


The effect of financial literacy and demographic variable on behavioral biases



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ABSTRACT

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The current research investigates the association between demographic factors, including financial knowledge and demographic characteristics like gender, occupation, age, education, and income, and investor behavior biases, including bias against overconfidence, disposition effect, and herding bias. Further enhancement of behavioural finance research is required in Indonesia. This study applied a quantitative analysis technique called structural equation modeling. Stock investors aged 17 and 40 were given questionnaires for this study. Respondent data collection was carried out by distributing questionnaires through several social media sites, such as Line, WhatsApp, and Instagram, to members of the investor's community. The total number of respondents obtained from distributing this questionnaire was 170. According to the study, overconfidence bias significantly affects income and financial literacy. However, overconfidence bias does not affect gender, occupation, investment experience, education, or age. Furthermore, for behavioral biases, the disposition effect does not affect financial literacy or all demographic factors. Finally, for herding behavior bias, bias significantly affects financial literacy, investment experience, and income, but herding bias does not affect gender, occupation, education, age, or income. These results have implications for investors with a high level of financial literacy, which will help them determine rational investment decisions. This research also has implications for high-income investors who tend not to follow herding behavior.

Contribution/ Originality: This study uses three aspects of a behavioral bias representing cognition and affection bias in Indonesia. This study also uses demographic and financial literacy variables, where, in the case of Indonesia, many people are trapped in fraudulent investments. This condition is due to people's financial literacy, which needs improvement.

1. INTRODUCTION

Nowadays, research on investor behaviour is a topic that attracts much attention. Investment decision-making is no longer based solely on efficient market theory but is evolving and influenced by the psychological factors of the investors themselves. This condition has led to many studies investigating behavioural finance, where humans can learn and behave about how to make financial decisions in investing (Beatrice, Murhadi, & Herlambang, 2021). An investor must have a good and correct understanding of the field of finance, both in terms of the problems and decisions that will be taken. A good understanding of financial matters can also be called financial literacy. This financial literacy provides knowledge for investors about managing sound finances (Isbanah, 2019; Murhadi,

Kencanasar, & Suttedjo, 2023). Investors frequently display bias when poor decisions are made. Additionally, demographic variables such as age, gender, level of education, financial status, job status, and investment experience may also impact investment decisions (Beatrice et al., 2021).

The association between investor behavioural biases and demographic parameters such as financial literacy and levels of income, profession, marriage status, and previous experience with investing has received much attention from researchers (Baker, Kumar, Goyal, & Gaur, 2018; Beatrice et al., 2021; Rasool & Ullah, 2020; Zahera & Bansal, 2018) with varying degrees of success. Several exciting research gaps need to be researched based on the three previous studies. For financial literacy variables with overconfidence bias and herding bias, several studies show that financial literacy significantly affects overconfidence bias (Baker et al., 2018; Rasool & Ullah, 2020). However, different research shows that when there is an increase in financial literacy, there does not seem to be an association between overconfidence bias and some samples of Indian investors (Takeda, Takemura, & Koza, 2013). Therefore, it is consistent with prospect theory that some psychological factors, such as behavioural biases, can influence investors' decision-making. Research shows that financial literacy significantly negatively affects herding bias (Baker et al., 2018; Dhar & Zhu, 2006; Jonsson, Söderberg, & Wilhelmsson, 2017). According to their colleagues and friends, many young or novice investors feel safer when discussing or following their investment decisions. However, Rasool and Ullah (2020) research demonstrates that financial knowledge greatly improves herding bias.

Among the demographic traits are gender, the disposition effect, and herding bias. Baker et al. (2018) study demonstrates that gender has a strong detrimental impact on overconfidence bias. Male respondents with significant investment experience tend to be more confident than other respondents. According to earlier studies Barber and Odean (2001); Bhandari and Deaves (2006); Elizabeth, Murhadi, and Sutejo (2022) and Kumar and Goyal (2016) the relationship between gender and overconfidence bias is consistent. Research demonstrates that the influence of gender on overconfidence bias is negligible (Beatrice et al., 2021; Rasool & Ullah, 2020). because women currently have access to the same knowledge and education as men. Women's confidence will consequently rise. Because a person's level of overconfidence will not be visible and solely depends on his level of expertise, there is no correlation between gender and overconfidence bias (Utami & Kartini, 2016).

Similarly, demographic variables, especially gender, can be coded, namely male gender has a value of 1, while female gender has a value of 0. According to prospect theory, male investors tend to be more overconfident because they have greater investment expertise and do not copy others. Baker et al. (2018) study demonstrates that gender substantially impacts dispositional effects. However, research by Beatrice et al. (2021) explains that gender has an insignificant influence on dispositional effects. This study's results are from previous research by Kumar and Goyal (2016) and Banerjee, De, and Bandyopadhyay (2018). Research by Baker et al. (2018); Rasool and Ullah (2020) and Beatrice et al. (2021) explains that gender has an insignificant effect on herding bias. Female shareholders typically prefer to follow the judgments made by others; hence, some male investors exhibit greater independence than female investors. As a result, compared to investors who do not, investors who work in finance exhibit lower herding biases.

Next, the demography variable is employment variables with overconfidence bias, disposition effect, and herding bias. Research by Baker et al. (2018) and Beatrice et al. (2021) explains that work has an insignificant effect on overconfidence bias. Research by Baker et al. (2018) explains that work significantly negatively influences the disposition effect. However, the research of Beatrice et al. (2021) explains that work has an insignificant effect on the disposition effect. Research by Baker et al. (2018) explains that work significantly negatively affects herding bias. Beatrice et al. (2021) studies, however, explain that work has a large beneficial impact on herding bias. The variable of investment experience affects bias towards overconfidence, the disposition effect, and herding bias. According to studies by Baker et al. (2018) and Rasool and Ullah (2020) investment experience strongly influences overconfidence bias. This advantageous effect results from some individuals with extensive investment expertise being more confident than others. Previous studies Barber and Odean (2001); Bhandari and Deaves (2006); Kumar

and Goyal (2016) and Lin (2011) have supported this conclusion. While research by Beatrice et al. (2021) explained that investment experience greatly benefits the disposition effect, research by Baker et al. (2018) found no significant relationship between investment experience and the disposition effect. This debate exists because some investors with greater expertise in the market will surely be more logical. After all, investors can learn from past mistakes, and there is a remote chance that they will hold onto a losing portfolio for an extended period (Chen, Kim, Nofsinger, & Rui, 2007). According to studies by Baker et al. (2018) and Beatrice et al. (2021) investment expertise has little bearing on herding bias. Overconfidence bias, disposition effect, and herding prejudice are all influenced by educational level. Education has a negligible impact on overconfidence bias, according to studies by Baker et al. (2018); Rasool and Ullah (2020) and Beatrice et al. (2021). As technology and social media develop, many investors can learn to start investing in the capital market. Research by Baker et al. (2018) shows that education significantly negatively affects the disposition effect, while research by Beatrice et al. (2021) shows that education has an insignificant effect on the disposition effect. This result is insignificant because disposition effects do not affect the level of education but affect the emotional level of investors, such as how investors solve problems from other decisions they make. Research by Baker et al. (2018); Rasool and Ullah (2020) and Beatrice et al. (2021) shows that education has an insignificant effect on herding bias.

Overconfidence bias, the disposition effect, and herding prejudice are all influenced by age factors. Age has a negligible impact on overconfidence bias, according to studies by Baker et al. (2018); Rasool and Ullah (2020) and Beatrice et al. (2021). According to a study by Baker et al. (2018) age has little impact on the disposition effect, whereas age has a considerable favourable impact, according to research by Beatrice et al. (2021). Research by Baker et al. (2018) shows that age significantly negatively affects herding bias, while Baker et al. (2018); Rasool and Ullah (2020) and Beatrice et al. (2021) show that age has an insignificant effect on herding bias. However, Beatrice et al.'s research from 2021 demonstrates that age has a large favorable impact on herding bias. The third demographic element is the level of income, which impacts bias towards overconfidence, the disposition effect, and herding bias. Following studies conducted by Baker et al. (2018); Rasool and Ullah (2020) and Beatrice et al. (2021) the level of income has a minor effect on overconfidence bias. In contrast to Baker et al. (2018) findings, Beatrice et al. (2021) found that income level significantly benefits the disposition effect. According to studies by Baker et al. (2018); Rasool and Ullah (2020) and Beatrice et al. (2021) income level has hardly any effect on herding prejudice. Based on the problem identification discussed above, this study aims to answer several problem formulations: Does financial literacy positively influence the overconfidence bias? Moreover, does financial literacy have a negative influence on herding bias? Demographic variables such as gender, job type, investment experience, education level, investor age, and income level can affect financial bias behaviour.

2. REVIEW OF LITERATURE

According to the school of thought known as behavioral finance, psychological factors impact how financial professionals behave (Kishor, 2022; Sewell, 2007). This definition states that behavioral and psychological biases influence investors' stock market judgments. As a result, understanding behavioral biases is crucial to understanding the principles behind investor behaviour in the capital markets (Goenadi, Murhadi, & Ernawati, 2022; Prosad, Kapoor, & Sengupta, 2015). Behavioural finance's goal is to assist investors in choosing investments. An investor's choice of investments will be influenced by emotional and cognitive variables (Pompian, 2012). Cognitive bias is the process of making a decision based on existing information or facts. Cognitive bias is a deviation that results from the investor's information. The types of cognitive biases are divided into eight categories: (1) Representativeness bias is the behaviour of investors who make investment decisions in a hurry without careful consideration. Usually, investors rely on their experience as a reference when making an investment decision. (2) Anchoring and adjustment bias is the behaviour of investors who refer to specific information only as a basis for making an investment decision. (3) Availability bias is the behaviour of investors who decide on the ease

and availability that become the investor's final decision. (4) Self-Attribution bias is the behaviour of investors who make an investment decision according to their talents and abilities in predicting and analysing the investment. (5) The illusion of control bias is the behaviour of investors who make an investment decision with complete confidence in achieving the investment performance they already have. (6) Conservatism bias is the behaviour of investors who make investment decisions that tend to force and deny changes that occur in their investments. (7) Confirmation bias (Selection bias) is the behaviour of investors who make an investment decision by supporting their views on their investment and ignoring any information that contradicts them. (8) Hindsight bias is the behaviour of investors who make investment decisions and tend only to remember and exaggerate the success of past investment experiences, even though these experiences failed (Pompian, 2012).

Second, emotional bias is a bias that focuses on the information and knowledge of an investor. Usually, investors included in emotional bias follow feelings and spontaneity compared to existing facts. The types of emotional biases are divided into 7 categories: (1) Overconfidence bias is the behaviour of investors who make an investment decision with excessive confidence in their predictions. (2) Loss aversion bias is the behaviour of investors who make investment decisions while maintaining investments that do not provide profits. (3) Self-control bias is the behaviour of investors who make investment decisions and cannot control themselves against the investment goals they have made. (4) Status-Quo bias is the behaviour of investors who make an investment decision based on their feelings of comfort so that they do not want to adjust the investment. (5) Endowment bias is the behaviour of investors who make an investment decision by assessing the investment from the sentimental side and maintaining it under any conditions. (6) Regret-aversion bias is the behaviour of investors who make an investment decision with fear of the impact that will occur, and it is not desirable. (7) Greed bias is the behaviour of investors who decide to continue to benefit, even though it must exceed the limits of their investment capabilities (Pompian, 2012).

Prospect theory is a theory that explains how customers choose and decide in ambiguous situations. Prospect theory has been regarded as an important contribution to the field of behavioural finance and the origin of biases, including loss aversion, framing, and the disposition effect, according to Prosd et al. (2015). Kahneman and Tversky (1979) have developed prospect theory as the behaviour of individuals when faced with hazardous conditions, such as making investment decisions and choosing investments. This theory will help investors predict the decision to reject risk in a gain condition or seek risk in a loss condition. In addition, this prospect theory will explain the tendency of individuals to give a smaller value to emerging results. However, individuals will give a higher value to results that are certain to occur. Therefore, individuals prefer to avoid risk in favour of profit.

According to Baker et al. (2018) and Rasool and Ullah (2020) research, each investor's behavioural bias is influenced by their level of financial literacy. This study utilised overconfidence bias, disposition effect, and herding bias as behavioural biases. Investors exhibiting strong overconfidence are bold in making investment judgements, whilst investors displaying low overconfidence are more cautious in their investment choices (Baker et al., 2018). Because many inexperienced or young investors feel safe following their friends or colleagues when making investing decisions, financial literacy has a strong negative impact on herding bias (Baker et al., 2018). Herding bias affects investment decisions, according to Isbanah (2019).

H_{iii}: Financial literacy has a positive influence on overconfidence bias.

H_{iv}: Financial literacy has a negative influence on herding bias.

When making decisions, female investors are less consistent than male investors because female investors prefer less risky investments. After all, they are more afraid to take something high-risk (Beatrice et al., 2021; Glenzer, Gründl, & Wilde, 2014). Female investors are less overconfident than male investors. Most female investors tend to be more risk-averse, which may influence their investment choices (Beatrice et al., 2021). According to Kaustia (2010) disposition effects are a phenomenon where investors favour selling stocks with a high value over those with a low value. Female investors typically exhibit higher disposition effects than male investors

because they tend to invest more after seeing returns on earlier investments (Baker et al., 2018). On the other hand, gender has an insignificant effect on herding bias (Beatrice et al., 2021). Compared to male investors, female investors frequently have a high herding bias. While female investors are more at ease following decisions and ideas put forth by others, male investors are typically more outspoken and do not.

H₂₆: Gender has a positive influence on overconfidence bias.

H₂₇: Gender has a positive influence on the disposition effect.

H₂₈: Gender has a negative influence on herding bias.

The following demographic factor is related to one's occupation, which is strongly associated with overconfidence, optimism, and the disposition effect rather than herding bias (Prosad et al., 2015). According to Beatrice et al. (2021) investors with jobs in finance are certainly more overconfident than investors with jobs in non-financial fields. Baker et al. (2018) found that some retired investors have a stronger overconfidence bias than private employees. Additionally, while making an investment decision, investors with a background in finance will display a higher level of overconfidence bias. Investors with backgrounds outside of finance often have a stronger disposition effect. Additionally, because they have a thorough understanding of the financial industry and do not mindlessly follow the judgments of others, investors who work in finance tend to avoid herding tendencies (Beatrice et al., 2021).

H₂₉: Occupation has a positive influence on overconfidence bias.

H₃₀: Occupation has a negative influence on the disposition effect.

H₃₁: Occupation has a negative influence on the herding bias.

The following demographic factor is related to investment experience: According to Glaser and Weber (2007) some people with more investment experience undoubtedly have better confidence than those without (Baker et al., 2018). According to Baker et al. (2018) investors with more experience are more likely to be overconfident than investors with less experience. In the meantime, less confident investors will produce subpar results and excessive trading (Beatrice et al., 2021; Zhao & Zhang, 2021). The disposition effect is typically lower for investors with more expertise than those with less. In addition, investors with sufficient investment experience will undoubtedly learn more rationally. Herding bias is common among investors with little to no experience (less than one year). Investors with little investment experience tend to seek out and follow other people's information.

H₃₂: Investment experience has a positive influence on overconfidence bias.

H₃₃: Investment experience has a negative influence on the disposition effect.

H₃₄: Investment experience has a negative influence on the herding bias.

Furthermore, the educational background also affects investor behaviour bias. According to Baker et al. (2018) investors with undergraduate and graduate degrees often have a lower disposition impact than investors with little or no education. Additionally, investors with undergraduate and graduate degrees unquestionably have a wealth of information and expertise in investing, according to Dhar and Zhu (2006). An investor's trust in the outcomes of investing decisions increases with his level of education (Beatrice et al., 2021). However, overconfident investors will perform poorly and engage in excessive trading (Barber & Odean, 2001). Due to their greater knowledge of investing, investors with undergraduate or graduate degrees have a lower amount of disposition impact. An investor's confidence in his investing judgments increases with his level of knowledge. They frequently do not mimic the financial choices of others.

H₃₅: Education has a positive influence on overconfidence bias.

H₃₆: Education has a negative influence on the disposition effect.

H₃₇: Education has a negative relationship with herding bias.

The following demographic factor is the age of the investor. The majority of senior investors often exhibit stronger behavioural bias than young and middle-aged investors (25-45 years), according to Kumar and Goyal (2016). The older an investor is, the more extensive his knowledge and understanding of investment are. However,

Tekçe, Yılmaz, and Bildik (2016) argue that as an individual's age and wealth progress, his overconfidence bias will decrease. According to Kumar and Goyal (2016) younger and middle-aged investors often have a stronger disposition effect than older investors. Because young investors are frequently unaware of the losses on their investments, they tend to have less investment expertise than older investors. The older the investor's age, the less they show herding bias because they do not follow investment decision recommendations from others. Because they need more expertise and understanding about investing, young investors have a strong tendency to follow the judgments of other investors.

H_{6a}: Age has a positive influence on overconfidence bias.

H_{6b}: Age has a positive influence on the disposition effect.

H_{6c}: Age has a positive influence on the herding bias.

The last demographic factor is income level. Investors with high-income levels can control themselves better and have higher confidence in selecting a stock to invest in Tekçe et al. (2016). Investors with greater incomes are more confident than investors with lower incomes. In the meantime, investors who do not work in finance typically have a stronger disposition effect because they desire to minimize the risks of making poor decisions, according to Dhar and Zhu (2006). Herding bias refers to investors who always follow or imitate other people's investment decisions (Kumar & Goyal, 2016). Investors working in finance do not display herding bias due to their extensive information and expertise in the financial field, which prevents them from being influenced or following the behaviour of others (Beatrice et al., 2021).

H_{7a}: Income level has a positive influence on overconfidence bias.

H_{7b}: Income level has a negative influence on the disposition effect.

H_{7c}: Income level has a negative influence on the herding bias.

3. RESEARCH METHODS

The three dependent variables used in this study to reflect behavioral biases are bias related to overconfidence, disposition effect, and herding bias. Financial literacy and demographic characteristics, including gender, occupation, investing experience, education, age, and income level, are used as two independent variables for comparison. Behavioural biases are irrational investor behaviours that arise when making an investment decision. The dependent variables used in this study are overconfidence bias, disposition effect, and herding bias. The measurements for each variable are shown in Appendix 1. In this study, the sample characteristics to be selected are investors who have invested less and more than one year and are aged 17-40 years. The analysis method used is SEM-Structural Equation Modelling; two models need to be tested for model fit, namely the measurement and structural models. The measurement model helps measure the suitability of the dimensional structure that will form a construct/factor/variable. Structural models help show the existence of causal or regression relationships that will be hypothesized, and this model has a hypothesized causal relationship between constructs (Minto, 2016). The study analysis used SEM (Structural Equation Modelling) for modelling purposes. SEM is a statistical method that integrates component analysis and regression analysis to examine the connections between variables in a model. It may be used to assess links between indicators and their constructions, as well as interactions between different constructs. Data processing and analysis in this study were conducted by Amos Structural Equation Modelling (SEM) software.

Several factors, among others, support the use of SEM. First, using the path analysis method in linear regression will be challenging because the studied model is rather complex. The link between variables that have multiple relationships can also be estimated using SEM. Third, SEM is precise enough to analyse questionnaire data incorporating perceptions since each observation's inaccuracy is considered while still being examined. Fourth, it is simple for researchers to alter the model to make it better and more statistically viable. Fifth, SEM can analyse reciprocal relationships simultaneously. By sending questionnaires to investors' members via various social media

platforms like Line, WhatsApp, and Instagram, respondent data was collected. One hundred seventy respondents were received in total through the distribution of this questionnaire.

Figure 1 depicts the research model for this study.

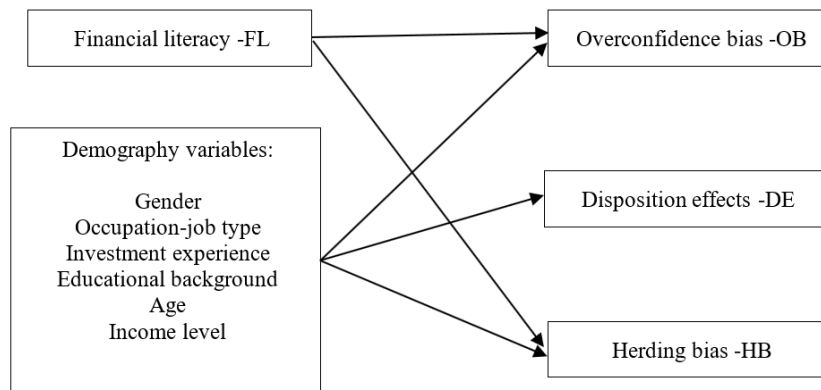


Figure 1. Research model.

4. RESULTS AND DISCUSSION

It is required to test the fit model, also known as the good fit index, to determine how well it fits the data. The measurement and structural models are required for the fit model test. The dependent variables, investor behaviour bias, and financial literacy are connected to some items to conduct the measurement model test. After invalid items were removed, the measuring model produced the following results Figure 2:

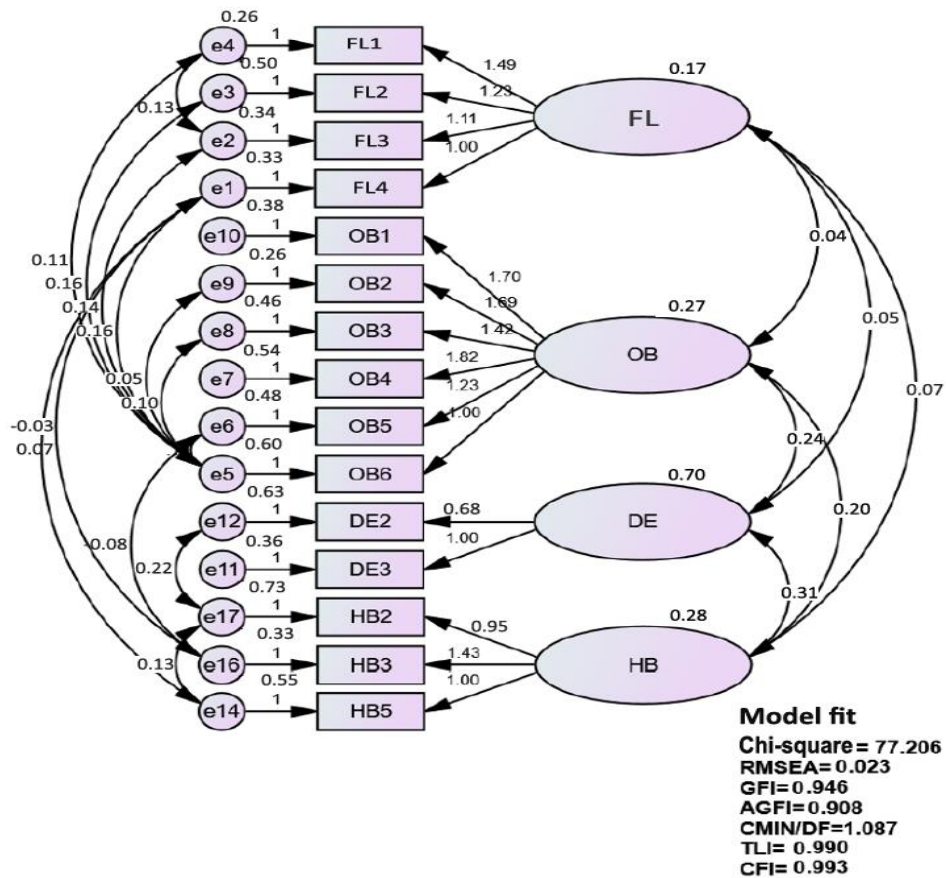


Figure 2. Measurement model.

Note: FL: Financial literacy; OB: Overconfidence bias; DE: Disposition effect; HB: Herding bias.

The validity test for every questionnaire item in the measurement model passes after explaining the measurement model. The findings of the fit test for the measurement model, which can be seen via several indicators, are as follows:

Table 1. Model fit test results measurement model.

No	Indicator	Criteria	Result	Note		
1	Chi-square	Expected to be small	77.206	Good fit		
2	RMSEA	$RMSEA \leq 0.08$	0.023	Good fit		
3	GFI	$GFI \geq 0.90$	0.946	Good fit		
4	AGFI	$0.80 \leq AGFI < 0.90$	0.908	Marginal fit		
5	CMIN/DF	$CMIN/DF \leq 2$	1.087	Good fit		
6	TLI	$TLI \geq 0.90$	0.990	Good fit		
7	CFI	$CFI \geq 0.90$	0.993	Good fit		
8	Measurement model fit	AVE	AVE ≥ 0.50	Financial literacy	0.413	Not fit
			Overconfidence	0.559	Good fit	
			Disposition effect	0.501	Good fit	
			Herding bias	0.414	Not fit	
		CR	CR ≥ 0.70	Financial literacy	0.735	Good fit
			Overconfidence	0.882	Good fit	
			Disposition effect	0.662	Marginal fit	
			Herding bias	0.671	Marginal fit	

Note: RMSEA: The root means square error of approximation; GFI: Goodness of fit; AGFI: Adjusted goodness of fit; CMIN/DF: Chi-square Minimum divided by degrees of freedom; TLI: Tucker Lewis index, CFI: Comparative fit index; AVE: Average variance extracted; CR: Critical ratio.

Table 1 shows the results of the fit model test for the structural model. There are five indicators that have a good fit or meet the criteria, namely chi-square, RMSEA, CMIN / DF, TLI, and CFI. Then, there are two indicators that have a marginal fit description or meet the criteria, namely GFI and AGFI. The results of all indicators on the measurement model meet the good fit criteria. In this table, it can be concluded that the model used has met the requirements, namely that 3-4 indicators must produce a good fit, meaning that this model can be used for further testing.

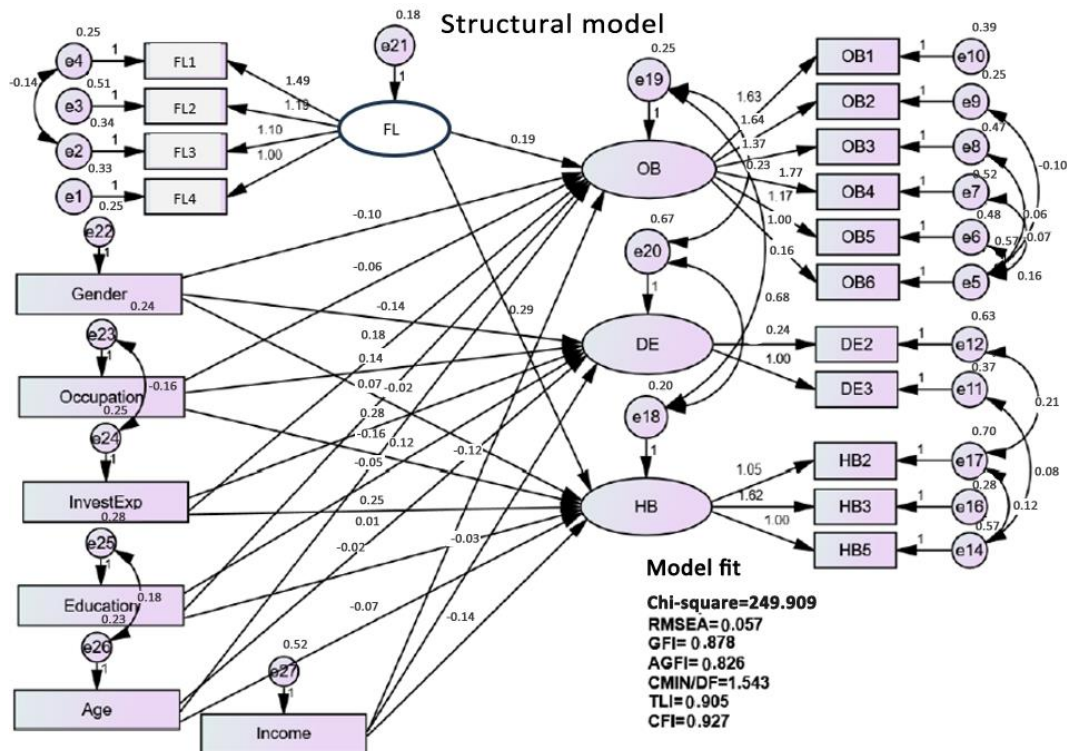


Figure 3. Structural model chart.

After finishing the measurement model test, we will go on to the structural model test. In order to ascertain the interaction between these variables, the structural model test uses three dependent variables—overconfidence bias, disposition effect, and herding bias—that are linked to seven independent variables—financial literacy, gender, age, education level, income, occupation, and investment experience. The outcome of the tested structural model is as follows: Figure 3 demonstrates the 20 hypotheses between the demographic variables affecting behavioural bias and the financial literacy variables. Therefore, the following calculation test calculates several good-fit index indicators. The outcomes of the structural model's model fit test are listed below in Table 2.

Table 2. Model fit test results structural model.

No.	Indicator	Criteria		Result		Note
1	Chi-square	Expected to be small		249.909		Good fit
2	RMSEA	$RMSEA \leq 0.08$		0.057		Good fit
3	GFI	$GFI \geq 0.90$		0.878		Marginal fit
4	AGFI	$0.80 \leq AGFI < 0.90$		0.826		Marginal fit
5	CMIN/DF	$CMIN/DF \leq 2$		1.543		Good fit
6	TLI	$TLI \geq 0.90$		0.905		Good fit
7	CFI	$CFI \geq 0.90$		0.927		Good fit
8	Measurement model fit	AVE	$AVE \geq 0.50$	Financial literacy	0.421	Not fit
				Overconfidence	0.559	Good fit
				Disposition effect	0.493	Marginal fit
				Herding bias	0.417	Not fit
		CR	$CR \geq 0.70$	Financial literacy	0.740	Good fit
				Overconfidence	0.882	Good fit
				Disposition effect	0.655	Marginal fit
				Herding bias	0.671	Marginal fit

The structural model's fit model test results are shown in Table 2, and five indicators—chi-square, RMSEA, CMIN/DF, TLI, and CFI—fit or fulfil the requirements. Then, GFI and AGFI, two indicators, have a marginal fit description or satisfy the criteria. All indicator results on the measurement model satisfy the requirements for a good match. As seen in the table, the model has proven to be suitable for future testing because it satisfies the criteria that 3–4 indicators must give a decent fit.

Table 3. Hypothesis testing results.

Hypothesis		CR	Estimate	p
H1a	Financial literacy → Overconfidence bias	1.654	0.148	0.098*
H1b	Financial literacy → Herding bias	2.532	0.248	0.011**
H2a	Gender → Overconfidence bias	-1.103	-0.092	0.27
H2b	Gender → Disposition effect	-0.828	-0.082	0.408
H2c	Gender → Herding bias	-0.22	-0.02	0.826
H3a	Occupation → Overconfidence bias	-0.486	-0.051	0.627
H3b	Occupation → Disposition effect	0.666	0.082	0.506
H3c	Occupation → Herding bias	1.061	0.124	0.289
H4a	Investment exp. → Overconfidence bias	1.588	0.168	0.112
H4b	Investment exp. → Disposition effect	1.352	0.169	0.176
H4c	Investment exp. → Herding bias	2.159	0.258	0.031**
H5a	Educational level → Overconfidence bias	0.611	0.067	0.541
H5b	Educational level → Disposition effect	-0.277	-0.035	0.782
H5c	Educational level → Herding bias	-0.195	-0.023	0.846
H6a	Age → Overconfidence bias	-1.22	-0.142	0.223
H6b	Age → Disposition effect	0.03	0.004	0.976
H6c	Age → Herding bias	-0.561	-0.07	0.575
H7a	Income level → Overconfidence bias	-1.944	-0.16	0.052*
H7b	Income level → Disposition effect	-0.25	-0.024	0.803
H7c	Income level → Herding bias	-2.24	-0.209	0.025**

Note: **Significant at $\alpha=5\%$; *Significant at $\alpha=1\%$.

The analysed data from testing hypothesis 1a show a substantial positive connection between financial literacy and overconfidence bias. The results of this study are supported by Baker et al. (2018); Rasool and Ullah (2020); Sartika and Humairo (2021) and Wendy (2021) which show a strong positive association between financial literacy and overconfidence bias. Financial literacy can help investment decisions become more rational (Ateş, Coşkun, Şahin, & Demircan, 2016). A better level of financial literacy can prevent investors from making irrational decisions, which is why Takeda et al. (2013) found that investors with a higher level of overconfidence bias also have higher levels of overconfidence. The findings of hypothesis 1b demonstrate a significant positive association between financial literacy and herding prejudice. The results of this study are supported by Rasool and Ullah (2020) findings, which show a strong positive association between financial literacy and herding bias.

The more financial literacy a person possesses, the more likely it is that when making investing decisions, they will copy those of other investors regarded as being on par with them. Since both male and female investors in Indonesia between the ages of 17 and 40 exhibit high financial awareness, their confidence will also rise. This outcome is because Indonesian investors are less likely to make irrational judgments if they have a high level of financial literacy. To promote financial literacy, Indonesian investors should strive to improve their knowledge and understanding of investments by utilising social media or the Internet. This would enable them to make well-informed investment choices. Consequently, Indonesian investors will have increased confidence in their capacity to select the desired investment product. This is because investors with advanced financial knowledge typically consider multiple factors and available information when making investment choices, taking into account both fundamental and technical aspects. Therefore, investors' financial literacy in Indonesia significantly positively impacts overconfidence bias.

The findings of this study also indicate that investors with a high level of financial literacy exhibit herding behaviour. This condition implicitly reflects that more than the stock market movements in Indonesia are needed for investors to make decisions based on fundamental and technical analyses. Given that there are "bookies" who can determine a stock's price movement. This result has an impact even though investors have high financial literacy; the information from the "bookie" will encourage investors to invest based on this information. Investors use this herding pattern to take momentary profits. It causes Indonesian investors' degree of financial literacy to have a very positive impact on herding bias.

Table 3 indicates a considerable positive relationship between investment experience and herding tendencies. The findings of a study by Ramashar, Sandri, and Hidayat (2022) which show a substantial positive relationship between investment experience and herding bias, support this study's findings. According to present circumstances, male and female Indonesian investors aged 17 to 40 with less than a year of investing experience are likely to exhibit more herding bias when making investment decisions. This outcome results from inexperienced new investors who are more likely to follow the recommendations or advice of more experienced or knowledgeable investors than themselves because they have yet to conduct their analysis of the desired results they hope to achieve in the future. This condition is supported by descriptive data from distributing questionnaires, which show that investors with investment experience of less than one year are dominant at 50.6%.

Investors with more than a year of investment experience made up 49.4%. As a result, investor herding bias in Indonesia is unaffected by investment experience. This outcome aligns with research on how financial knowledge influences herding behaviour favourably. This outcome demonstrates that investors with high financial literacy and extensive investment experience will continue to rely on the "bookie's" advice and make an effort to seek out short-term gains.

Additionally, Table 3 demonstrates a negative relationship between overconfidence bias and income. Research findings from Kumar and Goyal (2016) and Siratan and Setiawan (2021) which demonstrate a substantial inverse relationship between income and overconfidence bias, lend support to the findings of this study. According to the current situation, both male and female investors in Indonesia between the ages of 17 and 40 who have low-income

levels tend to develop an overconfidence bias because they think they can learn everything there is to know about investing online. Investors with low-income levels will form an overconfidence bias because they can get all the information from social media or the internet, so they get extensive knowledge and are more confident in their investment decisions. Therefore, the overconfidence bias is more likely the lower the income level held.

According to the study results, income level has a considerable negative impact on herding prejudice. Research by Rona and Sinarwati (2021) demonstrating a substantial inverse relationship between income and herding bias confirms the study's findings. The current conditions show that female and male investors in Indonesia aged 17 to 40 with both low and high-income levels think their investment decisions can provide benefits and minimize losses. Advice or suggestions from other investors do not readily sway high-income investors. Therefore, they must keep track of how investors behave while making investment selections. This outcome is because certain high-income investors have great expertise and knowledge in investing and will not copy other investors' decisions. Therefore, differences in investor income levels in Indonesia significantly affect herding bias.

5. CONCLUSION

This study shows that financial literacy positively influences overconfidence and herding behaviour, investment experience on the herding bias, and income level on overconfidence and herding bias. This result means that the relevant demographic factors affecting behavioural bias are investor experience in a positive direction and income level, which has a negative effect. These findings suggest that investors with a high level of financial literacy will be better able to make informed investment decisions. They can pay attention to various aspects and information available in making investment decisions so that investors can determine investment products appropriately and according to their wishes. This result is also intriguing because even investors with a high level of financial literacy exhibit herding behaviour. This condition is because stock transactions on the Indonesian stock market are frequently carried out by "bookies." Even investors with a high level of financial literacy and extensive investment experience will seek out short-term gains by adhering to the advice of these "bookies." This research also provides implications for high-income investors who tend not to follow herding behaviour. Given that "bookies" can still operate on the Indonesian capital market, investors with high incomes are more likely to entrust their investments to professionals because they are more confident in the management of specialists in the field.

Future researchers may build on this research by including additional demographic variables, such as ethnicity, monthly expenses, marital status, and the number of dependents. This study's drawbacks include a need for more participants aged 30 and older. Second, there needs to be more participant responses or answers. There is a need for participants to understand the questionnaire items. Additionally, distribution was done online, making it impossible to provide participants with directions. In future research, more respondents aged 30 years and over can be found to minimize data imbalances. Further research is also expected to avoid a lack of understanding of the questionnaire statements distributed online. Therefore, in the future, questionnaires can be distributed directly to provide clear explanations and directions if respondents need help understanding the questionnaire statements.

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Appendix 1. Variables and questions.

Variables	Question
Overconfidence	<ol style="list-style-type: none"> 1. I am an experienced investor. 2. My investment performance is better than most people's. 3. I believe in my knowledge about investing in the capital market. 4. I feel more confident in my investment knowledge than analysts. 5. The investment returns I get come from my investment experience. 6. My skills and knowledge about the stock market can help me invest in profitable stocks.
Disposition effect	<ol style="list-style-type: none"> 1. I often do not respond quickly to good or bad news on an investment. 2. I often do not realize the losses in my investment decisions. 3. I immediately sell the shares I own when I have made a profit.
Herding bias	<ol style="list-style-type: none"> 1. I rarely consult with others before buying/Selling shares. 2. The decisions of other investors influence my investment decisions in buying/Selling stocks. 3. I always react quickly to changes in other investors' decisions in the stock market. 4. I often consult with people close to me (Family, friends, or colleagues) before buying/Selling stocks. 5. I follow blog/Social forum information before buying/Selling stocks.
Financial literacy	<ol style="list-style-type: none"> 1. I understand that it is safe to invest in more than one stock. 2. I understand that inflation has a negative impact on investments. 3. I understand that the benefit of saving is to save money for the future. 4. I understand that the purchasing power of money in the present will be different from that in the future.
Gender	0 = Woman; and 1 = Man
Occupational	<p>Jobs are divided into 2: jobs related to finance and jobs not related to finance. Some jobs in the financial sector include those working in banks, securities, insurance, investment managers, financial analysts, and other finance-related jobs. For the measurement of this occupational variable, there are two codes as follows:</p> <p>0 = Not related to the financial field. 1 = Related to the financial field.</p>
Investment experience	<p><i>Investment experience</i> is an investment experience owned by an individual with different financial products and assets (Adil, Singh, & Ansari, 2022). For the measurement of this investment experience variable, there are two codes, as follows:</p> <p>0 = Less than one year. 1 = More than one year.</p>
Educational level	<p>Education is a process and effort of an individual in realizing the learning process, growing the potential within each individual. For the measurement of this education variable, there are four indicators, which are as follows:</p> <p>1 = Senior High School 2 = Diploma or Undergraduate 3 = Master's degree 4 = Doctoral degree</p>
Age	<p><i>Age</i> is the time recorded since an individual was born. The measurement of this age variable has two indicators, which are as follows:</p> <p>1 = 17 - < 25 years 2 = 25 - ≤ 40 years</p>
Income level	<p><i>Income level</i> is the wages or results individuals get after completing their activities or work. For the measurement of this opinion level variable, there are three indicators, namely as follows:</p> <p>1 = < IDR 4,000,000 2 = IDR 4,000,000 - IDR 7,000,000 3 = > IDR 7,000,000</p>

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