Journal of Strategic Innovation in Economics and Busines
E-ISSN: 3110-4177
Volume 1 Issue 3, 2025, Pp. 23-32
DOI: https://doi.org/10.65101/sinebis.v1i3.209

Mitigating Investment Irrationality in the Digital Era: Financial Education as a Strategic Moderator of Cognitive Bias and Social Media Influence

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Received: 08-12-2025 Revised: 08-01-2026 Accepted: 24-01-2026

Abstract

This study examines how cognitive biases and social media exposure influence investment decision-making among Millennials and Generation Z in Indonesia, while considering financial education as a moderating factor. Drawing on behavioral finance theory, this research examines how psychological and digital information factors shape investment behavior in an emerging market context. Data were obtained from an online survey involving 253 young investors and were analyzed using the Partial Least Squares–Structural Equation Modeling (PLS-SEM) approach. The results indicate that cognitive biases, particularly overconfidence and herding behavior, exert a significant influence on individual investment decisions. Social media exposure also significantly affects investment behavior, underscoring digital platforms as dominant sources of financial information for young investors. Furthermore, the findings reveal that financial education serves as an effective moderating mechanism in the relationships between cognitive biases and investment decisions, as well as between social media influence and investment decision-making. Higher levels of financial education help mitigate the adverse effects of psychological biases and reduce investors' reliance on unverified financial information circulating on social media. These findings contribute to the behavioral finance literature by integrating cognitive bias, social media influence, and financial education within a unified empirical framework. From a practical standpoint, this study emphasizes the strategic importance of strengthening financial education initiatives to enhance the quality investment decisions among digitally native generations in emerging markets.

Keywords: Cognitive Bias, Social Media, Financial Education, Investment Decision, Millennials and Generation Z.

Introduction

In recent years, the participation of young investors in financial markets has increased substantially, reflecting a significant shift in financial behavior among Millennials and Generation Z. Advances in digital technology have expanded access to a wide range of financial instruments, enabling individuals to invest in stocks, mutual funds, and other assets through mobile applications with minimal cost and effort. This digital transformation has lowered entry barriers to investment activities and encouraged broader participation, particularly among younger generations. At the same time, growing economic uncertainty,

rising inflation, and labor market instability have heightened awareness of the importance of early financial planning and long-term wealth accumulation. The increasing popularity of financial freedom narratives on social media has further strengthened young investors' motivation to engage in investment activities at an early stage (Pradhana, 2025).

Indonesia represents a compelling context for examining this phenomenon. According to data from the Indonesian Central Securities Depository (Kustodian Sentral Efek Indonesia, KSEI), the total number of capital market investors reached 16.99 million by June 2025, with individuals aged 30 years and below accounting for more than half of all investors. This demographic dominance indicates that Millennials and Generation Z have become the primary drivers of investment growth in the Indonesian capital market. However, the rapid increase in investor participation does not necessarily translate into optimal investment outcomes. Despite their large numbers, young investors hold a disproportionately small share of total investment assets compared to older age groups, suggesting potential weaknesses in financial decision-making and investment management capabilities.

One factor that strongly shapes investment behavior among young investors is the growing influence of social media. Digital platforms such as TikTok, Instagram, YouTube, and X (formerly Twitter) have evolved beyond entertainment and communication tools into major sources of financial and investment information. Social media facilitates rapid dissemination of financial content in engaging and easily digestible formats, making complex financial topics more accessible to young audiences. However, the speed and volume of information circulating on social media are not always accompanied by adequate verification, which may encourage impulsive and heuristic-driven investment decisions. As a result, individuals may rely on trending narratives, influencer recommendations, and peer opinions rather than thorough analysis, increasing their vulnerability to suboptimal investment choices.

From a behavioral finance standpoint, investment decisions are not solely guided by rational evaluation but are frequently shaped by psychological tendencies commonly referred to as cognitive biases. Among young investors, two prominent biases are overconfidence and herding behavior. Overconfidence bias reflects individuals' inclination to overestimate their financial knowledge and predictive abilities, which often results in excessive trading activities and an underestimation of investment risk. In contrast, herding behavior describes the tendency of investors to mimic the actions of others without conducting independent analysis. This behavior is frequently driven by fear of missing out (FOMO), social pressure, and the belief that collective decisions are inherently more reliable than individual judgment. Within digital investment environments, these biases are further intensified by viral trends, influencer-driven

narratives, and online investment communities that generate strong social signals. Empirical studies provide evidence supporting the relevance of these behavioral patterns. Herding behavior has been shown to influence the quality of investment decisions among Generation Z investors (Fikri et al., 2022), while overconfidence bias significantly affects investment decision-making among young investors (Situngkir et al., 2024).

The consequences of such behavior are reflected in the unequal distribution of investment assets across age groups. Although young investors represent a growing proportion of market participants, older investors continue to hold the majority of total assets within the Indonesian capital market. This imbalance suggests that increased market participation among Millennials and Generation Z is not necessarily accompanied by effective financial management or rational investment decision making. These patterns underscore the need to examine factors that can mitigate irrational behavior and improve decision quality among young investors.

Conceptually, financial education refers to the process of enhancing individuals' knowledge, skills, and confidence in managing financial resources and making informed financial decisions. Adequate financial education enables individuals to understand fundamental financial concepts, evaluate risks, plan for the long term, and critically assess financial information obtained from various sources, including social media. Individuals with higher levels of financial education tend to demonstrate stronger self-control, are less vulnerable to emotional influences, and are better equipped to recognize and manage behavioral biases. Prior research emphasizes the importance of financial education in helping individuals identify and reduce behavioral biases in financial decision-making (Rahmadani et al., 2023).

Despite the rapid growth of Millennials' and Generation Z's participation in the Indonesian capital market, a critical paradox persists between high levels of market entry and the relatively low accumulation of quality investment assets among these young investors. This phenomenon suggests that increased digital access and intensive exposure to social media, rather than fully empowering investors, may instead deteriorate investment decision quality through the amplification of cognitive biases such as overconfidence and herding behavior. Young investors, as digital natives, are particularly vulnerable to heuristic-based decision making within information environments characterized by high speed, low verification, and strong social influence. The central issue underlying this condition lies in the uncertainty surrounding the extent to which financial education can function as a strategic buffering mechanism capable of mitigating the adverse effects of psychological biases and social media

influence on investment decisions. Therefore, this study addresses the urgent need for empirical evidence on the effectiveness of financial education in moderating the relationships between cognitive bias, social media influence, and investment decision-making within an emerging market context.

By integrating psychological, informational, and educational dimensions within a single empirical framework, this study seeks to contribute to the behavioral finance literature and provide practical insights for improving investment decision-making in the digital era.

Research Method

1. Research Design and Data Collection

A quantitative explanatory approach is employed in this study to assess the effects of cognitive bias and social media exposure on investment decisions, while also examining the moderating role of financial education. Data were collected through a structured online questionnaire distributed using Google Forms. The population comprises Indonesian Millennials (1981–1996) and Generation Z (1997–2012) who have participated in or shown interest in investment activities and rely on social media for financial information. Using purposive sampling, the study obtained 253 valid observations, which is considered sufficient for conducting PLS-SEM with four latent variables (Hair, et al., 2021).

2. Measurement of Variables

All constructs were measured using multi-item scales adapted from prior studies. Responses were recorded on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cognitive bias was measured through indicators of overconfidence and herding behavior, while social media influence captured the extent to which social media is used as an investment information source. Financial education reflects respondents' financial knowledge and decision-making competence, and investment decision represents rationality and consistency in investment behavior.

3. Data Analysis

Partial Least Squares–Structural Equation Modeling (PLS-SEM) was employed for data analysis using SmartPLS version 4. Following the methodological guidelines proposed by (Hair, et al., 2021), the analysis involved a two-stage evaluation process, consisting of the measurement model and the structural model assessment. The measurement model was evaluated by examining internal consistency reliability and construct validity. Reliability was assessed using Cronbach's Alpha and Composite Reliability, while convergent validity was evaluated through the Average Variance Extracted (AVE). Discriminant validity was examined

using the Heterotrait–Monotrait Ratio (HTMT), which is considered a more robust and contemporary criterion compared to the traditional Fornell–Larcker approach.

The structural model was assessed by analyzing path coefficients, coefficient of determination (R^2), and the significance of hypothesized relationships. Hypothesis testing, including direct and moderating effects, was conducted using a bootstrapping procedure with 5,000 subsamples, which represents the recommended standard for significance testing in PLS-SEM.

Result

1. Measurement Model Assessment

An evaluation of the measurement model was conducted to examine internal consistency reliability and convergent validity. The findings show that all constructs meet the reliability criteria, with Cronbach's alpha and composite reliability values above 0.70. Furthermore, convergent validity is supported, as the average variance extracted (AVE) for each construct is greater than 0.50.

Table 1. Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability	AVE
Cognitive Bias	**0.900**	**0.901**	**0.667**
Social Media	**0.908**	**0.909**	**0.685**
Financial Education	**0.921**	**0.925**	**0.717**
Investment Decision	**0.919**	**0.920**	**0.714**

Discriminant validity was assessed using the Fornell–Larcker criterion. The square root of AVE for each construct exceeds its correlations with other constructs, confirming adequate discriminant validity.

Table 2. Discriminant Validity (Fornell–Larcker Criterion)

Construct	Financial Education	Cognitive Bias	Social Media	Investment Decision
Financial Education	**0.847**			
Cognitive Bias	**0.454**	**0.817**		
Social Media	**0.439**	**0.398**	**0.828**	
Investment Decision	**0.553**	**0.608**	**0.602**	**0.845**

Discriminant validity was further evaluated using the Heterotrait–Monotrait Ratio (HTMT). As presented in Table 4, all HTMT values are below the recommended threshold of 0.85, indicating that discriminant validity is satisfactorily established for all constructs, including the interaction terms used to assess the moderating effects.

Table 3. Discriminant Validity (HTMT Criterion)

Variabel	(M) Edukasi Keuangan	(X1) Bias Kognitif	(X2) Media Sosial	(Y) Keputusan Investasi	(M) Edukasi Keuangan x (X1) Bias Kognitif	(M) Edukasi Keuangan x (X2) Media Sosial
(X1) Bias Kognitif	0,492					
(X2) Media Sosial	0,479	0,439				
(Y) Keputusan Investasi	0,596	0,666	0,658			
(M) Edukasi Keuangan x (X1) Bias Kognitif	0,298	0,237	0,114	0,24		
(M) Edukasi Keuangan x (X2) Media Sosial	0,096	0,117	0,254	0,325	0,496	

2. Structural Model Assessment

The structural model was evaluated by examining the coefficient of determination (R^2). The R^2 value for investment decision is 0.625, indicating that cognitive bias, social media, and financial education jointly explain 62.5% of the variance in investment decisions. This reflects moderate-to-strong predictive power

3. Hypothesis Testing

Hypotheses were tested using the bootstrapping procedure with 5,000 resamples. Path coefficients, t-values, and p-values are reported in Table 4.

Table 4. Structural Model Results

Hypothesis	Path	β	t-value	p-value	Decision
H1	**Cognitive Bias → Investment Decision**	**0.277**	**4.222**	**0.000**	**Supported**

H2	**Social Media → Investment Decision**	**0.271**	**4.148**	**0.000**	**Supported**
H3	**Financial Education × Cognitive Bias → Investment Decision**	**0.163**	**2.051**	**0.040**	**Supported**
H4	**Financial Education × Social Media → Investment Decision**	**0.177**	**2.242**	**0.025**	**Supported**

4. Model Quality and Bias Assessment

Common method variance (CMV) was assessed using full collinearity variance inflation factors (VIF). All VIF values range between 1.407 and 1.811, well below the threshold of 3.3, indicating that CMV is not a concern. The model fit assessment shows satisfactory results, with an SRMR value of 0.050, indicating a good model fit.

Discussion

The present study examines how cognitive bias and social media exposure influence investment decisions among Indonesian Millennials and Generation Z, with financial education serving as a moderating variable. As illustrated in **Figure 1**, the conceptual framework positions financial education as a strategic mechanism that moderates the effects of psychological and informational factors on investment decision-making. Overall, the findings reinforce behavioral finance theory by demonstrating that investment behavior is not solely driven by rational evaluations of risk and return but is significantly shaped by cognitive and social influences (Thaler, 2015).

Based on the evaluation of the measurement model presented in **Table 1**, all constructs meet the required criteria for internal consistency reliability and convergent validity, as indicated by Cronbach's alpha, composite reliability, and AVE values exceeding recommended thresholds. using the Fornell–Larcker criterion, as shown in **Table 2**, confirming that each construct measures a distinct conceptual domain. These results indicate that the measurement model provides a robust foundation for structural analysis. Furthermore, discriminant validity was reinforced through the Heterotrait–Monotrait Ratio (HTMT) assessment. As reported in **Table 3**, all HTMT values fall below the recommended threshold of 0.85, indicating that the latent constructs including the interaction terms are empirically distinct. Collectively, these results confirm the robustness of the measurement model and provide a solid foundation for subsequent structural model analysis.

The structural model assessment reveals that cognitive bias and social media exposure significantly influence investment decisions among young investors. As reported in **Table 4**,

cognitive bias particularly overconfidence and herding behavior has a positive and significant effect on investment decision-making. This finding is consistent with prior studies suggesting that limited investment experience and excessive self-confidence increase susceptibility to behavioral distortions (Fikri et al., 2022); (Situngkir et al., 2024). In digital investment environments, such biases are further amplified by rapid information dissemination and intense social interaction, leading investors to rely on heuristic judgments rather than comprehensive fundamental analysis.

Similarly, the significant effect of social media on investment decisions, as shown in **Table 4**, highlights the growing role of digital platforms in shaping investors' perceptions and actions. Social media functions not only as a source of financial information but also as a channel of social influence that reinforces herd behavior and Fear of Missing Out (FOMO). This finding aligns with recent evidence suggesting that social media intensifies peer pressure and speculative behavior among young investors (Salaming et al., 2025; Zhao & Li, 2024). For Millennials and Generation Z, who are highly engaged in online communities, social validation often becomes a decisive factor in investment choices.

A key contribution of this study lies in the moderating role of financial education. The interaction effects reported in **Table 4** indicate that financial education significantly weakens the influence of cognitive bias and social media exposure on investment decisions. This suggests that financial education operates not merely by enhancing technical knowledge but by strengthening self-control, critical thinking, and the ability to critically evaluate information quality. These findings support earlier arguments that financially educated individuals are better equipped to recognize cognitive distortions and resist impulsive, socially driven investment behavior (Lusardi & Mitchell, 2014). Evidence from other emerging markets further corroborates this mechanism, as financial education has been shown to mitigate behavioral biases in contexts such as Pakistan (Mahmood et al., 2024).

From a model performance perspective, the coefficient of determination (R^2) for investment decisions is **0.625**, indicating that cognitive bias, social media influence, and financial education jointly explain **62.5% of the variance** in investment decisions. This value reflects **moderate to strong explanatory power**, demonstrating that the proposed model captures a substantial proportion of behavioral variation among young investors. Consequently, the findings underscore the importance of integrating psychological, informational, and educational dimensions when analyzing investment behavior in digitally driven emerging markets.

Overall, this study extends the behavioral finance literature by empirically demonstrating that financial education functions as a strategic protective mechanism against psychological and informational biases in the digital investment environment. The results highlight the necessity of complementing technological access and market participation initiatives with behavioral oriented financial education programs to improve the quality and sustainability of investment decisions among digitally native generations.

Conclusion

This study provides empirical evidence that cognitive bias—particularly overconfidence and herding behavior and social media exposure significantly distort the rationality of investment decisions among Millennials and Generation Z in Indonesia. The findings further demonstrate that financial education functions effectively as a strategic moderating mechanism that mitigates the adverse effects of psychological biases and reduces investors' reliance on unverified digital information. These results imply that capital market development strategies should not rely solely on technological access and digital participation, but must be accompanied by behaviorally oriented financial education initiatives to strengthen decision quality. Accordingly, financial education should be viewed not merely as an educational tool, but as a vital protective instrument for sustaining young investors' participation in emerging market environments.

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