



The Moderating Role of Financial Literacy and Gender on The Effect of Overconfidence And Present Bias on MSME Financial Decision-Making In Bandung City, Indonesia

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Abstract

Background. Behavioral finance research has so far focused largely on capital-market investors in developed countries, while understanding of how overconfidence and present bias shape the financial decisions of Micro, Small, and Medium Enterprise (MSME) owners in developing countries particularly the protective role of financial literacy and gender as moderators remains limited and yields inconsistent findings across contexts.

Aims. This study addresses that gap by examining the effect of overconfidence and present bias on financial decision-making among 388 MSME owners in Bandung City, Indonesia, with financial literacy and gender as moderating variables.

Methods. Using Moderated Regression Analysis (MRA), the results show that overconfidence ($\beta = -0.324$, $p < 0.001$) and present bias ($\beta = -0.581$, $p < 0.001$) both have a significant negative effect on the quality of financial decision-making.

Result. Financial literacy moderates the effect of overconfidence ($\beta = -0.026$, $p = 0.035$) but does not moderate the effect of present bias ($p = 0.999$) a pattern that contrasts with some findings among individual investors in Pakistan and Saudi Arabia. Gender is not found to moderate either relationship ($p > 0.05$), diverging from the classic finding of Barber and Odean (2001) in the United States investor context.

Conclusion. These findings indicate that the effectiveness of financial literacy as a protective factor is bias-specific rather than bias-general, with important implications for the design of financial literacy interventions for the MSME sector in developing countries.

Keywords: Overconfidence, Present Bias, Financial Decision-Making, Financial Literacy, Gender, MSME, Behavioral Finance



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INTRODUCTION

Background and Research Urgency

Micro, Small, and Medium Enterprises (MSMEs) contribute 61.07% to Indonesia's GDP and absorb 97% of the workforce, yet the MSME failure rate remains high, reaching 60% within the first five years of operation. One explanation that has received growing attention in the literature is that this failure is not solely a matter of limited capital or market access, but also a matter of the quality of financial decision-making, which is influenced by the cognitive and emotional biases of business owners (Kahneman & Tversky, 1979).

Two biases that have been most widely studied in this context are overconfidence and present bias. Recent research continues to confirm the relevance of both: Bawalle et al. (2025) found that overconfident investors in Japan were more prone to panic selling during market downturns, even when their financial literacy was high a finding that challenges the conventional assumption that financial literacy is always protective. Balasubramanian and Sargent (2020) also showed that overconfidence can override rational decision-making processes even when individuals possess adequate financial knowledge.

However, most empirical evidence on cognitive bias and the moderating role of financial literacy comes from the context of individual investors in capital markets in developed countries or in the Middle East and South Asia (Adil et al., 2022; Ahmad & Shah, 2022; Ahmed et al., 2022). Studies at the MSME level in developing countries where business owners are simultaneously the sole decision-makers with limited resources to correct bias remain scarce. This is a significant gap, given that the MSME context is structurally different from the capital-market investor context: decision time horizons are shorter, financial stakes are more personal, and access to professional financial advisors is far more limited.

A second gap lies in inconsistent findings regarding the effectiveness of financial literacy as a moderator. Prasetyo et al. (2023) found that financial literacy negatively and significantly moderates the effect of overconfidence and herding bias on investment decisions, whereas Hussain et al. (2023), in the context of Pakistani investors, found a positive and significant moderation direction for the relationship between herding bias and loss aversion. Other research has even found that financial literacy does not significantly moderate the effect of disposition effect, herding, and overconfidence on investment decisions at all. This inconsistency indicates that the protective role of financial literacy is likely contextual and bias-specific rather than universally applicable, a hypothesis that has not been widely tested

explicitly within a single study comparing moderation effects across more than one type of bias simultaneously.

This study responds to both gaps through three main contributions. First, it shifts the unit of analysis in behavioral finance from capital-market investors to MSME owners in developing countries, a structurally different yet understudied context. Second, it directly tests within a single model whether financial literacy moderates overconfidence (a cognitive bias) and present bias (a more affectively/time-preference-laden bias) differently, providing more decisive empirical evidence for the bias-specific moderation hypothesis than previous studies, which generally test only a single type of bias. Third, it examines the role of gender as a moderator in the Indonesian MSME context, offering a point of comparison to the classic finding of Barber and Odean (2001), which was derived from the U.S. retail investor context more than two decades ago.

Research Contribution

Theoretically, this study extends the behavioral finance literature to the still underexplored context of MSMEs in developing countries and provides empirical evidence of the bias-specific moderation of financial literacy, a nuance that has thus far been discussed less explicitly in a literature that tends to treat financial literacy as a generally protective factor. Practically, these findings provide guidance for MSME support institutions and financial institutions in designing interventions tailored to the type of bias to be addressed, rather than generic financial literacy programs.

LITERATURE REVIEW

Behavioral Finance Theory and Bounded Rationality

Kahneman and Tversky (1979), through Prospect Theory, showed that individual decisions are influenced by framing, loss aversion, and mental accounting rather than pure expected utility. Simon (1957) complemented this with the concept of bounded rationality — limited cognitive capacity forces individuals to use heuristics that, while efficient, are prone to producing systematic biases. A recent bibliometric study of more than 7,000 Scopus articles spanning 40 years confirms that overconfidence and loss aversion remain foundational themes that have become integrated into the standard body of literature, while financial literacy, FinTech, and ESG have become rapidly growing frontier research themes since the late 2010s.

Overconfidence Bias: Cross-Context Evidence

Overconfidence manifests in overestimation, overplacement, and overprecision (Moore & Healy, 2008). Barber and Odean (2001) showed that overconfidence is associated with excessive trading frequency and lower returns among U.S. retail investors. In a more diverse context, Ahmad and Shah (2022) found that heuristic-driven overconfidence bias affects the quality of investment decisions in Pakistan, with risk perception as a mediator and financial literacy as a moderator. However, the direction of overconfidence's effect on decision quality is not always consistent Adil et al. (2022) and Ahmad (2021) found that overconfidence has a significant positive effect on investment decisions, whereas in the MSME context, Benayad and Aasri (2023) in Morocco found that overconfidence among MSME managers instead has a negative effect on investment decision quality, consistent with the argument that the shorter horizon of small businesses is more vulnerable to the negative consequences of this bias compared with trading in liquid markets.

Present Bias and Time Preference

Present bias causes inconsistent time preferences, in which individuals are more patient for trade-offs far in the future but impatient for trade-offs occurring today versus tomorrow (O'Donoghue & Rabin, 1999). Meier and Sprenger (2010) linked present bias to low savings and excessive debt accumulation. In the MSME context, present bias is conceptually distinct from overconfidence: overconfidence is a belief distortion that can be corrected with additional information, whereas present bias is a preference distortion that is more affective in nature and is expected to be more resistant to interventions based on knowledge alone (Thaler & Sunstein, 2008).

Financial Literacy as a Moderator: Contextual Effectiveness

Financial literacy is defined as a combination of awareness, knowledge, skills, attitudes, and behaviors needed to make sound financial decisions (OECD, 2013; Huston, 2010). Van Rooij et al. (2011) showed that individuals with high financial literacy make better investment decisions. However, recent evidence shows that this effectiveness is not uniform across types of bias. Adil et al. (2022) found that financial literacy moderates the relationship between behavioral bias and investment decisions, but Prasetyo et al. (2023) found a negative-significant moderation direction for overconfidence and herding bias, contrary to Hussain et al. (2023), who found a positive-significant moderation for herding bias and loss aversion in

the individual investor context in Pakistan. Other studies have even found that financial literacy does not significantly moderate the effect of disposition effect, herding, and overconfidence on investment decisions at all. This cross-study inconsistency underlies the argument that the moderating effectiveness of financial literacy is likely bias-specific: effective for biases rooted in belief distortion (cognitive), but less effective for biases rooted in time-preference distortion (affective).

Gender in Financial Decision-Making

Barber and Odean (2001) found that male investors were more overconfident than female investors in the U.S. retail investor context of the late 1990s. However, generalizing this finding to other contexts requires re-examination. Croson and Gneezy (2009) argued that gender differences in economic decision-making are inconsistent across contexts and tasks and are strongly influenced by local social environments and incentive structures. More recent research on the generational theory of behavioral biases (Altaf & Jan, 2023) further shows that patterns of behavioral bias may be more strongly influenced by generational and socioeconomic factors than by gender alone.

Hypothesis Development

H1: Overconfidence has a negative effect on financial decision-making among MSME owners in Bandung City.

H2: Present bias has a negative effect on financial decision-making among MSME owners in Bandung City.

H3: Financial literacy moderates the effect of overconfidence on financial decision-making among MSME owners in Bandung City.

H4: Financial literacy moderates the effect of present bias on financial decision-making among MSME owners in Bandung City.

H5: Gender moderates the effect of overconfidence on financial decision-making among MSME owners in Bandung City.

H6: Gender moderates the effect of present bias on financial decision-making among MSME owners in Bandung City.

The conceptual framework of this study positions overconfidence and present bias as independent variables affecting financial decision-making (the dependent variable), with financial literacy and gender as moderating variables tested in parallel on both effect pathways.

METHOD

Research Design and Context

This study uses a quantitative explanatory approach with a cross-sectional design. Bandung City was selected because it is one of Indonesia's largest centers of the creative economy and MSMEs, with more than 200,000 MSME units across sectors (culinary, fashion, services, trade, and crafts), making it representative for examining the phenomenon of cognitive bias in MSME financial decision-making in a developing country.

Population, Sample, and Procedure

The population consists of MSME owners in Bandung City (approximately 200,000 units). The sample size was determined using the Slovin formula (5% margin of error), yielding a minimum target of 400 respondents; anticipating non-response, 450 questionnaires were distributed via simple random sampling. Respondent criteria: having operated the business for at least 2 years and being actively involved in the business's financial decision-making. After screening, 388 valid questionnaires were processed (response rate 86.2%). Respondent profile: 62.4% male, 37.6% female; the majority aged 31–40 years (45.6%); the largest sectors were culinary (32.5%) and fashion (24.3%). This unbalanced gender composition (a ratio of roughly 5:3) is a relevant methodological note and is discussed further in the limitations section, given its implications for the statistical power to detect gender moderation effects.

Variables and Measurement

Overconfidence (X1, 10 items, adapted from Hayward et al., 2006; Moore & Healy, 2008) measures overestimation, overplacement, and overprecision. Present bias (X2, 15 items, adapted from Meier & Sprenger, 2010) measures inconsistent time preference. Financial decision-making (Y, 15 items, adapted from Gibson, 2000) measures the quality of investment, financing, and working-capital decisions. Financial literacy (Z1, 10 items, adapted from Huston, 2010; OECD, 2013). Gender (Z2) is coded as a dummy variable (0 = female, 1 = male). All items except gender use a 1–5 Likert scale.

Analysis Technique: Moderated Regression Analysis

The analysis uses MRA with three hierarchical models:

$$\text{Model 1: } Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + e$$

$$\text{Model 2: } Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 Z_1 + \beta_4 Z_2 + e$$

$$\text{Model 3: } Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 Z_1 + \beta_4 Z_2 + \beta_5 (X_1 \times Z_1) + \beta_6 (X_2 \times Z_1) + \beta_7 (X_1 \times Z_2) + \beta_8 (X_2 \times Z_2) + e$$

Prior to regression analysis, validity (Pearson correlation), reliability (Cronbach's Alpha), and classical assumption tests (Kolmogorov–Smirnov normality, linearity, multicollinearity via Tolerance/VIF, and heteroscedasticity via scatterplot) were conducted. Predictor and moderator variables were mean-centered prior to forming interaction terms to reduce structural multicollinearity, following the standard procedure of Aiken and West (1991) for moderated regression analysis.

DISCUSSION

Instrument and Classical Assumption Tests

All items were valid ($r\text{-count } 0.437\text{--}0.917 > r\text{-table } 0.0996$) and reliable (Cronbach's Alpha: Overconfidence 0.917; Present Bias 0.915; Financial Decision-Making 0.904; Financial Literacy 0.802). Classical assumption tests were satisfied: normality (Kolmogorov–Smirnov $p=0.151$), linearity (Deviation from Linearity $p>0.05$ for all variables), no multicollinearity (Tolerance 0.347–0.895; VIF 1.117–2.882), and no heteroscedasticity (randomly scattered scatterplot).

Moderated Regression Analysis Results

Model 1 (direct effects): $F=317.066$ ($p<0.001$), $R^2=0.622$. Model 2 (with moderators): $F=178.299$ ($p<0.001$), $R^2=0.650$. Model 3 (with interactions): $F=90.299$ ($p<0.001$), $R^2=0.657$. The increase in R^2 from Model 2 to Model 3 ($\Delta R^2=0.007$) is small in absolute terms but consistent with the typical range of interaction effect sizes in non-experimental field studies (McClelland & Judd, 1993), which structurally tend to produce smaller ΔR^2 values than laboratory experimental studies.

Hypothesis	Coefficient	t-value	Sig.	Decision
H1: OC → FDM	-0.324	-5.860	0.000	Significant
H2: PB → FDM	-0.581	-15.850	0.000	Significant
H3: OC×FL → FDM	-0.026	2.113	0.035	Significant
H4: PB×FL → FDM	-0.000	0.002	0.999	Not Significant
H5: OC×G → FDM	-0.021	0.182	0.856	Not Significant
H6: PB×G → FDM	-0.013	0.184	0.854	Not Significant

Positioning the Findings within the Global Literature

Overconfidence and Present Bias: Why Present Bias Has a Stronger Impact

The finding that overconfidence ($\beta=-0.324$) and present bias ($\beta=-0.581$) have a significant negative effect is consistent with Barber and Odean (2001) and Balasubramnian and Sargent (2020). More interesting to explore, however, is the difference in effect magnitude: the present bias coefficient is almost twice that of the overconfidence coefficient. We propose two complementary explanations for this pattern. First, a decision-frequency-based explanation. Overconfidence in MSMEs tends to manifest in large, episodic decisions such as business expansion decisions, taking on large debt, or investing in fixed assets which occur relatively rarely within the MSME operational cycle. Present bias, by contrast, affects recurring, daily cash-allocation decisions: how much profit to withdraw for personal consumption versus reinvest, when to delay payments to suppliers, or when to postpone the purchase of productive assets. Because these small but repeated decisions accumulate over time, the cumulative impact of present bias on overall financial decision quality becomes larger than that of overconfidence, which arises at rarer, larger decision moments.

Second, an explanation based on psychological mechanisms drawing on dual-process theory (Kahneman, 2011). Overconfidence is fundamentally a failure of metacognitive calibration an individual can consciously be made to question their beliefs when presented with explicit evidence or an analytical framework, because the core problem lies in a mistaken estimate rather than in conflicting motivations. Present bias, by contrast, involves a conflict between the visceral affective system that responds to immediate rewards (the "hot" system) and the deliberative system that weighs long-term consequences (the "cold" system) (Loewenstein, 1996). This hot–cold conflict is inherently more difficult to resolve simply by providing additional information, because the problem is not a lack of knowledge but the strength of the affective impulse itself at the moment the decision is made. This pattern also helps explain why the magnitude of present bias's effect is much larger: its resistance to cognitive correction makes its impact on decision quality harder to dampen by other factors in the model, including financial literacy itself, as discussed in the following subsection.

Financial Literacy Moderation: When Knowledge Is Enough, and When It Is Not

The finding that financial literacy moderates overconfidence ($\beta=-0.026$, $p=0.035$) but does not moderate present bias ($p=0.999$) provides direct evidence for the bias-specific

moderation hypothesis proposed in this study. It is important to note, however, that the magnitude of this interaction coefficient (-0.026) is practically small despite being statistically significant. This indicates that financial literacy functions as an attenuating factor that dampens part of the negative impact of overconfidence, rather than as an eliminating factor that fully neutralizes the bias. In other words, MSME owners with high financial literacy who are overconfident still make suboptimal decisions compared with their non-overconfident counterparts; only the gap is smaller than it would be under low financial literacy.

Why does this attenuation pattern occur for overconfidence but not for present bias? We propose the following analogy to explain the mechanism: financial literacy essentially provides an explicit analytical framework for an understanding of probability, risk–return trade-offs, and cash-flow projections that functions as a calibration tool against excessive belief. Because overconfidence is a problem of belief miscalibration, an external calibration tool such as this analytical framework is logically relevant as a corrective factor. Present bias, however, is not a problem of belief calibration but one of motivation and time preference; providing an analytical framework to someone who rationally knows that saving is better, yet still chooses short-term consumption because of an affective impulse, is akin to giving reading glasses to someone whose problem is not eyesight but impulse control. The instrument does not target the true root of the problem.

This finding should be read carefully against a diverse literature. Prasetyo et al. (2023) found that financial literacy negatively and significantly moderates overconfidence, consistent with this study. However, Hussain et al. (2023), examining other biases (herding, loss aversion) in Pakistan, found a positive moderation direction. We propose that this difference in direction is not a contradiction but is consistent with the bias-specific moderation framework: herding bias, unlike overconfidence or present bias, has a strong informational component individuals follow the crowd partly because they lack confidence in their own independent analysis. High financial literacy can increase confidence in one's own analytical ability, thereby pushing individuals away from herding behavior, a mechanism distinct from the belief-calibration mechanism relevant to overconfidence. This suggests that classifying biases by their root cause (information deficit, belief distortion, or affective preference distortion) may be more predictive of the direction and strength of financial literacy's moderating effect than simply grouping biases together under the general label of 'behavioral bias.'

A more conservative alternative explanation for the non-significant result on H4 should also be considered: limited statistical power. Interaction effects in non-experimental field

studies are consistently reported to have much smaller effect sizes than main effects (McClelland & Judd, 1993), so detecting a genuinely existing but small interaction effect requires a much larger sample size than is typically used in main-effect studies. With a $PB \times FL$ interaction coefficient close to zero ($\beta = -0.000$), the bias-specific argument above remains the most parsimonious explanation, but replication with a larger sample size is still needed to confirm that this non-significant result truly reflects an absence of effect rather than merely inadequate power.

Gender: Not Confirmed as a Moderator

The non-significant moderation of gender ($p=0.856$ and $p=0.854$) differs from the classic finding of Barber and Odean (2001). We propose three complementary explanations rather than simply concluding that 'gender is not relevant.' First, the context and incentive-structure argument of Croson and Gneezy (2009): gender differences in economic decision-making depend heavily on local social context and incentive structures rather than applying universally. Retail investors in the Barber and Odean study traded using discretionary income with financial consequences relatively separate from day-to-day survival. MSME owners, whether male or female, by contrast, make decisions with stakes that directly determine their and their families' livelihoods. We propose a 'high-stakes equalization effect' hypothesis: when decision consequences are existential to business survival, the situational pressure to engage in more deliberative cognitive processing (System 2) increases equally across both genders, eroding the overconfidence gap observed in trading contexts with relatively lower stakes.

Second, a possible selection effect. Women who choose and persist as MSME owners in Indonesia — an environment that has historically been more challenging for female entrepreneurs in terms of access to capital and business networks are likely a systematically different subpopulation from women in the general population, for example in terms of resilience, risk tolerance, or decision-making confidence. If so, gender comparisons within the MSME sample cannot be directly equated with gender comparisons in the more heterogeneous retail investor population.

Third, the limited statistical power resulting from the unbalanced sample composition (62.4% male versus 37.6% female) must also be considered. Although the total sample size ($n=388$) is adequate for detecting main effects, the female subgroup ($n \approx 146$) provides more limited statistical power to detect small gender interaction effects than would be the case with a balanced 50:50 composition. Future studies should ideally employ stratified/quota sampling

to ensure adequate gender balance before definitively concluding that gender does not play a moderating role in the Indonesian MSME context.

These three explanations are not mutually exclusive and likely operate simultaneously. What is clear is that this finding adds to the evidence for Croson and Gneezy's (2009) argument that generalizing gender differences in financial decision-making across contexts must be done with great caution, and aligns with the shift in perspective within the generational theory of behavioral biases (Altaf & Jan, 2023), which suggests that contextual and structural factors are more relevant explanators than a single demographic category such as gender.

CONCLUSION

This study shows that overconfidence and present bias have a significant negative effect on the quality of financial decision-making among MSME owners in Bandung City, with present bias showing a far greater impact; financial literacy is shown to moderate (weaken) the effect of overconfidence but not that of present bias, while gender is not found to moderate either relationship. This bias-specific moderation finding extends the behavioral finance literature to the still underexplored context of MSMEs in developing countries, while also implying that MSME development programs need to be differentiated according to the type of bias targeted: risk–return calibration training and second-opinion mechanisms for overconfidence, and choice-architecture approaches such as commitment savings, subsidized credit (KUR) with mandatory reinvestment, and peer accountability groups for present bias, which does not respond to financial literacy. This study has limitations in the form of a cross-sectional design, a self-reported questionnaire susceptible to social desirability bias, an unbalanced gender sample composition, and a scope limited to two types of bias and one city; future research is therefore encouraged to use longitudinal or experimental designs with stratified sampling to ensure gender balance.

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