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Relationship between Psychological Factors and Investment Decision Making: The Mediating Role of Risk Perception

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Abstract

The purpose of this study is to examine the role of various psychological factors which affect investment decision of Pakistani investors. A study model has been developed to describe the impact of risk propensity, asymmetric information, and problem framing on investor's behavior while making decisions through mediating role of risk perception. It also determines how much weight is attached to each independent variable by the investors when they make their decisions. The data for this study has been collected through an adapted questionnaire to determine the relationships between our variables. Structural Equation Modeling has been employed to determine the relationships among the variables. The findings and overall discussion concludes that the investor's behavior depends on how the available information is being presented to them and how much they are prone to taking risk while making decisions; thus playing a significant role in determining the investment style of an investor.

Keywords*:* psychological factors, perception of risk, information asymmetry, risk propensity, investment decision making

1. Introduction

Life is full of risky decisions, from the mundane to matters of life or death. Individuals differ in the risks they accept or even deliberately embrace. However, risk taking is not a single trait but is a behavior influenced by characteristics of the situation, the decision maker and the interactions between situation and decision maker. Understanding the mechanisms behind risk taking, who takes risks when and why, is particularly important when the goal is to influence and modify the behavior. We constantly face situations that require us to decide between actions that differ in level of risk. In most cases, while dealing with risk, human beings rely on their experiential system; our intuition, instincts and gut feeling always supported us in our survival through the evolution telling us whether the area was safe to sleep at or an animal was dangerous to approach. In today's

era, business managers are frequently confronted with decision making dilemma due to various opportunities and exposures to business hazards; and based on the risk analysis, they make decisions regarding controlling the identified risks and risk levels (Epstein, 1994).

What makes a decision risky depends on variability and uncertainty of the potential outcomes and uncontrollability of outcome accomplishment (Highhouse and Yuce, 1996; Sitkin and Pablo, 1992; Singh, 1986). It is difficult to estimate the odds of attaining desired outcomes with certainty associated with alternatives as there are factors outside an individual's control.

Number of researches has examined decision making process under risk and uncertainty (Bazerman, 1998; Kuhberger, 1998; Sitkin and Weingart, 1995; Highhouse and Yuce, 1996). These researches focus on the normative theory of preferences under risk and departures from it, stressing the importance of the outcome probabilities, their expected values, and rational decision-making. The rule of rational decision making is to select an alternative to assign probabilities to the outcomes, with highest calculated expected value. However, there is significant evidence that decision makers may deviate from this approach due to number of reasons (Bazerman, 1998; Kahneman and Tversky, 1979). The certainty effect is one of the reasons, that decision makers overweight those outcomes which increase the averseness of losses and the attractiveness of gains. Another important idea is that the pain associated with losses appears larger than the pleasure associated with gains (Bazerman, 1998); thus the decision makers, when faced with potential gains, tend to show a risk averse behavior; while others facing potential losses tend to show risk seeking behavior (Kahneman and Tversky, 1979).

In essence, decision-making pertaining to risk frequently departs from the standard finance's assumptions of rationality and instead adheres to the ideas associated with bounded rationality.

In the present days, a new financial sub discipline called behavioral finance has ignited a wave in explaining the behavioral aspects of investment decisions. It is becoming an essential part of the decision making process, because it has a great influence on investors' decision making behavior and will help them to select a better investment option. The investors are generally less able to objectively evaluate companies' risks and returns, and tend to be emotionally biased in their trading decisions. Many economic and financial theories presume that investors act rationally; however, they are only human. They act according to market sentiments and some even follow their gut feeling when making financial decisions; therefore, it is necessary to examine the factors that prompt the investors to make investment decisions. Many researchers have discussed the investors' behavior and tried to enhance the understanding of people managing investments in different ways; it is mainly personal characteristics that influence investment decision-making. The nature of psychological factors and individuals' behavior at the time of investment decision-making has been under discussion.

Two aspects are mainly influential on risky decision making: risk propensity and risk perception of the decision makers. Risk propensity involves the tendency of a decision maker to either take or to avoid risks whereas risk perception is decision maker's assessment of the risk inherent in a situation. The exact nature of the relationship between decision-making, risk propensity, and risk perception is not well understood. While

researches have been conducted to analyze the effects of risk perception and propensity on investor's behavior, there are only few studies that have examined all three factors together (Mahmood et al., 2011; Rana et al., 2011 and Chou et al., 2010). These studies have measured risk propensity, perceived risk, and investor's decision-making in the context of other variables effecting propensity and perception. The independent impact of risk propensity on risk perception is still under discussion. Because of the lack of other empirical studies on this relationship, there is a need for further study to see their impact on investor behavior.

Several researchers specify that perceived risk comes mainly from three different sources namely: the individual, the product and the situation (Singh and Bhowal (2010); Mallet 2004). Although researchers generally agree that there is a relationship between perception and decision-making (Krueger and Dickson, 1994; Sutcliffe, 1994), there are some inconsistencies about their relationship.

One of the common deviations from rational decision-making is the framing effect, the tendency to avoid risks when decisions are framed in terms of possible gains and to accept risk when they are framed in terms of possible losses (Singh, 2012; Edwards et al., 2002). Studies have shown that framing and other factors can significantly impact investor's decisions, however there are only few studies regarding the impact of risk perception. In addition, researchers suggest that decision-making can be influenced by affect (Dunegan et al., 1992), the nature of task and familiarity with the problem (Slovic, 2000). Most of these factors have an indirect effect on investor's decisions through changes in risk perception.

Mahmood et al. (2011) and Wang et al. (2006) have suggested in their studies that there should be transparency, timely spread and asymmetry of information about all the listed companies for every investor and empirical testing of these relationships should be done to determine the true effect of these factors on investment decisions.

Although researches have been conducted in this area in Pakistani perspective; but by combining all these variables together in this study will help to explore the intensity of the strength and weaknesses of these factors and will help us to determine how much weight is attached to each independent variable by the investors when they make their decisions.

1.1 Scope of the Study

This study is focused on determining the factors effecting the risk perception of the investors while making investment decisions. The data gathered is primarily at the Islamabad Stock Exchange in Islamabad and does not represent data of across Pakistan to explore any regional influences.

2. Literature Review

While there are many different factors that may affect investor's decisions, risk perception plays an important role in decision-making. Sitkin and Pablo (1992) have defined risk perception as the investors judgment of the risk involved in a situation. It has been indicated by previous studies that the level of risk associated with different situations affect the investor's perception. Perception is the mental interpretation of physical sensations produced by stimuli from the outside world (Fischhoff, 1994). A subjective role is being played by risk perception in determining the best alternative

among different investment decisions (Slovic, 2000). Situational and individual differences in choosing among risky decision alternatives have been shown to be associated with different perceptions of the investment risks, rather than with differences in the inclination to accept or to avoid the investment alternatives which are perceived as riskier (Singh and Bhowal, 2008; Weber, 2001; and Weber and Milliman, 1997). Researchers in psychology and Finance argue that perception of risk is the third important determinant of choice behavior (Weber and Milliman, 1997; Pennings and Wansink, 2004). Hence, the way investors subjectively perceive the risk of an investment seems to be able to predict their actions.

Perception of risk goes beyond the individual, and it is a social and cultural construct reflecting values, symbols, history, and ideology (Weinstein, 1989). It follows from the specificity and variability of human social existence that it should not simply be presumed that scores and ratings on identical instruments have the same meanings in different contexts (Boholm, 1998). Adams (1995) claimed that "the starting point of any theory of risk must be that everyone willingly takes risks". He concluded that this was not in fact the starting point of most of the literature on risk.

Risk perception is a communication source which can prepare investors to obtain risk according to their understanding and psychological factors (Rana et al., 2011**)**. At different levels of perception towards risk, the individual investor thinks differently about his investment and make decisions differently (Hallahan et al., 2004). A number of researches have concluded that decision-making behavior of an investor is affected by the attitude towards the risk as well as the way in which the investment risk is perceived by the investor and both are important mediators in investment decisions (Weber and Hsee, 1998; Chen and Tsai, 2010; Sitkin and Weingart, 1995; Sitkin and Pablo, 1992).

Risk perceptions and risk propensity are the most important determinants of risk related behavior. Previous empirical work on risk factors (Sitkin and Weingart, 1995) found that people high in risk propensity are more likely to perceive a situation as one of low risk and thus have a higher tendency to take risk compared with people low in risk propensity. Earlier studies found that investment behavior of investor depends on their perception of risk. The way investors perceive risk and react to it depends on his/her personality traits, level of confidence and return level. The more return he/she requires, the extra systematic risk he/she would have to bear i.e. high they perceive risk; more return will they demand (Singh and Bhowal, 2008). Taken this into account, it can be said that there will be a positive relationship between risk propensity and the risk perception of decision makers (MacCrimmon and Wehrung, 1986; Fischer and Jordan, 2006).

The argument suggested by Sitkin and Pablo (1992) that positively framed problems, in the realm of gains will be positively related to risk perception, i.e. how risky decision is rather than the inclination to take or avoid risk, and vice versa, is based on the assumption that as positive framing is found to be related with the avoidance of risk then it must have a positive relation to the risk perception and vice versa situation for negative framing. Where potential losses are emphasized, a decision maker will perceive negatively framed consequences as involving higher risk because these situations give the decisions makers the belief that they have much to lose and positively framed consequences will be perceived as involving a low level of risk, where potential gains are emphasized, because they believe that there is little to lose (Sitkin and Pablo, 1992). Same results have been predicted by prospect theory that problem framing affects an individual's positive or

negative perceptions of aspects of a situation; thus risk perception appears to mediate the effects of problem framing on investment decisions as either opportunities or threats, thus it plays a critical role in mediating the investor behavior (Xiao et al., 2003).

Perceived risk determines not only the sources of information consulted, but also the type of information used by the investor. The same behavior could be observed as well in the stock market because information is a means allowing limiting uncertainty surrounding the investment situation. Lu et al. (2010) are of the view that information asymmetry refers to a situation where financial investors have a set of unequal information i.e. people existing in stock market do not all have the same information rather some are more informed than others i.e. informed investors have some private information, while others have only public information (Chang et al., 2008). Nwezeaku and Okpara (2010) indicate that the level of information asymmetry can be characterized by the risk of investing with a privately informed investor. Thus, the less the investors share the same information, the more will be level of risk perception towards their decisions in stock market (Mahmood et al., 2011). Moreover, Wang et al. (2006) specify that "good quality of information disclosure i.e. transparency, timely release, integration and authenticity could reduce investors' risk perception".

1.2 Hypotheses Development

Sitkin and Weingart (1995) extended the model of Sitkin and Pablo (1992) which depicts that risk perception and risk propensity are important mediators in investment decisions. Risk perception is a communication source which can create implications and prepare investors to obtain risk on the basis of psychological factors (Rana et al., 2011). This study hypothesized that risk propensity and problem framing affect risky decision making by influencing what is perceived. Risk propensity is linked to risk perception in several ways; such as attention given to certain information and the investor's ability to react to risky attributes influences the evaluation of risky situations. This approach is consistent with previous work of Jackson and Dutton (1988) and Staw et al. (1981). Thus, risk propensity not only affect decision making directly, but is also have an indirect effect on risky decision making through its effect on risk perceptions (Sitkin and Pablo, 1992).

- **H_1:** Risk perception has a mediator effect on risk propensity in risky investment decisions

Similarly, impact of problem framing on risky investment decisions will be mediated by risk perception because it affects the strength and clarity of an individual's positive or negative perceptions of aspects of a situation. Xiao et al. (2003) concluded that the effects of problem framing on investment decisions are mediated by the perception of risk in an opportunity or threat situation. These perceptions play central role in mediating the investor decision making behavior. The opportunity framing and gain situations increases the perception of opportunities, thus leading to more risk-seeking investment decisions whereas the loss situations and framing of threat results in an increased threat perception and more risk-averse decisions. Together, these results suggest that framing variables affect the investor's behavior by their impacts on risk perception.

- **H_2:** The impact of problem framing on risky investment decisions is mediated by risk perception

Lu et al. (2010) are of the view that information asymmetry refers to a situation where financial investors have a set of unequal information i.e. people existing in stock market

do not all have the same information rather some are more informed than others, that is, some have private information, while others have only public information (Chang et al., 2008). Nwezeaku and Okpara (2010) indicate that the level of information asymmetry can be characterized by the risk of investing with a privately informed investor. Thus, the less the investors share the same information, the more will be level of risk perception towards the stock market.

- **H_3:** The effect of information asymmetry on risky decision-making behavior is mediated by risk perception

The research model for this study is as follows:

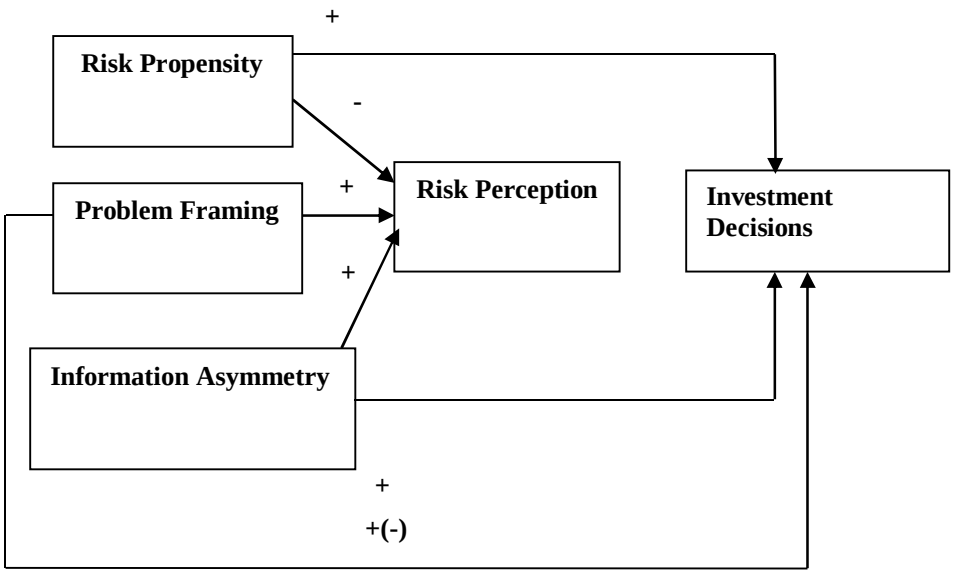

Figure 1: Research Model

3. Research Methodology

3.1 Sample and Procedure

Probability and non-probability are two sampling methods. To draw statistical conclusions, probability sampling is the most popular method used. In this study, probability random sampling was used, in which a structured questionnaire was distributed among 200 financial investors of Islamabad Stock Exchange for evaluating their opinion for data collection. After collecting information from the respondents, the collected and managed data was analyzed through SPSS and AMOS software. Cronbach's alpha and Confirmatory Factor analysis were used to check the validity and reliability of the instrument.

3.2 Instrument and Measures

For our study, five variables were used; investment decisions as dependent variable; risk propensity, problem framing and Information asymmetry as independent variables; and one mediating variable, risk perception. A 5 point Likert scale was used for the variables of the study (strongly disagree = 1 to strongly agree = 5).

Table 1: Source and Reliability of Measurements Instrument

Variables	Source	No. of Items	Cronbach's Alpha
Investment Decisions	Pasewark and Riley (2010) and Wood and Zaichkowsky (2004)	6	0.823
Information Asymmetry	Wang et al., (2006)	5	0.795
Risk Propensity	Byrne and Blake (2007), Mayfield et al., (2008)	6	0.656
Problem Framing	Vlaev et al., (2009) and Grable and Lytton (1999)	6	0.788
Risk Perception	Nosic and Weber (2010)	4	0.793
Total		**27**	0.770

The table shows the reliability of each dimension and overall reliability of the instrument. The Cronbach's alpha values for each variable represent the reliability of each of the dimension set out in the questionnaire. The investment decision have six 6 items with reliability of 0.823, information asymmetry with five (5) items indicates the reliability of 0.795, risk propensity (6 items) has reliability value of 0.656. The reliability of problem framing is 0.788 and for risk perception, it comes out to be 0.793. Finally, the reliability index for the measurement instrument of twenty seven (27) items is 0.770, which shows a good sign for scale reliability. The table shows that all values of alpha coefficients for the variables meet the minimum standard for reliability of 0.70 as recommended by Nunnally (1978). Thus, the results indicate that these multiple measures are highly reliable for measuring each construct.

4. Results and Discussion

For a variable to act as a mediator, the following conditions must be fulfilled: (i) independent variable must be related to the dependent variable, (ii) independent variable must be related to the mediator, (iii) mediator must be related to the dependent variable, and (iv) when independent variable and the mediator are included, If the relationship of the independent variable to the dependent variable is insignificant through the mediating variable, it indicates that there is complete mediation; but if it is still significant and the path declines, it is the evidence of partial mediation (Baron and Kenny, 1986).

The structural equation model has been used to measure the direct effects of the independent variables on investment decision making and also to check the mediating effects of the risk perception on investor's decision making behavior. Figure 2 reveals the direct effects of Risk Propensity, Problem Framing and Information Asymmetry on Investment Decisions without the mediating variable. It has been found that investment decisions has a significantly negative relationship with problem framing ($r = -0.263$, $p<0.05$) whereas a highly significant positive relationship with information asymmetry ($r = 0.442$, $p<0.05$) and risk propensity ($r = 0.292$, $p<0.05$).

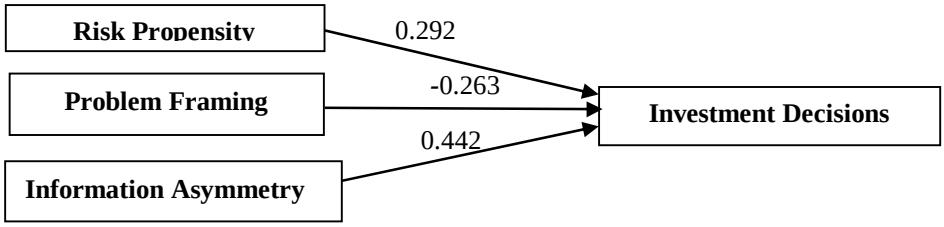

Figure 2: Structural Equation Model: Direct Effects Without Mediation

The next step is to check the impact of independent variables on investment decisions through the mediating variable, risk perception

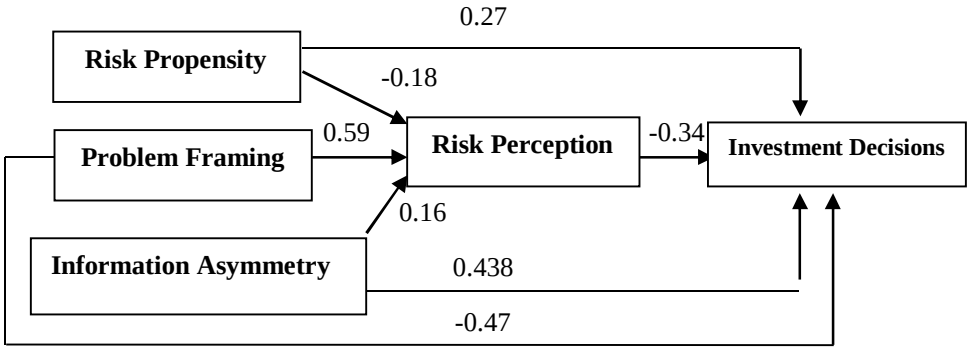

Figure 3: Structural Equation Model: Indirect Effects With Mediation

Analysis of the figures indicates that risk propensity is positively (0.270) and significantly ($p<0.05$) related to Investment Decisions when risk perception is included as a mediating variable. The regression weights has been substantially reduced (0.292 to 0.270) but were significant. If the regression weight is reduced, but it is still significant, it provides evidence of partial mediation (Baron & Kenny, 1986). It means that risk propensity variable has both direct effects on investment decisions and indirect effects through partial mediation of risk perception; thus supporting hypothesis H_1. It also shows that problem framing has a significantly negative (-0.469) impact on the investment decisions through the partial mediation of risk perception. The reduction in the values of regression weights from -0.263 to -0.469 and its significance clearly proves our hypothesis H_2.

Although the regression weights have been reduced from 0.442 to 0.438; but the positive and highly significant relationship between Information Asymmetry and Investment Decisions with Risk Perception as a mediating variable indicates that Risk Perception partially mediates the relationship between Information Asymmetry and Investment Decisions supporting the hypothesis H_3.

Table 2: Comparison of Direct and Indirect Effects

Variables			Direct Effects		Indirect Effects		Hypothesis Support
			Estimate	P-Value	Estimate	P-Value	
Risk Propensity	→	Investment Decisions	0.292	0.050	0.270	0.037	H_1 is accepted
Problem Framing	→	Investment Decisions	-0.263	0.048	-0.469	0.008	H_2 is accepted
Information Asymmetry	→	Investment Decisions	0.442	0.000	0.438	0.000	H_3 is accepted

The results of this study clearly shows that the propensity to take risk, problem framing and information asymmetry significantly affect the investment decision making behaviour of the investors through partial mediation of risk perception.

5. Conclusion

To examine the role of various psychological factors which affect investment decision of investors, a risky decision-making behavior model has been developed to understand the irrational behavior of investors while making investment decisions. Risk is one of the significant consequences related to uncertainties involved in decision making process. This study focuses on how psychological factors and risk perception have an impact on investor's behaviour during decision making. For analysis of the study hypothesis, participants were selected from Islamabad Stock Exchange, Islamabad, who are facing the most critical challenge, investment decisions. Finding of this research provide insight into the impact of psychological factors on the decision making behaviour of the investors through the mediating role of risk perception in Pakistani culture context.

Several studies conducted earlier on determining the critical factors generally concentrated on the direct effects of the psychological factors on investment decisions. The direct as well as indirect effects of the factors related to the investment decisions as determined in the present study, have been supported by Sitkin and Pablo (1992) and Sitkin and Weingart (1995) in their studies. The results of this study that psychological factors have a significant effect on the investor' decision making behaviour was also declared as critical factors by Akhtar et al., (2011). The key finding of this study also signifies that risk perception performs a key role in the investment decision making process, which is in line with the study of Mahmood et al. (2011). It is found in the earlier research that the people's level of risk perception plays a very important role that affects the investment behavior of an investor (Singh, 2010; 2008; Wang et al., 2006). Therefore, for the stable and continuous development of the stock markets, management and controlling of investors' risk perception are considered to be very important.

Our model and previous studies conducted by Rana et al., (2011) and Chou et al., (2010) clearly justified that risk propensity is taking a critical part in the decision making behavior. While going for investment in shares, investors try to make proper tradeoffs between risks and return; the expectations of returns from the investments strengthen their investment behavior although they perceive risk towards the investment decisions (Fischer and Jordan, 2006; Rana et al., 2011). The results of this study show that the investor's risk perception and risk propensity show a significant negative relationship; which also concurs with Sitkin and Weingart's (1995) study on risky decision-making

behavior. For investors with a low risk propensity, the riskier the investment, the stronger their sensitivity to risk becomes. Thus investors with high risk propensity have a relatively lower risk perception (Chou et al., 2010; Bodie et al., 2001).

A number of studies (Neale et al., 1986; Singh, 1986; Tversky & Kahneman, 1986, 1992) have found the influence of problem framing on decision making. According to the prospect theory, framing directly affects how risky a situation is perceived to be leading to different behavioral outcomes. This study implies that by analyzing problem framing and other determinants of risk perception, the investor can effectively increase or decrease their risk taking attitude to achieve the target. Situations that are positively framed results in risk averse investment decisions, whereas negatively framed situations results in risk seeking; this idea has also been supported by Edwards et al., (2002). The finding that risk perception has a partial mediation effect on problem framing is important as it is an extension of previous researches on framing effects (Sitkin and Weingart, 1995; Sitkin and Pablo, 1992).

Flow of information such as media news, government decisions etc. causes the stock prices to fluctuate up and down; resulting in different investment decisions (Warneryd, 2001). The basic knowledge of information asymmetry, investor's biases, and investment risk environment are required by the investors; which enable them to acquire confidential information for accurate assessment of the stock market and make decisions accordingly (Wang et al., 2006). Daniel et al. (2002) have also supported that conventions of transparently reporting of all relevant information, improved rules for better disclosure and increased investment knowledge should be adopted. A strong evidence from Cohen et al., (2007) have supported that risk perception can be greatly influenced by the framework in which investors are when they make investment decisions. Thus the stock market and investment situation influences the risk perception of the investor; especially, information asymmetry is considered as an important factor of risk perception which is in line with the results of the previous studies by Aliakbar et al., (2012) and Wang et al., (2006).

In this study, risk perception was found to significantly reduce the relationships between the independent variables and investment decision making. Investors make investment decisions on basis of their expectations that investment will ultimately provide high level of returns, at lower level of risk. It signifies the role of risk perception as a mediating variable in the investment decision making process. Sitkin and Weingart (1995) also supported for the inclusion of risk perception as mediator of effects on risky decision-making behavior. The finding that the mediator variables strongly predict the risky decision-making behavior provides a prospect to more efficiently expect investor's risk behaviour (Mahmood et al., 2011). Our results provide a clear support for the crucial mediating influence of risk perception on investor's risk-taking behavior which is also supported by Bodie et al. (2001) and Wang et al. (2006).

This study presented the results of the determinants of decision making behavior and provided support for the portions of the Sitkin and Pablo model that a mediated model of risk behavior is more powerful than one in which the direct effects of a number of independent variables are examined individually. Not only did the studies reported here provide general support for a mediated model in which risk perception is a key mediator, but they also supported the causal relationships involved. Overall, this study has been helpful in exploring the intensity of the strength and weaknesses of these factors and also

helped the investors to determine the weight age attached to each independent variable while making the decisions. It will also help in providing an insight on the decision making process and raising awareness to the issues of subjectivity and performance helping them to reduce these biases for improving the profitability. Apart from their theoretical importance, our findings have important policy implications; they contribute to the current debate on the communication of investment risks to investors and on the measurement of investors' risk attitude.

The good outcome of our analysis is: investors behave more rational than they are often said to; they base their decision on risk preferences like risk attitude and risk perception and, at least those with a high financial literacy, behave in accordance to personal circumstances like their invested amount or the planned investment horizon. Thus, the data analysis and the results of the current study clearly indicate that the psychological factors play a critical role in investment decision making process. Therefore, it can be said that asymmetry of information, risk taking behavior, and decision context affect the perceptions of risk associated in a particular investment situation.

5.1 Limitations and Future Research Directions

Despite the time limitation, random sampling technique for data collection was adopted involving only the investors of Islamabad Stock Exchange. Follow-up studies can collect the data on wider scale to re-verify the proposed model. The study can be further expanded in the future by using various other psychological and behavioral factors having a significant impact on the investor's decision making behavior, such as emotional biases, fear, anger, etc. Other variables identified in Sitkin and Pablo 1992 study may also be examined in future researches; as only a sub section of their model has been taken in this study. Thus, this study provides a conceptual and empirical springboard for future work on other potentially important determinants of risky decision-making behavior.

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