



Information Asymmetry, Moral Hazard, and Investment Performance: The Moderating Role of Financial Literacy among Indonesian Millennial Investors

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Abstract

Background: The rapid growth of millennial participation in Indonesia's capital market has increased access to investment opportunities while creating challenges related to information quality, opportunistic behavior, and investors' ability to evaluate financial information.

Objective: This study examines the relationships between information asymmetry and moral hazard and investment performance and investigates the moderating role of financial literacy among Indonesian millennial investors.

Methods: A quantitative cross-sectional explanatory design was employed involving 247 investors aged 31–40 years who possessed a Single Investor Identification (SID), held a bachelor's degree, and had at least one year of experience investing in the capital market. Data were collected using an online five-point Likert scale questionnaire and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4 and 5,000 bootstrap resamples.

Results: Information asymmetry was not significantly associated with investment performance ($\beta = 0.050$; $p = 0.226$), while moral hazard also was not significantly associated with investment performance ($\beta = 0.100$; $p = 0.052$). Financial literacy significantly moderated the relationship between information asymmetry and investment performance ($\beta = 0.151$; $p < 0.001$) but did not significantly moderate the relationship between moral hazard and investment performance ($\beta = -0.053$; $p = 0.342$).

Conclusion: Financial literacy operates as a selective rather than universal moderator, indicating that its moderating role differs across distinct sources of investment risk.

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INTRODUCTION

The Indonesian capital market has undergone a significant transformation driven by rising retail investor participation, facilitated by the digitalization of financial services, the ease of opening online securities accounts, and the proliferation of technology-based investment platforms (Bustamante & Ubilla, 2026; Ndukaji, 2025). This trend has expanded public access to investment instruments and consistently driven growth in the number of individual investors. Data from the Indonesian Central Securities Depository (KSEI) indicates that the number of Single Investor Identification (SID) accounts surpassed 12 million in 2024, with the majority of investors falling into the under-40 age group (Zega & Satato, 2025). While the dominance of Millennials and Generation Z serves as a positive indicator of the deepening of the national financial market Kurniadi (2023), it also presents challenges regarding the quality of investment decision-making

(B. M. Barber & Odean, 2000).

The rise in the number of investors has not necessarily been accompanied by an improvement in the quality of investment decisions. Millennial investors rely heavily on digital technology to access information about stocks, mutual funds, bonds, and other financial instruments through social media, trading platforms, investment communities, digital channels, and financial influencers (Raja Guru et al., 2026). While this ease of access increases information availability, it also heightens the risk of spreading incomplete, unverified, or misleading information (Gorzon et al., 2024). Consequently, investors face information overload, causing investment decisions to be frequently influenced by perceptions, market sentiment, and the quality of the information received rather than by fundamental analysis (Pernagallo & Torrisi, 2022).

This phenomenon demonstrates that modern capital markets are influenced not only by fundamental economic factors but also by the quality of information distribution. According to Information Asymmetry Theory, markets do not always operate under conditions of perfect information, as some participants possess access to more complete, timely, and accurate information than others (Gorzon et al., 2024). Akerlof (1970) explained that information asymmetry can lead to market failure when investors are unable to distinguish the quality of the assets being traded. In the Indonesian context, this situation is further complicated by the fact that many retail investors are relatively new and rely more on external information than on independent analysis, making them more susceptible to rumors, community recommendations, and the opinions of financial influencers (Raut, 2020; Syukur et al., 2025).

Beyond information asymmetry, moral hazard also represents a significant issue in investment decision-making. Moral hazard is reflected in investor behaviors such as taking excessive risks, neglecting diversification, or investing without considering fundamental risks. Agency Theory explains that such behavior can arise from information imbalances that encourage opportunistic actions, potentially undermining market efficiency (Jensen & Meckling, 1976). Phenomena involving illegal investment schemes such as Binomo, Quotex, and various schemes promising high returns demonstrate that some investors remain willing to take high risks even when information regarding potential losses is available (Constantino et al., 2024). This indicates that the quality of investment decisions is determined not only by the availability of information but also by investors' ability to comprehend, evaluate, and interpret that information.

The behavioral finance perspective posits that investors do not always act rationally, as they are influenced by information limitations, cognitive biases, emotions, and their social environment (D. Kahneman & Tversky, 2013). Under conditions of uncertainty, investors tend to employ heuristics as decision-making shortcuts; this practice can heighten the risk of judgment errors if the information utilized is inadequate (Tversky & Kahneman, 1974). Consequently, the quality of information and an investor's ability to process it are critical determinants of investment performance. Financial literacy is one factor capable of mitigating the negative impacts of information asymmetry (Rehman & Mia, 2024). It encompasses the ability to understand financial products, evaluate risks, assess information, and make rational investment decisions (Lusardi & Mitchell, 2014). Financial literacy is a multidimensional concept influenced by demographic, psychological, social, economic, and technological factors (Fernandes et al., 2014). Furthermore, various studies have demonstrated that investors with high financial literacy are better equipped to identify relevant information, reduce behavioral biases, and construct more optimal investment portfolios (Adil et al., 2022). Taken together, Information Asymmetry Theory identifies unequal information as a market-level condition, Agency Theory explains how information imbalances can create opportunities for opportunistic behavior, and Behavioral Finance Theory explains why individual investors may respond differently to the same informational environment. Within this integrated mechanism, financial literacy is positioned as a contingent individual capability that may alter how information asymmetry or moral-hazard-related perceptions are associated with investment performance, rather than as a mechanism assumed to improve performance in all circumstances.

Literature Review

Behavioral Finance Theory emerged as a critique of the traditional finance paradigm,

which assumes that investors always act rationally to maximize utility based on available information. Under the Efficient Market Hypothesis (EMH), security prices are assumed to fully reflect all relevant information, implying that price deviations are merely temporary. However, various market phenomena, such as market anomalies, excessive trading, overreaction, and underreaction, demonstrate that investor behavior often deviates from this assumption of rationality (Dhandapani & Kathiravan, 2026). This situation has driven the development of Behavioral Finance Theory, which integrates concepts from cognitive psychology and behavioral economics to explain investment decision-making processes. In the context of emerging markets, behavioral finance holds greater relevance than in mature markets. Factors such as relatively lower informational efficiency, the dominance of retail investors, and a high reliance on digital media make investment decisions more susceptible to the influence of psychological factors than to fundamental analysis (Katenova et al., 2025).

Information Asymmetry Theory

Information Asymmetry Theory, introduced by Akerlof (1970), explains that markets do not always operate under conditions of perfect information. An imbalance in the distribution of information results in some market participants possessing more complete information than others, leading to less efficient economic decisions. In the context of investment, information asymmetry arises when investors lack equal access to information regarding companies, industry prospects, or economic conditions (Zainuddin, 2025). Institutional investors generally possess greater resources for acquiring and analyzing information than individual investors (Cumaio et al., 2026). This disparity in information quality makes retail investors more prone to making decisions based on rumors, market sentiment, or recommendations from others. Empirical research indicates that high levels of information asymmetry increase investment uncertainty and affect the quality of investment decisions. However, studies also show that investors with strong analytical skills can mitigate the negative impacts of information asymmetry by conducting more comprehensive evaluations of information. The advancement of digital technology has introduced new dynamics to the concept of information asymmetry. On the one hand, digitalization has expanded investor access to various information sources. On the other hand, the sheer volume of information creates information overload, making it difficult for investors to distinguish between relevant information and speculative data. Consequently, the primary challenge in the digital era is no longer limited to accessing information but rather lies in investors' ability to evaluate the quality of that information.

Moral Hazard

Moral hazard describes the tendency of individuals to take greater risks when the negative consequences of their decisions are perceived as relatively minor or can be shifted to other parties. In the context of investment, moral hazard is reflected in investor behavior characterized by excessive speculative trading, aggressive use of leverage, and a disregard for portfolio diversification principles (Altman, 2013). Various studies indicate that such behavior increases the probability of investment losses, although empirical findings regarding this relationship remain inconsistent.

Investment Performance

Investment performance is an indicator reflecting an investor's success in achieving investment goals through a combination of returns, risk, and satisfaction with investment outcomes. Classical literature measures investment performance using objective indicators such as return on investment, abnormal returns, and the Sharpe ratio (Sharpe, 1988). However, developments in behavioral finance have expanded this concept to include subjective dimensions, specifically investor satisfaction, perceptions regarding the achievement of investment goals, and the ability to maintain a portfolio over the long term (Hoffmann et al., 2013; Statman, 2020). Consequently, investment performance is no longer viewed solely as a financial outcome but also as a reflection of the quality of the investor's decision-making process. Empirical research indicates that a combination of economic, psychological, and social factors influences investment performance. Investors capable of understanding financial information, managing risk, and

controlling behavioral biases tend to achieve better investment performance than those who rely merely on intuition or informal information (B. M. , and T. O. Barber, 2013; D. and M. W. R. Kahneman, 1998). Therefore, recent research increasingly frames investment performance as the outcome of an interplay between cognitive abilities, information quality, and investor behavioral characteristics.

Financial Literacy as a Moderating Variable

Financial literacy is defined as an individual's ability to understand financial concepts, evaluate economic information, manage risk, and make effective financial decisions. The OECD characterizes financial literacy as a combination of knowledge, behavior, and attitudes that enables individuals to achieve long-term financial well-being. This perspective indicates that financial literacy is not merely about the ability to perform calculations or understand financial products; rather, it reflects an individual's capacity to translate information into rational decisions (OECD, 2023). Recent literature reveals a paradigm shift in financial literacy research. While earlier studies predominantly treated financial literacy as an independent variable Lusardi & Mitchell (2014), contemporary research has begun to examine its role as a moderating variable capable of strengthening or weakening the relationship between behavioral factors and investment decisions (Shroff et al., 2024). Consequently, investors with high financial literacy are generally better equipped to make rational use of available information, even in the presence of information asymmetry.

Literature Synthesis and Research Gap

Based on a review of theory and prior research, it can be concluded that the relationships among information asymmetry, moral hazard, and investment performance remain inconclusive, yielding mixed results (Hott, 2022). Some studies find that information asymmetry diminishes investment decision quality, whereas others indicate that investors with high financial literacy can mitigate this negative impact through superior information evaluation capabilities (Lusardi & Mitchell, 2014). Similarly, the relationship between moral hazard and investment performance shows inconsistencies, as it is influenced by investor characteristics, experience levels, and market conditions (Jensen & Meckling, 1976). Recent meta-analyses also confirm that most prior studies have focused solely on the direct effects of behavioral variables on investment decisions Douhabi & Drissi (2026), while research examining financial literacy as a moderating variable, particularly regarding retail investors in emerging markets like Indonesia, remains relatively limited (Pernagallo & Torrisi, 2022).

This gap serves as the basis for developing the conceptual model of the present study, which examines the effects of information asymmetry and moral hazard on investment performance, with financial literacy acting as a moderating variable. Accordingly, the contribution of this study is not based merely on the limited number of moderation studies. It tests whether financial literacy operates selectively across two theoretically distinct sources of investment risk. The empirical pattern reported in this study (significant moderation for information asymmetry but not for moral hazard) suggests that financial literacy is not a universal moderator, thereby distinguishing information-processing contingencies from opportunistic-behavior contingencies in the investment-performance model.

Based on the theoretical framework and existing research gap, the research hypotheses can be formulated as follows:

H1: Information asymmetry is associated with investment performance.

H2: Moral hazard is associated with investment performance.

H3: Financial literacy moderates the relationship between information asymmetry and investment performance.

H4: Financial literacy moderates the relationship between moral hazard and investment performance.

METHOD

This study used a quantitative approach with an explanatory research design to examine the relationships of information asymmetry and moral hazard with investment performance, with

financial literacy as a moderating variable. This approach was chosen because it can explain relationships between variables by testing formulated hypotheses. The study population comprised Indonesian millennial individual investors registered as capital market investors. The research sample was initially determined using Slovin's formula with a 5% margin of error, resulting in 247 respondents. The eligibility criteria were respondents aged 31–40 years, possessing a Single Investor Identification (SID), holding a bachelor's degree, and having invested in the capital market for at least one year.

This study used a quantitative, cross-sectional explanatory design to test the associations of information asymmetry and moral hazard with investment performance and to examine the moderating role of financial literacy. Because the data were collected at a single point in time, the estimated structural paths are interpreted as statistical associations rather than definitive causal effects. The target population comprised Indonesian millennial individual investors registered in the capital market. Operationally, this study restricted the millennial sample to respondents aged 31–40 years at the time of data collection; this age range is an eligibility criterion for this study and should not be interpreted as encompassing the entire millennial cohort. A total of 247 eligible respondents were included. The original sample-size calculation used Slovin's formula with a 5% margin of error; however, an a priori statistical power analysis for the moderation model was not reported. Therefore, sample-size adequacy should be interpreted with this limitation in mind. Respondents were included based on the stated eligibility criteria: age 31–40 years, possession of a Single Investor Identification (SID), a bachelor's degree, and at least one year of capital-market investment experience. Because the manuscript does not document a complete sampling frame or a random-selection procedure from the full SID population, the sampling method is not characterized here as simple random sampling.

Primary data were obtained through an online questionnaire using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Information asymmetry was measured using items adapted from the concept of Information Asymmetry Theory, whereas moral hazard was measured based on indicators of opportunistic behavior in investment decision-making. Financial literacy was measured using the OECD/INFE framework, which encompasses the dimensions of financial knowledge, financial behavior, and financial attitude. Investment performance was measured based on investors' perceptions of investment goal achievement, profit levels, and satisfaction with investment results. The final measurement model contained four indicators for information asymmetry (X1.1–X1.4), three for moral hazard (X2.1–X2.3), six for financial literacy (M1–M6), and four for investment performance (Y1–Y4), as reported in Table 1. The manuscript does not provide the full wording of the questionnaire items; therefore, interpretation of the constructs is limited to the stated conceptual dimensions and the reported indicator structure.

Data analysis was conducted using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS 4 software. The analysis included evaluation of the measurement model through assessments of convergent validity, discriminant validity, and construct reliability. The structural model was evaluated using the coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2), followed by hypothesis testing using a bootstrapping procedure with 5,000 resamples. The moderating effect of financial literacy was analyzed using the product-indicator approach to test the significance of the interaction between the independent variables and the moderator in predicting investment performance. All hypothesis tests used a 5% significance level, with a t-statistic > 1.96 and a p-value < 0.05 , consistent with conventional criteria for hypothesis testing in PLS-SEM (Hair Jr et al., 2021).

RESULTS AND DISCUSSION

Results

This convergent validity test aims to determine the validity of the relationships between the indicators and their respective constructs or latent variables. The test assesses the extent to which the measurement instrument used in this study accurately measures the intended constructs. The results of the convergent validity test in this study can be observed based on the outer loading values shown in the following Figure 1.

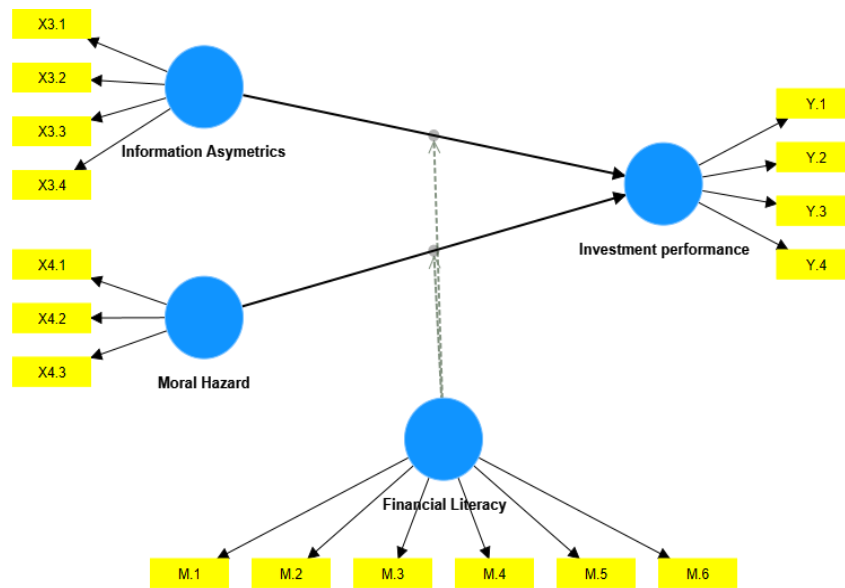


Figure 1. Convergent Validity Results

An indicator is considered to satisfy discriminant validity if its highest cross-loading value is associated with its intended construct rather than with other constructs. The observed cross-loading values provide evidence that the indicators are more strongly associated with the constructs they are intended to measure than with other constructs. Based on Table 1, it is evident that, for all indicators across the research constructs, the highest cross-loading value is associated with the construct they are intended to measure, compared with their cross-loading values for the other constructs. Thus, the indicators used in this study demonstrate adequate discriminant validity in measuring their respective constructs. In addition to examining cross-loading values, discriminant validity can also be assessed using the heterotrait–monotrait (HTMT) ratio. Discriminant validity was assessed primarily using the cross-loading and HTMT results. The cross-loading pattern in Table 1 shows that each indicator loads most strongly on its intended construct, supporting the discriminant validity of the measurement model. The Average Variance Extracted (AVE) value was evaluated separately as evidence of convergent validity rather than as a direct test of discriminant validity.

Table 1

Cross Loading Value

	Information Asymmetry (X1)	Moral (X2)	Hazard	Financial Literacy (M)	Investment Performance (Y)
X1.1	0.766	0.184		0.456	0.370
X1.2	0.729	0.221		-0.025	0.027
X1.3	0.833	0.402		0.060	0.217
X1.4	0.838	0.394		0.057	0.207
X2.1	0.383	0.995		0.110	0.169
X2.2	0.351	0.992		0.101	0.165
X2.3	0.367	0.994		0.109	0.222
M1	0.354	0.009		0.841	0.688
M2	0.257	0.068		0.840	0.629
M3	0.233	0.051		0.823	0.591
M4	0.276	0.101		0.806	0.575
M5	0.204	0.166		0.924	0.731
M6	0.212	0.150		0.942	0.737
Y1	0.233	0.146		0.734	0.882
Y2	0.357	-0.097		0.572	0.754
Y3	0.281	0.209		0.555	0.736
Y4	0.230	0.351		0.516	0.755

Based on the data presented in Table 2, the HTMT values for each pair of constructs are below 0.90 or, more conservatively, below 0.85 for constructs that are more conceptually distinct. Because all HTMT values fall below these thresholds, the results provide evidence that discriminant validity has been established.

Table 2

Heteroit-Monotrait Rasio (HTMT)

	Financial Literacy	Information Asymmetry	Investment Performance	Moral Hazard	Financial Literacy x Information Asymmetry
Financial Literacy					
Information Asymmetry	0,231				
Investment Performance	0,882	0,349			
Moral Hazard	0,109	0,400	0,287		
Financial Literacy x Information Asymmetry	0,435	0,331	0,210	0,122	
Financial Literacy x Moral Hazard	0,195	0,309	0,128	0,685	0,463

Based on the data presented in Table 3, the AVE values for information asymmetry, moral hazard, investment performance, and financial literacy are all greater than 0.50. Thus, it can be concluded that all four constructs demonstrate adequate convergent validity. As shown in Table 3, the AVE values for information asymmetry (0.629), moral hazard (0.987), financial literacy (0.747), and investment performance (0.614) exceed 0.50. These values support convergent validity for the four constructs. Discriminant validity is evaluated separately using the HTMT evidence reported above.

Table 3

Average Variance Extracted Value

	Average Variance Extracted	Conclusion
Information Asymmetry	0,629	Valid
Moral Hazard	0,987	Valid
Financial Literacy	0,747	Valid
Investment Performance	0,614	Valid

Reliability testing aims to determine the level of consistency of a measurement instrument. A construct is generally considered to have acceptable reliability if its Cronbach's alpha and composite reliability values exceed 0.70. Based on the reliability test results, all constructs used in this study demonstrated values exceeding the established criterion of 0.70. This indicates that the measurement instruments generally exhibit satisfactory internal consistency. Reliability was evaluated using Cronbach's alpha and composite reliability. Information asymmetry, financial literacy, and investment performance all exceed the stated 0.70 criterion for both measures. For moral hazard, Cronbach's alpha is 0.993, while the reported composite reliability value is 1.026. Because a composite reliability estimate above 1.00 is not an admissible reliability coefficient under standard interpretation, this value should be treated as a reporting or estimation anomaly and verified against the original SmartPLS output before a definitive reliability conclusion is made. The very high moral-hazard outer loadings (0.992–0.995) likewise warrant verification for possible indicator redundancy or transcription error.

Table 4
Reliability Results

	Cronbach's alpha	Composite Reliability	Conclusion	
Information Asymmetry	0,789	0,845	Reliable	
Moral Hazard	0,993	1,026	Reliable	Requires
			verification	
Financial Literacy	0,931	0,939	Reliable	
Investment	0,841	0,806	Reliable	
Performance				

The data presented in Table 5 show that the adjusted R^2 value obtained for the research model predicting investment performance is 0.614. This indicates that approximately 61.4% of the variance in investment performance is explained by the predictors included in the structural model, while the remaining 38.6% is attributable to factors not represented in the model. Table 5 reports an R^2 of 0.622 and an adjusted R^2 of 0.614 for investment performance. Accordingly, the structural model explains approximately 61.4% of the adjusted variance in investment performance through the predictors included in the model as a whole: information asymmetry, moral hazard, financial literacy, and the two interaction terms. The remaining variance reflects factors not represented in the specified model.

Table 5
Coefficient of Determination Result

	R-square	R-square Adjusted
Investment Performance	0,622	0,614

Hypothesis testing in this study was conducted by examining the p-values associated with each hypothesized relationship between the independent and dependent variables. A research hypothesis is considered supported if the p-value is less than 0.05. The following are the results of the hypothesis testing conducted in this study.

Tabel 6.
Hypothesis Testing Results

	Original sample	T- statistic	P- values	Conclusion
Information Asymmetry → Investment Performance	0.050	1.210	0.226	Rejected
Moral hazard → Investment Performance	0.100	1.946	0.052	Rejected
Information Asymmetry x Financial Literacy → Investment Performance	0.151	3.934	0.000	Accepted
Moral Hazard x Financial Literacy → Investment Performance	-0.053	0.950	0.342	Rejected

Discussions

The Effect of Information Asymmetry on Investment Performance

Hypothesis testing results indicate that information asymmetry does not significantly affect investment performance ($\beta = 0.050$; $t = 1.210$; $p = 0.226$); thus, Hypothesis 1 is not supported. This finding suggests that, within the present sample and model, information asymmetry is not independently associated with investment performance at the 5% significance level. Theoretically, this result offers a perspective on Akerlof (1970) Information Asymmetry Theory. Although Akerlof posited that information imbalances can contribute to market inefficiencies and suboptimal decisions, the present finding suggests that the direct relationship between information asymmetry and investment performance may depend on other factors, including investors' ability to process and evaluate available information. In today's digital era, information flows rapidly through online platforms and social media; consequently, the challenge

may extend beyond information access to investors' ability to filter and evaluate available information (Gorzon et al., 2024). This finding can also be interpreted through the perspective of Behavioral Finance Theory, in which the interaction between information and cognitive processes influences investment decisions. Widespread digital access may reduce differences in information availability among millennial investors, meaning that information asymmetry alone may not be the primary differentiator of investment performance.

These results are consistent with Gorzon et al. (2024), who stated that, amid information overload, the quality of investment decisions is influenced more by the ability to manage behavioral biases than by information limitations alone. The findings are also consistent with Wendy (2024), who found that the quality of decisions made by Indonesian investors is determined more by financial literacy and risk perception, with more financially competent investors potentially better able to mitigate the negative effects of information asymmetry through evaluation. However, the present data do not directly measure whether respondents consistently verify information across digital channels, nor do they establish that millennial investors have successfully adapted to digital information environments.

The non-significant H1 result should therefore be interpreted narrowly: within this sample and model, information asymmetry was not independently associated with investment performance at the 5% significance level. The significant interaction tested in H3 indicates that this relationship varies with financial literacy, but the direction and form of that conditional relationship require simple-slope or conditional-effect analysis and, ideally, an interaction plot for a more specific interpretation. Thus, this study provides evidence that the quality and processing of information may be more relevant to investment performance than the mere presence of information asymmetry, although this mechanism should be examined directly in future research. These results are consistent with literature suggesting that information availability alone may be insufficient to explain investment outcomes under conditions of information overload (Gorzon et al., 2024). Wendy (2024) likewise emphasizes the relevance of financial literacy and risk perception in Indonesian investment decisions.

The Effect of Moral Hazard on Investment Performance

Hypothesis testing indicates that moral hazard does not significantly affect investment performance ($\beta = 0.100$; $t = 1.946$; $p = 0.052$); thus, Hypothesis 2 is not supported. This result suggests that, within the present sample and model, there is insufficient statistical evidence to conclude that moral hazard is directly associated with investment performance at the 5% significance level. Because the p-value is close to the conventional threshold, the result should not be interpreted as evidence that moral hazard is irrelevant or that it cannot influence investment performance. Rather, the study did not obtain sufficient statistical evidence for the proposed direct association in this sample. Theoretically, Information Asymmetry Theory Akerlof (1970) and Agency Theory Jensen & Meckling (1976) characterize moral hazard as a consequence of information imbalances and opportunistic behavior that may arise when decision-makers have incentives to act in ways that are not fully aligned with the interests of principals. However, the extent to which this construct affects individual retail investors' investment performance depends on how moral hazard is operationalized and whether the relevant principal-agent conditions are present at the individual investment level.

Based on Behavioral Finance Theory Barberis, individual investment decisions may be influenced by cognitive biases and analytical capacity in addition to institutional or agency-related factors. The increasing transparency of the Indonesian capital market, supported by OJK regulations and digitalization, may provide contextual conditions that limit certain opportunities for information-related or opportunistic behavior; however, these mechanisms were not directly measured in this study. This interpretation is broadly consistent with Healy & Palepu (2001) discussion of the role of transparency and disclosure in reducing information problems. Furthermore, Rehman & Mia (2024) emphasize the relevance of financial literacy and digitalization to modern investment decision-making. Gorzon et al. (2024) also demonstrate that behavioral biases, such as overconfidence and herding, can substantially influence investment decisions in digital environments. Nevertheless, the present study did not directly compare the explanatory power of behavioral biases with that of moral hazard. Therefore, these factors should

be treated as possible contextual explanations rather than empirical findings established by the current data. Overall, the results suggest that improving investment performance may require attention to financial literacy, risk management, and behavioral factors, while the role of moral hazard requires further investigation using more directly targeted measures of agency and opportunistic behavior.

Financial Literacy as a Moderating Variable of the Effect of Information Asymmetry on Investment Performance

Testing indicates that financial literacy significantly moderates the relationship between information asymmetry and investment performance ($\beta = 0.151$; $t = 3.934$; $p < 0.001$); thus, Hypothesis 3 is supported. This finding establishes the presence of a statistically significant interaction between information asymmetry and financial literacy in predicting investment performance. Theoretically, these findings provide an extension of Information Asymmetry Theory Akerlof (1970) by suggesting that the association between information asymmetry and investment performance is conditional on investors' financial literacy. From the perspective of Behavioral Finance Theory Barberis, financial literacy may be relevant to investors' ability to evaluate financial information and make decisions. This interpretation is also consistent with the OECD/INFE (2023) framework, which conceptualizes financial literacy through financial knowledge, behavior, and attitudes. However, without a reported simple-slope analysis, conditional-effect analysis, or interaction plot, the coefficient alone does not establish whether financial literacy strengthens or weakens the relationship at specific levels of the moderator, nor does it demonstrate a specific behavioral mechanism such as rational information processing, bias mitigation, or improved risk evaluation. Accordingly, financial literacy is interpreted here as a contingent moderator of the information asymmetry–investment performance relationship rather than as a proven mitigating mechanism.

Furthermore, Lusardi & Mitchell (2014) emphasize financial literacy as a form of human capital that can support financial evaluation and decision-making. Wendy (2024) also found that financial literacy among Indonesian investors is associated with risk perception and information-seeking behavior. In the digital era, Rehman & Mia (2024) highlight the importance of financial literacy in navigating information overload and misinformation. These findings provide a possible context for the contrast between the unsupported direct relationship in Hypothesis 1 and the significant interaction in Hypothesis 3; the relationship between information asymmetry and investment performance appears to be conditional on financial literacy in the present model. The practical implication is that regulators, such as the OJK and the IDX, may consider directing capital market education toward critical financial thinking, fundamental analysis, and the evaluation of digital information to support the quality of retail investors' decisions. This result is compatible with literature that conceptualizes financial literacy as human capital relevant to financial evaluation and decision-making Lusardi & Mitchell (2014) and with evidence linking financial literacy to investment decisions among Indonesian investors. Rehman & Mia (2024) also highlight the importance of financial literacy in contemporary financial environments. However, the specific conditional pattern of the interaction cannot be determined from the interaction coefficient alone. A more precise account of whether the relationship becomes stronger, weaker, positive, or negative at different levels of financial literacy requires additional conditional-effect analysis. For practice, the result supports continued attention to investor financial education, while the specific mechanisms through which financial literacy may influence investment performance should be tested in future studies.

Financial Literacy as a Moderating Variable of the Effect of Moral Hazard on Investment Performance

Results reveal that financial literacy does not significantly moderate the relationship between moral hazard and investment performance ($\beta = -0.053$; $t = 0.950$; $p = 0.342$); thus, Hypothesis 4 is not supported. While financial literacy significantly moderates the relationship involving information asymmetry in H3, no statistically significant moderating effect was observed for moral hazard in H4. Grounded in Information Asymmetry Theory Akerlof (1970) and Agency Theory Jensen & Meckling (1976), moral hazard may stem from principal–agent

conflicts and control over assets, which can involve conditions beyond the individual investor's direct control. From the perspective of Behavioral Finance Theory Barberis, financial literacy may enhance aspects of individual decision quality but does not necessarily resolve agency problems that lie beyond an investor's control.

These findings are consistent with Lusardi & Mitchell (2014), who conceptualize financial literacy as a form of human capital while recognizing that individual knowledge does not substitute for institutional and regulatory mechanisms. Rehman & Mia (2024) similarly highlight the importance of institutional and environmental factors in contemporary financial decision-making. The interaction between moral hazard and financial literacy was not statistically significant ($\beta = -0.053$; $t = 0.950$; $p = 0.342$); thus, Hypothesis 4 is not supported. Within the present model, financial literacy did not significantly condition the association between moral hazard and investment performance. Agency Theory and Information Asymmetry Theory offer possible explanations for why opportunistic behavior may involve institutional or principal-agent conditions that are not readily altered by individual financial knowledge; however, these institutional mechanisms were not directly measured in this study.

Furthermore, Healy & Palepu (2001) emphasize the importance of corporate disclosure and issuer transparency in addressing information and agency problems. For Indonesian millennial investors, high financial literacy does not necessarily protect them from poor governance practices. This provides a possible theoretical explanation for the finding that financial literacy is not a universal moderator across the two relationships examined. However, the present study does not directly test governance quality, issuer transparency, OJK oversight, IDX mechanisms, or Good Corporate Governance (GCG). These factors should therefore be treated only as possible explanations and directions for future research. The empirical contribution supported by the data is narrower: financial literacy significantly moderated the information asymmetry-investment performance relationship but did not significantly moderate the moral hazard-investment performance relationship, indicating that its moderating role is selective rather than universal.

CONCLUSION

This study analyzes the relationships of information asymmetry and moral hazard with the investment performance of millennial investors in Indonesia, with financial literacy serving as a moderating variable. The results indicate that neither information asymmetry nor moral hazard has a statistically significant direct association with investment performance. Information asymmetry was not significantly associated with investment performance ($\beta = 0.050$; $p = 0.226$), while moral hazard also did not reach statistical significance at the 5% level ($\beta = 0.100$; $p = 0.052$). Financial literacy significantly moderated the information asymmetry-investment performance relationship ($\beta = 0.151$; $p < 0.001$) but did not significantly moderate the moral hazard-investment performance relationship ($\beta = -0.053$; $p = 0.342$). Thus, the study's principal contribution is evidence that financial literacy operates as a selective rather than universal moderator across the two relationships examined.

The significant interaction involving information asymmetry suggests that the association between information asymmetry and investment performance is conditional on financial literacy; however, because the study does not report a simple-slope or conditional-effect analysis, the interaction should not be interpreted as proof that financial literacy necessarily strengthens or mitigates the relationship at specific levels of the moderator. Likewise, the non-significant direct effects should not be interpreted as evidence that information asymmetry or moral hazard is inherently irrelevant to investment performance. Rather, the findings indicate that the proposed direct relationships were not statistically supported within this sample and model. The cross-sectional design also does not establish historical shifts or causal change over time. Practically, the findings support continued attention to financial literacy in investor education while indicating that mechanisms associated with moral hazard may require separate investigation. Future research should employ longitudinal or experimental designs, report conditional-effect analyses for significant interactions, verify the moral-hazard measurement model, and examine additional behavioral and institutional variables, such as financial self-efficacy, risk tolerance, overconfidence, and digital financial literacy.

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AUTHOR CONTRIBUTION STATEMENT

All authors contributed to the conceptualization and development of the study, interpretation of the findings, and preparation of the manuscript. The authors participated in reviewing and revising the manuscript for important intellectual content. All authors read and approved the final version of the manuscript and agreed to be accountable for the integrity and accuracy of the work.

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