

DEDICATION

To My Beloved Prophet (PBUH) who is the best man of the world.

ACKNOWLEDGEMENT

I owe my deepest gratitude to Allah Almighty, the Exalted, who bestowed me with knowledge, ability and dedication to complete my thesis. I would like to extend my deepest sense of gratitude to my respected supervisor Dr. Faisal Aftab, who supported me at every step of my achievement of this objective. This thesis could not have been possible without his kind supervision and guidance.

I am also grateful to all my teachers and administrative staff, Library and Computer Lab staff and colleagues who played their roles at every step of my task completion. Finally, yet importantly, I would like to express my heartfelt thanks to my beloved father (late), mother and husband for their blessings. I am also grateful to all my family members and my friends as they helped me in my effort.

ABSTRACT

This research study investigated the level of financial literacy of retail investors of Pakistani stock markets and also tries to explore the interdependency between financial literacy and decision making of investors by scrutinizing the mediating role of three cognitive biases (Herd Behavior, Hindsight Bias, and Confirmation Bias) between financial literacy and decision making. A cross-sectional approach was used and data were collected through a questionnaire. The target population was the retail investors of PSX and the sample was 478 respondents. Binary Regression, linear regression, and mediation processes were used to test the relationship between variables. The results of the study indicated that age, professional experience, Locality, Finance certification and training, employment status, and education have a statistically significant relationship ($p < .005$) with financial literacy and gender, marital status, and income do not have a statistically strong relationship ($p > .005$) with financial literacy. The study also explored that Herd Behavior, Confirmation Bias, and Hindsight bias completely mediates between financial literacy and the decision-making of investors. Theoretically, this study implicated a new link in the theory of financial literacy and cognitive biases and also a relationship between financial literacy and investment decisions. This study has practical implications for all financial participants to improve financial literacy for sound decisions making. Future researchers can use the findings of this study in other financial sectors of Pakistan as well.

Key words: Financial literacy, stock markets, financial institutions, Investors, cognitive biases.

TABLE OF CONTENTS

Chapter	Title	Page
	AUTHOR’S DECLARATION	iii
	PLAGIARISM UNDERTAKING	iv
	DEDICATION	v
	ACKNOWLEDGEMENT	vi
	ABSTRACT	vii
	TABLE OF CONTENTS	viii
	LIST OF TABLES	xv
	LIST OF FIGURES	xviii
	LIST OF APPENDICES	xix
	LIST OF ABBREVIATIONS	xx
	TABLE OF GLOSSARY	xxi
1	INTRODUCTION	1
	1.1 Preamble	1
	1.2 Role of financial literacy in behavioral finance	3
	1.2.1 Transition from traditional to behavioral finance	4
	1.2.2 Diffusion of the concept of financial literacy	5
	1.3 Financial literacy and decision making of investors in Pakistan	7
	1.4 Identification of Gap	11

	1.5 Problem Statement	13
	1.6 Research Questions	14
	1.7 Distinction of the Study	15
	1.8 Structure of the study	17
2	LITERATURE REVIEW	18
	2.1 Introduction	18
	2.2 A critical overview of the concept of financial literacy	19
	2.3 The conceptual exploration of Financial Literacy	26
	2.4 Initiatives for advancement of financial literacy	29
	2.4.1 Evolution of the concept of Financial Literacy	33
	2.4.2 Measurement of the concept of financial literacy	36
	2.5 Evidence about low rate of financial literacy in the world	41
	2.6 Causal connection between Demographic variables and financial literacy	47
	2.6.1 Age and financial literacy of respondents	47
	2.6.2 Gender and financial literacy of respondents	48
	2.6.3 Education and financial literacy of respondents	49
	2.6.4 Professional background/Experience and financial literacy of respondents	49
	2.6.5 Financial literacy and finance certification and trainings	50
	2.6.6 Financial literacy and employment status	50

	2.7 Financial literacy in light of behavioral theories of Finance	53
	2.7.1. Behavioral approach	53
	2.8 Theoretical underpinnings on the role of Cognitive Biases in financial literacy.	58
	2.8.1 Herd Behavior	60
	2.8.2 confirmation Bias	61
	2.8.3 Hindsight Bias	63
	2.9 Financial literacy and Investment Decisions	65
	2.10 Summary	68
3	THEORITICAL FRAMEWORK	69
	3.1 Introduction	69
	3.2 Operationalizing the variables of the study	73
	3.2.1 Measurement of financial Literacy	73
	3.2.2 Measurement of Herd Behavior	76
	3.2.3 Measurement of Confirmation Bias	77
	3.2.4 Measurement of Hindsight bias	77
	3.2.5 Measurement of Decision Making	77
	3.3 Relationship of Socio-Demographical variables and financial literacy	77
	3.3.1 Relationship of Financial literacy and Age	78
	3.3.2 Relationship of Financial literacy and gender	80
	3.3.3 Relationship of Financial literacy and professional experience	81

3.3.4 Relationship of Financial literacy and marital status	82
3.3.5 Relationship of financial literacy and education	83
3.3.6 Relationship of Financial literacy and Finance certifications and trainings	85
3.3,7 Relationship of financial literacy and income.	
3.3.8 Relationship of financial literacy and employment status	87
3.3.9 Relationship of financial literacy and locality	88
3.5 Relationship of Financial literacy and cognitive biases	88
3.5.1 Relationship of hindsight bias, financial literacy and decision making of retail investors	89
3.5.2 Relationship of Herd behavior, financial literacy and decision making of retail investors	90
3.5.3 Relationship of confirmation Bias, financial literacy and decision making of retail investors	91
3.6 Relationship of Financial literacy and decision making of retail investors	92
3.7 Summary	93
3.9 Conceptual Frame work	94
4 RESEARCH METHDOLOGY AND DATA COLLECTION	95
4.1 Introduction	95
4.2 Epistemological, ontological and axiological stance of the study	95

4.3 Research Methodology and Justification	97
4.4 Research Design	99
4.5 Unit of analysis	99
4.5.1 Unit of observation	100
4.6 Time-Frame of the Study	101
4.7 Data collection and Analysis	102
4.7.1 Data collection	102
4.7.2 Data Analysis	102
4.8 Research tool	103
4.9 Sampling Process	103
4.9.1 Sampling Population	104
4.9.2 Sampling Frame work	105
4.9.3 Sampling Plan	105
4.9.4 Sampling Method	106
4.9.5 Sample Size	107
4.9.6 Response Rate	108
4.10 The Pilot Test	109
4.11 Limitations of the research methods	109
4.12 Summary	110
5 RESULTS AND DISCUSSION	112
5.1 Introduction	112
5.2 Statistical analysis	113
5.2.1 Reliability Test	113
5.2.2 Validity Test	114

	5.3 Relationship of financial literacy and socio-demographic variables	114
	5.4 Financial literacy and cognitive biases and decision making	115
	5.5 Characteristics of the respondents	115
	5.6 Descriptive Statistics	115
	5.7 Measurement of Basic Financial Literacy	119
	5.8 Measurement of Advance Financial sophistication	129
	5.9 Financial Literacy and Socio-Demographic Variables	134
	5.10 Financial literacy and Cognitive bias	147
	5.10.1 Relationship Financial literacy and Herd behavior	147
	5.10.2 Relationship of financial literacy and confirmation bias	149
	5.10.3 Relationship of Financial Literacy and Hindsight bias	150
	5.10.4 Relationship of financial literacy, Herd Behavior, Confirmation Bias, Hindsight Bias and decision making	152
	5.10.5 Mediation of Cognitive Biases between Financial literacy and Decision making	154
	5.11 Discussion	156
6	CONCUSION AND SUGGETSIONS FOR FUTURE RESEARCH	166
	6.1 Introduction	166

6.2 Major Findings	167
6.2.1 Comparison with other studies	169
6.3 Conclusion	170
6.4 Implications for the study	171
6.4.1 Contributions of the study	171
6.4.1 Theoretical implication	172
6.4.2 Practical Implications	172
6.4.3 Social Implications	174
6.5 Limitations of the study	175
6.6 Suggestion for Further Research	177
BIBLIOGRAPHY	180
APPENDIX A	221
APPENDIX B	230

LIST OF TABLES

TABLE NO.	TITLE	PAGE
2.1	Measurement techniques of financial literacy	23
2.2	Initiatives for advancement of the financial literacy	30
2.3	Some of the important factors those Causes High level of Financial Literacy generally in the world and specifically in Pakistan	52
3.1	Conceptual definition of financial literacy	71
5.1	Demographics of the respondents	116
5.2	Descriptive statistics	119
5.3	Distribution of financially literate and financially illiterate respondents in Basic financial literacy test	123
5.4	Distribution of Correctly Answered Basic Financial Literacy Questions (By Number)	126
5.5	Distribution of correctly answered Basic Financial Literacy Questions (By Concept)	127
5.6	Distribution of financially literate and illiterate respondents in Advance financial literacy test	129
5.7	Distribution of correctly answered Advance financial Literacy questions (by Number)	131
5.8	Distribution of correctly answered Advance Financial Literacy Questions (By Concept)	132

5.9	Classification Table	135
5.10	Variables not in the Equation	136
5.11	Omnibus Tests of Model Coefficients	137
5.12	Model Summary	137
5.13	Hosmer and Lemeshow Test	138
5.14	Contingency Table for Hosmer and Lemeshow Test	139
5.15	Classification Table ^a	139
5.16	Variables in the Equation	140
5.17	Model summary of Basic financial literacy and Herd Behavior	147
5.18	Effect of basic financial literacy on herd behavior	148
5.19	Model summary of basic financial literacy and confirmation bias	149
5.20	Effect of basic financial literacy on confirmation bias	149
5.21	Model summary of basic financial literacy and Hindsight bias	150
5.22	Effect of basic financial literacy on Hindsight bias	151
5.23	Model summary of financial literacy, Herd behavior, Confirmation bias, Hindsight bias and decision making	152
5.24	Effect of financial literacy, Herd behavior, confirmation bias, Hindsight bias on decision making	152
5.25	Direct effect of financial literacy on decision making	154

5.26	Indirect effect of financial literacy through herd behavior, confirmation bias and hindsight bias on decision making	154
5.27	Summarization of the hypotheses	156

LIST OF FIGURES

FIGURE NO	TITLE	PAGE
2.1	Flow chart of Financial Literacy	28
2.2	Main dimensions of behavioral finance	57
3.1	Conceptual Framework	94
5.1	Distribution of financially literate and illiterate retail investors	125
5.2	Distribution of basic financial literacy questions (by concept)	128
5.3	Distribution of financially literate and illiterate retail investors in advance literacy	130
5.4	Distribution of advance financial literacy questions (by concept)	133
5.5	Basic financial literacy on herd behavior	148
5.6	Basic financial literacy on confirmation bias	149
5.7	Basic financial literacy on hindsight bias	151
5.8	Financial literacy, herd behavior, conformation bias, and hindsight bias on decision making	152
5.9	Statistical mediation model of cognitive biases between financial literacy and decision making	155

LIST OF APPENDICES

APPENDIX NO	TITLE	PAGE
A	Questionnaire	221
B	Validity test (Bivariate analysis)	230

LIST OF ABBREVIATIONS

PSX: Pakistan Stock exchange

FL: Financial Literacy

FIL: Financial Illiteracy

BFL: Basic financial Literacy

AFL: Advance Financial Literacy

OECD: Organization for Economic Co-operation and Development

ANZ: Australia and Newzeland Survey

FINRA: Financial Industry Regulatory Authority

TABLE OF GLOSSARY

TERMS	DEFINATIONS
Bias	Inclination or prejudice for or against one person or group, especially in a way considered to be unfair
Cognition	Mental action or process of acquiring knowledge and understanding through thought, experience, and the senses
Confirmation bias	Tendency to search for, interpret, favor, and recall information in a way that confirms or strengthens one's prior personal beliefs.
Financial literacy	Financial literacy is the ability to understand and properly apply financial management skills.
Hindsight bias	Tendency of people to overestimate their ability to have predicted an outcome that could not possibly have been predicted.
Herd Behavior	Tendency to follow group behavior without rationality.

CHAPTER 1

INTRODUCTION

1.1 Preamble

Financial literacy is an emerging need for capturing the fast pace of capital markets in both developed and developing nations and it is also necessary for individuals and society (Skagerlund, Lind, Strömbäck, Tinghög, Västfjäll, 2018). Financial well-being of the participants and economies are dependent upon the strength of financial knowledge of market players. Lack of proper financial concepts and high level of financial illiteracy has become an important issue in all over the world. Brent and Ward (2018) considered financial exposure as a statistically significant and important indicator of financial literacy.

Financial literacy has an adamant role in stock market activities, individual investors need more to learn and know about these activities but in a rational manner. There is need of such sound knowledge which can improve the efficiency of financial decisions of investors (Anderson, Baker, David, Robinsonc, 2017) by covering their emotional and biased decisions. For better understating and improvement of the concept of financial literacy of investors' there is a need to uncover and explain the concept of financial literacy in detail. This research has an aim to explore the concept and the rank of financial literacy in Pakistani retail investors and another concern is to examine the effect of Pakistani demographics on the degree of financial literacy of these investors.

This research also argues about the relationship between financial literacy and decision making of investors after analyzing three major types of cognitive biases (Herd Behavior, Hindsight bias and confirmation bias) of retail investors in Pakistan. These biases are studied by different authors in international studies but in Pakistan this study will try to explore about Herd Behavior, Hindsight and confirmation bias.

The focus of this chapter is to provide a context for the development of the concept of financial literacy, to explain the meanings of financial literacy, to measure the level of financial literacy, to find out a link between demographical variables and financial literacy, and to explain the causal effect of financial literacy and investors' decision making and also to examine a mediation effect of cognitive biases on decision making capabilities of investors and financial literacy.

Rooij, Alesse and Lusardi (2011) have research on the role of financial literacy and stock market participation. They explored the link how financial literacy helps to be an active participant of stock markets. Their study had main objective of exploration about how financially literate investors actively take part in stock market activities. This research has a different angle of stock market activity and financial literacy.

The concept of financial literacy has been also explored by this research and this research intends to link up the high level of financial literacy with good investment decisions and a low level of financial literacy with an inefficient investment decision. This research intends to take in account decision making capabilities of retail investors by considering their cognitive biases and many of the demographical variables.

This chapter throws light and provides an overview of current requirements of the stock markets and then explores the purpose of this study with a link of individual investor's requirements in these stock market movements. The discussion moves from research questions to a problem statement, and then the conceptual framework for the study. This chapter also enlightens the importance of the study and the last part of the chapter describes the organization of the study.

1.2 Role of financial literacy in behavioral finance

The concept of financial literacy is much important for both traditional and behavioral finance theories. From traditional finance theories to behavioral finance theories, the conceptualization of financial literacy is greatly important. For understanding the basic and crude concepts of finance, financial literacy is playing a vital role. Behavioral finance is a reasonably new field and as compared to conventional economics and finance, behavioral finance is quickly expanding, it is actually a confluence of cognitive psychology and finance which explains the economic decisions (Nofsinger and Baker, 2010; Angew, 2010; Capuano, and Ramsay, 2011; Aren, and Zengin, 2016). Economists have recently taken an interest and are much keen about a number of cognitive biases from a field of psychology. These biases are playing a vital role in health of financial decisions of investors (Fang and Silverman, 2005; Meier, and Sprenger, 2013).

Due to theoretical and practical changes in the field of finance; new theories of finance have emerged. A prominent researcher from the school of behavioral finance, Tversky, and Kahneman (1985, 1986) challenged traditional theory and showed the idea of some cognitive anomalies of investors by demonstrating the concept of prospect theory. It is evident from literature that behavioral finance throws light on the major aspects of human behavior' while not consider normative analysis of human psychology that is studied by traditional finance followers (Stracca, 2004; Berument, and Gozpınar, 2006; Berument and Ogut-Eker, 2009). Human beings are not like machines that they can take accurate financial decisions; behaviorists have conception that due to the right brain working, human often suffers from cognitive and emotional biases. On the other hand, the existence of strong financial knowledge provides strong basis to take rational decisions and avoid judgmental mistakes. More financially literate people are prone to judgmental errors and are good financial decision makers (Lusardi and Mitchell, 2007). Behavioral theory focuses on that financial knowledge gives base for more debiased decisions.

1.2.1 Transition from traditional to behavioral finance

Behavioral finance has two main thoughts: one is cognitive psychology and the second is limits to arbitrage. Cognitive refers to thinking style of people. There is a vast literature in psychology (Groopman and Prichard, 2007; Croskerry, 2003) which demonstrates that there are systematic errors in thinking style of people. Their way of thinking and priorities some time can cause distortions. Traditional finance ignores this body of knowledge while behavioral finance considers this body of knowledge for understanding the psychological state of an individual (Ritter, 2003).

The modern world is focusing on the hidden areas of human mind and now researchers are in an effort to dig out the emotional factors and anomalies of individuals at the time of decision making (Ahmed, Ramakrishnan, and Noreen, 2018). Financial knowledge gives a way to overcome these biases and to debiased financial decisions. Behavioral finance is an emerging branch of finance, which is capturing the theories of traditional finance and showed that bounded rationality is an aspect of behavioral economics and influence on the decisions making of investors, and according to this perspective financial knowledge can be improved by providing decision makers good education in the relevant field in conducive boundaries (Altman, 2012). Now researchers are studying cognitive psychology with reference to finance and considering investors as human not machines.

Cognitive psychology tries to explore the cognitive mechanism of a human brain. Cognitive psychology demonstrates that people often suffer from cognitive biases (Muñoz-Murillo, Álvarez-Franco, and Restrepo-Tobón (2020) and in financial markets' these cognitive biases can influence the decisions of the players, these biases can harm the cognitive skills of any investor and in turn can influence the financial literacy of investors because cognitive skills are the main factors for examination of financial literacy.

Cueva, Iturbe-Ormaetxe, Mata-Pérez, Ponti, Sartarelli, Yu, & Zhukova, (2016) explored those cognitive abilities correlate with behavioral choices. Cognitive biases are judgmental

errors of individuals and in stock markets these errors can have an influence on portfolio strategies of investors. For overcoming these biases and errors and for making more debiased decisions a person should be financially literate.

Traditional finance has been a ruling aspect of finance from decades but with the emergence of behavioral theories of finance' the colors of traditional theories of finance has been faded. Financial literacy has been studied with both aspects of finance but behavioral aspects of finance support more to the need of financial literacy. Proponents of basic finance theories say that markets are perfect and an investor is enriched with information so in this situation there is no need of knowledge of finance. While behavioral finance supporters have a paradigm in which there is a great need of financial knowledge for overcoming the errors and biases of human minds because behavioral finance opposes the concepts of old finance theories of perfect markets.

1.2.2 Diffusion of the concept of financial literacy

Behavioral finance emphasizes on the financial knowledge of the individual. If individuals are aware about financial terms and are much equipped with financial knowledge then he or she could overcome many of the mental and behavioral anomalies. Lusardi and Mitchell (2007) explored that financially literate investors are better than the financially illiterate persons because he can decide well and in an organized manner about features of any investment/saving.

Financial literacy has become an important determinant for improvement in financial well-being of individuals (Karakurum-Ozdemir, Kokkizil, and Uysal, 2019). Governments, policy deciders and financial agents are focusing on the promotional activities throughout the world because they are aware that there is a positive association between financial knowledge, awareness, exposures and the financial outcomes. They are offering programs like credit management, credit analysis, home buying classes, saving and investment

seminars. Governments are focusing to educate young adults through schools, colleges and institutions.

Recent changes in different financial programs by the US government show that financial literacy is a big concern of the US government (Meier, 2013). In 2008, US passed through its big financial crises after the major financial slump of 1929; this crisis raised the serious concern about improvement of financial knowledge in the country. This global recession focused on the important role of individual investors and their relationship with stock markets.

Investors became more concerned after that global crisis in scrutiny of their financial statements and accounts. Not just in the USA but in all over the world after the global crisis, financial institutions' especially banks are involved to initiate complex financial instruments and to launch innovative products. This step forwardness and upward movement of financial institutions demands high level of cognition and financial knowledge from investors. Investors need to understand more, and they should be more capable and educated for handling the complex phenomena of stock markets, and financial literacy has become a crucial element for penetration in stock markets (Karakurum-Ozdemir, Kokkizil, and Uysal, 2019) and making good investment decisions and for reaping the fruit from financial markets.

For highlighting the need of financial literacy Palmer (2008) demonstrated through his study that financial literacy is much advantageous for wealth accumulation' and argued that financially literate people are better in their financial decisions regarding saving, positive wealth accumulation and do not have much debt burdens. The researcher provided evidence through his study that people who are financially literate are 10 to 15 percent wealthier than financially illiterate people.

The need and place of financial literacy is increasing day by day, in all over the world financial literacy conception and its need is becoming stronger. Most of the countries are in an effort to equip their investors with a latest knowledge of complex securities. Researchers

are in an effort to enhance the place of financial literacy in theories and practical scenarios. Due to these efforts of researchers and practitioner's financial literacy concept is more famous in overall financial knowledge.

1.3 Financial literacy and decision making of investors in Pakistan

Financial literacy has been viewed in stock markets by different angles, Rooij, Lusardi and Alesse (2011) examined stock market activities with reference to financial literacy. They measured the concept of financial literacy and its impact on investor's participation in stock markets. Almenberg and Dreber (2015) examined the link between gender, financial literacy and stock market participation.

Zou and Deng (2019) explored the relation of financial literacy and participation of households in financial markets by examining 2012 consumer finance surveys. These mentioned studies focused on the role of financial literacy in participation of stock market activities. This research study explored the link between financial literacy and decision-making capabilities of investors. Unlike other studies, this study is not focusing on direct participation but emphasizes on decision making capabilities of retail investors. Decisions of investors direct the fund for investment, this study has an objective to explore the relationship of financial literacy with decision making skills of investors.

The financial service markets' especially stock markets have become more and more complex and understanding of these instruments is essential to make good decisions in these markets, there is more need to have more sophisticated financial knowledge and more in-depth concepts of finance for understanding this fast mechanism (Goel, and Khanna, 2014). Investment is another name of committing funds for a specific purpose of gaining returns from that invested money and in today's age investments is very much necessary as part of income (Dhiman, and Raheja, 2018).

Decision theory was developed by Warner (1968) and explained actions of individuals and this theory was based on both perspective and descriptive forms. Perspective form holds that individuals take those actions which maximize their utility and descriptive form describes individuals do not take actions which maximize their utility. According to these theory actions taken for decisions of investors are much crucial in their returns, if they are efficient in their decision making than there is more probability to earn high returns.

Poor decision making of investors can provide poor results and can be dangerous for overall stock markets. Financial literacy helps individuals to better understand situations and to make good decisions. Hassan and Anood (2009) measured the impact of financial literacy on investment decisions in UAE. Singh and Sharma (2015) defined the effect of financial literacy on investment decisions for better financial planning.

Investment decisions are affected by the level of financial literacy and it has been explored by researchers with different measures in different contexts. Grohmann, Klühs, Menkhoff (2018) declared that financial literacy has a clear beneficial effect. In Pakistan, Bashir, Nazir, and Afzal (2013) explored a link between financial literacy and investment decisions. Investment decisions are not directly measured by any of the researchers in relation to financial literacy and cognitive biases in Pakistan (Bhabha, Khan, Qureshi and Naeem, 2014).

Financial literacy in Pakistan is a concern to be studied, Asian markets are the world's prominent markets. Research literature and theory provided evidence that Asians are more emotional people and suffers from variety of cognitive biases (Ko, Lee, Yoon, Kwon, & Mather, 2011). In majority of the Asian countries, specifically in Pakistan, due to lack of education people are more emotional and are suffering from bundle of behavioral and cognitive biases. Behavioral biases are an aspect of behavioral and cognitive psychology, and in finance studies behavioral finance provides rationale for understanding the cognitive biases of Asian investors (Kim and Nofsinger, 2008; Jalilvand, Noroozabad, and Switzer, 2017).

Mapping the current level of financial literacy in Asia, is a pronounced challenge for researchers and theorists because there is a very low level of research activities regarding financial literacy in Asia. There is a great shortage of financial literacy data in Asian countries and available survey data is also spotty. But one good thing is that World Bank, ADB, and OECD sponsored many surveys based on same instruments for having a meaningful comparison in different contexts (Yoshino, Morgan, & Wignaraja, 2015).

Pakistan is a part of Asia, and the Pakistani stock markets are important for study. Pakistani stock market is much volatile in nature and investors in Pakistan are greatly emotional, because the overall literacy rate is very low in Pakistan. The overall literacy rate is not up to the mark (Rehman, Jingdong, Hussain, 2015) and Pakistan is considered as a developing country in the overall world. There is lack of awareness in individuals about their livings.

There are many matters to be considered but financial literacy is also an adamant part of this game. In Pakistan, savings and investment rates are not good; there is need to give awareness to Pakistani individuals about the financial mechanisms of the country. For betterment of stock investments, Karachi, Lahore and Islamabad stock exchanges have been merged and denominated as PSX (Pakistan Stock exchange) in 2016. So, those individuals can save and invest in a better way and preserve money for their own and country's future.

According to Amin (2007) a current survey of literacy in Pakistan, the literacy percentage is very low among females (68%) as compared to Males (81%) and in the rural areas literacy rate is low (49%) as compared to urban areas (74%). The Literacy rate in 2012 was 56% which was based on literacy of both males and females from rural and urban areas (Rehman, Jingdong, Hussain, 2015). People rely normally on the informal source of financial literacy, for example newspapers, fellows, family and friends' etc, and Pakistanis suffering from financial illiteracy (Ahmed, Kashif and Ali, 2016).

In Pakistan, demographics are changed from other developed countries and the main reason for such change is low level of literacy rate. People are not much educated, have low-income levels, less sophisticated professions and another reason in changed demographics is

religious philosophy. In Pakistan, religious teachings give insight about presence of Riba (interest) in financial structure of the economy.

In the past few years' many of the stakeholders took a step forward for improvement of financial literacy in people of Pakistan. The most important of all is National Financial Literacy Program by the State bank of Pakistan in 2010 (Ali, Khalid and Khalid, 2010). But still there is need to improve research in this regard. For understanding the Pakistani financial mechanism, investors should have detailed knowledge of finance in light of Islamic teachings. Financial literacy helps investors to gain confidence and Pakistani retail investor should also be equipped with strong financial insight for competing in international markets.

In Pakistan, literacy rate is very low and the concept of financial literacy is not as much explored by the researcher and institutions (Gaffar and Sharif, 2016). Investors in Pakistan are not aware about the characteristics of different sources and markets, due to lack of knowledge about the true meanings of the money, majority of the people do not put their money in investment instruments' but they put their money in shape of gold and in ornaments in lockers. So, this is adamant to study, how these investors take investment decisions and how their decisions are affected by their cognitive biases.

Several studies have indicated that the context in which a decision maker resides also influences on the evaluation of risk-related decisions (Bromiley, 1987; Shapira, 1995). Pakistani context also influences on the intellect of investors because they get nourishment from this culture. How an investor responds to the different situation, either he/she takes or avoids risks, it is also dependent upon the cultural context in which he/ she resides.

1.4 Identification of Gap

In the current era, with vast advancement and fast pace of technology, every aspect of life is changing, and financial markets are a prominent part of this change. In advanced economies, the functions of financial instruments have been so much improved and have become more complex. Turbulent changes in the current environment have created a point to think about the factors which affect financial decisions (Niazi and Malik, 2019). Current liberalization and technical advances of stock markets have raised the technicality and complexity of markets and financial mechanisms (Bannier and Schwarz, 2018). The advancement of financial instruments and mechanisms gave a bundle of challenges for financial players while in the meanwhile there are many other opportunities for financial participants. For availing these opportunities and for coping up with these challenges, detailed knowledge of finance is necessary. Proper training in financial knowledge will educate individuals and would instill financial confidence and will empower them to explore new endeavors (Thomas and Subhashree 2020).

Worldwide research on financial literacy has shown results that the problem of poor financial behavior still exists as it was ten years ago (De Beckker, DeWitte, & Van Campenhout, 2019). Kumar and Goyal (2021) described that basic financial literacy levels have similar results in developed and undeveloped economics but advanced financial literacy varies in developed and underdeveloped economies. The determinants, patronizing factors for the measurement of financial literacy have been studied by various researchers in different cultural contexts.

Financial literacy is an emerging concept all over the world therefore understanding financial literacy is vital for having improved financial decisions (Hanson and Olson, 2018). Many of the researchers have studied this concept about different demographical variables, and the effect of a high level of financial literacy on different financial activities. Reswari, Sudarto, Widiastuti (2018) explored the relationship between demographics and financial literacy and considered this relationship important for the exploration of the concept of financial literacy.

Financial literacy is a concept of basic finance which gives knowledge of financial instruments and equipped individuals with different cognitive skills for decision-making processes. Lusardi (2014) defined financial literacy as a combination of cognitive ability and investment in the human capital for understanding financial decisions. The financial literacy rate is in the main aspect of policies of governments and this regard, every year efforts are made by governments.

On the other hand, researchers are to determine the causal links between financial literacy and other variables in varied contextual backgrounds. The decision-making in an investment process is very crucial because investors put their money and time into decision making (Awais, Laber, Rasheed, and Khursheed, 2016). Calcagno and Monticone (2015) explicated that financial literacy is a necessary element for strong decision making. Sound decisions of investment can make sound financial results and sound economies, for making sound financial decisions there should be a deep understanding of financial knowledge.

In Pakistan, there is a need for such a study which can provide an extensive view about the level of financial literacy and its effect on retail investors' decision making. Gaffar and Sharif (2016) investigated the level of financial literacy in Pakistan but did not develop the link with the decision-making of investors and this study was based on a small sample of 300 respondents and was based on data from Karachi. Fatima (2019) argued and declared that Pakistan is ranked as the lowest in terms of financial access rate, almost 100 million adults are unbanked in Pakistan. Pakistan is in dire need of financial knowledge and planning for supporting its unstable economy. Nosheen and Safi Ullah (2020) investigate the relationship between behavioral biases and financial literacy but they did not find the mediation of biases between financial literacy and decision making of investors in Pakistan. There is no such study that investigated the mediation of cognitive biases between financial literacy and decision-making in the cultural context of Pakistan.

This study aimed to fill this gap and has an objective to analyze the causal links between financial literacy and investment decisions by considering the mediation of cognitive biases (Herd behavior, Confirmation bias, and Hindsight Bias) of investors. This study will also explore the causal links between financial literacy and demographical determinants in the

cultural context of Pakistan. Due to the prevailing religion Islam in Pakistan, there is a need to understand the influence of Islam on the financial literacy of Pakistani investors and this is possible through providing knowledge about finance in Pakistani structure according to the Sharia board of Pakistan. This study will try to fill this gap by providing insight into the importance of financial literacy and how this literacy and decision-making can get affected by the cognitive biases of investors.

1.5 Problem Statement

An extensive review of the literature in the context of financial institutions has revealed that in developed and underdeveloped countries' investor is a prominent aspect of financial institutions (Rooij, Lusardi, & Alessie, 2011). Individuals demand great care about their mental grooming about financial decisions. Bekaert and Harvey, 1997, 2014; Maxfield, 2009; Koehler, Wendt, and Horn, 2017) discussed that stock market volatility comes from different processes in an emerging economy of developing countries and individuals are a part of an overall index of the stock markets.

An important question to study about individuals in current research is, Are Individuals financially literate or not? Are they well equipped with financial knowledge? Individuals do not have a logical state of mind, especially when individuals are not much financially literate then they make judgments based on an emotional indication from their minds. Tversky and Kahneman's (1974) studies showed that those who do not possess financial skills and knowledge cannot save more and individuals without a high level of financial literacy are often pass-through specific rules of thumb in investment and saving decisions.

Based on the above discussion' the specific problem statement of the proposed study is to assess:

“Pakistani investors are suffering from inefficient financial decisions which ultimately is not favorable for their portfolios and economy as well. Financial literacy rate can affect the health of their financial decisions and their financial decisions can also be affected by their cognitive biases (Tversky and Kahneman, 1974). So, there should be an exploration of the link between financial literacy, decision making and cognitive biases of investors”.

The area of concern for this research study is to explore the levels of financial sophistication of retail investors and to investigate how cognitive biases mediate between financial literacy and the decision-making of investors. The above problem of the study raised the following questions for research.

1.6 Research Questions

Financial literacy is the basic element which explains a wide range of decisions. Financial literacy is an element of investment decisions (Brent and Ward, 2018). Lusardi (2014) defined the financial literacy as the ability of processing economic decisions for making optimal financial decisions. There is need to explore the concept of financial literacy and to find out the level of financial literacy in every country and context for development of a globalized economy. This study explored the concept of financial literacy and has an aim to find out links between different variables and financial literacy. This study explored the following research questions;

- What is the effect of different demographical variables on the level of financial literacy in retail investors of stock markets?
- What is the level of financial literacy in retail investors?
- Is there any mediation of Herd Behavior in Financial literacy and decision making?
- Is there any mediation of Confirmation bias between financial literacy and decision making of investors?

- Is there any mediation of Hindsight bias between financial literacy and decision making of investors?
- What is the effect of financial literacy on decision-making capabilities of retail investors?

1.7 Distinction of the Study

Decision making of investors is a crucial element in portfolio design and profit earning and for earning a handsome profit from investments there should be strong and sound financial concepts (Chardon, Lee, Zawan, Liu, 2016). The need of financial literacy for more educated and rational decisions is emerging from the past decades to current dynamic environment; researchers are focusing more on the enhancement of the concept of financial.

Many of the researchers are working on this concept in different sectors of financial markets. It is evident that from past few decades to now, many of the researchers and international organizations have expanded resources and efforts for examination and exploration of the concept of financial literacy. In the traditional study of finance there was emphasize on just logics and rational decisions of the financial market players, but with the emergence of behavioral finance theories, traditional theories of finance are now fading in their colors. Many of the researchers are now applying the theories of psychology in finance and economics (Altman, 2012). According to psychology literature, individuals suffer from many of the cognitive biases and researchers are trying to examine the influence of these cognitive biases on financial markets.

As stock markets are an adamant part of a financial structure of any country and individual investors suffer from many of cognitive biases at time of portfolio decisions. This study emphasizes on two major types of cognitive biases (Herd Behavior, Confirmation and hindsight bias). The uniqueness of the study is to explore and examine the link between these biases and the level of financial literacy. This study demonstrates that with an increase

of financial literacy rate, these biases decrease and in turn investment decisions become more valid and strong.

The implication of this study is based on the evidence about the importance of financial literacy in international financial markets. In the current era, there is need of such theoretical foundations which can bridge the gap between thinking of traditional and behavioral researchers. In international and local markets, there are bundle of such factors which are attached with behavioral finance and traditional researchers are not able to reach those factors because these are out of their reach. There is need to search and investigate those factors, so in an attempt to dig out reasons behind many of cognitive biases, their effect on investment decisions and for finding out a strong link between financial literacy and good investment decisions, this study has been conducted.

1.8 Structure of the study

The first chapter ----- provides a thorough overview of the field of inquiry. This chapter also provided a view about a statement of research topic, related studies, the purpose of the study, major research questions, a problem statement, research objectives, and the reason for choosing this topic and its significance.

The second chapter of the study has provided an extensive view of the relevant literature. The key variables are theoretically connected by the means of a model provided later, so that the reader can have a better understanding of above-mentioned issues.

The third chapter -----provides an account for logical relationships of variables, hypotheses, development and the rationale for a conceptual framework.

The fourth chapter -----gives an insight about the methodological aspects of the study, development of theoretical framework and hypothesis according to the objectives of the study.

The fifth chapter----- gives detailed insight about the methodology of the study, sample selection, data collection and rationale for selection of various techniques for data analysis.

The sixth chapter ----- has provided the major findings for the test employed and showed connection between these findings and objectives of the study. It has included the discussion regarding the major implications of research and identified further areas for research. It has also speculated that this research will be an integrated part of this existing body of knowledge.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter provides a wide-ranging review of the literature. An obligatory initial consideration is to provide reader an understanding about the basic theoretical assumption of the concept of financial literacy, link of financial literacy and different demographic variables, and its role in investment sector based on the assessment of available literature about financial literacy, cognitive biases and investment decisions.

This chapter critically reviews the extant of literature on the concept of financial literacy and then reviews logically the work of famous and prominent authors about the concept of financial literacy and its role in different financial markets. This study also emphasizes and reviews the nature and development of two types of major cognitive biases and how these biases affect the investment decision making capabilities of retail investors and also analyzes how financial literacy affects the presence of cognitive biases in investment sector. The detailed study of literature provides the understanding about financial literacy, cognitive biases and investment decisions in stock markets of Pakistan.

The key objectives of this chapter are;

- To critically review the literature available on financial literacy
- To find out the influence of demographics on financial literacy
- To find out the underlying theories of behavioral finance
- To explore literature about biases, decision making and financial literacy of retail investors.

2.2 A critical overview of the concept of financial literacy

The changing nature of financial mechanisms due to technological changes in the world has given the importance to the concept of financial literacy. Individuals are more responsible for their personal finances than ever before, they have to take their financial decisions more frequently and with more accuracy (Lusardi, 2019). From 1980's structural design and change of financial markets, markets have been groomed and a variety of financial products are increasing speedily by introduction of new financial products. Financial markets are offering extended range of diversified products and these products are a source of persuasion for household investors (Pellinen, To "rma "kangas, Uusitalo, and Raijas, 2011)¹. By introduction of financial products, need of financial literacy is enhanced and raised and day by day, till now many of the developing and under developing countries are lacking in good financial knowledge.

By increment in number of financial products, financial markets are becoming complex (Andersen and Bollerslev, 1997). On the other hand, it is much difficult for an investor to understand this complex phenomenon (Shleifer and Vishny, 1997; Willis, 2008). For deep understanding of this complex phenomenon every investor should be equipped with financial knowledge so that investors can take better decisions. Consumers are confronted with more challenging financial environment that employs a wide range of financial products and services (Bi, Dean and Meng, 2020). Knowledge about these financial products, markets, and financial processes is known as financial literacy. Knowledge accompanied with ability to use this knowledge is recent conceptualization of financial literacy. Financial literacy has been studied by different public and private organizations in developed countries through surveys for measuring the level of financial literacy. In 2005, survey research of OECD, shown that in majority of the developed nations including, US, UK, Astralia, and any European countries, financial literacy is not up to the mark (Al-Tamimi and Kali, 2009).

¹See "*After the great complacence: Financial crisis and the politics of reform*" by Engelen, et al. (2011).

Financial literacy has been investigated in different research studies in different cultural contexts. There are three research traditions concerned with financial literacy (Almenberg and Widmark, 2011). First layer of researchers studied effect of demographic variables on financial literacy (Almenberg and Widmark, 2011; Almenberg, and Säve-Söderbergh, 2011; Fernandes, Lynch, and Netemeyer, 2014; Huston, 2010; Guiso and Japelli, 2008; Lusardi and Mitchell, 2007; Bashir, Arshad, Nazir, and Afzal, 2010).

The second tradition examined the effects of financial literacy on financial decisions (Catasús, and Johed, 2014; Almenberg and Widmark, 2011; Johnson and Sherraden, 2007; Lusardi and Mitchell, 2007, 2008, 2009; Van Rooij, Lusardi, and Alessie, 2007; Carter, 1973). The third tradition explored the effects of financial education on financial literacy (Bayer, Bernheim, and Scholz, 2009; Molly and Wolfe-Hayes, 2010; Fernandes, Lynch and Netemeyer, 2014; Mandell, and Klein, 2009).

There are many definitions, instruments and linked concepts in literature introduced by variety of research studies but there is no standardized concept about financial literacy. Due to shortage in standardized literature of financial literacy, the conception of financial literacy is not stable, there are many increments in this concept, on one hand which is good for exploration of more knowledge but on the other hand it is becoming more difficult measure the rate of financial literacy of individuals.

Research studies shows that the causal link between financial literacy and variety of variables has been studied. Financial literacy has been studied for risk management, diversification strategies, inflation and also for mortgaging (Meier, and Sprenger, 2013; Gerardi, Goette, and Meier, 2010), lower credit card fees (Lusardi and Tufano, 2009 and Lusardi and Mitchell, 2009), less high-cost borrowing (Dsney and Gathergood, 2013), asset portfolio diversification (Graham, Harvey, and Huang, 2009), better planning for retirement, stock market participation (Rooij, Lusardi, and Alessie, 2012).

The proof for causal relationship has been less accommodating and many other components of financial literacy related to skills of managing money could be more significant (Agarwal, and Klapper, 2013; and Stango and Zinman, 2014).

Researchers are in effort to explore the relationship of financial literacy with variety of variables. They searched a lot about determinants of financial literacy. But different economic social and demographic contexts of different countries showed different results of research about financial literacy. For linking up financial literacy with different contexts, researchers viewed concept of financial literacy with different dimensions. In spite of all these efforts researchers still need a homogeneous definition and measure of financial literacy.

A momentous challenge for conducting research on financial literacy is to find out a standard meaning of financial literacy there is lack of standardization about the concept of financial literacy in literature. In most recent literature financial literacy is defined as “having the knowledge, skills and confidence to make responsible financial decisions” (Altman, 2012). Effective financial decisions making for a person’s wellbeing is dependent upon the financial literacy, while financial literacy is an amalgamation of attitude, knowledge, skills and a good sensible behavior for these decisions (French, and McKillop, 2016).

There are numerous definitions of financial literacy in literature but one definition by OECD (2012) shows most relevant characters of the concept of financial literacy as it argued that financial literacy is ‘a connectivity between awareness, knowledge, skills behavior and attitude which is essential for investment decision making and it is ultimately necessary for financial welfare of the investors (Erner, Goedde-Menke, and Oberste, 2016)².

² OECD is in constant effort to explore about financial literacy. See other surveys of OECD, 2005-18 for further exploration of the concept.

This definition highlights three main components of financial literacy, (1) ability to understand financial matters (2) application of these financial concepts for financial well-being in real scenario (3) confidence, to make appropriate and optimal financial decisions. An investor should have proper understanding of financial instruments and mechanisms, and practically those investors should be able to pursue that knowledge in financial markets and most importantly there should be appropriate level of confidence in a person (not over-confident or under-confident) to make wise decisions about personal finances.

After discussing the enriched sources and critically viewing the all aspects of demonstrated knowledge of financial literacy, this concept is easy and difficult at time. Its conception needs more analysis. By viewing different definitions of different researchers, the following definition of financial literacy by Remund (2010) seems more logical and rational.

This definition can be used for understanding and measuring the concept of financial knowledge of individuals. Remund (2010) defined financial literacy as an ability to understand and possess complex concepts of finance for sound decision making. To differentiate this definition, Remund (2010) explained that management of borrowings, personal financing and saving, budgeting and investing. In a rational review, Remund (2010) summarized various definitions of financial literacy and classified them into five categories:

- (1) Knowledge of financial concepts
- (2) Ability to communicate about financial concepts
- (3) Aptitude in managing personal finances
- (4) Skill in making appropriate financial decisions
- (5) Confidence in planning effectively for future financial needs

Other than these explorations of the concept of financial literacy different researchers explored these concepts in different styles. There are some diverse and some similar aspects of this concept defined by different researchers.

For instance, Hilgert, Hogarth and Beverley (2003) defined it as financial knowledge. In 2003, Moore defined it as “individuals are considered financially literate if they can use their learned concepts in a content way”. Lusardi and Mitchell (2007) explored as “awareness of basic economic and financial concepts that are essential to make important saving and investment decisions”. ANZ Bank (2008), drawn from Schagen, as an ability of managing money and making good decisions regarding money is called financial literacy.

Financial literacy has been measured in variety of angles in different countries with different demographical context, as mentioned in above extant of literature, financial literacy been measured and defined by different authors, some said its knowledge of finance, others said that it is a qualitative type of knowledge, individual researchers and governments explored financial literacy in different cultures with different determinants. Most of the researchers used surveys for measuring the financial literacy and many of the researchers used the Big three questions of Lusardi and Mitchell (2005) for measurement of financial literacy. Another Survey by Karakurum-Ozdemir et al. (2019) used time value of money, division simple and compound interest.

Following table give an insight about the measurement of financial literacy by chronological order.

Table 2.1

Chronological Measurement of the concept of financial Literacy

Year	Author	Measurement techniques
1998	Chen and Volpe	Analyzed financial literacy among 924 students at United States and participants were asked 52 questions of personal finance for measurement of financial literacy and concluded that students need to improve their knowledge of personal finance.

2003	Beal and Delpachitra	They investigated the level of financial literacy in Queens land by a questionnaire based on 25 multiple choice questions which was based on five financial areas. This study concluded that the level of financial literacy is low among individuals so they should improve that level.
2008	Gerek and Kurt	They conducted research in Turkey and used an instrument developed by National council on economic education and concluded that students had an average level of economic literacy.
2008	ANZ Bank	ANZ survey derived 26 questions from an operation frame work for measuring financial literacy in Australian culture. These are based on the concepts of Numeracy, debt, investment, saving etc.
2008	Lusardi and Tufano	They used three multiple choice question for measurement of basic financial literacy. There content domain was debt.
2008	Hastings and Tejedaashton	They used three multiple questions of Lusardi and Mitchell (2007) based on investment, and savings.
	Lusardi and Mitchell	Lusardi and companions measured financial literacy through 3 basic questions of finance in United states. These questions are based on the

2008- 2011		concepts of compounding interest, inflation and risk diversification and they concluded that overall financial literacy level is not up to the mark in United States.
2011	Rooij, Lusardi and Alesse	They developed five questions based on the concepts of Numeracy, inflation, simple interest, compound interest and money illusion and they concluded that stock market investors are not properly financially literate in basic and advance terms. They measured advance literacy through eleven more questions of stock market activities.
2012	Henager and Georgia	They used an instrument based on 6 questions adapted from the instrument of health literacy of Weiss et al. (2005).
2014	Schwella & Nieuwenhuyzen	They developed a scale on three main constructs of financial knowledge, attitude and behavior for measuring the financial literacy in south African context. On average the first-year SAMA students achieved scores of 55.55%, 69.85%, and 77.11% for financial literacy knowledge, behavior and attitude
2015	OECD-INFE	OECD/INFE developed a frame work for measuring financial literacy, this is based on three main areas; knowledge, behavior and attitude.

2018	Salvatore, Franceschi, Neri and Zanichelli,	They adopted the frame work of OECD/ INFE in Italian context and found that Italy is lowest in financial literacy among G20 countries.
2019	Nicolini and Haupt	They measured financialize with 50 items questionnaire based on 5 specific topics and compared these items with Lusardi and Mitchells questions for measuring financial literacy and concluded that Lusardi and Mitchell's questions are best for measuring financial literacy and for deeper understanding further items can be used.

Financial literacy is being explored in different sectors as well and there is need to explore this concept in developing countries as like developed nations. In a critical stance, this concept should have some more exploration for fixation of its determinants. Following section is exploring more this concept by the point of view of its determinants and also by understating its different contexts.

2.3 The conceptual exploration of Financial Literacy

Defining a concept is not an easy task because people have divergent mindsets about the concepts and on the other corner contents of the concept is also a difficult task to elaborate. It becomes a difficult task when people have different meanings of the same concept. It is also the case of “financial literacy”, which consists of ability, education, knowledge (explicit and implicit), competence and responsibility at the same time. For understanding the concept of financial literacy there are many interchangeable words for instance, financial capability, economic literacy, financial literacy, financial education, financial knowledge, financial competence, economic capability.

In different countries financial literacy has quite different expressions. In USA and in Australia people use financial literacy for financial knowledge (Lusardi and Mitchell, 2009, 2010). In Canada and UK financial capability is normally used for financial knowledge (Remund, 2010; Orton, 2007). OECD does not have clear definition of financial literacy and it uses the concept of financial literacy, without clearly exploring the concept (OECD, 2005). Due to variations and divergence in the concept of financial literacy it is difficult to make comparisons, especially when studies about financial literacy have been done in different languages and different countries (Zait & Berteau, 2015).

There are number of studies which provided strong evidence for measurement of financial literacy level in different countries and contexts (Lusardi and Tufano, 2015; Smith and Haslem, 2014; Fernandes, Lynch Jr, and Netemeyer, 2014; Atkinson and Mess, 2012; Mandell and Klein, 2009; Remund, 2010; Johnson, and Sherraden, 2007; Lusardi and Mitchell; 2007, 2008, 2010, 2011; Huston, 2010; Bernhiem, 1991, 1995; Bernhiem, Garret and Maki, 2003; Moore, 2003; Beal, and Delpachitra, 2003; Rooij, Lusardi and Alesse, 2011; Chen and Volpe 1998). For defining the aspects of financial literacy, researchers scrutinized different aspects, for instance, ANZ survey considered it as financial knowledge and explicates that it is the ability of making informed judgments and effective decision-making capability (ANZ, 2005; Gallery, 2010; Huston, 2010; Fonseca et al., 2012; OECD, 2013). Remund (2010) considered it as the ability to communicate about different financial concepts. Orton (2007) said that it is attitude of people for usage of financial instruments, financial operations experience (FINRA, 2010).

The President's Advisory Council on Financial Literacy (PACFL, 2008) defined that financial literacy is known as the ability to use some one's knowledge and skills to manage financial resources for life time financial benefits. There are some highlights of conceptual definition of financial literacy which gives an idea to integrate some basic qualities of the word financial literacy. The exploration of this concept gives us a way to see and analyze the initiatives for improvement of financial literacy, in all over the world initiatives are taken for the improvement of financial literacy, this section explains and explores the

initiatives taken for the improvement of the concept of financial literacy. Deep understanding of the concept of financial literacy gives us a pathway to understand the need of financial literacy and to improve the level of financial literacy.

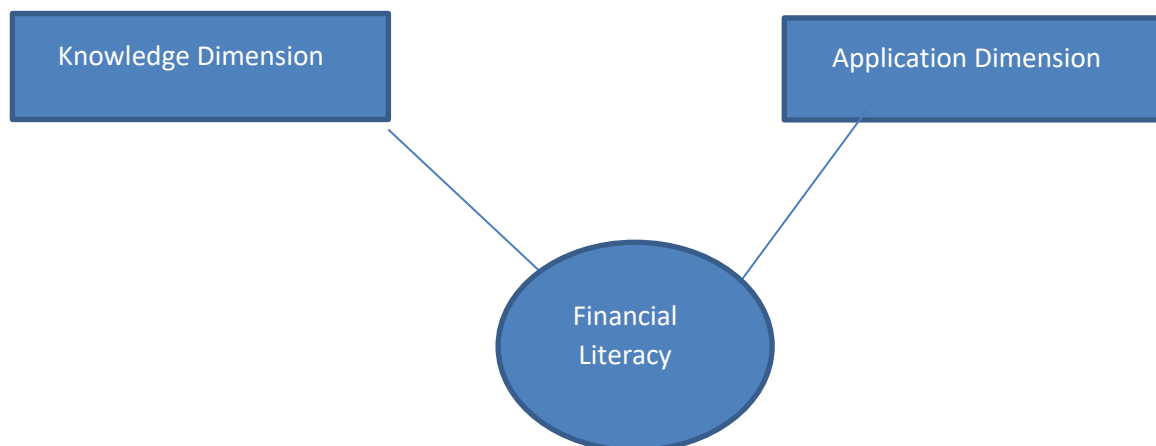


Figure2.1: Flow chart of the Concept of Financial Literacy

Source: Antoni and Notshe (2020); Murillo, Franco, Tob'on, (2019)

Flow chart of the financial literacy gives an idea about the true dimensions of the financial literacy. On one extent it has knowledge dimension and on the other hand it has application extent. Theoretical and practical both aspects are ample for the concept of financial literacy. Previous studies have explored the concept of financial literacy by using multidimensional variables (Priyadharshini, 2017, Dewi et al., 2020). The conceptual exploration of the concept of financial literacy has given an idea about the importance of the financial literacy. Financial illiteracy causes low returns and will causes hard financial decisions for youth (Murillo, Franco, Tob'on, (2019). It describes those investors should know the basic concepts of finance and at the same time they should be able to apply this knowledge (Antoni and Notshe, 2020). Financial literacy is an important aspect to explore and the world is working for advancement of this concept. Following section will throw a deep

understanding about advancement for increment in financial literacy rate in throughout the world.

2.4 Initiatives for advancement of financial literacy

In all over the world, bundle of efforts is made for improvement of the rate of financial literacy. Financial literacy has become an important phenomenon for researchers and scholars and also for policy makers (Pahlevan, Naghavi, Sharif & Waheed (2020). In current world, Jiang, Liao, Wang, and Xiang, (2020) found the impact of good education in development of good financial literacy. For earning handsome salary or profit from any institution an individual should be properly equipped with sound knowledge. In the same way, for earning meaningful profits from stock markets there is need to understand the instruments, and requirements of the stock markets (Rooij, Lusardi and Alesse, 2011; Zou and Deng, 2019).

Individuals are confronted with more complex problems (Lusardi, 2015) and financial education, trainings, exposures and experiments provide financial awareness to individuals (Hanson and Olson, 2018). If an individual is aware about the financial movements of any financial markets, then he is considered as financially literate. Financial literacy provides information about all financial aspects of financial markets. Financial education though it's formal or informal provides an individual a deep insight about the instruments of the financial markets and provides ability to make logical based on facts and knowledge (Chen, Jiang and Liu, 2015). Financial education, knowledge and financial exposures give a move towards the concept of literacy in financial terms.

In Islamic philosophy, financial knowledge should be guided by Islamic laws under the educational guidance of Holy Quran, and Ahadees Mubarika. In Islamic countries like Pakistan, meaning of financial literacy is incomplete without proper guidance of Islam. Many of the countries are making efforts for improvement and advancement of financial

literacy in all over the world. For instance, ANZ surveys, in Australia are specifically focusing on financial literacy of the individuals. OECD/ INFE report (2019) give an insight about financial literacy and financial education programs in APEC (Asian Pacific economic corporation) countries and reported that though financial literacy rate is low but the techniques for data collection process has been improved. This report declared that Canada has 70% financial literacy rate, Korea 69%, New Zealand, China, Hong Kong has 69%, China and Chile have 67%, average 11 APEC economies have 64%, Indonesia, 64%; Thailand 61%, Malaysia, 59%; Russian Federation, 58%, MEXICO 58% (OECD, 2019). Breidbach, Culnane, Godwin, Murawski, and Sear, (2019) declared in his consumer research report that for having a clearer picture of Australian Financial issues we should improve financial well-being of consumers.

By critically viewing the concept and exploration of financial literacy there is still deficient corners in this area. There are bundle of research studies available in this regard, but there is need to have some strong, specific and measurable definition and instrument of financial literacy for developed and developing countries. In developing countries there is no such big activities on the part of governments which can advance financial knowledge according to the cultural and religious context of a specific country.

Empirically, conceptually and theoretically advances are made for improvement of financial literacy and many of these are mentioned in following section (Bartholomae and Fox, 2016).

Table 2.2

Efforts for Advancement of the Financial literacy

USA	USA passed two statutory mandates for improvement of financial literacy, the Financial Literacy and Education Improvement Act, passed under Title V of the Fair and Accurate Credit Transactions Act (FACT) of 2003 created the Financial Literacy and Education Commission (FLEC)
-----	--

(Iresel, 2016). For help of parents and educators, Jumpstart coalition guides and provides resources in finance matters through a web site (Munday, 2011).

United
Kingdom

United Kingdom developed an independent body named as The Money Advice Service, formerly the Consumer Financial Education Body (CFEB), it plays a vital role for serving consumers on financial products under the tag of Parliament. It provided a good frame work (FE) for financial actions description and it is included in curriculum as well. A web site named as “The Make Money Make Sense” is designed for educating young people about matters of basic financial decisions. Else than this, training programs and financial resource center is also introduced for knowledge and information of people (Iresel, 2016). Personal Finance education group, provides consultancy, support and resources to teachers and school leadership teams (Munday, 2011).

Australia

Oesterreichische National bank (OeNB) in cooperation with public and private bodies made efforts to improve basic financial knowledge in Australia, disseminate basic economic knowledge, and create a base for improvement of financial education actions in Australia. In Australia, ANZ surveys are also an initiative for improvement of financial education and information.

New Zealand

New Zealand developed a national strategy with three main concerns for improvement of financial literacy. These concerns are developing quality, extending delivery and monitoring and evaluation (Crossan, 2011).

Italy Pattichiari Consortium is an independent and private body in Italy; it has a legal personality and also a nonprofit organization. This organization introduced different financial programs for adults and specifically students to make them financially responsible citizens. This organization also introduced a website for not just education of people but also for download helping material for their better financial decisions (Iersel, 2016).

Ireland The competition and consumer protection commission (CCPL) with amalgamation of National Consumer Agency and Competition Authority worked for better markets by taking different actions for instance opened a financial information center in Dublin and also provided a financial helpline service. This helpline and information service provide guidance about handling of loans, saving and investing, retirement planning, asking for loans, insuring assets. There are also training programs and seminars for adults to guide them about usage of money. There are effective financial educations campaigns are introduced in Ireland on Television, radio, internet and also in press (Iresel, 2016).

Pakistan State bank of Pakistan with collaboration of NIBAF, introduced a national financial literacy program for youth for strengthening their financial and money management skills (National Financial literacy Program for youth, 2020).

OECD/ INFE reported levels of financial literacy in many countries and also highlighted the specific targeted groups in need of financial literacy in different countries, also OECD/INFE highlighted the level of financial literacy in APEC countries, highlighted that cost is the only cause of prohibition in financial education programs.

2.4.1 Evolution of the concept of Financial Literacy

Bernhiem was the first researcher who explored the concept in formal manner in 1991. He measured the rate of literacy in American households and through asking basic financial concept about interest rate, risk and securities. He concluded that most of the American households are not active in financial terms. Bernhiem (1995, 1998) with his companions has given bundle of research studies for exploration of the concept of financial literacy. In his view, if an individual can identify basic profit and loss mechanism of any security by understating the features of security then he/she has some level of financial literacy. The level increased with the in-depth knowledge of complex securities. So, Bernhiem was mostly known as the founder of the concept and he defined the concept as basic knowledge finance for understanding of securities.

Lusardi and Mitchell (2007) mentioned and defined the concept of financial literacy as the awareness of initial and basic knowledge of finance for making logical saving decisions. Anamaria Lusardi and Olivia S. Mitchell are also prominent name of researchers in the context of financial literacy. Lusardi (2007) studied individuals for their levels of financial literacy and concluded that financial literacy is at different levels (Basic, intermediate and advance) in individuals. But at very basic level if an individual can, calculate interest rate, have knowledge of inflation, and is aware about diversification of risk then he / she is

financially literate. Lusardi (2008) used some specification of financial literacy in following words;

“That financial literacy is actually Knowledge of initial financial concepts, for example compounding of interest, risk diversification concepts, and the initial knowledge of risk diversification”

(Lusardi, 2008)

Lusardi examined the level of financial literacy in America, Italy, Ireland, Canada, UK based on three basic questions of finance and she demonstrated that among all countries rate of financial literacy is very low³. People are not able to calculate their own saving plans properly. An important aspect of Lusardi’s research is, the level of financial literacy is affected greatly by different demographical variables for instance age, gender, education level, professional background etc.

Lusardi (2007) demonstrated that knowledge of debt is a part of financial literacy, he defined that debt literacy is actually in simple way is the knowledge of debt contracts on the other hand specifically debt literacy is the knowledge of compounding of interest on loans which individuals acquire in routine financial decisions. So, Lusardi and his companions, done bundle of research works in area of financial literacy and they examined the concept with different angles. Lusardi and Mitchell diffused the concept in detail till date.

Rooij, Lusardi and Alesse (2007), examined the data of Dutch survey data, and explicated fundamental relationship in financial knowledge and stock investment behavior of individuals. If an individual is aware about the financial aspects of stock markets, then their behavior is more logical and rational then financially illiterate people. Hilbert and Hogarth (2003) demonstrated that financial understanding is interconnected with process of tackling

³ Lusardi and Mitchell are the most renowned names in exploration of the concept of financial literacy and their work is available on different determinants of financial literacy.

cash flows, assets and money and they explained that financial literacy is also an alternative of financial knowledge. Rooij, Lusardi and Alesse (2011) introduce the most simple and applicable instrument of financial literacy which has been adopted by different research studies. Their working is highlighted with respect to stock market participation of investors.

Financial literacy has another definition that it is the capacity to make strong guesses and strong judgments to manage money through effective investment decisions (Worthington, 2005). Another researcher Moore (2003) explored the concept of financial literacy as “if someone can demonstrate his/her learned knowledge of finance then he is considered as financially literate person. Due to indirect measurement of financial literacy proxies should be used because financial literacy can be enhanced through practical experience and agile integration of knowledge. With higher literacy people become more competent and more sophisticated” (Moore, 2003).

According to the above-mentioned definition, financial literacy is actually the level of financial sophistication which an individual gain through financial knowledge experience and exposures, and financial literacy can be measured directly so emphasize should be for measurement and improvement of financial literacy through the world.

Another solid definition is presented by National Council on Economic Education (NCEE) 2005 which highlights the concept in these words’ awareness of basic economic principals and knowledge and understanding of basic economic terms and also the knowledge of, U.S. economy (Morton, 2005). This definition provides rationale that if you are aware about the movements of the economy and have sound knowledge about components of the economy and is aware about basic concepts of economy then he/she can be considered as financially literate person. This definition gives an insight about understanding of the economy and focus is on the knowledge about economic mechanism of the country.

Mandell (2007) explicates the concept as “it is the ability of an individual to distinguish and find out the best instrument from complex instruments and market choices that will be in their own best interest in long run”. An individual’s financial growth and interest is

dependent upon his knowledge that how much he actually equipped with financial knowledge for moving in different financial structures like saving sectors, banks, taxation and investments. Individuals can manage cash flows better if they are aware about the attributes of financial instruments and risks attached with those instruments.

Due to dynamic movement for financial markets, the interest of researchers has been increased in understanding the concept of financial literacy. Many of the previous and contemporary studies (Lusardi and Mitchell, 2014; Japelli and Padula, 2013; Van Rooij and Lusardi, 2012; Remund, 2010; Huston, 2010; Hung, Parker and Yoong, 2009; Lusardi, 2008; Johnson and Sherraden, 2007; Lusardi and Mitchell, 2007) explored the concept of financial literacy and what kind of role it plays in financial well-being of individuals.

Najuguna, Mutanu, Otsola and Thuku (2011) studied financial literacy and pension literacy in Kenya. Rooij, Lusardi and Alessie (2007) explored the role of financial literacy in stock market activity. National Council on Economic Education (NCEE, 2005) demonstrated that financial illiteracy is common and people are mostly unaware about the basic principles of investment and saving. OECD (2005) measured the concept of financial literacy in Europe on the basis of high, medium and low level.

Breidbach, Culnane, Godwin, Murawski, and Sear, (2019) declared in consumer research report of 2019 that most Australian almost 77% regrets when it comes to their finances, and most of the Australians are not prepared to bear their financial shocks, so there is need to improve their financial education. Above mentioned studies have explored the variety of definitions explored by different researchers, in different contextual cultures but still financial literacy is lacking a standardized definition and researchers and governments are working accomplish this task in majority of the countries.

2.4.2 Measurement of the concept of financial literacy

Advancement of the business world has grabbed the attention of the world-wide researchers and in current era most of the researchers are actively emphasizing on the concept of financial mechanisms and financial literacy (Agnew et al. 2014; Arrondel et al, 2013; Rooij Lusardi and Alesse, 2011; Lusardi, 2011; Delavande et al, 2008; Al-Tamimi and Hussain, 2009; Lusardi and Mitchell, 2006, 2007, 2008). Markets of the world are stretching their boundaries and are becoming complex day by day. Investors should be equipped with sound knowledge of finance and economics. With increment in financial instruments, it is becoming more essential for investors to understand the broad concepts of finance.

As complexity of markets is increasing, the understanding of new and advanced instruments of stock markets has become a hard issue for investors. The activity of markets is affected by the level of sophistication of the decisions of individual investors. If individuals make good financial decisions, this impacts on the overall activity of the financial markets. The level of understanding of financial instruments is dependent upon formal and informal information which investors acquire through different sources.

Financial literacy can provide a sophisticated level of understanding to investors about financial instruments. Financial literacy is an emerging issue and gained the interest of various researchers' groups including bankers, employers, governments, financial markets, and other organizations, especially in developed countries (Al-Tamimi and Kali, 2009; Arondel, 2013; Harrison, 2014).

There is variety of ways used by researchers for measurement of the concept of financial literacy. There is a stream of surveys conducted by ANZ, World Bank and OECD, in different countries for measuring the concept of financial literacy, these surveys highlight the importance of financial knowledge as well as demonstrates that how much improvement is needed in different countries for an acceptable level of financial literacy. OECD (2014)

assessed financial literacy in different years based on different linked demographical variables. OECD assessing financial literacy in different countries based on different extents. In 2014, OECD measured financial literacy of young adults through its program for International Student Assessment (PISA) to test the financial ability of 15 years of younger for handling their personal finance. This program was based on participants from 65 countries and this program is very best place to compare the level of financial literacy in different countries in young students (Messy, 2012).

FINRA (Financial Investors education foundation) offered an instrumental financial literacy and based on the concept of compound interest, risk diversification, inflation, bond prices and mortgaging for measurement of the concept of financial literacy (Palmer, 2014).Lusardi and Mitchell (2007) devised a module for checking the level of financial literacy and this module was based on the survey data of health and retirement survey (2004). Lusardi and Mitchell (2007) developed a survey form for examining financial literacy based on the concept of inflation, compound interest and risk diversification.

Hilgert and Hogart (2002) demonstrated that financial illiteracy is widespread in surveys under the guidance of National Council on Economic Education (NCEE). Agnew and Szykman (2005), Bernhiem (1995, 1998), Mandell (2007) Remund (2010) and Moore (2003) have done similar work for measurement of financial literacy with link to different demographical variable and geographical locations. Financial literacy measurement needs advancement and scrutiny for measuring the rate in overall world and recently researchers gave more importance to this concept as compared to previous years.

There are many surveys initiated by different organizations, countries and researchers for measurement of financial literacy. There are many surveys like Washington Financial Literacy Survey, the Jump\$tart Coalition Survey, or the Survey of consumer finances 2001 which obtained information about financial literacy but Heath retirement survey (HRS) 2004 proved more successful for obtaining information on financial literacy (Johnson and

Sherraden, 2007)⁴. These surveys were initiated in different countries by different governments for measurement of the level of financial literacy in individuals.

Survey of OECD (2009) reflected that financial literacy is very much low amongst household individuals. Most of the people feel difficulty in answering the questions about interests, diversification, saving and budgeting programs. OECD surveyed 23 countries for examination of financial literacy rate and declared a very low level of financial literacy (Grifoni and Messy, 2012). People are not able to understand the financial mechanism and have low level of financial awareness. Financial literacy does not seem at appropriate level and people are facing problems in management of their financial decisions.

In international scenario, the organization of economic co-operation and development (OECD, 2008) programs are initiated for improvement of financial literacy. OECD has developed a good opportunity for educating people financially by providing them a source as www.financialeducation.org. OECD has considered the improvement of financial education as an integral part of its overall development project. A study by the OECD (2005) reviewed financial literacy in the USA, UK, European countries, Australia, and Japan. This study found that level of financial literacy is very low in all these countries and study suggested that financial literacy improvement plans should be integral part of OECD programs.

Lusardi and Mitchell (2007) and OECD concluded their survey of Europe, Australia and Japan by highlighting low level of financial literacy in those countries. Christelis, Jappelli and Padula (2007) supported the results of OECD Survey and reported that many of the Europeans are low in financial literacy. Due to complex nature of markets and businesses of current era, financial literacy is becoming an emergent need of every country. Many of the developed countries are working for improvement of financial education ratio in their particular contexts. United Nations is working seriously for improvement of financial

⁴ Data of HRS (2004) has been used by different researchers for exploration of the concept of financial literacy. See Lusardi (2005, 2006 and 2009).

education, in 2003; Congress established the financial literacy and education commission, for transparent and improved credit transactions in the country.

This commission has a basic aim to improve all aspects of financial literacy in financial markets of the country. In 2006, furthering in this regard, commission publicized the strategy regarding financial literacy (Financial literacy Education Commission, 2006). This report is based on 13 different areas related to financial knowledge and offers insight about financial processes of the financial markets. Commission also offered services for online clearing house by introducing the website www.mymoney.gov. For exploration of financial knowledge, this website integrates informative resources of 20 agencies of (members of commission) regarding financial literacy service.

The financial authorities and companies on the field of financial services have recently expressed concerns over the level of financial awareness of consumers (FSA, 2005, 2006a; OECD, 2005; FINRA, 2009). In the United States, many of the communities and community-based organizations are playing a vital role for improvement in the rate of financial literacy. The World Bank (2009) has recommended for initiation of financial literacy programs for overall improvement in financial markets. The World Bank conducted a survey “The Financial Literacy survey. This survey was a part of World Bank’s Financial Governance/Consumer Protection in Financial Services Program in ECCU5 Countries.

For strengthening the confidence level of consumers this program aimed to improve the consumer protection and the level of financial literacy. In 2008, World Bank conducted a survey in Russia for examination of the level of financial literacy. This survey aimed to explore the knowledge about the level of financial literacy of households and different target groups prior to the implementation of the action plan for increasing the financial literacy of the general population and in particular of the low-income groups (Sofia, 2010).

In Australian context, ANZ surveys conducted by Australian Nationals are an agile effort by Australian government for examination of the level of financial literacy in individuals. This survey (ANZ, 2007, 2008, 2011) explored knowledge about financial literacy and

provides some implications for enhancement of financial literacy level in individuals. Several studies show the important place of financial literacy and currently developed underdeveloped countries are focusing on conscious efforts to search the rate of financial literacy in their specific contexts and also focusing on the increment of this rate of financial knowledge.

Many of the big organizations, OECD, FINRA, ANZ survey and World Bank are in constant efforts to improve the financial literacy rate in developed countries, every year many of the efforts are made by the renowned organizations, but one lacking point is that these efforts also should be done in developing countries. There is serious need to increase the level of financial literacy in developing countries. The concept of financial literacy has been evolved from Bernhiem (1995) to till date, there are bundle of definitions and explanations of this concept are available in current literature, with evolution of the concept of financial literacy, more in-depth knowledge of financial literacy has been described by the researchers.

2.5 Evidence about low rate of financial literacy in the world

Financial markets are now equipped with complex financial instruments but individual investors are not completely aware about the steering of new techniques and complex instruments (Shleifer and Vishny, 1997; Willis, 2008). In financial markets there are variety of instruments, for instance, stocks, bonds, bills, foreign exchange securities and many other financial instruments. Stock markets are an essential part of any financial mechanism. There is need of more sophisticated financial knowledge (Jiang, Liao, Wang, and Xiang, 2020) for understanding the new complex structures of these stock markets (Shleifer and Vishny, 1997; Willis, 2008) but research about many of the countries declared low financial literacy in individuals (Atkinson and Messy, 2012; Mandell, 2008; Lusardi and Mitchell, 2007; Beal and Delpachitra, 2003; Chen and Volpe, 1998). Although

individuals are actively participating in financial markets but are not making optimal decisions of their investment portfolios. So, the question is either they have good financial literacy level and financial knowledge or not (Rooij, Lusardi, & Alessie, 2007).

Research has shown that many of the developed countries are lacking in appropriate level of financial literacy (Ameriks, Capli, and Leahy, 2003; Lusardi and Mitchell, 2007a; Van Rooij, Lusardi, and Alesse, 2008; OECD, 2005, 2012). There is need to scrutinize the level of financial literacy among all developed and underdeveloped countries. There is need to improve financial literacy among individuals for development of financial and economic structures.

The first known name of Bernhiem (1995, 1998) is considered by world as the pioneer of the concept of financial literacy. He gave the concept that majority of the household individuals are not aware about basic financial concepts in America. He introduced the idea of financial literacy in cultural context of America and he wrote a paper named as “The Vanishing Nest Egg: Reflections on saving in America” in 1991. He demonstrated through his research that most of the Americans are lacking in the basic financial literacy, they were not able to calculate some figures and were not able to calculate their saving benefits. Bernhiem argued that normally people were using crude rule of thumbs for saving and their behavior was dominated by such rules. They did not have proper financial education but their results showed that people were dependent upon some hints and rules of thumbs.

Lusardi, Anamaria is an adamant name of research in the area of financial literacy. She with companions introduced a set of questions and instruments for measurement of the concept of financial literacy. In 1999, she explored through her research named as “Information, Expectations, and Savings for Retirement,” that an individual’s expectations about the retirement can have important consequence on the retirement plan outcome. If an individual can plan and understand in a better way about retirement income then he can save more. This is possible through understanding of financial concepts.

Bernhiem (2001) and Bernhiem Garrett, and Maki (2003) showed that if an individual has some knowledge of financial instruments, they can get more profit and can save more in terms of money. Bernheim and his companions examined data of 2000 individuals by changing their time span and their states and this data has a background of Merrill Lynch (1995) surveys. They asked respondents from the age group of 30-49 about the state and date of their graduation. This type of survey gave the authors an insight that individuals who were introduced to financial education were more rational in their saving behavior. Those who were benefited through financial education in their high schools were better savers. They demonstrated that financial education provided those graduates a rational saving behavior in those states where such mandate was offered. They also noted that saving rates were increased after financial education was introduced and this was increased gradually with time.

Another study by Rooij, Lusardi, and Alesse (2011) is “Financial literacy and retirement plan in the Netherlands.” is of great importance for the exploration of the concept of financial literacy. They argued that households are facing complex situations in financial matters and are not much skilled in this regard. They are lacking in financial knowledge about saving, they are not aware of the pros and cons of different saving plans. This study provided knowledge about the context of pensions and saving plans in the Netherlands and concluded those who are more financially literate and knowledgeable are good savers. A high level of financial literacy plays an important role in the financial well-being of an individual as studied by Anamaria Lusardi and Olivia S. Mitchell 2006.

They researched the role of financial literacy in retirement planning and wrote a paper named “Financial Literacy and Planning: Implications for Retirement Wellbeing”. They demonstrated that in America, very few households are confident about their retirement saving plans and most of them are not aware of the causes of their bad retirement saving plans. The author devised a purpose-built module for the measurement of financial literacy for HRS (Health and Retirement Study, 2004).

That module was much helpful to examine the ways of information seeking, decision making and about the knowledge of financial concepts of households. This research described that financial knowledge and good planning are linked, households who use retirement calculators, attended seminars, trainings, help of financial experts and skillful in financial matters are good planners and save more.

They also highlighted the interrelationship of financial knowledge and planning, according to them individuals with high financial knowledge plan good than others. Moreover, individuals who plan were habitual of using more formalized techniques for example financial calculators for retirement planning, seminars on retirement, and solutions of financial experts, and do not trust more on colleagues, family or friends. As a result, highly literate persons in finance have more knowledge of better investment in complex stocks.

Rooij, Clemens, Kool, and Henriëtte (2006) argued in a research study that pension sector risk aversion is very much prominent, they wrote a paper named as “Risk-return preferences in the pension domain: Are people able to choose?” and explored that self-assessment of risk and financial expertise of an individual are important skills of an individual. If an individual has good financial skills and is aware about risk aversion then he can maintain good pension savings.

Chen and Volpe (1998) showed that financial literacy is much essential for handling complex situation of financial markets. He studied 530 online investors for the purpose of investigating financial literacy level of online investors. They argued that the level of financial literacy in online investors should be higher than others because they are normally surrounded by more complex information.

Financial Literacy, Retirement Planning, and Retirement Wellbeing: Lessons and Research Gaps, written by Lusardi, and Mitchell (2009). This paper explored the importance of financial literacy for retirement planning and authors argued in this research financial literacy plays a vital role for good saving plans after retirement. Lusardi and Mitchell (2009) explored several self-assessed and objective measures of financial literacy which were a

new addition in ALP (American Life panel) through their research named as “How Ordinary Consumers Make Complex Economic Decisions: Financial Literacy and Retirement Readiness.” In this study Lusardi and Mitchell tried to connect efforts of American consumers which they make for planning for their retirement. They examined the financial knowledge and information of individuals which they acquired in their school level or which they acquired before entrance in labor market they examine the causal relationship between financial literacy and planning for retirement and concluded that these who are more equipped with financial knowledge are more ready for retirement.

Financial literacy is an essential aspect of current financial mechanism; due to fast change in financial mechanism individuals need more sophistication about financial terms. In 2011, another pronounced study of Van Rooij and companions is “Financial literacy and stock market participation. This study was about measurement of financial literacy with regard to stock market participation. They explored that majority of the respondents are on basic level of financial knowledge and not knowledgeable about interest compounding, inflation, and the time value of money. They also argued that most of the respondents are not aware about stocks, bonds, relationship between stocks and bonds, and their characteristics. They concluded that people with low financial literacy are less likely to invest in stocks.

Rooij, Lusardi and Alesse (2011) provided strong knowledge for exploration of financial literacy, their work is much adamant in this context. They worked on different aspects of financial literacy in relation to this concept with different variables. There are many other researchers who provided strong evidence for importance of the concept of financial literacy.

Bayer, Bernheim and Scholz (1996) showed that financial education seminars have strong effect on economic benefits of employees through their retirement plans of the employees. Else than monetary benefits seminars are affecting positively on participation rates of employees in retirement plans, the average 11.5 percent more employees are participating in retirement plans who are getting education through seminars than those who are not getting financial education. This research showed that financial education can be a remedy

in those firms where employee participation in retirement plans and saving rate is not up to the mark.

Bayer, Bernheim and Scholz (2009) have examined and studied the effect of financial literacy sponsored by employer on retirement planning. They explored that there is positive relationship between financial literacy and household equity holdings. Lesser compensated employees have more effect of financial education on their savings.

Atkinson, McKay, Collard, & Kempson, (2007) financial literacy rate is very low among UK residents but due to developed financial structure of UK it ought to be higher within UK people. Beal and Delpachitra (2003) give an account about low level of financial literacy among Australian students through their research. Bucher-Koenen and Lusardi (2011) showed through their research study named as “Financial literacy and retirement planning in Germany” that very low level of financial literacy exists between German savers. Almenberg and Dreber (2015) explored through their research study “Financial literacy and retirement planning in Sweden” that financial literacy provides rationale for good retirement plans to individuals.

Mandel and Klein (2007) also supported the results about low level of financial literacy even after the taking financial courses in Atlanta. Drexler, Fischer and Scholar (2014) also supported the results and explored that financial literacy rate is very low among Individual Micro entrepreneurs of America. their research evidenced that financial decisions taken by these business class requires good rate of financial literacy but they often lack in the desired level of financial literacy.

Aren and Zengin (2016) researched about financial literacy and wrote a paper named as “Influence of financial literacy and risk perception on choice of investment”. They discussed that financial literacy is very low among investors and by increment in financial literacy rate investors can take better investment choices and can avoid more risk in selection of securities.

If individuals do not really possess the capabilities for evaluation of their financial decisions, then what type of role financial literacy can play in optimization of their decision making? This question is now really considerable for most of the researchers of stock markets.

2.6 Causal connection between Demographic variables and financial literacy

In different cultures, there is diversity in basic norms, traditions, customs, and behaviors of people and people behave and think differently due to diversity of basic beliefs and ideology of a specific culture. Demographical variables in different cultures effect on the level of financial literacy and researchers (Hogarth 2002; Hastings and Tejada-Ashton, 2008; Al-Tamimi, 2009; Bashir, 2010, Mandell and Klein 2007; Rooij, Lusardi, and Alesse, 2011; Lusardi and Mitchell, 2007; Almenberg, and Säve-Söderbergh, 2011; Sekita, 2011; Fernandes, Lynch and Netemeyer, 2014; Lusardi, and Tufano, 2015) and they have measured the level of financial literacy along with different demographical angles.

2.6.1 Age and financial literacy of respondents

Financial sophistication of individuals is also affected by their age group, many of the researchers (Bucher-Koenen, and Lusardi, 2011,2008; Atkinson and Messy, 2012; Rooij, Lusardi, and Alesse, 2010, 2012) explored through their research studies that financial literacy varies in different age groups and age is an important indicator for understanding the concept of financial literacy.

Robert and Jones (2001; Cude et.al, 2006) demonstrated that young people are often more confronted with financial choices. Boyle et al. (2012) also explored that with decline in

cognitive skills older people are not able make sound financial decisions. According to above mentioned literature, age is a prominent factor for understanding of the financial literacy. In different age groups, financial literacy varies among individuals. So, the question is how age effects in Pakistani context on the level of financial literacy of a retail investor. This study will help to explore the effect of age on the level of financial literacy of retail investors of Pakistani stock markets.

2.6.2 Gender and financial literacy of respondents

Gender also influences on the level of financial literacy because men and women have different characteristics, intellectual levels, interests etc. (Hsu, 2016; Fonseca, Mullen, Zamarro, and Zissimopoulos, 2012). According to wide spread research, males are prominent parts of societies while female are subordinates to males (Almenberg and Dreber, 2015). Females normally are less financially educated than men and are actually not much financially literate (Worthington, 2006; Chen and Volpe, 2002; 1998; Lusardi and Mitchell, 2007, 2010, 2011). Ali, Ng, and Kulik (2014) demonstrated through his research that gender gap is very much pronounced in investment decisions and risk taking. In Pakistan, culture is male dominating (Macey, 1999) where majority of the females are less educated (Roomi, and Parrott, 2008). In Pakistani culture, gender is an important determinant of the concept of financial literacy in investors of PSX. This research study will help to explore this causal link through investigation of this relationship among financial literacy and gender.

2.6.3 Education and financial literacy of respondents

Financial literacy education has its solid base and place for increasing the ratio of good financial decisions (Opletalová, 2015). Xiao and Porto (2017) took data from National Financial capability study of 2012, which is a larger data set and explored the relationship between financial education and financial satisfaction and measure the effect

of financial capability and financial literacy and financial behavior as mediators. This study explicated that financial literacy, financial capability and financial behavior are much strong mediators between financial education and financial satisfaction. So, the question is either in Pakistan this relationship of financial literacy and education exists or not? In Pakistan, there is need of such study which can explore the effect of financial education on the level of financial literacy of Pakistani retail investors. This study will bridge up this gap by exploring the relationship between financial education and financial literacy.

2.6.4 Professional background/Experience and financial literacy of respondents

Professional background is a matter of concern at time of exploration of the level of financial literacy in an individual. Kotlikoff and Bernheim (2001) as cited in (Jhonson and Sherraden, 2007) argued that cognitive knowledge gained through experiences with financial education can be more effective. NEFE (2005) study explored that financial literacy have strong relation with financial experiences, people who have stock market experiences have more knowledge about financial market movements. If an individual has purchase and sale of stocks in stock market then he/she knows about the features of product and movements of product. Retail investors of Pakistan are from diverse areas, some of them are households, some are bankers, teachers, mill employees and they have different professional backgrounds, so question is, how this diverse backgrounds or professional experiences effects on the level of financial literacy of Pakistani retail Investors.

2.6.5 Financial literacy and finance certification and trainings

From various sources, training and development can be effective sources of knowledge enhancement. Training provides more knowledge to individuals and individuals are more knowledgeable after getting training sessions (Baron-Donovan, Wiener, Gross, and Block-

Lieb (2005). Toosi, Voegeli, Antolin, Babbitt, and Brown (2020) declared that financially trained individuals have a 7.2 percent more likelihood of having an account and an 8.2 percent likelihood of saving. There should be financial wellness aspects in the curriculum of the universities for the understanding of debit and credit, cash management, and consumerism (Durband, and Britt, 2012).

2.6.6 Financial literacy and employment status

The employment status of the investors is also a considerable factor for the determination of the level of financial literacy. Mouna and Anis (2017) explored that in Tanzanian investors financial literacy level is affected by the employment status of those participants. Investors belong from diversified backgrounds and their knowledge of finance is dependent upon their financial exposures which they gain from different job activities. As a prominent researcher of financial literacy, Kaodya and Khan (2017, 2020) explored the negative relationship between financial literacy and employment status by using a large data set in Japan. The employment status of employees can have different meanings for different employees. For instance, Investors from different professional backgrounds have different types of knowledge, participants of financial markets have more financial knowledge than any school, university, or college teacher, or any household. So, this is important to explore what type of effect the employment status of employees has in various cultural contexts.

Table 2.3

Some of the important factors those Causes High level of Financial Literacy generally in the world and specifically in Pakistan

Education of finance caused high level of financial literacy in overall world. (Dolvin and Templeton, 2006; Fox, Bartholomae, and Lee, 2005; Anthes and Most, 2000).

Financial Education

Not just in developed countries but also in developing countries for instance, Pakistan governments are putting emphasize on financial education of students and employees. All financial participants are advised by the researchers to enhance their financial concepts. In this regard, international and national governments are injecting different financial education programs. For instance, In USA, Jump start coalitions guide educators and parents, in UK, Personal Finance education group guides and advise young people, New Zealand also developed a national strategy for enhancement of financial education, Australian government also introduced series of ANZ surveys for improvement of financial literacy and Pakistani government also injected a program through State Bank of Pakistan for improvement of Financial literacy.

Professionanl experience

Financial experience of the participants is also a form of learning and in national and interantioanl scenario it is a cause of enhancement of financial literacy. AcNielsen Research (2005) explored that professional experience of employees also important and unskilled workers have low level of financial literacy.

Trainings and workshops	<p>Trainings and workshops, Ceminars and financial lectures provide opportunities for individuals to enhance their financial knowledge. Bayrakdaroglu and Şan (2014) explored that financial training enhance the level of financial literacy in managers. National and international governments also focusing on such sources for improvement of financial knowldege of young adults.</p>
Financial agents and advisers	<p>Financial advisers and agents provide consultancy in all over the world for local and international markets and financial instruments and it also effects on the increment of financial literacy (Calcagno, R., & Monticone, C., 2015).</p>
Social Media	<p>Social media is also a source of enhancement of financial literacy, thorough different channels, websits, podcasts, blogs, microblogs, wikis, social networks, media sharing sites, and cyberworlds and internet resources, individulas can enhance their financial knowledge (Karaa and Kuğu, 2016).</p>

2.7 Financial literacy in light of behavioral theories of Finance

Research on financial literacy goes contrary to rational theories of finance because according to Altman (2012) described that financially educated individuals can make strong decisions. Traditional finance focuses on the rationality of the investors while behavioral finance emphasizes on their mental anomalies as well. This argument of Altman (2012) demands a solid understanding of behavioral approach. In the following section there is discussion about essence and contradiction of behavioral approach.

2.7.1 Behavioral theory

Behavioral Finance is still a young field because academicians and researchers of traditional finance are also attached to behavioral finance. Behavioral finance has emerged as an adamant aspect for understanding the market mechanism and investor's behavior in stock markets. Behavioral Finance allows psychology to play a vital role in the study of finance (Abreu and Mendes, 2010). Individuals do not perform all the time rationally but the majority of the individuals suffer from different cognitive biases and behavioral anomalies (Kim & Nofsinger, 2008; Garcia, 2013; Shiller, 2003).

Carmerer, Loewenstein, and Prelec (2004) and Shimp, Mitchell, Beas, Bizon, and Setlow, (2015) demonstrated that in neurosciences there is justification for the dual process of thinking which is rational and irrational (cognitive and affective) for human neural basis. An individual is at times cognitive and affective, he has rationality and also biases and heuristics in his thinking process. The behavioral economics perspective gives the logical grounds to behavioral finance and in behavioral economics, there are two perspectives that support the need for financial literacy.

Behavioral finance negates the idea of rational theory that in markets individuals are always rational. According to behavioral finance, individuals are not prone to errors and biases and

this approach gives the rationale for implications of financial education or financial literacy (Altman, 2008; 2012). Behavioral finance though is an emerging field but needs more attention and refinement for exploration. Behaviorists are in widespread thoughts about anomalies that occur during the logical thinking process. There is a serious need to summarize all these concepts and provide a comprehensive base of all the concepts.

Behavioral finance is an emerging branch of finance and emphasizes the irrationality of investors in financial markets. Thus, behavioral finance is a field that has appeared for understanding the effect of emotions and cognitive errors on investors' decision-making process (Suer, 2007). Decision making of investors is based on their financial knowledge and this knowledge is affected by the presence of cognitive biases. Lusardi and Mitchell (2008) reviewed the detailed pervasiveness of low financial literacy in the United States, emphasizes that financial literacy is an important element of the financial decision-making of US citizens. Though they found financial literacy important in financial decisions making there is a need to link up these variables with decision-making capabilities by narrowing these skills into a variety of components.

Moreover, emotions and cognitive processes cause more irrationality in individuals (Loewenstein, Weber, Hsee and Welch, 2001; Lerner, Small, and Loewenstein, 2004). These two perspectives are discussed in the following sections in detail. Kahneman and Tversky's "errors and biases approach" and Simon March's "bounded rationality approach" provides great insight into the irrationality of individuals in markets and the following section will throw light on the role of financial literacy for improvement of the irrational behavior of a retail investor.

Behavioral finance is a paradigm that supports fewer narrow models for the study of financial markets than those based on Neumann-Morgenstern expected utility theory and arbitrage assumptions (Ritter, 2003). Kahneman and Tversky (1974) presented a theory based on the idea that individuals often make errors and are biased in decision making and these errors are embedded in the brains of individuals. This type of error and biases can be reduced by providing financial education, training, and experience.

Kahneman and Tversky (1981) described the market phenomena based on several psychological factors by sharing the concept of prospect theory. Prospect theory raised serious questions for the rational theories of finance by incorporating the psychological factors in financial decision making. In testing of EMH/CAPM, various psychological factors were noted by a variety of studies which were explored as overreaction or underreaction to information. Though prospect theorists incorporated psychological factors in financial decision-making there is a need to dig out these factors and to examine their influence on the financial literacy of investors.

Prospect theory explores two major aspects: first is a function of value that works like utility function in expected utility theory and the second one is the decision weight for analyzing the weight that is attached to probabilities of choice. Hogarth (1994) described that value functions present three main characteristics, one people evaluate outcomes implicitly, and people consider more closely the variations between outcomes when they are closer to a reference point, and people face loss and gains with different levels.

Behavioral finance rejects the fundamental concept of expected utility theory by considering behavioral elements in decision making and prospect theory provides logical ground for this consideration of behavioral elements. At the root of rejection is logical evidence provided by Thaler (2000) that agents in both contrived and non-contrived settings normally behave in a way that violates the boundaries of expected utility theory. Sugden (2000) and Tversky and Kahneman (2003) explored agents' behavior under risk and uncertainty, and this theory is alternative or somehow superior to Expected Utility Theory. They wrote that under rational theory agent's behavior is completely rational but they declared that and this is not as true under the umbrella of psychology.

According to Stracca (2004), behavioral finance emphasizes the positive description of human behavior while rational finance expects pure, accurate, and rational behavior from the players of the market. While in reality, it is not as much possible because psychological studies explore evidence about the right brain working with the left brain in an individual.

Behavioral finance opens a new pathway for thinking and gives new insight to traditional investors. One very much logical proverb in this regard is presented by Stateman (1999), over rationality is attached with traditional finance and people act normally in new theories of finance. Rational people follow utilitarian characteristics but do not follow value expressive ones, they do not get confused by cognitive errors, and are often risk-averse and do not averse to regret. Followers of behavioral finance do not follow any pattern (Stateman, 1999).

March (1978) proponent of Simon's work argued that individuals are normally rational at the time of decision making though their behavior actually contradicts the assertions of the rational theories. March (1978) was one of the pioneers of behavioral economics, he argued that human beings are not of mechanistic nature that if data is coded in their minds, then they can take accurate moves, it is possible irrationality in rational paradigm can be very much rational if digs below the surface. It is not necessary that players of financial markets can play accurate and calculated roles at the time of decision making.

There are different cognitive and emotional factors attached to the workings of human beings. Simon –March approach explored knowledge about heuristics and shortcuts of individuals in decision making. Their approach argues that these shortcuts and heuristics can be based on personal experiences of individuals and theses can be rational as well though these heuristics do not follow the pattern of rational wisdom.

It is also articulated by Simon March's approach that a choice environment can also be characterized by asymmetric information, incomplete information, and even false information and poor education. These factors can cause poor investment decisions and by improving financial education, quality of information, rules for and guidelines for investment decisions, these investment decisions can take optimal form. When time and cognitive capacity both are limited then the theory of bounded rationality describes that a human makes a decision that is partially rational (Simon, 1978). Individuals normally tend

to use heuristics and mental shortcuts at the time of decision making and biased decisions supports to the theory of bounded rationality (Foss, 2003).

In markets, investors normally cover their basic costs and some level of profit instead of optimal decisions. Due to less effort and knowledge of the markets, normally individual investors use shortcuts in their investment decisions. Akerlof and Shiller (2009) offered a substitute idea for rationality hypothesis to explain the market activities of profit volatility and fluctuations. The author considered that most of the market activities have economic reasons but people also behave without economic reasons and the activities of people are also influenced by their emotions, biases, and selfness etc. which he called animal spirits. The author argued that there should be animal spirits in people so that true activity of market can be examined.

They actually extended the Keynes J. M. (1936) ‘term of animal spirit’ which refers those investors irrational behavior is actually a compromise between optimism and pessimism and the impulsive reaction. Dhaoui (2011) supported the argument that economic behavior is a derivation of animal spirits. At time of unfolding the economic behavior he demonstrated that excessive volatility in market behavior is due to different animal spirits (pessimism, optimism and spontaneous reaction) of investors.

The two main pillars of behavioral finance are cognitive psychology and limits to arbitrage (Kaur, 2020)The following diagram gives an exploration of the concept;

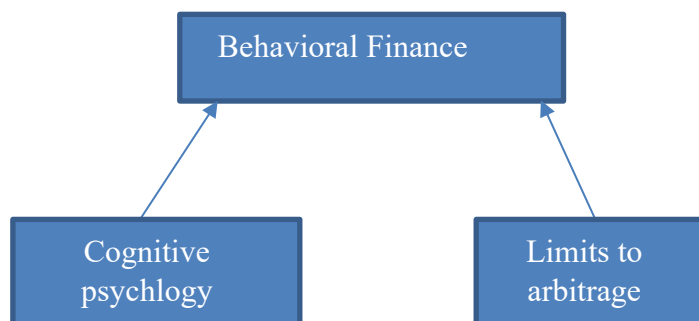


Figure 2.2: Main dimensions of behavioral finance, Source: Kaur, R. (2020, 09, 14).

Cognitive psychology (what people think) and limits to arbitrage (when markets will be inefficient) are the two main dimensions of behavioral finance. Cognitive psychology provides sound ground for this study, what people think and how they react towards different investment decisions. How their level of financial knowledge affects their financial decisions and how their cognitive biases affect the health of their decisions. The fast pace of changing knowledge explored that there is no ideal situation in markets and investors are also humans and are not fully captured by rationality but their rationality is bounded. There are many bounds in the way of rationally but the concern of this study is to analyze the two most adamant cognitive biases (Herd behavior, Hindsight bias, and confirmation bias) and how these biases are linked with the level of financial literacy of retail investors. The following section of the literature will throw detailed light on the working of these cognitive biases in decision-making process.

2.8 Theoretical underpinnings on the role of Cognitive Biases in financial literacy.

Dominant behavioral perspective is of Kahneman and Tversky (1985), they argued that human decisions are normally affected by emotional and intuitive aspects of an individual. Some studies show that the pattern of reasoning systematically becomes different from normal rational behavior. In the 1970's heuristics and biases program was introduced and for the exploration of cognitive biases and afterward these come as a result of heuristics, and this program showed that these heuristics and short cuts change complex cognitive tasks into simple mental operations (Barberis, and Thaler, 2003; Gilovich et al., 2002; Kahneman et al., 1982; Tversky and Kahneman, 1974).

This argument elaborates on the importance of understanding these biases and heuristics. The logic throws a question that why people use heuristics instead of systematic patterns of thinking. If it occurs due to some biases then what kind of biases are here in human cognition and how these biases effect the decision-making capability of a human.

Shoemaker (1995) emphasized that any kind of scenario thinking is not immune to biases, he focused that thinking of the future is processed through three types of knowledge. First, the things we know we know, second things we know we don't know, and, third things we don't know we don't know. Biases are a part of all three types of knowledge. These biases can range from an inclination to look for confirming information to over-and under-prediction (Shoemaker, 1995; Russo, 1992).

The study of Human reasoning and reproducible errors and what these errors show about causal mental processes is called biases program in cognitive psychology (Yudkowsky, 2008). Cognitive biases are the deviations from reasoned judgment and conclusions and to draw perceptions about others in an irrational manner (Kahneman and Tversky, 1973). Gigerenzer (2004) described it as "rationality is not logical but it is ecological in nature". This framework declares that cognitive biases are not errors of cognitive processing but these occur due to highly constrained and artificial environment (Hertwig, Fenselow, and Hoffrage, 2003; Gigerenzer, 1996, 2004; Hoffrage, Hertwig, and Gigerenzer, 2000; Gigerenzer, Hoffrage, and Kleinbölting, 1991)

This type of theory throws light on the importance of cognitive biases and focuses those cognitive biases are due to a composed artificial environment. So, there is a need of such studies which can explore the reasons, impact, and influence of these cognitive biases in different areas of decision making. In psychology, there is enriched literature about these biases but in finance, there is a need for exploration of knowledge about the presence of these cognitive irregularities. There is a need to dig out knowledge about the presence and working of these biases in different financial markets. This study has a concern about working on some cognitive biases in the decision-making of retail investors of Pakistani stock markets.

In the following section of this chapter, there is a discussion about two major types of cognitive biases. This section will discuss how hindsight bias, confirmation bias, affects the decision-making capabilities of retail investors of Pakistani stock markets. This section will also explicate the connection between financial literacy and these biases.

2.8.1 Herd Behavior

Herd Behavior is the actions taken by individuals in the same manner as others are taking the steps. People will be doing what others are doing instead of using their own information (Bnaerjee, 1992). Herding means to imitate larger groups, by word it means movement in a group. Investors in uncertain situations follow the patterns of confident people (Terhan and Shina, 2019). In real, herd behavior has two main types, one is rational herd behavior and other is irrational herd behavior. In rational herding investors follow the behavior of others with some logics, because when someone is moving in stock markets, some of the private information is revealed by his actions when someone follow others decisions with some logics, it can be beneficial.

The other type of herding is irrational herd behavior, in which someone follows others patterns without logics and any specific measures. Investors' irrational herd behavior is emerged due to emotional and cognitive biases; investors just watch the patterns of others in investment sector and follow those patterns without analyzing the utility and outcomes of those patterns (Saeedi and Hameedi, 2018). Herd behavior is a cognitive bias in which an investor does not take his decisions on his logics but tries to imitate the behavior of others. Herding occurs when people react irrationally towards information taken from others; they imitate but do not try to take their own decisions.

Kabir (2017) examined the herd behavior of investors during the financial crises of 2008 rationally. There can be cause of this imitation that people are financially illiterate and do not have confidence about their knowledge. BenMabrouk (2018) explored the existence of herd behavior in stock market and crude oil market. He also examined the cross-herding behavior in these two markets.

Zain Ullah (2019) described that financial literacy in investment is actually the prominent element of financial behavior and is the sound knowledge about the static on personal financial management. Giesler and Veresiu (2014) described that financial literacy is a skill of recognizing methods of investing in a systematic way. When an investor can investigate information in a scientific or systematic way then he/she will not follow the actions of others

without rationale. Hayat and Anwar (2016) argued that the financial literacy of an individual makes him capable to take good and rational decisions. Investors with behavioral biases act irrationally and financial literacy mitigates the herd behavior of investors (Sabir, Mohammad, and Shahar, 2019).

2.8.2 Confirmation Bias

The bias is a cognitive bias in which individuals tend to favor too much that information that confirms their prior beliefs (Foss, 2003). Wason's experiment of rule discovery (1968) proved that most of the people do not try to test their hypothesis on the basis of logic and do not see their hypothesis critically but they just tend to adopt information for approval of their hypothesis. The theory describes that confirmation bias has a great relationship in an individual's decision making (Evans, 1982; Evans; Tweney and Doherty, 1983; Cosmides, 1989; Wason and; Laird, 1972).

Wason's task 2-4-6 supports the idea that subjects were trying to confirm their hypothesis told by the experiment but did not try to falsify. Subjects were interested and sure that that triplet fit (2-4-6) the rule as they were told by the researcher. They were highly confident about their guesses and experiment and reported just a 20 percent success rate for that experiment. This level of success rate showed that though subjects were confident about their guesses they were not successful in their guesses due to confirmatory bias.

Different researchers, for instance, Geller and Pitz (1968), Godden (1976), Grabitz and Haisch (1972), demonstrated through their studies that when individuals are confronted with new information in which either supported or conflicted with their tentative decisions, normally individuals favored their supportive information. Jonas, Sculz-Hardth, Frey, and Thelen, 2001 through their study demonstrated that individuals try to favor their supporting information when information is presented before them. They conducted four experiments

and the results of their experiments provided evidence that respondents of the experiments were suffering from confirmation bias.

Complex phenomena of stock markets require high scrutiny and cognition from individuals. If individuals are not working with full rationale and are not interested in conflicting information with their beliefs then they can not work with efficiency. Sometimes individuals want to seek knowledge that does not negate their prior selections. Investors' Confidence is increased by screening out non-confirming evidence, this is a non a confirmation bias (Barber and Odean 2001; Deci and Ryan 1987; Burger 1989).

Investors' do not try to explore detailed information about stocks rather they just pick information that confirms their thoughts. Investors' confirmation biases affect their stock choices. For an exploration of the effect of confirmation bias in financial decision-making, many of the researchers conducted different experimental research studies. Sculz-Hardth, Frey, et al. (2000) examined the confirmation bias of a group of managers from banks and industrial companies and explored those bank managers had confirmation bias in their financial decisions.

Confirmation bias can play a vital role in the overconfidence of investors in stock markets because they will try to seek information that is supportive to them but this type of biased behavior will not be beneficial in the long run for investors' decisions. Once an individual has some idea he/she tries and makes efforts to defend it. However, financially literate retail investors will try to seek and understand more information and will not have a fear of contradiction.

People normally have a tendency to favor information that supports their existing beliefs and their ways. In Pakistan, people have a very low level of literacy and financial literacy . is not up to the mark. People are emotional in their behaviors, they try to defend their logic, views ideas and opinions, sometimes it causes clashes, losses, and disputes.

In stock markets of Pakistan, majority of retail investors are lacking in financial knowledge and take emotional moves, they have interest the information which supports their logic, opinions and choices. This kind of biased behavior hinders their way for new knowledge. This study will explicate presence confirmation bias in Pakistani retail investors of stock markets and its link with financial literacy and retail investors decision making is also a concern of this study.

2.8.3 Hindsight Bias

The Psychology literature provides logical evidence for the existence of Hindsight bias (Peters, 1999). Hindsight bias is a cognitive deficiency (Hawkins, and Hastie, 1990; Arkes, Faust, Guilmette, and Hart, 1988) which leads people to overestimate that how predictable an event was, such bias can cause a problem for decision-makers, though they belong from any psychological, social, or economic field (Schuett & Wagner, 2011). Hindsight bias, explored and explicated by Fischhoff (1975), and he described that it is the tendency of predicting the event when the outcome is already known.

Fischhoff 's (1975) conception about basic theoretical grounds of hindsight bias is widely accepted. According to his conception “ upon receipt of the outcome knowldege judges immediately understand it ad matches it what they already know about the event in question” (Fischhoff, 1975) and the outcome information is effortlessly assimilated in the scemantic representation of the domain in question.

People normally consider past events clearer and more transparent rather than of future uncertainty. This “knew-it-all-along” effect, or hindsight bias, has become an enduring and robust psychological finding in overall psychological research areas and this bias is normally known as judgmental bias (Roese and James, 1996;Christensen-Szalanskiand William,1991; HawkinsandHastie,1990).

Hindsight bias has been a matter of importance for many researchers (Blank, Musch, and Pohl (2007) for understanding different cases and different experimental studies. For instance, Christensen-Szalanski and William (1991) explored knowledge through meta-analysis of 122 studies and found six without bias. Christensen-Szalanski and William raised two important points through their meta-analysis, one is about the effect size of hindsight bias and another is for hindsight bias to be practically relevant.

Hawkins and Hastie (1990) considered hindsight bias for their detailed study. Hawkins and Hastie explored that hindsight bias occur when the outcome has some emotional significance and when the outcome has some imaginative grounds. When an individual is passing through some imaginative process and has some type of right brain working towards a phenomenon than outcome can be based on some hindsight bias.

In stock markets, investors' financial decisions are often suffered by cognitive biases and hindsight bias is more pronounced of all others (Biais and Weber, 2009). Individuals feel overconfident at the time of estimating an event and often do inaccurate judgments (Brown, Williams, and Lees-Haley, 1993). These wrong judgments are made by hindsight bias in retail investors (Kahneman and Riepe, 1998) in the prediction of their stock choices and decisions. On the other hand, if Retail investors are financially literate (formally or informally), then they can overcome this judgmental bias. It is described by LaBine, and LaBine (1996) that if people are more experienced and informed in any task then they can have less level of hindsight bias.

Hoffrage, Hertwig, and Gigerenzer (2000) proposed a process model RAFT for measurement of hindsight. Their findings were according to the idea that expertise reduces the effect of hindsight bias. This discussion leads to a point people with more knowledge and expertise of any tasks can have a reduction of hindsight biases. It means if an investor is more financially literate, knowledgeable, and experienced in financial instruments they can make secure investment decisions.

According to his argument, Hindsight bias occurs less with reference to experience and in more informed respondents (Bukzar, and Connolly, 1988). If someone has information and knowledge of determinants of an event then he/she can overcome this judgmental bias with rational thinking. Financial literacy provides a strong knowledge of finance and provides a rationale for good judgments on the bias of finance knowledge. So, in presence of financial literacy wrong judgments can occur not as much as in absence of a high financial literacy level Gallery and Gallery (2010) emphasized on the improvement of financial literacy for overcoming behavioral biases (Hindsight bias). They demanded rethinking of the importance of financial literacy for good financial decisions. Calvet, Campbell and Sodini, (2009) also supported the idea of enhanced financial literacy for overcoming hindsight bias and for good financial decisions.

Muntazir, Shah, Latif, Bashir, and Yasir (2013) explored that Pakistani stock investor is affected by hindsight bias in decision making. They showed that Pakistani investor is more biased than bank employees. In Pakistan, people are less educated and are emotional due to a low literacy rate. In stock markets of Pakistan, how retail investors are affected by this hindsight bias and what is the difference between financially literate and illiterate retail investors by the ratio of hindsight bias and also how their decisions are influenced by the presence of this bias is a major concern of this study.

2.9 Financial literacy and Investment Decisions

Financial literacy provides a deep understanding about the usage of financial resources in an optimal way. A person with profound financial knowledge can better manage his resources and can earn more return through diversification of risk and through making rational choices. Individual investors normally face difficulties in finding reliable sources and digesting all pertinent financial information. Less informed individual investors are inadequately situated to make proper financial decisions, as a result, earn fewer financial returns (Mouna & Anis, 2016).

Financially literate investors can digest financial information and can use this information in an optimal way with justified level of confidence (OECD, 2012). Mandell (2008) describes financial literacy as the ability of consumers to make financial decisions in their own best short- and long-term interests. Huston (2010) described financial literacy by explaining two dimensions of financial literacy one is theoretical knowledge and other is its practical aspect. Theoretical knowledge is essential for understanding the characteristics of markets and securities in investment sector and practical knowledge is necessary to make use of available best return in investment sector.

OECD (2012) defined and composed financial literacy as the combination of consciousness, knowledge, ability, attitude and behavior which is essential for making good financial decisions and plays a role in increment of financial wealth. According to this conceptualization of OECD, financial literacy is combination of financial knowledge, capacity and behavior which helps an individual for good financial decisions.

Guiso and Japelli (2008) demonstrated through a research study, along with other factors, an important variable is financial literacy in lack of portfolio diversification. People with low understanding of finance, variance, covariance, correlations have low level of diversification in their portfolios. Investors with low diversification often are not able to earn more and face risks in their investment. Jordan(2016) financial knowledge helps students to maximize their return on investment.

Financial literacy level affects the behavior of an individual as Lusardi (2007) revealed that due to improper financial knowledge individuals are not able to plan their savings and often are not able to take good financial decisions. Christelis et al. (2010) supported the argument that poor financial literacy in the European countries causes poor cognitive and decisions making skills in households and individuals are not able to make good financial decisions.

Rooij, Lusardi and Alesse (2011) revealed that financial literacy correlates with the stock holdings of investors. Investors have a good stock holding positions and participate actively

in stock markets if they are financially literate. Landström (1998) described investors evaluate projects before investments and financially illiterate investors often hesitate to invest in stocks without proper guidance and help of agents.

Graham et al. (2009) learned the role of investors and their competence level. An economic phenomenon is very complex and in these complex phenomenon investors have to take financial decisions. Investor's knowledge, skills and, competence level is very important because it effects on its future (Harrison, Dibben, and Mason, 1997). Therefore, their financial education is very important for understanding of correct financial information and for estimating the existing opportunities, and for having good decisions.

Financial literacy is knowledge of individuals which makes them capable for making sound decisions; governments in international scenario took many steps to improve the level of financial literacy in all over the world. The concept of financial literacy has been evolved from the exploration of Bernhiem (1995, 1998) to date with lot of determinants. In different contextual cultures, financial literacy has been studied with reference to different demographical factors. Religiosity is also an important factor which influence on the level of financial literacy of investors. Traditional finance theory does not much support to financial literacy as according to this theory individuals are already well informed and prone to errors. On the other hand, emerging theories of behavioral finance provides strong rationale for understanding the concept of financial literacy.

This theory describes those individuals are not machines and they are human beings, so many of the emotional and cognitive errors are attached with human thinking, so there is need to enhance financial knowledge for overcoming these errors and biases. From a number of cognitive biases, Hindsight and confirmation bias are more pronounced biases by which an investor can suffer. Decision making of investors can be improved and debiased by improving the theory level of financial literacy.

2.10 Summary

By reviewing the theoretical underpinnings of the concept of financial literacy, behavioral finance and cognitive biases of financial players, this chapter enlightened the concept of financial literacy and its role generally in financial markets while specifically in stock markets. This chapter, firstly provides an in-depth analysis of the concept of financial literacy, and explored it critically by throwing light on highlighted studies in this area.

Then it also enlightened the evolutionary process of this concept from starting to current conditions. Evidence about low level of financial literacy in majority of the countries is also presented this chapter. Before discussing the role of financial literacy in financial decision making, the theoretical underpinnings of behavioral finance theories are discussed.

This chapter also provided a rationale for existence of cognitive biases in financial sectors while also elaborated the influential role of demographics in measurement of financial literacy. This chapter also highlighted the big gap in available studies related to financial literacy, cognitive biases (Herd Behavior, Hindsight bias and Confirmation bias) and investment decision making skills of retail investors. There is no such study available in Pakistan which can link up the concept of financial literacy with debiasing of investors decisions by studying the mediation of most prominent cognitive biases (Herd Behavior, Hindsight and Confirmation) of investment sector. By providing a through review of literature about role of financial literacy in investment sector and for capturing the cognitive biases of retail investors this chapter direct this study towards the development of a sound theoretical frame work which is discussed with extensive details in the third chapter.

CHAPTER 3

THEORETICAL FRAMEWORK

3.1 Introduction

The review of landmark studies of literature provided the rationale for the development of theoretical framework which is presented and discussed in this chapter. A deep scrutiny was done to understand the key variables, data set and ways to test this model. This model is unique in a way that this model integrates two types of variables, on one extent this model captures the concept of finance and then tries to integrate the concepts of finance with psychology. So, a conscious care was given for selection of these variables on the basis of strong evidence from the theory of behavioral finance.

According to Whetten (1989) a good theoretical framework describes that the proposed research has support of established facts and theories and this emerging theory is free of just supposition and guesses. This model was developed on the basis of strong rationale provided by established theories of rational and behavioral theories of finance and financial literacy. This model objectively tries to capture and relate the variables connected to finance and behavior of investors in Pakistani context.

The conceptual framework of the study is developed on the two main streams: the first stream is based on the concept of financial literacy and important variables related to financial literacy scrutinized by the help of strong theoretical underpinnings while the other stream is based on some of important cognitive biases. This framework tries to link up these variables with dependent variable which is decision making capabilities for retail investors of Pakistani stock markets.

The key objective of this study is to develop a conceptual frame work in which

1. To Measure financial literacy of retail investors
2. To examine the effect of socio-demographical variables on financial literacy
3. To find out the mediation of cognitive biases between financial literacy and decision making of retail investors of Pakistan
4. To find out the possible link between financial literacy and decision making of individual.

These objectives can be achieved by a well-presented theoretical model in which financial literacy is the key variable. For understanding the concept of financial literacy, details are given in above discussion. There are some structured definitions of financial literacy and other variables of the theoretical model presented in following part of this chapter.

Theory of conceptual definitions of financial literacy has been discussed in literature review and in below section of the chapter there is chronological presentation of the conceptual exploration of the financial literacy and this table provides summarization of the conceptual aspects of financial literacy. These definitions are presented in chronological order and give the idea of evolutionary aspects of the concept. Other variables are also discussed in following table with comprehensive definitions of these variables.

These definitions provide a clear evolution of the concept of financial literacy and it is evident and transparent from the below presented definitions that the concept of financial literacy is evolving year by year and still researchers are exploring and showing the different meanings of the relationship of financial literacy and different variables.

Table 3.1*Conceptual definition of financial literacy*

Chen and Volpe, 1998	Financial literacy is the ability of reading financial information, analyzing and managing financial communication for financial well-being of own.
Kim et al., 2001	Basic knowledge of finance that is necessary for people to survive in the modern society.
Bowen, 2002	Financial literacy is the capability of understanding the key of financial Concepts which are necessary to function in the normal American society.
Hilgert, Hogarth, and Beverley, 2003	Financial knowledge.
Moore, 2003	Financially literate individuals can use their knowledge which they learned and they are competent enough to utilize their knowledge. For measuring financial literacy proxies should be used because it cannot be measured directly. Literacy increase with the practical experience of people, as people become more knowledgeable then they become more sophisticated and more competent.
Kempson, Collard and Moore, 2006	Individuals, who have mathematical literacy, can effectively manage with money, and know how to manage a credit and debts.
Worington, 2006	Mathematical ability and ability to understand financial concepts
Orton, 2007	Attitude towards the use of financial instruments.

Lusardi and Mitchell, 2007	Understanding and familiarity of most basic concepts of finance which are essential for making good saving selections.
Mandell, 2007	“The capability of making informed judgment san if using complex instruments that is beneficial in long term.
Huston, 2010	Ability to use different financial concepts and instruments.
Remund, 2010	Financial literacy is a measure of the degree to which one understands key financial concepts and possesses the ability to manage personal finances throughout the lifecycle.
Ahed, 2010	Financial literacy is the ability to understand finance.
Marten Van Rooij, 2011	A person is financially literate if has possess basic Knowledge of finance.
Gallery et al., 2011	Inertia of decision making.
Altman, 2012	For making good financial decisions financial literacy is Combination of skills, knowledge and confidence.
Atkinson and Messy, 2012	Financial literacy is awareness of financial information, knowledge, skills and also financial behavior that is necessary for a suitable financial behavior and also god for economic health.
Giesler, Markus, Veresiu and Ela, 2014	Understanding about the working of money in the world, it is the understanding of how money is earned, save and spread for help of others.
Ganesan, Pitchay, and Nasser, 2020.	Financial literacy comprises financial education, information and awareness and it also includes institutions and theories, skill to understand concept of interest and also financial planning and money management.

3.2 Operationalizing the variables of the study

For measurement of financial literacy these definitions provide a strong account, and previous studies provide an account for development of the operational definition Ribes-Iñesta and Emilio (2003) described that description and specification of procurers and expected outcomes of a concept is called its operational definition. Operational definition of any term makes it empirically clear and countable.

3.2.1 Measurement of Financial literacy

Financial literacy has not been measured till date in all over the world by a standardized way, the reason behind this is described by Kimiyaghalam and Safari (2015), that there are three main obstacles for designing a standardized measure of financial literacy. First is lack of good conceptualization, second is no clear picture of construct of financial literacy, and third is no clear and transparent instrument and interpretation of this instrument. Some of the researchers tried to measure financial literacy objectively (Lusardi and Tufano, 2009) and Grabble et al. (2009) while others tried to measure it subjectively (Stango and Zinman, 2014). For Instance, HRS (2004) used three simple questions about Interest, Risk diversification and real rate of returns. These three questions are parsimonious and understandable for general population and are adapted by many of the researchers, so these are known as big three questions.

Another example of construction for the concept of financial literacy in 2009 is provided by Natioanl financial capability study (NFCS) by adding these questions with two more questions regarding Mortgage and bond prices in large survey of financial capabilities of adults in US. These five questions are known as Big five questions by the researchers. There is no specification of the conceptual definition of the financial literacy so due to this there are varied ways of measurement of financial literacy. For measuring the financial literacy, it is necessary to develop a tool by viewing the concept of financial literacy as well the

general literacy rate of the country. Anamaria Lusardi and her companions (2007, 2008, 2009, 2011, 2013) are a pronounced name for exploration of the concept of financial literacy and she measured financial literacy through three easy but very much basic questions, these questions were also used in HRS (2004) for measurement of financial literacy.

Rooij, Lusardi, and Alesse (2011) also used seven more questions for examining the sophistication of financial Literacy in stock market investors. There are many other studies which measured financial literacy in various financial sectors but it is very much difficult from past to now, to develop an instrument which gives comparable results in all over the world, so there is need to understand why it is difficult to develop a comparable instrument for measuring the concept of financial literacy. One main reason can be the differences of cultural grounds, basic literacy rate variations, technological advancements, and many of the demographical variables. So, this is not possible to develop same instrument for measuring the concept of financial literacy in all over the world. Research studies used the instrument ranging from three to 67 items of instrument.

Most of these surveys were conducted online or through telephone. But the logic supports for development of such instrument which can cover the basic components, and is easy for handling by the respondent. Because more lengthy survey form make filling a laborious activity for respondents and they fill the survey forms blindly. Especially in countries Like Pakistan, where the basic literacy rate is very low, the measurement instrument of financial literacy should not be too much lengthy and difficult.

This study has main interest in measurement of financial literacy as for classification of respondents in two parts (Financially literate and financially illiterate) and agrees on the definition of Jump Start (2007), Lusardi, 2007, 2008, 2010, 2013), Rooij, Lusardi, and Alesse (2011) and HRS (2004), they conceptually defined financial literacy as "the skill to use knowledge and ability to manage financial resources for the life time financial health". This study uses questions introduced by HRS (2004), used and enhanced by Lusardi (2006) and Rooij (2011) for measuring basic and advance financial literacy.

So, the first hypothesis of the study is developed based on the above-mentioned discussion.

For operationalizing the concept of financial literacy, a similar method of Rooij, Lusardi and Alesse was adopted by the researcher. By this method respondents were classified in two basic forms;

- **Basic Financial literacy (Knowledge of basic calculation, compounding, inflation, discounting and money illusions)**
- **Advanced financial literacy (knowledge about stocks, bonds, risk diversification, risk and return, financial assets)**

Rooij, Lusardi and Alesse (2011), measured financial literacy in his study and in collaboration with Anamaria Lusardi and Rob Alesse, they measured financial literacy on very much logical grounds, they developed five basic questions for financial literacy, and they focused on simple calculations of investors (question no 1), understanding about compound interest working (question no 2) effect of inflation (3rd question) time value concept (4th question) and Money illusion (question no 5).

They further enhanced the concept of financial literacy in an advance form for checking the financial sophistication. They enhanced survey form with 11 more questions regarding the stock investment and portfolio choice. These questions related to stock market investment covers the aspects such as knowledge of financial assets, the returns and riskiness of different assets and working of stock markets. This instrument also tries to highlight the understanding level of risk diversification of individuals. The purpose behind adoption of this instrument is that it is strong in basic and advance concepts measurement, adopted by many of researchers in different contexts, also suitable in Pakistani context because of its brief nature and also emphasizes on the stock market knowledge and participation which is a major concern of this study.

For Measurement of financial literacy of retail investors respondents are divided in two groups.

(1) Financially literate and (2) Financially illiterate.

Respondents who scored more than 5 out of 5 in basic financial literacy questions will be considered as financially literate people while respondents who scored less than 5 are considered financially illiterate people in basic literacy test. This study has a purpose to classify the respondents in two groups, financially literate and financially illiterate so for this reason method of testing and evaluation has been modified. Advance financial literacy was just measured for determination of enhance knowledge of respondents but it was not measured for classification of groups because of insufficient data availability.

In the same manner if someone scored 6 in advance financial literacy tests than he is considered as financially literate in advance terms and has denomination of 1 while on the other hand if someone scored less than 6 than he has denomination of 0 and he is considered as financially illiterate person in advance terms. This method is used for getting score of financial literacy in binary form because research has an objective to categorize an individual either he is financially literate or not. This is a new method based on previous financial literacy questions.

3.2.2 Measurement of Herd Behavior

For measurement of Herd Behavior 5 statements are adopted from the most recent study of Baker, Kumar, Goyal and Gaur (2018). They used 5 statements for measurement of Herd in individual investors in India. So, by the support of theory and market contexts, these statements are used for measurement of Herd in retail investors of Pakistani Stock Market.

3.2.3 Measurement of Confirmation Bias

Confirmation bias is another cognitive bias which is measured through this study and this study used statements of Mahina and Bashaija (2018) with some modifications for measurement of confirmation bias in retail investors of Pakistan stock markets.

3.2.4 Measurement of Hindsight bias

For measurement of Hindsight bias questionnaire of Baker, Kumar, Goyal and Gaur (2018) is again used. They used 3 statements for measurement of Hindsight bias and these statements are adapted from their instrument for measuring Hindsight bias in retail investors of Pakistan stock markets.

3.2.5 Measurement of decision-making capabilities

Last part of the questionnaire is based on the assessment of decision making of investors. This decision-making capability of investors is measured through by Following equation was used for measurement of investment results of investors. Rasheed et al. (2018) measured decision making of investors with 5 statements. This study adapted these statements for measurement of the decision making of retail investors in stock markets of Pakistan.

3.3 Relationship of socio-demographical variables and financial literacy

This study is concerned with those demographical factors which can influence on the financial literacy of a retail investor and which are more supported by sufficient

literature support by studies conducted in other contexts. There is strong evidence from literature about measurement of the concept of financial literacy with reference to different demographical variables in context of different countries as discussed in Literature review. Financial well-being and its perception which individuals have actually varies across gender, age, education, employment type, marital status etc. (Pudney, 2011; Degutis and Urbonavicius, 2013; Meier and Sprenger, 2013; Barnard, 2016; Becchetti et al., 2017).

In Pakistan, there are few studies about measurement of financial literacy with reference to demographical variables (Shaikh, Ismail, and Mohd Shafiai, 2017; Ahmed, Ramakrishnan and Noreen 2017; Anwar, Khan, and Rehman, 2017; Ghaffar and Sharif, 2016; Bashir, Arshad, Nazir, and Afzal, 2013) In Pakistan, there is need of more exploration about financial literacy and its relationship with demographical variables.

3.3.1 Relationship of Financial literacy and Age

In some countries, age of the respondents in measurement of financial Literacy rate played a vital role while in other countries age do not affect as much on financial knowledge of the individual. Financial literacy has been measured with different demographical variables and age is an important factor of all these variables. There are numerous surveys and studies in which financial literacy has been measured with reference to age in different countries (Bashir, Arshad, Nazir, and Afzal, 2013; Rooij, Lusardi and Alesse, 2011; Lusardi and Tufano, 2009; Al-Tamimi and Kali, 2009, Lusardi and Mitchell, 2008; OECD, 2005, 2008, ANZ, 2007, 2008, 2011).

Danes and Hira (1987) have done a study on 324 college students in IOWA state University and found that college students are not much aware about credit cards, insurance terms and personal loans and overall financial knowledge is low among college students. Young people in particular are having to make more financial choices earlier and are increasingly confronted with opportunities to borrow money and apply for credit (Lusardi et al., 2010; Roberts and Jones, 2001).

Prior studies explored that the level of financial literacy (however measured) amongst young people is poor (Cameron et al., 2013; Borodich et al., 2010; Mandell, 2008). People aged from 30-40 were answered more correctly while more young and adult people were low in literacy. Due to low understanding of finance young people hired loans with higher costs (OECD, 2013; Scheresberg, 2013; Atkinson and Messy 2012; Lusardi and Mitchell, 2011; Agarwal et al., 2009).

Lusardi and Mitchell (2011) people under the age bracket of 25 to 65 answered more questions rather than those who were under 25 or over 65. She concluded through her different research studies that middle age people have more financial knowledge than younger and old age people. Monticone (2010) investigated the link between financial literacy and age and argued that the level of financial knowledge increases with the increase in age of an individual. Chen and Volpe (1998) argued that low level of financial knowledge is attributed with young age of the respondents. They showed through their study of college students that people under the age bracket of 23-29 , 29-40 or older showed more financial knowledge than younger.

Age will have an increasing effect on financial literacy, because as young people mature, they become more engaged in the financial markets (Cameron, Calderwood, Cox, Lim, & Yamaoka, 2014). In Pakistan, age of the investors is also a concern for measurement of financial literacy of retail investor. This study estimates this variable as in nominal categories and this is based on self-reporting of respondents about their age. This above mention theoretical underpinnings supports for the generation of the following hypothesis.

H1= Age influences on the level of financial literacy of retail investors.⁵

⁵See section 2.5.1 in literature Review

3.3.2 Relationship of Financial literacy and gender

Gender is another important demographical variable which has been measured in different studies (Fonseca, Mullen, Zamarro, & Zissimopoulos, 2012; Rooij, Lusardi, and Alesse, 2010; Lusardi and Mitchell, 2008, 2010, 2011, 2014; OECD, 2005, 2008, ANZ, 2007, 2008, 2011; Chen and Volpe, 2002). Nga and Yien (2013) measured influence of different demographical variables on financial decision-making including gender. In UAE, there is a significant relationship between gender and financial literacy; males are more knowledgeable than females in finance (Hassan Al-Tamimi & Kalli, 2009). Mandell (2008a) explored that financial literacy is higher in boys than girls but with passage of time in Jump start surveys girls performed better than boys and this difference of gender became stable (Mandell, 2008b). Fornero, and Monticone, (2011) explored through a research study that in Italy Men are more financially literate than females. Almenberg (2015) argued that in stock markets, participants are normally males not females because of their high financial knowledge. Bahovec, Barbić, and Palić, (2017) discussed that gender has a strong influence on acquisition of financial knowledge.

It is general behavior in overall world that women are lacking in financial education (Lusardi and Mitchell, 2008; OECD, 2013, Almenberg, 2015), many countries have customs to educate females for capturing the household issues instead of financial matters. Females are not much financially literate as compared to males (Lusardi and Mitchell, 2008; OECD, 2013). Almenberg (2015) argued that in stock markets, participants are normally males not females because of their high financial knowledge. Bucher-Koenen, Lusardi, Alesse, and Rooij (2012) pointed to a potentially important role for self-confidence that differs by sex. According to them less self-confidence can be a cause of low level of finance knowledge in women. Mahdavi and Horton (2012) demonstrated that in liberal art college of US women have very less level of financial literacy.

Normal trend in Asian countries, especially in Pakistan is that males are responsible for all financial matters and they work in financial markets. In overall scenario, studies provided evidence that also in other countries than Pakistan; females tend to trust in financial advisors (Stendardi, Graham, and O'Reilly, 2006). Lai (2010) disseminated through his research that women have low level of interest in financial matters and normally have impulsive purchases.

These studies provided the rationale that there is need to study financial literacy with reference to gender because gender is much important variable for studying the variation in the level of financial literacy. This study will try to investigate in Pakistan, where males dominate in every aspect of life, how gender effects on the level of financial literacy of investors. So, above mentioned discussion leads towards the development of following hypothesis of gender.

H2= Gender influences on the level of financial literacy of retail investors.⁶

3.3.3 Relationship of Financial literacy and professional experience

Financial literacy is actually a form of formal and informal financial knowledge which an individual can get from any formal source (finance degree or certification) or any informal source (financial experiences and exposures). Beal and Delpachitra (2003) found that, experience in the financial markets and financial literacy supports each other. In support of this argument Mandell and Klein (2009) argued that effect of the financial education on financial literacy levels disappears after seven years from the graduation, means formal education in enhancement of financial literacy is not as much vital as professional experience and informal training.

⁶See section 2.5.2 in Literature Review

In support of the argument Fernandes, Lynch and Netemeyer (2014) indicates that interventions to improve financial literacy explains only small part of the financial behavior and it decays by time like any other education. Calamato (2010) showed that employees with longer labor experience have shown high financial literacy as compared to inexperience people.

On the other hand, many researchers believe in formal education as Lusardi and Mitchell (2011) described that Individuals with low level financial literacy and higher level of confidence about financial markets are more prone to making wrong decisions than other individuals. Financial education and financial experiences both are important tools for improvement in financial literacy. Financial experience is also a form of education which is informal in nature and individuals can learn more through experiences. As it is a famous saying, practice makes a man perfect.

In study of Hassan Al-Tamimi and Kalli (2009) results revealed that professional experience has no significant effect on the level of financial literacy. Is here any strong link among financial literacy of investors and their professional experience in Pakistani culture, this is also concern of this study?

H3= Professional experience influences the level of financial literacy of a retail investor.⁷

3.3.4 Financial Literacy and Marital status

Marital status is also a relevant factor to examine financial literacy as Brown and Graf (2013) showed that single individuals have low level of financial literacy than married

⁷ See section 2.5.4 in literature Review

people. Calamato (2010) supported the argument and said that singles have fewer financial concepts. Single do not have responsibilities and shared cognition like married people and their financial experience is not as much strong as of married people. Number of dependent family members is also a relevant factor for financial literacy. Motola (2013) showed through research that families which have dependent members are less likely to show financial literacy. Marriage give dependency to participants and they cannot take decisions alone. Married people normally re supported by their siblings and feel more confidence in taking financial decisions. Kamaki and Mwangi (2017) showed that marital status is linked with financial well-being of the employees. Financial well-being is depended upon the good decisions of the participants and married people often discuss and take suggestions from their partners. Nayebzadeh et al. (2013) conducted research on professors and demonstrated that there is association between financial literacy and marital status of the professors. In Pakistan, where marriage is compulsory element of some one's life and highly appreciated by law and religion, the question is how financial literacy is related to marital status of an individual.

H4= Marital Status influences on level of financial literacy of a retail investor.

3.3.5 Relationship of Financial literacy and education

There are some studies which presented the support for determining a link between education and financial literacy. Results of US surveys and Lusardi and Mitchell (2007, 2011) noted that that there are substantial differences among people due to basic college education. People with basic education level can understand concepts of finance better than those who do not have any college education. Fernandes, Lynch and Netemeyer (2014) found that there is strong association between financial literacy and financial education. They done three empirical studies and found that by controlling psychological factors and by suing any instrument, partial effect of financial literacy diminished.

So, if an individual attended college and is equipped with basic knowledge, he /she can understand better financial concepts. Chen and Volpe (2002) suggest that, education in the field of business and economics increases the level of financial literacy. Bayrakdaroğlu, and Şan, (2014) indicates that well rounded financial education can help to initiate saving plans, manage debt and make strategic investment decisions for their retirement or their children's education.

Financial education strengthens the responsiveness of the meaning for competence and skills in the field of finances and can contribute to lower the risk on the level of the individual and society (Starček & Trunk, 2013). Mason and Wilson (2000) says that financial literacy covers the basic literacy means reading and mathematical literacy but at the same time it is more prone because it needs more specific financial knowledge.

The financial literacy covers the basic literacy, consequently the reading and mathematical literacy and is simultaneously its upgrade because it requires more knowledge and skills specifically in the financial field (Mason in Wilson, 2000); this explanation means that general literacy is related to financial literacy. With increase in general literacy financial literacy also increases.

If a person is educated in general terms for instance graduated in a subject, or is post graduate then it means he has the basic ability to calculate small calculations. So, he or she can have better financial knowledge than a person who is not literate in general terms. In Pakistan, general literacy rate is very low, so there is need of such study which can examine a causal link between financial literacy and education of retail investors of stock markets. The above-mentioned discussion leads towards development of following hypothesis

H5= Education influences on the level of financial literacy of retail investors.⁸

⁸ See section 2.5.3 in Literature Review

3.3.6 Relationship of Financial literacy and Finance certification and trainings

Finance certifications and trainings are considered important for enhancement of financial literacy by many of the researchers. Fernandes, Lynch and Netemeyer (2014) wrote that policy makers consider financial education as a necessary antidote for overcoming the complexity of financial decisions. Ansong (2011) wrote that there is need for improvement of financial literacy in individuals, and this type of finance education should be provided to students at university level so that they can have better financial management skills.

Tuong and Doan (2020) also emphasized that through training programs financial literacy can be enhance for the sake of better awareness of financial management skills. Kaiser and Menkhoff (2017) researched through a meta-analysis of 126 impact evaluation studies and concluded that financial education impacts significantly on financial behavior and specifically on financial literacy. Financial trainings and certifications provide specific financial knowledge about financial markets, financial securities, instruments and processes, which can enhance financial exposures of the individuals. Developed countries are focusing more on financial exposures of individuals through different seminars, trainings, and certifications along with financial education. Toosi, Voegeli, Antolin, Babbitt, and Brown (2020) explicated that training provides grounds high financial literacy. Pakistan is an underdeveloped country and do not have proper financial stability so, in Pakistan, there is need of such exploration to find out the causal link between financial trainings and certifications and financial literacy.

H6= Finance certification and training influences on the level of financial literacy of a retail investor.

3.3.7 Relationship of financial literacy and income

There are lot of demographic factors and other factors which have been shown to be linked with financial literacy. Shim, Barber, Card, Xiao and Serido (2010) explained that, some students showed learning about management of finances while others were taking risky steps. Authors demonstrated that such behavioral disparity can be caused due to socioeconomic and demographic factors, having in mind. Worthington (2006) and Hogarth (2002) pin up the relevant literature, which shows that income, educational attainment, age, and employment are typically linked with financial literacy.

From, other factors income of the respondents also a considerable factor because high level income employees can spend more on their financial education and can attend more workshops, seminars, and training sessions. Income level of an individual is also considered as an influential factor by some of the researchers. Monticone (2010); Hastings and Mitchell (2011); Atkinson and Messy (2012) demonstrated that individuals with low level of income level possess low level of financial literacy. Because low level of income does not give them liberty to spend money else than their domestic expenses. Low level of income also does not give space of mind to individuals to think freely about their financial decisions.

In Pakistan, the per capita income of individuals is not up to the mark, many of the individuals are not able to spend on their financial growth and cannot have long-term saving plans. They are indulged normally in short term investments and saving plans. They do not have enough financial resources to capture good agency services. So, the question is in such a country where general income level is not good how financial literacy of investors is affected by their income level.

H7= Income influences on the level of financial literacy of a retail investor.

3.3.8 Relationship of Financial literacy and Employment status

Employment Status of the investors is another important element for study of financial literacy. Investors have different professional backgrounds with different knowledge types which can affect their decision-making capabilities. Financial background of investors provides them with high level of financial literacy, Al-Tamimi (2009) conducted research in UAE, and found that the level of financial literacy among UAE investors is far away from required level. He also explored that employment status of the UAE investors also effect on their financial literacy. As investors who work in banks, and filed of finance, they have higher level of financial literacy.

Niu and Zhou (2018) considered employment status as an important determinant for retirement planning. Kamakia, Mwangi, and Mwangi (2017) found that employees financial knowledge influence of the financial wellbeing of the employees. Financial jobs provide them higher level of financial knowledge through more financial exposures and such employs are often more financially literate that others. Niu and Zhou (2017) also argued that self-employed people plan more about retirement because they have low benefits instead of government employees, so self-employed individuals have to learn more about their financial benefits.

As many of the researchers showed the positive significant relationship between financial literacy and employment status but some of the research studies shown negative relationship between financial literacy and employment status. As, Kadoya and Khan (2017) described that financial literacy is negatively associated with employment status and the results of their study is also supported by the Nayebzadeh, Taft, and Sadrabadi (2013), they also explored that there is no significant relationship between employment status and financial literacy in Iran.

H8= Employment status influences the level of financial literacy of a retail investor.⁹

⁹ See section 2.5.4 in literature Review

3.3.9 Relationship of financial literacy and Locality

Locality of the investors is also an important factor like many others because many of the researcher's considered locality as an important determinant for financial literacy. As, Razumovskaya, and Razumovskiy (2020) conducted a research study in Russian context and explored that use of more financial services is related to wider and better regions or settlements. In wider regions people can get high level of education and can get more training sessions and seminars. People in cities have more knowledge than residents of towns or villagers. Harun, Graham, Kamase, and Mir (2021) have explored through their research that Indonesian government introduced the village fund 2014, but this program could not get success due to many factors including low level of financial literacy. Citizens have more resources for making their future more polished and for getting higher level of financial education. Yunikawati, et al. (2020) have done a research study and explored that financial literacy influences of several personal financial decisions, however personal financial literacy among rural areas is very low and special curriculum should be designed for improvement of financial knowledge. For improvement of financial literacy in rural areas there should be parts of financial education included in curriculum of the graduates.

This study will try to highlight in Pakistan, where urbanization rate is not much good and majority of the individuals are villagers, how financial literacy can get effected by the residential place of an investors.

H9= Locality influences on the level of financial literacy of a retail investor.

3.5 Relationship of Financial literacy and cognitive biases

Financial literacy is actually the mental capability of any individual or cognitive skills specifically related to financial knowledge. An individual has some rational approach

about basics of finance and is able to manage his finances through this cognitive ability then he is financially literate. Though, this literacy can vary in the level from basic to advance.

Research supports the concept that financial literacy increases with cognitive capacity (Bucher-Koenen & Ziegelmeyer, 2011). If an individual is intelligent and cognitive than he has more sense of financial concepts as well. Financial knowledge can be derived through general intelligence as well with other sources of information. Cognitive abilities of an individual often face cognitive biases.

3.5.1 Relationship of Hindsight bias, financial literacy and decision making of retail investors.

Merkle (2017) explored the relationship between financial knowledge, Hindsight bias and overconfidence in decision making of investors of UK. Hindsight bias is a prominent concern of behavioral researchers and researchers are finding the effects of this bias on decision making of investors (Black, 2012). This bias can cause serious decision-making mistakes and current researchers are focusing to determine the existence, measurement and its working in different sections.

Ates, Coskun, Sahin and Demircan (2016) evidenced that financially literacy enhancement can eliminate biases and individuals can make more strong financial decisions. Financial literacy provides information to investors about securities and their use and also informs investors about evaluation of stocks. Calved, Campbell and Sodini (2009) explicates that better educated household investors are better decision makers and are face less biases.

Firstly, Kahneman and Riepe (1998) wrote about hindsight bias of investors by exploring factors related investors performance. Bias and Weber (2009) measured hindsight bias of investors and devised a test for measurement. He explored that Hindsight bias is actually a mental condition in which an individual does not remember his initial response but

overestimates his initial response after knowing the fact. Biased people normally remember their selection incorrectly after having knowledge about winning stock. If an individual is biased then he will not remember that his initial selection of an asset but he will show his selection of winning stock in second time, though it may not be true.

In financial sectors, many of researchers are focusing to examine hindsight bias in financial decisions but in Pakistan there is big gap in this regard. Hussain, Shah, Latif, Bashir, and Yasir (2013) measured Hindsight bias of Pakistani stock investors and demonstrated that most of the investors are biased in their decision making. This study focuses on measurement of hindsight bias with respect to financial literacy which will enable the Pakistani investors to de (bias) their investment decisions.

H10= Hindsight Bias mediates between financial literacy and decision making of retail investors.¹⁰

3.5.2 Relationship of Herd Behavior, financial literacy and decision making of retail investors.

Herd behavior is a phenomena or trend in which investors follow the behavior of others, and during turbulent periods of economy herd behavior becomes more prominent than in a tranquil period (Wanidwaranan and Padungsaksawasdi, 2020). Christie and Huang (1995) also supported the argument that herd behavior occurs more pronouncedly in turbulent environment. Herd behavior means imitation of behaviors of others is increasing in stock markets with increase in irritational investment behaviors, and illogical imitation of others' behavior is causing unstable stock market situation. For avoiding the risk of herd behavior in current markets it is necessary to understand it deeply (Han, 2020). Bouteska (2020) said that herd behavior is a behavioral similarity which is due to interactions of behavior of many people and it leads to convergence of equity shares. He further explored

¹⁰ See section 2.7.1 in Literature review

that by herding people do not try to use their own knowledge and beliefs and avoid rationality instead of this they follow patterns of others. Financial literacy helps individuals to understand their investments rationally and avoid herding in the investments. Decision making of investors get affected by the irrationality of their behavior, and Herd behavior is also a form of irrationality. Financial literacy will enhance knowledge and confidence of investors and provides them a systematic method of decision making (Giesler, and Veresiu, 2014). So, the question is, how financial literacy will try to cope up with the herding in investors behavior. This study will explore that either herd behavior mediates between financial literacy and decision making.

H11= Herd Behavior mediates between financial literacy and decision making of retail investors.

3.5.3 Relationship of Confirmation Bias, financial literacy and decision making of retail investors.

Confirmation bias is a type of mental irregularity in which an individual tries to confirm his existing thoughts, in order to accomplish this task, he does not try to evaluate contradictory and opposite thoughts. He just tries to support that information which supports to his argument. This mental condition is very much dangerous for investors in stock markets. In 1960, Wason's rule of discovery has supported the measurement of confirmation bias in general form. This research of Wason has been followed by many others (Johnson-Laird and Wason, 1970).

Rabin and Schrag (1999) studied existence of confirmation bias in economic settings on formation of beliefs. Confirmation bias is defined as the extension in overconfidence; people tend to favor information which confirms their beliefs and do not make efforts for assessing the information for next decisions. Park, Konana, Gu, Kumar and Raghunathan

(2013) studied behavior of 502 investors and confirmed that investors admire their prior beliefs and do not try to evaluate stocks.

Park, Konana, Gu, Kumar and Raghunathan (2013) supported this argument and explored that investor with education have less motivation for their favored information. Nelson (2014) behavioral (confirmation) bias affects the cognition of human beings. By this argument an inference can be drawn that if investors cognition has influence of confirmation bias than they cannot make rational decisions. So, there is a question, is financially literate person has solid information rational choices?

In Pakistan, where generally the literacy rate and specifically the financial literacy rate are very low, investors are often victim of different types of biases (Hussain, Shah, Latif, Bashir, Yasir, 2013). Confirmation bias can be just like a poison for portfolios of stock investors because biased investors would not try to search information for diversified portfolios but they will try to purchase their favorite securities though in real its profitable or not.

H12= Confirmation Bias mediates between financial literacy and decision making.

3.6 Relationship of Financial literacy and decision making of retail investors.

Recent studies have shown that lack of financial literacy leads to bad portfolio and saving decisions or lack of financial literacy causes suboptimal decisions (Lusardi and Mitchell, 2007; Lusardi and Tufano, 2009; Van Rooij et al., 2011). Financial literacy controls the irregularities of cognition and provides sound knowledge base to investor for optimal decision in financial markets. Financial markets and especially stock markets are dynamic mechanisms and decisions for sound portfolio investment require sound financial

knowledge of securities. Financial knowledge gives investors proper confidence and save them from over and under confidence in stock markets.

Financial literacy increases the chances of rational decisions and in turn controls cognitive biases and effects on the return of an investors (Jappelli and Padula 2013; Lusardi and Mitchell 2013; Hsu 2011; Delavande, and Rohwedder, and Willis 2008). For instance, Delavande, Willis, and Rohwedder (2008) considered risky bond and stocks and explicated a simple two-period model of saving and portfolio allocation, which allows for understanding of financial knowledge as human capital (Lillard, 1999 and Becker 1975). That work posits that individuals will optimally invest in financial knowledge and will select good advisors and portfolios which will return higher and will minimizes risks of projects. So, this study hypothesizes the following statement.

H13 = Financial literacy has strong positive direct relationship with good decision making of retail investors.¹¹

3.7 Summary

The overruling purpose of this chapter was to encapsulate the major theories about financial literacy and cognitive biases and also elaborate the causality of the relationship between financial literacy and stock market decisions by providing strong theoretical support. This chapter highlighted that there are many factors which are important for measurement of financial literacy. Financial literacy gets affected by the cultural differences and many of the socio and demographical variables. This chapter also provided an insight about the emerging field of behavioral finance and provided a rationale about the link between financial literacy and cognitive biases. In concluding remarks, this study suggests the importance of financial literacy in good stock returns. This chapter provides rationale for development of a conceptual model which is shown below;

¹¹ See section 2.8 in literature Review

Conceptual Frame work

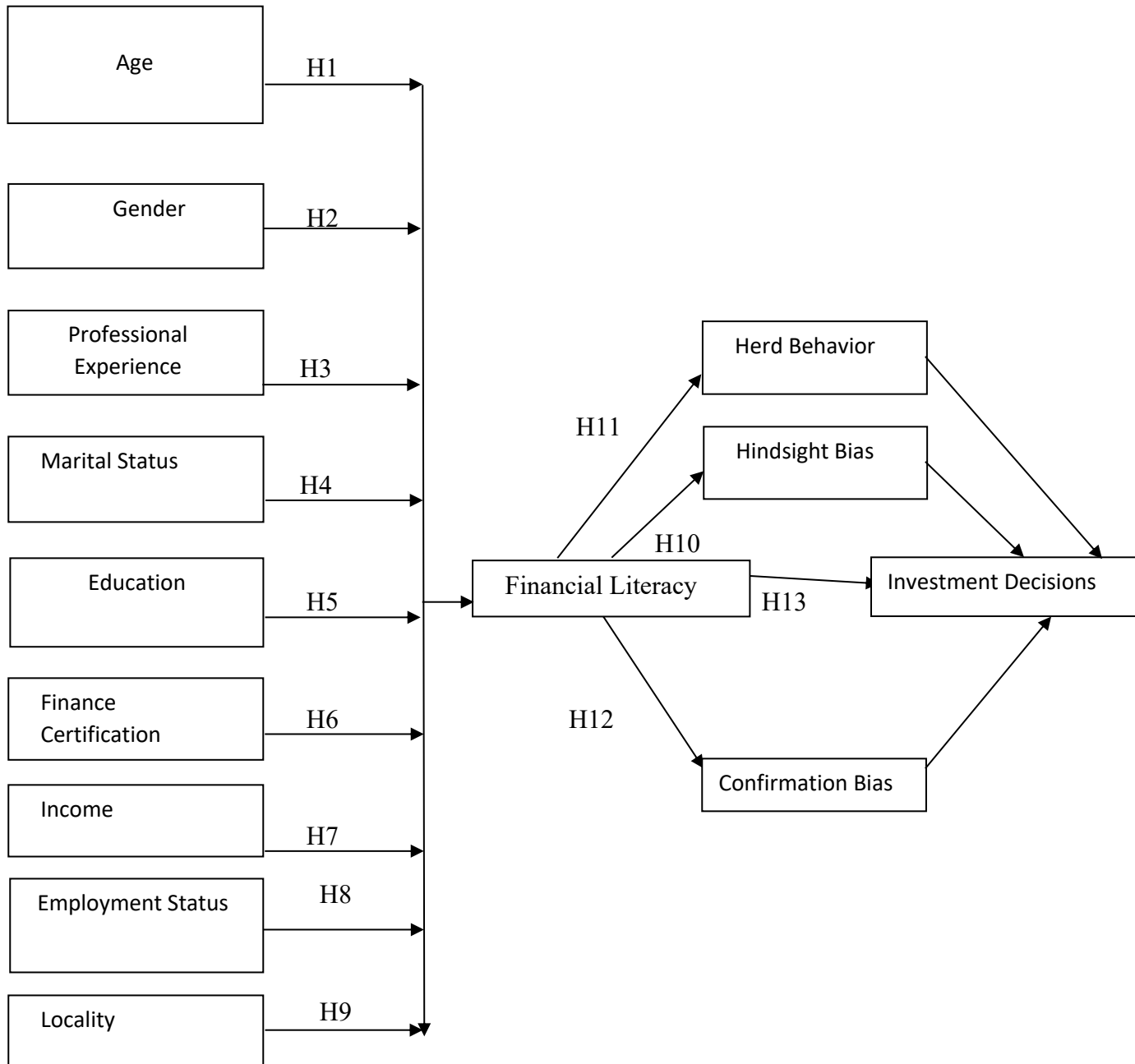


Figure 3.1: Conceptual Frame work

CHAPTER 4

RESEARCH METHDODOLOGY AND DATA COLLECTION

4.1 Introduction

Research in business is closely integrated with many of the research tools which describe the organizational reality. This chapter throws light on the research methodology and data collection process which are needed to test the causal links of the conceptual model in detail. For empirically testing the model it is evident that appropriate research methods and extensive body of data is needed.

This study is based on positivist paradigm and quantitative strategy is used for the purpose of data analysis. This study has a logical research design, in which data is examined through developing a questionnaire. The questionnaire used is based on the already tested and survey questions. The reliability and validity of the instrument was checked and also piloting was done for more reliability. This study investigates the roles of demographics in determination of financial literacy, measurement of financial literacy of investors and in turns the role of financial literacy in cognitive biases and investment decisions of investors in stock markets of Pakistan.

4.2 Epistemological, ontological and axiological stance of the study

Native methodologies explored the relationship between the methodology, epistemology (ways of knowing), ontology (ways of being) and axiology (ways of doing) are viewed as

circular and connected rather than separate entities (Wilson, 2008). This research study has an objective stance and falls under positivist paradigm. According to Hesse-Biber (2009) defines a paradigm as a framework which guides for theory building and this paradigm influences on perspective and philosophies of the researches about their stand points towards world.

Guba and Lincoln (1994) described that development of a paradigm is based on these logical questions

- a. The Ontological question is what the real nature of reality is
- b. The epistemological question what is the basic belief about knowledge (i.e. what can be known)
- c. The methodological (axiological) question is how the researcher can go about finding out for evidencing his /her belief.

This research study falls under the positivist paradigm and sees reality as an objective form of knowledge. Quantitative technique for hypothesis testing is used in this research because hypotheses are derived through literature. There are two major opposing schools of thoughts, qualitative and quantitative. A qualitative researcher explicates all the relevant facts and believes that reality is not measurable and there are multiple realities in the world which are open to individual interpretation. Positivist believes that there is one reality in quantifiable world (Allan, 1998). This is evidenced and declared by researchers that these two approaches have two different views of analyzing the reality (Hitchcock and Hughes, 1994, p.4).

In extensive view, qualitative philosophy provides explanations of complex phenomena, proportions and procedures and is not much concerned with specific outcomes of a study. According to Yin (1984) qualitative methods provides more deep understanding of complex phenomena and it allows researcher to understand closely a social reality and to observe phenomena in more detail. This approach is appropriate when understanding of phenomena is an addition in theorizing about the phenomenon. Qualitative research helps the

researchers to observe and judge the behaviors of the participants (Sutton and Auston, 2015).

Quantitative approach is used for more generalizations and has an underlying root of objectivity. It is used to quantify behaviors, beliefs and opinions for getting some generalized observations from large data sets. Quantitative approach is more appropriate for hypothesis testing. Logical positivist approach maximizes the neutrality and objectivity.

As for as ontological stance, this study views the financial literacy, behavioral biases and investment decisions as objective form of knowledge and according to epistemological stance there are three main sources of knowledge, truth belief and justification. For consideration of knowledge a truth must be supported by some reliable sources otherwise it cannot be considered as truth. This study found reliable resources for judging the relationship between financial literacy, cognitive biases and investment decisions. These concepts are derived from through and deep understanding of literature. Positivist paradigm is more suitable for knowing the details of the variables and for quantification of the relationships between variables and quantitative approach is used for testing the hypothesis.

4.3 Research Methodology and Justification

Martin (1990) demonstrated that choice of research method is never simple, research methods are the tools and techniques to give justification for your proposed theory or hypothesis. Therefore, a researcher has to decide both epistemological and ontological stance for the phenomena which is under study. Lewis, Thorn Hill and Saunders (2007) argued that epistemology is actually the knowledge about nature. Whereas ontology is the name of nature and its components. On the basis of this epistemological and ontological stance, a researcher should define in which paradigm his research will fall.

Paradigm is actually the cluster of beliefs and dictates specific influences on a science in particular discipline about the research concerns, methods, results and interpretations (Brayman, 2007). There are two major schools of thoughts one is positivist and other is interpretivist. Positivist paradigm normally consists of experimental and manipulative methods and ensures that there is distance between the subjective biases of the researcher and objective reality of under study phenomenon. Positivist paradigm generally focuses on the hypothesis's development and their testing, normally quantitative approach is used under this paradigm (Cresswell, 1998).

According to Braymen and Bell (2004) deductive approach is more associated with quantitative approach and quantitative approach has a specific purpose of hypotheses testing and generalization of findings as

“Quantitative research methods focus on the certain objectivity and also focus on the production of generalizable and quantitative results by some statistical method. Quantitative beliefs are based on certain objectivity about reality which can be quantified. Study of cause and effect is done by quantitative methods”.

(Rubin and Bobbie, 1993; p.30)

So, this study has a specific purpose of find out causal relationship between variables and then testing the hypotheses based on these emerging causal inks between variables. For this purpose, quantitative approach is used mainly while for measuring the cognitive biases, experimental technique is also used.

This study is based on positivist paradigm and the purpose of this study is to generalize the results of the conceptual model for national and international world. The research approach for this study is deductive approach and deduction is actually a process of deducing the hypotheses on basis of known phenomena through support of theory and these deduced hypotheses are must subjected to the empirical testing for generalization of the facts (Braymen and Bell, 2015).

4.4 Research Design

Research methods are tools for examining the connection between different viewpoints by which a social scientist see the nature of reality and its ways for examination of this social reality (Barymen and Bell, 2015, p.4). Research methods are actually the strategy to achieve the desired objectives of the research. For finding out the answer of research problem and for exploring the issue there is need of strong methodological approach.

According to Kerlinger (1986), research design is: “the system or plan for examining the research questions” (p.279). This definition is further supported by Rubin (1980) by defining the methods as; “For evaluating a particular theory or perspective a plan of data collection and analysis is called research design” (p.70).

This research is based on a specific focus to examine the level of financial literacy, find out the causal link between socio-demographic factors and financial literacy, measurement of financial literacy, a link with financial literacy and cognitive biases and at last to examine the effect of financial literacy on investment decisions. For the purpose of developing a research design the researcher scrutinized a number of vital questions including the unit of analysis, the time frame of the investigation, the sampling unit and process, the rationale of the study, predictable challenges to the research, and finally, the technique of data collection. This section throws light on these critical aspects of research design used for this study.

4.5 Unit of analysis

Rubin (1989) defines unit of analysis in a way that unit of analysis can be any individuals, groups, organizations, and/or social artefacts in any specific context, for this

study unit of analysis are organizations and houses of retail investors, because the concern of this study is to examine the retail investors of Pakistani stock markets.

In stock market activities, there are two prominent types of investors, for understanding the unit of analysis there should be clear distinction in these investors. The intention here is to make a difference, in types of investors; there are two major types of investors, institutional and retail. If companies are investing in other companies, then these investors were considered as institutional investors while if investors are investing in companies directly or through agents then they are considered as retail investors.

4.5.1 Unit of observation

Conceptually, a retail investor is an individual who is participating in stock market activities by his means. Clearly, every individual who is investing in stocks or securities of stock markets is considered as retail investor. On the other side, operationally retail investors for this study were considered who invested money in the stock market activities from last one year. Because of the fulfillment of the objective of this study there is need of return of last one year. So, investors who are investing money from last six months or less than one year were excluded from the study.

These respondents were presented a well-structured survey form for the collection data and all the participants of the study were autonomous to join the research, because of the lengthy nature of analysis any participant with excuses was not considered. Confidentiality and privacy of all participants was maintained and participants were guaranteed about issues related to confidentiality so they gave answers with confidence.

4.6 Time-Frame of the Study

Time frame for the study is another important point for achieving the optimum results, longitudinal time frame is better and by longitudinal study maximum results and more necessary data can be gathered. But the time constrains and changes in socio-demographical environment related to financial literacy of individuals' makes this virtually impossible at least within the scope of this study so this study is conducted on cross sectional basis.

Due to ever changing mechanisms of financial markets and instruments and changing nature of complexity of these instruments, literacy standards can vary from year to year so by longitudinal process it can be very much difficult to understand the financial literacy of individuals at any given point in time. An alternative of this can be to do survey every year for finding out the increasing and decreasing trend in financial literacy rate.

In psychology, it is appropriate to examine individuals by longitudinal approach but this study is not only concerned with psychological issue of individuals but it is integrating this psychological issue with the given state of financial knowledge of individuals in a specific year. So, for this study it is appropriate to use cross-sectional approach and for examination of psychological biases short time intervals within a year will be used in this study.

4.7 Data collection and Analysis

4.7.1 Data collection

This study examined retail investors and these informants belong to different occupation and professions for example banks, Dfi's, Universities, investment houses, students and households etc. the data were collected from various banks and institutes, for instance,

Habib bank, Habib metro bank, Habib metropolitan bank, Silk bank, Faisal bank, National bank, Arif habib securities, First capital equity limited, The University of Faisalabad, University of Lahore etc. and many of the households were also included. The major cities were Islamabad, Lahore, Gujrat and Faisalabad. These individuals are investing in stock markets from last one year and all were registered investors under any broker. These informants were homogeneous on the basis of stock investment but heterogeneous by professions, job status, and age, gender etc. Households, bankers, students, mill employees, employees of investment companies and from all types of institutions and companies' respondents participated in this research activity. Participants in this study were autonomous to join on the basis of their confidentiality and anonymity. As discussed above this study follows positivist paradigm and is based on quantitative approach so questionnaire is used as tool for data collection.

4.7.2 Data Analysis

Data are analyzed in quantitative strategy, by application of statistical tools. In this study, under positivist paradigm, statistical techniques are used for data analysis. In first section, of the study, data of financial literacy score was examined based on the techniques adopted by Rooij, Lusardi and Alesse (2011). Financial literacy responses were collected from respondents and were scored for pass/ fail of investors in this test. The passing criteria was 5/5 score in financial literacy test. Advance literacy was measured by additional 11 questions of advance knowledge of finance.

The second step of this process of data analysis was to examine the Herd behavior, hindsight and confirmation bias and their mediation between financial literacy and decision making of investors. In data analysis phase, statistical tools (binary regression) were used to determine the causal links in financial literacy and demographics (age, gender, education, professional experience, and religiosity), and Process Macro (Hayes,2020) were used for analysis of mediation between cognitive biases, financial literacy and decision making.

4.8 Research tool

The questionnaire developed for this study was developed after the rigorous study of literature and previously developed tools. This questionnaire is based on some adopted and some adapted parts. A great scrutiny was done for development and enhancement of the instrument according to literacy standards of Pakistani investors. There are five sections of the questionnaire, first part comprises on the demographic information, for instance, age, gender, employment status, professional experience, income, education and marital status. And locality etc. the other section contains research questions regarding financial literacy and third section contains questions regarding Herd behavior, Hindsight bias and confirmation and in last section contains questions regarding decision making. This questionnaire was adopted and modified according to the need of study. The basic and advance financial literacy questions were adopted by Rooij, Lusardi and Alesse (2011), and questions regarding Herd Behavior, and Hindsight bias were adopted from Baker, Kumar, Goyal and Gaur (2018) and questions related to Confirmation bias were adopted by () and statements of decision making were adopted by Rasheed et al. (2018).

4.9 Sampling Process

A process of choosing small and tiny units (individuals, groups and organizations) from a population for the purpose of estimation of generalized outcomes of the whole population (Sekrean, 2006). The sampling process is to draw individuals from population for generalization of results (Pinsonneault and Kraemer, 1993).

Sampling process is a most important element and by good sampling process a healthy sample can uncover the many of hidden qualities of the entire population, but is not easy task to draw an appropriate sample which can represent the qualities of the entire population. It involves time, money, location, and also accuracy of selection of population (Braymen and Bell, 2015).

This study has a sampling process in which investors were searched who were investing in stocks from last one year, these investors were searched through employees of banks, development financial institutions, universities, business organizations, colleges and through chain referencing investors were asked to give reference of other investors. The sampling process scrutinized those investors with less than one year on investment activities were dropped from the sample because they were not qualified for this study and will not be able to represent the true characteristics of population in terms of research objectives of this study.

4.9.1 Sampling Population

A good sampling Population should be able to represent the qualities of actual population. Tull and Hawkins (1990) believe “a population must be defined in terms of elements, sampling units, extent and time” (p. 465). This study defined population according to the definition of Tull and Hawkins in the following manner.

Definition of Population

Element	Individual Investors
Sampling Unit	Banks, Development Financial Institutes, Houses, Universities, Investment Banks, Diversified companies, households.
Extent	Individuals who are investing in stocks Markets (PSX) Registered with CDC or Broker of Stock Exchange

Who have UIN (Unique Identification Number)
with NCCPL (National Clearing Company of
Pakistan)

Time

Investment history of Last one year

4.9.2 Sampling Frame work

Sampling frame for this study was not clearly defined with boundaries and investors were searched on judgmental basis because there is no framework regarding the availability of investors in Pakistan. On the other hand, sampling unit for this study is organizations and houses of diversified nature where any investor can work or reside. There was no available alternative method of selection of investors and this method did not harm at any extent to the objectives of the study though it required hard work and more search on the part of the researcher.

4.9.3 Sampling Plan

First phase of this plan was of data collection about financial literacy cognitive biases and decision making of investors. Respondents were contacted through phone before distribution of questionnaires and prior approval of related organizations was taken when some investors were professionals not households. For first phase, survey forms were mailed to respondents so that they can fill the form at home or in office. While some of the investors were approached by personal visits of the researcher. The researcher explained the purpose of the study, the length of the questionnaires, and assured the confidentiality of the results. The researcher told investors that this study will be helpful for Pakistani stock market investors and will also be beneficial for individual investors. The researcher also told them about the nature of the study and also explored those questions about financial

literacy are not culturally specific but these are selected from international studies. The research raised the confidence of the investors by giving them time before starting the survey.

4.9.4 Sampling Method

Sampling technique has great association with the nature of the study. Inappropriate technique of sampling can destroy the essence of the research. Sampling technique should be integrated with the philosophy, objectives, and purpose of the study. For this study, non-probability sampling technique, convenience sampling was used. These techniques can be best defined as researcher may self-select respondents; no attempt is made in their construction to sample randomly from any well-defined population (Lunneborg, 2007). Convenience sampling means haphazardly selecting those cases which are easily available for our research.

In this study, there is no proper list available with the name of individual investors of stock markets of Pakistan. Lists of individual investors' names under specific institutes and organizations are not available but total population is known for this study. So, this study used convenience sampling on the availability of investors. Another reason for convenience sampling is the long procedure of data collection of this study. Convenience sampling is more appropriate because due to the nature of the study there was need of willing and available investors. In any other systematic method, there should be sequence available for sampling method but for this study there was no list in a systematic manner available for the names and addresses of the investors. So, investors based on their availability and willingness was best suitable for this study.

4.9.5 Sample Size

Sample size of the study is another major concern; sample selection is a crucial issue because in international scenario there are lot of surveys available on financial literacy with different number of sample sizes. Those surveys were based on the measurement of financial literacy through organizations, research teams, and individuals. Financial literacy has been measured in households (Bernhiem, 1990; Lusardi and Mitchell, 2007), saving sector (Lusardi, 2007), capital market investors (Rooij, Lusardi, and Alesse, 2011).

Different researchers and teams used different sample sizes for measuring the financial literacy, Chan and Volpe investigated 530 online individuals for finding out the level of financial literacy, Driva, Lührmann, and Winter (2016) sampled 418 individuals for measuring financial literacy. Siekei, Wagoki, and Kalio (2013) measure financial literacy of 282 small scale business owners. Normally large sample size for measuring financial literacy is taken by government institutes and agencies which has bundle of resources and information. On the other hand, Niles (2006) reported that for finding an appropriate sample size, $1/\sqrt{N}$ approach is appropriate.

According to this approach sample size should be under range of 200-500 for 0.45 chance of error. So, this study also adopted the approach of $1/\sqrt{N}$ and by using this approach chance of error is under range which is 0.045. According to this formula, chance of error is under range and the results for *survey are good*. On individual level normally sample size under the range of 600 was taken by investors. Sample size for this study is 478 retail investors which is based on formula presented by Niles(2006) and also based on the reference of similar studies of past to till date. Due to long nature of the study and unavailability of respondents a medium sized sample size was selected. Many of the previous and researches provided the base for selection of this sample size.

This study actually derived sample from the available number of retail investors of stock markets. Sample was derived on the basis of known population of stock investors which is (.22 million) based on their UIN's (Unique identification number) registered, this record has been obtained through National Clearing Company of Pakistan Limited (NCCPL).

Above mentioned study of Chen and Volpe provided grounds for selection of 478 individuals for measuring the concept of financial literacy. This study is multidisciplinary in nature and demanded more than one-time activity, so not too much investors were available for data collection purpose and a justified number of 478 respondents were chosen by the researcher for data collection of financial literacy.

4.9.6 Response Rate

O'Sullivan et al. (1994) demonstrated that for a good response rate firstly a researcher should have an appointment with the respondent either through phone or mail and on the other hand questionnaire should be arranged in easy, comprehensive, attractive and understandable manner.

These methods were scrutinized before distribution of the questionnaire. After selection of the sample size many of the respondents from different cities were contacted through phone and were requested to participate and they were assured about their confidentiality of responses.

In response total of 500 respondents showed consent to take part in the activity and questionnaire were circulated in the respondents, from which 7 respondents refused to answer the financial literacy test. While others returned questionnaire with some blanks, so these respondents were automatically dropped from the survey due to incomplete survey forms. Response rate for this study was not bad because total of 478 respondents answered from 500. It could be better if investors were searched more but due to the time limitation of this study, no more time was possible to give investors.

4.10 The Pilot Test

Pilot test was conducted for this study to check the general feasibility of the instrument and also to scrutinize the validity and reliability of the instrument, although questions for financial literacy measurement were adapted by Rooij, Lusardi and Alesse (2011). For Measurement of cognitive biases (Herd behaviour, Confirmation Bias and Hindsight bias) Questionnaire of Baker, Kumar, Goyal and Gaur (2018) is used and for measuring the decision-making skills of investors questionnaire of Rasheed et al. (2018) is used. The pilot test helps the development of final survey questionnaire and guided about the modification of some of the questions and sequence. The instrument used in piloting was developed on the same pattern which was selected for the final survey but after the piloting some of the amendments were made. The sampling frame was comprised of individual household investors and students who were investing in stocks from last one year.

For the purpose of piloting, 43 participants were requested to take part from Gujrat and Lahore. Determination of suitable sample size for piloting is done in the same way as for final research survey. For this purpose, convenience sampling technique was used. Respondents were asked to give comments for more clarity of wording and structure of the questions. Financial literacy questions were not changed while some of the questions regarding confirmation bias and herd behaviour were bit changed after piloting.

4.11 Limitations of the research methods

This study has some limitations and there should be discussion about these limitations for the purpose of clarifying the objectives and for generalizing the results of the study. This study used survey techniques and a questionnaire was used for intake of responses, but one limitation of survey method is that, many of the individuals did not want to respond on close ended questions they want to share their opinions regarding the

phenomenon, so their responses cannot be calculated in this research study. Moreover, a standardised questionnaire imposes limitations on the profundity of data which can be collected about the observable fact under investigation (Kerlinger 1986, p. 418).

There is another limitation for this study, for examination of financial literacy rate general literacy rate of the country should be stable but in Pakistan it is evident through research that there is low level of general literacy and so many of the investors do not even know the meaning of stocks but they are investing with the help of others. There was a great difficulty for the researcher to identify cases from the population of investors for getting responses. So, this sample can be larger but a hurdle was unwillingness and unavailability of proper records about investors.

There are some other limitations in procedural process of this study, the investors are more sensitive by the presence of an investigator and they feel ashamed when they are asked any question regarding financial literacy and they are not aware. So, at first step some of the investors refused to being a part of the study.

This study can be viewed as a qualitative study by using diary methods and photographs as unit of observation. Respondents could be asked to note down their investment experiences in diaries and then these responses can be collected. Another way of analyzing the causal links between financial literacy and decision-making capabilities can be to use multivariate analyses. This study has a limitation that due to time constrains and nature of the study, these qualitative methods could not be used. Further researchers can use these qualitative methods for further exploration of the concept of financial literacy.

4.12 Summary

This chapter encapsulates the detail methods for the fulfillment of research objectives and enlightens a good road map for the reader to use these methods in further

research studies. This chapter provide detail frame work of unit of analysis, complete sampling for process for gathering justified data, operational definitions, hypotheses based on these definition and questions to measure those hypotheses. In later part this chapter gives detail about statistical analysis techniques and tools for the examination of above-mentioned hypotheses. This chapter tried to narrow down the objective of the study in operational manner and throws light on the practical aspects and achievement of those objectives of the study. The result derived from this chapter will be discussed in the following chapter.

CHAPTER 5

RESULTS AND DISCUSSION

5.1 Introduction

This chapter discusses the results of the collected data for this study for the measurement of financial literacy of retail investors of Pakistani stock markets. It is an effort to find out the effect of financial literacy on decision making capabilities of retail investors through measuring the effect of herd Behavior, hindsight bias and confirmation bias. This study also has an aim to examine the link between different socio-demographic variables and financial literacy so the principal purpose of this research is to gain an understanding of the role of financial knowledge in debiasing the stock investment decisions of investors.

The first part of the study reviewed the theoretical underpinnings about financial literacy and effect of different socio-demographical variables on the level of financial literacy.

The purpose of this chapter is to classify individuals on the basis of financial literacy, to examine the link between the socio-demographic variables and financial literacy and then financial literacy and investment decisions of investors by undertaking the effect of cognitive biases (Herd behaviour, hindsight bias, confirmation bias) and to test the hypotheses pertaining to these relationships.

These examinations are performed by the following steps:

- 1. An assessment of the level of financial literacy of individual investors and division of these individuals in two groups (financially literate and financially illiterate)**

through exam type test developed by Rooij, Lusardi and Alesse (2011) and questions of Lusardi and Mitchell (2007) about financial literacy.

2. An assessment of link between socio-demographical variables and financial literacy by taking basic financial literacy as dependent variable.
3. An assessment of the link between cognitive biases and return on investments in both groups (Financially literate and financially illiterate).
4. An assessment of causal relationship between good decision-making capability and financial literacy of investors

5.2 Statistical analysis

Statistical analysis provides the generalized results for the collected data. For this study, descriptive statistics is used for summarization of data (mean, standard deviation, and percentages) while for testing the causal relationships between causal links of conceptual model inferential statistics is used.

5.2.1 Reliability test

Reliability means to obtain the same results when measure is repeated to same group of participants (Herbert, 2013). Reliability is the consistency of a measure or test; it is the ability of a test to measure repeatedly which it intends to measure. For this study, reliability of the instrument was measured by Cronbach's alpha (α) test and score of this test is .834 which is more appropriate for reliability of the instrument.

5.2.2 Validity test

For checking the validity of the instrument, a bivariate analysis was done and results showed that all the statements of questionnaire are highly correlated with each other. Not a single statement has value above than alpha level of .05, so all the statements are included which were adopted by the instruments of other researchers as mentioned in chapter no 4 of the manuscript. Detail results of Bivariate analysis are attached in Appendix B.

5.3 Relationship of financial literacy and socio-demographic variables

This study aims to find out causal link between the socio-demographic variables (age, gender, education, professional experience, marital status, Income, locality, Finance certification and trainings, and employment status) and financial literacy. Financial literacy test scores have been changed in binary form for division of respondents as mentioned above and this binary variable was considered as dependent variable for socio demographic variables of investors. So, for examining the causal link between financial literacy (DV) and socio demographic variables (IV's) a Binary Logit model was run and reference category for each variable with coding is considered its last category.

$$\text{Eq.1 Predicted logit of Basic financial Literacy} = P(\text{BFL}) = \frac{1}{1 + e^{-(b_0 + b_1x_1 + \dots + b_{23}x_{23} + \epsilon_i)}}$$

$$\begin{aligned} & (b_0 + b_1 * \text{age} + b_2 * \text{age (1)} + b_3 * \text{age (2)} + b_4 * (\text{age})^3 + b_5 * \text{age (4)} + b_6 * \text{Gender} + \\ & b_7 * \text{Professional Exp} + b_8 * \text{Professional Exp (1)} + b_9 * \text{Professional Exp (2)} + b_{10} * \\ & \text{Professional Exp (3)} + b_{11} * \text{Professional Exp(4)} + b_{12} * \text{Marital Status} + b_{13} * \\ & \text{Income} + b_{14} * \text{Income (1)} + b_{15} * \text{Income (2)} + b_{16} * \text{Income (3)} + b_{17} * \text{Income(4)} + b_{18} * \\ & \text{Locality} + b_{19} * \text{Locality (1)} + b_{20} * \text{Locality (2)} + b_{21} * \text{Finance Certification} + \\ & b_{22} * \text{employment Status} + b_{23} * \text{Education} + \epsilon_i) \end{aligned}$$

5.4 Financial Literacy, cognitive biases and decision making.

As it has been discussed that financial literacy scores categorized respondents in two groups (financially literate and financially illiterate). For examination of mediation of Herd Behavior, Hindsight and confirmation bias on decision making of retail investors. Following equations were used for examining statistically significant relationship of hindsight and confirmation biases with decision making of retail investors.

$$\text{Eq.2} \quad \text{DM} = \alpha + \beta (FL) + \beta (HB) + \varepsilon$$

$$\text{Eq. 3} \quad \text{DM} = \alpha + \beta (FL) + \beta (CB) + \varepsilon$$

$$\text{Eq. 4} \quad \text{DM} = \alpha + \beta (FL) + \beta (HNB) + \varepsilon$$

5.5 Characteristics of the respondents

The respondents of the study are comprised of different characteristics but all belong from individual investors' category. Individuals who are working in different organizations with different positions but are investing in stocks of capital markets (Karachi, Lahore and Islamabad) are respondents of the study. These respondents are from diverse cities for instance, Lahore, Islamabad, Faisalabad and Gujrat. These individuals should be registered stock investors under the category of retail investors of NCCPL and they should have at least one-year experience and investment record.

5.6 Descriptive Statistics

Descriptive statistics are the tools for presenting large data sets in manageable and summarized form. Summary statistics represents summarized information in possibly simple

way. This demographical information is conceptualized as important by the researcher for drawing the results of the study.

Table 5.1

Demographics of The Respondents

Age	18-28	173	36.2
	28-38	105	22.0
	38-48	69	14.4
	48-58	80	16.7
	58-68	51	10.7
Gender	Male	417	87.2
	Female	61	12.8
Professional Experience	> 5 years	163	34.1
	5-10 years	126	26.4
	10-15 years	72	15.1
	15-20 years	70	14.6
	More than 20	47	9.8
Martials	Married	200	41.8
	Single	260	54.4
	Separated	18	3.8
Finance Certification and Trainings	No	324	67.8
	Yes	154	32.2
Education	Competed High School	134	28
	Undergraduate	112	34.4
	Graduate	159	33.3
	Post Graduate	63	13.2
	Doctorate	10	2.1

Income	below 100000	79	16.5
	100000-200000	75	15.7
	200000-300000	127	26.6
	300000-400000	165	34.5
	more than 400000	32	6.4
Employment status	Households	126	26.4
	Private sector	71	14.9
	Investors from Dfi's	95	19.9
	Investors from Banks	117	24.5
	Students	39	8.2
	Public Sector	13	2.7
	Others	17	3.6
Locality	Village	252	52.7
	Town	92	19.2
	City	134	28

Table 5.1 shows the distribution and frequency percentages of the respondents. As it is explicated by the table that in age category, majority of the respondents 173 (36.2%) are from age bracket of 18-28 years, 105 (22.0%) fall under age bracket of 28-38, 69(14.4%) respondents fall in 38-48 years bracket, 80(16.7%) have age under 48 to 58 years, and 51(10.7%) respondents are from age bracket of 58-68 years. As for as Gender is concerned, a big proportionate of respondents are males that shows dominance of males in financial sector of Pakistan, out of 478 respondents total 417 (87.2%) respondents are males while 61 (12.8%) respondents are females.

This table shows that out of 478 respondents, major portion of respondents have less than 10 years' experience as it is evident from distribution that 163 (34.1%) have less than 5 years and 126 (26.4%) have less than 10 years' experience, 72(15.1%) respondents have

less than 15 years of experience and 70 (14.6%) respondents have less than 20 years' experience and only 47(9.8%) respondents have more than 20 years of experience.

This table shows that 200 (41.8%) respondents are married and 260 (54.4%) respondents are single while 18 (3.8) people are separated. Out of 478 respondents 324(67.8%) respondents do not have any finance related certification or degree while 154 (32.2%) respondents have finance degree. Family size of the respondents was also considered for the study and according to above table 305 (63.8) respondents belong to small families are number of their family members are in range of 1-2, 79(16.5) respondents fall under range of 3-4 family members' while 94(19.7) respondents have 5 above family members. As for as family type is concerned 325(68%) people belong to nuclear family type while 153 (32%) people belong to joint family structures.

This table explicates that out of 478 people majority 226 (47.3%) respondents visit bank on yearly basis, 91 (19%) people visit bank on half yearly basis,49(10.3) people visit bank on quarterly basis while 112(23.4%) respondents visit bank on monthly basis. As for as the general education level of the respondents are considered, total of 104(21.8%) respondents completed high school education, 126(26.4) respondents are undergraduates, 170 (35.6) respondents are graduates, 69(14.4%) people have post graduate degree while 9(1.9%) people have doctorate degree.

Income distribution of the respondents shows that 79 (16.5%) respondents have income less than 100000, 75 (15.7 %) are from income category of 100000 to 200000, 127 (26.6%) have income level of 200000 to 300000, 165 (34.5%) individuals have income range of 300000 to 400000 and 32 (6.4%) have more than 400000. For understanding the nature of investors, their occupation was also examined and above table shows that out of 478 respondents 126 (26.4%) investors are households, 71 (14.9%) are from private sector companies, 95 (19.9%) are from Development financial institutions, 117 (24.5%) are from investment banks, 39(8.2%) are students, 13 are from public sector companies (2.7%) and 17 (3.6%) are from other miscellaneous professions. These findings reveal that majority of

the investors 252 (52.7%) are residents of the villages, 92 (19.2 %) are from towns and 134 (28%) individuals are from cities.

Table 5.2 shows the descriptive for the data which includes mean and standard deviation for the selected sample.

Table 5.2

Descriptive statistics of the respondents

	Mean	Std. Deviation
Age	2.4372	1.39602
Gender	1.1276	.33401
Professional Experience	2.3975	1.34467
Martials	1.6192	.55834
Income	2.9916	1.19745
Locality	1.7531	.86496
Finance Certification	1.3222	.46780
And trainings		
Education	2.3787	1.08975
Employment Status	2.9561	1.60977

5.7 Measurement of Basic Financial Literacy

In the era of fast and rapid financial changes and expansion of economic scenarios gave a rational base for understanding about the sound and current financial knowledge of individuals, either they are well equipped with sound financial and are able to navigate the good financial movements for their overall financial wellbeing or not. For providing sound

financial measurement tools, researcher needs to understand what type of financial knowledge people have and what actually they should have and also, they should understand the gap between these two things. There are few fundamental financial concepts applicable in every economic context and environment. One of these important concepts is Numeracy, second concept is inflation and the third is diversification. It is not easy to translate these concepts in measurable indexes of financial literacy but Lusardi and Mitchell (2008, 2011b, 2011c) have designed a standard set of questions for measuring these concepts and also implemented these concepts in numerous surveys in the USA and other countries from last ten years (Lusardi, 2019).

Financial literacy is the main variable of the interest for this study. Measurement of financial literacy is done in different countries by using different methods and number of questions. Some used more elaborative type of questionnaires (Mouna & Anis, 2016) and some used few number of questions Lusardi and Mitchell (2007) used (three questions based on the concept of numeracy, inflation and risk diversification), Rooij, Lusardi, and Alesse (2007) used (five questions based on the concepts of numeracy, inflation, compounding, money illusion and time value of money), Kadoya and Khan (2019) used (four questions based on Numeracy, inflation and risk measurement techniques) even Stango and Zinman (2008) used a single question to measure the level of financial literacy. The logic behind using short and long versions of questionnaires is different according to the general literacy rate, socio demographic variables and infrastructure of that country.

In such countries, where general literacy rate is very low and people are not much intellectual, use of complicated and more complex questionnaires is not reliable. If people do not have general literacy, then it's not an easy task to understand the complicated phenomena of financial markets. Rooij used a rational approach for measuring the level of financial literacy. Rooij, Lusardi and Alesse (2011) used two types of literacy questions for investors; first part used general questions about basic financial literacy concepts, while the second part assessed high level of financial sophistication of investors.

In Pakistan where general literacy rate is very low, and people are normally not able to understand and participate in financial markets. It is a complicated task to measure the financial literacy of investors. This study adopted and modified the questions of HRS (2004); Lusardi, 2007; 2014 and Rooij, Lusardi and Alesse (2010) for measuring the basic financial literacy of retail investors, this study also adopted the 11 more questions introduced by Rooij, Lusardi and Alesse (2011) for measuring the relationship between basic financial literacy and advance financial literacy. The questions adopted by this study are based on concepts of Numeracy, compounding, inflation and valuation of money (Lusardi, 2011) which has become a standard in the literature (Gambacorta, Locatelli, Pico, and Rampazzi, 2018). This instrument is also used in different studies, for instance, study of Driva, Lührmann, and Winter (2016) used such questions for measurement of financial literacy.

These basic questions of financial literacy or similar to these questions are used in many different studies (Bucher-Koenen & Ziegelmeyer, 2011). Following table provides basic financial literacy questions adopted by Rooij, Lusardi, and Alesse, (2011) and HRS (2004) and also by numerous surveys in USA and around the world (Lusardi, 2019) for measurement of basic financial literacy. These questions were examined by picking the correct answers of respondents. The data derived from this test was examined on further binary basis for analysis after collection of correct, incorrect and don't know answers.

Due to the objective of division of financially literate and financially illiterate group, scores of basic financial literacy test were further divided into two groups. 1 is assigned to those respondents who scored more than 4 and these individuals were considered as financially literate individuals and 0 is assigned to those who scored less than 5. In the same manner if someone scored 6 in advance financial literacy tests than he is considered as financially literate in advance terms and has denomination of 1 while on the other hand if someone scored less than 6 than he has denomination of 0 and he is considered as financially illiterate person in advance terms. This method is used for getting score of financial literacy in binary

form because research has an objective to categorize an individual either he is financially literate or not. This is a new method based on previous financial literacy questions.

Basic Financial Literacy Measurement Index

Numeracy	Suppose you had h100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?
	<i>(i) More than 102 (ii) Exactly 102 (iii) Less than 102 (iv) Do not know.</i>
Interest compounding	Suppose you had 100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total?
	<i>(i) More than 200 (ii) Exactly 200 (iii) Less than 200 (iv) Do not know</i>
Inflation	Inflation: Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?
	<i>(i) More than today (ii) Exactly the same (iii) Less than today (iv) Do not know.</i>
Time value of money	Assume a friend inherits €10,000 today and his sibling inherits €10,000, 3 years from now.

Who is richer because of the inheritance? (i) My friend (ii) His sibling (iii) They are equally Rich (iv) Do not know

Money illusion

Suppose that in the year 2010, your income has doubled and prices of all goods have doubled too. In 2010, how much will you be able to buy with your income?

(i) More than today; (ii) The same; (iii) Less than today; (iv) Do not know.

Financial literacy is the key variable for this study. The following table shows the number and percentages of respondents in both groups financially literate and financially illiterate. Majority of the respondents 330 (69%) are financially illiterate and 148 (31%) respondents are financially literate. This study shows that in basic literacy test almost only one quarter of the investors are aware about basic financial literacy concepts. Majority of the respondents could not qualify the financial literacy test; these investors are not aware with the basic finance concepts.

Table 5.3

Distribution of Financially Literate and Financially Illiterate Respondents in Basic Financial Literacy Test

Financially illiterate	330	69
Financially literate	148	31

Financial literacy is an important variable for studying the performance of financial decisions; financial decisions are considered much important for financial wellbeing and financial capability of individuals. Dynamic moves of financial landscape highlight the

importance of investment decisions and financial literacy as well (Janor, Yakob, Hashim, Zanariah, & Wel. 2017). Hastings and Mitchell (2020) explored that one of the important factors for improper financial decisions is low level of financial literacy among individuals. The global survey of financial literacy on Standard and Poor's ratings (2015) considered financial literacy an important factor for good decision making and also showed that globally most of the individuals are financially literate only 33% individuals are financially literate in both developed and underdeveloped economies. This survey is based on the data of more than 150000 individuals and considered a person as financially literate person if he answers 3 out of 4 concepts of basic finance. These concepts are numeracy, inflation, risk diversification and compounding (Saeedi and Hameedi, 2018).

This study also evaluated the investors' financial literacy based on these concepts with some modifications by Rooij, Alesse and Lusardi, (2011). The result of the study declared that only 31 percent individuals are financially literate in Pakistan and the results are much similar to above mentioned global survey of financial literacy. The concern of this study is to examine the role of financial literacy in good investment decisions. This table shows that in Pakistani context, level of financial literacy is very low among investors which are an alarming situation for investment sector.

Awais et al. (2016) explored that financial literate investor can make better decisions than financially illiterate investors. Dincer & Yuksel (2020) highlighted the importance of financial literacy and emphasized that investors with high level of financial literacy will save more and will make the right financial decisions, because financially illiterate individuals do not want to try complex financial products or if any of those use they can suffer from portfolio problems but literate investors will make rational choices and this will contribute to their budgets. By the review of the studies it is evident that financial literacy provides logical ground for sound decision making (Rasool and Safi Ullah, 2019). So, precisely this study also measured financial literacy of investors for exploring the relationship with their investment decisions.

In all over the world financial literacy rate is very low as reported by Farber (2016) nearly two third of the Americans cannot pass basic financial literacy test. From all of the respondents One-third (34 percent) of the respondents answered all questions of basic financial literacy test correctly (Lusardi, 2011) in USA. In previous studies different researchers (Bernheim 1995, 1998; Hogarth and Hilgert 2002; Moore 2003 and Lusardi and Mitchell 2007b, 2007c) supported the results of this study. Mandell (2005) also reported the similar results for US young adults (Lusardi, Mitchell, and Curto 2010).

In specific groups or smaller samples, high level of financial illiteracy is also reported among specific groups of population (Agnew and Szykman, 2005, Mandell, 2004; Moore, 2003; Bernheim, 1998; Bernheim, 1995). The Organization for Economic Cooperation and Development (OECD) showed that 30 member countries have very low financial literacy rate. OECD declared that consumers argue that financial information regarding financial matters is not easy to search and integrate (OECD, 2005). Bucher-Koenen and Ziegelmeyer(2011) also explored through SAVE that financial literacy is low among different groups of individuals. Overall, in the world, normal ratio of financial literacy among different groups is very low and as Pakistan has very low level of general literacy, so the results of this study about financial literacy was predictable.

Following is the Pie chart which shows the distribution of the respondents according to their basic financial literacy percentage.

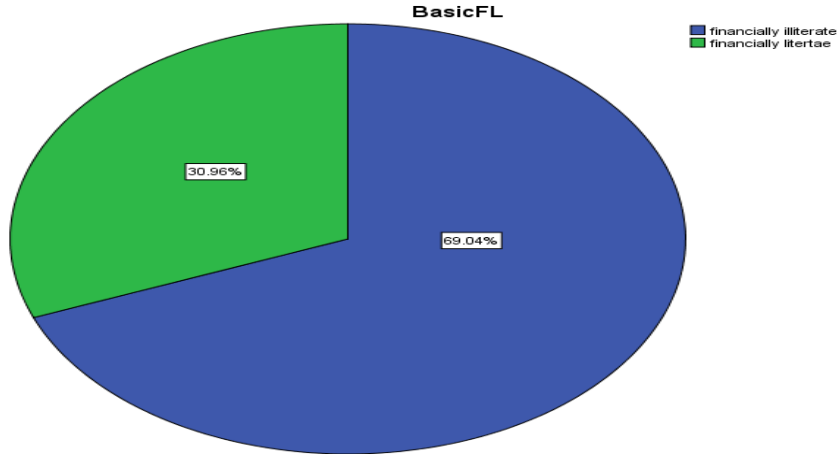


Figure 5.1: Distribution of financially literate and illiterate retail investors

Table 5.4 shows the number and percentages of the respondents who answered basic literacy questions correctly. In this study, respondents who did not answer a single question correctly are denoted as 0. Respondents who answered one question correctly are denoted as 1 and in the same way numbers are denoted to correctly answered questions. Out of 478 individuals 18 (3.8 %) respondents did not answer any question correctly. From five basic financial literacy questions one question was answered by 86 (18%) respondents correctly and 113 (23.6%) respondents answered two questions correctly.

Table 5.4

Distribution of Correctly Answered Basic Financial Literacy Questions (By Number)

0.00	18	3.8	3.8
1.00	86	18.0	21.8
2.00	113	23.6	45.4
3.00	80	16.7	62.1
4.00	32	6.7	68.8
5.00	149	31.2	100.0

Total 80 (16.7%) investors answered three questions correctly, 32 (26.7%) answered 4 questions correctly and 149 (31.2%) individuals answered all questions correctly. This study demonstrated that almost 31 percent individuals were not able to answer 5 questions of basic financial literacy test and were counted as financially illiterate individuals and it is much evident that overall basic financial literacy is very low and people are not much aware about even basic finance concepts. These results are supported by Van Rooij (2010) who reported that only 40.2% respondents answered all five questions of basic financial literacy and basic level of financial literacy is very low among Dutch population.

Table 5.5

Distribution of correctly answered Basic Financial Literacy Questions (By Concept)

Name of Questions	Correct Answers	Incorrect Answers	Don't Know
Numeracy	320 (66.9)	90(18.8%)	68(14.2%)
Interest	298(62.3%)	92(19.2%)	88(18.4%)
Compounding			
Inflation	280(58.6%)	87(18.2%)	111(23.2%)
Time value of Money	272 (56.9%)	90(18.8%)	116(24.3%)
Money Illusion	255(53.3%)	123(25.7%)	100(20.9%)

Table 5.5 shows that question no 1 (Numeracy) was answered correctly by 320 (66.9%), and answered incorrectly by 90 (18.8%) investors and 68 (14.2 %) respondents answered they don't know. In Russian context, percentage of first correct answer is 58.4% (Kunovskaya, 2010). Numeracy question was answered by 90.8% Dutch investors (Rooij, Lusardi, and Alesse, 2007). In Italian context, the evidence available suggests that Italy is far behind the other world in basic and financial capabilities. In a survey of 24 countries done by OECD under the Program for the International assessment of adult competencies

(PIAAC), Italy is very low in literacy and numeracy (Gambacorta, Locatelli, Pico, & Rampazzi, 2018).

Second question (Interest compounding) was answered correctly by 298(62.3%) individuals, 92(19.2%) answered incorrectly and 88 (18.4 %) answered don't know. Interest compounding concept is not as much bad in Pakistani investors as in US because Lusardi and Mitchell reported that in US only two third of the respondents understand compound interest concept. In Dutch survey, 76.2% respondents answered correctly about this question (Rooij, Lusardi, & Alesse, 2007). In Indonesian context, this question was answered by 78% respondents (Cole et al. 2009).

Third question was regarding inflation, and answered correctly by 208(58.6%) investors, incorrectly by 87 (18.2%) investors and 111(23.2%) individuals showed they don't know. In Russian context, 54.3% were aware about inflation concept (Kunovskaya, 2010). In Indonesian context, this question was answered by 61% (Cole et al., 2009), In Dutch population, 82.6% respondents answered this question correctly. In Americans, 75.25% respondents answered this question correctly (Lusardi and Mitchell, 2006). Time value of money concept is answered by 272 (56.9%) correctly, 90 (18.8%) incorrectly and 116 (24.3%) investors answered they don't know. Last question (Money illusion) of basic financial literacy was answered correctly by 255 (53.3%), incorrectly by 123(25.7%) and 100 (20.9%) answered they don't know about this concept. According to Kunovskaya (2010) this concept was understood by 44.6% Russians.

These findings show that percentage of correct answers for five basic literacy questions are not answered satisfactorily by the respondents. On the other hand, increasing number of don't know responses shows that a large number of respondents showed no knowledge about these questions and they even did not try to attempt these questions.

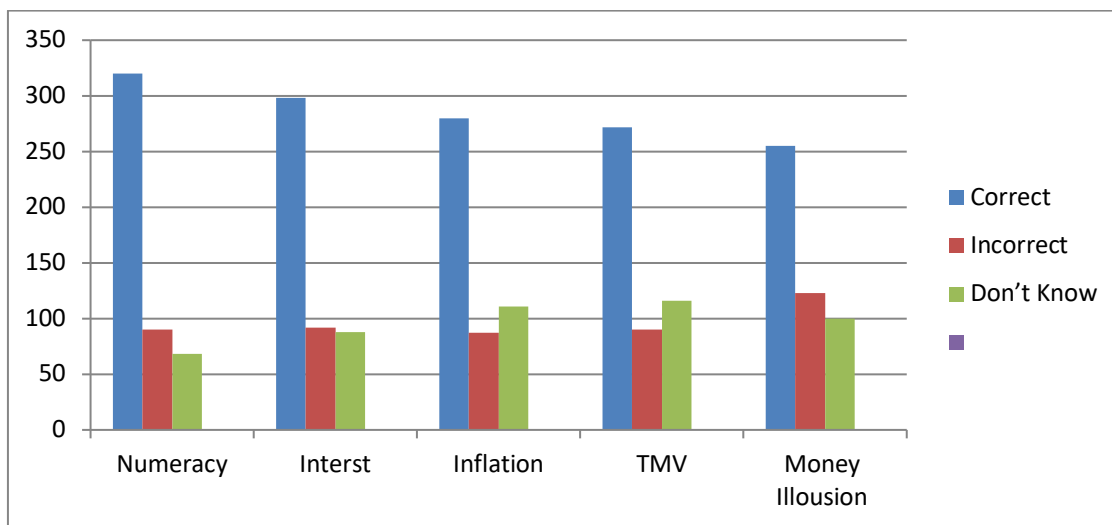


Figure 5.2: Distribution of basic financial literacy questions (by concept)

Figure 5.2 shows the numbers of respondents who answered correctly, incorrectly and don't know about basic financial literacy questions. This figure shows distribution of answers according to the nature of questions. These questions range from basic numeracy to money illusion.

5.8 Measurement of Advance Financial sophistication

Measurement of advance financial sophistication was done to examine the further financial knowledge of the respondents. Financial literacy is further examined by 11 additional questions of financial literacy. For assessing the level of Advance Financial Literacy, additional 11 questions were introduced in financial literacy measurement form. Respondents could not solve those advance literacy questions as it is declared by table 5 that only 16 (3.3 %) respondents from selected sample of 478 scored 11 out of 11. While remaining respondents 462 (96.7%) did not answered above than average and were categorized as financially illiterate individuals in advance terms.

Table 5.6

Distribution of financially literate and illiterate respondent's (Advance) financial literacy

Financially Illiterate	462	96.7
Financially Literate	16	3.3

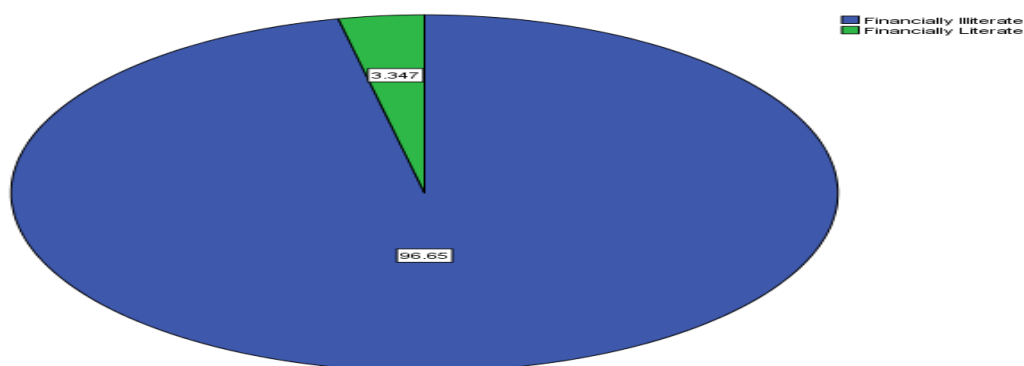


Figure 5.3: Distribution of financially literate and illiterate retail investors in advance literacy

Table 5.7 shows the number and percentages of respondents who answered advance literacy questions correctly. In this study, respondents who did not answer a single question correctly are denoted as 0. Respondents who answered one question correctly are denoted as 1 and in the same way numbers are denoted to correctly answered questions. Out of 478 individuals 110 (23%) respondents did not answer any question correctly. Only one question was answered by 100 (20.9%) respondents correctly and 53 (11.1%) respondents answered two questions correctly. Three questions are answered correctly by 34(7.1%), four questions are answered by 26(5.4%), five questions are answered by 16 (3.3%) respondents, total 14 (2.9%) investors answered 6 questions correctly, 27 (5.6%) answered 7 questions correctly, 36 (7.5%) individuals answered eight

questions correctly, 38 (7.9%) answered 9 questions correctly, 8 (1.7%) respondents answered 10 questions correctly and just 16 (3.3 %) respondents answered all questions correctly. So, according to this analysis 96.65 percent individuals do not have advance financial knowledge. According to the above-mentioned results it is much evident that overall advanced financial literacy is very low and people are not much aware about advance finance concepts.

Discussion in this context shows that overall, a small number of investors are completely familiar with advance financial literacy concepts. This low level of advance financial literacy in Pakistan is not much different from the results of Dutch and American populations as Rooij, Lusardi and Alesse (2010) reported low literacy rates and Rooij declared that only 5 % respondents answered all 11 questions of financial literacy in Dutch people.

The reason behind such low raito of adadvanced financial literacy is the abscence of basic financial knowledge in the repondets. Pakitan is an Islamic country, and there should be more awareness about the financial concpets under guidance of shria (Islamic Board) but Pakistani financial players are not much equipped with financial knowledge. The low raito of financial facilitation for enhancement of financial literacy can be a reason for this low percentage of financial literacy.

Table 5.7

Distribution of Correctly Answered advance Financial Literacy Questions (By Number)

.00	110	23.0	23.0
1.00	100	20.9	43.9
2.00	53	11.1	55.0
3.00	34	7.1	62.1
4.00	26	5.4	67.6
5.00	16	3.3	70.9
6.00	14	2.9	73.8

7.00	27	5.6	79.5
8.00	36	7.5	87.0
9.00	38	7.9	95.0
10.00	8	1.7	96.7
11.00	16	3.3	100.0

Table 5.8 shows the proportionate of each correct, incorrect and don't know responses for every question. This table demonstrates that 197 (41.21%) percent respondents answered question no 6 correctly, 207 (43.30%) respondents answered question no 6 incorrectly and 74 (15.48%) answered as don't know. Question no 7 was answered correctly by 178 (37.23%), incorrectly by 212 (44.35%), 88 (18.41%) respondents answered as don't know. Total of 187 (39.98%) respondents answered correctly, 172 (35.98%) incorrectly and 119 (24.89%) responded as don't know to question no 8. Question no 9 was correctly answered by 184(38.49%), incorrectly by 185 (38.70%) and 109 (22.80%) answered as don't know.

Table 5.8

Distribution of correctly answered Advance Financial Literacy Questions (By Concept)

Question No	Correct	Incorrect	Don't know
Q6	197(41.21%)	207(43.30%)	74(15.48%)
Q7	178(37.23%)	212(44.35%)	88(18.41%)
Q8	187(39.98%)	172(35.98%)	119(24.89%)
Q9	184(38.49%)	185(38.70%)	109(22.80%)
Q10	176(36.82%)	187(39.12%)	115(24.05%)
Q11	192(40.16%)	148(30.96%)	138(28.87%)
Q12	171(35.77%)	142(29.70%)	165(34.51%)
Q13	133(27.82%)	146(30.54%)	199(41.63%)

Q14	103(21.54%)	207(43.30%)	168(35.14%)
Q15	65(13.59%)	214(44.76%)	199(41.63%)
Q16	58(12.13%)	266(55.64%)	154(32.21%)

Question no 10 is correctly answered by 176 (36.82%), incorrectly by 187 (39.12%) and 115 (24.05%) responded as don't know. Question no 11 was correctly answered by 192 (40.16%), 148 (30.96%) and 138 (28.87%) answered as don't know. Question no 12 was correctly answered by 171 (35.77%), 142 (29.70%) answered incorrectly and 165 (34.51%) answered as don't know. Question no 13 was answered correctly by 133 (27.82%), incorrectly by 146 (30.54%), and 199 (41.63%) responded as don't know. Question no 14 was correctly answered by 103 (21.54%), incorrectly by 207(43.30%) and as don't know by 168 (35.14%). Question no 15 was correctly answered by 65(13.59%), incorrectly by 214 (44.76%) and 199 (41.63%) responded as don't know. Question no 16 was correctly answered by 58(12.13%), incorrectly by 266 (55.64%) and as don't know by 154 (32.21%).

This tables shows that the percentages of correct answers is very low among investors, though investors are aware about the functionality of stock markets as 41 % investors answered these questions correctly but by giving more complicated concepts of stock market functionalities in securities, risk, return, interest rates, and diversification this is evident from results that investors are not aware about advance financial concepts. This result comprehends with Rooij, Lusardi and Alesse (2011) that individuals are far away from advance financial knowledge of stock markets.

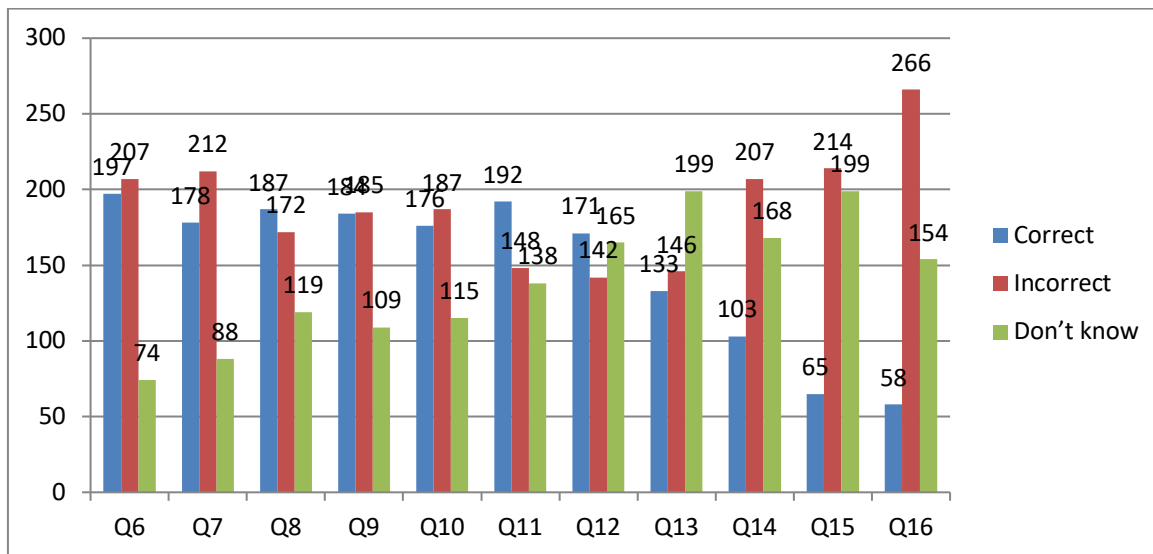


Figure 5.4: Distribution of advance financial literacy questions (by concept)

Above mentioned figure shows the distribution of advance financial literacy questions with proportionate of correct, incorrect and don't know. This represents graphically how many respondents gave correct answers, how many gave incorrect answers and how many responded they do not know.

5.9 Financial Literacy and Socio-Demographic Variables

Financial literacy has been studied with effect of different socio-demographic variables in different countries. As discussed above, financial literacy of an individual has influence of different socio demographic variables, for example gender, education, professional experience, income, age, and locality. Global survey of financial literacy as per ratings of Standard and Poor's (2015) used age, income, gender, and education level of the respondents (Saeedi and Hameedi, 2018). Mouna and Anis(2016) recently studied the infleucne of socio-demogrphahic variables (age, gender, education, and annual income and employment status) on the level of financial lietry in Tunisian huosehold invetors. Al-Tamimi (2009) instigated how different socio-demographic varaibles effect on an

individual's financial literacy level. Volpe et al. (2002) assessed the financial literacy of 530 online investors and demonstrated that financial literacy rate varies due to age, income, gender, education, and previous online trading experience as variables.

Bucher-Koenen and Ziegelmeyer (2011) also reported that financial literacy is low among Saving respondents on the basis of different socio demographic variables. This study has an aim to demonstrate the relationship between different socio demographic variables and financial literacy of investors. For measuring the relationship between financial literacy and socio demographic variables a binary regression model was used. Mouna and Anis (2016) used Logistic regression for measuring the relationship between socio demographic variables and financial literacy.

Some of the important socio demographic determinants were adopted by the study by incorporating the suggested socio demographic variables (age, gender, Professional experience, Marital Status, Locality, Income, Finance Certification and training, employment Status, and Education) by Gambacorta, Locatelli, Pico, & Rampazzi, (2018) with some enhancements and modifications. A logistic regression analysis was run to investigate the relationship between sociodemographic variables and financial literacy. Following is the statistical model of binary logistic regression of financial literacy and socio demographic variables.

Table 5.9

Classification Table

Observed	Predicted	
	Basic Financial Literacy	
	Financially Illiterate	Financially Literate

Step 0	Basic Financial Literacy	Financially Illiterate	330	0	100.0
		Financially Literate	148	0	0.00
Overall Percentage					69.0

Table no 5.9 shows the results of Block 0 output and describes a model that includes only intercept. This table provides evidence about observed and predicted values of basic financial literacy proportionate without the existence of any predictor. This table demonstrated that 330 individuals are predicted as financially illiterate and 148 are financially literate. The overall percentage of prediction is 69.0 percent, which means that without predictors it is 69.0% correct prediction that 148 individuals are financially literate and 330 are illiterate.

Table 5.10

Variables not in the Equation

	Score	Df	Sig.	
	Age	350.993	4	.000
	Age(1)	104.114	1	.000
	Age(2)	53.151	1	.000
	Age(3)	.443	1	.506
	Age(4)	177.200	1	.000
	Gender	8.594	1	.003
	Professional Exp	290.032	4	.000
Step 0	Professional Exp(1)	82.293	1	.000
	Professional Exp(2)	51.670	1	.000
	Professional Exp(3)	2.492	1	.114
	Professional Exp(4)	121.093	1	.000
	Marital status	57.223	1	.000

Income	67.832	4	.000
Income(1)	21.628	1	.000
Income(2)	17.142	1	.000
Income (3)	1.098	1	.295
Income (4)	8.380	1	.004
Locality	202.102	2	.000
Locality	94.370	1	.000
Locality	15.100	1	.000
Finance	96.148	1	.000
Certification			
Employment Status	119.245	1	.000
Education	112.972	1	.000
Overall Statistics	400.063	18	.000

Table 5.10 provides the individual significance of the predictors; if these variables are used in the model for prediction of financially illiterate and literate groups then these will have a strong and statistically significant effect on the dependent variable. It is evident from the information stated in the table 5.11 that all variables are statistically significant ($p < .05$) except age (3), Professional experience (3) income category (3). So, overall inclusion of these variables can be significant and individually these predictors are statistically significant. These variables can play a good role in prediction of financial literacy because their significance shows that these are better for inclusion in model for prediction of criterion.

Table 5.11

Omnibus Tests of Model Coefficients

		Chi-Square	Df	Sig.
	Step	537.508	19	.000
Step1	Block	537.508	19	.000
	Model	537.508	19	.000

Table 5.11 provides the results for Omnibus Test and reveals that inclusion of all predictors will be better for prediction of the event. There is chi-square value of 537.508 ($p < .05$) which

is statistically significant, this is the good evidence against null hypothesis and demonstrated that independent variables simultaneously working together better for prediction of financial literacy. This table shows the conjunction of these variables as good factor for prediction of criterion. Significant results of Chi Square highlight the importance of these variables together for measurement of variation in predicted variable.

Table 5.12

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	54.064	.675	.951

Table 5.12 shows the value of -2LL which is 54.064 which is compared to the -2LL for the previous null model in the omnibus test of model coefficients which shows a significant decrease it means our new model with inclusion of explanatory variables is good. It also provides value Cox and Snell R Square .675 Nagelkerke R Square .951. These values provide a direction that total of 67.5 to 95.1 percent variation is explained in the prediction of basic financial literacy by all the predictors. Which is the good level of predictions supported by the results of chi square.

Table 5.13

Hosmer and Lemeshow test

Step	Chi-square	Df	Sig.
1	.902	8	.999

Table 5.13 shows the results for Hosmer and Lemeshow test, this known as goodness of fit test and helps to determine whether model is adequately describing the data or not. This test shows that whether or not the observed events matched the expected events. Then a person like chi square is constructed for expected and observed frequencies. If this test (HL) is insignificant than the data is adequately fit into model but if the Hosmer lemeshow test is

significant than the data is not fit to the model (Abdulhafedh, 2017). This test is applied to that data through SPSS and table 5.13 shows the adequacy of model for description of data as it has insignificant .999 value ($P > .05$) for chi square .902. However, the chi-squared statistic which provides its base is dependent upon the sample size (Restore, n.d.). These results explicated a sign of good model fit. It supports the above-mentioned results.

Table 5.14 shows the observed and expected numbers of financially literate and financially illiterate respondents. This table explicates that numbers of financially literate people are 46 and our model is predicting 46 which is very good. This contingency table is breakdown of Hosmer lemeshow statistic and declares that result of this contingency table also supports the above-mentioned results and reveals that this model is good enough for prediction of

Table 5.14

Contingency Table for Hosmer and Lemeshow Test

		Basic financially illiterate		Basic financially literate		Total
		Observed	Expected	Observed	Expected	
Step 1	1	48	48.000	0	.000	48
	2	48	48.000	0	.000	48
	3	48	47.999	0	.001	48
	4	48	47.996	0	.004	48
	5	48	47.977	0	.023	48
	6	48	47.850	0	.150	48
	7	40	38.883	8	9.117	48
	8	2	3.270	46	44.730	48
	9	0	.025	48	47.975	48
	10	0	.001	46	45.999	46

the likelihood of financial literacy and financial illiteracy.

Table 5.15*Classification Table*

		Predicted			
		Basic Financial Literacy			Percent Correct
		F Illiterate	F Literate		
Step 1	Basic Financial Literacy	F Illiterate	325	5	98.5
		F Literate	3	145	98.0
Overall Percentage					97.9

This table 5.15 is used to analyze the accuracy of regression model. This table is used to cross classify the observed and predicted percentages of dependent outcome for finding out the good percentage of predicted cases. According to this percentage, if the predicted probability is greater than or equal to the cut off value than event is expected to occur otherwise not (Abdulhafedh, 2017). Table 5.15 shows the predictive accuracy of logistic regression by another way because it compares the predicted outcomes with actually observed outcomes and according to this table 97.9 percent outcomes are correctly predicted by this model. This table provides better prediction than the null hypothesis, which predicted the outcomes almost 69 percent. This is transparent that inclusion of all IV's is very much good for predicting the likelihood of financial literacy. This is evident through this table that 97.9 percent outcome is predicted by the inclusion of variables and by alternative model than null. This percentage is very good for prediction of variation in predicted variable.

Table 5.16***Variables in the Equation***

	B	S.E.	Wald	Df	Sig.	Exp(B)
Age			16.928	4	.002	
Age (1)	-4.523	2.202	4.221	1	.040	.011
Age (2)	-5.647	2.348	5.786	1	.016	.004
Age (3)	-2.718	2.097	1.680	1	.195	.066
Age (4)	.093	1.901	.002	1	.961	1.097
Gender	-1.196	1.340	.797	1	.372	.302
Professional Exp			18.504	4	.001	
Professional Exp (1)	-6.222	1.876	10.997	1	.001	.002
Professional Exp (2)	-7.319	1.943	14.189	1	.000	.001
Professional Exp (3)	-4.560	1.830	6.211	1	.013	.010
Professional Exp (4)	-2.074	1.663	1.555	1	.212	.126
Marital status	-.850	.793	1.147	1	.284	.428
Income			6.781	4	.148	
Income (1)	-3.649	1.892	3.719	1	.054	.026
Income (2)	-3.934	1.576	6.230	1	.013	.020
Income (3)	-2.188	1.445	2.293	1	.130	.112
Income (4)	-2.005	1.530	1.717	1	.190	.135
Locality			10.340	2	.006	
Locality (1)	-2.959	1.018	8.446	1	.004	.052
Locality (2)	-4.249	1.566	7.368	1	.007	.014
Finance Certification and trainings	2.392	.918	6.793	1	.009	10.939
Employment Status	1.170	.358	10.669	1	.001	3.223
Education	2.006	.668	9.028	1	.003	7.431
Constant	.445	3.501	.016	1	.899	1.561

a. Variable(s) entered on step 1: Age, Gender, Professional Exp, Marital status, Income, Locality, Finance Certification and trainings, Professional Status, Education.

Table 5.16 shows labeled Variables in the Equation and in this table coefficients, their standard errors, the Wald test statistic with associated degrees of freedom, p-values, and the exponentiated coefficient (also known as odd ratios) are included. The Predictor variable age, in logistic regression was found to contributed, there is a significant overall effect of

age ($Wald=16.928$ $df=4$, $p<.05$). The age is tested as a whole (age) and then 1st, 2nd, 3rd and 4th categories are tested with the reference category of 5th class. Age categories from 1-2 are significant while age (3) and age (4) are statistically insignificant. The unstandardized Beta weight for the constant; $\beta = .445$, $SE=3.501$, $Wald=.016$, $p < .05$. The unstandardized Beta weight for predictor age (1), $\beta -4.523$, $SE=2.202$, $Wald=4.221$, $p<.05$. The unstandardized Beta weight for predictor age (2), $\beta -5.647$, $SE=2.348$, $Wald=5.786$, $p<.05$. The odds of age (1) is (.011) for this category than reference class of age 5, which means that odds of being financially literate for age category (5) is 90.9 times higher than age category of one. While odds of being financially literate for age category (2) is a lot lower (.004) for this category than the reference category of age (5) which means that odds of being financially literate for age category (5) is 250 times higher than age category of 2.

There is a statistically significant relationship between age group and the likelihood of being financially literate. There are other research studies which supports this relationship between age and financial literacy in different countries. The findings of the effect of age on financial literacy are consistent with previous studies (Mouna and Anis, 2016; Chen and Volpe, 1998; Volpe et al. 2002, Al Tamimi, 2009; Fonseca, 2012, Gathergood, 2013). Kadoya and Khan, (2019) found a significant relationship between age and financial literacy and argued that younger people have less level of financial literacy in Japan.

Basic financial literacy was closely related to respondents' age. It was not surprising that those respondents who belong from the age bracket of 26 to 45 were the most likely to answer correctly of more than one-half of the questions while people older than 65 were the least likely (Kunovskaya, 2010). But it is evident from the above discussion of odd ratios for the variable age that mature people have more likelihood of being financially literate in Pakistan. In Pakistan, investors normally learn from their experience and by getting older and experience they become more financially literate. The result of this study about the relationship of age and financial literacy is not supported by the study of Reswari, Sudarto, Widiastuti (2018), which explicates that there is not statistically significant relationship between age and financial literacy in Indonesian context.

The other predictor for the likelihood of financial literacy is a professional experience of investors which have a statistically significant relationship ($Wald=18.504$ $df=4$, $p<.05$) with basic financial literacy. This variable professional experience contributed as whole in the model and professional experience is tested as a whole (professional Exp) and then 1st, 2nd, 3rd and 4th categories are tested with the reference category of 5th class. Professional experience categories from 1-3 are significant while professional experience (4) is statistically insignificant. The unstandardized Beta weight for predictor Professional Experience (1), $\beta=6.222$, $SE=1.876$, $Wald=10.997$, $p<.05$. The odds of professional experience category one is (.002) which means the odds of being financially literate with professional experience of more than 20 years are 500 times higher than professional experience category (1). The unstandardized Beta weight for predictor Professional Experience (2), $\beta = -7.319$, $SE=1.943$, $Wald=14.189$, $p<.05$. The odds of professional experience category (2) are very low (.001) which means being financially literate with professional experience of more than 20 years are 1000 times higher than professional experience category of 2.

The unstandardized Beta weight for predictor Professional Experience (3), $\beta = -4.560$, $SE=1.830$, $Wald=6.211$, $p<.005$. The odds of professional experience category (3) are (.010) which means that chances of being financially literate with professional experience of more than 20 years are 100 times higher than professional experience category (3). This pattern of odd ratios reveals that individuals with more experience have higher chances of being financially literate than the lower level of professional experience. This result is consistent with the results of Chen and Volpe, (1998), Calamato (2010) and Kim and Garaman (2004). In recent study of Chinese mutual fund retail investors, Liao, Wang and Xiang (2020) explored that richer professional experience is positively correlated with higher level of financial literacy.

The third predictor of the model is Locality of investors which has a statistically significant relationship ($Wald=10.340$, $p>.005$) with basic financial literacy. The Predictor variable Locality, in logistic regression was found to contributed, there is a significant overall effect of Locality, ($Wald=10.340$ $df=2$, $p<.05$). The Locality is tested as a whole (Locality) and

then Village; Town categories are tested with the reference category of City. The unstandardized Beta weight for predictor Locality (1), β -2.959, $SE=1.018$, $Wald=8.446$, $p<.05$. The odds of Locality 1 (Village) are .052 which means that being financially literate as a citizen is 19.23 times higher than villagers. The unstandardized Beta weight for predictor locality 2 (Town), β -4.249, $SE=1.566$, $Wald=7.368$, $p<.05$. The odds of being financially literate with locality (2) are .007, which means citizens have 142.85 times higher chances of being financially literate than town residents. The results of the study are supported by the Klapper and Panos (2011), their study explored that those living in rural areas generally score worse than their city counterparts. Norman et al. (2019) also conducted a research study for exploring the relationship of the demographic variables and financial literacy, and found that locality has a significant relationship with the level of financial literacy.

The fifth predictor of the model is Finance Certification and trainings of investors which has a statistically significant relationship ($B=2.392$, $SE= .918$, $Wald=6.793$ $df=1$, $p<.05$) with basic financial literacy. According to the model, the log of the odds of an investor for being financially literate is positively associated and there are 10.933 percent chances that finance certification and trainings will enhance the level of financial literacy. It is evident from the results that with every one unit increase in finance certification and training will increase the likelihood of being financially literate for investor.

Employment status of the investors has contributed in overall logistic regression ($B=1.170$, $SE= .358$, $Wald=10.669$ $df=1$, $p<.05$) and has a positive significant relationship with basic financial literacy of the respondents. The odds of employment status (3.223) declared that there is 3.223 percent chance that employment status of respondent's effect on the level of financial literacy of the respondent.

The results of the study are supported by the study of social learning and consumer socialization theories imply employed people should be more financially knowledgeable, because employed people have more opportunities to understand financial mechanism. Individuals who are employed in financial sector have more depth knowledge of finance

than household and students (Kdoya and Khan, 2019). They argued that level of financial literacy is affected by the occupation of an individual. Laxmi and Maheshwary (2018) concluded that occupation is significant factor for affecting the levels of financial literacy.

The last predictor of the model is education and it also has a statistically significant relationship ($B=2.006$, $SE=.668$, $Wald=9.028$ $df=1$, $p<.05$) with financial literacy. The odd ratio for being financially literate for an educated person are 7.431 which. These results show that education as predictor of financial literacy is statistically significant in Pakistani context and this result is integrated with Mouna and Anis (2016) and Al-Tamimi (2009). Reswari, Sudarto, Widiastuti (2018) found a positive significant relationship between education and financial literacy.

Lusardi and Mitchell (2014) supported the results of this study and their study explicated that there is significant link between respondents' age and financial literacy. Without a college degree low chance of being financially literate was found in their study. They also reported that level of numeracy is not strong among individuals with low level of education attainment. Jayanthi and Rau (2019) also found a positive significant relationship between education and financial literacy of the respondents and concluded that a higher level of education can lead to higher degree of financial literacy.

The most recent research of Niu, Zhou, Gan, (2020) demonstrated that uneducated people tend to be more financially illiterate in China. Jiang, Liao, Wang and Xiang (2020) used a unique data set of Chinese mutual fund retail investors and explored that higher level of education provides strong basis for good financial literacy. Norman et al. (2019), also conducted a study for understanding the relationship of the demographic variables and financial literacy, and concluded that education is a significant factor for understanding the level of financial literacy. Kadoya and Khan also found a significant relationship among education and financial literacy and explored that less educated people have low level of financial knowledge in Japan.

Income, gender and marital status are not significant predictors of the likelihood of being financially literate because these predictors have $p > .05$. So there is no influence of gender, income and marital status in the prediction of financial literacy of an individual. In Indonesian context, study of Reswari, Sudarto, Widiastuti (2018), explicates that there is not statistically significant relationship between gender, income, marital status and financial literacy. In Russian Context, the study of Kunovskaya (2010) showed that there is no significant relationship between gender and financial literacy, so the findings of this study also supports this result. Gender is a well-known predictor of financial literacy in many of the countries as discussed in literature review, but according to the results of this study, gender is an insignificant predictor.

The recent research of Morgan and Trinh (2019) and Rahmatia (2019) found that gender has no statistically significant effect on financial literacy. There can be a reason that in overall Pakistan, females are not much educated as compared to men and in the cultural context of Pakistan normally women are responsible for their home based activities. Due to less involvement in financial matters they are not much aware about financial terms. So, females participate less than males but very few women who participate in financial markets are normally belong to upper class and are much educated so they are familiar with financial concepts. There can be any other reasons as well but a new research paradigm under qualitative philosophy is recommended for this concern. Nigus (2020), Mbarire and Ali (2014) and Norman et al. (2019) argued that there is no statistically significant relationship of income and financial literacy and the results of their study supports to this study.

In concluding remarks, a logistic regression was performed to ascertain the effects of age, gender, education, professional experiences, income, marital status, locality, finance certification and training, and employment status on the likelihood that participants are financially literate or financially illiterate. The logistic regression model was statistically significant, $\chi^2(4) = 573.508$ $p < .0005$. The model explained 67.5% to 95.1 (Nagelkerke R^2) of the variation in basic financial literacy.

5.10 Relationship of Financial Literacy and Cognitive biases

To study the relationship between financial literacy, cognitive biases and decision making, this research run the mediation analysis. Financial literacy is taken as an independent variable, Herd Behavior, Confirmation Bias, and hindsight bias were considered as mediators and decision making was dependent variable. Following section of the study shows that a set of regressions were run and mediation was investigated by Andrew F. Hayes through process macro for answering the relevant research questions and for measuring the mediation between financial literacy, cognitive biases and Decision making of the retail investors of PSX. For running mediation analysis in Process Macro, Model 4 is used and financial literacy is taken as independent variable (X), Decision making of the investors is taken as the dependent variable(Y) and Herd Behavior (M), Confirmation Bias (M) and Hindsight Bias (M) have been included as mediators. This research explored the Positive relationship between financial literacy and decision making and also explicates the mediation between financial literacy, Cognitive biases and decision making of investors in following section of the study.

5.10.1 Relationship of financial literacy and Herd behavior

Table 5.17

Model summary of Basic Financial Literacy(X) and Herd Behavior (M)

Model Summary						
R	R-sq	MSE	F	df1	df2	p
.8942	.7996	4.3437	1899.6552	1.0000	476.0000	.0000

The above table shows the model summary of the relationship between financial literacy(X) and Herd Behavior (M). The correlation value (R) is .8942 which declared a significant positive relationship between financial literacy and herd behavior and value of R-sq is .7996 which indicates the variation in financial literacy and herd behavior, according to above mentioned results financial literacy causes 79.96 % changes in Herd behavior of the investors. So, there is strong positive association between financial literacy and herd behavior.

Table 5.18

Effect of Basic Financial Literacy on Herd Behavior

Model Summary						
	coeff	se	t	p	LLCI	ULCI
constant	17.5109	.1147	152.6281	.0000	17.2855	17.7363
Basic FL	-8.9866	.2062	-43.5850	.0000	-9.3917	-8.5814

Outcome variable: Herd Behavior

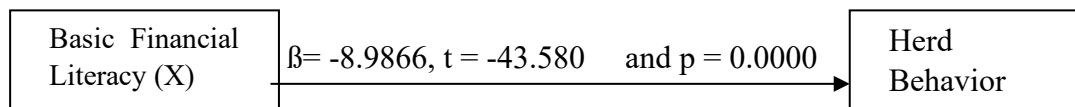


Figure 5.5: Basic Financial Literacy on Herd Behavior

Table 5.18 shows the value of coefficient, standard error and t value with level of significance ($p < .05$) the value of the intercept is 17.5109 and coefficient (B) for the relationship between Herd behavior and financial literacy is $\beta = -8.9866$, $SE = .2062$ which is statistically significant with $p < 0.05$. As results indicates that one unit increase in financial literacy will decrease herd behavior by 8.896 percent. So, there is statistically significant relationship between financial literacy and herd behavior. The results are supported by the study of baker, Kumar, Goyal and Gaur (2019). They argued that there is negative association between financial literacy and herd behavior of the investors. Noor and Safi Ullah (2019) supported the results of this study and explored the relationship between

financial literacy and herd behavior and argued that there is negative association between herd behavior and financial literacy.

5.10.2 Relationship of financial literacy and confirmation bias

Table 5.19

Model summary of Basic Financial Literacy and Confirmation Bias

Model Summary						
R	R-sq	MSE	F	df1	df2	p
.9056	.8201	14.7568	2169.3166	1.0000	476.0000	.0000

The above table shows the model summary of the relationship between financial literacy(X) and Confirmation Bias (M). The correlation value (R) is .9056 which declared a significant positive relationship between financial literacy and confirmation Bias and value of R-sq is .8201 which indicates the variation in financial literacy and confirmation bias, according to above mentioned results financial literacy caused 82.01 % changes in confirmation bias of the investors. So, there is strong positive association between financial literacy and confirmation bias.

Table 5.20

Effect of Basic Financial Literacy on Confirmation Bias

Model Summary						
	coeff	se	t	p	LLCI	ULCI
Constant	41.5868	.2115	196.6602	.0000	41.1713	42.0023
Bfl	-17.7004	.3800	-46.5759	.0000	-18.4472	-16.9537

Outcome variable: Confirmation Bias

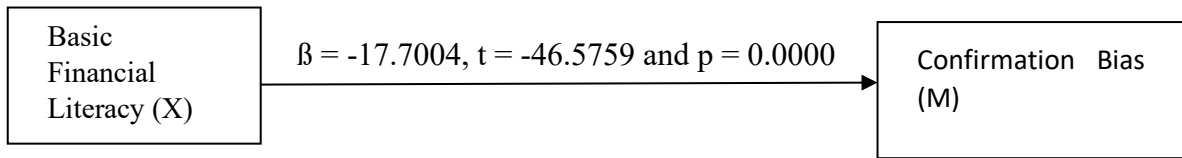


Figure 5.6: Basic Financial Literacy on Confirmation Bias

Table 5.20 shows the value of coefficient, standard error and t value with level of significance ($p < .05$) and the value of the intercept is 41.58 and coefficient (B) for the relationship between confirmation bias and financial literacy is $\beta = -17.7004$, $SE = .3800$ which is statistically significant with $p < 0.05$. As results indicates that one unit increase in financial literacy will decrease confirmation bias by 17.70 percent. So, there is statistically significant relationship between financial literacy and herd behavior.

5.10.3 Relationship of financial literacy on Hindsight bias

Table 5.21

Model summary of Basic Financial Literacy and Hindsight Bias

Model Summary						
R	R-sq	MSE	F	df1	df2	p
.7151	.5113	3.2781	498.0296	1.0000	476.0000	.0000

The above table shows the model summary of the relationship between financial literacy(X) and Hindsight Bias (M). The correlation value (R) is .7151 which declared a significant positive relationship between financial literacy and Hindsight bias and value of R-sq is .5113 which indicates the variation in financial literacy and hindsight bias, according to above mentioned results financial literacy causes 51.13% changes in Hindsight bias of the

investors. So, there is strong positive association between financial literacy and hindsight bias.

Table 5.22

Effect of Basic Financial Literacy on Hindsight Bias

Model Summary						
	coeff	se	t	p	LLCI	ULCI
Constant	8.8374	.0997	88.6684	.0000	8.6415	9.0332
Basic FL	-3.9973	.1791	-22.3166	.0000	-4.3492	-3.6453

Outcome variable: Hindsight Bias

Table 5.22 shows the value of coefficient, standard error and t value with level of significance ($p < .05$) and the value of the intercept is 8.837 and coefficient (B) for the relationship between confirmation bias and financial literacy is $\beta = -3.9973$, $SE = .1791$ which is statistically significant with $p < 0.05$. As results indicates that one unit increase in financial literacy will decrease hindsight bias by 3.99 percent. So, there is statistically significant relationship between financial literacy and herd behavior. The study of Noor and Safiullah (2019) also supported the results of this study and argued that there is negative association between hindsight bias and financial literacy.

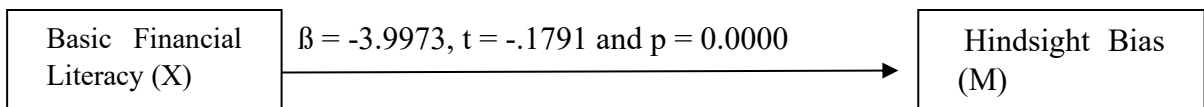


Figure 5.7: Basic Financial Literacy on Hindsight Bias

5.10.4 Relationship of Financial Literacy, Herd behavior, Confirmation bias, Hindsight bias and decision making

Table 5.23

Model Summary of Financial Literacy (Y) Herd Behavior (M), Confirmation Bias (M), Hindsight Bias (M) and Decision Making (Y)

Model Summary						
R	R-sq	MSE	F	df1	df2	p
.8638	.7461	4.7879	347.4431	4.0000	473.0000	.0000

This table 5.23 indicates the relationship between Financial literacy, herd behavior, confirmation bias hindsight bias and Decision making. The value of R is .8638 which shows strong association among variables and R-sq is .7461 that explicates that financial literacy, herd behavior, confirmation bias and hindsight bias together caused 74.61 percent variation in decision making. The above-mentioned results show that above model is statistically significant with consideration of these variables.

Table 5.24

Effect of Basic Financial Literacy (X), Herd Behavior (M), Confirmation Bias (M), Hindsight Bias (M) on Decision Making (Y)

Model Summary						
	coeff	se	t	p	LLCI	ULCI
Constant	22.97	1.3575	16.9222	.0000	20.303	25.638
Basic FL	.7218	.6552	1.1017	.2711	-.5656	2.0092
Herd B	-.4142	.0497	-8.3353	.0000	-.5118	-.3165
Confirm B	.2009	.0270	-7.4495	.0000	-.2539	-.1479
Hindsight B	.1119	.0555	2.0175	.0442	.0029	.2208

Outcome variable: Decision Making

The above table shows the direct effect of financial literacy (X), Herd behavior (M), Confirmation bias (M) and Hindsight bias (M) on decision making (Y). It is evident through the results that financial literacy does not have statistically significant direct effect on decision making ($B=.7218$, $SE=.6552$, $p<.05$). The direct effect of Herd behavior is negative but statistically significant ($B=-.4142$, $SE=.0947$, $p<.05$), the direct effect of Confirmation bias is also statistically significant ($B=-.2009$, $SE=.0270$, $p<.05$) while Hindsight bias has also significant effect ($B=.1119$, $SE=.0555$) on decision making.

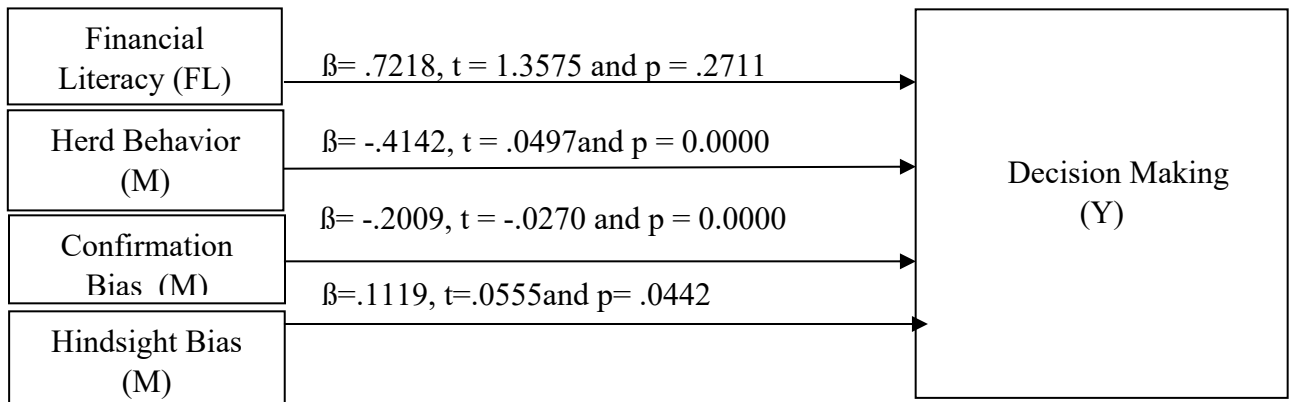


Figure5.8: Financial Literacy, Herd Behavior, Confirmation Bias, and Hindsight Bias on Decision making

This table explicates that there is full mediation between the variables of the model because financial literacy is not significant in presence of mediators and do not have statistically significant direct effect on the decision making of the investors. The results of the study are supported by the study of Aigbovo and Ilaboya (2019), they demonstrated that hindsight bias has a significant effect on individual investor's decision making. In Pakistani context, the study of Rasool and Safi Ullah (2019) also supported the results of this research study and explicated that with an increase in financial literacy, the likelihood of biasness in investment decisions reduces.

Table 5.25*Direct effect of financial literacy and decision making*

Effect	Se	T	P	LLCI	ULCI
.7218	.6552	1.1017	.2711	-.5656	2.0092

Table 5.25 shows the direct effect of financial literacy on decision making, which is not significant. It means financial literacy has no direct effect on decision making but it effects on the thinking of the investors and reduces the cognitive biases and in turn decision making of investors becomes better. Insignificant value of relationship between financial literacy and decision-making shows that there is not partial mediation between financial literacy and decision making but cognitive biases fully mediate between financial literacy and decision making.

5.10.5 Mediation of cognitive biases between financial literacy and decision making

Table 5.26*Indirect effect of financial literacy through herd behavior, confirmation bias and hindsight bias on decision making*

	Effect	BootSE	BootLLCI	BootULCI
Total	6.8306	.8647	4.9885	8.3737
Herd Behavior	3.7128	.8662	2.3411	4.9252
Confirmation Bias	3.5559	.6587	1.6986	5.0923

Hindsight Bias	-.4472	.2168	-.8835	-.0276
----------------	--------	-------	--------	--------

The indirect effect of financial literacy through Herd behavior (IE=3.72) is positive and statistically significant: 95% CI= (2.3411, 4.9252). The indirect effect of financial literacy through confirmation Bias (IE=3.5559) is positive and statistically significant: 95% CI= (1.6986, 5.0923). The indirect effect of financial literacy through Hindsight Bias (IE=-.4472) is negative and statistically significant: 95% CI= (-.8835, -.0276). These indirect effects describe that there is full mediation of these biases between financial literacy and decision making.

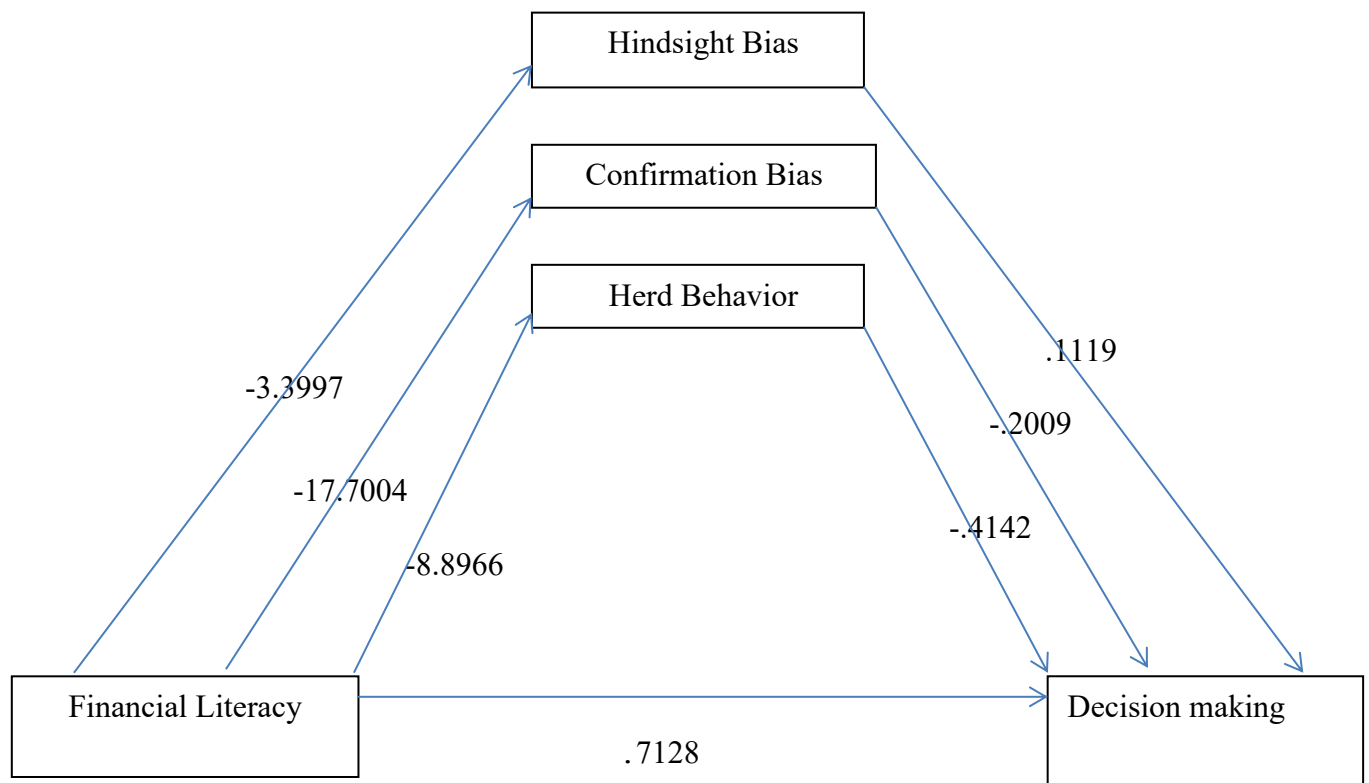


Figure 5.9: Statistical mediation model of cognitive biases between financial literacy and decision making.

5.11 Discussion

The main aim of the study was to measure the level of financial literacy and its link with decision making of retail investors of Pakistani stock markets. This aim was further enhanced by the examination of a link between financial literacy and different demographical and socio-economic variables. Another concern was to find out the link between basic financial literacy and advance financial knowledge of retail investors. The other objective was to measure the presence of cognitive biases in both financially literate and financially illiterate groups of retail investors.

In order to achieve the real goals of the study, several hypotheses were developed. All the hypotheses were developed after the great scrutiny of the literature. In the relevant field data were collected from retail investors of Pakistani stock markets whom belong to different professions and backgrounds. Appropriate statistical techniques were used for data analysis. This section will elaborate the main findings of each hypothesis and contribution in fulfillment of the objectives of the study.

This study presented 13 hypotheses and the results of these hypotheses are summarized in following table.

Table 5.27

Summarization of the hypotheses of the study

H1 postulates that age has great influence on the level of financial literacy of retail investors	Results shown that there is strong relationship between age and financial literacy of investors. Lusardi and Mitchell (2007) discussed that age is a good predictor of financial literacy; normally middle age people are more financially literate than younger and old people.
---	--

H2 postulates that gender and financial literacy has strong link

This Hypothesis is also accepted and results shown statistically significant relationship between gender and financial literacy. Basher, Arshad, Nazir and Afzal (2013) explored relationship between age, gender, and income with financial literacy in cultural context of Pakistan but in saving sector.

H3 postulated that there is positive significant link between professional experience and financial literacy

H3 also has been accepted and declared that there is strong statistical relationship between professional experience and financial literacy. Al-Tamimi and Kali (2009) also noted the strong relationship between professional experience and financial literacy.

H4 postulated that there is significant positive relationship between marital status and financial literacy

This hypothesis was not accepted and results show that there is no statistically significant relationship between marital status and financial literacy of the investors.

H5 postulated that there is positive significant link between locality and financial literacy

This hypothesis is also accepted and showed that there is significant relationship between locality and financial literacy.

This hypothesis is also accepted and showed that there is significant

H6 postulated that there is positive significant link between Finance certification and trainings and financial literacy

relationship between finance certification and training and financial literacy.

H7 postulated that there is positive significant link between Income and financial literacy

This hypothesis is rejected and showed that there is no significant relationship between Income and financial literacy of the retail investors. Reswari, Sudarto, Widiastuti (2018) explored that there is no significant relationship between income and financial literacy. Baker, Kumar, Goyal and Gaur (2019) also supported the results that income is not a significant indicator of financial literacy.

H8 postulated that there is positive significant link between employment status and financial literacy

This hypothesis is accepted and showed that there is significant relationship between occupation and financial literacy of the retail investors. Laxmi and Maheshwary (2018) showed that occupation effects on the level of financial literacy of retail investors.

H9 postulated that there is positive significant link between education and financial literacy

This hypothesis is also accepted and showed that there is strong statistical relationship between educational and financial literacy of investors. Christelis, Appall, and Paula (2010) Lusardi (2012) noted that basic education especially of finance degrees enhance the level of

H10 postulated that Hindsight bias mediates between financial literacy and decision making of an investor.

H11 Herd mediates the relationship between financial literacy and decision making of investors.

H12 postulated that confirmation bias mediates the relationship between financial literacy and decision making

financial literacy so education is also a good predictor of financial literacy.

Ateş, Coşkun, Şahin, and Demircan, (2016) demonstrated that there is strong relationship between behavioral biases and financial literacy. He also showed that positive negative relationship between financial decision making and more biased agents had financial literacy and overconfidence which is a resultant of Hindsight bias normally. Biaisi and Weber (2009) supports the results of hypotheses no 6 by showing through their results that Hindsight bias effects on investors perception and more biased investors had low investment performance.

Hypothesis 11 is also accepted and showed that there is negative significant relationship between Herd behavior and financial literacy.

In south Korean study of 502 investors, Park, Konana, Gu, Kumar and Raghunathan (2010) explored that confirmation bias in investors make them adversely overconfident and supports the results of hypotheses H 12 of this study.

Hypothesis no 13 postulates that high level of financial literacy effects on the decision making of retail investors.

Investment decisions are measured through different ways in research and this study emphasized on decision making of investors by calculating one-year return on investment of investors. Regression results for this hypothesis support the argument that one unit increase in financial literacy

First aim of the study: Financial literacy is an essential concept to be explored in current era of rapid movements. Awais et al. (2016) individuals with high level of financial literacy can make better decisions than those who are less financially literate. Shah et al. (2020) argued that financial literacy is an important factor for good decision making of investors. Financial literacy is very low not just among the under developed countries but financial knowledge is not at up to the mark level in developed countries (Kimiyaalam and Yap, 2017).

The first aim of the study is to measure the level of financial literacy of retail investors and distribute these retail investors for further analysis in two groups (Financially literate and financially illiterate). The results of the study show that majority of the respondents in Pakistan are financially illiterate and do not have basic knowledge of finance. As, results of the financial literacy test shows that only 31% investors are financially literate in basic financial knowledge while 69 % are financially illiterate and based on these findings it is suggested that there should be more work for enhancement of financial literacy rate in Pakistan for efficient and smooth working of stock markets.

There are very few numbers of respondents who qualified the test of financial literacy in all over the world in different contexts as adopted by the Rooij, Lusardi, and Alesse (2007). Worldwide, one in every three individuals is financially literate (Kalpper and Lusardi, 2019). The countries which have highest financial literacy rate, these are developed

countries specifically Denmark, Netherland, Germany and Sweden; almost 65% of their adults are financially literate. In Southern Europe, for example in Greece and Spain, financial literacy is very low and 45% to 49% their individuals are financially literate. Bulgaria and Cyprus, 35 percent individuals are financially literate. The lowest financial literacy rate is of Romania which is only 22 percent among adults of the country (Kalpper and Lusardi, 2019). Douissa (2020) measured financial literacy in the university of Sharjah on 2500 students through an online % survey and found that 31.36% of students are financially literate.

Especially there is scarce work for exploration of the concept of financial literacy in different sectors of Pakistan. The results of the low level of financial literacy support to the evidence of other research studies conducted in different cultural contexts of the world (Rooij, Lusardi and Alesse, 2011; Lusardi, and Mitchell, 2011; Huston, 2010; Mandell and Klein, 2009; Lusardi, 2008; Lusardi, and Mitchell, 2007; Bernhiem, 1998; Chen and Volpe, 1998).

Second aim: to investigate the relationship between different demographical variables and financial literacy of retail investors in the context of stock markets of Pakistan. Previous studies in the context of financial literacy discussed these variables in different contexts and in Pakistan there is need of such study to explore this causal link. Findings of this study are consistent with the landmark studies in this area. Age is a prominent determinant of financial literacy as Klapper and Lusardi (2019) demonstrated that younger people often suffer from financial illiteracy in all over the world. Prominent research studies declared the relationship of gender and financial literacy (Kimiyağhalam and Yap, 2017; Lusardi and Mitchell, 2014; Fonseca, Mullen, Zamarro, and Zissimopoulos, 2012; Chen and Volpe, 2002).

Lusardi and Mitchell, 2014 described that gender gap in financial literacy is persistent and prominent, normally women are not much financially literate but there is shortage of understanding and theoretical underpinnings in this regard. Almenberg and Derber (2014) through a Swedish study showed that the relationship of financial literacy and gender is not

much significant as basic financial literacy is measured because in Swedish stock markets women are active and literate participants.

As in this study there is no such significant relationship of gender and financial literacy and this study supports the results of Almenberg and Derber (2014) but do not support the theoretical evidence of many of the previous studies and this is evident by results that in Pakistan there is no significant effect of gender on the level of financial literacy of Pakistani stock markets investors. One reason behind this insignificant relationship can be the low involvement of women in stock market. There are very few numbers of females who are involved in stock markets and mostly these women belong from upper class and have higher educational grounds so it can be possible due to high level of literacy they have strong financial knowledge as well.

This study also provided evidence that professional experience is also a good predictor of financial literacy and more experienced investors are more financially literate. Al-Tamimi and Kali (2009) described that professional are more financially knowledgeable than households and as experience of a person increases, he gets more chances of being of financially knowledgeable.

Klapper and Lusardi (2019) also showed that attainment of education also provides grounds for good financial knowledge. In advance countries, 52 percent adults with secondary education are financially literate and individuals with at least 15 years of education are almost 73% individuals are financially literate. In major emerging countries, these education gaps are similar. Kimiyaghalam and Yap (2017) also supported the results of this study and explicated that education is important factor for high level of financial literacy and specifically individuals who have finance and economics degree are more financially literate.

Third aim: To examine the mediating role of Herd Behavior between financial literacy decision making of retail investors. This study provided a logical base for understanding the mediating role of Herd Behavior between financial literacy and Decision making of the

investors. The results showed that there is negative significant relationship between financial literacy and herd behavior and herd behavior mediate the financial literacy and decision making of investors. Zain Ullah (2019) investigated the moderating role of financial literacy among investment behavior and trade returns and explored that financial literacy has strong moderating role among herd behavior and trade returns of the investors.

Lin, Tsai and Lund (2013) found individual herd and without information herd is negatively correlated with future market returns. Vidanalage and Shantha (2019) supported the results of this study and found that herd behavior is decreased by the individuals desire for learning, and this learning take place when an investor tries to evaluate past trading experience logically and consequentially herd behavior is minimized.

Fourth aim: To examine the mediating role of hindsight between financial literacy decision making of retail investors. This study provided a logical base for understanding the mediating role of Hindsight Bias between financial literacy and decision making of the investors. The results showed that there is negative significant relationship between financial literacy and hindsight bias and hindsight bias mediates the financial literacy and decision making of investors.

Biases are emotional and cognitive errors of human judgment, and effective decision making. H10 postulates that retail investors' hindsight bias mediates between their financial literacy level and decision making and this hypothesis is also accepted. Biais and Weber (2009) also supported the results of this study by studying the influence of hindsight bias on investors' memory and concluded that investors do not recall their initial answers. Tchaj (2012) also demonstrate through his research that investors suffer from hindsight bias and take ineffective decisions. Muntazir, Ali, Khalid and Muhammad (2013) also supported the results of study and described that hindsight bias effect on decisions making of investors.

To examine the mediating role of confirmation bias between financial literacy decision making of retail investors. This study provided a logical base for understanding the mediating role of confirmation bias between financial literacy and Decision making of the

investors. The results showed that there is negative significant relationship between financial literacy and confirmation bias and confirmation bias fully mediate the financial literacy and decision making of investors. H12 postulates that retail investors 'decision making capabilities are affected by the existence confirmation bias. Confirmation bias has strong effect on investment decision making (Park, Konana, Gu, Kumar, and Raghunathan, 2010).

Fifth aim: To examine the mediating role of confirmation bias between financial literacy decision making of retail investors. This study provided a logical base for understanding the mediating role of confirmation bias between financial literacy and Decision making of the investors. The results showed that there is negative significant relationship between financial literacy and confirmation bias and confirmation bias fully mediate the financial literacy and decision making of investors. H12 postulates that retail investors 'decision making capabilities are affected by the existence confirmation bias. Confirmation bias has strong effect on investment decision making (Park, Konana, Gu, Kumar, and Raghunathan, 2010).

Sixth aim: to measure the relationship of financial literacy and decision making of retail investors of stock markets of Pakistan. Research found an interrelationship between financial literacy and financial behavior (Rooij, Lusardi and Alesse, 2011). Different research studies focused on the relationship between decision making and financial literacy. Financial literacy has positive correlation with financial literacy (Oteng, 2019). This study provided rationale for strong investment decisions measured through return on investments and argued that financial literacy will cause good and informed decisions regarding investments and in turn an investor will earn more return on his investments.

This study has confirmation of the results of earlier studies of Vasantbhai, Sakaria and Sima (2013), Thilakam (2012), Agarwalla, Barua, Jacob and Varma (2012) and Oteng, (2019). All of these studies stated that there is positive correlation between financial literacy and investment decisions. Abebe, Tekle and Mano (2018) declared that financial literacy is important for saving behavior. Douissa (2020) stated that financial literacy is important for

accurate financial decisions as a result financial literacy has be recognized worldwide for logical financial inclusion. In conclusive remarks this study explored an aspect of linking up financial literacy with investors' decision making by taking into account the mediating role of cognitive biases, demographic and socio-economic variables in Pakistani context.

CHAPTER 6

CONCUSION AND SUGGETSIONS FOR FUTURE RESEARCH

6.1 Introduction

This study was undertaken for measuring the financial literacy level of retail investors and also effect of financial literacy on investment decisions of investors. This study also intended to explore the relationship between socio-demographical variables and financial literacy of the retail investors. This study also explored the mediation between financial literacy and cognitive biases of the investors. Towards those ends, literature of financial literacy, in light of behavioral theories was reviewed and synthesized. This chapter provides a brief account of the study and also the contribution which this study made in the research.

This chapter also provides a visualization of the horizon for research into the implementation of financial literacy in investment sector. This study provides a practical aspect of financial literacy for increment in decision making capabilities of investors. This discussion concludes with some of the challenges and limitations which have been encountered. By adding together all this, a futuristic aspect of this study is also offered.

6.2 Major Findings

The rationale of this study was to scrutinize the financial literacy level and link between socio-demographical variables and financial literacy of individual stock holders in Pakistani stock markets. For this purpose, the research was done to explore the link of financial literacy and decision making of investors, investors with at least one year of trading experience was selected. Based on a widespread review of the literature, some socio demo-graphical variables (age, gender, income, Martial Status, professional experience, employment status, finance certification and training, locality and education) were identified for having an influence on the level of financial literacy. Mediation of cognitive biases (Herd, Confirmation and Hindsight bias) was examined between financial literacy and decision making of retail investors.

For deep understanding of the influence of socio-demographic variables on financial literacy a binary regression was run after modification of financial literacy data into binary form. According to the results of this regression, age has negative but statistically significantly relation to financial literacy ($p < .005$). While odds of being an investor financially literate was positively correlated with professional experience, locality, finance certification and training, employment status and education, and have statistically significant relationship with these variables ($p < .005$), so with increase in professional experience, locality, finance certification and training, employment status, education the level of financial literacy also increase. But three of those (gender, income and marital status) are not statically significant ($p > .005$) which means gender and income change do not have any link with the level of financial literacy.

This investigation has generated ample evidence to suggest the importance of financial literacy for the betterment of financial decisions of stock investors. However, the findings here differ rather dramatically for gender as predictor of financial literacy. There can be one reason that in Pakistan normally females are not working in stock markets and very

few are working, so these females than have good financial and professional backgrounds, so they possess high level of financial knowledge.

An investigation of mediation between financial literacy and cognitive biases and decision making was also done and results showed that these three variables have statistically significant relationship with financial literacy (Herd behaviour, $(B=-.4142, SE=.0947, p<.05)$, Confirmation Bias $(B=-.2009, SE=.0270, p<.05)$ and Hindsight bias $(B=.1119, SE=.0555)$) was also done and the results of mediation declared that herd behaviour of investors mediates the relationship of financial literacy and decision making of investors. In the same way, confirmation bias and hindsight bias also mediate the relationship between the financial literacy and decision making of investors.

These findings are very much consistent with growing literature on the importance of financial literacy in investment sector and other financial sectors as well (Rooij, Lusardi and Alesse, 2007; Lusardi and Mitchell, 2011; Bashir, Arshad, Nazir and Afzal, 2013). Socio-demographical factors related to financial literacy were found to be related to all financial sectors of the economy. In particular, the significant relationship between financial literacy and cognitive biases and decision-making capabilities provides strong evidence for the increment of financial literacy rate in all over the country not just in investment sector of Pakistan.

This research evidently supports to the role of financial literacy for less biased decisions of investors and provides evidence through experiments that financially literate investors are less biased than financially illiterate investors. It is possible to conclude that not only these three biases but many other biases should be considered in future research about the role of financial literacy towards debiasing the decision-making capabilities of individual investors.

Another appealing finding is the direct relationship between financial literacy and decision-making capability of individual investors. It is evident from significant relationship of financial literacy and that individual investors whom are more financially

literate normally earn more return on their investments. The rationale behind this successful relationship is that financially literate investors are considered more prone to errors of return calculations; they are more equipped with risk diversification strategies. Their mathematical and financial skills are better than financially illiterate people so they design more active portfolios and in turn normally earn more returns.

This study finds out the strong causal link between financial education and decision-making skills of retail investors. In country like Pakistan, there is need of more exploration of this concept in other sectors as well. This study examined and declared that there is positive significant relationship between financial literacy and less biased decision of investors which can help to investors and all participants of the markets to move in a better way for economic growth of the country.

6.2.1 Comparison with other studies

This study revealed the very much unique aspect of financial literacy with cognitive biases and showed support that biases are a prominent aspect to be studied in different financial sectors of Pakistan. Hamid and Loke (2020) also supported the argument and stated that financial education is important for shaping individual's behavior. Investors decisions are not prone to judgmental errors however high level of financial literacy make them less biased. Cole and Shanty (2009) supported the results of the study and showed that financial markets participation is dependent upon the cognitive abilities and financial education of the participants. West (2012) also supported the argument and focused on the existence of cognitive biases in financial decisions of the individuals.

The results of the study supported by theorists of behavioral finance specifically by Tversky and Kahneman (1982) and Barberis and Thaler (2003) emphasized that biases are an aspect of human judgment and rational choices which deviate with such biases from their real outcome. In Pakistan, overall literacy rate is very low and people are more emotional and

there is need of such studies to explore the effect of different cognitive biases in different financial markets. The results of the study are also supported by many studies as Skagerlund, Lind, Stromback, Tinghog and Vastfjall (2018) and Hsiao & Tsai (2018) whom emphasized of the importance of financial literacy.

6.3 Conclusion

This research was done with specific purpose of exploring the concept and level of financial literacy in stock markets of Pakistan. The basic purpose of this research was to investigate the level of financial literacy in retail investors and also to explore this phenomenon and the relationship between financial literacy, cognitive biases and decision making of investors. For exploring this relationship data was gathered and based on the extensive review of the literature some important socio-demographic variables (age, gender, income, marital status, professional experience, employment status, finance certification and trainings and education) were identified and their influence on financial literacy was also examined. Behavioural finance literature, provided a ground for inclusion of herd behaviour, Confirmation bias and hindsight bias as mediators between financial literacy and decision making.

The study showed that there is full mediation of these three variables (Herd Behaviour, confirmation bias and hindsight bias) between financial literacy and decision making. To find out the mediation of cognitive biases between financial literacy with decision making is a unique aspect of this study in context of Pakistani stock markets. The results showed that in Pakistan there is low level of financial literacy in both basic (31 %) and advance form. There is need of such reforms and programs which can enhance the level of financial literacy, as it is evidenced by the above-mentioned results normally financially literacy will decrease the herd behaviour, Confirmation bias and Hindsight bias of investors and in turn they will make less biased decisions. So, there is need to enhance financial literacy

for making debiased decisions and to earn good return on investment by making efficient and free of bias decisions.

There is another important finding of this study that advance financial knowledge of investors is not up to the mark and low level of advance financial literacy can be a problem for economic health of the country. There is also a big gap in Pakistani financial sectors to explore relation between financial literacy and all finance related activities. So, future research can bridge up this gap by opening new path ways in this area of research. The results all of these factors were reported and described in Chapter no 5 in requisites of quantitative analysis.

6.4 Implications for the study and contributions of the study

6.4.1 Contributions of the study

This study provided the modification in existing link of theory about cognitive biases, financial literacy and decision making. This study highlights those three important mental anomalies of investors (Herd, Hindsight and confirmation bias) can make their decisions ineffective. This study used new way of exploring mediation between these variables comparatively of larger sample size in Pakistan. This study also contributed in existing knowledge by exploring the relationship of socio-demographic variables and financial literacy specifically in dynamic environment of Pakistan.

Practically, this study gave an insight to policy makers to develop more and more educational programs for investors. As, this study revealed that investors have diverse backgrounds, some of them are households and some of them are even students. They do not have proper knowledge of finance according to Islam. So, it is the responsibility of the government to provide them health and enriched curriculum in institutes and else than this also provide them seminars, trainings and workshops. As one of the variables of this study is finance certification and trainings, and its significance reveled that trainings workshops

and finance certifications are very much necessary in Pakistan according to prevailing Islamic Law of Pakistan.

As, this study highlighted the gap in theory of financial literacy in Pakistani context and contributed to provide insight about filling this gap by examining financial literacy level of financial participants and also by understanding their cognitive biases and mediation of these anomalies between their level of knowledge and decision-making skills. This study highlighted that theoretical underpinning of financial literacy and decision making in Pakistan still lacking in such a theoretical link which explores the mediation of Hindsight bias, Confirmation bias and Herd behavior simultaneously between the basic financial literacy and decision making. So, this study contributed in this regard and bridged up this gap.

6.4.2 Theoretical implications

This study introduced a new concept of measuring the financial literacy and decision making by examining the cognitive biases (Herd behavior, Confirmation bias, Hindsight bias) as mediators. This study provided a new theory of mediation of cognitive biases between financial literacy and decision making of investors in Pakistan.

This thesis contributed in existing knowledge by measuring the level of financial literacy in both advance and basic forms in Pakistani context. This study used large sample size for measuring financial literacy in retail investors of Pakistan and methods are also unique in their application. This study combined three different biases and used mediation as statistical measure for investigation of mediation effect which is also unique in nature. Theoretically this thesis study provides a unique conceptual model which can enhance new aspects in field of financial literacy and behavioral finance.

6.4.3 Practical Implications

The data from this study explicates many practical implications which provide insight for future research in different financial sectors. The findings of this research have implications for all financial players to take advantage from the result and to apply different programs for measuring financial literacy in banks, development financial institutes, insurance companies, investment banks and all financial structures. This study showed results financial literacy has an important role for elimination or reduction of herd behavior, confirmation bias and hindsight bias which in turn effect on good decision making of investors so, practically in investment sector and other sectors as well this theory can be applied. By introduction of long term and short-term financial literacy programs, overall knowledge of finance can be enhanced. By enhancing the financial literacy levels both financially literate and financially illiterate groups can get benefit. Financially literate investors can learn more about financial securities and financially illiterate investors can get basic grounds of finance and numeracy from such programs. Trainings, seminars and workshops can enhance the financial awareness among investors and they can make better decisions for their own and country's financial growth.

Government can also get benefit from the findings of the study and can devise different programs for financial literacy improvement in different sectors for elimination of biases and for strong financial decisions. It is suggested that government should develop special parts in curriculum for enhancement of financial literacy under Islamic guidelines in every field of study. For improvement of household investors financial literacy government should start turning programs. To improve the knowledge of retail investors a special institute should be established where special psychological problems of investors should be treated and expert trainers should give strong financial knowledge.

Government of Pakistan needs more attention towards enhancement of not just financial knowledge but in depth Islamic financial knowledge and for this purpose this study will provide a strong ground and will help investors to understand the role of Islamic financial

knowledge in Pakistan. Currently Government of Pakistan is taking steps towards financial knowledge enhancement and programs under the umbrella of State bank and also by name of NFLP (Nation Wise Financial Literacy Program). This study will provide strong rationale to improve the level for financial literacy in different sectors of Pakistan for the sake of covering the cognitive biases and for the purpose of sound investment decisions.

This study can guide financially literate as well financially illiterate investors. Financially literate investors can enhance further knowledge of finance by considering the effect of finance degrees, certifications, and trainings as supported by the results of the study. While financially illiterate investors can also be benefited by the results of this study. They can have financial trainings, short term finance certifications, finance trainings provided by different Institutes. Government should guide investors by free seminars and workshops for finance education under Islamic Shria.

6.4.4 Social Implications

The results of this study have social implications for individual level, organizational level and governmental level. At individual level the results of this study provide solid and logical grounds for improvement of financial literacy of retail investors. Retail investors can scrutinize their cognition and knowledge and can urge how these factors can affect on their decision making.

At organizational level, all financial institutions can devise survey programs for measurement of financial literacy and cognitive biases and can have trainings, seminars and workshops for financial participants. There can be special organizations which can work on improvement of financial literacy.

At organizational level, Pakistani government can play a vital role for improvement of financial literacy by devising nationwide programs and by assigning a specific place to financial literacy in curriculum of the students. Government can provide research grants for scrutinizing the relationship of financial literacy, cognitive biases and investment decisions in overall markets of Pakistan.

In Pakistan, this study will also helpful for shaping up the views regarding the importance of Islamic financial knowledge and will enhance the urge of Islamic financial knowledge in investors. Socially, this study will also provide grounds for all types of retail investors (including household investors who are suffering more from their cognitive biases due to low level of financial knowledge) to have firm decisions by improving their financial knowledge and by removing their intentional and unintentional biases. Social this study will explore knowledge about importance of Islamic financial literacy and will help to introduce Islamic Financial knowledge in societal events and learning institutes and to enhance the knowledge of Pakistani people about not just financial literacy but about Islamic financial literacy.

6.5 Limitations of the study

The vast and logical review of literature provided evidence that discussion about financial literacy is widespread and there is need of some standardized dimensions for measuring and linking the level of financial literacy with other variables. There is no standardizing definition as mentioned by Remund (2010) after reviewing the many of resources about financial literacy. The research found short comings and limitations in the standardization of the concept of financial literacy. These shortcomings include a standardized conceptual framework, measurement tool and definitional aspect of the financial literacy in all over the world for implementation of financial literacy programs.

In particular, to identify which aspect of financial knowledge matter for specific sectors, which method should be used to organise this specific knowledge in an implementable way. While Rooij, Lusardi, Volpe and others have been strong advocacy of what is needed for measuring financial literacy and how it can be improved. But in real they offered a short view of financial knowledge implementation in different sectors of the economy. There are numerous things which can have influence on the level of financial literacy of an individual.

On the other hand, in behavioural finance literature there is great shortage of such literature which shows the experimental evidence about hindsight bias and confirmation bias with relation to financial literacy. In fact, there is need of such standardized measure which can provide evidence about the link of financial literacy and cognitive biases. Tversky and Kahneman (1989) advocated well about existence of cognitive and behavioural biases in investment related activities but there is limitation that they provided less practical evidence from investment sector related to cognitive biases.

Admittedly, it is not an easy task to connect financial literacy of an individual with cognitive biases and investment decisions of an investor. The various approaches to behavioural finance tried to explore a link between financial knowledge and cognitive biases as Shah and Seppala tried to notice the effect of biases in investment sector and Rooij, Lusardi and Alesse (2011) identified the link between financial literacy and stock market participation of investors.

It is openly accepted that this study has similar shortcomings and limitations in finding out the standardized way of measuring financial literacy. This study adopted the method of Rooij Lusardi, and Alesse (2011) due to more reliability of their instrument for measuring financial literacy. This study has limitation of offering a standardized set of financial literacy questions, definition, and theoretical frame work for all over the world. But this study fortunately offers a good theoretical framework of financial literacy in relation with socio-demographical variable, cognitive biases and investment decisions of investors.

In limitations, boundaries of standardization of the concept this study offered good experimental ways for measuring hindsight bias and confirmation bias of investors in both financially literate and illiterate groups of investors. Another limitation of this study is, it only further studies.

Due to their increasing interest of current researchers in the field of behavioural finance, researchers and participants both might have a biased view of the concept of behavioural aspects in the field of finance. This may be particularly true for this study, because behavioural aspects used for this study are not explored in their complete extent but their effect was examined in investment sector. These biases can have variety of faces in other sectors.

The insights into the measurement of financial literacy and cognitive biases for decision making skills were developed by using the quantitative approach. This suggestion is proposed by the researcher that future researchers should incorporate a detailed part based on qualitative research (focus group technique) to gain more detailed insight for examination of relation of financial literacy with behavioural biases and investment decisions of investors.

Although there is strong methodological rationale adopted by the study, but there are still limitations that must be elaborated. This study is based on cross sectional sample and due to cross sectional nature causal relationships are not as much stronger as these can be through longitudinal study. A longitudinal study with required controls and necessary before and after measure is more suitable for such type of study. This regrettably is not possible with stock market investors and their daily operational activities in stock markets. Such study imposes much on respondents and interfere their daily activities.

6.6 Suggestion for Further Research

Oehler *et al.*, (2009) argued that investors need financial knowledge because most of them are relying on the counselling of agents and banks which often leads to mal practices. While incomplete information and purely commission-oriented information by banks often leads investors to inappropriate decisions. Investors need proper information about stock market and related securities for gaining appropriate level of confidence for optimal decisions. Oehler (2005) gave the suggestion that for better and improved stock decisions of investors there is great need of financial education. Financial education will provide in-depth insight towards complete financial literacy of investors. Behavioural finance focuses those investors are not prone to errors but they need complete and detailed knowledge of financial markets for covering their mental irregularities and cognitive biases. Though this is not completely guaranteed that financial literacy will eliminate the biases of investors but financial knowledge will help to reduce cognitive biases and will help investor for making effective and optimal investment decisions (Oehler and Werner, 2008).

Further research is undoubtedly needed to examine the execution of financial literacy programs. Although there is need to explore in detail the link between financial literacy, cognitive biases and investment decisions but this study provided the rationale for this aspect and shed light on this causal relationship. Several issues in this research remained unexplored. Cognitive biases of investors are in variety of forms and there is a long list of cognitive and emotional biases from which an investor can suffer but this study focused on two major cognitive biases and remaining are left for further research in this field.

The former investigation has surely provided rationale for the importance of financial literacy and its determinants for the successful implementation of financial literacy programs in the financial sector. The concerns for future investigation highlighted by this study are classified under three heads; conceptual, methodological, and analytical issues. These issues are classified for in-depth scrutiny but it does not mean that these are mutually exclusive. In fact, these issues are collaboratively important for further research in field of behavioural finance and for development of quality financial literacy programs.

There is need to standardized knowledge about financial literacy and its influence on decision making capabilities. Future researchers should have some standardized dimensions for measuring the knowledge of financial literacy. No just financial literacy but for Muslims there should be awareness about Islamic financial literacy. Islamic knowledge about financial matters should be enhanced through future research studies and Muslim scholars should play part for improvement and understanding of meanings Islamic financial literacy according to Shria Board.

Future researchers are certainly needed to examine the mental irregularities of financial participants of banks, saving institutes, development financial institutes and also can measure their financial literacy in basic and advance term. Future researchers can examine the link between high financial literacy and the low level of cognitive biases. Future researchers can explore the subjective knowledge of financial literacy with qualitative approach. There are some methodological alternative available for analysing the link between financial literacy, cognitive biases and investment decisions. So, alternatively multivariate analysis also can be used to judge these causal links between variables. In future researchers should measure the sector wise financial literacy and should check the role of different sectors in overall growth of the financial markets and in turn in Pakistan.

BIBLIOGRAPHY

Abdul Halim Abdul Hamid & Norizatun Azmin Mohd Nordin (2001). A Study on Islamic Banking Education Experience and The Strategy for the New Millenium -A Malaysian Evidence. *International Journal of Islamic Financial Services*, 2 (4).

Abdulhafedh, A. (2017). Incorporating the multinomial logistic regression in vehicle crash severity modeling: a detailed overview. *Journal of Transportation Technologies*, 7(03), 279.

Abdullah, M. A., & Alex, A. (2015). Islamic financial literacy among bankers in Kuala Lumpur. *Journal of Emerging Economies and Islamic Research*.

Abdullah, M. A., Sabar, S., & Abu, F. (2017). Factors determining Islamic financial literacy among undergraduates. *Journal of emerging economies and Islamic research*, 5(2).

Abdullah, R., Razak, A. L. H. A., & Ali, U. I. S. S. (2015). Exploratory Research into Islamic financial Literacy in Brunei Darussalam. *Faculty of Business and Management Sciences, University Islam Sultan Sharif Ali Brunei Darussalam*.

Abreu, M., & Mendes, V. (2010). Financial literacy and portfolio diversification. *Quantitative finance*, 10(5), 515-528.

Adult financial literacy in Australia. (2007). Retrieved 12 9, 2014, from www.anz.com:

<http://www.anz.com/resources/3/d/3dbcd380493e8b9395e5d7fc8cff90cd/2011-Adult-Financial-LiteracySummary.pdf?CACHEID=3dbcd380493e8b9395e5d7fc8cff90cd>

Agarwal, S., Driscoll, J. C., Gabaix, X., and Laibson, D. (2009). The age of reason: Financial decisions over the life cycle and implications for regulation. *Brookings Papers on Economic Activity*, 2009(2), 51-117.

Aggarwal, S., and Klapper, L. (2013). Designing government policies to expand financial inclusion: Evidence from around the world. Retrieved October, 27, 2014.

Agnew, J. R. (2010). Pension participant behavior. *Behavioral Finance: Investors, Corporations, and Markets*, 577-594.

Agnew, J. R., and Szykman, L. R. (2005). Asset allocation and information overload: The influence of information display, asset choice, and investor experience. *The Journal of Behavioral Finance*, 6(2), 57-70.

Agnew, J., Bateman, H., Eckert, C., Iskhakov, F., Louviere, J. J., and Thorp, S. (2014). Individual judgment and trust formation: An experimental investigation of online financial advice. SW Australian School of Business Research Paper, (2013ACTL21).

Ahmad, M. A. H. A. D. Z. I. R. (2010). Why Islamic financial literacy is important. *Personal Money. March*.

Ahmad, M., Shah, S. Z. A., and Mahmood, F. (2017). Heuristic biases in investment decision-making and perceived market efficiency: a survey at the Pakistan stock exchange. *Qualitative Research in Financial Markets*, (just-accepted), 00-00.

Ahmad, N., and Haron, S. (2002). Perceptions of Malaysian corporate customers towards Islamic banking products and services. *International Journal of Islamic Financial Services*, 3(4), 13-29.

Ahmed, F., Kashif, M., & Ali, I. (2016). Financial Literacy Among Students: A Case of Higher Education Institution, Pakistan. *RADS Journal of Social Sciences & Business Management*, 3(2), 27-40.

Ahmed, K. O. M. (2015). Policies Required in the Area of Knowledge Generation in Sudan and its Challenges. *International Proceedings of Economics Development and Research*, 83, 54.

Ahmed, Z., Ramakrishnan, S., & Noreen, U. (2018). Two Sides of a Coin: Effects of Perceived and Actual Financial Literacy on Investment Decision Making Behavior Mediated by Financial Risk Tolerance. *International Journal of Engineering & Technology*, 7(4.28), 499-504.

Ahmed, Z., Ramakrishnan, S., and Noreen, U. (2017). Financial Literacy as Competitive Advantage for Individual Investors' Decision Making. *Advanced Science Letters*, 23(9), 8988-8993.

Aisyah, I., & Saepuloh, D. (2019). The Implementation of Islamic Financial Literacy Through "Kencleng" Program in School. *KnE Social Sciences*, 148-157.

Akerlof, G., and Shiller, R. (2009). How animal spirits destabilize economies. *McKinsey Quarterly*, 3, 127-135.

Al-Qaradawi, Y. (2001). *Fi fiqh al-aqalliyat al-muslima*. Cairo: Dar al-Shuruq.

Albeerdy, M. I., and Gharleghi, B. (2015). Determinants of the financial literacy among college students in Malaysia. *International Journal of Business Administration*, 6(3), 15.

Ali, K., Khalid, U., and Khalid, Z. (2012). Promoting Financial Inclusion and Literacy in Pakistan via G2P Payment Programs. *Pakistan Microfinance Network*. Google Scholar.

Ali, M., Ng, Y. L., and Kulik, C. T. (2014). Board age and gender diversity: A test of competing linear and curvilinear predictions. *Journal of Business Ethics*, 125(3), 497-512.

Allgood, S., & Walstad, W. B. (2016). The effects of perceived and actual financial literacy on financial behaviors. *Economic inquiry*, 54(1), 675-697.

Almeida, L. S., Prieto, L. P., Ferrando, M., Oliveira, E., and Ferrándiz, C. (2008). Torrance Test of Creative Thinking: The question of its construct validity. *Thinking skills and creativity*, 3(1), 53-58.

Almenberg, J., & Dreber, A. (2015). Gender, stock market participation and financial literacy. *Economics Letters*, 137, 140-142.

Almenberg, J., and Säve-Söderbergh, J. (2011). Financial literacy and retirement planning in Sweden. *Journal of Pension Economics and Finance*, 10(4), 585-598.

Altman, M. (2012). Implications of behavioral economics for financial literacy and public policy. *The Journal of Socio-Economics*, 41(5), 677-690.

Ameer, R., & Khan, R. (2020). Financial socialization, financial literacy, and financial behavior of adults in New Zealand. *Journal of Financial Counseling and Planning*.

Ameriks, J., Caplin, A., and Leahy, J. (2003). Wealth accumulation and the propensity to plan. *The Quarterly Journal of Economics*, 118(3), 1007-1047.

Andersen, T. G., and Bollerslev, T. (1997). Intraday periodicity and volatility persistence in financial markets. *Journal of empirical finance*, 4(2-3), 115-158.

Anderson, A., Baker, F., & Robinson, D. T. (2017). Precautionary savings, retirement planning and misperceptions of financial literacy. *Journal of Financial Economics*, 126(2), 383-398.

Antara, P. M., Musa, R., and Hassan, F. (2016). Bridging Islamic financial literacy and halal literacy: the way forward in halal ecosystem. *Procedia Economics and Finance*, 37, 196-202.

Anthes, W. L., and Bruce, W. M. (2000). Frozen in the headlights: The dynamics of women and money. *Journal of Financial Planning*, 13(9), 130-142.

Antoni, X. L., Dlepu, A., & Notshe, N. (2020). A comparative study of financial literacy among undergraduate commerce and arts students: A case of a South African University. *International Journal of Economics and Finance*, 12(2).

Anwar, M., Khan, S. Z., and Rehman, A. U. Financial Literacy, Behavioral Biases and Investor's Portfolio Diversification: Empirical Study of an Emerging Stock Market.

ANZ.2008. ANZ Survey of Adult Financial Literacy in Australia.

Aren, S., and Zengin, A. N. (2016). Influence of financial literacy and risk perception on choice of investment. *Procedia-Social and Behavioral Sciences*, 235, 656-663.

Arkes, H. R., Faust, D., Guilmette, T. J., & Hart, K. (1988). Eliminating the hindsight bias. *Journal of applied psychology*, 73(2), 305.

Arrondel, L., Debbich, M., and Savignac, F. (2013). Financial literacy and financial planning in France. *Numeracy*, 6(2), 8.

Arrow, K. J., and Hurwicz, L. (1958). On the stability of the competitive equilibrium, I. *Econometrica: Journal of the Econometric Society*, 522-552.

Asian Development Bank. (2013, September 10). Retrieved August 01, 2017, from Keynote Speech at the ASEAN Financial Literacy Conference – Stephen P. Groff: <https://www.adb.org/news/speeches/keynote-speech-asean-financial-literacy-conference>

Ates, S., Coskun, A., Sahin, M. A., & Demircan, M. L. (2016). Impact of financial literacy on the behavioral biases of individual stock investors: Evidence from Borsa Istanbul. *Business and Economics Research Journal*, 7(3), 1.

Atkinson, A., and Messy, F. A. (2011). Assessing financial literacy in 12 countries: an OECD/INFE international pilot exercise. *Journal of Pension Economics and Finance*, 10(4), 657-665.

Atkinson, A., and Messy, F. A. (2012). *Measuring financial literacy: Results of the OECD*. OECD Publishing.

Bahovec, V., Barbić, D., and Palić, I. (2017). The Regression Analysis of Individual Financial Performance: Evidence from Croatia. *Business systems research journal: international journal of the Society for Advancing Business and Information Technology (BIT)*, 8(2), 1-13.

Baidoo, S. T., Boateng, E., & Amponsah, M. (2018). *Understanding the Determinants of Saving in Ghana: Does Financial Literacy Matter?* *Journal of International Development*, 30(5), 886–903. doi:10.1002/jid.3377.

Baker, H. K., and Nofsinger, J. R. (Eds.). (2010). *Behavioral finance: investors, corporations, and markets* (Vol. 6). John Wiley and Sons.

Baker, M., & Wurgler, J. (2007). Investor sentiment in the stock market. *Journal of economic perspectives*, 21(2), 129-152.

Balmer, D., King, A., Moloney, W., Moselen, E., & Dixon, R. (2020). Nursing students and health literacy: The effect of region and program level. *Nurse Education in Practice*, 42, 102688.

Banerjee, A. V. (1992). A Simple Model of Herd Behavior. *The Quarterly Journal of Economics*, 107(3), 797–817. doi:10.2307/2118364.

Bank, A. N. Z. (2008). ANZ survey of adult financial literacy in Australia. *Accessed March, 11, 2009*.

Bannier, C. E., & Neubert, M. (2016). Gender differences in financial risk taking: The role of financial literacy and risk tolerance. *Economics Letters*, 145, 130-135.

Bannier, C. E., & Schwarz, M. (2018). Gender-and education-related effects of financial

Barber, B. M., and Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *The quarterly journal of economics*, 116(1), 261-292.

Barber, B. M., and Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *The quarterly journal of economics*, 116(1), 261-292.

Barberis, N., & Thaler, R. (2003). A survey of behavioral finance. *Handbook of the Economics of Finance*, 1, 1053-1128.

Barnard, A., 2016, Sense of coherence: a distinct perspective on financial well-being, *South African Journal of Economic and Management Sciences* 19, 647–660.

Baron-Donovan, C., Wiener, R. L., Gross, K., & Block-Lieb, S. (2005). Financial literacy teacher training: A multiple-measure evaluation. *Journal of Financial Counseling and Planning*, 16(2).

Bartholomae, S., & Fox, J. J. (2016). Advancing Financial Literacy Education Using a Framework for Evaluation. *Handbook of Consumer Finance Research*, 45–59. doi:10.1007/978-3-319-28887-1_4.

Bashir, T., Arshad, A., Nazir, A., and Afzal, N. (2013). Financial literacy and influence of psychosocial factors. *European Scientific Journal, ESJ*, 9(28).

Bay, C., Catasús, B., and Johed, G. (2014). Situating financial literacy. *Critical Perspectives on Accounting*, 25(1), 36-45.

Bayer, P. J., Bernheim, B. D., and Scholz, J. K. (2009). The effects of financial education in the workplace: Evidence from a survey of employers. *Economic Inquiry*, 47(4), 605-624.

Bayrakdaroğlu, A., & Şan, F. B. (2014). Financial literacy training as a strategic management tool among small–medium sized businesses operating in Turkey. *Procedia-Social and Behavioral Sciences*, 150, 148-155.

Bayrakdaroğlu, A., and Şan, F. B. (2014). Financial literacy training as a strategic management tool among small–medium sized businesses operating in Turkey. *Procedia-Social and Behavioral Sciences*, 150, 148-155.

Beal, D. J., and Delpachitra, S. B. (2003). Financial literacy among Australian university students. *Economic Papers: A journal of applied economics and policy*, 22(1), 65-78.

Becchetti, L., L. Corrado, and M. Fiaschetti, 2017, The regional heterogeneity of wellbeing expenditure preferences: evidence from a simulated allocation choice on the BES indicators, *Journal of Economic Geography* 17, 857–891.

Bekaert, G. and Harvey, C.R. (1997) Emerging equity market volatility. *Journal of Financial Economics*, 43, 29-77.

Bekaert, G., Hoyem, K., Hu, W. Y., and Ravina, E. (2017). Who is internationally diversified? Evidence from the 401 (k) plans of 296 firms. *Journal of Financial Economics*, 124(1), 86-112.

Bell, D. E., Raiffa, H., & Tversky, A. (Eds.). (1988). *Decision making: Descriptive, normative, and prescriptive interactions*. Cambridge University Press.

BenMabrouk, H. (2018). Cross-herding behavior between the stock market and the crude oil market during financial distress: Evidence from the New York stock exchange. *Managerial Finance*, 44(4), 439-458.

Bernheim, B. D., and Garrett, D. M. (1996). The determinants and consequences of financial education in the workplace: Evidence from a survey of households (No. w5667). National Bureau of Economic Research.

Bernheim, B. D., and Garrett, D. M. (2003). The effects of financial education in the workplace: evidence from a survey of households. *Journal of public Economics*, 87(7-8), 1487-1519.

Bernheim, B. D., Carman, K. G., Gokhale, J., and Kotlikoff, L. J. (2001). The mismatch between life insurance holdings and financial vulnerabilities: evidence from the Survey of Consumer Finances (No. w8544). National Bureau of Economic Research.

Bernheim, B. D., Garrett, D. M., and Maki, D. M. (2001). Education and saving: The long-term effects of high school financial curriculum mandates. *Journal of public Economics*, 80(3), 435-465.

Bernheim, D. (1995). Do households appreciate their financial vulnerabilities? An analysis of actions, perceptions, and public policy. *Tax policy and economic growth*, 3, 11-13.

Bernheim, D. D. (1998). Financial illiteracy, education, and retirement saving (No. 96-7). Wharton School Pension Research Council, University of Pennsylvania.

Berument, H., Ceylan, N. B., and Gozpinar, E. (2006). Performance of soccer on the stock market: Evidence from Turkey. *The Social Science Journal*, 43(4), 695-699.

Berument, M. H., Ceylan, N. B., and Ogut-Eker, G. (2009). Soccer, stock returns and fanaticism: Evidence from Turkey. *The social science journal*, 46(3), 594-600.

Bhabha, J. I., Khan, S., Qureshi, Q. A., Naeem, A., & Khan, I. (2014). Impact of Financial Literacy on Saving-Investment Behavior of Working Women in the Developing Countries. *Research Journal of Finance and Accounting*, 13(5), 118-122.

Biais, B., & Weber, M. (2009). Hindsight bias, risk perception, and investment performance. *Management Science*, 55(6), 1018-1029.

Black, B. (2012). Behavioral economics and investor protection: Reasonable investors, efficient markets. *Loy. U. Chi. LJ*, 44, 1493.

Blank, H., Musch, J., and Pohl, R. F. (2007). Hindsight bias: On being wise after the event. *Social Cognition*, 25(1), 1-9.

Bley, J., and Kuehn, K. (2004). Conventional versus Islamic finance: student knowledge and perception in the United Arab Emirates. *International journal of Islamic financial services*, 5(4), 17-30.

Bondt, W. F., & Thaler, R. (1985). Does the stock market overreact?. *The Journal of finance*, 40(3), 793-805.

Borodich, S., Deplazes, S., Kardash, N., and Kovzik, A. (2010). Comparative analysis of the levels of financial literacy among students in the US, Belarus, and Japan. *Journal of Economics and Economic Education Research*, 11(3), 71.

Bouteska, A. (2020). *Tunisian Revolution and Herd Behavior: Empirical Evidence from the Tunisia Stock Exchange*. *International Finance Review*, 185–199. doi:10.1108/s1569-376720200000021011.

Bowen, C. F. (2002). Financial knowledge of teens and their parents. *Journal of Financial Counseling and Planning*, 13(2), 93.

Bowen, C. F., and Jones, H. M. (2006). Empowering young adults to control their financial future. *Journal of Family and Consumer Sciences*, 98(1), 33.

Boyle PA, Yu L, Wilson RS, Gamble K, Buchman AS, Bennett DA, Reddy H (2012) Poor decision making is a consequence of cognitive decline among older persons without Alzheimer's disease or mild cognitive impairment. *PLoS ONE* 7(8):e43647.

Brent, D. A., & Ward, M. (2018). Energy efficiency and financial literacy. *Journal of Environmental Economics and Management*.

Bricker, J., Detting, L. J., Henriques, A., Hsu, J. W., Jacobs, L., Moore, K. B., ... and Windle, R. A. (2017). Changes in US Family Finances from 2013 to 2016: Evidence from the Survey of Consumer Finances. *Fed. Res. Bull.*, 103, 1.

Brown, M., and Graf, R. (2013). Financial literacy and retirement planning in Switzerland. *Numeracy*, 6(2), 6.

Brown, R. S., Williams, C. W., and Lees-Haley, P. R. (1993). The effect of hindsight bias on fear of future illness. *Environment and Behavior*, 25(4), 577-585.

Brown, R. S., Williams, C. W., and Lees-Haley, P. R. (1993). The effect of hindsight bias on fear of future illness. *Environment and Behavior*, 25(4), 577-585.

Bryman, A. (2006). Bell, E. (2007) Business research methods. *New York: Oxford University*.

Bryman, A., and Bell, E. (2004). Research designs. *Social research methods*, 5.

Bryman, A., and Bell, E. (2015). *Business research methods*. Oxford University Press, USA.

Bucher-Koenen, T., and Lusardi, A. (2011). Financial literacy and retirement planning in Germany. *Journal of Pension Economics and Finance*, 10(4), 565-584.

Bucher-Koenen, T., and Ziegelmeier, M. (2011). Who lost the most. *Financial literacy, cognitive abilities, and the financial crisis*.

Bucher-Koenen, T., Lusardi, A., Alessie, R., and Van Rooij, M. (2017). How financially literate are women? An overview and new insights. *Journal of Consumer Affairs*, 51(2), 255-283.

Bukszar, E., & Connolly, T. (1988). Hindsight bias and strategic choice: Some problems in learning from experience. *Academy of Management Journal*, 31(3), 628-641.

Burger, J. M., McWard, J., and LaTorre, D. (1989). Boundaries of self-control: Relinquishing control over aversive events. *Journal of Social and Clinical Psychology*, 8(2), 209-221.

Calamato, M. P. (2010). *Learning financial literacy in the family*. San Jose State University.

Calcagno, R., & Monticone, C. (2015). Financial literacy and the demand for financial advice. *Journal of Banking & Finance*, 50, 363-380.

Calvet, L. E., Campbell, J. Y., & Sodini, P. (2009). Measuring the financial sophistication of households. *American Economic Review*, 99(2), 393-98.

Camerer, C. F., Loewenstein, G., and Prelec, D. (2004). Neuroeconomics: Why economics needs brains. *The Scandinavian Journal of Economics*, 106(3), 555-579.

Cameron, M. P., Calderwood, R., Cox, A., Lim, S., and Yamaoka, M. (2014). Factors associated with financial literacy among high school students in New Zealand. *International Review of Economics Education*, 16, 12-21.

Cameron, M. P., Calderwood, R., Cox, A., Lim, S., and Yamaoka, M. (2013). Personal financial literacy among high school students in New Zealand, Japan and the USA. *Citizenship, Social and Economics Education*, 12(3), 200-215.

Capuano, A., and Ramsay, I. (2011). What causes suboptimal financial behaviour? An exploration of financial literacy, social influences and behavioural economics.

Carter, E. E. (1973). A simultaneous equation approach to financial planning: Comment. *The Journal of Finance*, 28(4), 1035-1038.

Chardon, T., Lee, C., De Zwaan, L., & Liu, Y. (2016). University students and tax literacy: Opportunities and lessons for tax teaching. *J. Australasian Tax Tchrs. Ass'n*, 11, 85.

Chen, H., and Volpe, R. P. (1998). An analysis of personal financial literacy among college students. *Financial services review*, 7(2), 107-128.

Chittedi, K. R. (2014). Global Financial Crisis and Contagion: Evidence for the 'BRIC' Economies. *The Journal of Developing Areas*, 48(4), 243-264.

Chnstensen-Szalansld, J.J.J., and Willham, C. F. (1991). The hindsight bias: A meta-analysis. *Organizational Behavior and Human Decision Processes*, 48, 147-188.

Christelis, D., Jappelli, T., and Padula, M. (2010). Cognitive abilities and portfolio choice. *European Economic Review*, 54(1), 18-38.

Christie, W. G., & Huang, R. D. (1995). Following the pied piper: Do individual returns herd around the market? *Financial Analysts Journal*, 51, 31-37.

Cole, E. R. (2009). Intersectionality and research in psychology. *American psychologist*, 64(3), 170.

Cole, S. A., & Shastry, G. K. (2009). Smart money: The effect of education, cognitive ability, and financial literacy on financial market participation (pp. 09-071). Boston, MA: Harvard Business School.

Cosmides, L. (1989). The logic of social exchange: Has natural selection shaped how humans reason? Studies with the Wason selection task. *Cognition*, 31(3), 187-276.

Crapo, R. O., Hankinson, J. L., Irvin, C., MacIntyre, N. R., Voter, K. Z., Wise, R. A., ... and Veigi, G. (1995). Standardization of spirometry: 1994 update. *American journal of respiratory and critical care medicine*, 152(3), 1107-1136.

Cresswell, J. W. (1998). Qualitative inquiry and research design: Choosing among five traditions.

Croskerry, P. (2003). The importance of cognitive errors in diagnosis and strategies to minimize them. *Academic medicine*, 78(8), 775-780.

Crossan, D. (2011). How to improve financial literacy: Some successful strategies. *Financial literacy: Implications for retirement security and the financial marketplace*, 241-254.

Cude, B., Lawrence, F., Lyons, A., Metzger, K., LeJeune, E., Marks, L., and Machtmes, K. (2006). College students and financial literacy: What they know and what we need to learn. *Proceedings of the Eastern Family Economics and Resource Management Association*, 102(9), 106-109.

Cueva, C., Iturbe-Ormaetxe, I., Mata-Pérez, E., Ponti, G., Sartarelli, M., Yu, H., & Zhukova, V. (2016). Cognitive (ir) reflection: New experimental evidence. *Journal of Behavioral and Experimental Economics*, 64, 81-93.

Danes, S. M., and Hira, T. K. (1987). Money management knowledge of college students. *Journal of Student Financial Aid*, 17(1), 1.

Daniel, K., Hirshleifer, D., and Subrahmanyam, A. (1998). Investor psychology and security market under-and overreactions. *the Journal of Finance*, 53(6), 1839-1885.

De Bassa Scheresberg, C. (2013). Financial literacy and financial behavior among young adults: Evidence and implications. *Numeracy*, 6(2), 5.

De Beckker, K., De Witte, K., & Van Campenhout, G. (2019). Identifying financially illiterate groups: An international comparison. *International Journal of Consumer Studies*, 43(5), 490–501. <https://doi.org/10.1111/ijcs.12534>.

De Clercq, B., and Venter, J. M. P. (2009). Factors influencing a prospective chartered accountant's level of financial literacy: an exploratory study. *Meditari Accountancy Research*, 17(2), 47-60.

Deci, E. L., and Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of personality and social psychology*, 53(6), 1024.

Delavande, A. (2008). Pill, patch, or shot? Subjective expectations and birth control choice. *International Economic Review*, 49(3), 999-1042.

Dellande, S., and Saporoschenko, A. (2004). Factors in gaining compliance toward an acceptable level of personal unsecured debt. *International Journal of Bank Marketing*, 22(4), 279-290.

Dhaoui, A., and Jouini, F. (2011). RandD Investment, Governance and Management Entrenchment. *The Journal of World Economic Review*, 6(1), 35-53.

Dhiman, B., & Raheja, S. (2018). Do Personality Traits and Emotional Intelligence of Investors Determine Their Risk Tolerance? . *Management and Labour Studies*, 43(1-2), 88-99.

Di Salvatore, A., Franceschi, F., Neri, A., & Zanichelli, F. (2018). Measuring the financial literacy of the adult population: the experience of Banca d'Italia. Bank of Italy Occasional Paper, (435).

Disney, R., and Gathergood, J. (2013). Financial literacy and consumer credit portfolios. *Journal of Banking and Finance*, 37(7), 2246-2254.

Dolvin, S. D., and Templeton, W. K. (2006). Financial education and asset allocation. *Financial Services Review*, 15, 133.

Drexler, A., Fischer, G., & Schoar, A. (2014). Keeping it simple: Financial literacy and rules of thumb. *American Economic Journal: Applied Economics*, 6(2), 1-31.

Driva, A., Lührmann, M., and Winter, J. (2016). Gender differences and stereotypes in financial literacy: Off to an early start. *Economics Letters*, 146, 143-146.

Durband, D. B., & Britt, S. L. (Eds.). (2012). *Student financial literacy: Campus-based program development*. Springer Science & Business Media.

Eguchi, K., Enomoto, S., Furuno, K., Goldman, J., Hanada, H., Ikeda, H. and Iwamoto, T. (2003). First results from KamLAND: evidence for reactor antineutrino disappearance. *Physical Review Letters*, 90(2), 021802.

Engelen, E., Ertuk, I., Froud, J., Johal, S., Leaver, A., Ertürk, I., & Williams, K. (2011). *After the great complacency: Financial crisis and the politics of reform*. Oxford University Press.

Er, B., & Mutlu, M. (2017). Financial inclusion and Islamic finance: A survey of Islamic financial literacy index. *Uluslararası İslam Ekonomisi ve Finansı Araştırmaları Dergisi*, 3(2).

Erner, C., Goedde-Menke, M., and Oberste, M. (2016). Financial literacy of high school students: Evidence from Germany. *The Journal of Economic Education*, 47(2), 95-105.

Evans, J. S. B., Newstead, S. E., and Byrne, R. M. (1993). *Human reasoning: The psychology of deduction*. Psychology Press.

Fama, E. F. (1965). The behavior of stock-market prices. *The journal of Business*, 38(1), 34-105.

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The journal of Finance*, 25(2), 383-417.

Fama, E. F. (1998). Market efficiency, long-term returns, and behavioral finance. *Journal of financial economics*, 49(3), 283-306.

Fama, E. F., and French, K. R. (1997). Industry costs of equity. *Journal of financial economics*, 43(2), 153-193.

Fang, H., and Silverman, D. (2009). Time-inconsistency and welfare program participation: Evidence from the NLSY. *International Economic Review*, 50(4), 1043-1077.

Fatima (2019). Financial literacy in Pakistan, *Published in The Express Tribune*, April 13th, 2019.

Fernandes, D., Lynch Jr, J. G., & Netemeyer, R. G. (2014). Financial literacy, financial education, and downstream financial behaviors. *Management Science*, 60(8), 1861-1883.

Fernandes, D., Lynch Jr, J. G., and Netemeyer, R. G. (2014). Financial literacy, financial education, and downstream financial behaviors. *Management Science*, 60(8), 1861-1883.

Financial Industry Regulatory Authority (FINRA) (2010) Financial Capability in the United States: National Survey, Executive Summary. Washington, DC, available at <http://www.finrafoundation.org/resources/research/p120478>

Financial Literacy and Education Commission. (2009, 09 09). Retrieved 04 02, 2017, from "Financial Literacy and Education Commission Member Agencies": <https://web.archive.org/web/20090825001001/http://www.mymoney.gov/agency.shtml>

Finke, M. S., & Huston, S. J. (2014). Financial literacy and education. *Investor behavior: The psychology of financial planning and investing*, 63-82.

Finke, M. S., Howe, J. S., & Huston, S. J. (2017). Old age and the decline in financial literacy. *Management Science*, 63(1), 213-230.

Fischhoff, B. (1975). Hindsight is not equal to foresight: The effect of outcome knowledge on judgment under uncertainty. *Journal of Experimental Psychology: Human perception and performance*, 1(3), 288.

Fisher, K. L., & Statman, M. (2000). Cognitive biases in market forecasts. *Journal of Portfolio Management*, 27(1), 72-81.

Fonseca, R., Mullen, K. J., Zamarro, G., & Zissimopoulos, J. (2012). What explains the gender gap in financial literacy? The role of household decision making. *Journal of Consumer Affairs*, 46(1), 90-106.

Fonseca, R., Mullen, K. J., Zamarro, G., and Zissimopoulos, J. (2012). What explains the gender gap in financial literacy? The role of household decision making. *Journal of Consumer Affairs*, 46(1), 90-106.

Fornero, E., and Monticone, C. (2011). Financial literacy and pension plan participation in Italy. *Journal of Pension Economics and Finance*, 10(4), 547-564.

Foss, N. J. (2003). Bounded rationality in the economics of organization: "Much cited and little used". *Journal of Economic Psychology*, 24(2), 245-264.

Fox, J., Bartholomae, S., and Lee, J. (2005). Building the case for financial education. *Journal of consumer affairs*, 39(1), 195-214.

Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic perspectives*, 19(4), 25-42.

French, D., and McKillop, D. (2016). Financial literacy and over-indebtedness in low-income households. *International Review of Financial Analysis*, 48, 1-11.

FSA F. S. (2005). *Measuring Financial capability: an exploratory study*. FSA:London: consumer research study no 37.

Gallery, G., and Gallery, N. (2010). Rethinking financial literacy in the aftermath of the global financial crisis. *Griffith Law Review*, 19(1), 30-50.

Gallery, N., Newton, C., and Palm, C. (2011). Framework for assessing financial literacy and superannuation investment choice decisions. *Australasian Accounting Business and Finance Journal*, 5(2), 3.

Ganesan, Y., Pitchay, A. B. A., & Nasser, M. A. M. (2020). Does intention influence the financial literacy of depositors of Islamic banking? A case of Malaysia. *International Journal of Social Economics*.

Garcia, M. J. R. (2013). Financial education and behavioral finance: New insights into the role of information in financial decisions. *Journal of Economic Surveys*, 27(2), 297-315.

Geller, E. S., and Pitz, G. F. (1968). Confidence and decision speed in the revision of opinion. *Organizational Behavior and Human Performance*, 3(2), 190-201.

Gerardi, K., L. Goette, and S. Meier (2010). Financial literacy and subprime mortgage delinquency: Evidence from a survey matched to administrative data. *Federal Reserve Bank of Atlanta Working Paper*.

Ghaffar, S., & Sharif, S. (2016). The level of financial literacy in Pakistan. *Journal of Education & Social Sciences*, 4(2),132-143.

Giesler, M. and E. Veresiu, (2014). Creating the responsible consumer: Moralistic governance regimes and consumer subjectivity. *Journal of Consumer Research*, 41(3): 840-857. Available at: <https://doi.org/10.1086/677842>.

Gigerenzer, G. (2004). Fast and frugal heuristics: The tools of bounded rationality. *Blackwell handbook of judgment and decision making*, 62, 88.

Gigerenzer, G., and Goldstein, D. G. (1996). Reasoning the fast and frugal way: models of bounded rationality. *Psychological review*, 103(4), 650.

Gigerenzer, G., Hoffrage, U., and Kleinbölting, H. (1991). Probabilistic mental models: a Brunswikian theory of confidence. *Psychological review*, 98(4), 506.

Gilovich, T., Griffin, D., and Kahneman, D. (Eds.). (2002). *Heuristics and biases: The psychology of intuitive judgment*. Cambridge university press.

Go, C. G., Varcoe, K., Eng, T., Pho, W., and Choi, L. (2012). Money savvy youth: Evaluating the effectiveness of financial education for fourth and fifth graders. *San Francisco, CA: Federal Reserve Bank of San Francisco Working Paper*, 2.

Goel, I., & Khanna, S. R. (2014). Financial education as tool to achieve financial literacy. *ZENITH International Journal of Multidisciplinary Research*, 4(11), 72-79.

Goetzmann, W. N., Renneboog, L., and Spaenjers, C. (2011). Art and money. *American Economic Review*, 101(3), 222-26.

Goyal, K., & Kumar, S. (2020). Financial literacy: A Systematic Review and Bibliometric Analysis. *International Journal of Consumer Studies*. doi:10.1111/ijcs.12605.

Grabitz, H. J., and Haisch, J. (1972). An evaluation of confirming and disconfirming information in decision-making. *Archiv für Psychologie*.

Graham, J. F., Stendardi Jr, E. J., Myers, J. K., and Graham, M. J. (2002). Gender differences in investment strategies: an information processing perspective. *International journal of bank marketing*, 20(1), 17-26.

Graham, J. R., Harvey, C. R., and Huang, H. (2009). Investor competence, trading frequency, and home bias. *Management Science*, 55(7), 1094-1106.

Grifoni, A., and Messy, F. A. (2012). Current status of national strategies for financial education: A comparative analysis and relevant practices. *OECD Working Papers on Finance, Insurance and Private Pensions*, (16), 1.

Grohmann, A., Hübler, O., Kouwenberg, R., and Menkhoff, L. (2016). Financial Literacy: Thai Middle Class Women Do Not Lag behind.

Grohmann, A., Klühs, T., & Menkhoff, L. (2017). Does financial literacy improve financial inclusion? Cross country evidence.

Groopman, J. E., & Prichard, M. (2007). *How doctors think* (Vol. 82). Boston: Houghton Mifflin.

Guiso, L., and Paiella, M. (2008). Risk aversion, wealth, and background risk. *Journal of the European Economic association*, 6(6), 1109-1150.

Hamid, A., and Nordin, N. (2001). A study on Islamic banking education and strategy for the new millennium-Malaysian experience. *International Journal of Islamic Financial Services*, 2(4), 3-11.

Hanson, T. A., & Olson, P. M. (2018). Financial literacy and family communication patterns. *Journal of Behavioral and Experimental Finance*.

Hanson, T. A., & Olson, P. M. (2018). Financial literacy and family communication patterns. *Journal of Behavioral and Experimental Finance*.

Haron, S., Ahmad, N., and Planisek, S. L. (1994). Bank patronage factors of Muslim and non-Muslim customers. *International Journal of Bank Marketing*, 12(1), 32-40.

Harrison, N., and Agnew, S. (2016). Individual and Social Influences on Students' Attitudes to Debt: a Cross-National Path Analysis Using Data from England and New Zealand. *Higher Education Quarterly*, 70(4), 332-353.

Harrison, R. T., Dibben, M. R., and Mason, C. M. (1997). The role of trust in the informal investor's investment decision: An exploratory analysis. *Entrepreneurship Theory and Practice*, 21(4), 63-81.

Harun, H., Graham, P., Kamase, H. P., & Mir, M. (2021). A Critical Analysis of the Impacts of Financial Literacy and NPM on Village Funds Initiative in Indonesia. *International Journal of Public Administration*, 44(4), 336-345.

Hasnain, A., Batool, S., & Altaf, A. (2017). An investigation on Financial Literacy: a case of Southern Punjab, Pakistan. *Pakistan Journal of social Sciences (PJSS)*, 37(1).

Hassan Al-Tamimi, H. A., and Anood Bin Kalli, A. (2009). Financial literacy and investment decisions of UAE investors. *The Journal of Risk Finance*, 10(5), 500-516.

Hastings, J. S., & Tejeda-Ashton, L. (2008). *Financial literacy, information, and demand elasticity: survey and experimental evidence from Mexico* (No. w14538). National Bureau of Economic Research.

Hastings, J. S., and Mitchell, O. S. (2011). *How financial literacy and impatience shape retirement wealth and investment behaviors* (No. w16740). National Bureau of Economic Research.

Hawkins, S. A., and Hastie, R. (1990). Hindsight: Biased judgments of past events after the outcomes are known. *Psychological bulletin*, 107(3), 311.

Hayat, A. and M. Anwar (2016). Impact of behavioral biases on investment decision; moderating role of financial literacy. *SSRN Electronic Journal*: 1-14.

Hedesström, T. M., Svedsäter, H., and Gärling, T. (2007). Determinants of the use of heuristic choice rules in the Swedish Premium Pension Scheme: An Internet-based survey. *Journal of Economic Psychology*, 28(1), 113-126.

Henzinger, T. A., Horowitz, B., and Kirsch, C. M. (2001). Giotto: A time-triggered language for embedded programming. In *International Workshop on Embedded Software* (pp. 166-184). Springer, Berlin, Heidelberg.

Hertwig, R., Fanselow, C., and Hoffrage, U. (2003). Hindsight bias: How knowledge and heuristics affect our reconstruction of the past. *Memory*, 11(4-5), 357-377.

Hess, D. W. (2012). The Impact of Religiosity on Personal Financial Decisions. *Journal of Religion and Society*, Vol. 14(2012).

Hesse-Biber, S. (2009). Neglected issues in mixed methods research: Bringing theory into MM praxis with a focus on qualitative approaches, " 5th International Mixed Method Conference and Workshop. July, Harrogate.

Higgins, J., and Altman, D. G. (2008). Assessing risk of bias in included studies. *Cochrane handbook for systematic reviews of interventions: Cochrane book series*, 187-241.

Hilgert, M. A., Hogarth, J. M., and Beverly, S. G. (2003). Household financial management: The connection between knowledge and behavior. *Fed. Res. Bull.*, 89, 309.

Hochmuth, R. M., Wiles, H. C., Evans, E. A., and McCown, J. T. (1982). Extensional flow of erythrocyte membrane from cell body to elastic tether. II. Experiment. *Biophysical journal*, 39(1), 83-89.

Hoffrage, U., Hertwig, R., and Gigerenzer, G. (2000). Hindsight bias: A by-product of knowledge updating?. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 26(3), 566.

Hogarth, J. M. (2002). Financial literacy and family and consumer sciences. *Journal of Family and Consumer Sciences*, 94(1), 14.

Hogarth, J. M., and Hilgert, M. A. (2002). Financial knowledge, experience and learning preferences: Preliminary results from a new survey on financial literacy. *Consumer Interest Annual*, 48(1), 1-7.

Hsiao, Y. J., & Tsai, W. C. (2018). Financial literacy and participation in the derivatives markets. *Journal of Banking & Finance*, 88, 15-29.

Hsu, J. W. (2016). Aging and strategic learning: The impact of spousal incentives on financial literacy. *Journal of Human Resources*, 51(4), 1036-1067.

http://www.anz.com/Documents/AU/Aboutanz/AN_5654_Adult_Fin_Lit_Report_08_Web_Report_full.pdf. <https://propakistani.pk/2017/05/26/literacy-rate-pakistan-drops-2-2016-17>.

Huang, J., Nam, Y., and Sherraden, M. S. (2013). Financial knowledge and child development account policy: A test of financial capability. *Journal of Consumer Affairs*, 47(1), 1-26.

Hulett, M. D., and Hogarth, P. M. (1994). Molecular basis of Fc receptor function. In *Advances in immunology* (Vol. 57, pp. 1-127). Academic Press.

Hung, A., Parker, A. M., and Yoong, J. (2009). Defining and measuring financial literacy.

Hung, A., Yoong, J., and Brown, E. (2012). Empowering women through financial awareness and education. *OECD Working Papers on Finance, Insurance and Private Pensions*, (14), 1.

Hussain, I., and Sajjad, S. (2016). Significance of Financial Literacy and Its Implications: A Discussion. *Journal of Business Strategies*, 10(2), 141.

Hussain, M., Shah, S. Z. A., Latif, K., Bashir, U., & Yasir, M. (2013). Hindsight bias and investment decisions making empirical evidence form an emerging financial market. *International Journal of Research Studies in Management*, 2(2), 77-88.

Huston, C. (2008). Preparing nurse leaders for 2020. *Journal of Nursing Management*, 16(8), 905-911.

Huston, S. J. (2010). Measuring financial literacy. *Journal of Consumer Affairs*, 44(2), 296-316.

Iersel, J. v. (2016). Financial Education for all. Brussel: Visits and Publications.

Jalilvand, A., Noroozabad, M. R., and Switzer, J. (2017). Informed and uninformed investors in Iran: Evidence from the Tehran Stock Exchange. *Journal of Economics and Business*.

Jappelli, T., and Padula, M. (2013). Investment in financial literacy and saving decisions. *Journal of Banking and Finance*, 37(8), 2779-2792.

Jiang, J., Liao, L., Wang, Z., & Xiang, H. (2020). Financial literacy and retail investors' financial welfare: Evidence from mutual fund investment outcomes in China. *Pacific-Basin Finance Journal*, 59, 101242.

Johnson-Laird, P. N., and Wason, P. C. (1970). A theoretical analysis of insight into a reasoning task. *Cognitive Psychology*, 1(2), 134-148.

Johnson, E., and Sherraden, M. S. (2007). From Financial Literacy to Financial Capability among Youth. *J. Soc. and Soc. Welfare*, 34, 119.

Jonas, E., Schulz-Hardt, S., Frey, D., and Thelen, N. (2001). Confirmation bias in sequential information search after preliminary decisions: an expansion of dissonance theoretical research on selective exposure to information. *Journal of personality and social psychology*, 80(4), 557.

Jump\$Start Coalition. (2007). *National Standards in K-12 Personal Finance Education*. <http://www.jumpstart.org/guide.html>.

Kahneman, D. (2003). Maps of bounded rationality: Psychology for behavioral economics. *American economic review*, 93(5), 1449-1475.

Kahneman, D., & Riepe, M. W. (1998). Aspects of investor psychology. *Journal of portfolio management*, 24(4), 52.

Kahneman, D., and Tversky, A. (1982). The psychology of preferences. *Scientific American*, 246(1), 160-173.

Kahneman, D., Slovic, P., and Tversky, A. (1982). Judgments under uncertainty. *Heuristics and Biases*, Cambridge.

Kalberg, S. (1997). Max Weber's sociology: Research strategies and modes of analysis. *Cambridge (ed.)*.

Kamakia, M. G., Mwangi, C. I., & Mwangi, M. (2017). Financial literacy and financial wellbeing of public sector employees: A critical literature review. *European Scientific Journal*, 13(16), 233-249.

Karakurum-Ozdemir, K., Kokkizil, M., & Uysal, G. (2019). Financial literacy in developing countries. *Social Indicators Research*, 143(1), 325-353.

Karaa, I. E., & Kuğu, T. D. (2016). Determining advanced and basic financial literacy relations and overconfidence, and informative social media association of university students in Turkey. *Educational Sciences: Theory & Practice*, 16(6).

Kaur, R. (2020, 09 14). *What is Behavioral Finance and how does it affect your Financial decisions?* Retrieved 04 2021, from Finology: <https://blog.finology.in/behavioral-finance/what-is-behavioral-finance>.

Kempson, E., Collard, S., and Moore, N. (2006). Measuring financial capability: An exploratory study for the Financial Services Authority. *Consumer Financial Capability: Empowering European Consumers*, 39.

Kerlinger, P., and Lein, M. R. (1986). Differences in winter range among age-sex classes of Snowy Owls *Nyctea scandiaca* in North America. *Ornis Scandinavica*, 1-7.

Keynes, J. M. (1936). The general theory of money, interest and employment. *Reprinted in The Collected Writings of John Maynard Keynes*, 7.

Khan, M. J., Aslam, F., & Nisar-Ul-Mulk, S. (2020). Factors Affecting Financial Literacy and Financial Behaviour of Investors in Pakistan. *Research Journal of Social Sciences and Economics Review (RJSSER)*, 1(3), 80-90.

Kim, J., and Garman, E. T. (2004). Financial stress, pay satisfaction and workplace performance. *Compensation and Benefits Review*, 36(1), 69-76.

Kim, J., LaTaillade, J., and Kim, H. (2011). Family processes and adolescents' financial behaviors. *Journal of family and economic issues*, 32(4), 668-679.

Kim, K. A., and Nofsinger, J. R. (2008). Behavioral finance in Asia: Editorial. *Pacific-Basin Finance Journal* 16, 1-7.

Klapper, L., & Panos, G. A. (2011). Financial literacy and retirement planning: the Russian case. *Journal of Pension Economics & Finance*, 10(4), 599-618.

Ko, S. G., Lee, T. H., Yoon, H. Y., Kwon, J. H., & Mather, M. (2011). How does context affect assessments of facial emotion? The role of culture and age. *Psychology and Aging*, 26(1), 48.

Koomson, I., Villano, R. A., & Hadley, D. (2020). Intensifying financial inclusion through the provision of financial literacy training: a gendered perspective. *Applied Economics*, 52(4), 375-387.

Kotlikoff, L., and Bernheim, B. (2001). Household financial planning and financial literacy in Essays on saving, bequests, altruism, and life-cycle planning.

Kumar, S. and N. Goyal, 2016. Evidence on rationality and behavioral biases in investment decision making. *Qualitative Research in Financial Markets*, 8(4): 270-287. Available at: <https://doi.org/10.1108/qrfm-05-2016-0016>.

Kunovskaya, I. (2010). *The impact of financial literacy on use of financial services in Russia* (Doctoral dissertation, University of Georgia).

LaBine, S. J., and LaBine, G. (1996). Determinations of negligence and the hindsight bias. *Law and Human Behavior*, 20(5), 501.

Lai, H. L., Guzzi, M., Huston, J., Li, Z., Nadolsky, P. M., Pumplin, J., and Yuan, C. P. (2010). New parton distributions for collider physics. *Physical Review D*, 82(7), 074024.

Landström, H. (1998). Informal investors as entrepreneurs: Decision-making criteria used by informal investors in their assessment of new investment proposals. *Technovation*, 18(5), 321-333.

Lillard, L. A. (1999). Job turnover heterogeneity and person-job-specific time-series wages. *Annales d'Economie et de Statistique*, 183-210.

Lovallo, D., & Kahneman, D. (2003). Delusions of success. *Harvard business review*, 81(7), 56-63.

Lucey, T. A. (2007). The art of relating moral education to financial education: An equity imperative. *Social Studies Research and Practice*, 2(3), 486-500.

Lunneborg, C. E. (2007). Convenience sample. *Blackwell Encyclopedia of Sociology*.

Lusardi A, Mitchell OS, Curto V (2014) Financial literacy and financial sophistication in the older population. *Pension Econom.Finance*13(4):347–366.

Lusardi, A. (2008). *Financial literacy: an essential tool for informed consumer choice?* (No. w14084). National Bureau of Economic Research.

Lusardi, A. (2015). Financial literacy: Do people know the ABCs of finance? Public understanding of science, 24(3), 260-271.

Lusardi, A., and Mitchell, O. S. (2006). *Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth* (No. w12585). National Bureau of Economic Research.

Lusardi, A., and Mitchell, O. S. (2007a). Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth. *Journal of monetary Economics*, 54(1), 205-224.

Lusardi, A., and Mitchell, O. S. (2009). *How ordinary consumers make complex economic decisions: Financial literacy and retirement readiness* (No. w15350). National Bureau of Economic Research.

Lusardi, A., and Mitchell, O. S. (2007b). Financial literacy and retirement preparedness: Evidence and implications for financial education. *Business economics*, 42(1), 35-44.

Lusardi, A., and Scheresberg, C. D. B. (2013). *Financial literacy and high-cost borrowing in the United States* (No. w18969). National Bureau of Economic Research.

Lusardi, A., and Tufano, P. (2009). Teach workers about the perils of debt. *Harvard Business Review*, 87(11), 22-24.

Lusardi, A., and Wallace, D. (2013). Financial literacy and quantitative reasoning in the high school and college classroom. *Numeracy*, 6(2), 1.

Lusardi, A., Michaud, P. C., and Mitchell, O. S. (2017). Optimal financial knowledge and wealth inequality. *Journal of Political Economy*, 125(2), 431-477.

Lusardi, A., Mitchell, O. S., and Curto, V. (2010). Financial literacy among the young. *Journal of consumer affairs*, 44(2), 358-380.

Lyons, A. C., Palmer, L., Jayaratne, K. S., and Scherpf, E. (2006). Are we making the grade? A national overview of financial education and program evaluation. *Journal of Consumer Affairs*, 40(2), 208-235.

Macey, M. (1999). Religion, male violence, and the control of women: Pakistani Muslim men in Bradford, UK. *Gender and Development*, 7(1), 48-55.

Mae, S. (2009). How undergraduate students use credit cards: Sallie Mae's national study of usage rates and trends 2009. Retrieved April, 2, 2010.

Mandell, L. (2008). The financial literacy of young American adults: Results of the 2008 National Jump \$ tart Coalition survey of high school seniors and college students. *Washington, DC: The Jump \$ tart Coalition for Personal Financial Literacy*.

Mandell, L., and Klein, L. (2009). The impact of financial literacy education on subsequent financial behavior.

Mandell, L., and Klein, L. S. (2007). Motivation and financial literacy. *Financial services review*, 16(2), 105.

March, J. G. (1978). Bounded rationality, ambiguity, and the engineering of choice. *The Bell Journal of Economics*, 587-608.

Marcolin, S., and Abraham, A. (2006). Financial literacy research: Current literature and future opportunities.

Martin, R. D. (1990). Primate origins and evolution.

Mason, C. L., and Wilson, R. (2000). *Conceptualising financial literacy*. © Loughborough University.

Maxfield, S. (2009). Stock exchanges in low and middle income countries. *International Journal of Emerging Markets*, 4(1), 43-55.

Maxwell, J. A. (2012). *Qualitative research design: An interactive approach* (Vol. 41). Sage publications.

McNamara, G., and Bromiley, P. (1997). Decision making in an organizational setting: Cognitive and organizational influences on risk assessment in commercial lending. *Academy of Management journal*, 40(5), 1063-1088.

Meier, S., and C. D. Sprenger. (2013) Discounting financial literacy: time preferences and participation in financial education programs, *Journal of Economic Behavior and Organization* 95, 159–174.

Meier, S., and Sprenger, C. D. (2013). Discounting financial literacy: Time preferences and participation in financial education programs. *Journal of Economic Behavior and Organization*, 95, 159-174.

Merkle, C. (2017). Financial overconfidence over time: Foresight, hindsight, and insight of investors. *Journal of Banking & Finance*, 84, 68-87.

Metawa, S. A., and Almosawi, M. (1998). Banking behavior of Islamic bank customers: perspectives and implications. *International Journal of Bank Marketing*, 16(7), 299-313.

Monticone, C. (2010). How much does wealth matter in the acquisition of financial literacy? *Journal of Consumer Affairs*, 44(2), 403-422.

Moore, D. L. (2003). *Survey of financial literacy in Washington State: Knowledge, behavior, attitudes, and experiences*. Washington State Department of Financial Institutions.

Morton, J. S. (2005). The interdependence of economic and personal finance education. *Social Education*, 69(2), 66-70.

Mottola, G. R. (2013). In our best interest: Women, financial literacy, and credit card behavior. *Numeracy*, 6(2), 4.

Mouna, A., and Anis, J. (2016). Market, interest rate, and exchange rate risk effects on financial stock returns during the financial crisis: AGARCH-M approach. *Cogent Economics and Finance*, 4(1), 1125332.

Muñoz-Murillo, M., Álvarez-Franco, P. B., & Restrepo-Tobón, D. A. (2019). The Role of Cognitive Abilities on Financial Literacy: New Experimental Evidence. *Journal of Behavioral and Experimental Economics*, 101482. doi:10.1016/j.socec.2019.101482.

Muñoz-Murillo, M., Álvarez-Franco, P. B., & Restrepo-Tobón, D. A. (2020). The role of cognitive abilities on financial literacy: New experimental evidence. *Journal of Behavioral and Experimental Economics*, 84, 101482.

National Council on Economic Education (NCEE) (2005). *What American Teens and Adults Know About Economics*. Washington, DC: NCEE.

Nayebzadeh, S., Taft, M. K., & Sadrabadi, M. M. M. (2013). The study of university professors' financial literacy. *International Journal of Academic Research in Accounting, Finance and Management Sciences* 3 (3), 111-117.

Nelson, J. A. (2014). The power of stereotyping and confirmation bias to overwhelm accurate assessment: the case of economics, gender, and risk aversion. *Journal of Economic Methodology*, 21(3), 211-231.

Nga, J. K., Yong, L. H., and Sellappan, R. D. (2010). A study of financial awareness among youths. *Young Consumers*, 11(4), 277-290.

Nguyen, L., Gallery, G., and Newton, C. (2016). The influence of financial risk tolerance on investment decision-making in a financial advice context. *Australasian Accounting, Business and Finance Journal*, 10(3), 3-22.

Niazi, M. K. S., & Malik, Q. A. (2019). Financial attitude and investment decision making-moderating role of financial literacy. *NUML International Journal of Business & Management*, 14(1), 102-115.

Nidar, S. R., and Bestari, S. (2012). Personal financial literacy among university students (case study at Padjadjaran University students, Bandung, Indonesia). *World Journal of Social Sciences*, 2(4), 162-171.

Niles, R. (2006). Sample size: How many survey participants do I need. Retrieved from. <http://swcta.net/goode/2015/02/06/sample-size-how-many-survey-participants-do-i-need/>

Niu, G., & Zhou, Y. (2017). Financial literacy and retirement planning: evidence from China. *Applied Economics Letters*, 25(9), 619–623. doi:10.1080/13504851.2017.1352072.

Njuguna, A. G., Mutanu, L., Otsola, J. K., and Thuku, V. M. (2011). *Financial and pension literacy: a survey of pension scheme members in Kenya*. United States International University-Africa, Retirement Benefits Authority.

O'sullivan, T., Hartley, J., Saunders, D., Montgomery, M., and Fiske, J. (1994). *Key concepts in communication and cultural studies* (p. 267). London: Routledge.

OECD (Organisation for Economic Development and Cooperation. (2013b). *PISA 2012 Assessment and Analytical Framework: Mathematics, Reading, Science, Problem Solving and Financial Literacy*. Paris: OECD Publishing .

OECD. (2005). *Improving Financial Literacy :analysis of issues and policies* . Paris: OECD.

OECD. (2008). *Biofuel Support Policies: An Economic Assessment*. OECD Publishing.

OECD. (2009). *“Informal is Normal? Towards More and Better Jobs in Developing Countries”*. Paris: OECD .

OECD. (2012). *Gender Equality in Education, Employment and Entrepreneurship: Final Report to the MCM*. Paris: OECD.

Oehler, A., and Kohlert, D. (2009). Financial Advice Giving and Taking—Where are the Market’s Self-healing Powers and a Functioning Legal Framework When We Need Them?. *Journal of Consumer Policy*, 32(2), 91-116.

Oehler, A., and Werner, C. (2008). Saving for retirement—a case for financial education in Germany and UK? An economic perspective. *Journal of Consumer Policy*, 31(3), 253-283.

Oehler, A., Wendt, S., and Horn, M. (2017). Are investors really home-biased when investing at home? *Research in International Business and Finance*, 40, 52-60.

Opletalová, A. (2015). Financial education and financial literacy in the Czech education system. *Procedia-Social and Behavioral Sciences*, 171, 1176-1184.

Organization for Economic Co-operation and Development (OECD) (2005) *Improving Financial Literacy: Analysis of Issues and Policies*. Paris, France: OECD.

Orton, L. (2007). *Financial literacy: Lessons from international experience*. Canadian Policy Research Networks.

Palmer, K. (2008). The financial literacy crisis. *Tersedia: <http://money.usnews.com/money/personal-finance/articles/2008/04/02/financial-literacy-101>* [26 Januari 2016].

Park, J., Konana, P., Gu, B., Kumar, A., & Raghunathan, R. (2010). Confirmation bias, overconfidence, and investment performance: Evidence from stock message boards. *McCombs Research Paper Series No. IROM-07-10*.

Park, J., Konana, P., Gu, B., Kumar, A., & Raghunathan, R. (2013). Information valuation and confirmation bias in virtual communities: Evidence from stock message boards. *Information Systems Research*, 24(4), 1050-1067.

Pellinen, A., To"rma" Kangas, K., Uusitalo, O., and Rajjas, A. (2011). Measuring the financial capability of investors: A case of the customers of mutual funds in Finland. *International Journal of Bank Marketing*, 29(2), 107–133. doi:10.1108/02652321111107611.

Perry, Vanessa, G. and Shelia, A. (2002) *Credit Smart Research: A Study of Consumer Financial Knowledge and Implications for Social Marketing. Social Marketing Quarterly*, 8 (3), 3–16.

Pinsonneault, A., and Kraemer, K. (1993). Survey research methodology in management information systems: an assessment. *Journal of management information systems*, 10(2), 75-105.

President's Advisory Council on Financial Literacy (PACFL) (2008). 2008 Annual Report to the President. Accessed March 11, 2009 at <http://www.treas.gov/offices/domestic-finance/financial-institution/fin-education/council/index.shtml>.

Priyadharshini, S. H. (2017). From financial literacy to financial well-being: A study of the level of financial literacy of women teaching faculty in educational institutions in Coimbatore region. (Doctoral dissertation, Bharathiar University, Coimbatore).

Pudney, S., 2011, Perception and retrospection: the dynamic consistency of responses to survey questions on wellbeing, *Journal of Public Economics* 95, 300–310.

Razumovskaya, E., & Razumovskiy, D. (2020, May). Regional Differences in Income and Involvement in the Use of DFS as Factors of Influence on the Population

Financial Literacy. In *International Conference on Economics, Management and Technologies 2020 (ICEMT 2020)* (pp. 64-70). Atlantis Press.

Regezi, J. A., Sciubba, J. J., and Jordan, R. C. (2016). *Oral pathology: clinical pathologic correlations*. Elsevier Health Sciences.

Rehman, A., Jingdong, L., & Hussain, I. (2015). The province-wise literacy rate in Pakistan and its impact on the economy. *Pacific Science Review B: Humanities and Social Sciences*, 1(3), 140-144.

Rem Johnson, E., and Sherraden, M. S. (2007). From Financial Literacy to Financial Capability smong Youth. *J. Soc. and Soc. Welfare*, 34, 119.

Remund, D. L. (2010). Financial literacy explicated: The case for a clearer definition in an increasingly complex economy. *Journal of consumer affairs*, 44(2), 276-295.

Restore(n.d.).<https://www.restore.ac.uk/srme/www/fac/soc/wie/researchnew/srme/modules/mod4/12/index.html>.

Rheingold, A. A., Herbert, J. D., and Franklin, M. E. (2003). Cognitive bias in adolescents with social anxiety disorder. *Cognitive Therapy and Research*, 27(6), 639-655.

Ribes-Iñesta and Emilio (2003). What is defined in operational definitions? The case of operant psychology. *Behavior and Philosophy*, 31: 115.

Ritter, J. R. (2003). Differences between European and American IPO markets. *European financial management*, 9(4), 421-434.

Roberts, J. A., and Jones, E. (2001). Money attitudes, credit card use, and compulsive buying among American college students. *Journal of Consumer Affairs*, 35, 213-240.

Roomi, M. A., and Parrott, G. (2008). Barriers to development and progression of women entrepreneurs in Pakistan. *The Journal of Entrepreneurship*, 17(1), 59-72.

Rosacker, K. M., Ragothaman, S., and Gillispie, M. (2009). Financial literacy of freshmen business school students. *College Student Journal*, 43(2), 391-400.

Rubin, A., and Babbie, E. (1993). The logic of sampling. *Research methods for social work*, 367-371.

Rubin, D. B. (1986). Comment: Which ifs have causal answers. *Journal of the American Statistical Association*, 81(396), 961-962.

Russo, J. E., and Shoemaker, P. J. (1992). Managing overconfidence. *Sloan management review*, 33(2), 7. *sample size table*. (2006). Retrieved 01 11, 2015, from <http://www.research-advisors.com>: <http://www.research-advisors.com/tools/SampleSize.htm>

Sabir, S. A., Mohammad, H. B., & Shahar, H. B. K. (2019). The role of overconfidence and past investment experience in herding behavior with a moderating effect of financial literacy: evidence from Pakistan stock exchange. *Asian Economic and Financial Review*, 9(4), 480.

Samuelson, P. A. (1965). Proof that properly anticipated prices fluctuate randomly. *IMR; Industrial Management Review (pre-1986)*, 6(2), 41.

Saunders, M., Lewis, P., and Thornhill, A. (2007). Formulating the research design. *Research methods for business students*, 130-161.

Scanes, C. G., Sharp, P. J., Harvey, S., Godden, P. M., Chadwick, A., and Newcomer, W. S. (1979). Variations in plasma prolactin, thyroid hormones, gonadal steroids and growth hormone in turkeys during the induction of egg laying and moult by different photoperiods. *British Poultry Science*, 20(2), 143-148.

Schagen, S. (1997). The Evaluation of NatWest Face 2 Face with Finance.NFER.

Schuett, F., and Wagner, A. K. (2011). Hindsight-biased evaluation of political decision makers. *Journal of Public Economics*, 95(11-12), 1621-1634.

Schulz-Hardt, S., Frey, D., Lüthgens, C., and Moscovici, S. (2000). Biased information search in group decision making. *Journal of personality and social psychology*, 78(4), 655.

Schwella, E., & van Nieuwenhuyzen, B. J. (2014). *Measuring financial literacy: Developing and testing a measurement instrument with a selected group of South African military officers.* *Africa Education Review*, 11(3), 365–385. doi:10.1080/18146627.2014.934993.

Sekaran, U., and Bougie, R. (2006). *Research method for business. Salemba Empat, Jakarta.*

Sekita, S. (2011). Financial literacy and retirement planning in Japan. *Journal of Pension Economics & Finance*, 10(4), 637-656.

Shafi, M. (2014). Determinants influencing individual investor behavior in stock market: a cross country research survey. *Arabian Journal of Business and Management Review*, 2(1), 60-71.

Shaikh, S. A., Ismail, A. G., and Mohd Shafiai, M. H. (2017). Application of waqf for social and development finance. *ISRA International Journal of Islamic Finance*, 9(1), 5-14.

Shapira, M., and Rappoport, A. (1995). Shape blending using the star-skeleton representation. *IEEE Computer Graphics and Applications*, 15(2), 44-50.

Shiller, R. J. (2003). From efficient markets theory to behavioral finance. *Journal of economic perspectives*, 17(1), 83-104.

Shim, S., Barber, B. L., Card, N. A., Xiao, J. J., and Serido, J. (2010). Financial socialization of first-year college students: The roles of parents, work, and education. *Journal of youth and adolescence*, 39(12), 1457-1470.

Shimp, K. G., Mitchell, M. R., Beas, B. S., Bizon, J. L., and Setlow, B. (2015). Affective and cognitive mechanisms of risky decision making. *Neurobiology of learning and memory*, 117, 60-70.

Shleifer, A., & Vishny, R. W. (1997). The limits of arbitrage. *The Journal of Finance*, 52(1), 35-55.

Shoemaker, N. (Ed.). (1995). *Negotiators of change: Historical perspectives on Native American women*. Psychology Press.

Shuan, M. (2011). *Financial capability: Why is it important and how it can be improved?* Nairobi, Kenya: CfbT Trust.

Siekei, J., Wagoki, J., & Kalio, A. (2013). An assessment of the role of financial literacy on performance of small and micro enterprises: Case of Equity Group Foundation training program on SMEs in Njoro District, Kenya. *Business & Applied Sciences*, 1(7), 250-271.

Simon, H. A. (1955). A behavioral model of rational choice. *The quarterly journal of economics*, 69(1), 99-118.

Simon, H. A. (1978). Rationality as process and as product of thought. *The American economic review*, 68(2), 1-16.

Skagerlund, K., Lind, T., Strömbäck, C., Tinghög, G., & Västfjäll, D. (2018). Financial literacy and the role of numeracy—How individuals' attitude and affinity with numbers influence financial literacy. *Journal of behavioral and experimental economics*, 74, 18-25.

Slovic, P. (1972). Psychological study of human judgment: Implications for investment decision making. *The Journal of Finance*, 27(4), 779-799.

Sofia, M. J., Bao, D., Chang, W., Du, J., Nagarathnam, D., Rachakonda, S. and Bansal, S. (2010). Discovery of a β -d-2'-deoxy-2'- α -fluoro-2'- β -C-methyluridine nucleotide prodrug (PSI-7977) for the treatment of hepatitis C virus. *Journal of medicinal chemistry*, 53(19), 7202-7218.

Stango, V., and Zinman, J. (2014). Limited and varying consumer attention: Evidence from shocks to the salience of bank overdraft fees. *The Review of Financial Studies*, 27(4), 990-1030.

Starček, S., and Trunk, A. (2013). The meaning and concept of financial education in the society of economic changes. In *Learn International Conference*.

Stateman, M. (1999). Behavioral Finance: Past Battle and Future Engagement. *Financial Analysis Journal*, 55(6), 18-27.

Stendardi, E. J., Graham, J. F., and O'Reilly, M. (2006). The impact of gender on the personal financial planning process: Should financial advisors tailor their process to the gender of the client?. *Humanomics*, 22(4), 223-238.

Stracca, L. (2004). Behavioral finance and asset prices: Where do we stand?. *Journal of Economic Psychology*, 25(3), 373-405.

Sucuahi, W. T. (2013). Determinants of financial literacy of micro entrepreneurs in Davao City. *International Journal of Accounting Research*, 1(1), 44-51.

Suer, M. P., Sommers, D., and Stanley, H. (2002). *U.S. Patent No. 6,431,439*. Washington, DC: U.S. Patent and Trademark Office.

Sugden, R. (2000). Credible worlds: the status of theoretical models in economics. *Journal of economic methodology*, 7(1), 1-31.

Taft, M. K., Hosein, Z. Z., Mehrizi, S. M. T., & Roshan, A. (2013). The relation between financial literacy, financial wellbeing and financial concerns. *International Journal of Business and Management*, 8(11), 63.

Tchai, T. (2012). The hindsight bias effect in short-term investment decision-making. *Universal Journal of Management and Social Sciences*, 2(11), 201-212.

Thaler, R. H. (2000). From homo economicus to homo sapiens. *Journal of economic perspectives*, 14(1), 133-141.

Thaler, R., and Barberis, N. (2002). *A survey of behavioral finance*. National Bureau of Economic Research.

Toosi, N. R., Voegeli, E. N., Antolin, A., Babbitt, L. G., & Brown, D. K. (2020). Do financial literacy training and clarifying pay calculations reduce abuse at work?. *Journal of Social Issues*, 76(3), 681-720.

Torngren, G., & Montgomery, H. (2004). Worse than chance? Performance and confidence among professionals and laypeople in the stock market. *The Journal of Behavioral Finance*, 5(3), 148-153.

tribune.com.pk/story/1949358/financial-literacy-pakistan.

Tull, D.S. and D.I. Hawkins (1984), *Marketing Research*, New York :MacMillan, pp. 341-49.

Turnbull, G. K., and van der Vlist, A. J. (2014, November). Financial literacy, homebuying and foreclosures. In *The American Real Estate and Urban Economics Association (AREUEA) Conference, Boston*.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *science*, 185(4157), 1124-1131.

Tversky, A., & Kahneman, D. (1983). Extensional versus intuitive reasoning: The conjunction fallacy in probability judgment. *Psychological review*, 90(4), 293.

Tversky, A., and Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *science*, 185(4157), 1124-1131.

Tversky, A., and Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211(4481), 453-458.

Tversky, A., and Kahneman, D. (1986). Rational choice and the framing of decisions. *Journal of business*, S251-S278.

Tversky, A., and Kahneman, D. (1991). Loss aversion in riskless choice: A reference-dependent model. *The quarterly journal of economics*, 106(4), 1039-1061.

Tversky, A., and Kahneman, D. (1992). Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and uncertainty*, 5(4), 297-323.

Tweney, R. D., and Doherty, M. E. (1983). Rationality and the psychology of inference. *Synthese*, 57(2), 139-161.

Van Rooij, M. C., Lusardi, A., and Alessie, R. J. (2012). Financial literacy, retirement planning and household wealth. *The Economic Journal*, 122(560), 449-478.

Van Rooij, M., Lusardi, A., and Alessie, R. (2007). *Financial literacy and stock market participation* (No. w13565). National Bureau of Economic Research.

Van Rooij, M., Lusardi, A., and Alessie, R. (2011). Financial literacy and stock market participation. *Journal of Financial Economics*, 101(2), 449-472.

Varcoe, K. P., Martin, A., Devitto, Z., and Go, C. (2005). Using a financial education curriculum for teens.

Varcoe, K. P., Peterson, S. S., Wooten Swanson, P., and Johns, M. C. (2010). What do teens want to know about money—a comparison of 1998 and 2008. *Family and Consumer Sciences Research Journal*, 38(4), 360-371.

Wanidwaranan, P., & Padungsaksawasdi, C. (2020). The effect of return jumps on herd behavior. *Journal of Behavioral and Experimental Finance*, 27, 100375.

Wason, P. C. (1960). On the failure to eliminate hypotheses in a conceptual task. *Quarterly journal of experimental psychology*, 12(3), 129-140.

Wason, P. C. (1968). Reasoning about a rule. *The Quarterly journal of experimental psychology*, 20(3), 273-281.

Wason, P. C., and Johnson-Laird, P. N. (1972). *Psychology of reasoning: Structure and content* (Vol. 86). Harvard University Press.

Weiss, B. D. et al. (2005). Quick assessment of literacy in primary care: The newest vital sign. *Annals of Family Medicine*, 3(6), 514-522. doi:10.1370/afm.405.

West, J. (2012). Financial literacy education and behaviour unhinged: Combating bias and poor product design. *International Journal of Consumer Studies*, 36(5), 523-530

Whetten, D. A. (1989). What constitutes a theoretical contribution?. *Academy of management review*, 14(4), 490-495.

Widyastuti, U., Suhud, U., & Sumiati, A. (2016). The Impact of Financial Literacy on Student Teachers' Saving Intention and Saving Behaviour. *Mediterranean Journal of Social Sciences*, 7(6), 41.

Willis, L. E. (2008). Against financial-literacy education. *Iowa L. Rev.*, 94, 197.

Wolfe-Hayes, Molly A. (2010) "Financial literacy and education: An environmental scan." *The International Information and Library Review*, 42(2),105-110.

Worthington, A. C. (2013). Financial literacy and financial literacy programmes in Australia. *Journal of Financial Services Marketing*, 18(3), 227-240.

Xiao, J. J., Chen, C., and Chen, F. (2014). Consumer financial capability and financial satisfaction. *Social Indicators Research*, 118(1), 415-432.

Yoshino, N., Morgan, P., and Wignaraja, G. (2015). Financial education in Asia: Assessment and recommendations.

Yudkowsky, E. (2008). Cognitive biases potentially affecting judgment of global risks. *Global catastrophic risks*, 1(86), 13.

Yunikawati, N. A., Priambodo, M. P., Puspasari, E. Y., Jabbar, M. A., & Sidi, F. (2020, July). Financial Literacy for Rural Resident: A Qualitative Study. In *1st International Conference on Science, Health, Economics, Education and Technology (ICoSHEET 2019)* (pp. 69-72). Atlantis Press.

Zait, A., & Berteza, P. E. (2015). Financial literacy – Conceptual definition and proposed approach for a measurement instrument. *The Journal of Accounting and Management*, 4(3), 37-42.

Zarcadoolas, C., Pleasant, A., and Greer, D. S. (2005). Understanding health literacy: an expanded model. *Health promotion international*, 20(2), 195-203.

Zou, J., & Deng, X. (2019). Financial literacy, housing value and household financial market participation: Evidence from urban China. *China*.

APPENDIX A

Questionnaire

Bahria University

Islamabad Campus, Pakistan



Department of Management Sciences

Bahria University, Shangrila Road.

Sector F-8, Islamabad, Pakistan.

Tel:051-9260002: Winter 2020

Mediation effect of cognitive biases on financial literacy and decision making of investors in Pakistan

We would like your support for completion of this study, which deals with an important issue of financial literacy and its role for debiasing investors decisions. We have approached you because of your part in stock markets of Pakistan as a retail investor.

We request you to fill out the attached questionnaire and for further participation kindly give your consent.

I will participate in further session of this study.

Yes/ No

We know your time is very important resource and we will appreciate your participation in this study. As, financial illiteracy is an emerging issue and this study will provide help to cover up problems regarding financial illiteracy and will highlight importance of financial literacy in stock markets of Pakistan. This questionnaire is in use to collect some

general and some specific information about your financial knowledge. All the information will use for academic purpose. All the information collected from you will be kept confidential and is only for academic purpose and your name will not be showed anywhere in this research study.

Thanks in advance for your cooperation and participation.

Yours sincerely,

Ayesha Saba
 Doctoral Candidate
 03032260900

ayesha.saba.sadaf@gmail.com

Prof. Dr. Faisal Aftab

Ph: 0343 3332222

faftab@bahria.edu.pk

Kindly fill the questionnaire with the following points in concentration.

- 1- Ticks mark the option in the box which is right.
- 2- Strongly agree means that you highly agree with the asked question/ statement and vice versa with strongly disagree.
- 3- Neutral option is about having a neutral opinion about the question / statement.
- 4- Agree option is showing of agreement with the statement/ question and vice versa with the disagree option.

Age	(i) Under 20 (ii) 21-30 (iii) 31-40 (iv) 41-50 (v) 51-60
Gender	(i)Male (ii) Female
Professional Experience	(i) > 5 years (ii)5-10 years (iii)10-15 years (iv)15-20 years (v) More than 20
Martials	(i) Married (ii) Single (iii) Separated
Finance Certifications and trainings	(i) No (ii) Yes

Education	(i) Competed High School (ii) Undergraduate (iii) Graduate (iv) Post Graduate (v) Doctorate
Income	(i) below 100000 (ii) 100000-200000 (iii) 200000-300000 (iv) 300000-400000 (v) more than 400000
Employment Status	(i) Households (ii) Private sector (iii) Investors from Dfi's (iv) Investors from Banks (v) Students () Public Sector () Others
Locality	(i) Village (ii) Town (iii) city

Section No 1

Basic Financial Knowledge

(1) Numeracy

Suppose you had 100 Rupees in a savings account and the interest rate was 2% simple interest. After 5 years, how much do you think you would have in the account if you left the money to grow?

(i)	(ii)	(iii)	(iv)	(v)
More than 102	Exactly 102	Less than 102	Do not know	Refusal

(2) Interest compounding

Suppose you had 100 rupees in a savings account and the interest rate is 20% per year compounded annually and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total?

(i)	(ii)	(iii)	(iv)	(v)
More than 200	Exactly 200	Less than 200	Do not know	Refusal

(3) Inflation

Imagine that the interest rate on your savings account was 1% per year and inflation was 2%

per year. After 1 year, how much would you be able to buy with the money in this account?

(i)	(ii)	(iii)	(iv)	(v)
More than today	Exactly the same	Less than today	Do not know	Refusal

(4) Time value of money

Assume a friend inherits €10,000 today and his sibling inherits €10,000, 3 years from now.

Who is richer because of the inheritance?

(i)	(ii)	(iii)	(iv)	(v)
My Friend	His Siblings	They are equally rich	Do not know	Refusal

(5) Money illusion

Suppose that in the year 2018, your income has doubled and prices of all goods have doubled too. In 2018, how much will you be able to buy with your income?

(i)	(ii)	(iii)	(iv)	(v)
More than today	Exactly the same	Less than today	Do not know	Refusal

Section No 2.	Advance Financial Knowledge
----------------------	------------------------------------

(6) Which of the following statements describes the main function of the stock market?

- (i) The stock market helps to predict stock earnings
- (ii) The stock market results in an increase in the price of stocks
- (iii) The stock market brings people who want to buy stocks together with those who want to sell stocks
- (v) Do not know

(7) Which of the following statements is correct? If somebody buys the stock of firm B in the stock market.

- (i) He owns a part of firm B
- (ii) He has lent money to firm B
- (iii) He is liable for firm B's debts
- (iv) None of the above
- (v) Do not know

(8) Which of the following statements is correct?

- (i) Once one invests in a mutual fund, one cannot withdraw the money in the first year
- (ii) Mutual funds can invest in several assets, for example invest in both stocks and bonds
- (iii) Mutual funds pay a guaranteed rate of return which depends on their past performance
- (v) Do not know

(9) Which of the following statements is correct? If somebody buys a bond of firm B

- (i) He owns a part of firm B
- (ii) He has lent money to firm B
- (iii) He is liable for firm B's debts
- (iv) None of the above
- (v) Do not know

(10) Considering a long time period (for example 10 or 20 years), which asset normally gives the highest return?

- (i) Savings accounts
- (ii) Bonds
- (iii) Stocks
- (iv) Do not know

(11) Normally, which asset displays the highest fluctuations over time?

- (i) Savings accounts
- (ii) Bonds
- (iii) Stocks
- (iv) Do not know

(12) When an investor spreads his money among different assets, does the risk of losing Money.

- (i) Increase
- (ii) Decrease
- (iii) Stay the same

(iv) Do not know

(13) If you buy a 10-year bond, it means you cannot sell it after 5 years without incurring a

major penalty. True or false?

(i) True

(ii) False

(iii) Do not know

(14) Stocks are normally riskier than bonds, True or false?

(i) True

(ii) False

(iii) Do not know

(15) Buying a company stock usually provides a safer return than a stock mutual fund. True or false?

(i) True

(ii) False

(iii) Do not know

(16) If the interest rate falls, what should happen to bond prices?

(i) Rise

(ii) Fall

(iii) Stay the same

(iv) None of the above

(v) Do not know

Section no 3	Cognitive Biases
---------------------	-------------------------

Herd Behavior

HERD1: I rarely consult others before making stock purchases or sales

SA	A	N	D	SD
----	---	---	---	----

HERD2: Other investors' decisions of buying and selling stocks affect my investment decisions

SA	A	N	D	SD
----	---	---	---	----

HERD3: I usually react quickly to the changes in other investors' decisions and follow their reactions to the stock market

SA	A	N	D	SD
----	---	---	---	----

HERD4: I consult others (family, friends or colleagues) before making a stock purchase

SA	A	N	D	SD
----	---	---	---	----

HERD5: I follow social blogs/ forums before making a stock purchase/sale

SA	A	N	D	SD
----	---	---	---	----

Confirmation Bias

C1: prefer to buy local stocks than international stocks because the information of local stocks is always available and very reliable

SA	A	N	D	SD
----	---	---	---	----

C2: I rely on previous experiences in the market for my next investment

SA	A	N	D	SD
----	---	---	---	----

C3: I use trend analysis of some representative stocks to make investment for all stocks that I invest in because of its accuracy

SA	A	N	D	SD
----	---	---	---	----

C4: I normally take precautionary measures due to the poor performance of the stock market

SA	A	N	D	SD
----	---	---	---	----

C5: The stocks I bought expecting dividend income, always pay high dividends

SA	A	N	D	SD
----	---	---	---	----

C6: I find it easier to trade in stocks I had bought for liquidity purposes

SA	A	N	D	SD
----	---	---	---	----

C7: The stocks I buy to hold always provide high capital gains

SA	A	N	D	SD
----	---	---	---	----

C8: I rarely lose on stocks I trade in for speculative purposes

SA	A	N	D	SD
----	---	---	---	----

C9: I rely on market trends in the stock market while investing

SA	A	N	D	SD
----	---	---	---	----

C10: I often use available information which supports to my idea

SA	A	N	D	SD
----	---	---	---	----

C11: I prefer to buy international than local stocks because the international stocks have a record of performance elsewhere.

SA	A	N	D	SD
----	---	---	---	----

Hindsight Bias

HS1: I was able to predict the collapse of Sensex in the wake of the 2007 global financial crisis.

SA	A	N	D	SD
----	---	---	---	----

HS2: I would be convinced if in 2006–2007 someone had told me that a financial crisis would happen in a year.

SA	A	N	D	SD
----	---	---	---	----

HS3: I believe that I would have gained more if my advisor had waited for a longer period

SA	A	N	D	SD
----	---	---	---	----

Section no 5

Decision making

DM1: When making an investment, I trust on the rational analysis

SA	A	N	D	SD
----	---	---	---	----

DM2: I generally make investments that feel right to me

SA	A	N	D	SD
----	---	---	---	----

DM3: When making investments, I rely upon my instincts

SA	A	N	D	SD
----	---	---	---	----

DM4: When I make an investment, it is more important for me to feel the investment is right than have a rational reason for it.

SA	A	N	D	SD
----	---	---	---	----

DM5: When I make Investment, I tend to rely on my intuition.

SA	A	N	D	SD
----	---	---	---	----

HER5	P C	.484	.630	.516	.460	.597	.573	.635	.632	.551	.630	.552	.693	.674	.728	.726	1	.702	.657	.608	.544	.333	.444	.521	.584
	Sig.(2-T)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000
	N	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478
cdm0	P C	.586	.623	.520	.444	.588	.636	.620	.679	.555	.647	.609	.677	.654	.703	.696	.702	1	.725	.692	.604	.411	.452	.512	.570
	Sig.(2-T)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000
	N	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478
cdm1	P C	.562	.602	.478	.484	.558	.608	.635	.666	.503	.664	.601	.652	.631	.683	.686	.657	.725	1	.705	.591	.362	.366	.472	.585
	Sig.(2-t)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000
	N	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478
cdm2	P C	.563	.581	.465	.453	.504	.530	.575	.612	.430	.623	.601	.613	.621	.661	.628	.608	.692	.705	1	.650	.378	.293	.376	.439
	Sig.(2-T)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000
	N	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478
CDM3	P C	.535	.516	.415	.339	.454	.521	.494	.532	.390	.547	.496	.561	.500	.564	.547	.544	.604	.591	.650	1	.339	.266	.319	.399
	Sig. (2-t)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478
CDM4	P C	.312	.246	.215	.227	.344	.270	.333	.344	.250	.309	.346	.313	.333	.328	.374	.333	.411	.362	.378	.339	1	.123	.234	.286
	Sig. (2-t)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.007	.000	.000	.000
	N	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478
HNB0	P C	.373	.402	.286	.258	.366	.402	.406	.431	.380	.379	.398	.433	.382	.457	.407	.444	.452	.366	.293	.266	.123	1	.560	.525
	Sig.(2-t)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.007		.000	.000
	N	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478
HNB1	P C	.318	.463	.396	.353	.430	.469	.513	.498	.481	.478	.449	.496	.446	.553	.538	.521	.512	.472	.376	.319	.234	.560	1	.658
	Sig.(2-t)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000
	N	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478
HNB2	P C	.410	.525	.411	.383	.495	.507	.562	.567	.509	.522	.485	.559	.515	.553	.574	.584	.570	.585	.439	.399	.286	.525	.658	1

