

## RESEARCH ARTICLE

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# The Impact of Cognitive Biases on Retirement Planning Behaviour: Evidence from Pakistan

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## Abstract

Retirement saving is one of the most important financial decisions people make, yet it is often influenced by psychological biases rather than careful planning. This study looks at how two common biases—risk aversion and overconfidence—affect retirement saving behaviour among working individuals in Pakistan. Risk-averse people tend to avoid risk and prefer safe but low-return options, which limits their ability to build enough savings for the future. Overconfident individuals, on the other hand, often believe they know more than they do or expect higher future earnings, which leads them to save less than required. Although these biases are different in nature, both result in inadequate retirement preparedness. By focusing on these two biases, the study adds evidence from Pakistan to the growing field of behavioural finance and highlights the need for practical steps, such as better retirement plan design and awareness programs, to help individuals overcome bias-driven under-saving.

**Keywords:** Risk aversion; Overconfidence bias; Retirement saving behaviour; Behavioural finance; Prospect theory; Pakistan; Investment decisions; Financial planning

## 1. Introduction

Retirement adequacy is an escalating policy concern in Pakistan as demographic shifts and increasing life expectancy extend the period households must finance after the labor market exit, while formal pension coverage and private savings remain limited (Najeeb & Ali, 2024). Traditional models that treat under-saving as a problem of income or information alone fail to account for predictable psychological distortions that shape long-horizon financial choices; behavioral economics shows that heuristics and biases systematically alter intertemporal trade-offs, risk perceptions, and plan participation (Kahneman & Tversky, 1979; Laibson, 1997). Empirical work in retirement contexts demonstrates that present bias reduces contribution rates, inertia and default effects depress enrollment and escalation of savings, and overconfidence can lead to under-provisioning or excessive trading that harms long-term outcomes (Madrian & Shea, 2001; Thaler & Benartzi, 2004; Barber & Odean, 2001). Recent systematic reviews and country studies underscore the policy relevance of these mechanisms but also highlight uneven measurement and limited evidence from South Asia (Saleem et al., , 2023).

This study therefore addresses four linked objectives: (1) to quantify the relative influence of multiple cognitive biases—overconfidence, present bias, loss aversion, anchoring, optimism, and status-quo bias—on concrete retirement behaviours (enrolment, contribution regularity, and perceived preparedness); (2) to test whether financial literacy moderates the relationship between biases and saving outcomes; (3) to control for socioeconomic constraints so as to isolate behavioral effects; and (4) to examine heterogeneity by age and income, assessing whether biases operate differently for younger

workers versus those near retirement. The research gap motivating these objectives is threefold: most prior studies measure a single bias or rely on high-income samples, comparative magnitudes of biases are rarely estimated within one representative sample, and interactions between biases and financial literacy or binding constraints are under-explored in developing-country settings (Saleem et al., 2023).

The study's significance lies in its direct policy implications: by identifying which biases most strongly depress retirement saving and which subgroups are most affected, the findings can guide targeted interventions—default redesign, commitment devices, and tailored financial education—to raise long-term financial security in Pakistan and similar contexts (Thaler & Benartzi, 2004; Laibson, 1997).

## **2.Literature Review**

Retirement saving decisions are among the most critical financial choices individuals make, yet they are often shaped by psychological biases rather than purely rational calculations. Two of the most influential biases in this domain are risk aversion and overconfidence, both of which have been extensively studied in behavioral finance and are highly relevant to understanding retirement planning behaviour.

### ***Risk Aversion and Retirement Saving***

Risk aversion refers to the tendency of individuals to prefer avoiding losses over acquiring equivalent gains (Kahneman & Tversky, 1979). Prospect theory demonstrates that people weigh losses more heavily than gains, leading to conservative investment choices. In the context of retirement planning, this bias

manifests in reluctance to invest in equities or higher-yield assets, even when such investments are necessary to achieve long-term adequacy.

Empirical studies confirm the impact of risk aversion on saving behaviour. Rasool and Ullah (2020) found that Pakistani investors consistently preferred low-risk securities, even at the cost of lower returns. Similarly, Ball et al. (2010) reported gender differences, with women displaying stronger risk aversion in retirement portfolios. This tendency often results in portfolios dominated by fixed deposits or low-yield bonds, which may fail to keep pace with inflation, thereby eroding retirement wealth.

Risk aversion also influences contribution behaviour. Individuals who perceive retirement saving as risky may delay enrollment or contribute minimally, preferring liquidity over long-term commitment. Mahmood et al. (2024) observed that risk-averse investors in Pakistan were less likely to diversify, a finding that parallels retirement savers' reluctance to allocate funds to equities. Thus, while risk aversion protects against volatility, it paradoxically increases the risk of inadequate retirement savings.

### *Overconfidence and Retirement Saving*

Overconfidence bias is the tendency to overestimate one's knowledge, predictive ability, or control over outcomes (Bhandari & Deaves, 2006). In retirement planning, overconfidence can lead individuals to underestimate the resources required for old age or to assume that future income will compensate for current under-saving. Barber and Odean (2001) demonstrated that overconfident investors trade excessively, reducing portfolio performance. Applied to retirement saving, this bias may cause individuals to believe they

can “catch up” later or achieve higher returns through active management, leading to procrastination and under-contribution. Ahmad and Shah (2020) found that overconfidence reduced Pakistani investors’ ability to make sound financial choices, a dynamic that can translate into unrealistic expectations about pension adequacy.

Overconfidence also affects risk perception. Individuals who overestimate their financial literacy may ignore diversification principles, concentrate investments in familiar assets, or assume that market downturns will not affect them significantly. Mahmood et al. (2024) reported that overconfidence significantly influenced investment decisions in Pakistan, reinforcing the idea that retirement savers may misjudge the balance between risk and return.

Risk aversion and overconfidence exert opposite pressures on retirement saving behaviour. Risk aversion discourages participation in higher-yield investments, while overconfidence encourages excessive risk-taking or underestimation of future needs. Together, these biases can create a paradox: some individuals save too conservatively, while others save inadequately due to misplaced optimism. Both pathways lead to insufficient retirement preparedness. The literature suggests that these biases are particularly pronounced in emerging markets, where pension systems are less developed and financial literacy is uneven. Studies in Pakistan highlight the prevalence of both risk aversion and overconfidence among investors (Mahmood et al., 2024; Ahmad & Shah, 2020), underscoring the need to examine their specific impact on retirement saving behaviour.

## **Theoretical Context**

Bounded rationality (Simon, 1955) provides the overarching framework, emphasizing that individuals rely on heuristics rather than exhaustive optimization. Prospect theory (Kahneman & Tversky, 1979) explains risk aversion, while overconfidence is rooted in cognitive psychology's findings on self-assessment errors (Bhandari & Deaves, 2006). Together, these theories explain why retirement savers deviate from rational models of consumption smoothing (Modigliani & Brumberg, 1954) and why interventions are needed to align behaviour with long-term goals.

Although extensive literature documents risk aversion and overconfidence in general investment behaviour, fewer studies directly examine their impact on retirement saving in emerging economies. Most evidence comes from developed countries with established pension systems. The Pakistani context remains under-researched, with recent studies focusing on stock market investors rather than retirement savers (Mahmood et al., 2024). This gap is critical because retirement planning involves longer horizons and greater uncertainty than short-term investing.

Understanding how risk aversion and overconfidence shape retirement saving behaviour has direct policy relevance. Excessive risk aversion can be addressed through default portfolio diversification and inflation-protected instruments, while overconfidence can be mitigated by realistic projections and transparent communication about retirement adequacy. By focusing on these two biases, research can provide actionable insights for pension design and financial education in Pakistan and similar contexts.

## Hypotheses

*H1 Individuals with higher levels of risk aversion are less likely to allocate retirement savings to equity or higher-yield investment options, preferring low-risk, low-return assets.*

*H2: Greater risk aversion is negatively associated with the amount and regularity of contributions to retirement savings plans, as risk-averse individuals prefer liquidity and avoid long-term financial commitments.*

*H3: Individuals with higher levels of overconfidence are more likely to underestimate the resources required for retirement, leading to lower contribution rates and inadequate retirement preparedness.*

*H4 : Overconfident individuals are more likely to adopt concentrated or risky retirement portfolios, believing they can achieve superior returns or “catch up” later, which increases the likelihood of under-saving.*

*H5 : Risk aversion and overconfidence exert opposite effects on retirement saving behaviour: risk aversion leads to overly conservative saving and investment, while overconfidence leads to insufficient saving and excessive risk-taking. Both biases, however, contribute to inadequate retirement preparedness.*

## Methodology

### Research Design

This study adopts a **quantitative, cross-sectional survey design** to examine the impact of risk aversion and overconfidence bias on retirement saving behaviour among working individuals in Pakistan. A structured questionnaire was used to collect primary data, allowing for statistical testing of the proposed hypotheses.

This design is consistent with prior behavioral finance studies that have investigated cognitive biases in investment decisions (Mahmood et al., 2024; Adil, Singh, & Ansari, 2021).

### **Target Population and Sampling**

The target population comprises **employed individuals in Pakistan** across both public and private sectors who are eligible to participate in retirement saving schemes (e.g., provident funds, voluntary pension schemes, or private savings plans). Since retirement planning behaviour is influenced by employment type and income level, respondents were drawn from diverse occupational groups including banking, education, healthcare, and manufacturing.

A **convenience sampling technique** was employed, similar to Mahmood et al. (2024), due to accessibility constraints and the exploratory nature of the study. Questionnaires were distributed in person at workplaces and through online platforms (LinkedIn, WhatsApp, and email). The sample size target was **250–300 respondents**, which is adequate for regression analysis and consistent with comparable studies in behavioral finance (Rasool & Ullah, 2020).

### **Instrument Development**

The questionnaire was divided into three sections:

2. **Section A:** Demographic information (age, gender, education, income, employment sector, years of work experience).
3. **Section B:** Measurement of cognitive biases. Risk aversion was measured using items adapted from Tversky & Kahneman (1974) and Rasool & Ullah (2020), focusing on preferences for safe versus risky retirement

investment options. Overconfidence was measured using items adapted from Bhandari & Deaves (2006) and Ahmad & Shah (2020), capturing self-perceived financial knowledge and confidence in retirement planning decisions.

4. **Section C:** Retirement saving behaviour. Items assessed contribution frequency, contribution amount, portfolio diversification, and perceived preparedness for retirement. These measures were adapted from Lusardi & Mitchell (2014) and Thaler & Benartzi (2004).

All items were measured on a **five-point Likert scale** ranging from “strongly disagree” (1) to “strongly agree” (5).

### **Pilot Testing**

A pilot study was conducted with 30 respondents to ensure clarity and reliability of the instrument. Cronbach’s alpha was used to assess internal consistency. Reliability coefficients above 0.70 were considered acceptable (Baker, Kumar, Goyal, & Gaur, 2019). Minor wording adjustments were made based on feedback.

### **Data Collection Procedure**

Data was collected over a six-week period. Respondents were assured of confidentiality and anonymity, and participation was voluntary. Ethical approval was obtained from the relevant institutional review board.

### **Data Analysis Techniques**

Data were analyzed using **SPSS/AMOS**. Descriptive statistics were used to summarize demographic characteristics. Reliability and validity of constructs

were tested using Cronbach's alpha and factor analysis. To test the hypotheses, **multiple regression analysis** was employed, with retirement saving behaviour as the dependent variable and risk aversion and overconfidence bias as independent variables.

The regression model was specified as:

$$RSB = \beta_0 + \beta_1 RA + \beta_2 OC + \epsilon$$

Where:

1. *RSB*= Retirement Saving Behaviour
2. *RA*= Risk Aversion
3. *OC*= Overconfidence
4.  $\epsilon$ = Error term

### **Descriptive Statistics**

Table 1 presents the descriptive statistics for the main study variables. Respondents reported moderate levels of risk aversion and overconfidence, while retirement saving behaviour scores were relatively low, suggesting under-preparedness. Pearson correlation coefficients were calculated to examine associations among variables. Table 3 shows that risk aversion was negatively correlated with retirement saving behaviour ( $r = -.32, p < .01$ ), while overconfidence was also negatively correlated ( $r = -.28, p < .01$ ).

**Table 1**

## Reliability Coefficients and Correlations Among Study Variables

Variable	Cronbach's $\alpha$	Mean	SD	1	2	3
1. Risk Aversion	.742	3.41	0.82	—		
2. Overconfidence	.751	3.56	0.79	.12	—	
3. Retirement Saving Behaviour	.768	2.98	0.85	-.32**	-.28**	—

*Note.* N = 250. Cronbach's  $\alpha$  values above .70 indicate acceptable reliability. \*\*p < .01.

The table shows that all three constructs—risk aversion, overconfidence, and retirement saving behaviour—demonstrated acceptable internal consistency, with Cronbach's alpha values ranging from .742 to .768. Mean scores suggest moderate levels of risk aversion and overconfidence among respondents, while retirement saving behaviour was relatively low, indicating under-preparedness.

Correlation results reveal that both risk aversion and overconfidence were negatively associated with retirement saving behaviour. Specifically, higher risk aversion was linked to lower contributions and conservative portfolio choices, while greater overconfidence was associated with unrealistic expectations and insufficient saving. Interestingly, the correlation between risk aversion and overconfidence was weak and nonsignificant, suggesting that these biases operate independently rather than jointly. Together, these findings

confirm that both biases—though conceptually opposite—contribute to inadequate retirement preparedness in Pakistan.

### Regression Analysis

Multiple regression analysis was conducted to test the hypotheses. The model was significant ( $F(2, 247) = 18.62, p < .001$ ), explaining 21% of the variance in retirement saving behaviour ( $R^2 = .21$ ).

**Table 4**

Regression Results Predicting Retirement Saving Behaviour

Predictor	$\beta$	SE	$t$	$p$
Risk Aversion	-.29	.07	-4.15	>0.05
Overconfidence	-.25	.08	-3.62	>0.05

*Note.* Dependent variable = Retirement Saving Behaviour.

The regression coefficients indicate that both risk aversion and overconfidence significantly reduce retirement saving behaviour. Specifically, for every one-unit increase in risk aversion, retirement saving behaviour decreased by 0.29 units ( $\beta = -.29, p < .001$ ). Similarly, for every one-unit increase in overconfidence, retirement saving behaviour decreased by 0.25 units ( $\beta = -.25, p < .001$ ).

### Discussion of Results

The findings of this study provide important insights into how risk aversion and overconfidence bias shape retirement saving behaviour in Pakistan. Both

biases were found to have significant negative effects, though they operate through different psychological mechanisms.

The regression results showed that risk aversion was negatively associated with retirement saving behaviour. Respondents who scored higher on risk aversion were less likely to contribute regularly to retirement plans and tended to avoid diversified portfolios. This outcome is consistent with prospect theory (Kahneman & Tversky, 1979), which argues that individuals give disproportionate weight to potential losses compared to equivalent gains. In the retirement context, this manifests as reluctance to invest in equities or higher-yield instruments, even though such investments are necessary to maintain purchasing power over long horizons.

Empirical evidence supports this interpretation. Rasool and Ullah (2020) found that Pakistani investors consistently preferred low-risk securities, even at the expense of long-term returns. Similarly, Ball et al. (2010) reported that risk aversion leads to conservative retirement portfolios, particularly among women. The present study extends these findings by showing that risk aversion not only influences portfolio composition but also reduces contribution behaviour, thereby compounding the risk of inadequate retirement preparedness.

Overconfidence bias also emerged as a significant negative predictor of retirement saving behaviour. Respondents who overestimated their financial knowledge or future earning capacity contributed less and displayed unrealistic expectations about retirement adequacy. This finding resonates with prior research showing that overconfidence leads to excessive trading and poor investment outcomes (Barber & Odean, 2001). In Pakistan, Ahmad and Shah

(2020) similarly observed that overconfidence reduced investors' ability to make sound financial choices.

In the retirement context, overconfidence may cause individuals to believe they can "catch up" later or achieve superior returns through active management, leading to procrastination and under-saving. Bhandari and Deaves (2006) noted that overconfidence is particularly prevalent among younger and higher-income individuals, which may explain why some respondents in this study underestimated the resources required for retirement.

Although risk aversion and overconfidence are conceptually opposite—one discourages risk-taking while the other encourages it—their effects converge in producing inadequate retirement preparedness. Risk-averse individuals save too conservatively, while overconfident individuals save too little. Both pathways ultimately undermine long-term financial security. This paradox highlights the complexity of behavioural influences on retirement planning and underscores the need for interventions that address both biases simultaneously.

### ***Contribution to Literature***

The results contribute to the growing body of behavioral finance literature by providing empirical evidence from Pakistan, an emerging economy where retirement planning is under-researched. Previous studies in Pakistan have focused primarily on stock market investors (Mahmood et al., 2024), but this study demonstrates that the same biases extend to retirement saving behaviour. By isolating risk aversion and overconfidence, the research clarifies their

distinct and combined effects, filling a gap in the literature on retirement planning in developing contexts.

### ***Policy and Practical Implications***

The findings have direct implications for policymakers and financial institutions. For risk-averse individuals, pension schemes should offer inflation-protected instruments and diversified default portfolios to reduce the perceived risk of equity exposure. For overconfident individuals, interventions should emphasize realistic projections of retirement needs and highlight the dangers of under-saving. Financial education campaigns can play a role, but structural solutions such as automatic enrollment and contribution escalation may be more effective in countering these biases (Thaler & Benartzi, 2004).

### **Conclusion**

In sum, the study confirms that both risk aversion and overconfidence significantly hinder retirement saving behaviour in Pakistan. These biases, though opposite in nature, converge in producing inadequate retirement preparedness. Addressing them requires a combination of behavioural insights, policy interventions, and institutional design to ensure that individuals achieve financial security in retirement.

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