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Investment Behaviour Among Indonesian Millennials: The Roles of Financial Literacy and Self-control

Ummu Salma Al Azizah*

Universitas Muhammadiyah Prof. Dr. HAMKA, Indonesia.

Abstract: This current study was aimed to address the significant issue of the lack of financial literacy among Indonesian millennials, despite their active involvement in capital markets. Particularly, it examined the potential connections between financial literacy and self-control with the investment tendencies of this demographic in the Indonesian context. To this end, a survey was administered to 265 university students (78 males and 187 females) who attended an investment seminar at a private university in Jakarta, Indonesia. Using rigorous statistical analysis, specifically multiple regression analysis with PLS-SEM (Partial Least Squares Structural Equation Modeling) software, the data were analysed and a significant and positive relationship between financial literacy and the investment behaviorsamong Indonesian millennials. However, the study shows that millennials' self-control has a negative but statistically insignificant impact on their investment behavior. These results not only contribute to the existing body of knowledge but also provide fresh insights from a sample of young millennials in Indonesia. Furthermore, this study explores the intricate relationship between financial literacy and self-control concerning investment behavior.These findings have practical implications for educational institutions, financial practitioners, and policymakers. Educational institutions could incorporate financial literacy education into their curricula to equip young adults with necessary financial skills, while financial practitioners could refine their marketing strategies and provide educational resources tailored to financially literate millennials. Finally, the policymakers could use these findings as a reference to develop policies that enhance financial literacy among young people.

Keywords: Investment, investment behaviour, millennials, financial literacy, self-control.

INTRODUCTION

The investment landscape in Indonesia has undergone a remarkable transformation in recent years, largely driven by the unprecedented surge of interest and active participation among the millennial generation.This shift has been primarily driven by the increased interest and active participation of the millennial generation, reflecting not only a fundamental change in generation but also in the country's financial markets. Indonesian millennials, renowned for their adaptability to digital technologies and innovative financial instruments, have seized upon the evolving investment climate with enthusiasm, effectively reshaping traditional paradigms.Data from the past four years indicates that Indonesian millennials have become increasingly involved in the nation's capital markets. According to an economic report by Kunjana(2019), it is estimated that by August 2019, individuals aged below 30 accounted for 40% of investors in the market. This surge in millennial involvement signifies a change in economic participation and financial decision-making among younger demographic groups. By leveraging digital platforms and new technologies, millennials have taken advantage of the opportunities presented by the changing investment climate, marking a departure from traditional investment practices.

*Address correspondence to this author at the Universitas Muhammadiyah Prof. Dr. HAMKA, Indonesia; E-mail: ummusalma@uhamka.ac.id

Concurrently, data from the Indonesian Central Securities Depository (ICSD) confirmed that there were 856,482 Single Investor Identification (SID) accounts owned by millennials, managing assets totalling IDR 12.15 trillion (Hafiyyan, 2019). Previously, the ICSD reported a 41.14% increase in these asset figures to approximately 1.62 million SIDs in 2018. More recently, in 2021, this figure saw a further rise of 56.45% compared to the prior year (Kusuma, 2021).In their paper, Widoatmodjo and Onasi(2021)reference data from the Indonesia Capital Market Institute (TICMI) indicating that 54.41% of millennial investments in Indonesia are allocated towards capital markets, with 80.88% of those investments made in stocks. These reference suggest a marked inclination among millennials for investments in stocks, bonds, and other securities. Additionally, an article by Ceverina(2022) has shown an interest in in sustainable project investments. This indicates that Indonesian millennials extend their investment considerations beyond mere financial returns to include the long-term impact and sustainability of their investment choices.

However, despite the high interest and their participation in the capital markets, the increasing number of Indonesian millennials joining the capital markets do not seem to possessa sufficient level of financial literacy,which constrainsthem from carrying outgood financial planning, managing their finances and making stronginvestments. The 2019 na-

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tional survey by the Indonesian Financial Service Authority—also known as OtoritasJasaKeuangan (OJK)—revealed that theindex of Indonesian financial literacy was 38.03%, with the financial inclusion index reaching 76.19%. Indonesian millennials reported thatthey could only allocate 10.7% of their income for savings, with51.1% needed for daily spending (Septy, 2021). Similarly, a survey conducted by OCBC NISP Bank in 2021 found that 85.6% of Indonesian millennials werein unhealthy financial positions, and that while the remainder were doing better, their finances were still not ideal(OCBC NISP, 2021). The findings also showed that 43% of millennials depended on loans from their friends or relatives, despite claiming toput money away into theirsavings each month. The OCBC NISP survey findingsare supported by anearlier study fromKunjana(2019), whichrevealed thatmany millennial investors tend to be consumptive, making itdifficult for them to plan and manage their finances.

In light of this context, the present study sought to explore the potential links between two variables - financial literacy and self-control - and the investment behaviours of Indonesian millennials. An additional exogenous variable of peer influence (PI) was initially incorporated into our study. However, upon failing to exceed the average variance extracted (AVE) threshold of 0.50 in our preliminary analysis, this variable was excluded from further investigations. Consequently, our research endeavoured to address the succeeding questions:

RQ1 Is financial literacy significantly associated with investment behaviour?

RQ2 Is self-control significantly associated with investment behaviour?

LITERATURE REVIEW

A comprehensive review on relevant literature was conducted to identify several drivers of investment behaviours among young people. Prominently, financial literacy, self-control, and peer influence were observed as significant factors. Within the context of this paper, investment behaviour is percieved as the catalyst guiding the selection of investment portfolios(Massa & Simonov, 2005). The existing literature have detailed varying forms of investment actions undertaken by individuals such as saving (Amari *et al*., 2020; García & Vila, 2020), retirement planning (Hastings & Mitchell, 2020; Koposko & Hershey, 2016) and investing (Akims & Jagongo, 2017; Rahman & Gan, 2020; Singh, Ajay & Sharma, 2016).Subsequent subsections will specifically address financial literacy and self-control among the younger demographic, especially the millennials under the age of 40 years. This paper aims to explore and evaluate the relationship between these factors and their influence on investment behaviors.

Financial Literacy and Investment Behaviour

Financial literacy is a crucial determinant in individual investment behaviour patterns. As defined by the OECD(2015), financial literacy refers to an individual's acumen, knowledge, and proficiency in monetary management. According to a study cited by Kuntze et al. (2019)from the Government Accountability Office (GAO), individuals endowed with adequate financial literacy exhibit improved financial decision-making abilities and future financial planning. They are adept at effective and efficient monetary management. Hence, sufficient financial literacy influences the ability to make informed financial decisions, bolstering personal financial wellbeing.

Extant literature has captured a rampant issue of financial illiteracy among young individuals. For instance, Philippas and Avdoulas (2020) conducted a study among 456 Greek university students. It examined the interconnections among individual financial literacy, fiscal fragility, and financial wellbeing. The study concluded that students boasting superior financial literacy were better equipped to weather unexpected financial crises, attributing their resilience to improved money management skills. Similarly, two American studies (Scheresberg & Lusardi, 2014; Xiao *et al*., 2011) found that several U.S. college students grapple with money management, falling prey to credit card debts and loans. Corroborating this, a 2009 survey uncovered that approximately 84% of undergraduate students relied on credit cards to subsidize their reckless behaviour including, but not limited to, substance abuse, risky sexual practices, and dangerous driving.

A current study by Adil et al. (2022)explores the impact of behavioural biases on investment decisions and the role of financial literacy in moderating this relationship. The study focuses on individual investors in the Delhi-NCR region and analyzes how overconfidence, risk-aversion, herding, and disposition influence investment decisions based on gender. The findings reveal that behavioural biases significantly affect investment decisions and that financial literacy can act as a moderator in this relationship. This suggests that financial literacy plays a crucial role. In this context, financial literacy can assist investors in acquiring knowledge and awareness to address behavioural biases when making investment decisions. An example of this is investors with higher financial literacy being more likely to comprehend the risks and returns associated with various investment options, enabling them to make informed decisions and avoid overconfidence bias. Furthermore, financial literacy can aid investors in recognizing the impact of framing and loss aversion biases on their investment decisions and taking appropriate measures to mitigate their effects.

Futhermore, Sekita *et al*. (2022)examined the relationship between financial literacy, wealth, and behavioral biases in Japan. The findings of this study revealed that financial literacy positively and significantly influences wealth accumulation and investment behavior, such as participation in the stock market and investment in stocks. The findings suggest that it was important to comprehend and distinguish between different types of financial literacy, as these various types have distinct impacts on financial assets. Sekita *et al.* believe that comprehending these distinctions in financial literacy allow individuals make more informed financial decisions and enhance their financial well-being. This means that when people have solid financial knowledge, such as budgeting, investing, or comprehending different financial instruments, they tend to make informed decisions regarding their finances. Such a solid knowledge, in turn, can lead to positive financial outcomes, like growing their wealth through wise investments, achieving financial goals, and reducing financial stress, thereby contributing to an overall sense of improved financial well-being.

Within the Indonesian context, previous research indicates a prevalence of low financial literacy, with only 21.7% demonstrating adequate understanding. This lack of financial knowledge has been found to contribute significantly to high levels of indebtedness (Prashella & Leon, 2020).In their study, Prashella and Leon (2020) assertedthat financial education could help increase financial literacy among young people, and accordingly, could prevent negative financial behaviours such as materialism, compulsive buying, and a propensity to fall into debt. Young people with such a sufficient level of financial literacy have been found to be capable of deciding their financial planning, accumulating wealth, clearing debts, and paying into pensions, which they keep up thanks to their ability to process economic information (Isomidinova et al., 2017). In addition, an investigation byLantara and Kartini(2016) examined the level of financial literacy among undergraduate and postgraduate university students, finding it to be lower than for studentsin the US and Australia.Their low level of financial literacy promoted negative behaviours such as taking out expensive mortgages and refinancing their mortgages due when interest rates fell.Moreover, their lack of financial literacy impacted their individual ability to fulfil their long-term financial goals such as steady money management, home-buying, attending higher education, and pension financing. A poor understanding of financial literatureand information leads to poorsaving ability and insecure retirement planning accordingly(Lusardi, 2007).

It is therefore proposed that the implementation of financial literacy programmes designed specifically for young individuals, notably university students, could result in long-term positive implications, enhancing their financial conduct (Brown et al., 2014). Financially educated young individuals are likely capable of engaging in enhanced financial planning and management, thereby improving their personal wellbeing and at the same time, fostering the economic growth of the nation. On these grounds, the subsequent hypothesis is proffered:

H1 Financial literacy is significantly associated with investment behaviour

Individual self-control and investment behaviour

The literature extensively explores the integral role that invidual's self-control plays in fostering sound investment practices, aside from financial literacy. Generally, self-control pertains to an individual's capacity to regulate their emotions and conduct (Hofmann et al., 2009; Kotabe & Hofmann, 2015). In the context of this current study, self-control is construed as the ability to delineate goals, observe behaviour pertaining to their attainment, and maintain dedication to these goals upon facing temptations. With respect to financial management, individuals with higher degrees of self-control are more successful in attaining their financial objectives, such as adept management of wealth and successful investment(Biljanovska & Palligkinis, 2018). For instance, individuals demonstrating strong self-control are less susceptible to deviating from decisions they have made to save their money (Modigliani, 2005). Conversely, those indicating lower financial self-control exhibit compulsive tendencies (Achtziger *et al.,* 2015)and commonly engage in speculative investment behavior (Ryu & Ko, 2019). Reflecting this, Gathergood (2012) found in his study that individuals battling self-control issues are prone to credit-dependency and unanticipated expense accrual leading to excessive indebtedness.

Several of the previously discussed studies provided empirical insights into the advantages and drawbacks of self-control. Individuals who demonstrate high levels of self-control are often more proficient in their financial management, exemplified in their saving and investment habits, resulting in more efficacious financial behaviours. They also tend to experience lower levels of anxiety concerning financial matters, thus promoting a sense of security about their financial future (Strömbäck *et al.,* 2017). Therefore, an individual's financial behaviours and their overall financial well-being appear to be significantly dictated by the adeptness of their financial activity management. In addition, a current study by Alshebami and Aldhyani,(2022) who examined the relationship between social influence, financial literacy, and saving behavior among young adults in Saudi Arabia also suggest that prominent role of self-control. Their study found that individuals with strong self-control can manage their finances proportionally. More importantly, having strong self-control is critical in enabling them to address their financial goals, and thus continually increase their savings. On the other hand, individuals with poor self-control often encounter income-related challenges, have poor retirement planning, and make more credit withdrawals, which incurs additional financial risks. Corresponding to these observations drawn from the existing literature, we propose the ensuing hypothesis:

H2 Self-control is significantly associated with investment behaviour

METHODS

The current study was aimed to examine whether financial literacy and self-control could be associated with the Indonesian millennials' investment behaviour. The study hypothesises were evaluated by scrutinizing university students' perceptions and choices during their investment engagement and decision to either invest or not invest in a product. A survey method was employed to gather pertinent data. Through non-probability sampling, a cohort of 265 Indonesian millennials, who participated in an investment seminar and workshop convened by a private university in Jakarta, Indonesia, was engaged. The study adopted methodological constructions from preceding analyses on elements impacting investment behaviour, such as financial literacy, self-control, and peer influence. As mentioned earlier, peer influence (PI) was considered as an additional exogenous variable in the study to impact the investment behaviour of Indonesian millennials. Nevertheless, this variable did not perform optimally during the preliminary statistical data analysis round, the analysis failed to reach the average variance extracted (AVE) threshold of 0.50 leading to the subsequent exclusion of the PI variable.

An online survey developed by adapting prior research literature (Ariffin *et al.*, 2017b; Sutherland & Canwell, 1997)was distributedto the study participants. The survey questionnaire comprised of 30 questions and developed with a five-point Likert scale, ranging from ‘strongly disagree’ to ‘strongly agree’. The initial section of the survey solicited demographic details such as gender, age, and faculty. The subsequent section focused on pivotal indicators including financial literacy, self-control, peer influence, and investment behaviour.Responses were received from 265 Indonesian millennials.

Data analysis was conducted using SEM-PLS software. For rigorous analysis, responses that offered incomplete information or partial opinions were omitted. Employed statistical tests consisted of descriptive statistics, Cronbach’s Alpha test, factor analysis, and structural equation modelling (SEM).Reliability and validity tests were performed on the constructs, and a confirmatory factor analysis model was estimated employing Structural Equation Modelling-Partially Least Squares (SEM-PLS) version 3.3.2. In addition, pathway analysis was used to ascertain the relations between independent and dependent variables. Post data cleansing via SPSS, 213 responses were considered for measurement and ten questions were omitted from the final analysis.

FINDINGS AND DISCUSSION

Sample Characteristics

The following profile of the participants was obtained after screening the data collected from ouronline survey. The majority (68.08%) of respondents were female, while 31.92% were male; 66.67% were 17–20 years old, 32.39% were 21–25 years old, and only 0.94% were 26–30 years old; most(58.69%) respondents had an allowance below 500 K IDR, 32.86% had anallowance between 500 K and 1000 K IDR, and 18 respondents (or 8.45%) had an allowance higher than 1000 K IDR (see Table **1**).

Table 1. Demographic information.

Demographic	Category	Frequency	Proportion
Gender	Male	68	31.92
	Female	145	68.08
Age	17–20 years old	142	66.67
	21–25 years old	69	32.39
	26–30 years old	2	0.94
Allowance	< 500 K IDR	125	58.69
	500–1000 K IDR	70	32.86
	>1000 K IDR	18	8.45

Note. 1 K = 1000; USD1 = 14,740 IDR.

Research Instrument

Our well-structured questionnaire sought to gather information on investment behaviour as the dependent variable,along with financial literacy, self-control, and peer influence as the independent variables(Ariffin et al., 2017a).

Measurement Assessment Model

A reliability test of each construct was carried out using the composite reliability (CR) and Cronbach’salpha scores. For a construct to be considered reliable in a model, it must have a composite reliability score and Cronbach’s alpha value of above 7.0 (Azizah & Mulyono, 2020; Fornell & Larcker, 1981; Sumardi *et al.*, 2022). The results of these tests are shown in Table **2**, indicating that the composite reliability and alpha scores for each construct were above 0.70, *i.e.* falling within the acceptable reliability range. Next, a convergent validity test was conducted using the average variance extracted (AVE). Taking the formula proposed by Hair *et al.* (2019), the AVE was computed by dividing the sum of the squared standard loading by the sum of the squared standard loading plus the sum of the indicator measurement errors. The results shown in Table **2** indicate that the convergent validity was assured as the AVE scores for all the constructs were above the recommended threshold of 0.50 (Fornell & Larcker, 1981).

Table 2. Summary of confirmatory factor analysis.

Variables	Label	Standardised Factor Loading	Cronbach ’s Alpha	Composite Reliability	AVE
Financial literacy	FL2	0.894			
	FL3	0.747			
	FL4	0.884			
	FL6	0.871	0.872	0.913	0.724
Self-control	SC1	0.741			
	SC2	0.860			
	SC3	0.856			
	SC4	0.734			
	SC5	0.828			
	SC6	0.808			
	SC8	0.751	0.905	0.925	0.638
Investment behaviour	IB1	0.785			
	IB2	0.864			
	IB3	0.889			
	IB4	0.874			
	IB5	0.704			
	IB6	0.882			
	IB7	0.894			
	IB8	0.817	0.94	0.951	0.707

Structural Model

Ourstructural model was assessed after the reliability and validity of the constructs were confirmed. The results for the structural model are shown in Table **3**, demonstrating that the hypotheses for this study yielded satisfactory results, in line with the prediction of this study. The results suggested that financial literacy and self-control significantly influence young millennials' investment behaviour. An analysis of the path coefficient showed that the most influential factor driving investment behaviour was financial literacy, followed by self-control, with standard deviationsof 0.533 and -0.360, respectively. A significant positive relationship also existed between financial literacy and investment behaviour, while self-control had a negative influence on investment behaviour. The findings of our analyses indicated there was discriminant validity amongst the constructs (Table **4**).

Table 3. Path coefficient and P-value.

Hypothesis		Standard deviation	P-values	Result
H1	FL > IB	0.533	0.000	Supported
H2	SC > IB	-0.360	0.000	Supported

Table 4. Discriminant validity.

	Gender	Age	Allowance	FL	SC	IB
Gender	1.000					
Age	0.058	1.000				
Allowance	-0.049	0.139	1.000			
FL	-0.066	-0.004	-0.018	1.000		
SC	0.055	0.048	0.087	-0.510	1.000	
IB	-0.051	-0.075	-0.067	0.716	-0.618	1.000

DISCUSSION

In a context of young millennials' increasing intention to participate in the stock market, the effects of financial literacy and self-control on their investment behaviour were hypothesised and carefully examined. The main purpose of this study was to determine the factors correlated with the investment behaviour of young millennials. Three main factors—financial literacy, self-control, and peer influence—were studied accordingly. By collecting data from millennial investors in Indonesia through a structured questionnaire with various aspects related to investment behaviour, we found that financial literacy has a significant relationship with investment behaviour. This study's model had an overall explanatory power (R-squared) of 54% for financial literacy toward investment behaviour, and 35% for self-control toward investment behaviour. The four factors that most reflected financial literacy were managing credit use, balancing income and expenditure, money management, and budgeting. With the higher outer loading was how respondents understanding how to invest their money (0.894); this finding was in line with that of a previous study by Cao *et al.*, (2021). Therefore, the financial literacy amongst young millennials explaineda high proportion of variation in the factors influencing investment behaviour. This finding of the studythat investment behaviour is significantly affected by millennials' financial literacy is supported by previous studies (Akims & Jagongo, 2017; Hastings & Mitchell, 2020; Raut, 2020). Therefore,it can be concluded that financial literacy has a positive impact on investment behaviour among young millennials in Indonesia.

On the other hand, the results also detected a negative and significant association of self-controlwith investment behaviour (β equal to -0.351 and P-value less than 0.05). As such, young Indonesian millennials can strengthen their investment behaviour by increasing their self-control. In many research studies, financial traits and financial attitudes (i.e., financial anxiety, optimism, financial security, deliberative thinking, interest in financial issues, and precautionary savings) had a positive influence on trading activity, but ourresults showed that the millennials had low self-control, which was insignificantly associated with their investment behaviour. This result is consistent with the research studies on investment behaviour to have found that self-efficacy has a low impact on investment behaviour (Akhtar & Das, 2019; Lai, 2019). Few research results provide the insignificant association between self-control and investment behaviour. Therefore, people with good self-control are more likely to save money from eachpayslip and have better general financial behaviour. This means they can feel more confidentabout their finances and security, both for the present and the future. Based on the current study, hypotheses 1 and 2 can be accepted.Furthermore, we may notethat respondents' investment decisionswere associatedwith the demographic variables of respondents, which influenced their financial literacy, self-control, and investment behaviour, such as their gender, age, and allowance. However, only the effect ofgender was found to be statistically significant.

According to this study's findings, young millennial women are more financially literateand this influences their investment behaviour, with females50%more literate than male respondents. Millennials in Indonesia inthe age range from 17 to20 years old were generally financially literate but hadweak self-control related to investment behaviour. The findings of this study suggest that investment bodies in Indonesia should focus more on increasing young's women self-control because they have good financial literacy but lack control when it comes to their investment behaviour. Nowadays, it is very important for people, especially youths, to invest in what they want to do. The financial literacy of millennials in Indonesia is quite good, but they need to improve their self-control and be more willing to invest in their future. Previously, there has been little research into the factors associated with investment behaviour among millennials in Indonesia. So, this studyhelps to fill aresearch gap. We suggest that self-control among millennials should be improved, along with their financial literacy in terms of investments.

CONCLUSION, LIMITATION AND THE STUDY IMPLICATION

Overall, this study highlights a significant relationship between financial literacy and investment behavior, with financial literacy accounting for 54% of the variance in investment behavior. It also suggests that self-control explains 35% of the variance in investment behavior. Specifically, factors such as credit management, income-expenditure balance, money management, and budgeting are strongly associated with financial literacy. However, the study reveals a negative relationship between self-control and investment behavior, implying that improving self-control could enhance investment behavior. These results contradict previous research which indicates that financial traits positively influence trading activity. It is important to note that the surveyed millennials in this study exhibited low self-control, which did not have a significant correlation with their investment behavior. On the contrary, findings demonstrate that strong self-control is associated with improved financial behavior, confidence, and security. This research also addresses a gap in understanding the factors influencing millennials' investment behavior in Indonesia. It emphasizes the importance of enhancing self-control alongside financial literacy. Investment bodies should focus on developing both aspects to empower millennials in making informed investment decisions and securing their financial futures. The study contributes to filling a research gap and highlights the significance of comprehensive financial education among Indonesian millennials.

The current study was limited in the scope of design and findings. The study employed a cross-sectional design allowing the collection of required data at a specific time point. Such a design constrained the causal links between financial literacy, self-control, and investment behavior is constrained. Additionally, the study was restricted to a small sample of university students who attended an investment seminar. Consequently, the findings may only be applicable to other age groups or populations beyond Indonesia. Moreover, the study's demographic representation had a disproportionate number of female participants, which could restrict the generalizability of the findings to a broader community of Indonesian millennials.

The findings of the present study offer insightful recommendations tailored towards individual investors, particularly those from the millennial generation. The outcomes provide pragmatic advice for these individuals by underscoring the necessity to enhance self-control and financial literacy for notable impacts on their investment activities. The significance of financial literacy has been underscored in numerous studies, reflecting its relevance to various researchers, organisations, and economists. Grasping the diverse economic activities of the populace could constitute an integral part of fostering national development and economic growth. Arguably, the ability of young millennials to exercise self-control is a critical determinant of their financial management proficiency, in conjunction with their financial literacy. Equipped with these dual aspects, they can appreciate the essence of money and flourish in their investment endeavours. Therefore, initiatives aimed at promoting financial literacy and self-control will be fundamental in aiding potential millennial investors in improving their investment behaviour. Future research should aim to validate the findings espoused herein by employing larger Indonesian samples, and potentially incorporating respondents from 'Generation Z.'

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COMPETING INTERESTS

The authors declare that they have no competing interests

AUTHORS’ CONTRIBUTION

All authors contributed equally to the conception, design and application of the study.

DATA AVAILABILITY

The data of the current study are available in Azizah and Mulyono(2020) at doi:10.1016/j.dib.2020.106083.

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