Explaining the Disposition Bias among Investors: The Mediatory Role of Personality, Financial Literacy, Behavioural Bias and Risk Tolerance

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ABSTRACT

Investors are frequently subjected to cognitive error. They often sell stocks that have increased in value, while keeping stocks that have dropped in value. We proposed a theoretical framework explaining what factors affect this disposition bias and how. According to the proposed theory, Disposition bias is affected through risk tolerance, financial literacy and behavioural biases. Lower risk tolerance and low financial literacy can aggravate disposition bias. Similarly, those who are more prone to behavioural biases like Anchoring, Loss Aversion, Overconfidence, and Representativeness, also have a higher tendency of Disposition bias. We also proposed that personality factors such as Superego, Parsimony, Orderliness, and Obstinacy also influences both the level of financial literacy as well as behavioural biases that in turn affect disposition bias. Empirical validity was established by conducted a survey using close ended questionnaire. Data was collected from 182 investors trading through 3 brokerage firms in Karachi. Confirmatory factor analysis and structured equation modelling were used for analysis. The results suggested that financial literacy significantly affect all behavioural biases (except Representativeness) as well as Disposition Bias. Higher financial literacy will tend to show less disposition bias and they better can make portfolio decision. Similarly risk tolerance also affect disposition biases as risk averse investor will tend to show more disposition bias. Among the behavioural factors, Anchoring, overconfidence and loss aversion affect disposition biases. Overconfidence also seems to affect risk tolerance. Personality traits like superego and parsimony seems to affect almost all the behavioural biases. Similarly, superego and parsimony have an effect on risk tolerance. Similarly, Superego and obstinacy affected financial literacy. This finding will help investors to better manage their portfolio by mitigating these biases.

Keywords: Disposition Bias, Behavioural Bias, Financial Literacy, Risk Tolerance, Investment Decision, Herding Behaviour

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1. Introduction

1.1 Background to the Study

Decision making always remains as a complex process. Many factors involve in decision making process. When it comes to stock market then it becomes even more complex because little delay results in huge losses. An investor spread his money in different funds & stocks this involves many factors which could be financial knowledge, Cognitive & behavioural biases, Sentiments & demographics.

In Pakistan, investor’s do have influence of their family, colleagues & peer group when effect decision process. As the stock market usually based on speculation then being a financial literate, an investor can protect him from incurring losses because he understands the behaviour of the market. It is very common in investors that they sell shares when its price goes up & hold when prices go down and this may not allow investor to constitute effective portfolio. Cognitive biasness is another reason for ineffective portfolio, because investor unable to see the correct picture of the market due to biasness. Disposition bias also based on investor risk appetite, that how much risk an investor can bear for a given level of return. Risk appetite varies from person to person, gender, age & income level. Personality also plays a vital role in constituting portfolio.

Pakistan is a developing country therefore; financial literacy becomes more important to make effective portfolio with limited choices available. Investors can be at great risk when they are not financially literate & enter into a contract with service provider of financial markets. Barber, Odean and Zhu, (2005) says that small investors and individual’s sentiments can affect security prices. Many psychological factors affect individuals & small investor’s sentiments. In decision making process more importance will be given to cognitive factors because understanding human nature in overall perception on top of for effective decision making. To avoid various biases investors educate themselves they are likely to encounter and can take steps to bring effectiveness. Mouna & Anis (2015) says that when earning profits investor’s makes mistake by selling their shares whereas when incurring losses, they hold investment for a long time. Based on market sentiments they buy overpriced stocks and positive evaluation of some institution.

Hilgert et.al (2003) indicated of a positive relationship between financial literacy and the likelihood of investing in desirable financial practices: timely payment of bills, tracking expenses budgeting, full payment of credit card bills every month, investing out of each pay check, creating an emergency fund, expanding investment and setting goals and objectives. Poor financial decision can be made due to lack of financial literacy because it is associated with investment in equity, debt, retirement planning and this could be affected welfare of people. Kimball & Shumway (2006); Van Rooij et al (2011); Yoong (2011) state that lower level of
financial literacy may hinder people to invest in equity market. Thus, investors relinquish a considerable profit or gain (Cocco et al 2005).

1.2 Problem Statement

As most of researches have been done on financial literacy, many of them suggest that investor’s financial knowledge is far below from the needed level (Mouna & Aziz, 2016). Changing in demographics, economic indicator, financial products it becomes crucial that investors should have some basic level financial literacy to understand and survive (Mouna & Aziz, 2016). Lusardi & Mitchell (2014) the rapid grow of complex financial products needs people to determine how much to keep in spare, invest so as not to outlast their benefits while addressing their needs, which expects family units to be well outfitted with financial knowledge.

Although much literature has been written but types of different assets are not directly associated with financial knowledge. To study about financial choices of households many literatures are available but to restriction in trading data measurement of financial literacy becomes toughest job for the researchers (Bailey et al. 2006). Investors with relatively high financial literacy & with advance financial knowledge will go for mutual fund in their portfolio according to many researches. Overconfidence plays a role in choosing stocks & research suggests that overconfidence investors usually invest in stocks. Those who are less financial literate will tend to go toward advices to deal with complex financial products. Also to cope with these financial houses can provide education to their customers so their financial knowledge about the investment may improve. Campbell (2006) according to financial theory, households do prefer to participate in equity market either directly through financial advisor. This behaviour most often leads to biases.

Usually, during pricing stock exchange poor decision can often lead to deviation from returns & affect returns for the investors. Shefrin & Statman (1985) says that stock market investors exhibits specific bias while decision making which is disposition bias. Where investors sells stocks once it goes up & hold the stocks which losses their value. Richards, Rotterford, Kodwani & Creevy (2017) disposition bias is seen with poor investment performance and show to a larger size by investors with minimum experience & lower complexity. Odean (1998) has Reveals that propensity to this bias is linked with poor investment outcomes, so investors should reduce sensitivity to this bias. (Boolell-Gunesh et al., 2009, Chen et al., 2007, Dhar and Zhu, 2006, Feng and Seasholes, 2005, Grinblatt and Keloharju, 2001, Shapira and Venezia, 2001) suggest that at some degree investor with experience and complexity should learn to minimize this bias.

Richards, Rotterford, Kodwani & Creevy (2017) suggest that disposition effect can be reduce at some extent through stop losses because stop losses can mechanize an exit strategy, limits self-
control for an investor. (Dybvig, (1988), Gollier (1997) says that strategy for stop losses looks inefficient for the investors who seek for maximization of portfolio returns under the usefulness maximization purpose. To stock market investors, the importance of stop losses can be a self-control mechanism that allows them to balance their unwillingness to sell losses and their eagerness to sell profits. Richards, Rotterford, Kodwani & Creevy (2017) investigate the relationship between the use of sophistication, experience and stop loss and compare the degree to which each of these variables reduces the effect of disposition.

1.3 Gap Analysis

Mouna & Anis (2015) conducted research on sentiments of small investors, financial literacy & stock returns. In this study, researcher focus was on cognitive errors that creates biases in decisions. Their focus was on small investors sentiments and its effect on investment on stock returns also, if experience can play a role in mitigating this. They conclude that investors with low level of knowledge and skills will more likely to be influenced by behavioral bias. The study conducted in Tunisian context that they try to find out the relationship between financial literacy, cognitive biases and stock returns.

In Pakistan also researches conducted regarding to understand behavior pattern and investment decision when combine with financial literacy. Risk is used by most of the researchers because of its crucial role in investment. Awais, Laber, Raheed& Khursheed (2016) conducted research to understand the role of financial literacy and investment experience with the mediating role of risk. They came up with the finding that in order to invest one must has to bear risk. Investors with high financial literacy and knowledge will have more risk tolerance & therefore they will demand higher returns to match this return with the level of risk they assume.

In the above mentioned research the focus was more on to gauge the risk if it could play a role when making decisions. Whereas study which conducted in Tunisian context gauge how cognitive errors combine with financial literacy affect investment experience. We combined financial literacy with investment experience and risk on investment decision.

The past researches on the disposition bias has been studies under the light of different variables like behavioural bias, demographic effect, sentiments of the investors, risk tolerance, ambiguity aversion etc. So, these variables have been utilized in our research and have helped us in reaching to our goal. Unlike the other studies focusing on only one or two variables, this study has focused on many while studying the impact of those on the investor’s disposition with mediating effect of risk and personality.

We particularly focused on Disposition bias, and how it is affected through risk tolerance, financial literacy and behavioural biases. We also included personality factors influences on both
the level of financial literacy as well as behavioural biases that in turn affect disposition bias. To best of our knowledge, the effect of these combined factors on disposition biases was never studied before. Moreover, no such study was undertaken in Pakistan. It will add value as literacy rate in Pakistan considered being low and, therefore they display greater biases.

1.4 Research Objectives
The purpose of this study is to explore the relationship between behavioural bias, financial literacy, personality, risk tolerance & disposition bias and how these affects the portfolio of investors in the context of a developing country. It becomes more important when comes to developing country, because of insufficient resources mostly people are not literate, especially in finance but they do investment. Therefore, they exhibit these biases on greater extent. In this study we specifically analysed that how investors with changes in personality trait, level of financial literacy, level of risk tolerance, and the presence of cognitive biases (Loss aversion, Anchoring, Overconfidence & representativeness) will affect investment decision and ultimately result in disposition bias. And how this biases can be reduced to manage the portfolio.

1.5 Research Question
i) What is the impact of overconfidence on investor’s disposition bias?
ii) What is the impact of Anchoring on investor’s disposition bias?
iii) What is the impact of Representativeness on investor’s disposition bias?
iv) What is the impact of Loss aversion on investor’s disposition bias?
v) What is the impact of financial literacy on investor’s disposition bias?

1.6 Significance
The current research work contributes in several ways to behavioural finance's theoretical and practical viewpoint. The work relates to the theoretical dimension in identifying the difference between behavioural biases, financial knowledge and disposition bias that personality and risk have in mediating role. In Pakistan, people are emotionally attached with their peer group and follow their advice when making decision in any aspect of their life. Therefore, it is more important how they make an investment because without knowing much about the investment, it can be very risky. This research also examines the positive and negative effects of financial literacy while the literature still states that financial literacy has a positive impact on disposition bias. For institutional investor’s and individual shareholders this research is of great importance. To understand behaviour pattern of themselves, this research will be proof as a milestone the biases they incorporate in their decisions either financial literacy or illiterate. Individual
investor’s and institutional investor will get insight how they better manage their portfolio by reducing biases with financial literacy. This will have positive impact on their returns.

1.7 Definitions
Following terminologies are used in this report

1.7.1 Overconfidence Bias. Belief on own abilities.

1.7.2 Anchoring Bias. It is cognitive bias, occurs when investor give more importance to initial information and make it reference for judgement in future.

1.7.3 Loss Aversion. Cognitive bias occurs when investors try to avoid losses rather substantial gain.

1.7.4 Representativeness. Tendency of people to make decisions considering that two events are correlated for an outcome.

1.7.5 Financial literacy. Ability of people to process financial knowledge when making decisions.

1.7.6 Disposition bias. It says that investors will sell the share when prices going up and will hold the securities when prices go down.

1.7.7 Risk Tolerance. The degree of uncertainty an investor is able to handle.

1.7.8 Personality. Individual’s characteristics

2. Literature Review
(Chu & Wang, 2017) Conducted study on financial literacy and wellbeing of an investor. They focus on how households’ choices and returns differ with level of financial literacy. The Return has taken as an indicator of financial wellbeing. The survey conducted in almost all the provinces of china and involves questions about assets and debt of households, income and expenditure, financial literacy & financial planning. 3906 households participated in the survey from 25 provinces of mainland china. The study concludes that Households with a high level of financial literacy are more likely to engage in financial markets. They also found that households with greater financial literacy levels are more likely to hold mutual funds in their portfolios.

To study the financial literacy, risk attitude and saving motives of Indonesian investors with respect to disposition bias Leon & Pringganingrum (2018) conducted a research. Their aim was to investigate the impact of financial literacy, saving motives, risk on disposition bias of reksa dana investors of Indonesia who invest in Indonesian market. Reksa dana is an Indonesian word which mean is mutual fund. Data was gathered through a questionnaire from 321 respondents. The data used in the research was analyzed through ordinal logistic regression. The finding of the
study shows that disposition bias will be lower when investors financial knowledge higher whereas with low financial knowledge investors will show greater disposition bias. Shapira & Venezia (2001) also found that for nonprofessional investors disposition impact will be higher than professional investors. Due to higher technical knowledge, high skills and experience than nonprofessional investors they tend to show lower biases. However, Jonsson et al (2017) found that Investors’ risk-taking attitude has no impact on bias although the investor is in the risk-seeking or avoiding group. This research was carried out for mutual fund investor’s biases and financial literacy,

(Kramer, 2016) Examine the relationship between financial literacy, confidence & financial advice seeking. The sample size for this study consist of 1276 households from which financial advice seeking and financial literacy data was available. The result shows that the advice seeking tendency is remarkably similar for people who have high and low financial literacy. Somewhat 30% of households and investors of DHS sample show that Regardless of their level of assessed literacy, the primary source of advice should be professional financial advice. More confident investors seek less financial advice whereas no relationship observed between financial advice seeking and financial literacy.

Mouna & Anis (2015) conducted their study on financial literacy of the Tunisian people. The results revealed that financial literacy and education of economics have significant effect on behaviour of investors. The lack of understanding of economics and finance has been shown to be a strong deterrent to shareholdings and the lack of literacy has discouraged households from taking part in the stock market

(Javed, Bagh, & Razzak, 2017) Have studies herding effect, overconfidence & representativeness in their study to know determinants of behaviour & perceived investment performance in PSX known as Pakistan stock exchange. The study shows that overconfidence, representative, and herding bias have positive impact of perceived investment performance& strong correlation was found between the variables. Investment performance increased due to the overconfidence bias & representativeness biases of the investor

(Parveen & siddiqui, 2018) Examine disposition effect, overconfidence bias, anchoring bias of Pakistan investors. Abnormalities were noted in investor behaviour when the global economy was disturbed by the 2008 financial crisis, which began in the US and resulted in a global recession (Parveen & siddiqui, 2018). Investors use heuristics when they are faced with an intense situation in their financial decisions. The results suggested that Anchoring heuristic and disposition effect was found to highly significant and positively affecting the decision-making
process of investors. Overconfidence found to be negatively related to decision making, means that whenever investors will be overconfident, they may lose returns on their investment.

Masomi and Ghayekhloo (2011) study the behavioural impact of investors on decision making in Tehran stock exchange. This study’s results showed that behavioural factors manipulate investor decision-making. It was also found that the conduct of institutional investors trading in Tehran stock exchange was strongly influenced by heuristics such as anchoring and the fallacy of gamblers.

(Prosad, Kapoor, Sengupta, & Roychoudhary, 2017) Carry out their study on disposition and overconfidence in Indian equity market. It also detects growing bias has a greater impact in terms of trading volumes on the Indian equity market. (Prosad et al, 2017) also explored the area of behavioural finance in Indian equity market. The data comprises of total daily returns and volume of transactions for each constituent stock and total index returns. Overall results show that both biases have a positive combined impact on the volume of transactions even after volatility control. The market-wide VAR results show that there is overconfidence that is consistent with the previous findings.

(Ahmad & Maochun, 2019) Carry out study to gauge the relationship between personality trait and investment decision using risk tolerance. Five personality traits namely extraversion, agreeableness, conscientiousness, neuroticism & openness to experience were taken to study with biases herding behaviour, disposition, overconfidence, anchoring, & representativeness in Pakistan. Data was collected from traders of Pakistan stock exchange who frequently trade. Negative correlation was found between disposition and risk tolerance whereas significant effect was observed with personality traits and other behavioural biases. According to findings of the study individual with personality traits Conscientiousness, Neuroticism and openness to experience was found to be high risk taker.

(Khan, 2017) Studies behavioural biases (Loss aversion & availability biases) on decision making of investors using risk as an moderator. The sample was consisting of 260 questionnaires initially but those who responded were only 230. This study concludes that there is no significant difference between men and women decision-making responses with respect to loss aversion bias. Just a few respondents were prone to risk tolerance bias and investment decision taking has a positive relationship. Most respondents were subject to bias in familiarity and the relationship between familiarity (availability) bias and investment decision making is weak. Risk perception moderation strengthens the relationship between loss aversion bias investment decisions while weakening the relationship between familiarity (availability) bias and investment decisions.
(Aren & Zengin, 2016) Carry out study on financial literacy and risk perception on investment choice of investors. People living in Istanbul were respondent of the study. The data was collected through survey method via email and in person. No relationship was found between personality traits and the investment choice. Whereas it is found that investment choices vary with the financial literacy and risk perception. It is found that the investor who is risk takers will go for equity investment, foreign exchange & portfolio. Whereas investors with low risk propensity have deposits which they think can provide safe returns. They also observed that men are more financial literate than women when gauge advance financial literacy.

Jonsson et al (2017) conducted study on mutual fund investor’s disposition bias and financial literacy, saving motives, risk attitude. The research contains Swedish data which was collected through survey in 2013 from 1564 households. Significant effect found of financial literacy on disposition bias.

(Sadi, Asl, Rostami, Gholipour, & Gholipour, 2011) Conducted study on behavioural aspects of investor’s, biases and investor’s personality affect financial decision. They conclude that there is a strong relationship between the personality of the investors and the perception errors in the stock market in Tehran and these findings are consistent with the research literature. The results show that there is a direct relationship between openness and insight and bias in confidence and a reverse relationship between bias in openness and availability. The results indicate that there is an inverse relationship between self-assuredness and randomness.

(Marcin, Adam, & Monika, 2015) to investigate the degree of propensity to behavioural biases (the impact of certainty, the sunk cost fallacy, and mental accounting) among individuals with different levels of market investment expertise and to determine whether this susceptibility is associated with certain personality traits (impulsiveness, venturesomeness, and empathy). The research included 200 participants from Warsaw Stock Exchange and 100 Warsaw School of Economics students who engage passively in the transaction. Results showed that behavioural bias sensitivity depends on the level of stock market investing knowledge. (Marcin et al, 2015) showed that Fine arts and music students were less vulnerable to over-confidence and more successful in predicting the likelihood of market events than a group of stock market traders and professional investors.

(Hunjra & Lubna, 2015) conducted study on psychological factors which affects decision making with mediating risk of risk. Probability random sampling was used in this study, in which a structured questionnaire was distributed among Islamabad Stock Exchange's 200 financial investors to evaluate their data collection opinion. The findings of this study show a significant
negative relationship between the risk perception and the risk tolerance of the investor. The riskier the investment becomes for investors with a low risk tendency, the greater their risk aversion becomes.

(Yuniningsih1, Widodo, & Wajdi, 2017) evaluated how much risk investors are willing to take when making their investment-related to loss aversion, in terms of risk-taking actions related to loss aversion. They suggested that Loss aversion has a significant influence on risk-taking in investment decision-making, particularly in stocks.

2.2 Theoretical Framework

2.2.1 Disposition Biases
Disposition effect is the inclination of an investor to sell high-value securities and hold losing stocks. Investors make wise investments but fail to reach maximum potential gains that are typically impacted by failing to pay attention to details and holding a poorly performing stock (Brown and Kagel, 2009). Chen et al (2007) says that when shares purchased which perform badly considered to be as bad decisions. Furthermore, Therefore, these investors have a cognitive bias 1) they tend to sell shares that grow or performs well than shares whose prices have dropped, which is consistent with the disposition effect of accepting gain rather than loss 2) investors are overconfident and 3) investors believe that previous returns also indicate future earnings (bias).

Disposition effect is due to the investors ' inability to sell their shares at a loss. Household and retails investors usually show this bias because they trade the shares on daily or weekly basis. Such findings strongly show the disposition effect is one of the important biases that market analysts as well as individual investors need to critically analyze and investigate. Moreover, the basic nature of the disposition effect when it has the biggest tendency to occur in the equity market is preferable to consider. Individual investors tend to protect their profits by selling ' winners ' that are securities that have risen since they were bought and holding on to their losers. This action is not fair as it results in tax costs for selling winners, but hanging on to losers means ignoring tax benefits

2.2.2 Cognitive bias
The cognitive bias is used to show the mistakes that people tend to make when thinking about the impact that varying decisions and conclusions. Looking into the idea of bias there are many forms that can be identified, some of which are considered to be associated to memory as well (Dwyer, 2018). Recall of events and occasions that have happened in the past may have bias due to various reasons that may also create an impact on the way they think and commence with their decisions. Other forms of cognitive bias are based on the issues that may be faced based on
attention and possible retention (Korteling, Brouwer, & Toet, 2018). The attention span of a person is considered to be limited. Some people are known to pay attention to everything that is happening around them while others may become oblivious to their surroundings after a while. This form of attention can also create a level of bias based on what you may see around you as compared to others (Dwyer, 2018).

The application of cognitive bias shows error in the process of thinking and processing information that is present around people. It is a method if gathering information and deducing meanings from it based on what they see (Lebowitz & Akhtar, 2019; Morin, 2019). It is true that the human brain is considered to be complex and known to process information and derive meanings that have different implications and meanings. The idea is that cognitive bias tends to occur when the mind tends to start the process of simplifying information and data. These can be considered as rules that have been set by the person so not only process information but also derive conclusions and final decisions faster than light or sound (Wood, 2015).

It is important to note that when a person is about to make a decision or conclusion about a certain fact or point around them. This makes them consider themselves as being rational, impartial and capable of analysing all the Information that is present for them. There are times however, when these analyses tend to provide bias based on the outlook of bad decisions made (Chira, Adams, & Thorn, 2008).

The mind states that if one was to look at all possible results when making a decision, the process of decision making would take too long even for the smallest choices. The decision making process is considered to be the most complex process thus when looking at the information that is around along with the complex behaviour that is followed, one has to rely on quick thinking to make some decisions (Toshino, Masashi, & Suto, 2004). There are many different factors that can cause cognitive bias, however the implications of mental processes, called heuristics, play a major role in the decision process. There are times when these decision processes can be considered as accurate will at times these processes can be misleading and present mistakes in the thinking processes. Of the factors that tend to have a major impact the key factors that influence are motivations, society and culture, norms and the overall the limitations that have been set in one’s mind (Mehta, 2007).

Within the domains of cognitive bias there are four main implications that are noted and studied. These four are known as Loss Aversion, Overconfidence, Anchoring and Representativeness.

### 2.2.3 Loss Aversion

The concept of loss aversion is based on the implications of the ‘prospect theory’. This theory is usually applied in different marketing domains that are implacable on the economists more so
than the psychologists (Gearon, 2018). If one is to define the process of loss aversion, a simple definition does not state how people hate the concept of losing. Rather it looks into the process of how people tend to hate the idea of loss more so than the idea of being able to win. Based on the concept of the application of financial literacy and the management of risk it states how people hate loss compared to the profits that can be acquired (Thiel, 2017). The fear of loss, especially when looking into processing financial gains cannot be justified. Loss is something that people tend to avoid, thus make investments to counter them, a look for risk adverse avenues of profit and revenue management. Loss aversion was highlighted in the 80s by two economists named Kahneman and Tversky under the paper called “Choices, Values and Frames”. The two presented the results that the loss of financials is double fold as compared to the management of financial gain (Yechiam, 2015). A classic example that can be applied here is that of profits gained from a simple investment made. One tends to feel good when the profit is received as compared to any loss that may be incurred. If profit is gained the feeling, though resonates with happiness, gives a short lived feeling, while loss is something that keeps on and gives a negative connotations and emotions all throughout the day, if not days. Truth be told, the concept of loss hitting harder than gain is the key here (Patrick, 2008). There was another study that was carried out in the year 2010 by a few neuroscientists that stated that the brainwaves where a complex set of emotions that allowed them to study and understand how and what makes people behave the way they do. Within the series of tests that were conducted, there were varying scenarios present. Some of these scenarios looked in to the management of financials and how they responded to profit and loss in these scenarios. It was here that it was noted that of the two groups made, the first was risk averse and looked for chances to save themselves, while other sought out risk and where willing to change the challenge (Weber, 2010). The brain is a complex organ that is known to process millions of thoughts at one time. It is noted that those who are willing to take and accept challenges are prone to have damaged amygdale. Amygdale is a tissue that is found in the brain which allows the person to take or reject risks as they come. Thus within this research that was done the scientists managed to determine that the people who did have damaged amygdale were literally more prone to take risk and manage financial gambles as compared to the people who didn’t have damaged amygdale (Weber, 2010; Bracha & Donald, 2012)

2.2.4 Overconfidence
The second cognitive bias that has been identified here is overconfidence. Overconfidence has major implications that have severe impacts on the decision-making process. The impact is seen not only in the corporate world of profit and loss but in personal investments as well. It is noted
that as per one of the researchers, the concept of overconfidence is based on understanding how clearly can people contemplate the level of their knowledge and ability to apply that knowledge in front of others (Shefrin, 2007). The level of overconfidence can be truly measured based on the way people tend to overestimate the way they can perform or understand situations. There are times, especially within the realms of financial management that clearly shows that overconfidence can lead to risk and at times loss as well. To manage the concept of overconfidence within the investment realms it can be said that financiers and entrepreneurs are more risk averse and thus tend to look at forecasted or predicted results before sharing their decisions (Farnam, 2015; Missier, Mantyla, & Bruin, 2011).

2.2.5 Anchoring
The process of Anchoring is based on boarding on looking for unnecessary hooks or rather anchors that allows a person to make completely random decisions that may have no supportive evidence or guides to them. These are considered to be psychological heuristic that tend to provide a feeling of security no matter how false it may be for them (Furnham & Boo, 2011). It has been concluded that the overall idea behind Anchoring is to gauge the level of stability that different investors are willing to apply within their business means. This level of stability can also indicate the application of indecisiveness and the possibility of involving in risk based decisions (McElroy, 2007; Cherry, 2019).

2.2.6 Representativeness
One can say that the level of invests that have been made in comparison to what the person aims to achieve in the near future also tends to fall under cognitive bias. The process of stereotyping when making different kinds of decisions also has an impact on the investor experience. Here this is linked to the process of long term and short-term decision-making processes that are a consequence of representativeness. Representation has a strong hold in the minds of the consumers. The word is linked to the overall reputation of the brand in the market along with the overall implications that its stock has to offer. The bigger and better the company, the bigger and better will be the stock (Kartasova, 2013).
There are times when renowned companies may also lose out on their judgements and make bad decisions that lead to loss as well. This application of bad investments can then lead the overall investors to look into other avenues while moving away from these ones instead. The only reason why this is done is to secure positive growth and keep away from risk of loss. There are times when companies tend to increase their stock prices as a result of which when the market does...
supersede later the investors are stuck in a dilemma to manage the earning and the returns that are to be made (Krishnan & Booker, 2002).

2.2.7 Personalities

The personality of a person was usually considered within the domains of being introverted or extraverted. However, in modern times these personalities have changed to be a part of five different points. These points are taken in as extraverts, agreeable, conscious, and neurotic and willingness to be open (Madigan, Stoeber, & Passfield, 2016). Extraverts are considered as people who are more outgoing and social as compared their opposites who are labelled as he introverts. These people are considered as open and more prone to be talkative and welcoming to different scenarios. They are also perceived to be risk-takers as well (Poropat, 2009). The trait of agreeableness is a reflection of people who are jovial and considered as not only pleasant but also helpful as well (Roberts & Robins, 2000). Conscientiousness is used to show the level of trust and responsibility that is reflected from the personality developed of the person (Rasquinha, Dunn, & Dunn, 2014). A neurotic person is mostly considered to be perpetually nervous and in a depressive and aggressive state of affairs (Childs & Stoeber, 2012). Lastly the concept of openness allows them to share traits of curiously and originality (Vecchione, Schoen, Castro, Cieciuch, Pavlopoulos, & Caprara, 2011).

2.2.8 Parsimony

The concept of applying Parsimony is to look for solutions and possible answers to that are simple and accurate. These simple and accurate answers tend to respond to different process and cognitive behaviours that are present. As categorized before the brain is a very complex organ that makes many complex decisions and commences with complex tasks. However, not all factors are complex some of which can be solved in a simple and assertive manner. There are many scientists who tend to state that parsimony is simply the use of brief, concise and supportive assumptions. It allows people to not only understand the terms that are being applied to ensure simplicity but also manages to remove all kinds of bias and unwanted confusions as well (Anderson, 2019).

The application of parsimony is based under the heading of The Laws of Parsimony. It was based on the concept that one should not look at the process of gaining multiple options rather it should look into singular processes as well. The idea suggests accuracy and perseverance within the results to be managed (Thomsen, Olesen, Schnieber, & Tonnesvang, 2014).
2.2.9 Orderliness
Orderliness refers to a general desire to maintain structure, cleanliness, and organization. Several studies have reported that, of the two aspects of Conscientiousness, Orderliness, but not Industriousness, significantly predicts political conservatism. As such, political conservatism may be more closely related to characteristics emphasized by Orderliness than by Industriousness. Orderliness may predict conservatism because it is related to several of the defining goals and motivations of the political right, such as decreased tolerance of ambiguity and uncertainty, and increased need to maintain (Cherry, 2019). Orderliness also appears to be associated with higher trait disgust. One possible explanation for the relationship between Orderliness and trait disgust is that Orderliness contributes to a pathogen avoidance strategy. Maintaining physical order may facilitate pathogen avoidance by preventing bacterial growth and pest infestation; an orderly and neat environment also makes it easier to notice signs of contamination such as rodents and insects. Furthermore, an orderly environment fosters familiarity, and may reduce exposure to unexpected, potentially dangerous stimuli. In addition, the relationship between preference for order and disgust may be bi-directional (Farnam, 2015).

2.2.10 Superego
The nature of ego functions can be clarified, and complicated, by the implications that can be derived from the superego formations. One clue to understanding superego formation was provided by Freud’s analysis of melancholia. He suggested that when a personal relationship is “lost,” the lost object can be regained nonetheless by “identification,” that is, the lost object is “set up again inside the ego” (Hassin, Uleman, & Bargh, 2005). When the sexual object is given up, the ego is altered, insofar as the abandoned libidinal object is now set up inside the ego. The ego incorporates the object within itself, “identifies” with it, and thereby builds up its structure or “character.” In this way an object cachexia is substituted by introjections. Freud suggests that perhaps the id can give up its objects only by identifications of this sort, and that the ego can consequently be considered a precipitate of abandoned object cachexia (Soto & John, 2017).

2.2.11 Obstinacy
The word obstinacy or rather obstinate is used to define the stubbornness that is present when one is unwilling to change or accept the surrounding implications. The process of obstinate action-oriented behaviour occurs during process learning, when learners are unsure about representing the learnt phenomena; which was activated by the teaching of what method during the content learning phase and leads towards critical reflexivity in the learning realm (Crocker, Gaudreau, Mosewich, & Kljajic, 2014). However, obstinate action-oriented behaviour offers and enables the
learners an opportunity to demonstrate the how and why, which generates the art of obstinate action-oriented behaviour learning. In the area of social science, especially with educational activities, where both teaching and learning occurs, the process and critical reflexive phases need to be strengthened to generate the art of obstinate action-oriented behaviour towards becoming successful and effective (Parks-Leduc, Feldman, & Bardi, 2015).

2.1. Hypotheses
H1: Financial literacy has insignificant effect on Investor’s disposition Bias.
H2: Overconfidence has insignificant effect on Investor’s disposition Bias.
H3: Anchoring has insignificant effect on Investor’s disposition Bias.
H4: Representativeness has insignificant effect on Investor’s disposition Bias.
H5: Loss aversion has insignificant effect on Investor’s disposition Bias.
H6: Risk Tolerance has insignificant effect on Investor’s disposition Bias.
H7: Over confidence has insignificant effect on Investor’s disposition Bias mediated by risk tolerance.
H8: Anchoring has insignificant effect on Investor’s disposition Bias mediated by risk tolerance.
H9: Representativeness has insignificant effect on Investor’s disposition Bias mediated by risk tolerance.
H10: Loss aversion has insignificant effect on Investor’s disposition Bias mediated by risk tolerance.
H11: Obstinacy has insignificant effect on Investor’s disposition Bias mediated by over confidence.
H12: Obstinacy has insignificant effect on Investor’s disposition Bias mediated by Anchoring.
H13: Obstinacy has insignificant effect on Investor’s disposition Bias mediated by Representativeness.
H14: Obstinacy has insignificant effect on Investor’s disposition Bias mediated by Loss aversion.
H15: Orderliness has insignificant effect on Investor’s disposition Bias mediated by over confidence.
H16: Orderliness has insignificant effect on Investor’s disposition Bias mediated by Anchoring.
H17: Orderliness has insignificant effect on Investor’s disposition Bias mediated by Representativeness.
H18: Orderliness has insignificant effect on Investor’s disposition Bias mediated by loss aversion.
H19: Parsimony has insignificant effect on Investor’s disposition Bias mediated by over confidence.

Electronic copy available at: https://ssrn.com/abstract=3681253
H20: Parsimony has insignificant effect on Investor’s disposition Bias mediated by Anchoring.
H21: Parsimony has insignificant effect on Investor’s disposition Bias mediated by Representativeness.
H22: Parsimony has insignificant effect on Investor’s disposition Bias mediated by loss aversion.
H23: Super ego has insignificant effect on Investor’s disposition Bias mediated by over confidence.
H24: Super ego has insignificant effect on Investor’s disposition Bias mediated by anchoring.
H25: Super ego has insignificant effect on Investor’s disposition Bias mediated by Representativeness.
H26: Super ego has insignificant effect on Investor’s disposition Bias mediated by loss aversion.
H27: Obstination has insignificant effect on Investor’s disposition Bias mediated by Financial literacy.
H28: Superego has insignificant effect on investor’s disposition bias mediated by risk tolerance.
H29: Obstination has insignificant effect on investor’s disposition bias mediated by risk tolerance.
H30: Super ego has insignificant effect on Investor’s disposition Bias mediated by Financial literacy.
H31: Financial literacy has insignificant effect on Investor’s disposition Bias mediated by risk tolerance.
H32: Financial literacy has insignificant effect on Investor’s disposition Bias mediated by over confidence.
H33: Financial literacy has insignificant effect on Investor’s disposition Bias mediated by Anchoring.
H34: Financial literacy has insignificant effect on Investor’s disposition Bias mediated by Representativeness.
H35: Financial literacy has insignificant effect on Investor’s disposition Bias mediated by loss aversion.
H36: Parsimony has insignificant effect on Investor’s disposition Bias mediated by Risk Tolerance.
H37: Orderliness has insignificant effect on Investor’s disposition Bias mediated by financial literacy.
H38: Parsimony has insignificant effect on Investor’s disposition Bias mediated by financial literacy.
H39: Orderliness has insignificant effect on investor’s disposition bias mediated by risk tolerance.
3. Research Methods

Research Model:
Disposition Bias = \( \beta \) Loss aversion + \( \beta \) Overconfidence + \( \beta \) Representativeness + \( \beta \) Anchoring + \( \beta \) Financial literacy + \( \beta \) Risk tolerance + \( \beta \) Personality

Illustration of the model has been showed in Figure 2.

3.1 Method of Data Collection

Primary data collection method was effectively used which was the most appropriate method for collecting responses directly from our respondents. The primary data was collected through the participation of investors from different brokerage houses in Karachi. The purpose was to gauge their financial literacy & biases. Also, to measure level of risk they can bear. The target population was being explored by visiting individually and handing over the questionnaires personally.

3.2 Sampling Technique

In this research non-probability convenience sampling technique was used. Because we accessed investors who were convenient to reach also brokerage house selected based on convenient to communicate and reach.

3.3 Sample Size

As per the supervisor’s guidance and requirement of the research criteria the primary data was collected from the 182 respondents. The responses were collected from three brokerage house of Karachi. The responses were given anonymously by investors due to prevailing conditions in the country.

3.4 Instrument of data collection

The instrument used for collecting the primary data from our 182 respondents was a close ended questionnaire. The questionnaire was adopted from previous studies. The questionnaires have 5 parts. First part covers the financial literacy of the investors. This adopted from Van Rooij et al. (2011a, b). 2nd part of the questionnaire covers risk tolerance (Mark M Kramer 2016). 3rd part of the questionnaire covers cognitive bias such as Anchoring, Overconfidence, Loss aversion & Representativeness (Amari Mouna & Jarboui Anis, 2015). Fourth part of the questionnaire covers personality such as orderliness, parsimony, obstinacy & superego (Mudrack and Naughton (2001). Final part of the questionnaire covers disposition bias which is our dependent variable.
(Weber and Camerer, 1998). In Anchoring, Representativeness, Loss aversion & overconfidence we used dichotomous scale which consist of answers Yes or No. For personality traits question dichotomous scale was used consist of Yes or No. For disposition bias we used a Likert scale ranging from not likely at all to highly likely i.e., 1 to 5. Likert scale was also used for risk tolerance ranging from strongly disagree to strongly agree. For financial literacy questions we used dichotomous & multiple-choice. Question 1, 2, 3, 6, 7, 9, 10 & 11 consist of multiple choices. Whereas, question 4, 5 & 12 consist of dichotomous.

### 3.5 Statistical Technique

The data collected through questionnaire was pooled into Smart PLS. We used PLS regression by making model to estimate the relationship between the variable & to check the outer loadings. To check the sig value PLS bootstrapping was used.

#### 3.5.1 Demographic Analyses

Total were 182 participants of which 160 were males and 22 were females. Below table summarize the numbers.

| Gender   | Frequency | Percent | Valid Percent | Cumulative Percent |
|----------|-----------|---------|---------------|-------------------|
| Valid    |           |         |               |                   |
| Male     | 160       | 87.9    | 87.9          | 87.9              |
| Female   | 22        | 12.1    | 12.1          | 100.0             |
| Total    | 182       | 100.0   | 100.0         |                   |

Age Group were taken in 5 slots starting with 16 & 55 Onwards shown in below table.

| Age     | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-----------|---------|---------------|--------------------|
| Valid   |           |         |               |                    |
| 16-24   | 18        | 9.9     | 9.9           | 9.9                |
| 25-34   | 55        | 30.2    | 30.2          | 40.1               |
| 35-45   | 65        | 35.7    | 35.7          | 75.8               |
| 46-55   | 42        | 23.1    | 23.1          | 98.9               |
| 55 onwards | 2   | 1.1     | 1.1           | 100.0              |
| Total   | 182       | 100.0   | 100.0         |                    |

Taken together age with Gender, below table summarize

### Gender * Age Cross tabulation
Annual income of the participants is summarized below.

| Annual Income Level        | Frequency | Percent | Valid Percent | Cumulative Percent |
|----------------------------|-----------|---------|---------------|--------------------|
| Valid less than 400,000    | 17        | 9.3     | 9.3           | 9.3                |
| 400,000-800,000            | 44        | 24.2    | 24.2          | 33.5               |
| 800,000-1600,000           | 117       | 64.3    | 64.3          | 97.8               |
| Greater than 1600,000      | 4         | 2.2     | 2.2           | 100.0              |
| Total                      | 182       | 100.0   | 100.0         |                    |

3.5.2 Descriptive Analyses

As mentioned, there were 160 participants were male & 22 were female. 75% Male given correct answers whereas out of 22 females 54% females given the correct answers. 89.3% Male showed high financial literacy, 5% show mediate whereas 5% show low financial literacy. 36.36% females show high financial literacy, 27.27% show mediate whereas 36.36% show low financial literacy. When ask about willingness to take risk 64.3% individuals says that they will take risk whereas 13.7% were not agreeing to take risk and 22% people were in between. When asked about whether they go with steady returns with low risk or high return with high risk 63.7% shows they are disagreed means they will go with high risk that will generate high return. Whereas only 2.7% shows agree with the statement. 33.6% people were in between. When asked about willingness to borrow money if think investment will generate positive outcome, 67% show they are agreed whereas only 8.8% said they won’t borrow even if they will see investment can generate higher profit. When ask about the chance people can invest their saving for high returns, 62.4% people were agreed whereas only 6.7% people show disagree. If analyze risk tolerance, 34% people show ability to take risk whereas 22% people show they won’t take any risk others were in between. In overconfident, 65.9% state they are experienced investor, whereas only 1.1% say they have no experience and all other were in between. 58.7% people say that they rely on their own investment opinion rather someone else, whereas 1.1% disagree with
that. 58.8% say that they can predict stock prices after they do some analyses, whereas 1.1% were have no idea in prediction all others were in between. 34.6% people say that they consult with their family or colleague when making investment, other show that they do not consult anyone in making investment approximately 58.2%. 61% people were agreed that they do compare stock price of 52 high while making purchase, whereas 39% state it as false. 39.6% say that they will sell their stock when prices will hit 52 weeks high whereas 60.4% were not agreed. 62.6% people say that they will not buy any stock which current prices are higher than last year, whereas 37.4% people were not agreed. 41.2% people consider that prices are high when it hits 52 weeks high whereas 58.8% where not agreed. 41.8% people say that they will not invest in a company who has poor earning history whereas 58.2% say they will invest. 76.4% people say that they will prefer to buy stock who has good past performance because they think that good performance will continue in the future whereas 23.6% were disagreed. 85.7% consider stocks good if the performance of the firm is good over the past period whereas 14.3% reluctant to agree with that. 87.4% say that they trust on the reports, past performance about the stock on which my portfolio is composed off. Whereas 12.6% were disagree. When ask about if investors are concerned more on loss rather gain 75.8% were disagree means that they will prefer gain over loss hence showing less loss aversion whereas 24.2% agree with that statement. 80.8% disagreed with the given statement about whether they will invest or not when market performance is poor. 80.8% says they will investment even performance of market is poor whereas 19.2% say that they will not increase their investment. We ask that is it more important to save capital than to earn gain, 79.7% people say that they will go for gain rather saving investment, whereas 20.3% were agrees. When it comes to personality 79.7% says that they won’t like suggestion and they do things in their own way whereas 20.3% were disagree. 76.9% people say that they become angry when forced to do thing they are not agreed upon whereas 23.1% were disagreed with the statement. 85.7% people says that they have strong opinion on what they do, whereas only 14.3% denied. 86.8% says that to get their right they will be stand for own self whereas 13.2% denied. 88.5% says that they work more efficiently rather wasting time whereas 11.5% were not agreed. When ask about how often you follow systematic approach and methodical in life, 44.5% show they are agreed whereas 55.5% show they don’t follow. 73.1% says when they must do something trick or difficult, they usually make plans to figure out things but 26.9% were not agree with the statement. 73.6% says that they arrange the things to smooth their life whereas 26.4% were not agreed. 89% says that they save their money so that they can invest to get some returns whereas 11% says they will not. 79.7% says that they keep record of their money being spent whereas 20.3% say they don’t keep record. 80.1% people says that they like to collect things whereas 19.9% says that they don’t. 86.8% people say that they don’t like to waste their money
on something unproductive. 66.5% says that they have certain principles set and they take their life according to that. When asked about if fund A will decline in value what is probability that you will sell your fund. 72.9% people say that they are uncertain, cannot say anything about that whereas 5% says they will not sell & 1.7% says that they will sell the fund A. When ask you to have invested equal amounts in mutual equity funds A, B, and C. During the past 12 months, funds B and C have increased in value, whereas fund A has declined in value. What is the likelihood that you would sell your shares in fund A? 60.4% people says that they will not sell the fund A shares. Whereas 4.9% says that they will confirm sell the shares. 21.4% were says they are likely to sell. When asked if Fund A, B & C declined in value what is the probability that you will sell your share. 63.5% says they will sell the shares whereas, 4.4% says they will not. 8.3% were uncertain.

| Variables     | Questions                                                                                       | Descriptive Stats | Confirmatory Factor Analysis |
|---------------|-------------------------------------------------------------------------------------------------|-------------------|----------------------------|
|               |                                                                                                 | Standarized Mean | Outer Loading | T Stats | P Values |
| Risk Tolerance| How would you rate your willingness to take risks in financial matters?                         | 0.862             | 0.862         | 32.09   | 0        |
|               | I think it is more important to have safe investments and guaranteed returns, than to take a risk to have a chance to get the highest possible returns. | -0.658            | -0.657        | 11.476  | 0        |
|               | If I think investment will be profitable, I am prepared to borrow money to make this investment. | 0.797             | 0.795         | 23.561  | 0        |
|               | I am prepared to risk losing a part of my savings if there is a chance of a high return.       | 0.761             | 0.762         | 20.714  | 0        |
| Over confidence| I am an experienced investor.                                                                    | 0.922             | 0.924         | 64.194  | 0        |
|               | I feel more confident in my own investment opinions over opinions of my colleagues or friends    | 0.344             | 0.344         | 3.116   | 0        |
|               | I consult others (family, friends or colleagues) before making stock purchase.                 | -0.243            | -0.248        | 2.093   | 0.037    |
|               | I can predict the future stock price movement after I did some analysis.                       | 0.906             | 0.908         | 50.427  | 0        |
| Anchoring     | I compare the current stock prices with their recent 52 week high and low price to justify my stock purchase. | 0.597             | 0.601         | 7.841   | 0        |
|               | I am likely to sell my stock after the price hits recent 52 week high                           | 0.837             | 0.839         | 26.047  | 0        |
|               | I am unlikely to buy a stock if it was more expensive than last year                           | -0.251            | -0.249        | 2.258   | 0.024    |
|               | I see the stock price as high if the price has increased to 52 week high.                      | 0.805             | 0.808         | 19.467  | 0        |
| Reperesentiveness | I tried to avoid investing in companies with a history of poor earnings.                     | 0.744             | 0.757         | 10.627  | 0        |
|               | I rely on past performance to buy stocks because I believe that good performance will continue. | 0.489             | 0.493         | 4.56    | 0        |
|               | Good stocks are firms with past consistent earnings growth                                     | 0.495             | 0.491         | 5.001   | 0        |
|               | I trust the research and past performance of the past stocks composed my portfolio.            | 0.626             | 0.635         | 8.432   | 0        |
| Loss Aversion | I am more concerned about a large loss in my stock than missing a substantial gain (profits).   | 0.757             | 0.755         | 13.34   | 0        |
|               | I feel nervous when large paper losses (price drops) have in my invested stocks.             | 0.81              | 0.81          | 19.988  | 0        |
|               | I will not increase my investment when the market performance is poor.                         | 0.788             | 0.789         | 17.906  | 0        |
|               | When it comes to investment, no loss of capital is more important than returns.               | 0.706             | 0.705         | 12.557  | 0        |
| Obstinance    | When I have decided how to do a thing, I dislike having others make suggestions.               | 0.769             | 0.772         | 15.162  | 0        |
|               | I become angry when someone insists on doing something with which I do not agree.             | 0.433             | 0.435         | 4.104   | 0        |
I have strong opinions on many subjects.  
I usually stand up for my rights.  
I usually get through my work efficiently without wasting time.  
I am systematic and methodical in my daily life.  
When I have to undertake something difficult, I usually make out a plan of procedure.  
I like to arrange my life so that it runs smoothly and without conflict.  
I believe in “saving for a rainy day”.  
I keep a careful record of money that I spend.  
I sometimes enjoy going through and looking at my possessions.  
I like to collect things.  
I do not like to waste money.  
I think that I have a more rigorous standard of right and wrong than most people.  
I carry a strict conscience with me wherever I go.  
I have a strong sense of responsibility about my duties.  
I am guided in my conduct by certain principles which I have accepted.  
I am conscientious about telling the truth.  
Suppose you have one single mutual fund (mutual equity fund A). During the past 12 months, it has declined in value. what is the likelihood that you would sell your shares in fund A?  
Suppose you have invested equal amounts in mutual equity funds A, B, and C. During the past 12 months, funds B and C have increased in value, whereas fund A has declined in value.  
Suppose you have invested equal amounts in mutual equity funds A, B, and C. During the past 12 months, all three funds (A, B, and C) have declined in value. what is the likelihood that you would sell your shares in fund A?

3.6 Structural Equation Modeling

To test the study hypothesis, we have used the structural equation model (SEM) whereas the testing has been gone through Smart PLS software. Moreover, to evaluate the indirect and direct effects of all the constructs the testing was done. The use of (SEM) structural equation model has been observed to be a foremost procedure that has been used below different regression models and methods (Barron & Kenny, 1986). It used to evaluate the structural relationship between exogenous and endogenous variables. It includes factor analysis and multivariate analysis. Moreover, the equation of regression targets at explaining each construct to assess the cause and effect relationship while all of the factors in the causal model could demonstrate their cause and effect at exact time. Likewise, the idea of using this model ensures to apply technique of bootstrapping which has been viewed as reasonable for both small and large sample size and does not require any kind of indirect effect (Hayes, 2013). In order to check the all direct and indirect effects, a technique has been implemented which is known as bootstrapping (Shrout & Bolger, 2002).

3.7 Measurement of Outer Model
The goal of measure of fit in the measurement model is to study about the reliability and validity of the instrument and to check its reliability and validity we perform test of convergent validity and discriminant validity in software naming Smart PLS.

3.8 Composite Reliability

Reliability implies stability of questionnaire outcomes. For the similar target population, at whatever points the questioner reutilize the questionnaire it will give similar outcome. It demonstrates inside consistency & repeatability of the survey is high. The primary measure for unwavering quality is to maintain a strategic distance from unfairness in research. In this manner, it tends to be improved by testing the pursuit procedure and investigation, as is done utilizing diverse research and examination techniques or different researchers. This also incorporates the dependability and legitimacy of the exploration.

Reliability of the measurement instruments was evaluated using composite reliability. All the values were above the normally used threshold value i.e. 0.70. This is the accepted reliability value range. Estimation of reliability can be done by degree of constancy that lies amongst various variables (Hair, 2010). Below is the table of composite reliability.

| Composite Reliability |
|-----------------------|
| Anchoring             | 0.643 |
| Disposition Bias      | 0.198 |
| Financial Literacy    | 1.000 |
| Loss Aversion         | 0.850 |
| Obstinacy             | 0.793 |
| Orderliness           | 0.527 |
| Overconfidence        | 0.635 |
| Parsimony             | 0.766 |
| Representativeness    | 0.690 |
| Risk Tolerance        | 0.658 |
| Superego              | 0.034 |

3.9 Factor loadings significant

Table of descriptive statistics also mentioned loadings used in (CFA) confirmatory factor analysis. Construct with the loading of .5 are consider as strong loading variables whereas the constructs with the loading of below .5 are considered as less are better to be removed from the table.

3.10 Convergent Validity

Convergent validity is the level of agreement in at least two measures of a similar construct (Carmines and Zeller, 1979). Convergent validity was assessed by inspection of variance mined for each factor (Fornell and Larcker, 1981). Conferring to Fornell and Larcker (1981), if the,
variance extracted value is greater than 0.5 then convergent validity is established, and the result is drawn that the loadings are good but less than 0.5 are termed as less effective for the study.

Following table displays the result.

|                      | Cronbach’s Alpha | rho_A | Composite Reliability | Average Variance Extracted (AVE) |
|----------------------|------------------|-------|------------------------|----------------------------------|
| Anchoring            | 0.427            | 0.651 | 0.643                  | 0.445                            |
| Disposition Bias     | -0.07            | 0.567 | 0.198                  | 0.469                            |
| Financial Literacy   | 1                | 1     | 1                      | 1                                |
| Loss Aversion        | 0.764            | 0.765 | 0.85                   | 0.587                            |
| Obstinacy            | 0.678            | 0.725 | 0.793                  | 0.443                            |
| Orderliness          | 0.308            | 0.565 | 0.527                  | 0.427                            |
| Overconfidence       | 0.2              | 0.857 | 0.635                  | 0.465                            |
| Parsimony            | 0.622            | 0.622 | 0.766                  | 0.396                            |
| Representativeness   | 0.425            | 0.424 | 0.69                   | 0.365                            |
| Risk Tolerance       | 0.249            | 0.789 | 0.658                  | 0.597                            |
| Superego             | -0.466           | 0.76  | 0.034                  | 0.431                            |

### 3.11 Discriminant validity

Discriminant validity can be defined as any single construct when differs from other constructs in the model (Carmines and Zeller, 1979). Discriminate validity results are satisfactory when the constructs are having an AVE loading more than 0.5 which means that minimum 50% of variance was took by the construct (Chin, 1998). Discriminate validity is established if the elements which are in diagonal are significantly higher than those values in off diagonal in the parallel rows and columns. Discriminant Validity tests are being conducted in order to see whether non-related ideas or measurements are in fact unrelated or not. An effective assessment of discriminant legitimacy demonstrates that a trial of an idea isn't exceptionally associated with different tests intended to quantify hypothetically various ideas. The table for Discriminant Validity is given below:

|                      | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    |
|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Anchoring (1)        | 0.667 |       |       |       |       |       |       |       |       |       |       |
| Disposition Bias (2) | 0.600 | 0.685 |       |       |       |       |       |       |       |       |       |
| Financial Literacy (3)| 0.482 | 0.238 | 1.000 |       |       |       |       |       |       |       |       |
| Loss Aversion (4)    | 0.546 | 0.613 | 0.232 | 0.766 |       |       |       |       |       |       |       |
| Obstinacy (5)        | -0.414| -0.367| -0.436| -0.469| 0.666 |       |       |       |       |       |       |
| Orderliness (6)      | -0.428| -0.325| -0.372| -0.302| 0.354 | 0.653 |       |       |       |       |       |
| Overconfidence (7)   | 0.681 | 0.670 | 0.526 | 0.686 | -0.489| -0.382| 0.682 |       |       |       |       |
| Parsimony (8)        | -0.490| -0.454| -0.337| -0.475| 0.549 | 0.301 | -0.525| 0.630 |       |       |       |
| Representativeness (9)| -0.526| -0.536| -0.328| -0.543| 0.409 | 0.430 | -0.616| 0.536 | 0.604 |       |       |
| Risk Tolerance (10)  | 0.655 | 0.645 | 0.518 | 0.683 | -0.494| -0.449| 0.817 | -0.445| -0.589| 0.772 |       |
| Superego (11)        | 0.711 | 0.638 | 0.503 | 0.559 | -0.440| -0.442| 0.659 | -0.494| -0.610| 0.689 | 0.656 |

### 3.12 Model fit measures
The fitness of the model in SEM-PLS is defined by various measures such as standardised root-mean-square residual (SRMR), and the exact model fits like d_ULS and d_G, Normed Fit Index (NFI), and χ² (Chi-square). The model fit measures consisting the measured value of both saturated model as well as the estimated model is reported in above Table. The saturated model assesses the correlation between all constructs. The estimated model, on the other hand, takes model structure into account and is based on total effect scheme.

|                       | Saturated Model | Estimated Model |
|-----------------------|-----------------|-----------------|
| SRMR                  | 0.106           | 0.109           |
| d_ULS                 | 10.545          | 11.164          |
| d_G                   | 3.104           | 3.247           |
| Chi-Square            | 2705.976        | 2755.865        |
| NFI                   | 0.415           | 0.404           |

### 3.13 R Square

As adjusted R square value is relatively low in financial literacy & Loss aversion which is 0.325 & 0.411 respectively. Whereas Anchoring, Disposition bias, Overconfidence, representativeness & risk tolerance has relatively higher adjusted R square. It explains that how much variation in dependent variable is explained by independent variable.

|                           | R Square | R Square Adjusted |
|---------------------------|----------|-------------------|
| Anchoring                 | 0.555    | 0.543             |
| Disposition Bias          | 0.56     | 0.545             |
| Financial Literacy        | 0.325    | 0.31              |
| Loss Aversion             | 0.411    | 0.394             |
| Overconfidence            | 0.536    | 0.522             |
| Representativeness        | 0.47     | 0.455             |
| Risk Tolerance            | 0.74     | 0.726             |

### 3.14 Hypothesis Testing

In PLS-SEM, bootstrapping is one of the key strides, which gives the data of constancy of factor guesstimate. Sub-tests are drawn everywhere from the first example including substitution, in this process (Hair, Matthews, Matthews, & Sarstedt, 2017). Bootstrapping provides the information of stability of coefficient estimate. In this process, many sub-samples are drawn from the original sample with replacement (Hair et al. 2016). After running the bootstrap routine, SmartPLS shows the t-values for structural model estimates derived from the bootstrapping procedure. The results of path coefficients for the entire hypothesis are shown in the following table. The t-value greater than 1.96 (p < .005) shows that the relationship is significant at 95% confidence level (α = 0.05). Path showing the significance relationship between measured and latent variables are significant or not. The path diagram showed in figure 2.
|                                | Sample Mean (M) | Standard Deviation (STDEV) | P Values |
|--------------------------------|-----------------|----------------------------|----------|
| Anchoring -> Disposition Bias  | 0.233           | 0.079                      | 0.003    |
| Anchoring -> Risk Tolerance    | 0.046           | 0.069                      | 0.556    |
| Financial Literacy -> Anchoring| 0.114           | 0.07                       | 0.073    |
| Financial Literacy -> Disposition Bias | -0.202         | 0.076                      | 0.01     |
| Financial Literacy -> Loss Aversion | -0.172        | 0.089                      | 0.066    |
| Financial Literacy -> Overconfidence | 0.179          | 0.083                      | 0.017    |
| Financial Literacy ->Representativeness | 0.059          | 0.074                      | 0.502    |
| Financial Literacy -> Risk Tolerance | 0.086          | 0.067                      | 0.212    |
| Loss Aversion -> Disposition Bias | 0.153          | 0.099                      | 0.148    |
| Loss Aversion -> Risk Tolerance | 0.176           | 0.079                      | 0.038    |
| Obstinacy -> Anchoring         | -0.011          | 0.083                      | 0.921    |
| Obstinacy -> Financial Literacy | -0.244          | 0.11                       | 0.028    |
| Obstinacy -> Loss Aversion     | -0.245          | 0.107                      | 0.023    |
| Obstinacy -> Overconfidence    | -0.116          | 0.081                      | 0.182    |
| Obstinacy ->Representativeness | 0.048           | 0.086                      | 0.656    |
| Obstinacy -> Risk Tolerance    | -0.063          | 0.066                      | 0.36     |
| Orderliness -> Anchoring       | -0.103          | 0.072                      | 0.168    |
| Orderliness -> Financial Literacy | -0.144          | 0.107                      | 0.197    |
|                          | Path Coefficients | t-Value | p-value |
|--------------------------|-------------------|---------|---------|
| Orderliness -> Loss Aversion | -0.031            | 0.082   | 0.697   |
| Orderliness -> Overconfidence | -0.032           | 0.063   | 0.579   |
| Orderliness -> Representativeness | 0.175            | 0.07    | 0.013   |
| Orderliness -> Risk Tolerance | -0.085           | 0.052   | 0.123   |
| Overconfidence -> Disposition Bias | 0.274           | 0.121   | 0.02    |
| Overconfidence -> Risk Tolerance | 0.473           | 0.109   | 0.0      |
| Parsimony -> Anchoring | -0.16             | 0.091   | 0.089   |
| Parsimony -> Financial Literacy | 0               | 0.101   | 0.967   |
| Parsimony -> Loss Aversion | -0.181           | 0.115   | 0.136   |
| Parsimony -> Overconfidence | -0.196           | 0.084   | 0.024   |
| Parsimony -> Representativeness | 0.282           | 0.078   | 0.0      |
| Parsimony -> Risk Tolerance | 0.099           | 0.058   | 0.084   |
| Representativeness -> Disposition Bias | -0.106         | 0.077   | 0.177   |
| Representativeness -> Risk Tolerance | -0.046           | 0.066   | 0.521   |
| Risk Tolerance -> Disposition Bias | 0.212           | 0.115   | 0.073   |
| Superego -> Anchoring | 0.511             | 0.152   | 0.001   |
| Superego -> Financial Literacy | 0.318           | 0.115   | 0.004   |
| Superego -> Loss Aversion | 0.431             | 0.141   | 0.002   |
| Superego -> Overconfidence | 0.399           | 0.127   | 0.002   |
| Superego -> Representativeness | -0.395          | 0.119   | 0.001   |
| Superego -> Risk Tolerance | 0.153              | 0.084   | 0.052   |

Path coefficients indicate the following results:

1) Financial literacy has significant impact on investor’s disposition bias. Since the P value is less than 0.05 therefore null hypothesis rejected and alternate hypothesis accepted. It means that individual with higher financial literacy will tend to show less disposition bias. Investor’s with high financial literacy will not sell share solely based on price while going up or down.

2) Financial literacy has significant impact on overconfidence since the P value is less than 0.05 which reject the null hypothesis & alternate hypothesis accept. Investor’s with high financial literacy will tend to show high overconfidence in his ability to predict stock prices based on his financial knowledge.

3) No significant relationship found between financial literacy & anchoring, loss aversion, representativeness& risk tolerance since the P value is greater than 0.05. It means null hypothesis accepted.

4) Anchoring has significant relationship with disposition bias since the P value is less than 0.05. So, we reject null hypothesis and accept alternate hypothesis. Investors with high anchoring bias will tend to show more disposition bias because they will compare current prices with past data of stock earning. Therefore, when stock prices will go beyond or far from a reference point investor will use their previous study either to keep or drop the particular stock. Whereas anchoring has insignificant relationship with risk tolerance since the P value is greater than 0.05 which accepts the null hypothesis. Means that investor’s with anchoring bias will be less risky.

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because when they see prices are not consistent with past prices they will sell or buy share accordingly.

5) Loss aversion shows insignificant relationship with disposition bias. P value >0.05 indicates that when prices of particular security will go down, investors will not hold it as they prefer to avoid losses than to gain. Whereas loss aversion exhibits positive relationship with risk tolerance as P values is greater than 0.05 which is 0.038. Investors with loss aversion do not assume greater risk for holding security which falling below reference point.

6) Obstinacy which is a personality trait exhibits significant relationship with financial literacy & loss aversion as P value is less than 0.05. As people with obstinacy trait tend to show less disposition bias due to their higher financial literacy. Because people with these personality trait holds on their opinion and does not change their action about a situation or events. Obstinacy also exhibits positive relationship with loss aversion. Investors with obstinacy personality tend to show greater loss aversion because of their nature that they stick with their choices & do not assume risk.

7) Obstinacy has insignificant relationship with overconfidence, Anchoring, Representativeness& risk tolerance as Probability values is greater than 0.05. Investor’s with obstinacy trait won’t be overconfidence, will not rely on past performance or continue to invest in stocks with good returns in the past & they will not assume any given risk for investment.

8) Orderliness has effect on representativeness as P value is 0.013 which is less than 0.05 & rejects the null hypothesis. Investors with this personality trait will predict stock as it was in past because they will assume that good performance will continue. And they will avoid investing in companies’ stocks which have poor past returns because they predict by comparing past. Orderliness shows insignificant relationship with overconfidence, anchoring, loss aversion, risk tolerance & financial literacy. Investor’s with this personality trait will tend to show no cognitive bias (Overconfidence, Loss aversion & Anchoring). Also, they won’t be affecting by financial literacy because they tend to do things in order and in regular sequence. Individual with orderliness personality trait will be less risky because before they do their study or analysis about particular stock, they won’t invest their money.

9) In this study it is found that Parsimony has impact on Overconfidence & representativeness as P value is < 0.05 which urges us to reject null hypothesis & accept alternate hypothesis. People with Parsimony trait are unwillingness to spend their money. Due to this trait they believe on their ability and use to make decisions rather investing on someone’s advice. So when the prices of particular stocks go down they tend to sell shares in poorly performing fund. Since investors with these trait don’t want to spend money they compare the prices of current stocks with previous data and predicts futures of the stocks. This gives them
insight about security movement in particular situation. Whereas no relationship was found with financial literacy, loss aversion, risk tolerance & anchoring.

10) Representativeness shows insignificant impact with disposition bias & risk tolerance as the P value is greater than 0.05. Therefore, we can conclude that investors with this bias won’t show disposition bias and they will not sell share when prices go up or hold when go down. Rather they will use previous studies to support current situation of stock prices and decide about security.

11) Insignificant relationships were found between risk tolerance & disposition bias as P values greater than 0.05. It tells us that investor who can take risk or have risk tolerance won’t show disposition bias.

12) Superego has showed significant impact with cognitive bias (Anchoring, overconfidence, Loss aversion & Representativeness) & financial literacy. P values come to be less than 0.05 so we reject null hypothesis and accept alternate hypothesis. Investors with superego personality trait will tend to be more cognitive bias. It differentiates between right and wrong, and people make judgment using it. Here investors will belief in their own abilities, will make comparison between stock prices & at the same time will try to avoid loss. It is known that investors who will have high financial literacy will exhibit this trait as this gives them a chance to study movement of stock and manage their portfolio accordingly. Whereas result reports insignificant relationship with risk tolerance.

|                       | Standard Deviation (STDEV) | P Values |
|-----------------------|----------------------------|----------|
| Superego -> Financial Literacy -> Anchoring | 0.026 | 0.102 |
| Financial Literacy -> Anchoring -> Disposition Bias | 0.017 | 0.082 |
| Superego -> Anchoring -> Disposition Bias | 0.058 | 0.036 |
| Obstinacy -> Financial Literacy -> Disposition Bias | 0.029 | 0.094 |
| Superego -> Financial Literacy -> Disposition Bias | 0.036 | 0.061 |
| Superego -> Overconfidence -> Disposition Bias | 0.068 | 0.096 |
| Obstinacy -> Financial Literacy -> Overconfidence | 0.028 | 0.089 |
| Superego -> Financial Literacy -> Overconfidence | 0.037 | 0.069 |
| Financial Literacy -> Overconfidence -> Risk Tolerance | 0.046 | 0.035 |
| Superego -> Financial Literacy -> Overconfidence -> Risk Tolerance | 0.019 | 0.077 |
| Parsimony -> Overconfidence -> Risk Tolerance | 0.046 | 0.042 |
| Superego -> Overconfidence -> Risk Tolerance | 0.069 | 0.005 |

**3.15 Indirect Effect:**

In this study we try to see multiple mediation between variable if there is some sort of mediation. And we come up with the following results

1) Strong mediation effect found between Superegos, financial literacy and anchoring as P values are less than 0.05 in both path coefficients and indirect effect. Its mean that financial literacy plays an important role in managing portfolio effectively. Investors with superego trait and anchoring bias can
manage their portfolio. Strong mediation effect also found with Anchoring and disposition bias, as P values for path coefficients and indirect effect are less than 0.05. Its means investors with anchoring bias will more likely not sell shares in poor performing share. As they have anchoring bias, they will compare it with 52 weeks high and then decide their portfolio. Superego has strong mediation effect with overconfidence and disposition bias, as its values are less than 0.05.

2) Parsimony has showed strong mediation effect with overconfidence & risk tolerance. People with overconfidence bias will be more risk tolerates & they will likely not to sell share in poorly performing funds. Whereas partial mediation was found between parsimony with anchoring & Representativeness.

3) Partial mediation was observed between obstinacy, overconfidence & financial literacy. As P value for path coefficients found to be less than 0.05 whereas in indirect effect P value is founds to be greater than 0.05. So, we can say that there is partial mediation. Investors with obstinacy personality trait restricts themselves with their own choices because they believe they trust their own ability while investment.

4) Strong mediation indicated by obstinacy between financial literacy & disposition bias. As p value for path coefficient & indirect effect is less than 0.05. Its mean that people with high financial literacy have ability to control while prices goes down, because they do show disposition bias.

4 Discussions
The results supported previous findings of Sadi et al (2011). Investors with high anchoring bias will tend to show more disposition bias because they will compare current prices with past data of stock earning. Therefore, when stock prices will go beyond or far from a reference point investor will use their previous study either to keep or drop the particular stock. The application of cognitive bias shows error in the process of thinking and processing information that is present around people. It is a method if gathering information and deducing meanings from it based on what they see (Lebowitz & Akhtar, 2019; Morin, 2019).

In this study we have found significant relationship between financial literacy & disposition. Investors who have greater financial knowledge will manage their portfolio in an efficient manner. When studying cognitive bias, we have found that overconfidence & anchoring shows significant relationship with disposition bias as sig values is less than 0.05. Overconfident investors will hold their investment while prices go up rather sold to gain profit. Also, investors will be anchoring bias can minimize their disposition because they compare it with previous record and make decisions accordingly. We did not find any significant relationship between risk tolerance and disposition effect. Risk tolerance does not show any mediation between the variables. Superego trait of personality variable showed strong mediation with financial literacy, overconfidence and anchoring. Moderate mediation was found between superego with
representativeness & loss aversion. Particularly personality has not significant effect on disposition but some of the trait showed mediation. Risk tolerance has showed partial mediation with overconfidence, loss aversion and disposition bias

4.1 **Hypothesis assessment summary**

| Hypothesis                                                                 | Standard Deviation (STDEV) | T-values | P-values | Decision |
|----------------------------------------------------------------------------|-----------------------------|----------|----------|----------|
| H1: Financial literacy has insignificant effect on Investor’s disposition Bias. | 0.076                       | 0.079    | 0.01     | Accept   |
| H2: Overconfidence has insignificant effect on Investor’s disposition Bias. | 0.121                       | 2.119    | 0.02     | Accept   |
| H3: Anchoring has insignificant effect on Investor’s disposition Bias.     | 0.079                       | 2.750    | 0.003    | Accept   |
| H4: Representativeness has insignificant effect on Investor’s disposition Bias. | 0.077                       | 1.322    | 0.177    | Reject   |
| H5: Loss aversion has insignificant effect on Investor’s disposition Bias. | 0.099                       | 1.535    | 0.148    | Reject   |
| H6: Risk Tolerance has insignificant effect on Investor’s disposition Bias. | 0.115                       | 1.694    | 0.073    | Reject   |
| H7: Over confidence has insignificant effect on Investor’s disposition Bias mediated by risk tolerance. | 0.109                       | 4.560    | 0.00     | Accept   |
| H8: Anchoring has insignificant effect on Investor’s disposition Bias mediated by risk tolerance. | 0.069                       | 0.580    | 0.556    | Reject   |
| H9: Representativeness has insignificant effect on Investor’s disposition Bias mediated by risk tolerance. | 0.066                       | 0.647    | 0.521    | Reject   |
| H10: Loss aversion has insignificant effect on Investor’s disposition Bias mediated by risk tolerance. | 0.079                       | 2.00     | 0.038    | Accept   |
| H11: Obstinacy has insignificant effect on Investor’s disposition Bias mediated by over confidence. | 0.081                       | 1.296    | 0.182    | Reject   |
| H12: Obstinacy has insignificant effect on Investor’s disposition Bias mediated by Anchoring. | 0.083                       | 0.100    | 0.921    | Reject   |
| H13: Obstinacy has insignificant effect on Investor’s disposition Bias mediated by representativeness. | 0.086                       | 0.417    | 0.656    | Reject   |
| H14: Obstinacy has insignificant effect on Investor’s disposition Bias mediated by Loss aversion. | 0.107                       | 2.204    | 0.023    | Accept   |
| H15: Orderliness has insignificant effect on Investor’s disposition Bias mediated by over confidence. | 0.063                       | 0.532    | 0.579    | Reject   |
| H16: Orderliness has insignificant effect on Investor’s disposition Bias mediated by Anchoring. | 0.072                       | 1.431    | 0.168    | Reject   |
| H17: Orderliness has insignificant effect on Investor’s disposition Bias mediated by Representativeness. | 0.07            | 2.315    | 0.013    | Accept   |
| H18: Orderliness has insignificant effect on Investor’s disposition Bias mediated by loss aversion. | 0.082                       | 0.389    | 0.697    | Reject   |
| H19: Parsimony has insignificant effect on Investor’s disposition Bias mediated by over confidence. | 0.084                       | 2.249    | 0.024    | Accept   |
| H20: Parsimony has insignificant effect on Investor’s disposition Bias mediated by Anchoring. | 0.091                       | 1.712    | 0.089    | Reject   |
| H21: Parsimony has insignificant effect on Investor’s disposition Bias mediated by representativeness. | 0.078                       | 3.609    | 0.000    | Accept   |
| Hypothesis                                                                 | Coefficient | t-value | p-value | Decision |
|---------------------------------------------------------------------------|-------------|---------|---------|----------|
| H22: Parsimony has insignificant effect on Investor’s disposition Bias mediated by loss aversion. | 0.115       | 1.484   | 0.136   | Reject   |
| H23: Super ego has insignificant effect on Investor’s disposition Bias mediated by over confidence.  | 0.127       | 3.069   | 0.002   | Accept   |
| H24: Super ego has insignificant effect on Investor’s disposition Bias mediated by anchoring.       | 0.152       | 3.459   | 0.001   | Accept   |
| H25: Super ego has insignificant effect on Investor’s disposition Bias mediated by representativeness. | 0.119       | 3.297   | 0.001   | Accept   |
| H26: Super ego has insignificant effect on Investor’s disposition Bias mediated by loss aversion.   | 0.141       | 2.903   | 0.002   | Accept   |
| H27: Obstination has insignificant effect on Investor’s disposition Bias mediated by Financial literacy. | 0.11        | 2.226   | 0.028   | Accept   |
| H28: Superego has insignificant effect on investors disposition bias mediated by risk tolerance.    | 0.084       | 1.871   | 0.052   | Reject   |
| H29: Obstination has insignificant effect on investors disposition bias mediated by risk tolerance. | 0.066       | 0.932   | 0.36    | Reject   |
| H30: Super ego has insignificant effect on Investor’s disposition Bias mediated by Financial literacy. | 0.115       | 2.645   | 0.004   | Accept   |
| H31: Financial literacy has insignificant effect on Investor’s disposition Bias mediated by risk tolerance. | 0.067       | 1.165   | 0.212   | Reject   |
| H32: Financial literacy has insignificant effect on Investor’s disposition Bias mediated by over confidence. | 0.083       | 2.306   | 0.017   | Accept   |
| H33: Financial literacy has insignificant effect on Investor’s disposition Bias mediated by Anchoring. | 0.07        | 1.865   | 0.073   | Reject   |
| H34: Financial literacy has insignificant effect on Investor’s disposition Bias mediated by Representativeness. | 0.074       | 0.621   | 0.502   | Reject   |
| H35: Financial literacy has insignificant effect on Investor’s disposition Bias mediated by loss aversion. | 0.089       | 1.729   | 0.066   | Reject   |
| H36: Parsimony has insignificant effect on Investor’s disposition Bias mediated by Risk Tolerance.   | 0.058       | 1.617   | 0.084   | Reject   |
| H37: Orderliness has insignificant effect on Investor’s disposition Bias mediated by financial literacy. | 0.107       | 1.325   | 0.197   | Reject   |
| H38: Parsimony has insignificant effect on Investor’s disposition Bias mediated by financial literacy. | 0.101       | 0.041   | 0.967   | Reject   |
| H39: Orderliness has insignificant effect on investors disposition bias mediated by risk tolerance.   | 0.052       | 1.655   | 0.123   | Reject   |

### 4.2 Conclusion

Stock markets considered to be more volatile and helps firm to raise funds to achieve their objectives. We have shown that Pakistani investors are more subjected to behavioural biases in their decision because of lack of financial literacy. They more inclined themselves towards short term gain and subject to disposition bias. To gauge the interest of investors we analyse all variables from different approaches. The number of risk-taking investors is quite low. The aim of the study was to investigate the effect of behavioural bias and financial literacy on investor’s disposition bias with mediating effect of risk and personality. This was achieved through administer questionnaire to investors of stock markets from three brokerage houses in Karachi.

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The data was collected through 182 individuals from three brokerage houses in Karachi to achieve the purpose.

As in previous studies mostly people tried to find impact of financial literacy on investment decision or studied different biases in different context without any mediating or moderating variable. In this study we have taken personality and risk as a mediator and tried to check their effect of disposition bias. As said above Pakistani investors usually are short term investors who seek short term gains therefore, they fall easily in biases. As disposition showed by investors may take stock prices very above or low and create tense situation in the market. Which investors cannot bear because it’s also very versatile also have weak economy and political situation?

In Pakistan, since almost all members of the family are working so they try to save some of their money to meet future goals. To achieve this, many big investment houses have been opened in all over the country which providing opportunity to invest in stock markets, commodity, debt market and many more. As mentioned, most of the population is not education therefore brokerage houses helps to better manage their portfolio. This study would be beneficial for investors and brokerage houses as they will focus on financial literacy and try to reduce biases to enjoy gains.
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