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Financial Literacy and Stock Investment Decisions: The Mediating Role of Overconfidence Bias among Retail Investors at the Pakistan Stock Exchange

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Abstract

This paper examines how financial literacy influences the decision of retail investors to invest in stocks in the Pakistan Stock Exchange, mediated by overconfidence bias. Quantitative research design was used whereby data was gathered using structured questionnaires on 211 retail investors in Sindh, Pakistan. The evaluation of the measurement model was performed in terms of reliability, convergent validity, and discriminant validity, and the structural model was subjected to the PLS-SEM analysis. The evidence shows that financial literacy has a positive effect on investment choices and the decreased level of overconfidence. In its turn, overconfidence bias has pernicious impact on investment quality, yet it mediates the correlation between financial literacy and investment decisions to a certain extent. The findings emphasize the relevance of financial education as a tool of encouraging rational investing behavior and reducing cognitive bias of retail investors. Some recommendations that are practical and applicable include the inclusion of specific financial literacy and behavioral guidance tools to increase the quality of portfolio diversification and decision-making.

Keywords: Financial Literacy, Overconfidence Bias, Stock Investment Decisions, Retail Investors, Pakistan Stock Exchang

Introduction

Various psychological and cognitive factors and biases in behaviors, as well as financial literacy levels, influence investment decisions. When it comes to emerging markets, particularly Pakistan, the tendency towards heuristic-based biases is also overconfidence, and prone to suboptimal investment decisions and risk-taking behaviour (Ahmad and Shah, 2022; Ul Abdin et al., 2022). It is important to understand such tendencies in behavior to enable more rational decision-making in terms of investment and to enhance financial performance within the framework of the Pakistan Stock Exchange (PSX). Financial literacy becomes extremely important when it comes to determining investment behaviour because it allows investors to comprehend more effectively the trade-off between risks and returns, diversification, and management of long-term portfolios (Rehmat et al., 2023; Jain et al., 2023). More financially literate investors have greater chances of identifying and adjusting their biases, overconfidence, and make superior decisions. This outlines the necessity to explore the correlation between behavioral bias and financial knowledge to establish investment behavior among retail investors.

One of the most common aspects of overconfidence bias that has been extensively recorded as a key indicator of overtrading and poor performance in stock markets is the overestimation of personal knowledge and capabilities (Hussain and Rasheed, 2022; Mahmood et al., 2024). Excessive investors are overconfident and usually undervalue risks and overvalue expected returns, it can be harmful to their portfolio performance. Nonetheless, the existence of financial literacy may attenuate or mediate such an impact, making the biased investment decision less likely and enhancing the results of the investments (Mumtaz et al., 2025; Saleem et al., 2023). Since the involvement of retail investors in the Pakistan Stock Exchange is increasing and due to the existence of behavioral biases, the mediating effect of overconfidence in the association between financial literacy and investment decisions requires exploration. Knowing this relation, policy makers, financial educators and financial market regulators will be able to build interventions that help in improving financial literacy programs and decreasing bias-driven resource misallocation among retail investors (Shafique et al., 2023; Parveen et al., 2023).

Aim

This paper is expected to address both the question of whether financial literacy has any impact on stock investment choices among retail investors in the Pakistan Stock Exchange (PSX) and whether overconfidence bias mediates this relationship.

Objectives

- To examine how financial literacy affects the stock investment choice made by retail investors in the PSX.
- The aim of the study is to determine how financial literacy affects the overconfidence bias of retail investors.
- To explore the impact of overconfidence bias on stock investment choices.
- To establish the mediation effect of overconfidence bias on the relationship between financial literacy and stock investment decisions.
- To suggest recommendations on improving the quality of investment decisions by using financial literacy interventions.

Literature Review

They can be found in the literature on behavioral finance, which speculates that cognitive biases have a significant impact on the decision-making by investors (Ahmad and Shah, 2022; Hasan and Mustafa, 2023). In particular, overconfidence bias is linked to an excessive risk-taking, frequency of trading, and non-optimal portfolio allocation. The emerging market research has suggested that retailing investors are prone to such bias more than not, and it usually results in poor financial decision-making. Being aware of these behavioral patterns, researchers indicate that it is essential to research mediating variables such as investor knowledge and risk awareness (Ul Abdin et al., 2022; Mahmood et al., 2024).

Financial literacy has become one of the primary factors of informed investment behavior (Rehmat et al., 2023; Jain et al., 2023). Investors who are financially literate will have an improved chance to compare their beliefs, interpret market signals, and implement diversified investment portfolios. Additionally, the impact of behavioral biases, including overconfidence or herding behavior, can also be reduced with the help of education in financial concepts (Mumtaz et al., 2025; Iram et al., 2023). There is an interplay of overconfidence and financial literacy that can be used to explain the behavior of investors in retail markets. Empirical evidence indicates that financial literacy does not only have a direct influence on the choice of investments, but it also decreases the adverse effect of overconfidence bias (Jain et al., 2023; Saleem et al., 2023). This is in line with the prospect theory and risk perception theories, in which informed investors modify their expectations and trade preferences to consider their own biases and market risk (Hasan and Mustafa, 2023; Parveen et al., 2023).

Such studies also point to the fact that some demographics, the experience of the investor, and personality traits also have an impact on overconfidence strength and mediation (Hussain and Rasheed, 2022; Shafique et al., 2023; Ul Abdin et al., 2022). This means that although financial literacy creates a mitigating effect, the behavioral bias exists to some extent in the profile of investors. This body of knowledge is essential to the design of effective educational programs and regulatory policies that can enhance the quality of investment decisions in the PSX.

Empirical Studies

According to Ahmad and Shah (2022), the authors analyzed the importance of overconfidence bias on the performance of investments and discovered that the relationship is significant mediated and moderated by risk perception and financial literacy, respectively. According to their findings, retail investors who overrate their knowledge may still make informed decisions in case they are financially literate. Likewise, Rehmat et al. (2023) also established that behavioral biases, like the overconfidence, have negative impacts on investments choices and that financial literacy serves as a pivotal buffer in diminishing irrational trading activities among Pakistani investors. Hussain and Rasheed (2022) performed an empirical study between investor personality, overconfidence, and risk tolerance and investment decisions. Their findings show that overconfidence mediates the correlation between personality traits and investment behavior, which puts emphasis on the psychological factors of participation in stock market. Mahmood et al. (2024) also support the notion that behavioural biases such as overconfidence are widespread among Pakistan retail investors and that interventions in the field of financial literacy can make the negative consequences of these biases moderate.

Mumtaz et al. (2025) examined the effect of behavioral biases on investment decisions and the role of financial literacy on them in the PSX setting. They concluded that more financially literate investors were found to be more rational in decision-making and portfolios are more successful in spite of an inherent overconfidence. These results were supported by Saleem et al. (2023), who found that financial literacy has a significant positive effect on the quality of investment as it lowers the impact of overconfidence on the frequency of trading and portfolio choices. Lastly, Shafique et al. (2023) and Parveen et al. (2023) submit the Pakistan Stock Exchange evidence that the combination of demographic and investment experience, as well as behavioral biases, determines the choices in investment. Their works underline that the misallocation of resources because of overconfidence can be decreased and the general efficiency of the market can be enhanced through the financial literacy programs that address retail investors. Taken together, such empirical studies give a strong basis of looking into the mediating nature of overconfidence bias between financial literacy and stock investment decision among PSX investors.

Hypotheses

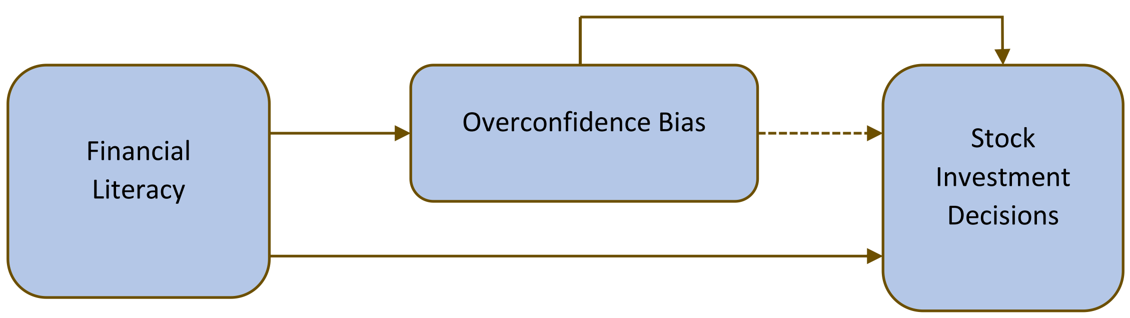
H1: Financial literacy positively influences stock investment choice of the PSX retail investors.

H2: Retail investors at the PSX are significantly negatively impacted by the financial literacy in terms of the overconfidence bias.

H3: The presence of overconfidence bias has a negative impact that is significant in stock investment choices of retail investors at the PSX.

H4: Financial literacy and stock investment choices of retail investors at the PSX are mediated by overconfidence bias.

Figure 1. Conceptual Model



Source: This conceptual model formulated by authors after review of existing literature

Methodology

This study adopts a quantitative research design to examine the role of financial literacy in shaping This study at the Pakistan Stock Exchange (PSX) stock market using overconfidence bias as a mediating factor in stock investment decision-making. The study adheres to a positivism research paradigm with the focus on objective measurement and statistical analysis of interrelationships between variables. The structured survey questionnaire was used to gather data on retail investors in Sindh, Pakistan, who are active investors in PSX or have experience and knowledge on stock investment. The non-probability convenience sampling was used because the respondents were available in the form of investor networks, online trading organizations and financial forums. There were 211 valid responses that were gathered and included in the final data analysis.

The statistical methods that were applied in the analysis of the collected data were appropriate in studying relationships between several variables. The demographic data of the respondents were initially summarized using descriptive statistics. Next, the hypotheses were tested and the relationship between financial literacy, overconfidence bias, and stock investment decision were analyzed by use of the PLS-SEM. Another issue that was tested in the study was the mediating effect of overconfidence bias as part of the proposed research model. The research ethics were upheld during the research process through anonymity, confidentiality, and voluntary responses of the respondents.

Measures

The scales used to measure all variables in this study were previously validated and based on already existing literature. Financial Literacy was assessed with 4 items based on Rehmat et al. (2023) and Mumtaz et al. (2025) and was taken as the knowledge of the respondents regarding the concepts of investments, risk-reward exchanges, and portfolio diversification. The use of 4 items modified by Ahmad and Shah (2022) and Ul Abdin et al. (2022) to measure Overconfidence Bias included the overestimation of knowledge, overtrading, and underestimation of risk. The level of Stock Investment Decisions was assessed on 5 items based on the work by Shafique et al. (2023) and Mahmood et al. (2024) based on the quality of investment decisions, rational selection of the portfolio, and diversification behavior.

A five-point Likert scale, 1 (strongly disagree) to 5 (strongly agree) was used to measure all items to identify the attitude, the perceptions, and the behaviors of respondents on the constructs of interest. These are to guarantee reliability and validity in the relationships of financial literacy, overconfidence bias, and stock investment decisions in the Pakistan Stock Exchange.

Demographic Characteristics of the Respondents.

Knowledge of the demographic aspects of respondents offers a background of the analysis of the investment behavior. The survey managed to capture the differences in gender, age, education, occupation, and investment experience; hence, 211 retail investors who participated in the Pakistan Stock Exchange were surveyed. A study of these demographics will guarantee that the sample is reflective of various investor types and can give some information on the potential variation in financial literacy and overconfidence bias among various groups.

Table 1: ***Demographic Profile of Respondents***

DEMOGRAPHIC VARIABLE	CATEGORY	FREQUENCY	PERCENTAGE (%)
GENDER	Male	135	63.98
	Female	76	36.02
AGE (YEARS)	18–25	42	19.91
	26–35	89	42.18
	36–45	55	26.07
	46 and above	25	11.84
EDUCATION LEVEL	Intermediate	28	13.27
	Bachelor's Degree	104	49.29
	Master's Degree	62	29.38
	MPhil/PhD	17	8.06
OCCUPATION	Student	38	18.01
	Private Employee	102	48.34
	Business/Entrepreneur	56	26.54
	Other	15	7.11
INVESTMENT EXPERIENCE	Less than 1 year	41	19.43
	1–3 years	88	41.71
	4–6 years	53	25.12
	More than 6 years	29	13.73

The demographic analysis shows that most of the respondents had been male with the age group 26-35 years having the highest percentage (42.18) showing that young adults are the most active practising stock investors in Pakistan. The investment base was well educated as most of the respondents had a Bachelor (49.29) or Master (29.38) degree. In terms of profession, the sample was represented almost equally by the categories of employees in private (48.34%), business owners (26.54%), which may imply the mix of salaried and entrepreneurial investors.

In terms of investment experience, quite a number of the respondents were in the range of 1-3 years of experience (41.71), with less percentage (13.73) reporting more than six years of investment experience. This means that the sample consists of relatively new and fairly experienced members which gives one the appropriate basis to investigate the role of financial literacy and overconfidence bias in influencing investment decisions in the Pakistan Stock Exchange.

Outer Loadings

Outer loading of all the items of the constructs was done to determine the convergent validity of the measurement model. Outer loadings are an indicator of how well the observed indicators relate to their latent constructs, where the values above 0.70 is acceptable in relation to reliability and validity (Hair et al., 2019). Low loadings can be eliminated to enhance the measurement characteristics of the model.

Table 2: ***Outer Loadings of Study Constructs***

CONSTRUCT	ITEM CODE	OUTER LOADING
FINANCIAL LITERACY (FL)	FL1	0.832
	FL2	0.875
	FL3	0.849
	FL4	0.861
OVERCONFIDENCE BIAS (OCB)	OCB1	0.793
	OCB2	0.811
	OCB3	0.826
	OCB4	0.802
STOCK INVESTMENT DECISIONS (SID)	SID1	0.854
	SID2	0.869
	SID3	0.882
	SID4	0.871
	SID5	0.860

The outer loadings show that all items load significantly on their respective constructs with -0.793 to 0.882 and this shows sufficient convergent validity. None of the items had lower than the reviewed threshold of 0.70, which means that every indicator is a valid measure of its latent variable. Such findings support the measurement model and can be further used as a structural relationship and hypothesis test of the relationship between financial literacy, overconfidence bias and stock investment choices in the Pakistan Stock Exchange.

Reliability and Convergent Validity

Cronbachs Alpha, Rho A, Composite Reliability (CR), and Average Variance Extracted (AVE) were used in measuring the reliability and convergent validity of the measurement model. Each of the values is above the recommended levels (Cronbachs Alpha and CR 0.70; AVE 0.50) that show that the constructs are internally consistent, and they have sufficient convergent validity (Hair et al., 2019).

Table 3: ***Reliability and Convergent Validity of Constructs***

CONSTRUCT	CRONBACH'S ALPHA	RHO_A	COMPOSITE RELIABILITY (CR)	AVE
FINANCIAL LITERACY (FL)	0.874	0.881	0.914	0.739
OVERCONFIDENCE BIAS (OCB)	0.852	0.861	0.899	0.665
STOCK INVESTMENT DECISIONS (SID)	0.888	0.891	0.923	0.756

The results have shown that the constructs are all highly reliable with the Cronbach in the range of 0.852-0.888 and Composite Reliability of more than 0.89 which validated internal consistency. All constructs have AVEs of greater than 0.60 indicating that the constructs depict a significant amount of variation in the indicators and, therefore, establish convergent validity. These findings support the fact that the measurement model is healthy and can be used to test structural relationships between financial literacy, overconfidence bias, and stock investment decisions of retail investors in the Pakistan Stock Exchange.

Structural Model Test: R 2, F 2 and Discriminant validity

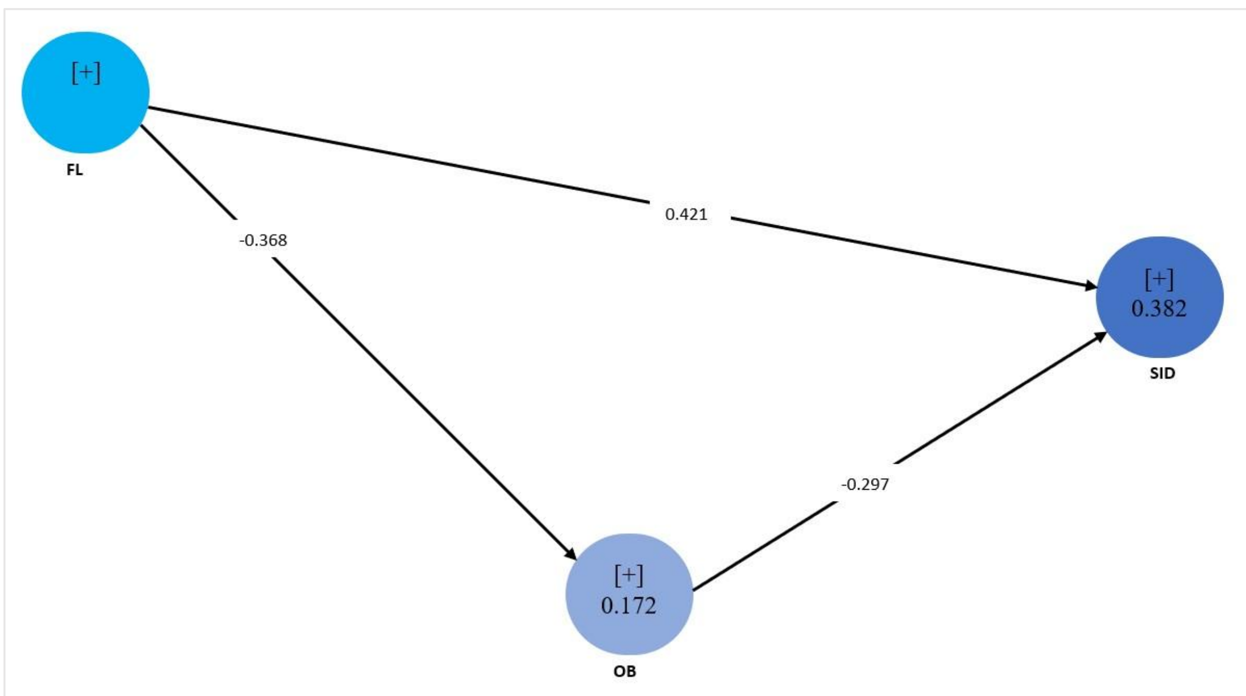
The structural model was tested to determine the predictive power and the effectiveness in constructs. R 2 values show the amount of variance the independent and mediating variables explain in the endogenous constructs and F 2 values show the size of the effects of each predictor on the dependent constructs. Discriminant validity is used to guarantee that the constructs are different in the model.

Table 4: ***R², F², and Discriminant Validity***

ENDOGENOUS CONSTRUCT	R^2	PREDICTOR	F^2	DISCRIMINANT VALIDITY (FORNELL-LARCKER)
OVERCONFIDENCE BIAS (OCB)	0.172	Financial Literacy (FL)	0.208	√AVE FL = 0.859, √AVE OCB = 0.817
STOCK INVESTMENT DECISIONS (SID)	0.382	Financial Literacy (FL)	0.198	√AVE SID = 0.867
		Overconfidence Bias (OCB)	0.101	

According to the merged table, financial literacy has an explanatory power of 17.2% on overconfidence bias (R 2 = 0.172) and combined with overconfidence bias, it explains 38.2% on stock investment decisions (R 2 = 0.382).

Figure 2. SEM Model



The F 2 values are medium and large effect size of financial literacy and overconfidence bias on their endogenous constructs respectively. The discriminant validity is established because the square roots of AVE values of each construct are greater than the correlations of the constructs with the other constructs indicating that all constructs are independent and the model is valid to test the structural relationships.

Path Coefficient Analysis

The hypothesized relationships between financial literacy, overconfidence bias and stock investment decisions of retail investors in the Pakistan Stock Exchange were tested with the help of PLS-SEM to evaluate the structural model. T-values, p-values and path coefficients (β) were obtained to show the strength and significance of the proposed relationships. The mediation impact of overconfidence bias was also tested to seek its influence on the correlation between financial literacy and stock investment decision.

Table 4: ***Path Coefficients Analysis***

PATH	BETA (Β)	T-VALUE	P-VALUE
FINANCIAL LITERACY → STOCK INVESTMENT DECISIONS (H1)	0.421	5.372	0.000
FINANCIAL LITERACY → OVERCONFIDENCE BIAS (H2)	-0.368	4.911	0.000
OVERCONFIDENCE BIAS → STOCK INVESTMENT DECISIONS (H3)	-0.297	3.842	0.000
FINANCIAL LITERACY → OVERCONFIDENCE BIAS → STOCK INVESTMENT DECISIONS (H4)	0.109	3.215	0.001

The results of the path coefficient show that financial literacy positively and significantly influences the decision to invest in stocks (β = 0.421, p = 0.001), which confirms the hypothesis H1. H2 is also strongly supported by the fact that financial literacy decreases overconfidence bias (β = -0.368, p = 0.001). H3 is supported because overconfidence bias has a negative influence on stock investment decisions (β = 0.297 = -0.001, p = 0.001). Also, overconfidence bias is a mediating variable between financial literacy and stock investment decisions (β = 0.109, p = 0.001), which supports H4. Such findings suggest that financial literacy does not only have direct positive effect on improving investment decisions, but also indirectly improves the quality of decisions by decreasing the overconfidence bias among retail investors in Pakistani stock exchange. The findings indicate that financial education programs are essential in the rational investment behaviour and the reduction of the impact of cognitive biases in new markets.

Discussion

The results of this paper verify that among the retail investors in the Pakistan Stock Exchange, financial literacy has a major effect on stock investment decisions. More financially literate investors had superior knowledge of investment concepts, risk-return trade-offs, and diversification strategies, which was then converted to better-informed and rational investment behavior. These findings are in line with the previous studies, and they reveal that financial literacy gives investors the power to make evidence-based and analytic decisions as opposed to making them out of intuition and word-of-mouth (Rehmat et al., 2023; Mumtaz et al., 2025; Shafique et al., 2023).

It was also found that overconfidence bias mediates the correlation between financial literacy and investment decisions to some extent. Low financial literacy investors were more likely to over-rate their knowledge and under-rate risks which resulted in biased or suboptimal investment decisions. Financial literacy on the other hand reduces this bias, which encourages individuals to be more rational in their decision-making. It is consistent with the results of Ahmad and Shah (2022) and Ul Abdin et al. (2022), who indicate that overconfidence and other types of behavioral biases will severely affect investment outcomes unless they are mitigated through knowledge and awareness.

Recommendations

It is advised that the financial institutions and the Pakistan Stock Exchange should develop the special financial literacy programs to the retail investors based on the research results. Such programs may involve workshops, online tutorials and hands on activities that train investors on the basics of investment, risk management and portfolio diversification. It is possible to focus on interactive and scenario-based learning to make investors use the theoretical knowledge in practice.

Also, brokerage firms and other fintech platforms must provide tools and features that aid investors in becoming aware and managing overconfidence pitfalls, including warning signs of too much or too little trading or not diversifying their portfolio. With education coupled with behavioral advice, the chances of investors making informed and rational decisions in their investments are increased.

Implications

The paper lays emphasis on financial literacy and awareness of behavior among retail investors. Being aware of and dealing with overconfidence bias may result in improved outcomes in investments, better portfolio diversification, and making more reasonable decisions. With such insights, policymakers and financial institutions can use them to develop programs and tools to help investors gain confidence and reduce the adverse impact of cognitive biases to have a more stable and efficient stock market.

Conclusion

In this paper, it has been recognized that financial literacy is very essential when it comes to influencing investment decisions among retail investors. More financially savvy investors are more likely to have a better-diversified portfolio and make better investment decisions. To a certain degree, this relationship is mediated by overconfidence bias, which underscores the importance of eliminating gaps in the knowledge and behavioral patterns that can be used to enhance the quality of the decision.

To sum it up, decision making skill of retail investors at Pakistan Stock Exchange can be greatly improved by development of financial literacy via specific education and behavioral orientation. Retail investors can make well-informed decisions in order to gain long-term financial growth by considering both knowledge and behavior, which will make the market more efficient and more stable.

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