

Green Finance Awareness, Risk-Taking, and Sustainable Investment Among Retail Investors in Indonesia: Does Gender Matter?

R. Amalina Dewi Kumalasari^{1*}; Mahir Pradana²;
Aditia Soelaksono³; Anita Silvianita⁴

¹Business Administration Study Program, School Economics and Business, Telkom University
West Java, Indonesia 40257

^{2,4}Master of Business Administration Study Program, School Economics and Business, Telkom University
West Java, Indonesia 40257

³Kantor Otoritas Jasa Keuangan Jember
East Java, Indonesia 68131

¹radenamalina@telkomuniversity.ac.id; ²mahirpradana@telkomuniversity.ac.id;
³aditiasoelaksono@gmail.com; ⁴anitasilvianita@telkomuniversity.ac.id

Received: 31st December 2025/ **Revised:** 23rd April 2026/ **Accepted:** 23rd April 2026

How to Cite: Kumalasari, R. A. D., Pradana, M., Soelaksono, A., & Silvianita, A. (2026). Green finance awareness, risk-taking, and sustainable investment among retail investors in Indonesia: Does gender matter? *Binus Business Review*, 17(3), 265–279. <https://doi.org/10.21512/bbr.v17i3.15065>

ABSTRACT

Indonesia has introduced green sukuk and sustainable finance regulations, but its green finance market remains less developed than those of countries such as China, Germany, and the United States. While prior studies have largely focused on financial literacy and investment intention, they have paid limited attention to the behavioral mechanisms through which green finance awareness translates into investment decisions, particularly among retail investors in emerging markets. The research addresses this gap by examining how green finance awareness influences investor behavior through investment risk-taking and external influences, while also testing the moderating role of gender. A quantitative research design is employed using a survey of 198 active retail investors who utilize digital investment platforms. Data are analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings indicate that green finance awareness significantly enhances investors' willingness to take investment risks and increases their susceptibility to external influences such as social norms, expert opinions, and market information. Both investment risk-taking and external influences positively affect sustainable investment decisions. However, gender does not significantly moderate the relationship between green finance awareness and investment risk-taking, suggesting that male and female investors respond similarly to green finance products. These findings contribute to the literature by providing an integrated behavioral perspective on sustainable investment decisions in the context of retail investors in Indonesia. The results offer practical insights for policymakers and financial institutions to design strategies that enhance retail participation in green finance and support the growth of Indonesia's sustainable investment market.

Keywords: green finance awareness, risk taking, sustainable investment, retail investors, gender

INTRODUCTION

Climate change and the ongoing global transition to a low-carbon economy have prompted financial institutions worldwide to rethink how they manage money flows and for what purposes. Green finance has become a key approach to support

environmentally responsible investments and help to achieve net-zero goals. Among the most visible forms are green bonds, which have grown rapidly across international markets. According to data from Climate Bonds Initiative (2025), the United States issued green bonds the most in 2024, at USD 84.7 billion, followed by Germany and China. Despite the rapid global

growth of green finance, retail investor participation in developing countries such as Indonesia remains relatively limited.

Indonesia has made efforts through initiatives such as green sukuk and green bonds. Regulations issued by the Financial Services Authority (Otoritas Jasa Keuangan (OJK)) on sustainable finance remain central to the national sustainability agenda (Otoritas Jasa Keuangan, 2017a, 2017b), the country has not yet ranked among the top ten global issuers. This reflects both the encouraging potential and ongoing challenges in developing Indonesia's green finance sector.

The expansion of green finance in Indonesia has been primarily driven by financial institutions and regulators. However, compared to the total number of retail investors, which reach approximately 14.83 million as of December 2024 (KSEI, 2024), participation in green finance instruments remains relatively small. For example, the number of green sukuk investors in 2024 was only 21,890, with an additional 4,313 new investors (INDEF, 2025). This suggests that green finance in Indonesia remains in an emerging phase, offering significant room for future growth. Without a sufficient understanding of how awareness can be translated into actual investment behavior, the effectiveness of policies and the development of green finance instruments risk being suboptimal.

Retail investors have the potential to play a significant role in financing sustainable projects and enhancing market resilience. Therefore, more in-depth research is needed to understand the factors that drive awareness to evolve into actual investment decisions, so that green finance policies and instruments can be designed more effectively. A regional survey conducted by Statista (2023), which includes 4,800 investors across six Southeast Asian countries, finds that 67% invest due to concern for future generations, 43% follow recommendations from friends or family, and 39% rely on advice from financial professionals. Fewer investors prioritize financial returns or tax incentives. These findings suggest that moral and social motivations are highly influential in driving sustainable investment in Southeast Asia, including Indonesia.

Research on investor behavior in Indonesia indicates that, although public awareness of sustainable investment exists, actual participation remains limited. Variables such as gender, financial literacy, and perceived costs influence individuals' interest in sustainable investment (Handayani & Rokhim, 2023). Many financial institutions and companies lack a comprehensive understanding of green finance, which impedes the spread of green financial education and literacy (Volz et al., 2015). This deficiency affects retail investors' capacity to evaluate the risks and potential returns associated with green investments. Consequently, enhancing investor awareness is crucial in motivating companies to adopt more proactive sustainable practices (Breitenstein et al., 2021).

Recent studies have shown that green financial

instruments, such as green bonds and green sukuk, can help to support sustainable growth (Adhiyogo et al., 2022; Cendekiawan & Firmansyah, 2024; Wahyuningsih et al., 2024). Adhiyogo et al. (2022) have examined the factors that influence investors' decisions to purchase green bonds and found that financial literacy and environmental awareness are key considerations. Wahyuningsih et al. (2024) have examined the Indonesian green bond market and its effects on the economy. Faisal et al. (2023) have employed the consumption value theory to investigate why people purchase green sukuk. Kim et al. (2024) have offered broader views on regional and global trends. Even with further research in this area, challenges persist, including low public awareness and ineffective marketing.

Green finance encompasses financial mechanisms designed to deliver long-term economic and environmental benefits by promoting efficient resource use, reducing waste, and strengthening climate resilience (Mudalige, 2023; Xing et al., 2024). Green finance also channels capital to projects that protect the environment, improve energy efficiency, and promote sustainable development (Wang & Ma, 2022). In practice, green finance enables investors to support environmentally beneficial projects through instruments such as green bonds and green sukuk. These instruments channel investment funds into activities such as renewable energy development, energy-efficient infrastructure, and sustainable waste management. For retail investors, understanding these instruments involves recognizing their financial characteristics and the environmental purposes of the projects they support. This understanding can help investors to assess whether their investment choices align with their financial objectives and environmental values.

Environmental, Social, and Governance (ESG) practices are essential for improving environmental performance, strengthening governance, and mitigating sustainability-related risks (Ahmad et al., 2024; Gillan et al., 2021). Green finance bridges the goals of economic growth and environmental protection by financing projects focused on renewable energy, energy efficiency, and climate change mitigation (Jinru et al., 2022; Umar et al., 2021; Xing et al., 2024). Over the long term, these initiatives promote green technologies, reduce carbon emissions, and foster sustainable industrial growth, thereby contributing to economic stability (Ji et al., 2021; Lin et al., 2024; Zhou et al., 2024).

In Indonesia, efforts to advance sustainable finance have included the issuance of Sustainable Development Goals (SDG) bonds, and the development of a green taxonomy is aligned with the United Nations Sustainable Development Goals (PwC Indonesia, 2023). These initiatives are part of a broader effort to direct investment toward environmentally and socially responsible sectors. Globally, institutions such as the Network for Greening the Financial System (NGFS) are playing a critical role in driving this

transition by promoting a more sustainable financial system (Mudalige, 2023). With growing demand for credible and responsible investments, green finance is no longer a niche concept but a crucial pillar of sustainable economic development.

Consumer behavior has emerged as a critical subject in sustainable finance research, particularly in relation to the perception and adoption of green financial solutions (Monk & Perkins, 2020). Several studies have underlined that the success of green finance efforts depends not only on institutional backing and regulatory frameworks but also on how consumers respond to environmentally friendly financial innovations. For example, Monk and Perkins (2020) have emphasized the importance of examining the development and dissemination of new green financial solutions, as well as identifying the factors that drive customer adoption.

Green customers are often described as individuals who consciously reject products that negatively impact the environment during their creation, use, or disposal (Witek & Kuźniar, 2021). They utilize products and services that satisfy their needs and enhance quality of life while safeguarding the ability of future generations to meet their needs by reducing the use of natural resources, hazardous materials, and the production of waste and pollutants (Trong Nguyen et al., 2023). This ecologically conscious approach also influences their financial decision-making. As investors, they evaluate the ecological and social ramifications of their investments. The application of behavioral economics helps to explain these judgments by relating financial choices to cognitive and emotional aspects, such as knowledge, perceptions, and psychological biases (Rahardjo & Atmaji, 2023).

Cognitive biases and knowledge levels significantly influence investment behavior, even though the study focuses on general financial literacy (Rahardjo & Atmaji, 2023). These determinants are equally relevant in the context of green finance, where risk perception, social norms, and psychological reactance affect investor willingness to engage in green finance activities (Al Amin et al., 2023). Environmental awareness, satisfaction, social support, and green marketing are further identified as key drivers of continued participation in green finance. These previous findings suggest that sustainable financial behavior is influenced by both rational processes and emotional, as well as social, factors.

In the same way, marketing and advertising methods are very important for getting people to use green financial products. Sabbar et al. (2023) have shown that green marketing and brand communication substantially affect investors' intentions to invest in green energy bonds in Indonesia. Gáspár et al. (2023) have shown that customer motives are not all the same. Some investors are motivated by financial rewards, while others are motivated by social impact or environmental concerns. This implies that comprehending consumer behavior in green finance

necessitates acknowledging its multidimensional characteristics, where economic, social, and psychological factors converge.

As environmental concerns and the rise of sustainable finance globally increase, consumer awareness of green financial products is becoming increasingly important. Green financial instruments (e.g., green bonds, green investment funds, and sustainable banking services) are specifically designed to finance projects that benefit the environment and promote long-term sustainable development. In the research, green finance awareness reflects an individual's recognition of the environmental relevance of financial products and the extent to which environmental sustainability is consciously considered and prioritized in investment-related decisions.

Some investors, as consumers of financial products, strongly value environmental and social responsibility, even if this means accepting potentially lower financial returns than traditional investments with equivalent risk (Gáspár et al., 2023). These investors, who are motivated by ethics, put making a beneficial social and environmental impact through their financial choices first. Nonetheless, studies on green purchasing behavior indicate that environmental consciousness does not consistently translate into actual purchase or investment actions (Joshi & Rahman, 2015).

In the Indonesian context, Adhiyogo et al. (2022) have discovered that financial literacy and risk perception substantially affect individual investors' intentions to invest in green bonds. However, robust data indicating that heightened environmental concern can influence investment intentions is scarce. This research aligns with the overarching notion of the value-action gap, where favorable attitudes toward sustainability do not invariably translate into corresponding behaviors. This gap highlights the behavioral complexities associated with adopting green finance, suggesting that heightened awareness must be complemented by trust, perceived value, and favorable market conditions to promote engagement in sustainable investments effectively.

Although the development of green finance in Indonesia continues to show a positive trend, understanding retail investor behavior in this context remains relatively limited. Most studies in Indonesia tend to focus on financial literacy, investment intention, or the development of instruments such as green bonds and green sukuk (Adhiyogo et al., 2022; Faisal et al., 2023). However, only a few studies specifically examine how awareness of green finance influences investment decision-making from a behavioral perspective.

In addition, previous Indonesian studies have examined related aspects of sustainable investment, including financial literacy as a moderator of green bond investment intentions (Adhiyogo et al., 2022), and awareness, social influences, and risk aversion in retail green sukuk investment (Kasmad et al., 2024). However, these studies do not directly establish

whether gender moderates the relationship between green finance awareness and investment risk-taking. Investment decisions involve psychological and social considerations, including investor characteristics and normative influences (Gáspár et al., 2023; Rathee & Aggarwal, 2022). Therefore, this research addresses this specific gap by examining how green finance awareness relates to sustainable investment decisions through investment risk-taking and perceived external influences among retail investors in Indonesia, while testing gender as a moderator of the awareness–risk-taking relationship.

One of the best aspects of green financial instruments is that they may help to attract private funding for climate and environmental projects (Liaw, 2020; Pham & Nguyen, 2022). Green bonds are becoming increasingly popular among these types of investments, as they enable investors to combine their financial objectives with their environmental goals while still earning good returns. Retail investors who prioritize environmental sustainability tend to select green bonds over conventional bonds that support carbon-intensive firms when making investment decisions (Bhutta et al., 2022; Rathee & Aggarwal, 2022). At the same time, green-bond issuers strengthen their business incentives and legitimacy, leading to a stronger corporate image, market expansion, reduced reputational risk, and diminished regulatory pressure by engaging in sustainability initiatives (Maltais & Nykvist, 2021). These outcomes have a positive effect on stock valuation. People buy these securities for several reasons, such as wanting to add environmentally friendly assets to their portfolios and help to achieve the SDGs and the Paris Agreement (Tolliver et al., 2019).

On the other hand, investors who care more about making money than being ethical sometimes want to get the most return with the least amount of risk and do not care about the environment. Some investors decide where to put their money based more on typical financial metrics like returns and risk-adjusted performance than on goals that have to do with sustainability. Individuals with lower risk tolerance typically exhibit a preference for safer assets, even when alternative investments may offer higher returns or stronger alignment with sustainability objectives (Gáspár et al., 2023).

However, risk considerations do not necessarily discourage engagement in sustainable or impact-oriented investments. Rathee and Aggarwal (2022) have found that while risk perception significantly influences impact investment intentions, it represents the weakest determinant compared to attitudinal and normative factors. This indicates that perceived risk does not constitute a primary barrier to sustainable investment adoption. Green investments can still deliver competitive financial performance despite perceived risks. Meanwhile, Nurhayadi et al. (2021) have found that Sharia-compliant green innovation firms in Indonesia outperform non-Sharia-compliant firms in terms of stock volatility and risk-adjusted

returns. Nevertheless, uncertainty regarding long-term performance persists, particularly due to limited historical data and evolving regulatory frameworks governing green financial instruments. In this context, financial literacy plays a crucial role in enabling investors to make informed decisions, especially when evaluating relatively new assets such as green bonds (Rahardjo & Atmaji, 2023).

From a behavioral perspective, awareness of green finance is expected to play an important role in shaping investment decisions. As awareness increases, investors tend to understand the options better, which helps reduce uncertainty and enables them to evaluate potential financial and non-financial returns. With more adequate information, investors are generally more rational in assessing risks, which can, in turn, increase their willingness to take investment risks. However, awareness does not always directly influence risk perception or investment decisions (Hosen et al., 2026). In some situations, other factors such as economic expectations and cognitive biases may play a more dominant role in shaping investor behavior. This suggests that the effect of awareness on risk-taking is contextual.

The relationship between awareness and risk-taking tendencies is not always uniform, as it may be influenced by sociodemographic factors, particularly gender. The literature suggests that female investors tend to exhibit higher levels of environmental awareness, yet at the same time demonstrate greater risk aversion, making them more cautious in investment decision-making, including in the context of sustainable investments (Gáspár et al., 2023; Lone et al., 2026). In contrast, male investors generally display higher confidence in their financial knowledge and a greater propensity to take risks (Patil & Gokhale, 2023). Gender has also been found to moderate the adoption of sustainable investment products, including green bonds and ESG-oriented assets (Kim et al., 2024; Patil & Gokhale, 2023). In this context, increased awareness of green finance may produce different effects. Among male investors, awareness may directly strengthen risk-taking behavior due to heightened perceptions of potential returns. Meanwhile, among female investors, increased awareness may primarily reinforce cautious considerations, thereby limiting its effect on risk-taking. Therefore, gender may serve as a moderating variable that influences the strength of the relationship between green finance awareness and investment risk-taking.

Nevertheless, recent evidence suggests that gender differences in sustainability-oriented investment behavior are gradually narrowing (Patil & Gokhale, 2023). In the Indonesian context, gender equality has become a key focus of sustainability initiatives, with increasing efforts from corporations and institutions to promote gender inclusion and expand investor participation (IBCWE, 2023). Accordingly, this moderating relationship becomes an interesting area for further investigation. Therefore, the research examines whether green finance awareness influences

investment risk-taking and also tests whether gender moderates the effect of green finance awareness on investment risk-taking among retail investors in Indonesia.

Next, investment decisions do not occur in isolation, but are often shaped by social dynamics and the influence of external information sources (Prajapati et al., 2021). Beyond individual characteristics such as personal preferences and financial literacy, investment decisions are also shaped by external influences, including social norms, peer recommendations, and information from the broader market environment. Prior studies suggest that market mechanisms play an important role in shaping investors' perceptions of risk and return in sustainable finance (Li et al., 2022; Liaw, 2020). Further evidence indicates that social and normative factors are critical determinants of sustainable and impact-oriented investment decisions. For instance, Rathee and Aggarwal (2022), in a study of individual investors in India, have shown that attitudes toward impact investing, subjective norms, and perceived behavioral control significantly influence investment intentions, highlighting the importance of ethical considerations and social influence in shaping investor behavior.

Consistent with this view, Lone et al. (2026) have found that social variables have a strong impact on investors' perceptions of green bonds in India. This suggests that investment preferences are shaped by social norms and the availability of sustainability-related information. Similarly, research conducted in Hungary by Gáspár et al. (2023) has revealed that investors with weaker personal beliefs about sustainability are highly responsive to external cues, including advertising campaigns, expert opinions, and prevailing social trends, all of which can play a significant role in determining their financial decisions. In such conditions, investors rely more heavily on external cues because they lack a strong internal basis for decision-making.

On the other hand, higher awareness may also encourage investors to become more active in seeking and evaluating information. Investors who better understand green finance may complement their existing knowledge by seeking additional references, considering expert opinions, and observing other investors' behavior. This information-seeking process may make them more receptive to external influences, as social norms and advice from others are relevant to investment preferences and intentions (Prajapati et al., 2021; Rathee & Aggarwal, 2022). Accordingly, greater awareness may increase investors' openness to recommendations and social information when making sustainable investment decisions.

The research conceptual framework outlines the interrelationships among key variables and is grounded in existing theoretical perspectives. This framework illustrates how green finance awareness influences investment risk-taking, susceptibility to external influences, and sustainable investment decision-making among retail investors in Indonesia.

Furthermore, the research proposes that gender acts as a moderating variable, influencing the relationship between green finance awareness and investment risk-taking. The research formulates the following hypotheses:

- H1: Green finance awareness has a significant influence on investment risk-taking among retail investors in Indonesia.
- H2: Green finance awareness has a significant influence on the perceived external influences among retail investors in Indonesia.
- H3: Investment risk-taking has a significant influence on sustainable investment decisions among retail investors in Indonesia.
- H4: Perceived external influences significantly influence sustainable investment decisions among retail investors in Indonesia.
- H5: Gender moderates the relationship between green finance awareness and investment risk-taking among retail investors in Indonesia.

METHODS

The research utilizes a quantitative methodology and a questionnaire survey to investigate the determinants affecting the investment behavior of retail investors in Indonesia. The sample comprises retail investors in Indonesia who have invested in, or intend to invest in, green financial products. This approach ensures that participants have relevant experience in making investment decisions influenced by sustainability considerations. The sampling technique used is non-probability convenience sampling, given the lack of a comprehensive sample size for the investor population with predetermined criteria.

The survey instrument consists of three main sections. The first section contains screening questions to ensure that respondents have previously invested in or are planning to invest in green financial products. The second section collects sociodemographic information, while the third section includes statements measuring respondents' perceptions based on variables related to sustainable investment behavior. The constructs measured in the second section include green finance awareness, investment risk-taking, perceived external influences, and sustainable investment decisions (see Table 1 in Appendices).

The questionnaire is translated into Indonesian to improve accessibility and undergoes translation validation. Participants respond using a seven-point Likert scale. Data collection is conducted online through the tSurvey platform (a paid digital survey platform in Indonesia that uses big data analytics to target respondents better). The survey is distributed to a relevant panel of respondents, specifically individual investors who actively use digital investment platforms such as Ajaib, Bibit, Pluang, Stockbit, Ipot, and RTI Business. A total of 200 responses are

collected, of which 198 are deemed valid for analysis. Participants are drawn from various regions across Indonesia. However, convenience sampling may limit the generalizability of the findings to the broader investor population. Although this sample may not fully represent the entire investor population, it is considered sufficient to generate meaningful insights (Gáspár et al., 2023; Hair et al., 2021).

The research employs Partial Least Squares-Structural Equation Modeling (PLS-SEM) to evaluate the suggested research framework. According to Hair et al. (2021), one of the main benefits of PLS-SEM is that it can test measurement models, assess validity, and examine relationships among variables simultaneously. This method is great for research that looks at more than one construct and indicator. To ensure that each latent variable is measured accurately and consistently, the analysis is conducted using SmartPLS 4 software. The researchers examine the indicators' external loadings to assess their reliability. If all values exceed 0.7, each item adequately represents the corresponding construct. Composite Reliability (CR) is used to check for internal consistency reliability. Values above 0.7 are seen as satisfactory. When the Average Variance Extracted (AVE) value exceeds 0.5, each construct accounts for more than 50% of the variance in its indicator. Moreover, discriminant validity is assessed to confirm that each construct separates from the others within the model. The Fornell-Larcker criterion assesses discriminant validity. This means that the square root of the AVE of each construct is higher than its correlation with other constructs.

Hypotheses H1–H4 are evaluated using the estimated structural path coefficients and their bootstrap standard errors, t-statistics, and p-values. Statistical significance is assessed at the 5% level. Then, for a two-tailed test, the conventional critical t-value is 1.96 (Hair et al., 2021). H5 is evaluated through the interaction term between green finance awareness and gender predicting investment risk-taking. A significant interaction coefficient supports moderation. A nonsignificant interaction indicates insufficient evidence of moderation.

RESULTS AND DISCUSSION

The research employs variance-based SEM using SmartPLS 3.0 to examine the proposed research model. Prior to discussing the structural relationships, the demographic characteristics of the respondents provide important context for interpreting the empirical findings. As presented in Table 2 (see Appendices), the sample is dominated by economically active individuals, with a higher proportion of male respondents and most participants falling within productive age groups.

The majority of respondents are male, accounting for 129 individuals (65%), while female respondents comprise 69 individuals (35%). In terms of age distribution, the largest proportion is aged 25–31 years (33%), followed by 18–24 years (22%)

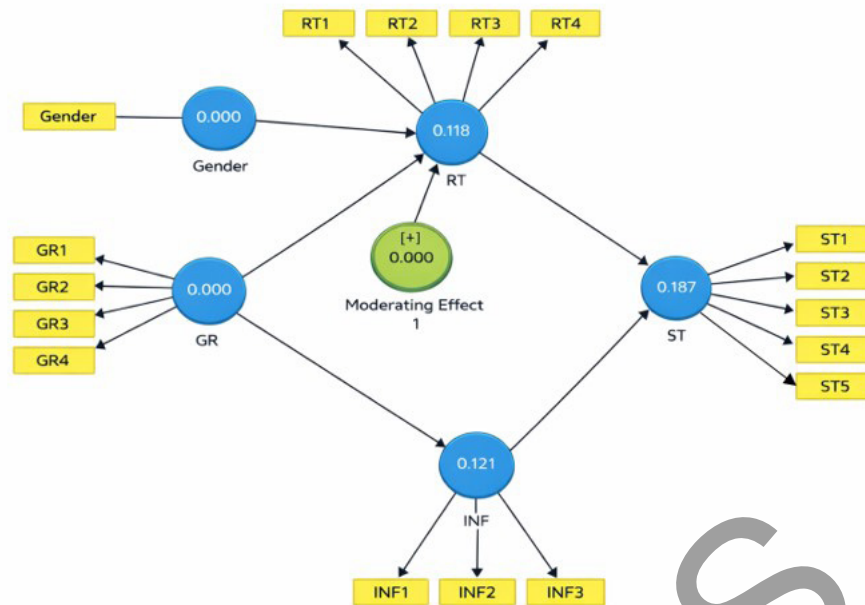
and 32–38 years (17%). Respondents aged 39–45 years and above 45 years account for 13% and 15% of the sample, respectively. In terms of occupation, the sample is dominated by employees, who constitute 50% of the respondents, followed by entrepreneurs at 35% and students at 15%. This distribution suggests that a substantial proportion of respondents are actively engaged in economic activities and financial decision-making.

In terms of educational background, most respondents have higher education qualifications: 69% hold undergraduate or postgraduate degrees, while 31% have completed senior high school. Regarding monthly income, most respondents fall into the middle-income category. Specifically, 54% report a monthly income ranging from IDR 1,200,000 to IDR 6,000,000. Respondents earning below IDR 1,200,000 and above IDR 6,000,000 represent 31% and 15% of the sample, respectively. Overall, this income distribution reflects a diverse range of economic capacities among the respondents.

The measurement model demonstrates satisfactory internal consistency reliability, convergent validity, and discriminant validity, as shown in Tables 3 and 4 (see Appendices). Outer loadings range from 0.604 to 0.867. Although several indicators have loadings below 0.70, they are retained because all constructs achieve CR values above 0.70 and AVE values above 0.50. Specifically, CR values range from 0.803 to 0.868, supporting internal consistency reliability, while AVE values range from 0.507 to 0.631, supporting convergent validity. Discriminant validity is supported by the Fornell-Larcker criterion. The square roots of AVE in bold numbers for green finance awareness (0.788), perceived external influences (0.794), investment risk-taking (0.712), and sustainable investment decisions (0.724) exceed their respective correlations with other constructs. These results support the adequacy of the measurement model for subsequent structural model assessment.

Since the research relies on self-reported data collected from a single survey source, the potential issue of Common Method Bias (CMB) is assessed using the full collinearity Variance Inflation Factor (VIF) approach, as recommended by Kock (2015). The results indicate that all full collinearity VIF values range from 1.000 to 1.227 (see Table 5 in Appendices), which are well below the conservative threshold of 3.3 (Kock, 2015). This suggests that CMB is unlikely to be a serious concern in the research. In addition, it evaluates potential multicollinearity issues in the structural model. All inner VIF values are below the threshold of 5, as recommended by Hair et al. (2021), indicating no significant multicollinearity among the constructs.

Figure 1 presents the model structure, with reflective indicators connected to their respective constructs. The interaction between green finance awareness and gender predicts investment risk-taking. Table 6 (see Appendices) also reports the path coefficients used for hypothesis testing: green finance



Note: GR = Green finance awareness; RT = Investment risk-taking; INF = Perceived external influences; and ST = Sustainable investment decisions

Figure 1 Structural Equation Modeling (SEM) Analysis Results Using SmartPLS

awareness $\rightarrow$ investment risk-taking ($\beta = 0.599$), green finance awareness $\rightarrow$ perceived external influences ($\beta = 0.499$), investment risk-taking $\rightarrow$ sustainable investment decisions ($\beta = 0.602$), perceived external influences $\rightarrow$ sustainable investment decisions ($\beta = 0.248$), and green finance awareness $\times$ gender $\rightarrow$ investment risk-taking ($\beta = 0.089$). These coefficients describe the direction and magnitude of the estimated relationships; their statistical significance is evaluated using the corresponding bootstrap statistics.

The significance of each relationship between variables is determined by comparing the t-statistic value with the critical value of the t-table at the 5% significance level. As shown in Table 6 (see Appendices), H1, H2, H3, and H4 are statistically significant, with p-values below 0.05. Conversely, H5 is not supported, as its p-value exceeds the 0.05 threshold. These findings provide important insights into the interaction between green finance awareness, investment risk-taking, external influence, sustainable investment decisions, and the moderating role of gender among retail investors in Indonesia.

The results indicate that green finance awareness has a positive effect on investment risk-taking among retail investors in Indonesia. This finding suggests that the higher the level of investors' understanding of the concepts and benefits of green finance is, the greater their willingness to take investment risks will be. From a behavioral perspective, it can be explained by reduced ambiguity and enhanced ability to evaluate potential expected returns. When investors are better informed, they not only understand the risks associated with green financial instruments

but can also recognize their long-term benefits, both financially and socially. These findings are consistent with previous studies emphasizing the importance of knowledge and awareness in shaping investment behavior. For example, Joshi and Rahman (2015) have demonstrated that consumer knowledge plays a crucial role in driving the adoption of environmentally friendly products. Meanwhile, Faisal et al. (2023) and Sabbar et al. (2023) on green bonds and green sukuk have also found that investors' understanding significantly influences investment decisions. Furthermore, Gáspár et al. (2023) have shown that investors in green finance consider not only financial returns but also social and environmental values. Therefore, increased awareness can strengthen perceptions of investment benefits and encourage investors to be more willing to take risks. However, this finding is not entirely consistent with the study by Hosen et al. (2026) that ESG awareness does not have a significant effect on either risk perception or investment decisions. In some cases, awareness can reduce uncertainty and enhance investors' willingness to take risks, while in other contexts, it may not be sufficiently strong to directly influence risk perception.

A full understanding of this risk-return relationship is very important for making smart investing choices. The beneficial impact of green financial awareness on perceived advantages and dangers is consistent with prior research. Consumer knowledge is very important for persuading people to buy things that are good for the environment (Joshi & Rahman, 2015). Similarly, research on green sukuk (Faisal et al., 2023) and green energy bonds (Sabbar et al., 2023) indicates that investors' knowledge

significantly influences their investment intentions. As investors gain a clearer understanding of green finance, they become more aware of its dual potential to generate financial returns while generating positive environmental and social impacts. Hence, it enhances their perception of its benefits. This perspective is reinforced by Gáspár et al. (2023) that investors who are interested in green financial products are often motivated by considerations beyond just financial returns.

Furthermore, the results indicate that investment risk-taking has a significant effect on sustainable investment decisions. This finding confirms that the willingness to take risks is a key factor driving investors to engage in sustainable investments. Investors with higher risk tolerance tend to be more open to green financial instruments, which are often still perceived as having a certain level of uncertainty compared to conventional investments. These results are consistent with previous studies showing that risk perception plays a role in shaping investment decisions, although it is not the sole determining factor. Adhiyogo et al. (2022) have found that Indonesian investors demonstrate increased interest in green bonds when they perceive returns to be commensurate with the associated risks. Similarly, Faisal et al. (2023) have shown that functional value, such as the rate of return, is an important factor in green sukuk investment decisions. Rahardjo and Atmaji (2023) have stressed how important it is for people to be financially literate so they can make smart investment decisions. In green finance, investors who are aware of sustainable investment risks make better decisions. Al Amin et al. (2023) have asserted that environmental mindfulness and resistance to change impact the persistence of pro-environmental financial practices. Analyzing these elements can facilitate more accurate risk evaluation. Increasing awareness of the advantages and disadvantages typically helps individuals to make informed decisions. Nevertheless, it can also lead to greater caution. Investors who are highly aware of the hazards may not invest, even when they see big benefits. This shows how important it is to have tailored activities that not only promote awareness but also deal with specific problems and lower perceived risks.

Investment risk-taking shapes sustainable investment choices for Indonesian retail investors. When investors see that rewards outweigh risks, they are more likely to add sustainable assets to their portfolios. This underscores the need to highlight both financial viability and social and environmental value when promoting sustainable investment products. On the other hand, although risk influences impact investment intentions, its effect is relatively weaker than attitudinal and social normative factors (Rathee & Aggarwal, 2022). This indicates that investors in the context of sustainable investment do not merely avoid risk but evaluate it alongside broader values and objectives. In other words, the decision to invest in sustainable instruments is not solely based on

risk-return considerations, but also on the perceived social and environmental benefits generated. This pattern aligns with Joshi and Rahman (2015) that awareness and value-based considerations drive eco-friendly purchasing behavior beyond purely economic concerns. As investors increasingly understand the combined financial and societal benefits of sustainable investments, they tend to perceive these instruments as more attractive and viable. Furthermore, the contribution of green financial technology in promoting sustainable practices suggests that technological innovation can enhance accessibility, transparency, and trust in sustainable investment products, thereby strengthening their perceived value (Aboalsamh et al., 2023).

The results also indicate that perceived external influence has a significant effect on sustainable investment decisions. This finding confirms that investment decisions are not solely based on individual considerations but are also strongly shaped by the social environment and the availability of information. Social norms, peer recommendations, and expert opinions can serve as important references that help investors evaluate investment options, particularly for relatively new instruments such as green finance. These findings are consistent with previous studies emphasizing the importance of social factors and market mechanisms in shaping investment decisions. Liaw (2020) and Li et al. (2022) have demonstrated that market development can influence investors' perceptions of risk and return, which in turn affect investment decisions. Moreover, social norms and peer influence significantly shape investment behavior. Joshi and Rahman (2015) and Rathee and Aggarwal (2022) have also highlighted that social factors play a crucial role in consumer decision-making.

In developing countries such as Indonesia, external influences may become even more important due to the limited experience and available information to investors regarding sustainable financial products. Government policies, incentives, and communication from financial institutions can create a more conducive environment for adopting sustainable investments. In line with this, in emerging markets, external influences tend to have a stronger impact on consumer behavior (Witek & Kuźniar, 2021). Additionally, psychological factors such as social support and satisfaction also play a role in sustaining investor engagement in green finance (Al Amin et al., 2023). These external forces can reinforce positive investment experiences and encourage long-term participation in sustainable financial markets. The findings suggest that external influence serves as an important mechanism that bridges awareness and sustainable investment decisions. Investors who are more aware of green finance not only understand its benefits but are also more connected to supportive social environments and information networks, thereby increasing their likelihood of engaging in sustainable investments.

An interesting finding is that gender does not moderate the relationship between green finance

awareness and investment risk-taking. This finding suggests that increased awareness of green finance has a relatively similar effect on risk-taking tendencies for both male and female investors. In other words, as the level of awareness increases, both groups tend to evaluate the potential benefits and risks of sustainable investments in a comparable manner. This finding does not fully align with some previous literature that highlights gender differences in investment behavior. Several studies suggest that women tend to be more cautious and have a stronger orientation toward sustainability, while men are generally more willing to take risks (Gáspár et al., 2023; Lone et al., 2026; Patil & Gokhale, 2023). However, the results show that, among retail investors in Indonesia, both female and male investors exhibit a similar relationship between their awareness of green financial products and their assessment of associated benefits and risks. This indicates that, in the context of sustainable investment, both genders respond similarly to levels of green finance awareness.

One possible explanation is that increased access to information and education on sustainable finance has created a more uniform level of understanding among investors. When investors possess sufficient awareness, they tend to rely on similar considerations in evaluating risks and potential returns, thereby reducing gender-based differences. This is consistent with the findings of Patil and Gokhale (2023) that gender-based differences in sustainability-oriented investment behavior are gradually narrowing. Furthermore, in the Indonesian context, increasing financial inclusion and the widespread use of digital investment platforms have enabled more equal access to information for both men and women. This condition may contribute to the homogenization of investor behavior, particularly in responding to information related to green finance. Overall, these findings suggest that green finance awareness plays a more decisive role than gender in influencing investment risk-taking. Therefore, efforts to enhance awareness through education and sustainable financial literacy initiatives have the potential to generate broad and relatively equal impacts across different gender groups.

CONCLUSION

The research offers significant theoretical and practical insights into the determinants affecting sustainable investment choices among retail investors in Indonesia. It focuses on green finance awareness, investment risk-taking, external influences, and the moderating effect of gender. The results show that green finance awareness significantly shapes investment risk-taking. It also affects external influences, all of which positively contribute to sustainable investment behavior. However, gender does not significantly affect the link between green finance awareness and investment risk-taking.

The research also offers actionable insights for

regulators and financial industry players to improve existing programs and policies. OJK and industry have launched financial literacy initiatives and green investment products. However, the findings show that raising awareness of green finance is crucial to shaping investors' views on benefits, risks, and social incentives. Therefore, educational programs should use simpler, more accessible materials, such as real-life green project examples, profit simulations, and clearer explanations of risks.

The research reveals that communities and influencers significantly drive public interest. Therefore, strengthening collaboration with them is essential to expand reach and build trust. Although segmentation-based marketing strategies exist, gender does not impact the main relationship. This means that educational and promotional efforts should focus on investment literacy and experience, rather than gender. Enhance the green investment ecosystem to be more inclusive, transparent, and appealing to new retail investors.

The research has several limitations. Convenience sampling of 198 digital-platform users may limit the generalizability of the findings to the broader Indonesian retail investor population. Then, the cross-sectional design captures respondents' perceptions at a single point in time, while self-reported responses may not fully reflect actual investment behavior. Therefore, future research should include a broader range of investors, examine additional demographic variables, and adopt a longitudinal approach to track changes in investor behavior. These efforts can deepen understanding of green finance adoption and help stakeholders to identify barriers to participation, thereby supporting the development of a sustainable financial system in Indonesia.

AUTHOR CONTRIBUTIONS

Developed the research framework, formulated the research objectives and develop the literature review, R. A. D. K.; Led the data collection process, R. A. D. K.; Provided analytical tools, R. A. D. K.; Conducted data analysis using PLS-SEM, R. A. D. K.; Drafted and finalized the manuscript, R. A. D. K.; Assisted in the development of the literature review and conceptual framework, M. P.; Provided analytical tools and supported model development, M. P.; Assisted in data analysis and interpretation, M. P.; Reviewed and refined the manuscript, M. P. And A. S.; Contributed to the design and development of the survey questionnaire, A. S. and A. S.; Provided contextual understanding of green finance policies, A. S.; Contributed to the discussion and policy implication sections, A. S.; Ensured alignment with regulatory perspectives and real-world practices, A. S.; and Validated the analytical approach, A. S.

DATA AVAILABILITY

The data that support the findings of the research

are available from the corresponding author, R. Amalina Dewi Kumalasari, upon reasonable request. The data are not publicly available due to privacy and confidentiality considerations of the survey respondents.

REFERENCES

- Aboalsamh, H. M., Khrais, L. T., & Albahussain, S. A. (2023). Pioneering perception of green fintech in promoting sustainable digital services application within smart cities. *Sustainability*, 15(14), 1–13. <https://doi.org/10.3390/su151411440>
- Adhiyogo, I., Dalimunthe, Z., Triono, R. A., & Arif, H. (2022). The intention of individual investors to invest in green bonds in Indonesia. *Global Business and Management Research: An International Journal*, 14(3S), 513–522.
- Ahmad, H., Yaqub, M., & Lee, S. H. (2024). Environmental-, social-, and governance-related factors for business investment and sustainability: a scientometric review of global trends. *Environment, Development and Sustainability*, 26, 2965–2987. <https://doi.org/10.1007/s10668-023-02921-x>
- Al Amin, M., Ahad Mia, M. A., Bala, T., Iqbal, M. M., & Alam, M. S. (2023). Green finance continuance behavior: The role of satisfaction, social supports, environmental consciousness, green bank marketing initiatives and psychological reactance. *Management of Environmental Quality: An International Journal*, 34(5), 1269–1294. <https://doi.org/10.1108/MEQ-09-2022-0257>
- Bhutta, U. S., Tariq, A., Farrukh, M., Raza, A., & Iqbal, M. K. (2022). Green bonds for sustainable development: Review of literature on development and impact of green bonds. *Technological Forecasting and Social Change*, 175.
- Breitenstein, M., Nguyen, D. K., & Walther, T. (2021). Environmental hazards and risk management in the financial sector: A systematic literature review. *Journal of Economic Surveys*, 35(2), 512–538. <https://doi.org/10.1111/joes.12411>
- Cendekiawan, M., & Firmansyah, A. (2024). Pengembangan green bonds di Indonesia: Upaya pemerintah untuk mewujudkan keuangan berkelanjutan. *Journal of Law, Administration, and Social Science*, 4(1), 87–100. <https://doi.org/10.54957/jolas.v4i1.714>
- Climate Bonds Initiative. (2025, May 31). *Sustainable debt global state of the market 2024*. <https://www.climatebonds.net/data-insights/publications/global-state-market-2024>
- Faisal, Y. A., Gunawan, I., Cupian, Hayati, A., Aprilidi, A., & Fajri, M. (2023). Examining the purchase intentions of Indonesian investors for green sukuk. *Sustainability*, 15(9), 1–12. <https://doi.org/10.3390/su15097430>
- Gáspár, S., Pataki, L., Barta, Á., Thalmeiner, G., & Zéman, Z. (2023). Consumer segmentation of green financial products based on sociodemographic characteristics. *Journal of Risk and Financial Management*, 16(2), 1–19. <https://doi.org/10.3390/jrfm16020098>
- Gillan, S. L., Koch, A., & Starks, L. T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance*, 66. <https://doi.org/10.1016/j.jcorpfin.2021.101889>
- Hair, J. F., Jr., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial Least Squares Structural Equation Modeling (PLS-SEM) using R*. Springer.
- Handayani, A., & Rokhim, R. (2023). A comparative study of financial performance between sustainable and conventional investment. *Journal of Entrepreneurship and Business*, 4(2), 114–124. <https://doi.org/10.24123/jeb.v4i2.5691>
- Hosen, M., Rahman, A. A., Yee, B. C. W., Arefin, S., & Gopinathan, S. (2026). Chapter 6 - Sustainable finance and behavioral choice: The role of risk perception in investment decisions aligned with the SDGs. In D. S. K. Ting & N. P. Awazi (Eds.), *Tenable engineering for a sustainable future* (pp. 151–171). Elsevier. <https://doi.org/10.1016/B978-0-443-40576-1.00012-3>
- IBCWE. (2023, December 24). *Gender equality trends in attracting investors in Indonesia*. <https://Ibcwe.Id/Gender-Equality-Trends-in-Attracting-Investors-in-Indonesia/>
- INDEF. (2025, September 23). *Sukuk negara sebagai game changer*. <https://indef.or.id/publikasi/sukuk-negara-sebagai-game-changer/>
- Ji, X., Zhang, Y., Mirza, N., Umar, M., & Rizvi, S. K. A. (2021). The impact of carbon neutrality on the investment performance: Evidence from the equity mutual funds in BRICS. *Journal of Environmental Management*, 297. <https://doi.org/10.1016/j.jenvman.2021.113228>
- Jinru, L., Changbiao, Z., Ahmad, B., Irfan, M., & Nazir, R. (2022). How do green financing and green logistics affect the circular economy in the pandemic situation: Key mediating role of sustainable production. *Economic Research-Ekonomska Istraživanja*, 35(1), 3836–3856. <https://doi.org/10.1080/1331677X.2021.2004437>
- Joshi, Y., & Rahman, Z. (2015). Factors affecting green purchase behaviour and future research directions. *International Strategic Management Review*, 3(1-2), 128–143. <https://doi.org/10.1016/j.ism.2015.04.001>
- Kasmad, Supatmin, Awaludin, T., & Syafrida, I. (2024). Community determination factors influence the interest in investing retail green sukuk: Sustainable investment as moderating variable. In *Proceedings of the 1st International Conference of Economics, Management, Accounting, and Business Digital (ICEMAB 2024)* (pp. 158–166). Atlantis Press. https://doi.org/10.2991/978-94-6463-614-7_21
- Kim, S. S., Nugroho, V., & Handoko, L. (2024).

- Competitions among sub-financial sectors and growth of green bond markets in ASEAN plus three countries. *Managerial Finance*, 51(1), 166–184. <https://doi.org/10.1108/MF-04-2024-0299>
- Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of E-Collaboration*, 11(4), 1–10.
- KSEI. (2024, December). *Statistik pasar modal Indonesia*. https://web.ksei.co.id/files/Statistik_Publik_Desember_2024_v3.pdf
- Li, Q., Zhang, K., & Wang, L. (2022). Where's the green bond premium? Evidence from China. *Finance Research Letters*, 48. <https://doi.org/10.1016/j.frl.2022.102950>
- Liaw, K. T. (2020). Survey of green bond pricing and investment performance. *Journal of Risk and Financial Management*, 13(9), 1–12. <https://doi.org/10.3390/jrfm13090193>
- Lin, X., Zhang, J., Yu, L., & Zhong, Q. (2024). Does macroprudential policy matter for corporate green innovation? The role of financing constraints and public environmental concerns. *Economic Analysis and Policy*, 82, 877–892. <https://doi.org/10.1016/j.eap.2024.04.018>
- Lone, F. A., Aggarwal, S., & Jain, S. (2026). Retail investors' perception toward green bonds in advancing sustainability: Evidence from India. *Asia-Pacific Financial Markets*, 33, 119–148. <https://doi.org/10.1007/s10690-024-09503-5>
- Maltais, A., & Nykvist, B. (2021). Understanding the role of green bonds in advancing sustainability. *Journal of Sustainable Finance & Investment*, 1–20. <https://doi.org/10.1080/20430795.2020.1724864>
- Monk, A., & Perkins, R. (2020). What explains the emergence and diffusion of green bonds? *Energy Policy*, 145. <https://doi.org/10.1016/j.enpol.2020.111641>
- Mudalige, H. M. N. K. (2023). Emerging new themes in green finance: A systematic literature review. *Future Business Journal*, 9, 1–20. <https://doi.org/10.1186/s43093-023-00287-0>
- Nurhayadi, Y., Wijiharjono, N., Al-Azizah, U. S., Johl, S. K., Shamim, A., & Kaur, S. (2021). Stock performance comparison between green innovation sharia companies and green innovation non-Sharia companies: Evidence from Indonesia Stock Exchange. In *SHS Web of Conferences*. EDP Sciences. <https://doi.org/10.1051/shsconf/202112405004>
- Otoritas Jasa Keuangan. (2017a). *Peraturan Otoritas Jasa Keuangan nomor 51/POJK.03/2017 tentang penerapan keuangan berkelanjutan bagi lembaga jasa keuangan, emiten, dan perusahaan publik*. <https://www.ojk.go.id/sustainable-finance/id/peraturan/peraturan-ojk/Documents/SAL%20POJK%2051%20-%20keuangan%20berkelanjutan.pdf>
- Otoritas Jasa Keuangan. (2017b). *Peraturan Otoritas Jasa Keuangan Nomor 60/POJK.04/2017 tentang penerbitan dan persyaratan efek bersifat utang berwawasan lingkungan (green bond)*. <https://www.ojk.go.id/id/regulasi/Documents/Pages/Penerbitan-dan-Persyaratan-Efek-Bersifat-Utang-Berwawasan-Lingkungan-Green-Bond/SAL%20POJK%2060%20-%20Green%20Bond.pdf>
- Patil, Y., & Gokhale, R. (2023). Investing in the age of millennials and Gen Z: A comparative analysis. *NLDIMSR Innovision Journal of Management Research*, 6(2), 15–28. <https://doi.org/10.31794/nldimsr.6.2.2022.15-28>
- Pham, L., & Nguyen, C. P. (2022). How do stock, oil, and economic policy uncertainty influence the green bond market? *Finance Research Letters*, 45. <https://doi.org/10.1016/j.frl.2021.102128>
- Prajapati, D., Paul, D., Malik, S., & Mishra, D. K. (2021). Understanding the preference of individual retail investors on green bond in India: An empirical study. *Investment Management and Financial Innovations*, 18(1), 177–189. [https://doi.org/10.21511/imfi.18\(1\).2021.15](https://doi.org/10.21511/imfi.18(1).2021.15)
- PwC Indonesia. (2023, February 1). *Indonesia's sustainable finance opportunities and G20 presidency achievements mapped out in new ESG intelligence report*. <https://www.pwc.com/id/en/media-centre/press-release/2023/english/indonesia-s-sustainable-finance-opportunities-and-g20-presidency-achievements-mapped-out-in-new-esg-intelligence-report.html>
- Rahardjo, J. C., & Atmaji. (2023). The effect of financial literacy on the investment decisions of investment application users. *International Journal of Economics, Business and Management Research*, 7(9), 1–16. <https://doi.org/10.51505/IJEBMR.2023.7901>
- Rathee, P., & Aggarwal, S. (2022). Understanding impact investment intention using the extended theory of planned behaviour. *Global Business Review*, 27(3), 631–649. <https://doi.org/10.1177/09721509221115001>
- Sabbar, S. D., Musa, H. A., Kadir, A. R., Nohong, M., Manan, A., Munizu, M., & Anwar, A. I. (2023). The role of green marketing and promotion of green energy bonds to reduce carbon emissions in Indonesia. *International Journal of Energy Economics and Policy*, 13(5), 73–82. <https://doi.org/10.32479/ijee.14695>
- Statista. (2023). *Leading reasons for investing in the environment in Southeast Asia in 2023*. <https://www.statista.com/statistics/1383119/sea-top-reasons-to-invest-in-the-environment/>
- Tolliver, C., Keeley, A. R., & Managi, S. (2019). Green bonds for the Paris Agreement and sustainable development goals. *Environmental Research Letters*, 14(6), 1–14. <https://doi.org/10.1088/1748-9326/ab1118>
- Trong Nguyen, L., Nguyen, T. H., Ngoc Nguyen, H., Dai Nguyen, L., Thi Thu Nguyen, D., & Duy Le, L. (2023). Determinants of green consumer behavior: A case study from Vietnam. *Cogent Business &*

Management, 10(1), 1–24. <https://doi.org/10.1080/23311975.2023.2197673>

- Umar, M., Ji, X., Mirza, N., & Naqvi, B. (2021). Carbon neutrality, bank lending, and credit risk: Evidence from the Eurozone. *Journal of Environmental Management*, 296. <https://doi.org/10.1016/j.jenvman.2021.113156>
- Volz, U., Böhnke, J., Eidt, V., Knierim, L., Richert, K., & Roeber, G. M. (2015). Empirical analysis of supply of and demand for green finance in Indonesia. In U. Volz, J. Böhnke, V. Eidt, L. Knierim, K. Richert, & G. M. Roeber (Eds.), *Financing the green transformation: How to make green finance work in Indonesia* (pp. 56–94). Palgrave Macmillan. https://doi.org/10.1057/9781137486127_4
- Wahyuningsih, M., Utami, W., Endri, & Kurniasih, A. (2024). Development of green bonds in Indonesia. *International Journal of Indonesian Business Review*, 3(1), 1–8. <https://doi.org/10.54099/ijibr.v3i1.876>
- Wang, J., & Ma, Y. (2022). How does green finance affect CO₂ emissions? Heterogeneous and mediation effects analysis. *Frontiers in Environmental Science*, 10, 1–14. <https://doi.org/10.3389/fenvs.2022.931086>
- Witek, L., & Kuźniar, W. (2021). Green purchase behavior: The effectiveness of sociodemographic variables for explaining green purchases in emerging market. *Sustainability*, 13(1), 1–18. <https://doi.org/10.3390/su13010209>
- Xing, L., Chang, B. H., & Aldawsari, S. H. (2024). Green finance mechanisms for sustainable development: Evidence from panel data. *Sustainability*, 16(22), 1–21. <https://doi.org/10.3390/su16229762>
- Zhou, F., Pan, Y., Wu, J., Xu, C., & Li, X. (2024). The impact of green finance on renewable energy development efficiency in the context of energy security: Evidence from China. *Economic Analysis and Policy*, 82, 803–816. <https://doi.org/10.1016/j.eap.2024.04.012>

APPENDICES

Table 1 Measurement Scale in the Research

Constructs	Indicators/ Items		Reference
Green Finance Awareness	GR1	I consider environmental sustainability a primary factor in my investment decisions.	Modified from Gáspár et al. (2023)
	GR2	When facing investments with similar risk levels, I prioritize environmental aspects over potential returns.	
	GR3	I intend to allocate a larger portion of my portfolio to environmentally sustainable financial products.	
	GR4	I believe that environmentally friendly financial products contribute to investments with higher social value.	
Investment Risk-taking	RT1	For investment products with the same risk but higher potential returns, I tend to choose the option with the higher return.	
	RT2	Given two products with the same level of risk, I prefer the green financial product.	
	RT3	Most of my investment portfolio consists of high-risk assets, including green bonds from developing countries, startups, and cryptocurrencies.	
	RT4	I consider cryptocurrencies to be an investment with high potential returns. Therefore, I am interested in investing in them.	
	RT5	When comparing financial products with the same level of risk, I prefer the one with the higher return.	
Perceived External Influences	INF1	My investment decisions are influenced by the views and recommendations of people in my social circle.	
	INF2	I tend to be influenced by the opinions or information of others/outside sources when making investment decisions.	
	INF3	I usually consider others' advice when deciding whether to put my money in savings for future investment opportunities.	
Sustainable Investment Decisions	ST1	I am willing to invest more in financial products that support environmental sustainability.	
	ST2	I see myself as a responsible and mindful consumer.	
	ST3	When investing in environmentally friendly products, I consider social expectations and sustainability values.	
	ST4	I plan to invest as much as possible in sustainable stocks and other environmentally friendly financial assets.	
	ST5	I believe it is essential to diversify my investments by incorporating sustainable financial products into my portfolio.	

Table 2 Demographics of Respondents

Profile	Criteria	N	%
Gender	Male	129	65
	Female	69	35
Age	18–24	44	22
	25–31	65	33
	32–38	34	17
	39–45	26	13
	> 45	29	15
Occupation	Student	29	15
	Employee	99	50
	Entrepreneur	70	35
Education	Senior High School	61	31
	Graduate and postgraduate	137	69
Income (IDR)	> 532.001–1.200.000	61	31
	> 1.200.000–6.000.000	107	54
	> 6.000.000	30	15

Table 3 Results of Measurement Model Assessment: Indicator Loadings, Construct Reliability, and Convergent Validity

Construct	Indicator	Outer loading	Composite Reliability	Average Variance Extracted (AVE)
Green finance awareness	GR1	0.745	0.868	0.622
	GR2	0.781		
	GR3	0.858		
	GR4	0.765		
Perceived external influences	INF1	0.867	0.835	0.631
	INF2	0.683		
	INF3	0.821		
Investment risk-taking	RT1	0.747	0.803	0.507
	RT2	0.695		
	RT3	0.604		
	RT4	0.788		
Sustainable investment decisions	ST1	0.668	0.845	0.524
	ST2	0.644		
	ST3	0.789		
	ST4	0.767		
	ST5	0.740		

Table 4 Results of Fornell-Larcker Criterion (Discriminant Validity)

Construct	GR	INF	RT	ST
Green finance awareness (GR)	0.788			
Perceived external influences (INF)	0.499	0.794		
Investment risk-taking (RT)	0.578	0.430	0.712	
Sustainable investment decisions (ST)	0.565	0.507	0.662	0.724

Table 5 Results of Collinearity VIF (Inner Model)

Construct	VIF
Green finance awareness	1.013
Perceived external influences	1.000
Investment risk-taking	1.227
Sustainable investment decisions	1.227

Table 6 Path Coefficient Results (Direct and Moderation Effects)

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-Statistics (O/STDEV)	P-Values
GR → RT	0.599	0.591	0.084	7.143	0.000
GR → INF	0.499	0.509	0.086	5.819	0.000
RT → ST	0.602	0.601	0.083	7.268	0.000
INF → ST	0.248	0.254	0.082	3.023	0.003
Moderation Effect: GR × Gender → RT	0.089	0.069	0.090	0.987	0.324