky, 1992). Several studies which applied prospect theory at

organizational level decision making have examined that when firms are operating at level above their target or reference point, they exhibit risk averse attitude towards their investment decisions and when such firms are operating at a level which is below their target or reference level, their attitude towards investment becomes risk seeking (Wen,Y-F., 2010; Shimizu, 2007; Kyle et.al., 2006).

The above literature assisted in inferring that capital investment behavior of corporate firms is risk averse whenever they make capital investment decisions in the domain of gain and their behavior about capital investment will be risk seeking whenever they make such decisions in the loss domain. This behavior is inconsistent with conventional or traditional finance which states that investors are all the time risk averse. Thus, the first two hypotheses were developed in this regard:

5.2.1. Risk Averse Behavior

The above hypotheses were checked with the help of two phase cumulative prospect theory value function. First hypothesis which relates to existence of risk averse behavior in corporate firms while making their capital investment decision has been checked with the help of fist phase of CPT value function as under:

$$\Delta C I_i = \gamma (Fin Per_i)^{\alpha} + \varepsilon_i \qquad (1)$$

In order to find the application of prospect theory, γ i.e., coefficient value should ideally but not necessarily be equal to one and the value of α i.e., power function or parameter should be less than 1 because this value being less than one indicates the presence of risk averse attitude of companies while taking their capital investment decisions.

Table 5.5 and 5.6 presented the results of analysis when ROA was used as measure of financial performance. Table 5.5 presents such results for the data span of 1996-2005 and table 5.6 presents results for the data span of 2006-2011. Existence of risk averse behavior in capital investment decisions of corporate sector was examined with the help of the model 1. Results of analysis are presented in the following tables:

Table 5-5. Risk Averse Behavior under Prospect Theory
ROA Independent Variable
1996-2005

Year	α	Co-efficient (γ)	t-Stat	R Square	Adjusted R²	F- stat
1996	0.40	1.143	57.920*	0.9946	0.9391	3354.803
	0.45	1.142	57.833*	0.994	0.9391	3344.7621
	0.50	*1.142*	*57.742**	*0.9946*	*0.9391*	*3334.170*
1997	*0.45*	*1.08*	*41.158**	*0.9912*	*0.9246*	*1694.04*
1998	*0.45*	*1.076*	*48.424**	*0.994*	*0.9226*	*2344.9206*
1999	0.45	1.352	88.358*	0.9903	0.9772	7807.1449
	0.55	1.324	88.888*	0.9900	0.9769	7549.6116
	0.90	1.229	80.070*	0.9882	0.9751	6411.2763
	0.95	1.216	78.959*	0.9879	0.9748	6234.6627
2000	0.45	1.385	138.066*	*0.9945*	0.9849	*1906.430*
	0.80	1.211	102.810*	*0.9903*	0.9806	*10570.016*
	0.95	*1.161*	*94.467**	*0.9884*	*0.9789*	*8924.0804*
2001	0.45	1.198	299.074*	0.9990	0.9873	89445.4075
	0.75	*1.086*	*664.009**	*0.9998*	*0.988*	*440909.2707*
2002	0.45	1.173	222.701*	0.9983	0.9865	49595.9464
	0.60	1.124	307.749 *	0.9991	0.987 3	94709.8189
	0.8	*1.06*	*618.798**	*0.9998*	*0.988*	*382911.8441*
2003	*0.45*	*1.056*	*157.104**	*0.9966*	*0.9845*	*24681.7574*
2004	0.45	1.642	51.111*	0.9681	0.956	2612.3457
	0.9	1.432	32.445*	0.9244	0.9128	1052.7086
2005	0.15	7.146	1.632	0.03004	0.0184	2.6638
	0.45	7.790	2.075**	0.04771	0.036 1	4.3092
	0.9	4.684	2.114 **	0.0493	0.0378	4.4722

*   Significant at 99%
**   Significant at 95%
*** Significant at 90%

Application of this theory was examined with the help of iterative process. This iteration was done by regressing the above model on various α values ranging from 0.15 to 0.95 in different years. It is clear from analysis of the above table that application of this theory was not found in all the years rather it was found partly during the time period of the above table. The years in which application of prospect theory was found are 1996, 1997, 1998, 2000, 2001, 2002 and 2003. Values of these years in the table are shown italic bold. However, existence of prospect theory behavior was not found during the years 1999, 2004 and 2005, because γ value of these years could not become 1 or near to 1 at α value less than 1 in spite of iteration. Application of prospect theory was missing in these years and it may be due to the reason explained by Langer, T.& Weber, M.(2005) that relationship between risk and return is not as general as described in the literature, rather it is largely dependent upon risk profiles of various investment opportunities.

Table 5-6. Risk Averse Behavior under Prospect Theory

ROA Independent Variable
2006-2011

Year	α	Co-efficient (γ)	t-Stat	R Square	Adjusted R²	F-stat
2006	015	6.405	23.638*	0.8380	0.8288	558.7750
	0.35	*1.08*	*3.705**	*0.1128*	*0.1035*	*13.7259*
	0.45	0.288	2.000**	0.3565	0.0264	3.9928
2007	0.05	3.063	2.911*	0.0835	0.0728	8.4781
	0.25	7.383	4.491*	0.1782	0.1674	20.1693
2008	0.05	2.148	23.555*	0.8739	0.8614	554.8509
	0.15	2.832	20.409*	0.8388	0.8264	416.5481
	0.45	5.201	12.411*	0.6553	0.6430	154.0465
2009	0.02	1.375	12.180*	0.9611	0.7945	148.3551
	0.05	1.787	13.147*	0.9664	0.7998	172.8607
	0.45	53.524	19.2*	0.9839	0.8173	368.6458
2010	0.25	4.240	4.771*	0.5584	0.5029	22.7678
	0.45	3.679	1.743	0.1445	0.0889	3.0410
	0.75	3.657	0.988	0.0515	-0.004	0.9778
2011	0.15	3.677	12.755*	0.8761	0.8327	162.713
	0.45	3.592	1.938	0.1404	0.097	3.7596
	0.75	3.169	1.196	0.0586	0.0151	1.4317

*   Significant at 99%
**   Significant at 95%
*** Significant at 90%

Application of prospect theory during the data span of the above table was examined with the help of iterative process. This iteration was done by regressing the above model or equation on various α values ranging from 0.02 to 0.75 in different years. It was found that application of this theory was not found in all the years except one i.e., 2006. Concerned values of this year in table 5-6 are shown in italic bold. Existence of prospect theory behavior in the years 2007-2011 was not found because γ value of these years could not become 1 or near to 1 along with α value less than 1 in spite of iteration.

Summary of the above analysis is presented in the following table:

**Table 5-7. Summary of Existence of Risk averse
Behavior under prospect Theory
ROA Independent Variable**

Year	α	Co-efficient (γ)	t-stat	R^2	Adjusted R^2	F-stat
1996	0.5	1.142	57.742*	0.9946	0.9391	3334.17
1997	0.45	1.08	41.158*	0.9912	0.9246	1694.04
1998	0.45	1.076	48.424*	0.994	0.9226	2344.9206
2000	0.95	1.161	94.467*	0.9884	0.9789	8924.0804
2001	0.75	1.086	664.009*	0.9998	0.988	440909.2707
2002	0.8	1.06	618.798*	0.9998	0.988	382911.8441
2003	0.45	1.056	157.104*	0.9966	0.9845	24681.7574
2006	0.35	1.08	3.705*	0.1128	0.1035	13.7259

* Significant at 99 %

It was obvious from the results of table 5-7 that implications of prospect theory were found in all the table years. All the parameters of the model were found as prescribed by this theory. Value of

t-statistic for all these years were significant meaning that financial performance of companies affected their capital investment decisions significantly. Moreover, R-Square values of the table reported that a substantial part of variations in capital investments were explained by financial performance of companies in each year, except 2006. These results are also according to findings of Godlewski, C.J. (2004) with regard to testing of risk averse behavior.

Table 5-8 and 5-9 present the results of data analysis when ROE was used as measure of financial performance. It means that dependent variable was same as in table 5.5 and 5.6 but independent variable was changed. Table 5-8 presented these results for the data span of 1996-2005 and table 5-9 presented such results for the data span of 2006-2011. Application of prospect theory in these years was examined with the help of iterative process. This iteration was done in order to find the desired level of coefficient at parameter values prescribed by prospect theory and it was done by regressing the above model 1 on various α values ranging from 0.10 to 0.95 in different years. These results are presented as under:

Table 5-8. Risk Averse Behavior under Prospect Theory
ROE Independent Variable
1996-2005

Year	α	Co-efficient (γ)	t-Stat	R Square	Adjusted R²	F-stat
1996	0.15	1.283	25.263*	0.8935	0.8804	638.2534
	0.20	1.268	20.016*	0.8405	0.8273	400.6467
	0.30	*1.040*	*11.587**	*0.6385*	*0.6253*	*134.2606*
	0.45	0.431	5.136*	0.2577	0.2445	26.3881
	0.90	0.013	1.35	0.0235	0.0103	1.8304
1997	0.45	1.541	17.075*	0.8019	0.7881	291.5781
	0.75	1.176	8.393*	0.4945	0.4806	70.4489
	0.80	*1.087*	*7.611**	*0.4458*	*0.4319*	*57.9332*
	0.90	0.909	6.342*	0.3584	0.3445	40.2277
1998	0.45	1.670	14.703*	0.7971	0.7790	216.1852
	0.7	1.144	6.738*	0.4521	0.4340	45.4015
	0.75	*1.004*	*5.868**	*0.3850*	*0.3668*	*34.4358*
1999	0.45	1.524	13.063*	0.7301	0.6787	170.6401
	0.6	*1.12*	*7.933**	*0.4567*	*0.4435*	*63.8905*
	0.65	0.969	6.898*	0.3850	0.3718	47.5852
	0.70	0.825	5.999*	0.3213	0.3082	25.9949
2000	0.45	1.592	22.021*	0.8361	0.8256	484.9525
	0.65	1.354	12.589*	0.6252	0.6147	158.4997
	0.80	*1.024*	*8.666**	*0.4415*	*0.431*	*75.1087*
2001	*0.30*	*1.113*	*14.022**	*0.7185*	*0.7056*	*196.6185*
	0.35	0.935	10.368*	0.5826	*0.5696*	107.5064
	0.45	0.526	5.937*	0.3140	0.3011	35.2588
2002	*0.45*	*1.077*	*7.541**	*0.4248*	*0.4118*	*56.8672*
2003	0.45	2.215	21.482*	0.8715	0.8568	461.4792
	0.9	*2.038*	*8.080**	0.4898	0.4751	65.2977
	0.95	1.920	7.318*	0.4405	0.4258	53.5568
2004	0.15	2.088	57.165*	0.9807	0.9651	3267.8615
	0.45	2.741	23.845*	0.8988	0.8832	568.5853
	0.90	3.020	10.315*	0.6244	0.6088	106.4179
2005	0.10	10.186	1.502	0.0330	0.0179	2.2566
	0.45	27.773	2.247*	0.1026	0.0875	7.5506
	0.95	26.169	2.643**	0.0957	0.0805	6.9886

* Significant at 99%
** Significant at 95%

Results indicate that application of prospect theory was not found in all years, rather it was found in some of the data years. These years are 1996, 1997, 1998, 1999, 2000, 2001 and 2002. Coefficient and parameter values in these years were as per the requirement of prospect theory i.e., coefficient value are equal to or very much near to 1 and values of parameter α are at the same time less than 1. These values are shown in the table in italic bold. Existence of irrational behavior of prospect theory was not found during the years 2003 to 2005 because γ value of these years could not be found equal to or near to 1 at α value less than 1 in spite of iteration.

Table 5-9. Risk Averse Behavior under Prospect Theory
ROE Independent Variable
2006-2011

Year	α	Co-efficient (γ)	t-Stat	R Squre	Adjusted R²	F-stat
2006	0.45	1.052	15.96*	*0.7061*	*0.6967*	*254.7475*
2007	0.40	1.365	5.202*	0.2235	0.2129	27.0652
	0.45	1.239	5.739*	0.2594	0.2488	32.9376
	0.50	*1.114*	*6.347**	*0.2999*	*0.2893*	*40.2853*
	0.55	0.991	7.034*	0.3449	0.3342	49.4899
2008	*0.10*	*1.414*	*22.911**	*0.8648*	*0.8527*	*524.9529*
	0.20	1.047	19.720*	0.8258	0.8134	388.8808
	0.30	0.753	16.775*	0.7743	0.76298	281.4184
	0.45	0.436	13.263*	0.6820	0.6698	175.9235
	0.60	0.239	10.671*	0.5813	0.5691	113.8864
2009	*0.01*	*1.155*	*26.825**	*0.9862*	*0.8862*	*719.5841*
	0.15	1.754	21.467*	0.9787	0.8787	460.8535
	0.25	3.049	12.401*	0.9389	0.8389	153.7985
	0.45	3.946	9.931*	0.9079	0.8079	98.6406
2010	*0.01*	*1.112*	*76.103**	*0.9975*	*0.9261*	*5791.7570*
	0.10	1.381	41.903*	0.9920	0.9206	1755.941
	0.45	2.362	7.024*	0.7789	0.7075	49.3464
	0.95	0.118	2.264*	0.2681	0.1966	5.1277
2011	0.10	10.886	20.051*	0.9458	0.9024	402.0639
	0.45	23.716	8.096*	0.7752	0.7317	79.3262
	0.90	41.143	3.968*	0.4065	0.3629	62.5889

* Significant at 99%
** Significant at 95%

Application of prospect theory during the data span of table 5-9 was examined with the help of iterative process. This iteration was done by regressing the equation of model 1 on various α values ranging from 0.01 to 0.95 in different years. It was found that application of this theory was found during 2006, 2007, 2008, 2009 and 2010 because coefficient and parameter values in these years are according to the description of prospect theory. Values of these years in the table are shown in italic bold. Existence of prospect theory behavior in the year 2011 was not found because in spite of iteration γ values of this year could not be found 1 or near to 1 along with α values less than 1.

Summary of the above results was presented in the following table:

Table 5-10. Summary of Existence of Risk averse
Behavior under prospect Theory
ROE Independent Variable

Year	α	Co-efficient (γ)	t-stat	R²	Adjusted R²	F-stat
1996	0.3	1.04	11.587*	0.638	0.6253	134.2606
1997	0.8	1.087	7.611*	0.4458	0.4319	57.9332
1998	0.75	1.004	5.868*	0.385	0.3668	34.4358
1999	0.6	1.12	7.933*	0.4567	0.4435	63.8905
2000	0.8	1.024	8.666*	0.4415	0.431	75.1087
2001	0.3	1.113	14.022*	0.7185	0.7056	196.6185
2002	0.45	1.077	7.541*	0.4248	0.4118	56.8672
2006	0.45	1.052	15.960*	0.7061	0.6967	254.7475
2007	0.5	1.114	6.347*	0.2999	0.2893	40.2853
2008	0.1	1.414	22.911*	0.8648	0.8527	524.9529
2009	0.01	1.155	26.825*	0.9862	0.8862	719.5841
2010	0.01	1.112	76.103*	0.9975	0.9261	5791.7570

* Significant at 99 %

It is obvious from results that implications of prospect theory are found in all the table years. All parameters of the model were found as prescribed by prospect theory. Value of t-statistic for all these years were also significant meaning thereby financial performance of companies affected their capital investment decisions significantly. Moreover, R-Square values reported that substantial part of variations in capital investment was explained by financial performance of companies in each year. Thus, hypothesis 1 was supported in twelve out of sixteen years. With regard to application of prospect theory; the results are according to findings of Godlewski, C.J. (2004).

5.2.2. Risk Seeking Behavior

Second hypothesis i.e., risk seeking attitude of corporate firms for capital investment in the loss domain was tested by the following regression equation:

$$\Delta C I_i = -\lambda \, (-\text{Fin Per}_i)^{\beta} + \varepsilon_i \tag{2}$$

Regression results of this model are presented in the following tables:

Table 5-11. Risk Seeking Behavior Under Prospect Theory
ROA Independent Variable
1996-2011

Year	β	Co-efficient (λ)	t-stat	R square	Adjusted R²	F-stat
1996	0.5	1.1426	41.6026*	0.9638	0.9844	1730.7736
1997	0.45	1.353	68.6113*	0.9867	0.9709	4707.5075
1998	0.45	2.4253	6.9727*	0.3965	0.3829	48.6195
2000	0.95	0.7903	40.2325*	0.9877	0.9378	1618.6555
2001	0.75	0.6526	55.5653*	0.9891	0.9597	3087.5107
2002	0.8	1.1119	109.9104*	0.9977	0.9607	12080.3071
2003	0.45	1.3369	26.9720*	0.9516	0.9246	727.4891
2006	0.35	3.4946	33.1199*	0.9759	0.9389	1096.9107

* Significant at 99%

During the entire data period of 1996-2011, risk seeking behavior was checked only for those years in which existence of prospect theory was found. Regression results revealed by table 5-11 presented a risk seeking view of companies involved in capital investment decisions, when ROA was used as an independent variable. In prospect theory, risk averse attitude of companies in gain domain is equivalent to their risk seeking attitude in loss domain. This reflection effect was captured by using same values of power function or parameter β in loss domain which were used for the parameter α in the gain domain because as per prospect theory, value of α in the domain of gain should be equal to the value of β in the loss domain and value of λ coefficient should be greater than 1.

So for as the values of λ coefficient is concerned, these were greater than one in all the years except year 2000 and 2001. These were 0.7903 and 0.6526 respectively. Presence of reflection effect was not found in these years. It means that risk seeking attitude prevailed among companies for the entire data period except these two years in which existence of such attitude remained absent.

Table 5-12. Risk Seeking Behavior Under Prospect Theory
ROE Independent Variable
1996-2005

Year	β	Co-efficient (λ)	t-stat	R Square	Adjusted R²	F-stat
1996	0.3	0.052	3.368*	0.2346	0.2076	11.3453
1997	0.8	0.322	35.688*	0.9688	0.9444	1273.676
1998	0.75	0.878	5.039*	0.3368	0.3168	25.3966
1999	0.6	5.636	23.939*	0.9502	0.9169	573.1177
2000	0.8	0.133	22.074*	0.9568	0.9113	487.276
2001	0.3	0.805	56.967*	0.9908	0.9575	3245.305
2002	0.45	0.539	36.303*	0.9835	0.9381	1317.9624

* Significant at 99%

Regression results revealed by table 5-12 presented a risk seeking view of companies involved in capital investment decisions when ROE was used as measure of financial performance during the data period of 1996-2005. It should be noted that during the first data block, risk seeking behavior is checked only for those years in which existence of prospect theory was found. In prospect theory, risk averse attitude of companies in gain domain is equivalent to their risk seeking attitude in loss domain. This reflection effect were captured by using the same values of power function or parameter β in loss domain which were used for parameter α in the gain domain because as per prospect theory, value of α in the domain of gain should be equal to value of β in the loss domain. These values were 0.3 in the year 1996 and 0.45 in the year 2002.

So for as the values of λ coefficient is concerned, it should be greater than 1. Analysis revealed that these values were less than 1 in all the years except in year 1999, when it was 5.636. It means when return on equity was used as an independent variable, risk seeking attitude did not prevail among companies for about entire data period with the exception of one year. Strong evidence supported the notion that managers were reluctant to take more risk in the situation of facing losses. Thus, weak evidence in support of hypothesis 2 is found.

Table 5-13. Risk Seeking Behavior Under Prospect Theory
ROE Independent Variable
2006-2011

Year	B	Co-efficient (λ)	t-stat	R Square	Adjusted R^2	F-stat
2006	0.45	1.395	60.928*	0.9922	0.9577	3712.3355
2007	0.5	0.559	34.237*	0.9662	0.9418	1172.1786
2008	0.1	1.746	52.492*	0.9814	0.9622	2755.4747
2009	0.01	3.132	79.87*	0.985	0.9747	6379.2928
2010	0.01	1.223	62.097*	0.9854	0.9678	3856.1353

* Significant at 99%

Regression results revealed by above table presented a risk seeking view of companies involved in capital investment decisions when ROE was used as measure of financial performance in the data period of 2006-2011. This reflection effect was captured by using the same values of power function or parameter β in loss domain which were used for parameter α in the gain domain, because as per prospect theory, value of α in the domain of gain should be equal to value of β in the loss domain. These values were 0.45 in the year 2006 and 0.01 in the year 2010. Moreover, λ coefficient for the entire period was greater than 1 except the year 2007. It was 0.559 during this year due to absence of risk seeking attitude. It could be implied that overall attitude of companies remained risk seeking throughout the data period and thus strong evidence exists in support of hypothesis 2 during the second data period block of 2006-2011.

5.3. Impact of Cash Flow Constraints on Prospect Theory Behavior

Literature regarding impact of cash flow on capital investment decisions of firms is well documented. Financial conditions of companies have been studied as constraint in making capital investments. There is mixed view regarding impact of financial constraints on capital investment decisions of companies. Although, it has been investigated that financial conditions or constraints have direct impact on corporate capital investment decision (Vogt., S.C., 1997; Black et.al., 2000), but its impact in affecting risk averse attitude of firms in the gain domain has also been evident of taking no affect of it. The reason of cash flow constraints for not affecting the risk averse behavior of corporate firm is that although firm is having good cash flow during period of gain, yet it might be possible that the firm is not interested or it is not urgent need of firm to increase its capital investment and thus financial limitations have no effect on risk averse behavior of firms (Wen, Y- F., 2010).

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However, the role of financial conditions in affecting the risk seeking behavior of firms is admitted unanimously in the literature. The firms may have risk seeking behavior in the domain of loss regarding capital investment, but financial constraints faced by those firms in condition of loss may affect that risk seeking behavior through financial hindrances. The researcher feels convinced with the arguments of Wen, Y- F., (2010) in testing the role of financial constraints in controlling risk averse and risk seeking behaviors of prospect theory.

5.3.1. Financial Constraints and Risk Averse Behavior

Third hypothesis i.e., to know the impact of financial limitations of firms on their risk averse behavior, the following regression model has been applied:

$$\Delta C\ I_i = \gamma\ (\text{Fin Per}_i{}^{\alpha 1}.\text{DER}_i{}^{\alpha 2}.\text{FCF}_i{}^{\alpha 3}.\text{OCF}_i{}^{\alpha 4}.\text{DPO}_i{}^{\alpha 5}.\text{FAR}_i{}^{\alpha 6}) + \varepsilon_i \qquad (3)$$

Table 5-14. Effect of Financial Constraints on Risk Averse Behavior
ROA Independent Variable
1996-2005

Year	Variables												R Square	Adjusted R^2	F-stat
	ROA		FCF		DER		OCF		DPO		FAR				
	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat			
1996	0.935	10.757*	-0.092	-0.37	0.114	1.695	0.682	1.509	0.2	1.721	0.136	1.215	0.9974	0.9195	857.6339
1997	1.01	172.26*	-0.95	-40.992	0.005	0.895	0.996*	26.757*	0.0009	-0.492	0.0005	0.0389	0.9999	0.8999	48092.3734
1998	0.992	9.533*	0.089	0.449	0	-0.004	-0.501	-1.41	0.025	0.109	0.252	1.172	0.9959	0.8825	365.2672
2000	1.16	30.107*	-0.266	-5.393*	0	0.639	-0.867	-4.775*	0.028	0.588	0.163	2.49**	0.9939	0.9835	2718.4002
2001	1.083	235.237*	-0.049	-3.875*	0	0.702	0.168	7.023*	-0.0006	-0.445	-0.025	-2.901*	0.9999	0.9873	138946.6586
2002	1.063	205.791*	0.021	4.544*	0	-0.688	0.103	6.688*	0.004	0.709	-0.033	-3.299*	0.9998	0.9873	114393.8329
2003	1.067	61.635*	0.007	0.234	-6.579	-1.859	0.339	6.794*	0.002	0.264	-0.093	-3.004*	0.9983	0.9852	7762.3058

* Significant at 99%

** Significant at 95%

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Above table describes the results of multiple regressions for those years in which application of the prospect theory was found. While applying multiple regressions in each year, those values as power function of independent variable ROA were used at which prospect theory was found to be existing during the iteration process. Detail of these α values is given in summary table 5-7. Coefficient values of ROA in each of these years is not significantly different from 1 which means that financial constraints of companies had not affected their risk averse behavior during the process of making capital investment decisions. Moreover, these values were found to be significant at 1% level in each year. These findings are in line with the hypothesis 3.

Table 5-15 Effect of Financial Constraints on Risk Averse Behavior
ROA Independent Variable
2006

Variables	Co-efficient	t-stat
ROA	-0.339	-1.351
FCF	-4.94	-4.838*
DER	0.012	12.6*
OCF	14.833	6.835*
DPO	-0.416	-4.663*
FAR	-0.329	-2.74*
R Square	0.7977	
Adjusted R^2	0.7782	
F-stat	67.727	

The data period of this study was split into two blocks due to non availability of data regarding corporate governance for the first block i.e., 1996-2005. Out of data period of the second block i.e. 2006-2011, application of risk averse behavior of prospect theory as depicted by table 5-7 was found only for the year 2006. So, impact of financial constraints on risk averse behavior of companies was examined in the above table only for that year. Results of multiple regression revealed that -0.339 coefficient value of ROA which was calculated at 0.35 α was significantly different than 1 which means that risk averse behavior of companies was controlled and eliminated by their financial constraints but this value was found to be insignificant. It was also found that free cash flow to sales (FCF), dividend payout (DPO) and fixed assets ratio (FAR) were negatively correlated with capital investment. These values were significant at 1% level. R square value of 0.7977 indicated that about 80% of variations in capital investment were explained by the explanatory variables. This year's finding is against the prediction of hypothesis.

Table 5-16. Effect of Financial Constraints on Risk Averse Behavior
ROE Independent Variable
1996-2005

Year	ROE		FCF		DER		OCF		DPO		FAR				
	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	R Square	Adjusted R²	F-stat
1996	-0.082	-1.181	-0.981	-8.074*	-0.001	-1.184	2.258	6.025*	0.059	0.748	-0.112	-1.102	0.577	0.533	16.153
1997	-0.000	-2.260**	-0.999	-1021.78*	-1.9E-5	-1.965	0.998	797.372*	-5.2E-05	-0.194	0.000	0.785	0.999	0.985	223985.4
1998	-0.002	-0.130	-0.345	-4.358*	-0.000	-0.165	-0.223	-1.591	-0.085	-1.781	0.210	4.853*	0.448	0.373	6.789
1999	-0.027	-0.840	-0.456	-7.908*	-1.1E-05	-0.758	0.410	3.584*	0.164	0.443	0.001	-0.033	0.511	0.463	12.391
2000	-0.031	-1.593	-0.131	-4.0*	1.94E-05	1.341	0.223	3.743*	-0.024	-0.958	0.092	4.229*	0.516	0.478	16.051
2001	0.263	5.018*	-0.792	3.091*	0.692	1.365	1.525	4.608*	0.508	5.788*	1.043	10.629*	0.9594	0.9443	437.9608
2002	-0.023	-0.442	0.008	0.234	-7.1E-06	-0.571	0.298	2.407**	0.093	1.721	0.011	0.210	0.373	0.315	7.146

* Significant at 99%
** Significant at 95%

The table described the results of multiple regressions for those years in which application of prospect theory was found. While applying multiple regressions in each year, those α values as power function of independent variable ROE were used at which prospect theory was found to be existing during iteration process. Detail of these α values is given in summary table 5-10. Coefficient values of ROE in each of these years are not significantly different from zero. It means that financial constraints of companies have affected their risk averse behavior during the process of making capital investment decisions due to which risk averse behavior was eliminated in each of the table year. These findings are not in line with hypothesis 3. Moreover, coefficient values of only two years i.e., 1997 and 2001 were found to be statistically significant at 5% and 1% level respectively. It was also observed by R Square values of the regression model that minimum of 37% and maximum of 99% variation in capital investment was explained by explanatory variables in different years.

Table 5-17. Effect of Financial Constraints on Risk Averse Behavior
ROE Independent Variable
2006-2010

Variables	Year									
	2006		2007		2008		2009		2010	
	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat
ROE	10.275	12.672*	-0.018	-1.469	27.213	8.167*	1.217	6.539*	1.217	23.797*
FCF	20.525	2.879*	-1.008	-128.405*	-6.097	-1.041	-1.444	-3.458*	-0.525	-4.02*
DER	-0.045	-5.041*	0.0002	1.835	-0.006	-0.779	39.098	1.736	-0.122	-0.088
OCF	-48.089	-2.864*	0.535	5.1*	-6.728	-0.51	2.045	2.464***	0.174	1.233
DPO	1.564	2.366**	0.01	0.168	-1.725	-0.278	-0.209	-0.688	-0.059	-0.712
FAR	4.135	4.835*	0.04	2.975*	-48.136	-4.608	-0.666	-1.583	-0.17	-2.21***
R Square	0.9071		0.9985		0.7018		0.9974		0.9991	
Adjusted R Square	0.8926		0.9871		0.6695		0.7949		0.8876	
F-stat	164.5303		9943.9157		30.2162		327.7817		1852.9828	

*   Significant at 99%
**   Significant at 95%
*** Significant at 90%

As explained earlier, the data period of this study was split into two blocks due to non availability of data regarding corporate governance for the first data period i.e., 1996-2005. Application of prospect theory was found for the years 2006, 2007, 2008, 2009 and 2010 during the second data period which was 2006-2011. So, impact of financial constraints on risk averse behavior of companies was examined for these years only.

Results of multiple regression revealed that coefficient values of independent variable in each year calculated on their corresponding α values were significantly different from zero except the year 2007. Coefficient value of this year although statistically insignificant was -0.018. It means that financial constraints of companies did not control their risk averse behavior in the above table years except the year 2007. These results indicate that findings of the table years except 2007 were as hypothesized. Moreover, R square values indicated that more than 90% variation in capital investment was explained by explanatory variables for the data period except the year 2008. This value was 0.7018 during this year.

A partial impact or role of financial constraints in controlling risk averse behavior of companies throughout data period in case of ROE as an independent variable highlights the importance of specific measure of financial performance in this regard. On the basis of results, we can say that application of hypothesis 3 up to some extent is variable dependent.

5.3.2. Financial Constraints and Risk Seeking Behavior

Fourth hypothesis which relates to examining the impact of financial limitations of firms on their risk seeking attitude in their loss domain has been tested with the following regression model:

$$\Delta C \, I_i = -\lambda[(-\text{Fin Per}_i)^{\beta1} \, (-DER_i)^{\beta2}(-FCF_i)^{\beta3}(-OCF_i)^{\beta4}(-DPO_i)^{\beta5}(-FAR_i)^{\beta6}] + \varepsilon_i \qquad (4)$$

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Table 5-18. Effect of Financial Constraints on Risk Seeking Behavior

ROA Independent Variable
1996-2005

Year	ROA		FCF		DER		OCF		DPO		FAR		R square	Adjusted R2	F-stat
	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat			
1996	1.209	21.001*	-0.637	-6.82**	-0.0002	-0.461	0.832	2.829***	0.108	1.498	-0.303	-2.957*	0.9834	0.9653	592.996
1997	1.305	1113.83*	-1.003	-377.686*	0	0.173	0.988	254.92*	-0.0003	-0.264	-2.07E-05	-0.0107	0.9999	0.9827	1970638.114
1998	1.79	36.06*	-1.005	-166.235*	-1.23E-06	-0.219	-0.337	-2.432	-0.005	-0.599	0.573	6.823*	0.9985	0.9843	7911.382
2000	0.772	12.29*	-0.001	-0.226	1.54E-06	0.019	-0.397	-1.66	-0.003	-0.039	0.056	0.486	0.9915	0.9221	294.931
2001	0.588	16.722*	-0.106	-1.528	-0.038	0.193	0.009	0.032	-0.043	-0.584	0.253	0.225	0.992	0.956	789.816
2002	1.128	34.848*	-0.04	-0.555	-2.56E-07	-0.12	0.059	0.782	0.003	0.264	-0.021	-0.4	0.9982	0.9523	2087.076
2003	1.289	8.767*	-0.372	-2.809*	-9.42E-05	-0.717	-1.563	-1.945	0.037	0.599	0.31	1.324	0.9654	0.9287	148.823

* Significant at 99%
** Significant at 95%

The table clearly described the results of multiple regressions in order to examine whether irrational behavior of risk seeking found in companies in their domain of loss was controlled by their financial constraints. Regression was run in those years of the first data period block i.e., 1996-2005 in which application of prospect theory was found in table 5-7 i.e., summary of existence of risk averse behavior under prospect theory. It was found that coefficient values of independent variable ROA were significant at 1% level for all the table years. Moreover, these values were significantly different from zero for all years except 2000 and 2001, which means that financial constraints have not contributed in eliminating risk seeking behavior of companies during the table years. Findings of these years are against the hypothesized statement. So for as the coefficient values of ROA for the years 2000 and 2001are concerned, although these values were not significantly different from zero, yet risk seeking attitude was not found initially under model 2 in these years. Coefficient values of ROA in these years were 0.772 and 0.588 respectively. If risk seeking behavior did not exist in any year or years, then matter of controlling this behavior by financial constraints of those years was irrelevant. It could thus be interpreted that financial constraints had not contributed in eliminating risk seeking behavior of companies during the table years.

Table 5-19. Effect of Financial Constraints on Risk Seeking Behavior

ROA Independent Variable
2006

Variables	Co-efficient	t-stat
ROA	3.401	28.269*
FCF	-0.775	-7.847*
DER	-7.3	-0.938
OCF	0.76	7.04*
DPO	0	65535*
FAR	0.306	1.577
R Square	0.998	
Adjusted R^2	0.9108	
F-stat	2408.085	

Multiple regression was run only on the data for the year 2006 out of the second data period block of 2006-2011, because risk seeking attitude was found initially only in the same year as depicted by table 5-11. Results of multiple regression for this year revealed that coefficient of independent variable ROA has reduced from 3.4946 to 3.401 after incorporation of variables of financial constraints in to basic model of value function in the loss domain. Both coefficient values are significant at 0.01 level. Financial constraints have not contributed in eliminating risk seeking behavior of companies during this year as coefficient value of independent variable ROA during this year was significantly different from zero. This result was similar to the results of the first data period i.e., 1996-2005 and thus against the hypothesis. Moreover, R Square value has indicated that explanatory variables of the model have explained about 100% of the variations in capital investments.

Table 5-20. Effect of Financial Constraints on Risk Seeking Behavior

ROE Independent Variable
1996-2005

Year	ROE		FCF		DER		OCF		DPO		FAR		R Square	Adjusted R2	F-stat
	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat			
1996	0.092	2.146**	-0.224	-1.481	-0.002	-0.091	-0.47	-1.116	0.01	0.794	-0.191	-1.381	0.6934	0.6143	12.067
1997	0.303	35.714*	-1.042	-17.961*	0.065	10.904*	0.737	7.84*	-0.001	-0.086	-0.122	-1.884	0.9978	0.9698	2840.412
1998	0.468	11.763*	-1.0001	-86.104*	0.0006	0.411	-0.441	-1.072	-0.021	-0.504	1.209	6.782*	0.9962	0.9735	1968.4996
1999	5.416	20.355*	-1.021	-10.178*	0.001	5.004*	-8.009	-2.714	0.061	0.216	0.641	0.474	0.993	0.9516	592.9807
2000	0.123	15.262*	0.004	0.489	0	-7.138*	-0.904	-1.938	0.109	0.987	0.231	1.552	0.9935	0.9328	439.0752
2001	0.736	16.767*	-0.173	-1.986	0	0.931	0.484	1.114	-0.001	-0.139	0.135	0.971	0.993	0.9516	595.9255
2002	0.521	28.918*	0.418	3.829	0	-9.364*	-0.444	-3.959*	0.005	0.357	0.053	0.769	0.9835	0.9381	1413.0207

* Significant at 99%
** Significant at 95%

In order to evaluate whether irrational behavior of risk seeking of companies in the domain of loss was controlled by financial constraints of companies, the table clearly describes the results of multiple regression with change in capital investment as dependent variable and ROE as an independent variable with financial constraints of companies as control variable. Regression was run on model for those years of the first data period block i.e. 1996-2005 in which prospect theory was initially found to exist. As the table 5-12 clearly depicts that out of the table data period, risk seeking behavior is found only in the year 1999, so impact of financial constraints on this behavior was examined for this year only. As 5.416 coefficient value of ROE for this year was significantly different from zero, so it can be stated that financial constraints have not eliminated risk seeking attitude among companies. This finding is also not according to hypothesis 4.

Table 5-21. Effect of Financial Constraints on Risk Seeking Behavior
ROE Independent Variable
2006-2011

Variables	Year							
	2006		2008		2009		2010	
	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat
ROE	1.323	29.797*	1.673	49.912*	3.139	43.334*	1.163	20.971*
FCF	-0.802	-8.554*	-0.645	-7.491*	-0.55	-13.555*	-0.106	-2.489**
DER	0	-0.246	0.0002	2.321**	-0.148	-0.071	0.058	0.815
OCF	0.864	8.427*	0.585	6.339*	0.302	1.181	-0.152	-1.121
DPO	-0.23	-0.096	0.32	0.772	-0.028	-0.643	0.034	0.439
FAR	0.281	1.526	0.002	0.271	-0.052	-0.405	0.086	0.879
R Square	0.9983		0.9921		0.9951		0.9886	
Adjusted R Square	0.9563		0.97		0.984		0.9682	
F-stat	2398.083		985.8312		3176.3059		752.3471	

* Significant at 99%
** Significant at 95%
*** Significant at 90%

Impact of financial constraints on risk seeking attitude of companies was examined with ROE as an independent variable for the second data period block of 2006-2011. As risk seeking attitude among companies was not found during 2007 as depicted by the table 5-13, so multiple regression result of this year has not been considered for discussing the impact of financial constraints on risk seeking attitude. So for as coefficient values of ROE for other table years were concerned, these values are significantly different from zero indicating that financial

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constraints did not contribute in eliminating risk seeking attitude of companies during the table years. Although these values are significant at 0.01 levels, yet the findings are not as per prediction of hypothesis 4.

5.4. Corporate Governance and Prospect Theory Behavior

Role of corporate governance for risk averse and risk seeking behavior of firms is very much obvious in the literature. Risk averse and risk seeking behavior of firms under Prospect Theory has been described as irrational behavior of firms and mechanism of good corporate governance is helpful in abating this irrational behavior. It improves the value and performance of firms. Variables of corporate governance are having positive association with decision to make capital investment in situation of gain and these variables are having negative relationship with capital investment decision in loss domain (Wen, Y- F, 2010).

5.4.1. Corporate Governance and Risk Averse Behavior

The following regression model has been applied to evaluate fifth hypothesis i.e., to know the impact of corporate governance on risk averse attitude of firms while making capital investment in their domain of gain:

$$\Delta C \, l_i = \gamma \, (Fin \, Per_i^{\alpha 1} .BSI_i^{\alpha 2} .IND_i^{\alpha 3} .DUA_i^{\alpha 4} .ACl_i^{\alpha 5.} \, ACT_i^{\alpha 6} \, IO_i^{\alpha 7} \, CON_i^{\alpha 8}) + \varepsilon_i \qquad (5)$$

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Table 5-22. Effect of Corporate Governance on Risk Averse Behavior

ROA Independent Variable

2006

Variables	Co-efficient	t-stat
ROA	-0.18	-0.353
BSI	0.804	3.674*
IND	0.771	2.251**
DUA	0.113	0.675
ACJ	1.207	2.694*
ACT	0.356	2.093**
IO	0.01	0.034
CON	1.373	3.194*
R Square	0.978	
Adjusted R^2	0.9666	
F-stat	562.229	

*   Significant at 99%
** Significant at 95%

This is clear from table 5-7 i.e. summary table of risk aversion under prospect theory that when ROA was used as an independent variable, risk averse behavior described under prospect theory was found only in the table year 2006 out of the entire data period of second block 2006-2011. Coefficient value of ROA was found to be -0.18 indicating that ROA and capital investment are negatively correlated although this value is not significant. As this value is not different from zero significantly, so it can be said that corporate governance has contributed in eliminating risk averse behavior of companies in the domain of gain. This result is as per the description of the hypothesis 5. R Square value of 0.978 has indicated that explanatory variables have explained about 98% variations in capital investment.

Table 5-23. Effect of Corporate Governance on Risk Averse Behavior
ROE Independent Variable
2006-2011

Variables	Year									
	2006		2007		2008		2009		2010	
	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat
ROE	-0.197	-8.81*	2.325	7.725*	45.814	13.331*	-5.077	-0.458	2.767	1.18
BSI	0.095	0.757	0.982	0.491	-9.933	-2.607**	0.545	5.18**	0.003	0.021
IND	0.097	0.529	-5.424	-1.451	-21.607	-3.857*	-1.427	-1.169	-0.143	-0.293
DUA	0.0001	0.001	-2.264	1.394	2.518	0.833	0.232	2.404***	-0.084	-1.277
ACI	0.276	1.27	-0.714	-0.205	2.609	0.489	6.031	0.529	-1.418	-0.515
ACT	0.06	0.644	1.568	1.011	0.21	0.067	0.027	0.197	-0.025	-0.369
IO	-0.068	-0.393	-5.265	-1.937	5.016	0.95	-0.363	-1.621	-0.029	-0.185
CON	0.269	1.144	-2.243	-0.616	-30.813	-4.331*	0.616	1.621	0.002	0.011
R Square	0.4717		0.4484		0.8489		0.9993		0.9984	
Adjusted R Square	0.4242		0.3926		0.8215		0.6644		0.854	
F-stat	11.051		8.8435		52.701		573.157		559.0449	

*   Significant at 99%
**   Significant at 95%
*** Significant at 90%

In order to examine the impact of corporate governance mechanism on prospect theory behavior of companies' risk aversion in situation of gain, multiple regression was run with change in capital investment as dependent variable, ROE an independent variable and variables of corporate governance as control variables. Table 5-9 explains that during the data period of 2006-2011, risk averse behavior was previously observed in 2006, 2007, 2008, 2009 and 2010 only as depicted by table 5-10. Regression results revealed that coefficients of independent variable ROE for table years were different from zero for all the years except the year 2006 in which it was -0.197. It means that corporate governance mechanism had eliminated risk averse behavior of companies only for this year. This year coefficient value was also significant at 1% level. Corporate governance has not contributed in eliminating or controlling the risk averse behavior of companies in the years of 2007, 2008, 2009 and 2010. Findings of these years were not found as per the provision of hypothesis 5. It was also found that board size, board independence, audit committee independence, shareholders activism and ownership concentration were positively correlated with capital investment, although these coefficient values were insignificant.

5.4.2. Corporate Governance and Risk Seeking Behavior

The sixth hypothesis i.e. to evaluate the impact of corporate governance on risk seeking attitude of firms while making decisions of capital investment in the domain of loss has been tested with the following regression equation:

$$\Delta C \ I_i = -\lambda \ [(\text{-Fin Per}_i)^{\beta_1} (\text{-BSI}_i)^{\beta_2} (\text{-IND}_i)^{\beta_3} (\text{-DUA}_i)^{\beta_4} (\text{-ACI}_i)^{\beta_5} (\text{-ACT}_i)^{\beta_6} (\text{-IO}_i)^{\beta_7} (\text{-CON}_i)^{\beta_8}] + \varepsilon_i \quad (6)$$

Table 5-24. Effect of Corporate Governance on Risk Seeking Behavior

ROA Independent Variable

2006

Variables	Co-efficient	t-stat
ROA	5.215	2.74**
BSI	0.385	0.874
IND	-0.048	-0.172
DUA	-0.048	-0.172
ACI	-2.721	-1.194
ACT	0.36	1.194
IO	0.456	1.312
CON	0.578	0.751
R Square	0.98001	
Adjusted R^2	0.93001	
F-stat	179.763	

* Significant at 99%
** Significant at 95%

As during the data period of second block i.e. 2006-2011, risk seeking behavior was observed only in the table year under the heading of risk seeking behavior under prospect theory explained by table 5-11, so impact of corporate governance on this risk seeking attitude of companies was analyzed only for this year. Analysis revealed that coefficient value of independent variable ROA was 5.215. This value was significant at 5% level. As this value was significantly different from zero, it could be implied that corporate governance has not affected risk seeking behavior of companies in loss domain. While, R Square has shown that explanatory variables have explained about 98% of the variations in capital investment.

Table 5-25. Effect of Corporate Governance on Risk Seeking Behavior
ROE Independent Variable
2006-2011

Variables	Year							
	2006		2008		2009		2010	
	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat
ROE	1.616	8.075*	1.849	4.902*	3.131	6.703*	1.185	5.379*
BSI	0.126	0.523	0.044	0.249	-0.055	-0.368	-0.021	-0.379
IND	0.067	0.271	-0.31	-0.815	0.023	0.141	0.087	1.236
DUA	-0.086	-0.576	0.123	1.033	0	0.007	-0.052	-1.212
ACI	-1.304	-2.272**	0.166	0.69	-0.203	-0.988	0.035	0.391
ACT	-0.015	-0.096	-0.014	-0.123	-0.017	-0.163	0.097	1.947
IO	0.122	0.4	-0.145	-0.836	0.071	0.419	0.158	1.999
CON	0.513	1.252	0.026	0.084	0.341	1.144	-0.305	-1.815
R Square	0.9942		0.9824		0.9855		0.9882	
Adjusted R Square	0.9469		0.9574		0.9733		0.9665	
F-stat	475.441		314.556		769.2971		523.4513	

* Significant at 99%
** Significant at 95%

Table 5-13 clearly explains that during the data period of second block i.e., 2006-2011, risk seeking behavior prevailed in companies throughout the data period except the year 2007. So, this year has not been included for examining the influence of corporate governance on risk seeking behavior of companies under table 5-25. When impact of corporate governance was checked on risk seeking behavior of companies in their domain of loss, it was found that coefficient values of independent variable ROE in different table years were significantly different from zero. It means that corporate governance had not controlled the risk seeking behavior of the companies in all the table years. This result does not support the theoretical background and predictions of hypothesis 6. While, R Square values have indicated that more than 98% of the variations in capital investment were explained by the explanatory variables.

5.5. Overall Impact of Financial Constraints and Corporate Governance on Prospect Theory Behavior

After reviewing the impact of financial constraints and corporate governance individually, multiple regression was run to examine overall stability or combined effect of these two control variables on risk averse and risk seeking behavior of companies while making their capital investment decisions in gain and loss situations respectively by applying the following procedure:

5.5.1. Financial Constraints and Corporate Governance VS Risk Averse Behavior

In order to evaluate overall impact of financial limitations of firms and corporate governance mechanism on their risk averse attitude, while making capital investment in gain domain, the following regression models is applied:

$$\Delta C I_i = \gamma (Fin\ Per_i^{\alpha 1}.FCF_i^{\alpha 2}.DER_i^{\alpha 3}.OCF_i^{\alpha 4}.DPO_i^{\alpha 5}.FAR_i^{\alpha 6}.BSI_i^{\alpha 7}\ IND_i^{\alpha 8}.DUA_i^{\alpha 9}.ACI_i^{\alpha 10}\ ACT_i^{\alpha 11}\ IO_i^{\alpha 12} CON_i^{\alpha 13}) + \varepsilon_i$$

(7)

Table 5-26. Effect of Financial Constraints and Corporate Governance on Risk Averse Behavior

ROA Independent Variable

2006

Variables	Co-efficient	t-stat
ROA	-0.068	-1.123
FCF	-1.189	-4.513*
DER	0.0003	0.964
OCF	2.112	3.491*
DPO	-0.052	-2.254**
FAR	-0.087	-2.97*
BSI	0.952	5.854*
IND	0.708	2.875*
DUA	0.006	0.054
ACI	1.118	3.446*
ACT	0.282	2.296**
IO	-0.114	-0.501
CON	1.147	3.746*
R Square	0.9895	
Adjusted R^2	0.9777	
F-stat	697.219	

* Significant at 99%

** Significant at 95%

When ROA was used as an independent variable, risk averse behavior in companies during the second data period block i.e., 2006-2011 was found only in 2006 as explained by table 5-7. Whether or not this risk averse behavior was eliminated by introducing control variables of financial constraints and corporate governance in to the model during the above table year, it was revealed by analysis that risk averse behavior in companies was eliminated when multiple regression was run by incorporating these control variables into the basic model of prospect theory. As coefficient value of ROA which was -0.068 was not significantly different from zero, so it indicated the findings of eliminating risk averse behavior although this value was not found to be significant. This finding was according to theory and hypothesis 7. Moreover, R Square during this year was 0.9895 which indicated that 99% variations in dependent variable i.e., capital investment were explained by the explanatory variables.

Table 5-27. Effect of Financial Constraints and Corporate Governance on Risk Averse Behavior
ROE Independent Variable
2006-2011

Variables	Year									
	2006		2007		2008		2009		2010	
	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat
ROE	-0.062	-4.616*	-0.009	-0.464	45.252	11.951*	0	65535	6.036	1.117
FCF	-0.738	-7.715*	-1.005	-109.609*	0.41	0.091	0.567	65535	-0.387	-0.487
DER	0.0002	1.564	0.0002	1.721	-0.0004	-0.667	0	65535	-6.777	-0.861
OCF	1.043	4.714*	0.553	5.026*	-1.717	-0.163	-0.345	65535	0.014	0.028
DPO	-0.025	-2.935*	0.027	0.41	0.51	0.107	-0.03	65535	0.217	0.314
FAR	-0.053	-4.964*	0.038	2.752*	-6.751	-0.667	0.439	65535	0.221	0.369
BSI	0.0001	0.002	0.077	0.734	-8.782	-2.092**	0.678	65535	0.392	0.443
IND	0.005	0.061	-0.11	-0.55	-21.273	-3.637*	-2.661	65535	0.751	0.415
DUA	-0.039	-0.915	-0.15	-1.746	2.625	0.792	0.19	65535	-0.051	-0.433
ACI	0.17	1.646	-0.04	-0.221	2.7002	0.488	2.07	65535	-6.617	-1.579
ACT	0.001	0.044	0.033	0.41	0.401	0.119	-0.125	65535	-0.041	-0.108
IO	-0.01	-0.125	-0.04	-0.277	5.45	0.973	-0.505	65535	-0.099	-0.213
CON	0.082	0.756	-0.044	-0.221	-29.67	-3.862*	0.771	65535	0.383	1.549
R Square	0.893		0.9985		0.8509		65535		0.9997	
Adjusted R Square	0.8687		0.9861		0.811		1		0.4982	
F-stat	60.354		4434.7839		30.734		--		624.607	

* Significant at 99%
** Significant at 95%

As corporate governance data could be made available from the year 2006, so the above mentioned combined analysis was done for the second data period block only i.e., 2006-2011. The above table analyzed impact of financial constraints and corporate governance on risk averse behavior of companies in the situation of gain for the entire data period except 2011, because when ROE was used as an independent variable, risk aversion was not depicted during this year under table 5-9. Results indicate that risk averse behavior in companies was eliminated in the presence of these control variables in the entire table years except 2008 and 2010 because coefficient values of ROE in 2006, 2007 and 2009 although insignificant except for 2006, were not substantially different from zero. Findings of these years were in accordance with Wen,Y-F. (2012) and the prediction of hypothesis 7. So for as the coefficient values of ROE for the year 2008 and 2010 were concerned, these were 45.252 and 6.036 respectively and value of the year 2008 was significant at 1% level. As these values were significantly different from zero, so it was implied that risk averse behavior of companies were not affected or controlled by financial constraints and corporate governance jointly.

5.5.2. Financial Constraints and Corporate Governance VS Risk Seeking Behavior

While the following model has been applied for examining the overall impact of financial constraints and corporate governance mechanism of firms on their risk seeking behavior while making capital investment in the loss domain:

$$\Delta C\,I_i = -\lambda[(-Fin\,Per_i)^{\beta 1}\,(-FCF_i)^{\beta 2}(-DER_i)^{\beta 3}(-OCF_i)^{\beta 4}(-DPO_i)^{\beta 5}(-FAR_i)^{\beta 6}(-BSI_i)^{\beta 7}\,(-IND_i)^{\beta 8}\,(-DUA_i)^{\beta 9}$$
$$(-ACI_i)^{\beta 10}(-ACT_i)^{\beta 11}\,(-IO_i)^{\beta 12}\,(-CON_i)^{\beta 13}]+\varepsilon_i \qquad\qquad (8)$$

Table 5-28. Effect of Financial Constraints and Corporate Governance on Risk Seeking Behavior
ROA Independent Variable
2006

Variables	Co-efficient	t-stat
ROA	2.89	4.037*
FCF	-0.85	-6.802*
DER	-0.0001	-1.451
OCF	0.487	6.151*
DPO	0	65535*
FAR	0.286	1.354
BSI	-0.118	-0.806
IND	0.191	1.302
DUA	0.136	1.2604
ACI	0.325	0.508
ACT	0.072	0.659
IO	0.215	1.112
CON	0.051	0.188
R Square	0.998	
Adjusted R^2	0.872	
F-stat	932.931	

* Significant at 99%
** Significant at 95%

It has been revealed by table 5-11 that during 2006-2011, when ROA was used as an independent variable, risk seeking behavior was found in companies only during the year 2006. Coefficient value of independent variable ROA was 3.496 in that table. Analysis of table 5-28 revealed that coefficient value of ROA has now become 2.89 which is significant at 1% level. It means that risk seeking behavior still existed in companies in spite of incorporating controlling variables of financial constraints and corporate governance in to the model. This finding is also not according to hypothesis 8. Negative values of coefficient of FCF, DER and BSIZE indicate that these variables are negatively correlated with capital investment. All the remaining variables are positively correlated with dependent variable. R Square value of 0.998 indicates that maximum variation in capital investment which is about 100% is explained by the regressers.

Table 5-29. Effect of Financial Constraints and Corporate Governance on Risk Seeking Behavior
ROE Independent Variable
2006-2011

Variables	Year							
	2006		2008		2009		2010	
	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat	Co-efficient	t-stat
ROE	1.156	4.197*	1.837	6.937*	3.661	13.196*	1.147	5.103*
FCF	-0.867	-7.151*	-0.676	-7.292*	-0.561	-13.91*	-0.091	-2.042**
DER	-8.107	-0.864	0.0002	2.075**	0.544	0.257	0.085	1.2
OCF	0.924	7.015*	0.625	6.257*	0.387	1.506	-0.179	-1.306
DPO	-1.957	-0.639	0.26	0.604	-0.041	-0.924	0.037	0.447
FAR	0.28	1.362	0.003	0.462	-0.081	-0.627	0.042	0.413
BSI	-0.113	-0.788	0.092	0.738	0.096	-1.11	-0.022	-0.411
IND	0.131	0.93	-0.416	-1.626	-0.071	-0.756	0.072	1.047
DUA	0.117	1.137	0.079	0.957	-0.021	-0.38	-0.068	-1.594
ACI	0.317	0.507	0.17	1.04	-0.253	-2.181	0.058	0.682
ACT	0.059	0.621	-0.023	-0.277	-0.079	1.299	0.054	1.062
IO	0.189	1.015	0.051	0.404	0.062	0.655	0.137	1.775
CON	0.042	0.16	-0.217	-1.015	0.077	0.453	-0.222	-1.274
R Square	0.9986		0.9929		0.9957		0.9905	
Adjusted R Square	0.9388		0.9658		0.9833		0.9657	
F-stat	969.2551		435.3682		1534.7295		362.1388	

* Significant at 99%

** Significant at 95%

During the data period of second block i.e., 2006-2011, when ROE was used as an independent variable, risk seeking behavior was observed in companies previously as mentioned in table 5-13 during all years except the year 2007 and 2011. When overall stability of the basic prospect theory model was analyzed for the table years by incorporating variable of financial constraints and corporate governance into this model, it revealed that coefficients of independent variable ROE for these years were different from zero indicating that risk seeking attitude of companies still existed. Controlling variables have not contributed in eliminating this behavior. Coefficient values of independent variable were significant for all the table years at 1 percent level. Negative coefficient values of free cash flow to sales (FCF) for all the table years revealed that capital investment and FCF are negatively correlated. R square values in all the years were more than ninety nine percent indicating that about one hundred percent variation in capital investment was explained by explanatory variables.

5.6. Risk- Return Relationship under Prospect Theory

Standard finance studies emphasize that risk and return are positively correlated and investors are risk averse in their attitude. This relationship is found to exist regardless of analysis being conducted at industry or firm level. This positive relationship is empirically found irrespective of national identity of firms (Fisher & Hall, 1969; Neuman, Bobel & Haid, 1979). However, negative relationship between risk and return is found in various empirical studies when accounting measures of risk and return are used. Likewise, when study is conducted by dividing data into various time spans, this relationship is again found. Firm size, nature of industry and studies based on diversification strategies of firms are also favoring negative risk return relationship (Treacy, 1980; Feigenbaum & Thomas, 1985; Bettis & Mahajan, 1985).

Much of the research in area of business, finance, economics and management assumes that individuals are risk averse in their risky choice decisions and their utility function is concave uniformly. But, prospect theory assumes that situation of individuals with respect to their behavior towards risk is attached with their state of being in gain or loss domain. Meaning thereby, they are not all the time risk averse. Rather, they are risk averse in the gain domain and risk seeking in the loss domain. This phenomenon implies that there is a negative relationship between risk and return. So being influenced by the argument of Feigenbaum & Thomas, 1985, we have applied the following hypotheses regarding risk and return relationship:

5.6.1. Negative Relationship Between Risk and Return

There is negative relationship between risk and return of firms having below target level return. It has been tested by the following model:

$$\rho_{\text{-Fin Peri.}\sigma i} = -1 \leq \rho i \leq 0 \tag{9}$$

5.6.2. Positive Relationship Between Risk and Return

There is positive relationship between risk and return of firms having above target level return.

It has been tested by the following model:

$$\rho_{\text{Fin Peri.}\sigma i} = 0 \leq \rho i \leq 1 \tag{10}$$

Regression results of both these models have been tabulated in the following tables:

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Table 5-30. Overall Risk Return Relationship

Return Measure	No. of Firms	Firms With Above Target Return			Firms With Below Target Return		
		No. of Firms	Spearman Rank-order correlation	*t-Statistic*	No. of Firms	Spearman Rank- order correlation	*t-Statistic*
ROA	139	69	0.422	*3.815**	70	-0.407	*-3.672**
ROE	139	70	0.421	*3.825**	69	-0.436	*-3.962**

$P \leq 0.01 =$ *Significant at 1 % level

Table 5-30 shows the results of Spearman rank-order correlation between risk and return when Return on Assets (ROA) and Return on Equity (ROE) are used simultaneously as measures or variables of return. In order to test the hypotheses of negative relationship between risk and return of firms with return below than the target level and positive relationship between risk and return of firms with return higher than their target level, time series median return of each firm is calculated first for the entire data period using ROA and ROE as measures of return simultaneously. Later on, cross section median return is calculated using these time series median ROA and ROE. This single median of median is called as target ROA and ROE.

Fishburn (1977) has described a risk measure. This measure of risk is based on the following three parts:

A. A reference or target level

B. Deviations from this target level and

C. Weighting of deviations

This measure defines risk as a probability weighting function of deviations from a reference level. Fishburn thus provided a generalized approach of dealing with the matter of dispersion. Using Fishburn measure of risk, time series median value return of each firm is deducted from single value cross section median return in order to determine each firm's distance from target return. This distance from target return is used as measure of risk in this study. Total of 139 firms are thus divided into two categories. The first category consists of 69 firms having positive values of distance from target and 70 firms having negative values of distance from target, using ROA as measures of return. Likewise, the second category consists of 70 firms having negative values of distance from target return and 69 firms with positive values of distance from target return using ROE. Afterwards, time series standard deviation of each firm is determined in order to evaluate the existence of correlation between risk and return using ROA and ROE as measures of return.

In order to test hypothesis of existing negative relationship between risk and return of below target firms, Spearmen rank-order correlation is used. Correlation coefficients of ROA and ROE with their risk measure which are -0.407 and -0.436 respectively indicate that risk and return are negatively correlated for firms having below target returns. Moreover, t-statistics of -3.672 and -3.962 respectively indicate that this relationship is significant for both the measures. These findings are consistent with Fishburn's measure of risk which explains that negative relationship exists between negative values of distance from target return of firms and their standard deviation. Moreover, the results are as per findings of Feigenbaum & Thomas (1985) and hypothesis 9 of this study.

Positive coefficient values of Spearman rank-order correlation between risk and return, using ROA and ROE respectively, as measures of return and standard deviation as measure of risk are

0.422 and 0.421. These values indicate that hypothesis 10 of existing positive relationship between risk and return of those firms having return greater than the target is also proved. Moreover, these values are significant at 1 % level because their t-values are 3.815 and 3.825 respectively. These findings are again consistent with findings of Feigenbaum & Thomas (1985).

Prospect theory describes that firms become risk averse above target which implies that greater distance above target induces less risk seeking. It means lesser dispersion around the mean value in the form of standard deviation will be in this situation. Above findings of hypothesis 10 are again consistent with Prospect Theory. But, Fishburn measure of risk is silent regarding above target return situation because this measure is normally considered as only below target risk measure.

Table 5-31. Classified Risk-Return Relationship Based on ROA

Sr. No	Classification of Firms	No. of Firms	Above Target Return			Below Target Return		
			No. of Firms	Spearman Rank-order correlation	t-Statistic	No. of Firms	Spearman Rank-order correlation	t-Statistic
1	Textile	73	36	0.486	3.24*	37	-0.29	-1.795
2	sugar	18	9	0	—	9	-0.183	-0.493
3	Paper	5	3	0.5	0.577	2	1	—
4	Cement	5	2	-1	—	3	0.5	0.577
5	Others	38	19	0.313	1.359	19	-0.6538	-3.562*
	Total	139	69			70		

*Significant at 1 % level

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Table 5-31 presents the results of Spearman rank-order correlation between risk and return when ROA is used as a measure of return and whole sample is divided into five categories based on relationship of firms with typical sectors like textile, sugar, paper, cement and others. The whole procedure described for analysis of data under Table 5-30 is applied on five sectors firms independently, in order to examine whether or not such division of sample into five subsamples causes change in correlation results.

It has been found that firms belonging to textile and others sectors jointly account for about 80% of whole sample in case of above target and below target firms, respectively with ROA as measure of return. Although, correlation coefficients of these two sectors 0.486 and 0.313 for above target, -0.29 and -0.653 for below target firms are according to hypothesis i.e., they are positive for above target firms and negative for below target firms. But out of these two sectors, coefficient of textile sector in case of above target firms and coefficient of others sector in case of below target firms is only found to be significant as their t-statistics are 3.24 and -3.562 respectively. So for as remaining three sectors namely sugar, paper and cement are concerned, their coefficient values except paper sector are not as per hypotheses. But, all these values are insignificant. Moreover, proportion of these three sectors firms in whole sample account for only 20%. These results indicate that division of whole sample into subsamples affects the results of analysis up to some extent against the predictions of hypotheses 9 and 10 and these findings are supported by Johnson, H. J. (1994).

Table 5-32. Classified Risk-Return Relationship Based on ROE

Sr. No	Classification of Firms	No of Firms	Above Target Return			Below Target Return		
			No.of Firms	Spearman Rank- order correlation	t- Statistic	No. of Firms	Spearman Rank- order correlation	t- Statistic
1	Textile	73	36	0.2497	1.5039	37	-0.465	-3.112*
2	Sugar	18	9	-0.633	-2.165*	9	0	—
3	Paper	5	2	1	—	3	1	4.745*
4	Cement	5	3	0.5	0.577	2	1	—
5	Others	38	19	-0.093	-0.385	19	-0.6128	-3.197*
	Total	139	70			69		

*Significant at 1 % level

Table 5-32 shows the results of Spearman rank-order correlation between risk and return when ROE is used as a measure of return and whole sample is again divided into same five categories based on generic relationship of firms with various sectors or categories like textile, sugar, paper, cement and others. The whole procedure described for analysis of risk and return presented under Table 5-30 is applied on these five sectors firms independently in order to examine whether such division of sample into five categories causes correlation result to change or not.

It has been found that consistent with classification of firms under Table 5-31, textile and others sectors jointly account for 80% of whole sample in case of above target and below target firms respectively. Correlation coefficient for above target firms belonging to textile, paper and cement sectors are positive as hypothesized. Their values are 0.2497,1 and 0.5 respectively but all are

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insignificant. For below target firms, values of -0.465 and -0.6128 for textile and others sector respectively are according to hypothesis i.e., they are negative. Their t-statistics of -3.112 and -3.197 indicate that these values are significant at 1% level.

So for as remaining two sectors of sugar and others in case of above target returns are concerned, their coefficient values are not according to hypothesis as these are negative. While coefficient values of sugar, paper and cement sectors for below target return are not according to hypothesis as these are positive.

Results of risk-return analysis exhibit that implications of prospect theory with respect to risk-return relationship are proven when whole data sample is tested as one unit. But when this sample is subdivided into five segments or sections, results change and show mixed pattern. Implications of prospect theory with regard to risk return relationship in such a situation is found partially in few sectors.

5.7. Primary Data Analysis

In order to determine whether prospect theory is practically applicable in corporate sector of Pakistan, a survey was conducted to find the existence of various attributes of this theory in this sector. For this purpose, a questionnaire was circulated among the same 139 listed companies of Pakistan which have been included in secondary data analysis of this study. Respondents of this questionnaire are managers of those departments which were directly concerned with financial and investment activities of companies. Out of these companies, response was received from 80 companies and thus response rate was 57.14%. This questionnaire was adopted from the study of Oslen (1997) which is an important study regarding risk attributes of prospect theory. It has been commonly discussed in literature that risk in investment is the possibility that actual return will

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be different from estimated return. In this regard, only down side return i.e. loss is taken in to account and upside return is ignored. Moreover, risk is a construct which is multidimensional and largely affected by the possibility of down side return Oslen (1997). Solvic (1987) has also found similar results in several areas. This loss aversion of investors has been tested through first part of this survey. Likewise, it has been described in the literature that investors adopt risk averse attitude in gain and risk seeking attitude in loss, this phenomena has been tested through part B of the questionnaire. Lastly, the phenomenon of time diversification effect has been tested through part C.

5.7.1. Cornbach's Alpha: A Data Reliability Test

In order to know the level of internal consistency or inter correlations among the correlated variables, first of all, data reliability test has been run on first six questions of questionnaire which measure loss aversion of decision makers. For this purpose, Cornbach's Alpha has been calculated whose value is found 0.70. This alpha value describes the degree of measuring a single construct which is unidirectional in nature with the help of a set of items. Its value of 0.70 indicates that inter correlations among tested items is good and at satisfactory level, because α value of less than 0.5 is normally considered as unacceptable.

5.7.2. Factor Analysis

The questionnaire used for data collection consists of 11 questions. Data analysis of the study includes factor analysis so that a large number of questions may be reduced into relatively small number of factors by making groups of these variables or questions in the form of factors. Grouping of these variables is based on similarity of their characteristics. The factors extracted through factor analysis are in a position to explain these variables with the help of variance.

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These factors may be used for any further analysis if required. Detail of this analysis has been presented and explained as under:

Table 5-33. Descriptive Statistics of Risk Attributes

Variables/Questions	N	Minimum	Maximum	Mean	Std. Deviation
The chance of incurring a large loss relative to what is expected	80	1	7	2.1250	1.49577
The chance that asset will earn less than the minimum needed to meet the client's need	80	1	7	2.2500	1.42758
The overall variability in assets return over time	80	1	7	2.7125	1.24467
The chance that asset will earn less than what is expected	80	1	7	2.6750	1.20940
The chance that the asset will earn less than it has earned historically	80	1	7	3.1500	1.32264
The chance of obtaining a large gain relative to what is expected	80	1	7	3.8750	1.41757

Descriptive statistics of the first part of the questionnaire consisting of six questions regarding measuring of loss aversion among the corporate firms with the help of risk attributes is explained by the above table. It is obvious and can be seen from the table that mean value of the first risk attribute i.e., the chance of incurring a large loss relative to what is expected is lowest at 2.1250 while the other risk attribute "the chance that asset will earn less than the minimum need to meet the client's need" is having mean value higher than it. As there is inverse relationship between

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the mean value of risk attributes and their rating by managers, so these results indicate that managers have shown the highest sensitivity for the first risk attribute as it has been highly rated by them. Likewise, the results indicate that managers have rated other four risk attributes as shown by their respective mean values from high to low after these first two. It is also clear that respondents have the lowest rating for the last attribute which is the chance of obtaining a large gain relative to what is expected because its mean value is the highest at 3.8750. It means that investors are least sensitive regarding upside variations in returns of their investments. Standard deviation of the first risk attribute is the highest, which indicates maximum dispersion or volatility of it around its mean value.

Table 5-34. Kaiser-Meyer Olkin (KMO) and Barlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.626
Barlett's Test of Sphericity	Approx. Chi-Square	196.838
	Df	55
	Sig.	.000

Kaiser-Meyer Olkin (KMO) and Barlett's test jointly measure whether or not the level of relationship among the variables is strong. Proceeding for factor analysis requires that the sample size should be adequate and KMO test measures the adequacy of the sample size. This test has been performed for evaluating this adequacy of sample. KMO test explains that test value should be at least 0.5 in order to make factor analysis meaningful. It is clear from the above table that KMO value is 0.626 which means that sample size of the study is adequate for conducting factor analysis.

So for as Barlett's test is concerned, it is another indicator of measuring strength of relationship among the variables. Null hypothesis regarding correlation matrix of the study is that it is an identity matrix and this null hypothesis is required to be rejected. A correlation matrix is an identity matrix if it's all diagonal elements is 1 and all off diagonal elements is zero. Identity of correlation matrix is tested with the help of Barlett's test. In order to reject this null hypothesis, Barlett's test should be significant i.e. its probability should be less than 0.05. It is indicated by the above table that significance level of this test is 0.000 which means that correlation matrix of the study is not an identity matrix and null hypothesis regarding identity of correlation matrix is thus rejected.

Table 5-35. Communalities

Variables	Initial	Extraction
large loss relative to expected	1.000	.780
investment will earn less than client need	1.000	.793
overall variability in investment return	1.000	.687
investment will earn less than expected	1.000	.606
investment will earn less than history	1.000	.581
large gain than expected	1.000	.789
situation of investors in gain	1.000	.767
situation of investor in loss	1.000	.702
investor preference in short run	1.000	.784
investor preference in long time	1.000	.706
investors feeling in making risky investment in long time	1.000	.731

Extraction Method: Principal Component Analysis.

Communality refers to the percentage of variance in each variable explained or accounted for by all the retained or extracted factors jointly. It is also called as sum of the squared factor loading of all factors for each of the individual variables. It is commonly considered as a reliability indicator. Communality table describes that 79.3% of variance in the variable "less earning than client's need" and 70.6% of variance in the variable "investors' preference in long time" is explained by all the extracted factors jointly.

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Table 5-36. Total Variance Explained

| Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.056	27.778	27.778	3.056	27.778	27.778	2.616	23.779	23.779
2	1.356	12.331	40.110	1.356	12.331	40.110	1.511	13.732	37.511
3	1.280	11.638	51.748	1.280	11.638	51.748	1.313	11.932	49.444
4	1.203	10.933	62.681	1.203	10.933	62.681	1.265	11.502	60.946
5	1.031	9.376	72.057	1.031	9.376	72.057	1.222	11.111	72.057
6	.728	6.615	78.671						
7	.675	6.134	84.806						
8	.629	5.722	90.527						
9	.507	4.608	95.135						
10	.333	3.032	98.167						
11	.202	1.833	100.000						

Extraction Method: Principal Component Analysis.

It is explained by the above table that number of components or factors in the first column are initially equal to number of variables but all these factors are not retained. Ultimately, only first five factors are retained as depicted by the second panel of the table. Initial Eigen values panel of the table depicts variance of the factors. We have standardized initial Eigen value as 1 as cut off criteria for factors selection during factor analysis which is based on correlation matrix. So, variance of each variable is equal to 1 and total variance is equivalent to the number of variables which is 11. As total variance is equal to total of Eigen values, total column of Eigen values represents the portion of total variance accounted for by each factor and the first factor normally accounts for the highest variance i.e. 3.056, then the second factor's variance i.e.1.356 and so on.

Whereas, the second panel of the table which relates to Extraction sum of squared loading explains that out of 11 factors, only first five factors have been retained because variances of only these five factors starting from 3.056 to 1.031 are greater than cut off criteria of Eigen value. Remaining factors are not significant and thus left over. Total column of this panel shows the variance attributed to or accounted for by each of these factors just like the total column of the first panel. But, it can be seen that variances of total column of second panel are equal to the variances of total column of the first panel which start from 3.056 and ends at 1.031. Last panel of the table relates to Rotation sum of squared loading which is based on variance redistribution after applying Varimax rotation. Total column of this panel presents the variances accounted for by each of the retained five factors. As varimax rotation redistributes the total variance of each factor, so that maximum variance may be accounted for by the retained factors. Variances of total column in last panel show this redistribution of variance starting from 2.616 for the first factor and ending at 1.222 for the fifth factor. It should be noted that although variance values of

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each factor of the second and third panel vary, yet their cumulative percentage mentioned against last factor of both these panels is same i.e. 72.057.

Figure 5-1. Scree Plot
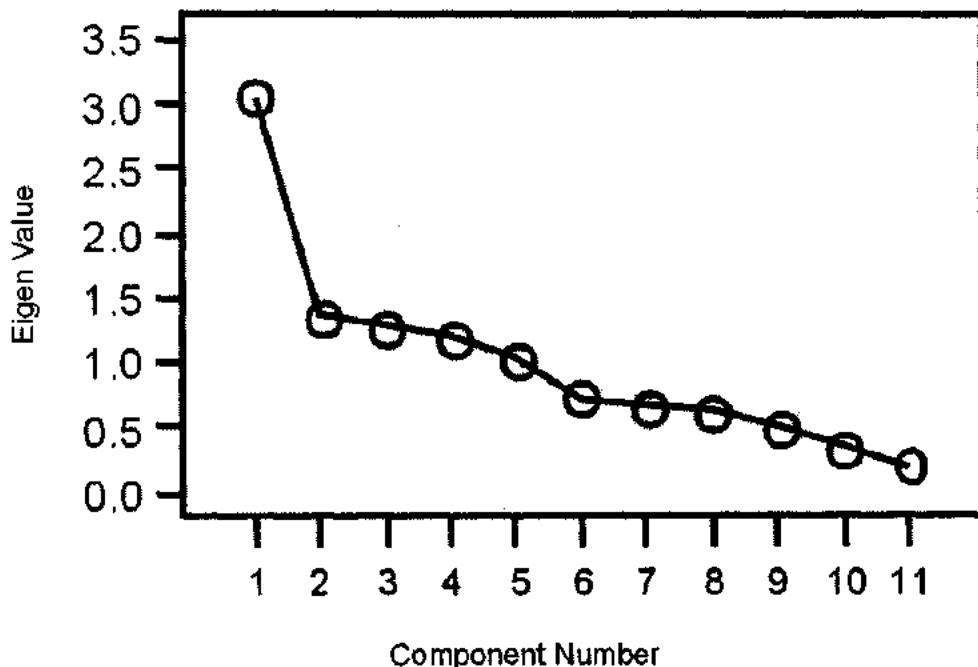
Scree plot is a graph which explains the results of table 5-37 graphically and is helpful in determining the number of factors to be retained or extracted graphically. It is showing Eigen values on Y axis and number of factors or components on X axis. It is obvious that first factor contains maximum Eigen value, then second factor, then third factor and so on. The graph curve which starts flattening between factor five and six indicates that Eigen value of factor six is less than 1, so this factor is left and first five factors have been retained.

Table 5-37. Component Matrix

Variables	Component				
	1	2	3	4	5
large loss relative to expected	.832				
investment will earn less than client need	.766				
overall variability in investment return	.822				
investment will earn less than expected	.599				
investment will earn less than history					
large gain than expected		.723			
situation of investors in gain				.829	
situation of investor in loss					.533
investor preference in short run			.664		
investor preference in long time	.508				-.514
investors feeling in making risky investment in long time			.628		

Extraction Method: Principal Component Analysis.

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The above table shows loading of each factor for each of the variables. Absolute value of each factor's loading indicates the importance of that factor for the concerned variable. Cut off criteria for the factor loading is set as 0.5 and factor loading of less than 0.5 has been suppressed. It is clear that first four variables or questions are loaded on factor 1, variable 6 is loaded on factor 2, variable 7 and 8 are loaded on factor 4 and 5 respectively, while variable 9 is loaded on factor 3 and variable 10 is loaded on factor 1 & 5 respectively. Last variable is loaded on factor 3 again. It should be noted from these results that variable 5 is not loaded by any of the factors.

Table 5-38. Rotated Component Matrix

Variables	Component				
	1	2	3	4	5
large loss relative to expected	.758				
investment will earn less than client need	.797				
overall variability in investment return	.728				
investment will earn less than expected	.642				
investment will earn less than history	.642				
large gain than expected			.867		
situation of investors in gain					.867
situation of investor in loss		.710			
investor preference in short run				.877	
investor preference in long time		.755			
investors feeling in making risky investment in long time			.601		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 17 iterations.

The above table shows correlation of each of the variable with each of the retained factor. The purpose of rotation is nothing more than to reduce the number of factors important for various variables on the basis of higher absolute loading value. Loss aversion of investors which is based on first 6 variables is loaded by factor 1 & 3. Variable 7 and 8 which measure the risk averse and risk seeking attitudes of investors are loaded by factor 5 & 2 respectively. While time diversification effect which is measured by last three variables is loaded by factor 4, 2 & 3 respectively. Although not required in this study, these factors can be used as variables instead of initial data for any sort of further analysis if required.

Table 5-39. Results of Risk Attributes

	Risk Attributes	Response In Percentage						
		Extremely Important	Very Important	Moderately Important	Neutral	Slightly Important	Least Important	Not At All Important
1	The chance of incurring large loss relative to expected	48	19	8.2	12.2	5.1	6.1	1.00
2	The chance that asset will earn less than the minimum needed to meet the client's needs	37.8	27	11.2	10.2	8.2	4.1	2.00
3	The overall variability in assets return over time	17.3	29	25.5	18.4	8.2	1.00	1.00
4	The chance that asset will earn less than what is expected	13.3	33	26.5	18.4	5.1	4.1	-
5	The chance that asset will earn less than it has historically	9.2	24	26.5	23.5	13.3	4.1	-
6	The chance of obtaining a large gain relative to what is expected	5.1	11	20.4	24.5	19.4	8.2	11.20

First part of the questionnaire which consists of six questions is related to loss aversion of managers while making their capital investment decisions. In order to examine the existence of loss averse attitude among mangers, six risk attributes have been evaluated on seven point Likert scale ranging from No.1 "Extremely Important" to No.7 "Not At All Important". Table 5-40 is

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related to the response of managers regarding various risk attributes. This table points out that risk i.e. the possibility of down side return is calculated with reference to some target return as described by the prospect theory. This target or reference point returns may be in the form of large loss relative to expected, less earning than clients' need, less earning than expected and less earning than earned in history. One question regarding upside return is also included in this part in order to examine the sensitivity level of investors for upside return as well.

So for as "the chance of incurring large loss relative to expected" one is concerned, 48% of respondents showed that it was the most important for them while it was not important for very few respondents. They were negligible, say only 1%. Likewise, same were the findings for second risk attribute that is the chance that assets will earn less than the minimum needs to meet the needs of clients. Risk attributes of overall variability in assets return and the chance for assets to earn less than expected return were very important for majority of the respondents i.e. 29% and 33% respectively.

Regarding the "chance that assets will earn less than historical return", the majority of the respondents were having moderate attitude towards it. It is important to note that majority of the respondents were neutral regarding the last risk attribute which is "the chance of getting large gain relative to the expected one". It means that upside return is not important for them. These findings indicate that losses are more important and meaningful for them (Hwang, S., Satchell, E., 2010).

Table 5-40. Results of Reflection Effect

Attributes	Risk Averse	Risk Seeker
Behavior of corporate managers in gain	77.6	22.4
Behavior of corporate managers in loss	49.00	51.00

The above table summarizes the results of managers' responses regarding their risk averse and risk seeking attitude. They were given two situations in which to make investments. One of the situations was of yielding gain for the investors and the other one was such that investors will sustain loss. Survey results indicate that responses of the managers were as per the provision of prospect theory. So for as the behavior of investors in gain domain is concerned, majority of them proved to be risk averse as they were 77.6% of the total sample size. Likewise, their majority proved to be risk seeking in the situation of loss as they were 51% of the total sample size. Thus "reflection effect" described by prospect theory is proved in corporate sector of Pakistan.

Table 5-41. Results of Time Diversification Effect

Attributes	Volatile Return	Moderate Return	Non-Volatile Return
Behavior of investor in short term horizon	26.5	62.2	11.2
Behavior of investor in long term horizon	62.2	33.7	4.1

Prospect theory explains that whenever investors have short time horizon for making investment, they prefer such type of investment opportunities which provide relatively smooth return, instead of volatile returns but when they have long time investment horizon, they like to prefer such type of investment opportunities which provide volatile returns. This phenomenon is called "time diversification effect" in the literature. This effect was evaluated in the questionnaire through three point Likert scale ranging from No.1 volatile return to No.3 non volatile return. Part C of this questionnaire was related to evaluation of the existence of time diversification effect described by prospect theory in Pakistan. It is clear from results indicated by the above table that response of managers in this survey was according to prospect theory. When investment period of investors was short term i.e. one year, 62.2% of investors preferred to invest in assets which will provide moderate return i.e., +2% to +18% with an average return of +10% and when their investment period was ten years, their majority which was again 62.2%, opted assets which will provide volatile returns ranging between -26% and +54% with an average of +14%.

Table 5-42. Results of Investors' Feeling

Attributes	More Safe	Indifferent	Less Safe
Investors' feeling in situation of long term volatile investment	42.9	24.5	32.7

In order to examine the causes of investing during long time horizon in assets which provide volatile returns to investors, it has been found that investors make investment in such assets because they feel themselves safer by investing in volatile return providing assets. As the table shows that whenever investment horizon is long term, a large number of investors i.e., 42.9 % are interested in investing in volatile return providing assets and very small number of them i.e., 24.5% are indifferent regarding investment alternatives. These findings are also according to the description of "time diversification effect" explained under purview of prospect theory. Thus, existence of this effect is proved in corporate sector of Pakistan.

CHAPTER SIX

CONCLUSION

Prospect theory which has been previously applied in stock market decisions of investors is investigated in this study from another aspect which relates to capital investment decisions taken by corporate firms in Pakistan. This study has strengthened the literature on behavioral corporate finance by establishing a link between behavioral finance and corporate finance. Not only application of prospect theory in capital investment decisions of companies has been investigated, but its allied implications like loss aversion, reflection effect and negative relationship between risk and return have also been explored in this study. Behavior of corporate firms described within the orbit of prospect theory is considered as an irrational behavior in conventional finance. This study has also investigated whether this irrational behavior is controlled by financial constraints of companies and implementing mechanism of good corporate governance in companies. This aspect of prospect theory has been analyzed by very few researchers. Results of this study have opened new avenues of research for the researchers of behavioral finance and corporate finance which are discussed in the later part of this chapter.

In the first phase of this study, application of this theory was tested together with its implications on financial and non financial data of companies. In the second phase, application of this theory was tested with the help of survey technique. The findings observed during these phases match with regard to application of prospect theory and various allied implications of this theory in Pakistan.

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An interesting fact regarding application of Prospect theory in Pakistan has been noticed from the results of this study which reveal that prospect theory behavior is not reflected all the time in companies' decisions. Li, Y., Yang, L.(2013) has also examined that attitude of individuals regarding risk varies over time. Likewise, it has been observed in the study that within a data period, sometimes companies take decisions rationally, while at the other times they do not. As human beings are not following static attitude, so this vulnerability in human behavior becomes the cause of inconsistent existence of prospect theory behavior as well. Moreover, application of this theory along with its allied implications in capital investment decisions of companies also depends upon specific measure of financial performance of companies used for analysis. Existence of prospect theory behavior is proved with the help of first part of two phase value function of prospect theory. Data period of this study consists of sixteen years and existence of prospect theory in capital investment decisions of companies has been found in twelve out of these sixteen years when ROE has been used as measure of financial performance of companies and existence of this theory has been found in eight out of these sixteen years period when ROA has been used as measure of financial performance of companies. It means that using ROE as an independent variable, companies proved to be risk averse in their attitude in twelve out of sixteen years and using ROA as an independent variable, same companies proved to be showing risk averse attitude in eight out of sixteen years. These results regarding application of this theory partly in some years is supported by the study of Wen,F.,Tao,M.,He,Z.,Chen,X., (2013) which states that application of prospect theory behavior is time dependent as well.

This study has also strengthened the concept that companies are loss averse by their attitude, just like individuals. The pain of loss is felt by them more than pleasure of gain. It may be due to the reason that when companies make heavy investment, it causes a change in their attitude towards

risk (Hwang, S., Satchell, E., 2010) and they show more sensitivity towards loss than to their gain. This loss aversion is shown in this study by the value of λ coefficient in the second part of two phase value function of prospect theory. Results of this study indicate that vulnerability in companies' behavior is found from this aspect as well i.e. they are not all the time loss averse in their attitude. When ROA was measure of financial performance, loss aversion in attitude of companies was seen for six out of eight years in which prospect theory was found in existence, but when ROE was used as measure of financial performance same loss aversion has been observed in five out of twelve years in which application of prospect theory was observed.

Prospect theory implicates that risk aversion of companies in gain domain is equal to risk seeking in their attitude when facing situation of loss. Behavior of companies in gain domain should be the mirror image of their behavior in the loss domain which phenomenon is known as "reflection effect". Results have indicated that companies are not found risk seeking in their behavior exactly for all the years in which they are found risk averse in their attitude. They have shown risk seeking attitude only for those years which have been mentioned above while explaining "loss aversion" of companies. These results are according to findings of various studies which provide that risk attitude of investors is time variant. It means that asymmetric relation between risk and return, explained by Shen, H.C. & Chih, L.H.(2005) which becomes the cause of "reflection effect" has also been found in the study.

Prospect theory behavior of being risk averse in gain and risk seeking in loss is described as an irrational behavior. Role of financial constraints and corporate governance in controlling this behavior has also been recognized in the literature. It has been found through this study that influence of financial constraints in controlling risk averse behavior of companies in gain is not seen when ROA is measure of financial performance, but its impact is seen when ROE was the

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measure of financial performance. These results are partly as per the hypothesis of this study which assumes no role of financial constraints in controlling risk averse behavior of companies. Results of the study reveal that role of financial constraints also depends upon measure of financial performance used. So for as, the impact of financial constraints on risk seeking behavior is concerned, the results indicate that financial constraints do not contribute in eliminating risk seeking behavior of companies.

Role of corporate governance for eliminating risk averse and risk seeking behaviors of companies has also been discussed in this study. Results indicate that role of corporate governance mechanism in controlling these behaviors is very weak because indications of controlling risk averse behavior are found only for one year during the entire data period for both return measures. While no effect of this variable is found at all on risk seeking behavior of companies.

Some studies have also discussed combined effect of financial constraints and corporate governance on prospect theory behavior of risk aversion and risk seeking. This study has also found that both these variables if applied jointly, assist in controlling risk averse behavior, irrespective of measure of financial performance used. This part of results match with findings of Wen, Y-F.,(2010). Joint impact of these variables is stronger than their individual impact. But role of these variables in controlling risk seeking attitude is again not found in this study.

Negative relationship between risk and return is also implicated by the prospect theory. It has also been concluded by results of this study that when whole data set is tested as one unit, risk and return of below target return firms are negatively correlated and these two are positively correlated in above target return firms. Results remain same in both measures of financial

performance. Moreover, these results are according to theory and are also supported by Jegers, M. (1991). It has also been noticed that when data set is classified on the bases of various sectors, results do not remain very much clear as per theoretical background because of mixed findings in both situations of gain and loss and for both measures of financial performance.

During second phase of data analysis which was based on primary data, similar findings were observed regarding application of prospect theory in corporate sector of Pakistan. When results were tabulated, it was concluded that companies showed more sensitivity towards their losses. Moreover, they were found risk averse while making their capital investment decisions in gain and risk seeking while making their capital investment decisions in loss domain. Thus, existence of prospect theory and reflection effect is found very clearly. It also concludes that investing behavior of companies is also influenced by the time horizon of making such investment. In the long time horizon, they feel themselves safer in making such types of investments which provide volatile returns. While in the short time horizon, they prefer to make such types of investments which provide stable returns to them. These results support another phenomenon of prospect theory known as "time diversification effect".

On the bases of data analysis, following findings have been developed in this study:

1. Level of application of various parameters of prospect theory does not remain same all the time when checked or measured. It varies over time due to the reason that human behavior is not a static phenomenon which always remains same.

2. Indications regarding the existence of Prospect Theory behavior of risk aversion in gain are very clear in Pakistan. The findings are same in case of primary as well as secondary data.

3. Investors are not all the time risk averse, rather they are found to be risk averse in situation of gain and risk seeking in their behavior in loss domain.

4. Existence of "reflection effect" is found during data analysis which reveals that if an investor is risk averse in gain, he will be risk seeking in loss.

5. Indications regarding loss aversion of companies are also found which means that losses are weighted more by them than gains. Pain of loss is felt by them more than pleasure of gain. This finding is consistent with Kahnman & Tversky, (1979).

6. Indications were found for partial or very nominal effect of financial constraints in controlling risk averse behaviors of companies, but these financial constraints did not contribute in controlling their risk seeking behavior.

7. Corporate governance has meager effect on risk averse behavior of companies and has no effect on their risk seeking behavior.

8. Combined effect or joint role of financial constraints of companies and corporate governance mechanism is better in eliminating risk averse behavior of companies than individual role of these variables, but combined effect of these variables in controlling risk seeking behavior of companies is not promising just like individual role of these variables in such a situation.

9. Implications of prospect theory regarding negative relationship between risk and return of companies are also proven, but when the whole sample is divided in to sub-samples, results get changed. These findings are consistent with Johnson, H. J. (1994).

Based on these findings, we can say that investment decisions of corporate firms are not always taken keeping in view the set principles of standard finance. It is recommended that as practical implications of this study are worthwhile for experts of corporate finance and academia, they

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should develop such type of investment and capital asset pricing models which should use a blend of financial and behavioral factors because these factors are difficult to be avoided or controlled during decision making process.

6.1. Limitations & Future Research Guideline

This study explains the role of behavioral factors in investment decisions of companies. It focuses on the issue that corporate managers are influenced by behavioral factors during such decision making process. It clarifies that companies are influenced by behavioral factors while making their capital investment decisions, but it did not specify those behavioral factors which are important in this regard. Moreover, only two variables, namely financial constraints and corporate governance have been analyzed for controlling the irrational behavior of Prospect Theory. Future research may be conducted to identify the specific behavioral factors that play an important role in forming prospect theory behavior in corporate managers along with extending the scope of this study to the role of macroeconomic and market related variables which may be helpful for controlling Prospect Theory behavior prevailing in investors.

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APPENDIX

<u>QUESTIONNAIRE</u>

Name: -------------------------------- **Organization:**--------------------------

Designation:------------------------- **Department:**-------------------

Part A   <u>Risk Attributes For Loss Aversion</u>

1. The chance of incurring a large loss relative to what is expected.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

2. The chance that investment will earn less than the minimum needed to meet the client's needs.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

3. The overall variability in the investment return overtime.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

4. The chance that the investment will earn less than what is expected.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

5. The chance that the investment will earn less than it has historically.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

6. The chance of obtaining a large gain relative to what is expected.

   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

1= Extremely Important
7= Not At All Important

Part B   <u>**Reflection Effect**</u>

1   Risk Averse Attitude in Gain

Imagine that a client has invested Rs.60, 000 and that the market is experiencing a downturn. You have two investment strategies that you can recommend under the existing circumstances to preserve your client's capital. If strategy A is followed, Rs.20,000 of your client's investment will be saved. If strategy B is followed, there is one – third probability that the entire $60,000 will be saved and two- third probability that none of the principal will be saved.

Given this information, which of these two strategies would you favor? Place a check mark in front of your choice:

Strategy A ☐

Strategy B ☐

2   Risk Seeking Attitude in Loss

Imagine that a client has invested Rs.60, 000 and that the market is experiencing a downturn. You have two investment strategies that you can recommend under the existing circumstances to preserve your client's capital. If strategy A is followed, Rs.40, 000 of your client's investment will be lost. If strategy B is followed, there is one– third probability that nothing will be lost and two- third probability that the entire Rs.60,000 will be lost.

Given this information, which of these two strategies would you favor? Place a check mark in front of your choice:

Strategy A ☐

Strategy B ☐

Part C   **Time Diversification Effect**

Suppose, there are three investment options available to a firm. Rate of return on investment "A" can vary from a high of +54% in any one year to a low of -26% in another year with average yearly return of +14%. While rate of return on investment "B" can vary from a high of +18% in any one year to a low of +2% in any other year with an average annual return of +%10%. So for as investment "C" is concerned, its annual return can vary from a high of +8% in a year to a low of +4% in another year with an average annual return of +6%. However, prediction of exact return from any of these investment options in advance is not possible in any particular year. But it can be assumed that yearly distribution of returns is independent and normally distributed.

Based on the above information, which of the following three statements is suitable to you:

i)   Given a 1 year investment horizon, I prefer

| A | | B | | C |

ii)   Given a 10 year investment horizon, I prefer

| A | | B | | C |

iii)   Given a 10 year, as opposed to a 1 year horizon, I feel _____ safe with investment "A"

| More Safe | | Less Safe | | About Same |