Investor Behavioral Bias Based on Demographic Characteristics

J. Elizabeth, W.R. Murhadi & B.S. Sutejo
University of Surabaya, Surabaya, Indonesia

ABSTRACT: This study aims to examine the effect of demographic characteristics such as age, gender, income, and occupation on investor behavioral biases such as overconfidence bias, disposition effect, and herding bias. This research was conducted by distributing questionnaires to respondents who are 151 stock investors listed on the Indonesia Stock Exchange with a minimum age of 17 years. The results of the study showed that each dependent variable was at least influenced by one of the demographic characteristics. From the hypothesis test, it can be seen that overconfidence bias was influenced by gender and income. While the disposition effect was influenced by age, and the herding behavior bias was influenced by occupation.

Keywords: behavioral bias, overconfidence bias, disposition effect, herding bias

1 INTRODUCTION

In general, when someone invests in something, they usually wish for a high rate of return and a low level of risk. To achieve their wish, investors have different ways of making decisions when investing. Kumar & Goyal (2016) stated that when investors make investments, not all investors make rational decisions because the lack of available information makes an investor is dependent on the surrounding factors as a decision-making method (Barber & Odean 2001; Bhandari & Deaves 2006; Lin 2011). Indirectly, the lack of available information makes investors tend to have a biased behavior when making investment decisions. Likewise, according to Prosad et al. (2014), behavioral bias occurs when traditional theory fails and based on traditional theory, an investor tends to make decisions logically.

Kumar & Goyal's research (2016) concluded that male investors tend to have higher confidence in making investment decisions. Banarjee et al. (2018) also conducted a study to look at the effect of demographic characteristics on investment behavior bias in India. Banarjee et al. (2018) pointed out that gender affects overconfidence bias, which supports Kumar & Goyal (2016) who proposed male investors tend to have higher confidence in making investment decisions. Similar to previous research conducted by Talpsepp (2013), Kumar & Goyal (2016) also induced that investors with a young age tend to have little experience in investing so that they experience losses more frequently and prone to have behavioral biases namely disposition effect when making decisions. This study opposed the research conducted by Banarjee et al. (2018), which stated that age does not influence investor behavioral bias.

In addition, the results of research conducted by Kumar & Goyal (2016) showed that income has a negative influence on overconfidence bias. Investors with lower middle income tend to be more biased compared to upper-middle-income investors. Investors with lower middle income tend to be more confident or have an overconfidence bias, while upper middle-income investors tend to be less confident. This is due to lower-middle-income investors tend to accumulate the wealth they have so that when making decisions, the investors tend to have a higher sense of confidence in the investment decisions they make. In other words, investors with middle to lower-income realize that their wealth is limited and when the investors decide to invest, it pinpoints that overconfidence bias occurs when making these decisions. Contrary to Banarjee et al. (2018), researchers

did not find any effect of income on investor behavioral bias.

Related to occupation-related research, Kumar & Goyal (2016) scrutinized that occupation does not influence investment behavior. The results of the research also support the results of this study by Banarjee et al. (2018), which concluded that the occupation of an investor does not influence investor bias. However, the results of the study contradict the results of research by Dhar & Zhu (2006) who found demographic characteristics such as occupation influence investor behavioral bias, especially disposition effect.

From some of the studies, it is argued that in investing, investors tend to have different patterns and behavioral biases because of the demographic elements (gender, age, income, and occupation). The perspectives of these researchers oppose the perspectives of Fama (1970), where every investor is rational in the decision-making process, in which this theory is known as the traditional finance theory. Additionally, according to the theory of Fama (1970), an investor behaves rationally or uses a logical and structured mindset when making investment decisions.

This study will examine the influence of demographic characteristics (gender, age, income, and occupation) appended to investors on investor behavioral bias (overconfidence, disposition effect, and herding) when making investment decisions. This research will focus on Indonesian investors investing in the stock market listed on the IDX who are also active in buying and selling shares for at least the past year.

2 RESEARCH METHODS

This study used three dependent variables and four independent variables. The dependent variables of this research were composed of investor behavioral bias, namely overconfidence, disposition effect, and herding. While the independent variables of this study were the demographic characteristics appended to investors such as gender, age, income, and occupation.

The questionnaire from Prosad et al. (2014) was used as a reference for this research's questionnaire. The questionnaire was distributed to retail investors who invested in shares listed on the IDX. It consists of 28 question items with the first eight questions included personal information including details about name, age, gender, profession, monthly income, and trading time span. While 20 other questions related to questions about investor behavioral bias. The 20 questions were divided into two parts with part A was a closed or multiple choice question type and part B was a type of statement on a scale of 1 (strongly disagree) to 5 (strongly agree). Respondent criteria in this study were retail investors who are Indonesian citizens investing in shares listed on the Indonesia Stock Exchange, the minimum age of the investor are 17 years, have actively invested in shares for at least one year, and have a basic knowledge of investment.

3 RESULTS AND DISCUSSIONS

Data collection in this study was done using questionnaires through online media such as Line, Instagram, Whatsapp, and others. The collected respondents were 151 respondents with the following is a description of the respondent's demographic characteristics based on gender, age, occupation, and income.

Descriptive statistics for the age category of respondents; respondents with ages <25 were 41.7% or 63 respondents, ages 25-50 were 43.7% or 66 respondents, and ages > 50 years were 14.6% or 22 respondents. The gender category of respondents: A total of 53% or 80 respondents were male respondents and female respondents were 47% or 71 people. The income category of respondents; respondents with income <Rp. 3,700,000 account for e 25.8% or 39 respondents, income Rp. 3,700,000 - Rp. 7,000,000 account for 31.8% or 48 respondents, and income > Rp. 7,000,000 were 42.4% or 64 respondents. The occupation category of respondents; finance-related occupations were 33.1% or 50 respondents, while non-finance related occupations were 66.9% or 101 respondents.

Before conducting the reliability and validity test, Kaiser Meyer Olkin's test was taken place and obtained a value of 0.700 (valid). Then the reliability test was carried out with the Cronbach alpha test using SPSS software and the numbers for variables overconfidence, disposition effect, and herding bias were 0.795, 0.786, and 0.800 (reliable) respectively. AMOS software was utilized to test the validity, in which factor loadings for each item must be a minimum value of 0.5 (Hair et al. 2014: 115). Table 1 shows that the factor loadings for all the items are higher than 0.5, which reflects that each indicator can be said to be valid.

Table 1. The results of the factor loading value on each Indicator Variable

		Factor Loading
Overconfidence	A1OV	0.650
	A2OV	0.501
	B1OV	0.708
	B2OV	0.717
	B3OV	0.614
	B5OV	0.610
Disposition Effect	A2DE	0.500
	A3DE	0.560
	B6DE	0.578
	B8DE	0.726
	B9DE	0.567
	B10	0.560
	B11	0.682
Herding	A5H	0.606
	A6H	0.601
	B4H	0.618
	B7H	0.557
	B12H	0.699
	B13H	0.553
	B14H	0.721

After testing the reliability and validity, the model fit test on the measurement model was performed. The measurement model was done by connecting the dependent variable (investor behavioral bias) with several indicators that are in it. The model fit test here can be measured through several indicators as follows:

Table 2. The results of model fit test on the measurement model

Indicators		Result	Desc.
Chisquare		204.460	Good fit
RMSEA		0.039	Good fit
GFI		0.885	Marginal fit
AGFI		0.856	Marginal fit
CMIN/DF		1.224	Good fit
TLI		0.900	Good fit
CFI		0.912	Good fit
Measurement model fit	CR	Overconfidence	0.727	Good fit
		Disposition effect	0.658	Marginal fit
		Herding	0.706	Good fit
	ACE	Overconfidence	0.464	Marginal fit
		Disposition effect	0.317	Not fit
		Herding	0.398	Not fit

The results of the model fit test on the measurement model showed five indicators with good fit information or met the criteria, namely Chi-square, RMSEA, CMIN / DF, TLI, and CFI. After the model fit test on the measurement model meets the criteria, the model fit test was also carried out on the structural model. In the structural model, the dependent variables such as overconfidence, disposition effect, and herding were then connected with independent variables of demographic characteristics such as age, gender, income, and occupation. Below are the results of the model fit test on the structural model.

Table 3. The results of model fit test on the measurement model

Indicators		Result	Desc.
Chisquare		284.119	Good fit
RMSEA		0.035	Good fit
GFI		0.871	Marginal fit
AGFI		0.839	Marginal fit
CMIN/DF		1.179	Good fit
TLI		0.907	Good fit
CFI		0.919	Good fit
Measurement model fit	CR	Overconfidence	0.715	Good fit
		Disposition effect	0.657	Marginal fit
		Herding	0.694	Marginal fit
	ACE	Overconfidence	0.444	Marginal fit
		Disposition effect	0.318	Not fit
		Herding	0.378	Not fit

Based on Hair et al. (2014: 583), the requirement of good fit index criteria is at least 3 to 4 indicators meet the criteria. The test results for the measurement and structural model show that five indicators met the criteria of a good fit, which indicates that this research is good and can be continued to test hypotheses.

The hypothesis test was performed to examine the effect of investor demographic characteristics on behavioral bias. This test was carried out using AMOS 22.0 software. The following is a research model in the structural model for this study:
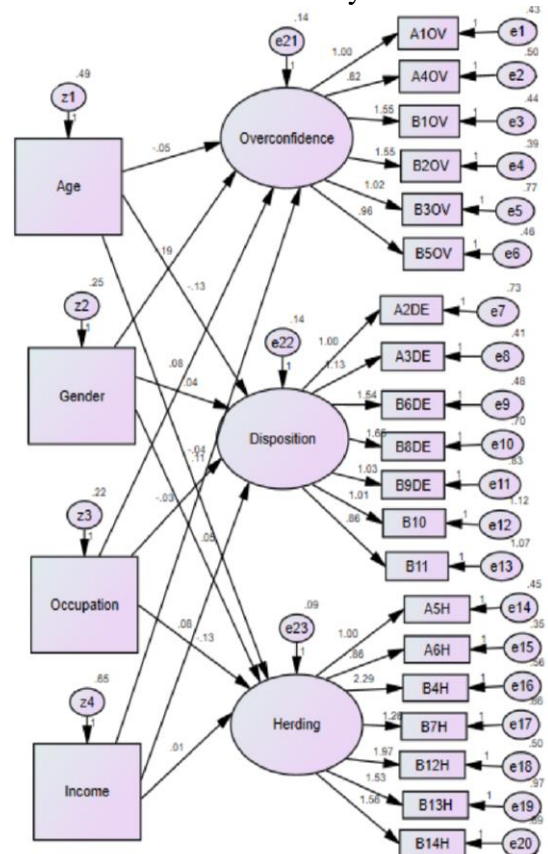

Figure 1. The results of Structural Research Model

From the structural model, it can be seen the effect of each demographic characteristic on each investor behavioral bias. Below are the results of the hypothesis test in this study

Table 4. The results of the hypothesis test

	Effect	Est.	P
H1a	Gender --> Overconfidence	-0.186	0.018*
H1b	Gender --> Disposition Effect	0.053	0.374
H1c	Gender --> Herding	0.039	0.599
H2a	Age --> Overconfidence	-0.054	0.452
H2b	Age --> Disposition Effect	-0.13	0.092**
H2c	Age --> Herding	-0.043	0.453
H3a	Income --> Overconfidence	0.109	0.091**
H3b	Income --> Disposition Effect	0.08	0.216
H3c	Income --> Herding	0.012	0.805
H4a	Occupation --> Overconfidence	0.075	0.337
H4b	Occupation --> Disposition Effect	-0.034	0.663
H4c	Occupation --> Herding	-0.135	0.047*

Table 4 shows that there are several effects of demographic characteristics on behavioral bias, namely: (1) gender had a significant negative effect on overconfidence at the 5% level, (2) age had a significant negative effect on the disposition effect at the 10% level, (3) income had a significant positive effect on overconfidence at the level of 0%, and (4) occupation had a significant negative effect on herding bias at the level of 5%.

Male investors had more overconfidence bias than female investors, which supports previous research by Kumar & Goyal (2016) who pointed out that male investors tend to have higher confidence in making investment decisions compared to female investors. Likewise, a research conducted by Barber & Odean (2001) showed that female investors apt to be more afraid of taking risks or risk-averse compared to male investors, so this indirectly affects the emergence of a lack of confidence in female investors when making investment decisions.

The findings of this study indicate that there is no significant effect of both male and female on the disposition effect bias, this result supports Kumar & Goyal (2016) and Banarjee et al. (2018) studies which also found that gender does not have a significant effect on the disposition effect. Yet, it does not support the research of Talpsepp (2013) that concluded female investors could be said to have more disposition effect than male investors. According to Utami & Kartini (2016), nowadays investors have a higher education level than in the past, implicating that in dealing with benefits or losses, they undoubt-

edly prone to be more rational and do not involve emotions when making decisions.

The results for this study postulated that there was no significant effect of both males and females on herding bias; this result is consistent with Jamil & Khan's research (2016) which also found that there is no significant effect between gender on herding bias. Jamil & Khan (2016) argued that neither female nor male influences herding behavior. Lakonishok et al. (1992) emphasized that herding bias is the behavior of investors who tend to imitate the decisions of a group or the people around them. This study found that there was no gender effect on herding bias because herding is a bias that can be experienced by someone but not influenced by one's gender. Herding behavior is the behavior of someone who likes to follow the decisions of others in which the behavior arises due to investor's lack of confidence (Gilo 2013) and other psychological things, not the gender of the investor.

The results for this study pinpointed that there is no significant effect either young or old age on overconfidence bias, this result supports the studies of Kumar & Goyal (2016) and Banarjee et al. (2018) which presented that there is no significant effect of investor age on overconfidence bias. These days, age-related issues are not a big thing as in general, since childhood, every child has been instilled high self-confidence both through formal and non-formal education, which is regulated in Government Regulation of the Republic of Indonesia number 17 of 2010 concerning the management and implementation of education in article 61 for formal education and article 109 for non-formal education. Therefore, this occurrence indirectly influences the pattern of an investor when making decisions. So it can be concluded that the age of the investor does not influence the investor's confidence when making decisions.

The results for this study suggested that younger investors had more disposition effect than older ones; this result supports the study of Kumar & Goyal (2016). Yet, it does not support Banarjee et al. (2018) that pointed out age does not have a significant influence on disposition effect. According to Kumar & Goyal (2016), this is due to young investors have less trading experience than older investors, so they tend to be reluctant to receive losses from their portfolios and end up holding unfavorable stocks. On the other hand, when keeping stocks that

provide profits, they tend to sell it to enjoy the profits immediately.

The results for this study indeed indicated that there is no significant effect of both young and old age investors on herding bias. This result is also consistent with the study of Kumar & Goyal (2016), who also concluded that there is no influence between the age of the investor and the herding bias. According to Lin (2011), herding bias is the behavior of investors who choose to follow the majority's decision. Such behavior generally occurs when investors do not have enough knowledge, so they choose to follow the majority's decisions. However, now investors possess higher education than in the past and information is also easier to obtain, which indirectly affects the behavior of investors when making decisions. In fact, investors tend to be more rational and logical by considering the various information they get compared to imitating the decisions of people around them.

The results for this study showed that the higher the income of investors, the more investors have an overconfidence bias compared to investors with low income. It is in line with Graham et al. (2005) that found that high-income investors have higher confidence in their competencies than the middle to lower-income investors. This result is not consistent with the study of Kumar & Goyal (2016) that investors with middle to lower-income tend to be more confident compared to investors with middle to upper income. The results of this study are also inconsistent with the study of Lin (2011), who found that there is no influence between income and overconfidence bias. Moreover, research by Grahan et al. (2005) found that investors with middle and upper income feel that they have better knowledge than investors with lower middle income. Immediately this shows that high-income investors have higher self-confidence than lower-middle-income investors. Most of the respondents were investors with middle to upper income. Indirectly, this study showed that investors with upper middle income have higher confidence in making investment decisions compared to investors with middle to lower-income.

Moreover, the findings for this study that there is no significant effect of either low or high-income investors on disposition effect, this result supports the previous studies conducted by Kumar & Goyal (2016), Lin (2011), and Banarjee et al. (2018) which also found that investor income does not influence disposition effect. According to Sherif & Statman

(1985), the disposition effect can be said to be the habits of investors when they feel the benefits or losses from their investments. When viewed from the definition of the disposition effect, it can be seen that this bias is influenced by the behavior or attitude of investors when responding to the loss/gain of the investment they do and not influenced by the investor's income. Therefore, it can be said that the disposition effect is not influenced by how high the investor's income is.

The results of this study indicated that there is no significant effect either low or high-income investors on herding bias; this result supports Kumar & Goyal (2016) who also found that investor's income does not affect herding bias. However, this finding is not consistent with Shusha & Touny research (2016), where investors with middle to upper income have herding bias compared to investors with middle to lower-income. According to Bikhchandani & Sharma (2001:283), one reason that makes herding bias to happen is imperfect information or limited information. These days, the advancement of the technological era does facilitate the dissemination of information and many unique sites inform about stock investment. Much information can be used as material for investor consideration, which reduces the possibility of herding bias to occur.

The results of this study scrutinized that there was no significant effect both investors with finance-related and non-finance related occupations on overconfidence bias, this result is in line with Lin (2011) and Kumar & Goyal (2016) who also concluded that investor's occupation does not affect overconfidence bias. However, these results are contrary to Chandra et al. (2015) who found that investors with finance-related occupations prone to feel more confident about their chosen investment, compared to investors with the non-finance occupation. According to Pompian & Wood (2006), overconfidence is excessive confidence and generally unreasonable. Generally, a person's level of confidence is varied and it cannot be seen from whether he works in finance or non-finance related occupations. The findings of Pompian & Wood (2006) observed that overconfidence bias is an unreasonable thing, thus showing that one's occupation does not influence bias.

The results of this study indicated that there is no significant effect of both investors with finance rand non-financial related work on overconfidence bias, these results correspond to Kumar & Goyal (2016) and Banarjee et al. (2018), but does not correspond to Dhar & Zhu (2006). Based on the finding of Barber & Odean (2000), disposition effect is "the hu-

man desire to avoid regret", reflecting that disposition effect is the desire of investors to avoid regrets that arise because of their choice. The finding shows that the type of investor's occupation does not influence the disposition effect, but how an investor responds to the impact of the decisions he makes. If the investor can tolerate regrets for the decision he made, the investor may not have that bias and has nothing to do with either investor's finance or non-finance related occupations.

The results of this study found that investors with non-finance related occupation had more herding bias than investors with the finance-related occupation, this result corresponds to Sarkar & Sahu (2018) but does not correspond to Kumar & Goyal's (2016) research, which found that there is no influence between occupation and herding bias. This is due to the lack of understanding related to investment, someone with non-finance related occupations will generally feel unfamiliar with the term of stock and they have a busy work so that investors ultimately prefer to follow the decisions of other investors.

4 CONCLUSION

The results of this study show that each dependent variable was at least influenced by one of the demographic characteristics. In the hypothesis test, it can be seen that overconfidence bias was influenced by gender and income. Whereas disposition effect bias was affected by age, and herding bias was influenced by occupation.

This study explains the influence of demographic characteristics such as gender, age, income, and occupation on investment behavior of stock investors in Indonesia. For financial advisers or planners, it is critical to pay attention to the demographic characteristics of a client or investor, so that they can provide recommendations on investment alternatives that are relevant to the characteristics of the related client or investor.

The limitation of this study is the imbalance of data in several categories, for example under the age category, most of the respondents were respondents with middle age and below, while only 14.6% were old-age respondents. Furthermore, because the questionnaire was distributed through online media, there was the possibility of several questions that respondents did not understand. For further research, it is, therefore, necessary to use more respondents to avoid the possibility of data gaps as in this study. In order to minimize misinterpretation upon the questionnaire, it is recommended not to distribute questionnaires online, but face-to-face.

REFERENCES

Banarjee, A., A. De., & G. Banyopadhyay. 2018. Impact of demographic profile on investor biases in India using olap and anova. *The Institute of Cost Accountants of India*.Vol. 43(4): 75-94.

Barber, B., & Odean, T. 2000. Trading is hazardous to your wealth: The common stock investment performance of individual investors. *The Journal of Finance,* Vol. 55(2): 773-806.

Barber, B.M., & Odean, T. 2001. Boys will be Boys: Gender, Overconfidence, and Common Stock Investment. *The Quarterly Journal of Economics,* Vol. 116(1): 261-292.

Bhandari, G., & Deaves, R. 2006. The demographics of overconfidence. *The Journal of Behavioral Finance*. Vol. 7(1): 5-11. doi: https://doi.org/10.1207/s15427579jpfm0701_2

Bikhchandani, S., & Sharma, S. 2001. Herd Behavior in Financial Markets *IMF Staff Papers.* Vol. 47 (3): 279-310.

Chandra, A. 2017, Does Individual heterogeneity Shape Retail Investor Behavior?. *International Journal of Social Economic.* Vol. 44 : 578-593. doi: 10.1108/IJSE-04-2015-0097.

Dhar, R, & Zhu, N. 2006. Up close and personal: investor sophistication and the disposition effect. *Management Science*. Vol. 52(5):726-740. doi: 10.1287/mncs: 1040.-473.

Fama, E.F. 1970. Efficient capital markets : are view of theory and empirical work. *The Journal of Finance*. Vol. 25 No. 2, pp. 383-417. doi: UE-170485 & UG-170486.

Gilo, R.S. 2013. Effects of level of investors' confidence and herding behavior on stock prices and their volatilities. *Thesis.* Hebrew University of Jerusalem.

Graham, J. 2005. Investor Competence, Trading Frequency, and Home Bias, *NBER Working Paper*. National Bureau of Economic Research.

Hair,J.F.*et al.* 2010. *Multivariate Data Analysis, 7th ed*., Prentice-Hall. Englewood Cliffs, NJ.

Jamil, S.A & Khan, K. 2016. "Does gender difference impact investment decisions? Evidence from Oman". *International Journal of Economics and Financial Issues* Vol. 6: 456-460.

Kaiser, H.F. 1970. A Second-Generation Little Jiffy. *Psychometrika: springer.* Vol. 35(4): 401-415.

Kumar, S., & Goyal, N. 2016. Evidence on Rationally Biases in Investment Decision Making. *Qualitative Research in financial Market.* Vol. 8 : 270-287. doi: 10.1108/QRFM-05-2016-0016

Lakonishok, J. 1992. The impact of institutional trading on stock prices. *Journal of Financial Economics.* Vol. 32 (1): 23-43. doi: https://doi.org/10.1016/0304-405X(92)90023-Q

Lin, H.W. 2011. Elucidating rational investment decisions and behavioral biases : evidence from the Taiwanese stock market. *African Journal of Business Management*. Vol.5 (5): 1630-1641.

Prosad, J.M., Kapoor, S., & Sengupta, J. 2014. Behavioral Biases in Indian Investors: a Survey of Delhi-NCR Region. *Qualitative research in financial markets.* Vol. 7 : 230-263. doi : 10.1108/QRFM-04-2014-0012.

Shusha, A.A., & Touny, M.A. 2016. The attitudinal Determinants of Adopting the Herd Behavior: An Applied Study on the Egyptian Exchange. *Journal of Finance and Investment Analysis.* vol. 5(1): 5-69.

Talpsepp, T. 2013. Does gender and age affect investor performance and the disposition effect?. *Research in Economics and Business : Central and Eastern Europe*. Vol.2 (1):76-93.

Utami, Dwi Liring & Kartini. 2016. Faktor Demografis, Personality Traits, dan Overconfidence. *Jurnal Siasat Bisnis* Vol. 20 (2): 181-196.