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Behavioral Biases, Financial Literacy, and Female Investors: the Role of Social Media

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ABSTRACT

The Indonesian capital market faces challenges in investor growth, particularly with low investment levels among women. Female investors lag behind men in both the number of investors and the value of investments. Despite an increase in the number of female investors, their investment values remain low, indicating limited active participation. This research aims to examine how financial literacy and behavioral biases influence Indonesian female investors decisions, with social media as a moderating variable. Using a sample of 126 female investors, the test was conducted with PLS-SEM. The results showed that regret aversion bias significantly negatively impacts female investors decisions, while financial literacy has a positive and significant effect. Overconfidence bias and herding behavior do not significantly influence investment decisions. Social media does not moderate the effects of these biases and financial literacy on investment decisions but could act as predictor moderation variable with significant positive impact on investment decisions.

Keyword: behavior bias; financial literacy; social media; women's investment decision

INTRODUCTION

Investment is a critical financial decision, involving the commitment of resources for future benefits. Investors seek returns through real assets like land and gold or financial assets such as deposits, stocks, and bonds.In Indonesia, the number of capital market investors has grown rapidly, tripling from 2.4 million in 2019 to 7.4 million in 2021. However, this growth slowed to 38% in 2022 and 5.5% in early 2023, with 10.8 million investors representing only 3.9% of the population as of April 2023. Despite the rise, stock investors remained just 1.5% of the population, lower than in other ASEAN countries (CNBC, 2022). From 2020 to 2023, men dominated Indonesian capital market investments, comprising 62.8% of investors and 80.5% of investment value as of April 2023. Women, while 37.2% of investors, held only 19.5% of the investment value. Although female investors increased by 172%, their investment value grew by just 59%, indicating limited active participation.

Despite these trends, some Indonesian women have achieved significant investment success, such as Ellen May educates on stock investment through social media and seminars, Dea Surjadi leads Golden Gate Ventures, and Melina Subastian is Principal of Investment at Alpha JWC Ventures. Finance Minister Sri Mulyani emphasizes the importance of

understanding investment fundamentals, showcasing the vital role women can play in Indonesia's investment landscape.

Investment decisions are crucial as they shape future financial plans. Rasheed et al. (2018) differentiate between rational investors, who base decisions on clear information and data, and irrational investors, who rely on instinct and feelings. Baker & Ricciardi (2014) emphasize that investment decisions are influenced by both financial analysis and psychological factors, with biases often impacting judgment.

Behavioral biases, systematic errors in judgment (Pompian, 2006), affect financial decisions. These biases are divided into cognitive biases, related to thinking processes, and emotional biases, related to feelings and emotions. Cognitive biases include overconfidence, representativeness, and anchoring, while emotional biases include endowment, self-control, and regret aversion.

This study focuses on overconfidence bias, regret aversion bias, and herding behavior. Overconfidence bias involves excessive confidence in one's abilities and underestimation of risks. Regret aversion bias leads to safer, conservative investments to avoid future regret. Women tend to show higher levels of regret aversion and herding behavior, which is the tendency to follow the majority's actions without independent evaluation (Salem, 2019; Hsu et al., 2021).

Financial literacy, as defined by OJK Regulation No. 76/POJK.07/2016, involves knowledge, skills, confidence, and attitudes that shape financial behavior and improve decision-making and management. High financial literacy helps in understanding investment products, managing risk, selecting goal-oriented instruments, and making rational decisions. The 2022 National Financial Literacy and Inclusion Survey (SNLIK) showed an increase in financial literacy to 49.68% (from 38.03% in 2019), while capital market literacy remained low at 4.11% (down from 4.92% in 2019), highlighting gaps in understanding financial concepts. Among Indonesian women, financial literacy rose from 36% in 2019 to 50% in 2022, with financial inclusion increasing from 75.1% to 83.9%, indicating greater use and understanding of financial products and risks, offering potential to boost female participation in the capital market.

Research on women's investment decisions reveals key insights. Hsu et al. (2021) found that women in Taiwan exhibit higher regret aversion bias than men, but financial literacy reduces these gender differences in biases. Studies by Almenberg (2015) show that women are generally more risk-averse and participate less in the stock market than men. However, with high financial literacy, both genders equally invest in risky assets. Increased financial literacy also decreases the likelihood of encountering behavioral biases (Rasool, 2020).

Women prefer investing in mutual funds, deposits, and gold, often diversifying their portfolios to minimize risk (Koti, 2019). Salem (2019) noted that women exhibit higher herding behavior and lower financial literacy, confidence, and risk tolerance than men, resulting in lower stock investments. Female entrepreneurs are generally risk-averse and conservative due to limited time and knowledge about investment products (Kappal & Rastogi, 2020; Baig et al., 2021).

Studies on Indonesian women’s investment decisions, such as Mahastanti (2014) and Winarta (2018), show that these decisions are influenced by family and close friends, leading to conservative, low-risk investments due to low financial literacy. Conversely, Susanto et al.

(2023) found that Indonesian doctoral students take higher risks than men, which contrasts with earlier studies.

Research by Yeh & Ling (2022), Fadli & Wijayanto (2020), Adil et al. (2022), Iram et al. (2023), and Weixiang et al. (2022) showed that financial literacy positively impacts investment decisions. However Ady (2019), and Arif (2015) found no such influence. Studies on overconfidence bias and herding behavior also show mixed results. Kartini & Nahda (2021) found both biases significantly affect investment decisions, whereas Bakar & Yi (2016) found only overconfidence bias to be significant. Ton & Dao (2014) found no significant effect of overconfidence bias, while Adil et al. (2022) found herding behavior negatively impacted investment decisions and overconfidence bias positively impacted male but not female investors.

Weixiang et al. (2022) and Suresh G (2021) concluded that overconfidence bias, regret aversion bias, and financial literacy significantly impact stock market investment decisions. Conversely, Ady & Hidayat (2019) found that financial literacy and regret aversion bias did not significantly affect investment decisions, while overconfidence bias did. Iram et al. (2021) found regret aversion bias insignificant but financial literacy significant in investment decisions. Overall, these studies suggest that financial literacy and behavioral biases like overconfidence, regret aversion, and herding behavior are crucial in shaping investment decisions, with financial literacy often mitigating the impact of biases.

In the digital era, social media has become crucial for exchanging investment and financial information. A 2022 Populix survey of 1,038 Indonesians revealed that 68% seek investment information via social media, primarily YouTube and Instagram (75% each). Other platforms include WhatsApp (38%), TikTok (37%), and Facebook (36%). Additionally, 42% use the OJK site, 40% consult friends or colleagues, 34% visit financial institution sites, and 32% follow influencer recommendations.

Social media impacts investment decisions by providing broader access to information, improving financial literacy, and reducing heuristic biases. However, it can also confuse investors and increase behavioral biases like herding bias. Despite its potential impact, no research has explored social media as a moderating variable between behavioral bias, financial literacy, and investment decisions. Previous studies, such as Junaidi (2023), indicate that social media and capital market literacy positively impact investor trading behavior. Social media significantly influences investment decisions (Junaidi, 2023; Subramanian, 2021; Abu-Taleb, 2021) and mediates the relationship between financial literacy and financial behavior (Khan & Ahmad, 2022). Yanto et al. (2021) highlighted social media's role in building financial literacy.

The role of social media in investment decision-making still requires further exploration, particularly in the context of its influence on behavioral bias and financial literacy. Therefore, this study introduces the novelty of social media as a moderating variable in the relationship between behavioral bias, financial literacy, and investment decisions, an aspect rarely explored. Additionally, it brings novelty by examining Indonesian female investors' investment decisions, offering new insights into this underrepresented group.

Overconfidence bias, where investors believe their decisions are superior, affects women's investment decisions, leading to higher risk-taking and overly optimistic assessments (Baker et al., 2019). Studies show overconfidence bias significantly impacts investment decisions (Kartini, 2021; Ady & Hidayat, 2019; Weixiang et al., 2022; Suresh, 2021; Iram et al., 2023). Therefore, the hypothesis is:

H1: Overconfidence bias significantly affects investment decision-making.

Regret aversion bias leads individuals to avoid decisions that might result in regret, opting for safer investments. Women often exhibit higher levels of this bias, resulting in conservative strategies (Pompian, 2006; Salem, 2019; Hsu et al., 2021). Research confirms regret aversion bias significantly influences investment decisions (Suresh, 2021). Thus, the hypothesis is:

H2: Regret aversion bias significantly affects investment decision-making.

Herding behavior involves following the majority's decisions without independent analysis, often leading to irrational decision-making. This can influence women to follow group actions. Studies show herding behavior significantly impacts investment decisions (Kartini, 2021; Suresh, 2021; Adil, 2021). Therefore, the hypothesis is:

H3: Herding behavior significantly affects investment decision-making.

Financial literacy involves understanding financial concepts and risks, essential for effective financial decision-making. Studies demonstrate that financial literacy significantly impacts investment decisions (Adil, 2021; Suresh, 2021; Yeh et al., 2021; Fadli et al., 2020; Weixiang et al., 2022; Iram et al., 2023). Thus, the hypothesis is:

H4: Financial literacy significantly affects investment decision-making.

Social media influences investment behavior by providing information and facilitating discussions. It can have positive effects by offering real-time information but can also negatively affect those who cannot critically analyze the information (Ismail et al., 2018). However, it can also have negative effects if users cannot critically analyze the information. Research by Junaidi (2023), Subramanian (2021), and Abu-Taleb (2021) shows that social media significantly influences investment decisions. This study aims to explore social media's moderating role in the relationship between behavioral biases and investment decisions, hypothesizing:

H5: Social media significantly affects investment decision-making.

H6: Social media moderates the influence of overconfidence bias on investment decision-making.

H7: Social media moderates the influence of regret aversion bias on investment decision-making.

H8: Social media moderates the influence of herding behavior on investment decision-making.

H9: Social media moderates the influence of financial literacy on investment decision-making.

By examining these hypotheses, this study seeks to provide insights into how social media interacts with behavioral biases and financial literacy to influence investment decisions among Indonesian women.

METHODS

This study employed purposive sampling to select Indonesian female investors who have been investing in the capital market for at least six months. This criterion ensures that respondents have sufficient investment experience and are not merely experimenting with investing. The study was conducted from November 2023 to February 2024, and data were collected through an online questionnaire distributed via personal WhatsApp messages, stock investor groups, and capital market study groups.

The sample size was determined based on the guidelines provided by Hair et al. (2013, 2017), which recommend that the minimum sample size for Structural Equation Modeling

(SEM) should be 5 to 10 times the number of indicators. With 26 indicators, the minimum required sample size was calculated as 26 × 5 = 125 respondents. A total of 134 responses were collected, but 8 responses were excluded as they did not meet the criteria (male respondents or those without investment experience). This resulted in a final sample of 126 valid respondents.

The study utilized quantitative data collected through structured questionnaires. The questionnaire consisted of five sections: demographic profile, financial literacy, behavioral biases (overconfidence bias, regret aversion bias, and herding behavior), social media usage, and investment decisions). Responses were measured using a Likert scale. The study focused on retail investors, who are individual investors using personal funds rather than institutional investors. This study was conducted in Indonesia, but no specific region was targeted, as the questionnaire was distributed online, allowing participation from female investors across different regions. The collected data were analyzed using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS-SEM) approach. The analysis was performed using SmartPLS 3.0 software, which is widely used for testing complex relationships between latent variables.

Table 1. Variables and Indicators

Variable	Operational Definition	Indicators	Source
Overconfidence bias	The tendency of individuals to be overly confident in their knowledge and abilities when considering investment risks (Baker et al., 2021).	Confidence in own opinion over financial analysts' opinions; Belief that personal investment performance is better than the market; Past investment success attributed to personal skills; Belief that personal skills and knowledge can outperform the market.	Baker et al. (2021)
Regret aversion bias	The tendency of investors to regret certain processes in investment decisions due to failure in providing expected returns (Talha et al., 2015).	Experience of investment losses; Feelings of regret when investing; Impact of loss experience on future investments.	Ady, Hidayat (2019)
Herding behavior	The tendency of individuals to follow the decisions and reactions of other investors (Baker et al., 2021).	Investment decisions influenced by other investors; Following social blogs/forums before buying stocks; Following other investors' reactions to stock price changes; Consulting family, friends, or colleagues before buying stocks.	Baker et al. (2021)
Financial literacy	The ability to manage funds to ensure growth and improve future well-being (Putri & Hamidi, 2019).	Budget planning; Banking knowledge (savings and loans); Insurance ownership; Investment portfolio.	Putri & Hamidi (2019)
Social media	Computer-based technology that facilitates the sharing of ideas, thoughts, and information through virtual networks and communities (Tandon, 2022).	Frequency of searching for investment information on social media; Investment decisions based on social media recommendations; Trust in financial experts on social media; Peer pressure on social media influencing investment decisions; Investment in companies with a good/strong image.	Abu-Taleb & Nilsson (2021)
Investment decision	Policy involving two or more investment alternatives with the expectation of future profits (Ady, 2019).	Allocation of part of monthly income for investments; Investment consideration; Willingness to spend all income on high-return investments; Investment based on quick and accurate calculations.	Ady, Hidayat (2019)

RESULT AND DISCUSSION

The characteristics of the respondents include age, education level, occupation, income, investment experience and frequency, and the percentage of income allocated to investments.

Table 2. Data Descriptions

Indicator	Explanation	Frequency	%
Age	18- 26 years old (Gen Z)	20	16
	27- 42 years old (Gen Millennial)	77	61
	43 - 58 years old (Gen X)	29	23
Education	Junior High School	1	1
	High schoolers	9	7
	D3	8	6
	Bachelor	88	70
	≥ Magister	20	16
Occupation	Private Employee	88	70
	Students	13	10
	Entrepreneur/Self employed	7	6
	Housewives	6	5
	Civil servants	4	3
	Others	8	6
Income	≤ Rp 5.000.000	25	20
	Rp 5.000.001 - Rp 15.000.000	72	57
	Rp 15.000.001 -Rp 25.000.000	15	12
	≥ Rp 25.000.000	14	11
Investment	0,5 - 3,5 years	74	59
Experience	4 - 7 years	24	19
	7,5 - 10,5 years	20	16
	14,5 - 17,5 years	5	4
	18 - 21 years	2	2
	21,5 - 24,5 years	1	1
Investment	1 - 7 times per month	107	85
Frequency	8 - 14 times per month	8	6
	15 - 21 times per month	4	3
	29 - 35 times per month	5	4
	36 - 42 times per month	1	1
	50- 56 times per month	1	1
Percentage of	1 - 11 %	66	52
Investment from	12 - 22 %	24	19
Income	23 - 33 %	15	12
	34 - 44 %	2	2
	45 - 55 %	13	10
	56 - 66 %	2	2
	67 - 77 %	2	2
	78 - 88 %	2	2
Source of Investment	Instagram	42	21
Information	WhatsApp	42	21
	YouTube	37	18
	Friend/Colleague	26	13
	TikTok	9	4
	Family	8	4
	Telegram	8	4
	Website/Business News	8	4
	Bank/Application	6	3
	Others	19	7

Source: Data is processed with Excel, 2024

The majority of respondents were millennials aged 27-42 years, comprising 61% of the total (77 respondents). Generation X (43-58 years) made up 23% (29 respondents), and Generation Z (18-26 years) accounted for 16% (20 respondents). Millennials dominated the sample due to their productive age, better financial status compared to Generation Z, and greater willingness to take investment risks compared to Generation X.

Regarding education, most respondents (70%) held a bachelor's degree (88 respondents), followed by 16% (20 respondents) with a master's degree or higher, 8% (10 respondents) with a high school education or equivalent, and 6% (8 respondents) with an associate degree (D3). The prevalence of bachelor's degree holders is consistent with current societal norms, where higher education levels increase investment knowledge and awareness.

In terms of occupation, 70% of respondents (88 respondents) were private employees, 10% (13 respondents) were students, 6% (7 respondents) were self-employed, 5% (6 respondents) were housewives, and 9% (12 respondents) were civil servants or held other professions. The dominance of private employees reflects the prevalent employment type in Indonesia.

Income-wise, 57% of respondents (72 respondents) earned between Rp 5,000,001 and Rp 15 million per month. Those earning ≤ Rp 5 million accounted for 20% (25 respondents), 12% (15 respondents) earned between Rp 15,000,001 and Rp 25 million, and 11% (14) earned ≥ Rp 25 million. The income distribution aligns with the predominance of millennials working as private employees.

Regarding investment experience, 59% of respondents had been investing for 0.5 to 3.5 years, 19% for 4 to 7 years, and 22% for ≥ 7.5 years, indicating a preference for long-term investment. All self-employed respondents had been investing for ≥ 10 years, reflecting their greater experience and risk tolerance. Investment experience showed that respondents with incomes < Rp 25 million predominantly invested for 0.5 to 3.5 years, while those with incomes ≥ Rp 25 million typically invested for 4 to 10.5 years, indicating higher income correlates with longer investment durations.

In terms of investment frequency, 85% of respondents invested 1 to 7 times per month, while 15% invested 8 to 50 times per month. When looking at the percentage of income allocated to investments, 52% of respondents invested 1 to 11% of their income, 19% allocated 12 to 22%, and 29% allocated 23 to 80%.

Most respondents obtained investment information from social media platforms, with Instagram and WhatsApp being the primary sources for 21% each, and YouTube for 18%. Information from friends and family accounted for 13% and 4%, respectively. There were generational differences in preferred social media platforms: Generation Z primarily used YouTube, Millennials preferred Instagram, and Generation X used WhatsApp. For self-employed respondents, friends and colleagues were the main sources of investment information rather than social media.

Table 3. Variables Descriptions

Indicator	Index	Criteria
Average index of variable Y (Investment Decision)	88,2	Moderate
Average index of variable X1 (Overconfidence Bias)	80,15	Moderate
Average index of variable X2 (Regret aversion Bias)	78,8	Moderate
Average index of variable X3 (Herding Behavior	73,8	Moderate
Average index of variable X4 (Financial Literacy)	97,15	High
Average index of variable Z (Social media)	73.52	Moderate

Source: Data is processed by Three Box Method, 2024

The average response regarding investment decisions was 88.2, indicating a moderate level and suggesting that female investor's decisions are not yet optimal. The lowest indicator, willingness to invest all income for higher returns, scored moderately, reflecting cautious behavior. Respondents typically allocate part of their income to diverse instruments, invest regularly and cautiously, conduct technical and fundamental analyses, seek references, understand investment tools, prefer low-risk and value investments, time their investments wisely, and align decisions with personal risk profiles. These responses highlight thoughtful, risk-conscious investing using surplus income.

The average response regarding overconfidence bias was 80.15, indicating a moderate level. Responses revealed mixed confidence levels: some respondents were confident in their investment decisions due to understanding risks, following financial advisors' advice, having relevant backgrounds, and thorough analysis. Others lacked confidence due to limited knowledge, reliance on intuition, or being conservative investors.

The average response regarding regret aversion bias was 78.8 indicating a moderate level. The highest indicator, experience of investment loss was high, showing that respondents had experienced losses. Other indicators, such as feeling regret while investing and the impact of past losses on future investments were moderate, suggesting that female investors remain interested in investing despite past losses. Responses revealed varied levels of fear in making investment decisions: some managed this fear by studying market trends, conducting regular evaluations, and consulting with knowledgeable friends, while others relied on conservative investments and careful financial management.

The average response regarding herding behavior was 73.8, indicating a moderate level. Responses showed that most respondents were not easily influenced by others due to past negative experiences, confidence in their own analysis, and awareness of personal investment styles and risk profiles.

The average response regarding financial literacy was 97.15, indicating a high level. Responses indicated that most respondents felt they had good financial literacy, often tracking income and expenses, engaging in financial planning, and having relevant educational and experiential backgrounds. However, some acknowledged needing more knowledge in specific areas like risk calculation and financial management.

The average response regarding social media was 73.52 indicating a moderate level. Responses indicated social media primarily as an information source to track the latest investment trends and global news that may affect stock prices, monitor market trends, follow bond offerings, and analyze fundamental reviews from experts to gain insights for decision-making. Additionally, they follow credible investment accounts, engage in discussion forums, learn from others' experiences, seek reliable content that teaches proper techniques, and avoid FOMO-driven decisions.

Convergent validity was assessed using outer loading values, with a threshold of greater than 0.60. The correlation between constructs and their respective variables met this standard, indicating that the indicators for each variable can be used as valid representatives of the research variables after the second convergent validity test.

Table 4. Convergent Validity Test

Indikator	Mod 1	Mod 2	Mod 3	Mod 4	Over (OB)	Regret (RAB)	Herd (HB)	Finlit (FL)	Inv (ID)	Sosmed (SM)
Mod 1 (OB*SM)	1,172									
Mod 2 (RAB*SM)		1,031								
Mod 3 (HB*SM)			1,097							
Mod 4 (FL*SM)				0.915						
X12					0.769					
X13					0.789					
X14					0.899					
X22						0.829				
X23						0.930				
X33							0.763			
X34							0.973			
X42								0.817		
X43								0.776		
X44								0.786		
Y1									0.776	
Y2									0.832	
Y4									0.764	
Z1										0.867
Z2										0.747
Z3										0.742

Source: Processed data using Smart PLS 3, 2024

Table 5. Average Variance Extracted (AVE) and Composite Reliability

Variabel	AVE	Composite Reliability
Mod 1 (Over*Sosmed)	1,000	1,000
Mod 2 (Reg*Sosmed)	1,000	1,000
Mod 3 (Herd*Sosmed)	1,000	1,000
Mod 4 (Finlit*Sosmed)	1,000	1,000
Overconfidence Bias	0.674	0.860
Regret Aversion Bias	0.776	0.874
Herding Behavior	0.764	0.865
Finance Literacy	0.629	0.836
Investment Decision	0.627	0.834
Social Media	0.620	0.830

Source: Processed data using Smart PLS 3, 2024

Discriminant validity was measured using AVE values for each construct, with a standard threshold of above 0.50. All variables met this standard, indicating that the validity test using AVE for each variable satisfied the requirements for research data validity. Reliability was evaluated using composite reliability values, with a criterion of greater than 0.70. Each variable achieved a value above this threshold, suggesting that all research variables are reliable. This implies that the variables in this study are consistent and dependable.

The R-Square value for investment decisions was 0.349, indicating that 34.9% of the variance in investment decisions is explained by the independent variables in the model. The remaining 65.1% is influenced by other factors not included in this research model.

Table 6. Test for Independent and Moderation Variables on Dependent Variables

Variables	Original Sample (O)	T Statistics (|O/STDEV|)	P Values	Result
Over -> Inv	0.133	1,174	0.241	Rejected
Regret -> Inv	-0.277	3,207	0.001	Accepted
Herd -> Inv	0.077	0.647	0.518	Rejected
Finlit -> Inv	0.321	3,432	0.001	Accepted
Sosmed -> Inv	0.207	2,251	0.025	Accepted
Mod 1 -> Inv	0.051	0.476	0.634	Rejected
Mod 2 -> Inv	0.138	1,466	0.143	Rejected
Mod 3 -> Inv	-0.180	1,635	0.103	Rejected
Mod 4 -> Inv	-0.081	0.706	0.481	Rejected

Source: Processed data using Smart PLS 3, 2024

Table 6 shows that H1 is rejected, implying no significant effect of overconfidence bias on investment decisions (p-value = 0.241). Meanwhile, H2 is accepted, indicating that regret aversion bias negatively affects investment decisions (p-value = 0.001). H3 is rejected, meaning that herding behavior does not significantly influence investment decisions (p-value = 0.518). H4 is accepted, showing that financial literacy positively impacts investment decisions (p-value = 0.001). H5 is also accepted, indicating that social media significantly influences investment decisions (p-value = 0.025). The moderation effects of the other variables (Mod 1, Mod 2, Mod 3, Mod 4) on investment decisions were insignificant (p-values > 0.05), suggesting these variables do not significantly impact investment choices, contradicting H6, H7, H8 and H9. These results highlight that while financial literacy and social media play important roles in shaping investment decisions, overconfidence bias, herding behavior, and the other moderator variables do not have significant effects.

In this study, the relationship between overconfidence bias and investment decisions showed a positive but not significant value. This result contrasts with findings by Kartini (2021), Ady and Hidayat (2019), Suresh (2021), and Iram et al. (2023), which indicated a significant impact of overconfidence bias on investment decisions. However, it aligns with Ton and Dao (2014), suggesting that overconfidence bias does not affect investment decisions. This also corroborates Adil (2021), who found no significant impact of overconfidence bias on female investors' decisions. Confidence is subjective and varies per individual, explaining why overconfidence bias might not influence investment decisions.

The respondents were primarily millennials (61%) aged 27-42 and Generation X (23%) aged 43-58, with 41% having over four years of investment experience, indicating that older, more experienced investors are less influenced by overconfidence bias. Mature investors manage emotions better, while younger investors are more prone to overconfidence. Experience boosts confidence, as knowledgeable investors feel more responsible for their decisions. Educationally, 70% held a bachelor's degree and 16% a master's, suggesting that higher education reduces overconfidence by promoting cautious decision-making. Middle-income respondents, earning Rp 5,000,001 to Rp 15,000,000 (57%), showed less overconfidence bias, aligning with findings that high-income investors are more prone to it (Elizabeth, 2020). Most respondents, being middle- or lower-income, invested cautiously,

allocating only 1-11% of their income and investing 1-7 times monthly. The moderate overconfidence bias index indicates that respondents did not exhibit excessive confidence. Adil (2021) noted that financial literacy lowers overconfidence, as female respondents demonstrated confidence due to thorough analysis, reflecting sufficient financial literacy.

Regarding regret aversion bias, the study found a significant negative relationship with investment decisions, indicating that higher regret aversion bias reduces investment decisions. This aligns with Weixiang et al. (2022), Suresh (2021), and Kengatharan and Kengatharan (2014). The dominance of millennials and Generation X respondents supports the notion that older generations with more experience exhibit regret aversion in investment decisions. Millennial's fear repeating past losses. Tang (2023) found no regret aversion bias among young Indonesian investors (Generation Z), who are influenced by peer opinions and social status.

Respondent's characteristics, dominated by those with a bachelor's degree (70%), with 0.5-3.5 years of investment experience and a monthly investment frequency of 1-7 times, allocating 1-11% of their income, indicate a lack of confidence and experience, leading to regret aversion bias in investment decisions. Private employees (70%) displayed regret aversion bias, likely due to dependence on their jobs for income and lack of financial freedom, fearing poor investment outcomes. Middle-income respondents also showed regret aversion bias, as they still need funds for daily life, fearing regret from unsuccessful investments. With an average regret aversion bias index at a moderate level, the high score on the indicator for past investment loss experiences suggests that respondents exhibit significant regret aversion. Hsu et al. (2021) found that Taiwanese female investors exhibit higher regret aversion bias. Weixiang (2022) noted that regret aversion causes investors to regret specific investment decisions. Most female respondents feared making wrong decisions, opting for low-risk investments, indicating significant regret aversion.

Regarding herding behavior, the study showed a positive but insignificant relationship with investment decisions. This contradicts Kartini (2021), Weixiang et al. (2022), Suresh (2021) and Adil (2021), who found a significant impact of herding behavior. However, it aligns with Bakar and Yi (2016), Ton and Dao (2014) and Alquraan et al. (2016), indicating no significant impact. Indonesian women investors showed no herding behavior, contrary to Mahastanti (2014) and Winarta (2018), who found that family and friends influenced Indonesian women's investment decisions, indicating a shift in behavior over time.

The dominance of millennials (61%) and Generation X (23%) respondents, with 41% having over four years of investment experience, supports findings that older, experienced investors are less influenced by herding behavior. Usriyono (2023) found that herding behavior does not significantly affect Indonesian millennials' investment decisions. Baker et al. (2018) found that older investors are less likely to seek references from others. Shusha and Touny (2016) showed that more experienced investors are less prone to herding behavior, making decisions more carefully. Respondent's characteristics, with 70% having a bachelor's degree and 16% a master's degree, indicate that higher education levels reduce herding behavior. Shusha and Touny (2016) found that education negatively impacts herding behavior, with higher-educated investors making more informed decisions. Private employees (70%) with non-finance-related jobs tend to exhibit higher herding behavior due to limited investment understanding (Elizabeth, 2020; Sarkar and Sahu, 2018). The study by Shusha & Touny (2016) found that investors with upper-middle income are more likely to exhibit herding behavior compared to those with lower-middle income. The herding behavior index

of 73.8, with the lowest indicator being influenced by other investors' decisions (68), suggested respondents were not heavily influenced by others. Bakar and Yi (2016) stated that most investors do not follow market trends blindly. Respondents are not easily influenced due to past losses when following others' advice, understanding that each person's analysis and risk profile differ, and knowing how to analyze stocks (fundamental and technical) before making investment decisions. Female investors tend to be cautious and avoid following the actions of other investors in their decision-making.

Regarding financial literacy, the study found a significant positive relationship with investment decisions. This aligns with Yeh et al. (2021), Fadli et al. (2020), Weixiang et al. (2022), Suresh (2021), Adil (2021), Iram et al. (2023), and Iram et al. (2021). Higher financial literacy helps female investors make better-informed decisions, understanding financial products, strategies, and risks.

The dominance of millennials (61%) and Generation X (23%) respondents with over four years of investment experience indicates good financial literacy. Shaari et al. (2013) found that age affects financial literacy, with younger individuals having lower literacy due to limited financial experience. Respondents' characteristics, with 70% having a bachelor's degree and 16% a master's degree, indicate higher financial literacy. Higher education levels correlate with better financial literacy, impacting investment decisions positively. Most respondents (70%) were private employees with limited investment experience located at Jakarta, Tangerang, Semarang. Urban location likely contributed to higher financial literacy. Respondents with average monthly incomes of Rp 5,000,001 to Rp 15,000,000 (57%) showed good financial literacy. Suresh (2021) stated that financial literacy improves investors' knowledge, aiding in better stock selection and risk management. Most female respondents reported adequate financial literacy, utilizing resources like financial planning, seminars, and social media for investment education.

Regarding social media, the study found a significant positive relationship with investment decisions. This aligns with Junaidi (2023) and Abu-Taleb (2021), who found social media significantly impacts investment decisions. Subramanian (2021) noted that social media content affects users, particularly in financial investments. The dominance of millennials (61%) indicates that technology-savvy individuals utilize social media for investment decisions. Aziz (2016) found a positive relationship between attitudes toward social media use and behavioral intention, with age influencing this connection. Younger consumers use social media more intensively, while social network size decreases with age. Millennials, being the first to adopt social media as their primary communication tool, are more easily influenced by it in both professional and personal contexts. Respondent’s characteristics, with 70% having a bachelor's degree and 16% a master's degree, suggest higher education correlates with social media use in investment decisions. Aziz (2016) found a positive relationship between attitudes toward social media use and behavioral intention, with education acting as a moderating factor. Highly educated consumers tend to use social media more intensively for communication and view information-oriented platforms like online forums as offering greater connectivity benefits. Most respondents (70%) were private employees, supporting findings that higher education levels correlate with social media use for investment decisions due to better access to relevant information and resources. Middle-income respondents (57%) used social media for investment information, indicating its role in accessible, relevant investment guidance. The social media variable index is moderate, averaging 73.52. The highest score, 91.4, is for investing in companies with a good social media image, while the lowest, 59.4, is for Peer

Influence, indicating respondents prefer using social media for personal analysis over following others. Abu Taleb (2021) highlights the importance of online information for investment decisions, especially due to social media's accessibility and real-time updates. Most respondents, primarily millennial women with higher education and moderate income, use social media for learning analysis, gathering news, and following credible accounts.

This study also provides novelty by demonstrating that social media plays a significant role in investment decisions but does not function as a moderator. Instead, it acts as a direct influencing factor, suggesting that female investors utilize social media primarily as an information source rather than as a behavioral reinforcement tool.

This study found that social media does not significantly moderate the effects of overconfidence bias, regret aversion bias, herding behavior, and financial literacy on investment decisions. Despite its significance as a predictor, social media doesn't impact how these factors influence decisions, possibly due to concerns over the accuracy of social media information. Kumari (2017) stated that people do not fully trust social media information and rely on other sources for investment decisions due to confusion, criticism, increased risk, and irrationality. Supported by strong financial literacy, these cautious investors rely more on personal analysis than on social media. Murthi (2023) similarly notes that robo-advisors, a type of social media technology, do not moderate overconfidence bias as investors prefer making decisions independently.

CONCLUSIONS

This study provides empirical evidence on the role of behavioral biases, financial literacy, and social media in shaping female investors' decision-making. The study found that regret aversion bias negatively impacts investment decisions, while financial literacy and social media positively impact investment decisions. Overconfidence bias and herding behavior did not significantly influence investment decisions in this study. However, social media does not significantly moderate the influence of behavioral biases and financial literacy on investment decisions; instead, it serves as a predictor moderation, introducing novelty in understanding social media's role in investment behavior. This suggests that female investors use social media primarily as an informational tool rather than as a factor that amplifies behavioral biases. This perspective provides new insights into the digital transformation of investment behavior and calls for further research into how social media can be leveraged for financial education.

The theoretical implications of this research contribute to management science by highlighting that one of the factors influencing women's investment decisions is the irrational behavioral bias of regret aversion. This fear of making suboptimal decisions leads female investors to adopt more conservative investment strategies, choosing more stable and conservative financial instruments like bonds and money market mutual funds over riskier options like stocks. This behavior affects the value of Indonesian women's investments in the capital market. The study supports Prospect Theory, which suggests that individuals faced with two choices tend to be risk-averse and choose safer options to avoid future regret. Risk-averse individuals make decisions based on their own evaluations of profit and loss prospects, lacking excessive confidence and not following others' opinions. This is evidenced by the study's findings that investment decisions are not influenced by overconfidence bias and herding behavior.

The practical implications of this study are directed towards female investors and market investment consultants. Understanding psychological biases and the role of social media can help financial advisors and investors make more informed, rational investment decisions, contributing to more effective investment strategies and financial planning. Higher financial literacy and cautious use of social media can mitigate the impact of psychological biases, promoting better investment outcomes. Investors should improve financial literacy through education and experience to enhance decision-making capabilities. Utilizing social media for up-to-date information can aid in better investment choices, but caution is advised to avoid misinformation. Addressing regret aversion bias through education and experience can help investors make more rational decisions. Recognizing that overconfidence does not significantly affect their investment decisions can help them avoid emotional traps and focus on thorough analysis and objective assessment of investment opportunities. This can reduce the risk of errors and lead to better long-term investment decisions. Utilizing financial technology can assist female investors in conducting more structured investment analyses. Understanding that herding behavior does not significantly affect the market in the short term allows them to focus more on fundamental research and analysis, avoiding the pressure to follow the crowd, which may not always yield optimal results. This enables female investors to maintain greater control over their investment portfolios and improve their chances of achieving long-term financial goals. Financial advisors should tailor strategies considering investors' psychological biases and social media's role in modern investment behavior.

The limitations of this study include that social media has not been able to act as a moderating variable for the influence of overconfidence bias, regret aversion bias, herding behavior, and financial literacy on investment decisions. This may be due to respondent's understanding of behavioral biases and questionnaire items, as well as the measurement of the social media variable. Data collection was conducted online using Google Forms distributed through WhatsApp, Telegram, and other means, which may have led to respondent's limited understanding of behavioral bias variables and questionnaire items. Additionally, researchers could not provide direct assistance to respondents, which might have led to questions during the questionnaire completion process. Although social media did not act as a moderating variable, it may serve as an intervening or control variable. Overconfidence bias and herding behavior did not influence the investment decisions of female investors. However, behavioral bias has other proxies.

Future research agendas include re-testing the proposed model with direct explanations to respondents filling out the questionnaires for better understanding, examining social media as an intervening or control variable in the influence of behavioral biases and financial literacy on investment decisions, and testing other proxies of behavioral bias, such as representativeness, anchoring and adjustment, cognitive dissonance, availability, self-attribution, illusion of control, conservatism, ambiguity aversion, mental accounting, confirmation, hindsight, recency, and framing biases, as well as endowment, self-control, optimism, loss aversion, and status quo bias, as independent variables on the investment decisions of Indonesian women. Additionally, cross-country studies may help examine cultural influences on these behavioral factors.

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