

# Effect of Anchoring Bias on Risky Investment Decision. Evidence from Pakistan Equity Market

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## Abstract

Study of behavioral finance shows the impact of psychology on the performance and abilities of investors and it is important to study because it shows the main factors behind market inadequacy. Investor's decisions are reflected by the cognitive errors, feelings and emotions and these behavioral actions urge an investor to take decision. The aim of this paper is to check that if investors take their decisions on the basis of their prior piece of knowledge than how the behavior or decisions of an investor reflect. For this purpose primary data is used to collect the respond of an investor. This study is conducted in Karachi Stock Exchange, Islamabad Stock Exchange and Lahore Stock Exchange.

**Keyword:** Anchoring, Risky Investment Decision, Stock Exchange

## Introduction:

Bias is leaning of character to present a viewpoint often accompanied by rejection consider the possible alternative view. Bias can be defines as in simple words that biases mean one sided not having an open mind. People are biased toward individual, race and nation (Pompain, 2008).

Cognitive biases are mental perception and thinking of an investor while individual involve in decision making process. This new concept is also introduced in many areas such as in the studied of psychology and behavioral economics. The purpose of this study is to investigate the effect of anchoring bias on risky investment decision.

Investor is an individual person who allocates his money to investment products with an expectation of favorable financial return. In general the basic motive of an investor is to maximize the return on capital while minimizing the risk. To get maximum profit over an investment and keep a low risk level is not an easy job. The investor needs to do a lot of work to increase the odds of success. He needs to analyze the risk, the available capital, and amount of investment, time period involved and amount of return (Yates, 1990).

Williams (2008) stated that the investor is said to be irrational who have not understand the logic and also lack of mental activity. Normal and rational investors are those who make investment after formulate strategies and save money for future. Those investors who save money for future are hardly to say lack of judgment. Those investors usually prefer to invest in certificate of deposits, bonds and shares. It is true that majority of investors are irrational not as Webster defined just due to cognitive biases, emotions and some other factors. Cognitive biases, emotions like fear, anxiety and greed are those factors which make investor to take irrational decisions even though goals of an investor are long-term. Traditional finance theory stated that investors make decisions on the available facts and figures and they are emotionless and there is no concept of biases, so early study stated that investors are rational.

A stock exchange also known as stock market is an organized market place which provides the services of sale and purchase of stocks and shares at a price governed by the forces of demand and supply. It provides services to stock brokers and traders to buy and sell stocks, shares, bonds and other securities. The Stock exchanges basically serves two purposes. They serve as primary market which provides a place to generate capital for corporations by channeling their shares and securities. They serve as secondary market where investors can sell and purchase their shares or other securities.

Decision making can be explained as the procedure associated with buying a certain choice at an amount of solutions. Stock market changes every day without any change inside the basics of the organization. Decision making is a cognitive process outcome in the selection of any affirmation about many alternative possibilities. Making is a final choice or selection of anything. Decision-making is often a difficult practice which includes

evaluation associated with a number of factors in various ways. Rational decisions of investors are based on the good decision making and also depending on two main things particular resources and elements, in addition to technical factors. Also, while making selections throughout investment industry, people tend to depend upon these two items. Decision making of an individual is generally determined by his or her personal factors for example age group, education, income, and many others. Together, his or her selections are also produced from difficult types of financing. From the get go there is always an issue of where and how a person can make a rational investment. Investment behaviours can be described as the way the people decide, predict, review and also assess the actual procedures with regard to determination creating, such as information collecting, understanding and also knowing, research and also investigation (Shefrin, 2007).

In the present research the researcher explored the relation among anchoring with risky investment decision.

### **Anchoring**

Anchoring bias described by Tversky and Kahneman (1986) it is a cognitive bias that occurs when people give too much place and importance to one aspect and ignore the other aspect, when decisions are based on the past experience and prior knowledge and ignore the present conditions of market. Anchoring affects every investor, even people who are experienced and highly knowledgeable in a field. During decision making, investor's decisions are based on initial information and they make judgment on the bases of anchor effect.

Anchoring is a cognitive bias that defines the common investors behavior to rely too much on the first piece and prior of information and material offered (the "anchor") when making investment decisions. Anchoring occur when investor make decisions on the basis of initial piece of informant and to make further and subsequent. Once an anchor is set, other judgments will be based on that prior information and standard will be set on the bases of prior knowledge and information. For example, the initial and first price offered for any particular share in which investor is interested sets and maintains the standard for the remaining cars. Decisions are made by investors on regular basis day by day due to its importance and magnitude. Wrong decision taken by the company will fall down the prices of shares it will be harmful and risky for both individuals as well as companies. Wrong decisions can be a result of insufficient information, but Kahneman (1974) also stated that the investors mind can be influenced by obtaining various kinds of information. Anchoring is one type of cognitive bias, which will be the main focus of this study. Anchoring refers to how a case of suggestion, such as information regarding words, numbers or pictures, can shake the investor decision (Tseng & Yang, 2011).

According to Shiller (2003), "anchoring refers to a biased judgment and decision which is far away from the initial assessment and most of the cases these judgments can give wrong output to investors so that's why risk enhance. This means that an earlier presented value affects investor when they are to estimate an unknown quantity.

According to Kahneman (2011) "any number that you are asked to consider as a potential and possible result to an estimate problem will induce an anchoring effect".

Numeric judgments under uncertainty are the most observed anchoring effect. The anchoring effect of a judgment does not have to be a numeric one (Cohen & Cohen, 1983), but is a general phenomenon. Anchoring and knowledge has interlinked with each other if investor not have an enough knowledge about particular investment so it means they are more uncertain so ultimately they have to take decision on prior information which is considered inadequate for an investor (Baird & Thomas, 1985).

Uncertainty must be radically differentiated from the familiar conception of Risk, though it has never been properly separated. Thus risk is given more importance in the literature as compared to the uncertainty.

### **Investors risk perception**

Individually, investors are different from each other. They perceive risk differently due to own experience, education and tenure period. Investor's perception can be measured by the portfolios results, where investors are like to invest to save their investment and due to fear of loss. In other words, we can say that when the possible outcome is different as compared to the present target then it means risk is not properly evaluated.

Hassan (2013) conducted a study and concluded that investors measure and analyze the risk in different ways at the same time to better evaluation of the market returns. They also measured behavioral factors influence the

individual investor's decision-making. Market situation affect the investor behavior and decisions but at the same time investors own thinking level and biases also affect to their mental capabilities.

In another study Kim and Nofsinger (2008) argued and concluded that different types of risk perception and biases are same affect to investors, majorly to institutional investor and individuals. Other factors which are defined by Kiefer are capital loss, regret, cash flow, goal shortfall, performance risk.

Lee and Cho (2005) states that economics certainly deals with risk it has nothing to deal with the uncertainty. Keynes mention that event that has occur in the past cannot be reoccurred again as the every moment is the moment of risk that is making the study broader to be researched upon. In a statement that is paradoxical in nature, the great British economist affirmed that our confidence is strong on the outcome that it can be reinforced only when we can find a situation in which a new series of events differs significantly from any happened previously (Keynes 1952). From the terms of insurance on the first era of the men to the development of the welfare state, the calculation of risks and efforts to make the contingencies more foreseeable and manageable are part of human behavior and history. It is common human behavior that familiar environment make one feel safer. So if investor is familiar with the market then investor feels satisfaction and comfortable. Investment instruments and products to be safer and are most reliable. Instead, investors choose those portfolios which they have know or select those companies which they have an enough knowledge so familiarity of companies matters for an investor (Huberman,2001) even though it would enhance the perception of risk because the known portfolio can be more risky. Those investors who are risk averse they make investment on those shares in which risk is low even the nominal profit exist, investment in risk-free instruments includes mutual funds, portfolios and also the institutional investor recommendations. Moreover people are generally avoided to take risk (Kahneman & Tversky, 1979). Familiarity with the market and fluctuation of shares can lead to the reduced and decreased risk perception (Slovic, Fischhoff, & Lichtenstein, 2000). It is identified that familiarity creates positive feelings and persuade investors to make risky investments.

In this perspective the notion of risk is taken as feelings which refer to "our fast, inborn, and intuitive reactions to danger" (Slovic et al., 2004). In other words, the choices made in situations of risk are in part the result often direct influence of the emotive reactions on the cognitive process. The studies carried out by Olsen suggest that in conditions of risk, emotive and rational reactions can diverge on account of risk assessment. He also stated and compared the risk perception of professional and nonprofessional investors and concluded that due to lack of experience and market knowledge nonprofessionals have to face difficulty and they are risk averse as well (Olsen, 1997). The basic definition of risk is to take any initiative or step or to do any decision whether financial, social, political or household without knowing its impact or result. Risk divides you into two steps ahead either positive (success) or negative (failure). Now days, the modern world is the world of technology, advancement and hands on knowledge. When we talk about risky investment regarding any business or corporate sector, we talk about the financial leverage a person have while investing into any particular business, for e.g. real estate sector was at boom about past 10 years but now it's been declining here in Pakistan due to security reasons or some other factors, now for a real estate investor it is a risky decision to have their capital tied up in this sector. This is actually the risk perception what people think and perceive risk of about and so they often react on it.

### **Prospect theory**

Expected utility theory is descriptive model of decision making under risk so Kahneman and Tversky(1971) develop an alternative model which explain the risk in a different way. Prospect theory explains that potential outcome before reaching the final outcome. It explains that investor's decisions are not based on final outcome and results. They usually take decisions on the bases of potential losses and gains at the same time theory describe that investor's preferences are inconsistent when the same choices are available in various forms.

Prospect theory postulate that it is common and irrational tendency of an investor that they compare their losses with their profits and their decisions are exist in gambling situation

Individual investors did not know where to invest and when to invest. Investors are the backbone of any economy. Economies moves according to the behavior of investors. Stock exchanges are to be considered the most appropriate place, where investors can get advantage of profit. At the same time, stock market give loses if investors did not make appropriate decision. Human decisions are not always rational it is based on Psychological thinking and mental modeling.

There are many different types of cognitive biases, which are closely related to each other. This study is exploring how an anchoring can effect on investors purchasing decision, but it is also vital to understand that how other cognitive biases linked to anchoring and how other biases can affect the investor decision.

The objective of this study is to test and analyze those factors/biases which are effecting more to investor decision. Previous studies have been executed on the effect of authority on decision-making, but there has been inadequate research on this subject in more specific business settings. This study is hence an attempt and challenges to extend this research field to recognize how cognitive biases can affect an investor's business decisions. The theoretical framework of the present research focus that how anchoring bias affect the risky investment decisions of an investor and understand when anchoring is induced and how it can be overcome. The theoretical framework also presents and discuss that in which scenario or business setting biases arises and it is countered by the investors while taking strategic and risky decisions and how anchoring bias effect to risk perception.

### **Problem Statement**

Behavioral finance emphasize and stress on the fact that our decisions are effected by human psychology, perception and thinking. Various biases affecting the investor's behavior while making risky investment decision. This study considers the effect of anchoring bias on investor's risky decisions.

Anchoring refers to that how images pictures and prior information effect and shake the decision of an investor (Kahneman, 2011). According to Kahneman (2011) "any number that you are asked to consider as a potential and possible result to an estimate problem will induce an anchoring effect".

### **Objective of the study**

Objective of this study is to discover the effect of anchoring bias on risky investment decision.

### **Significance of the study**

Biases are our personal judgment about particular thing, what we like and dislike investors thoughts vary individual to individual. Traditionally researches investigate that investor's acts and make decisions on rational basis. These traditional researches are not based on biases which are totally relevant to behavior of investors. The purpose of this study is to check the behavior of an investor and on which grounds their investment decisions are based so this study relates to behavioral finance. Investors own experience and market information plays vital for decision making. Individuals make decisions in those securities or portfolios in which they have enough information but sometimes lack of current market knowledge investors rely on prior piece of information and make risky investment decisions so this concept is called anchoring bias where decisions are based on prior knowledge and information.

### **Literature Review**

Stock market fluctuations affect to investors decisions. Sometimes investor decisions are consist of actions and behavior and sometimes decisions are based on investor thinking. Thinking relates to our personal perception and mental ability.

Investors past experiences indicated or reflect good or bad decisions. Decisions which are based on prior piece of information is said to be anchoring bias. Our initial information not only effect to investors perception but also investor's decisions are based on prior experiences. Risk perception effects to our thinking and negotiate with our mind (Ganzach, 2000)

Anchoring affecting our perception about the brand is researched in various studies. As Consumers on the daily basis or on regular intervals form images about alternatives of the decisions and compare those alternatives to make rational decisions. Investors in the same way consider those perceptions and compare the things from which they are supposed to take decisions. We therefore propose that there will be an anchoring effect while taking impressions of the alternatives one have so does in the financial market and in the behaviors of the investors while making any decisions. Such phenomenon that we will refer as "the brand anchoring effect" The brand anchoring effect with regard to financial investment decision makers can be studied in Anchoring is two way process like it has two different mechanisms from which it can be produced. First process discusses that

anchoring is an unconscious indicator, which occurs by a priming effect like people can get it unconsciously. In the second process anchoring can take place also in a conscious activity of adjustment. Anchoring conscious can be generated through the proper awareness (Thaler & Richard, 1999).

According to Kahneman (2011), anchoring is a form of suggestion, words, numbers or pictures can get someone to see, hear or feel something. It is thus the form of cue. This effect is therefore often perceived by people as unbelievable.

By working on it anchoring effect can be diminished. In order to reduce or eradicate the anchoring effect, it is important to activate process 2 as discussed in the former discussion by searching the memory for arguments against the anchor (Ganzach, Ellis, Pazy & Racci, 2008). Hence, “thinking the opposite” is a strategy to guard oneself against these effects (Kahneman, 2011). Second process is however working on data recovered from memory, where an anchor makes it easier to retrieve certain data (Kahneman, 2011). It is thereby difficult to reduce the anchoring effect, even after activating process two but still it will provide reasonable insight to get through the anchoring bias.

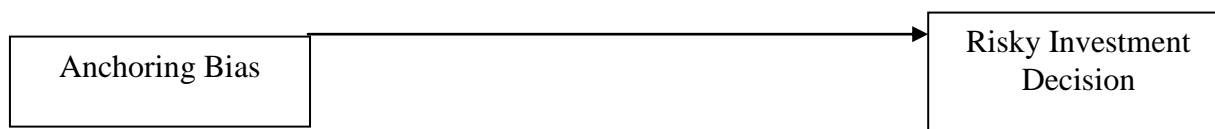
### Hypotheses of the Study

1. There is a significant relationship between anchoring and risky investment decision.
2. There is not significant relationship between anchoring and risky investment decision.

### Research Methodology

Anchoring is a cognitive bias that defines the common human propensity to rely too heavily on the first piece of information when making decisions

### Conceptual Framework



Sometimes investors take decisions on the basis of prior information so these decisions are too much risky. The purpose of our study is to check the effect of Anchoring on risky investment decision.

### Research Design and Methodology

This study is based on primary data. Questionnaires are personally handed over to the respondents for getting their responses. These respondents are individual investors who have interest to make investment in Karachi stock exchange or Lahore stock exchange or Islamabad stock exchange. The technique which is used in the present study is random sampling technique of investors to collect the data which represent the whole population of the present research.

### Population and Sample

Population of the present study consisted of the both male and female investors. The population of this study is individual investors who are above the age of 20 years and who have to encounter the risky decision making. A sample is “a smaller representative” set of units from a population used to determine truths about that population” (Field, 2005). There are major three factors that are influencing the representative like Sampling procedure, sample size and respondents. Simple random sample is used for collecting the data. The reason behind to choose this method is our population is homogeneous in nature and data is readily available. 450 questionnaires were distributed in between investors. 420 questionnaires are collected and while entering the data it was viewed that 400 questionnaires are properly filled. 180 questionnaires are distributed to Karachi stock exchange, 164 questionnaires are collected. The response rate of investors is nearly equals to 90%. 150 questionnaires are distributed to Islamabad stock exchange. 137 questionnaires are properly filled and entered. The response rate of individual investors is 91%. 120 questionnaires are distributed to Lahore stock exchange. 109 respondents’ results are considered to be filled. The response rate of investors is 90%.

### Measuring Instrument

The data for this research is collected by using questionnaire. As this study belongs to behavioral finance so Primary data is used and the data of this study is collected by the questionnaire. For this purpose structured questionnaire is used. The item Anchoring (2) are taken from the questionnaire of James (2011). He adapted this scale from (Weber & Milliman, 1997). Items (5) of risky decision making are taken from Risk Questionnaire

(Oxford Risk Questionnaires,2013).Interval scale used in which Response were taken on five point likert scale ranging from 5 strongly agree,4 agree, 3 Neutral, 2 disagree and 1 strongly disagree.

### Operational definitions of variables

#### Anchoring

Anchoring here in this study was operationally defined as scores obtained on, the questionnaire of (James, 2011).

#### Risky investment decisions

Risky decision making in this study was operationally defined as scores obtained on risky decision making are taken from Risk Questionnaire (Oxford Risk Questionnaires, 2013).

### Results

#### Reliability Statistics

|                  | Cronbach's Alpha | No.of items |
|------------------|------------------|-------------|
| <b>Anchoring</b> | 0.782            | 02          |

Respondent's results shows the consistency between items as the value of Cronback's Alpha is 0.78. It means that 78% anchoring response is reliable.

#### Anchoring and risky investment decision

##### Variables Entered/Removed<sup>b</sup>

| Model | Variables Entered           | Variables Removed | Method |
|-------|-----------------------------|-------------------|--------|
| 1     | Anchoring Bias <sup>a</sup> |                   | Enter  |

- a. All requested variables entered.
- b. Dependent Variable: Risky Investment Decision

Anchoring is independent variable and risky investment decision is dependent variable

##### Model Summary<sup>b</sup>

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|---------------|
| 1     | .564 <sup>a</sup> | .318     | .317              | .55642                     | 1.116         |

- a. Predictors: (Constant), Anchoring Bias
- b. Dependent Variable: Risky Investment Decision

R-square value shows that 31.8% anchoring affecting to risky investment decision while 68.2% other variables are affecting to risky investment decision.R value represents the coefficient correlation between these two variables.Autocorrelation is checked by the Durbin-Watson test. Value of Durbin-Watson is also shows the satisfactory results.

##### Coefficients<sup>a</sup>

| Model |                | Unstandardized Coefficients |            | Standardized Coefficients | T      | Sig. |
|-------|----------------|-----------------------------|------------|---------------------------|--------|------|
|       |                | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant)     | 1.406                       | .165       |                           | 8.518  | .000 |
|       | Anchoring Bias | .601                        | .044       | .564                      | 13.634 | .000 |

**Coefficients<sup>a</sup>**

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| 1     | (Constant)     | 1.406                       | .165       |                           | 8.518  | .000 |
|       | Anchoring Bias | .601                        | .044       | .564                      | 13.634 | .000 |

a. Dependent Variable: Risky Investment Decision

There is significant relationship between anchoring and risky investment decision as the sig value is less than 0.05. Constant (1.406) value shows the value of risky investment decision when the independent variable having zero value and B value (0.601) under the unstandardized coefficients tells the value of risky investment decision when there is a unit change in anchoring bias.

### Conclusion

Investors while taking investment decisions must consider these biases as risk factor associated with their investment portfolios. This research will help them judge investors attitudes towards risk with a new perspective, and in a better way, thus leading to better investment decision making. The present study is also helpful for investors to aware about the consequences of their demographic roles and behaviors regarding risky investments. Understanding of the cognitive factors by investors especially there is an uncertainty in investments. The current study will increase the confidence of individual investors to prefer risky investments by providing them guidance that how to control the constraint factors to achieve higher returns. Emotional and personality factors need to be incorporated in the investment strategies formulated for individual investors.

### Findings and limitations

It is common human tendency to make investment decision which give huge returns. Previous studies concluded that traditionally an investor decisions are based on rational. Only market forces and factors affecting and influence to investors to take decisions. Behavioral finance advances the concept that investor's perception is based on some psychological thinking. Investor's decisions are not based on the market situation.

### REFERENCES

- Baird, I. S., & Thomas, H. (1985). Toward a contingency model of strategic risk taking. *Academy of Management Review*, 10, 230-243.
- Berry, W. D., & Feldman, S. (1985). *Multiple Regression in Practice*. Sage University Paper. Series on Quantitative Applications in the Social Sciences, series no. 07050. Newbury Park, CA: Sage.
- Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Daniel, K. D., D. Hirshleifer, and A. Subrahmanyam, (2001) Overconfidence, arbitrage, and equilibrium asset pricing, *Journal of Finance* 56, 921-965.
- Ganzach, Y., Ellis, S., Pazy, A., & Racci, T. (2008). On the perception and operationalization of risk perception. *Judgment and Decision Making*, 3( 4), 317-324.
- Ganzach, Y., (2000). Judging risk and return of financial assets. *Organizational Behavior and Human Decision Processes*, 83: 353-370.
- Hassan, E. (2013). Impact of Affect Heuristic, Fear and Anger on the Decision Making of Individual Investor: A Conceptual Study. *World Applied Sciences Journal* 23 (4), 510-514.

- Kahneman, D. and Tversky, A. (1979) Prospect theory: An analysis of decision under risk, *Econometrica*, (47) 263 – 291.
- Kim, K.A., & Nofsinger, J.R. (2008). Behavioral finance in Asia, *Pacific-Basin Finance Journal*, 16, 1-7
- Lee, J., & Cho, J. (2005). "Consumers use of information intermediaries and the impact on their information search behavior in the financial market", *Journal of Consumer Affairs* 39 (1), 95-120
- Maldonado, M., & Dell'Orco, S. (2011). Towards an evolutionary theory of rationality. *Philosophical research online*. 66(2), 103-123.
- Odean, T., 1999, "Do Investors Trade Too Much?", *American Economic Review* 89, 1279-1298
- STULZ, R. (2003). *Handbook of the Economics of Finance*. New York: North-Holland.
- Pompain M. 2008. Using behavior investor types to build better relationship with your clients, *Journal of Financial Planning*, (8), 63-71.
- Shefrin, H. (2002) Behavioral decision making, forecasting, game theory, and role-play. *International Journal of Forecasting* 18, 375–382
- Shefrin, H. (2007) Behavioral decision making, forecasting, game theory, and role-play. *International Journal of Forecasting*.
- Shiller R. 2003. From Efficient Markets Theory to Behavioral Finance, *The journal of Economic Perspectives*, (17), 83-104.
- Slovic, P., B. Fischhoff, and S. Lichtenstein. (2000). Facts and fears: Understanding perceived risk. In *Societal risk assessment: How safe is safe enough*. 161–178. New York: Plenum Press.
- Sobel, Michael E. (1982). "Asymptotic Confidence Intervals for Indirect Effects in Structural Equation Models". *Sociological Methodology* 13: 290–312
- Thaler, Richard J., (1999). Mental Accounting Matters, "*Journal of Behavioral Decision Making*" (12), 183-206.
- Tseng, S., and Yang, C. (2011). "The role of information searches in investment choice variation: Digital information, advice seeking and heuristics", *African Journal of Business Management* 5 (12), 4934-4944.
- Tversky, A., & Kahneman, D. (1986). Rational choice and the framing of decisions. *Journal of Business*, 251-278.
- Tseng, S., & Yang, C. (2011). "Influence of information search on risky investment preferences: Testing a moderating role of income", *Proceedings of the 3rd International on Information and Financial Engineering*.
- Taylor, S. E. and J. D. Brown. "Illusion and Well-Being: A Social Psychological Perspective on Mental Health." *Psychological Bulletin* (1988), 193–210.
- Yates, J. F. (1990). Judgment and decision making. *Englewood Cliffs, NJ*: Prentice Hall.
- Williams, G. (2007). "Some Determinants of the Socially Responsible Investment Decision: A Cross-Country Study." *Journal of Behavioural Finance*, 843–57.



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