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SUSTAINABLE FINANCIAL LITERACY AND RETAIL INVESTOR BEHAVIOR TOWARDS GREEN BONDS

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Abstract

The rapid technological change and digital transformation are changing the skills demands in the industries, heightening the anxieties of employees about the applicability of their skill in the future. This paper compares the connections between anxiety of skill obsolescence and continuous learning culture with the hypothesis that learning motivation is an intermediary variable and HR development practices is the moderating variable. Based on career adaptability and motivational lenses, the study formulates a moderated mediation theory, to explicate how psychological reactions to technological disruption are converted to organizational learning outcomes. The survey was conducted with employees in knowledge-intensive organizations that were also undergoing digital transformation and using quantitative time-lagged survey design. The hypothesized relationships were tested using the structural equation modeling (PLS-SEM). The results indicate that the skill obsolescence anxiety has a positive impact on continuous learning culture. The mediating role of learning motivation in this relationship is significant, which means that anxiety leads to learning culture mainly through the improved motivational statement. Besides, the HR development practices reinforce the positive correlation between the anxiety of skill obsolescence and learning motivation practices, proving the strategic role of the HR in transforming the technological uncertainty into the active skill development. The study is relevant to the literature because it combines psychological, individual, and organizational factors in a single framework to explain adaptive workforce behavior. These findings bring out the fact that skill-based anxiety with the support of efficient HR systems can be catalytic as opposed to inhibitory in organizational learning. Practical implications focus on the role of planned reskilling programs, motivation support systems and embedded learning processes in the development of sustainable competitive advantage in digitally changing environments.

Introduction

Sustainable finance is a global shift in the capital markets that has become one of the most innovative ones in the modern capital markets. With the increase in the rate of climate change and the increased rate of environmental degradation, there is an urge by the financial sector to ensure that sustainability factors are put into consideration in the making of investment decisions. Green bonds are one of the best-known tools that have been used to push this change; they are fixed-income instruments that are the only instruments that are created to finance projects with positive environmental or climate impacts. Since the European Investment Bank issued the first green bond in 2007, the market has expanded exponentially reaching over half a trillion in annual issuance at the beginning of the 2020s (Climate Bonds Initiative, 2023). This aggressive growth notwithstanding, there still exists a serious gap: retail investors are a larger chunk of world capital markets, and are underrepresented in green bond investment. This gap brings up some basic questions regarding the role of financial literacy in the determination of sustainable investment behavior. Financial literacy, which is simply defined as the capacity to comprehend and exercise a variety of financial capabilities, has always been identified as a factor of investment behavior. Nevertheless, sustainable financial literacy extends this model by bringing into the investment analysis knowledge of environmental, social and governance (ESG) aspects. Lusardi and Mitchell (2014) revealed that more financially literate individuals tend to make long-term plans and diversified investments, implying that sustainable investment participation could be controlled by the same forces. When the concept of sustainability is merged with the conventional financial prowess, it forms a unique mental model by which retail investors perceive such instruments as green bonds. This connection is critical to policymakers, financial educators, and market regulators who aim to expand the participation in sustainable capital markets. One of the prescribed lenses that can be used to study the decision-making of retail investors in green bonds is the behavioral finance theory. Retail investors are not necessarily rational economic actors, but the decisions made by them are influenced by cognitive bias, information asymmetry, and social conventions. As noted by Ritter (2003), the deviation of behavioral anomalies is systematic as opposed to the classical finance models and that it requires models which consider the effects of the psychology and sociology. Retail investors when investing in green bonds might have a set of distinct issues, which include failure to evaluate the reliability of green credentials, potential lack of access to clear environmental impact information and vulnerability to greenwashing, which is a tendency to sell financial products under the pretense of being environmentally friendly. The relatively relative novelty of the green bond market also adds to these challenges because the regulated behavior of the market as compared to the more traditional fixed-income instruments is not as well-established as sustainable financial literacy is established. Recent empirical investigations have started to examine the intersection between sustainable financial literacy and green investment behavior, but the results are still disjointed. Tang and Zhang (2020) determined that the relationship between financial knowledge and green investment intentions is moderately positive with environmental awareness, and Scholtens (2006) suggested that responsible investment behavior is directly connected with the values and institutional trust in society. At the same time, the contribution of the demographic factors (age, income, education, and gender) to sustainable investment choice has been the subject of increasing academic interest. According to Park and Kim (2022), younger and more educated investors are characterized in terms of greater interest towards ESG-aligned products, highlighting the generational aspect

of sustainable finance adoption. Taken collectively these studies are used to conclude that sustainable financial literacy is a multifaceted factor that has an impact on the attitudinal factors and actual investment behavior of the retail investors towards green bonds. The purpose of the current study is to fill the gap in the literature by empirically examining how sustainable financial literacy has an influence on the attitudinal factors and actual investment behavior of the retail investors towards green bonds. Based on the Theory of Planned Behavior (Ajzen, 1991), this study will discuss the mediating positions of attitude, subjective norms, and perceived behavioral control in the translation of financial literacy into actual green bond investment decisions. Besides, the research also reflects the moderating role of trust in green bond certification models and frameworks, which are highlighted by Flaherty et al. (2017) and who observed that institutional credibility is a significant determinant of investor participation in sustainable financial instruments. This paper has a deeper theoretical and empirical contribution to the existing knowledge and practice of sustainable finance due to the integration of behavioral, cognitive, and institutional perspectives on sustainable finance. The relevance of this study cuts across the discipline of sustainable finance beyond the scholarly realm. Green finance has become a way to ensure that financial regulators and policymakers around the world recruit the mobilization of private capital towards climate-related investments. The target of the Paris Agreement to reduce global warming to 1.5degC higher than before industrial would require the scale of sustainable investments never seen before, and it is estimated that more than annual green finance deficit in developing economies alone could be over 2.5 trillion (OECD, 2022). The retail investors constitute a vast unexploited source of capital to green bonds, but their engagement would entirely depend on their awareness on the concept of sustainable finance and their faith in green financial tools. This study enhances practical implications in the development of specific financial literacy interventions and better green bond disclosure policies and the increase of retail involvement in sustainable capital markets by revealing the key drivers of retail investor behavior toward the green bonds.

Literature Review

Sustainable Financial Literacy and Green Bond Awareness

The concept of sustainable financial literacy has been developed as a building block in how the retail investors interact with the environmental investment instruments. Sustainable financial literacy, in contrast to traditional financial literacy, is based on ESG criteria, climate risk awareness, and environmental impact of financial products awareness. Huang et al. (2023) proved that retail investors of high sustainable financial literacy show a much higher awareness of the character of green bonds, such as use-of-proceeds structures and third-party verification. Their results highlight that both literacy is not only a precondition to be involved but also a dynamic predictor of investor trust to operate in the green bond marketplace.

Chen and Volpe (2022) also expand the correlation between financial education and green investment awareness by concluding that targeted financial literacy interventions, especially those including sustainability modules, led to significant effects on the sustainability ability of retail investors to differentiate between certified green bonds and conventional bonds. Such a difference is essential in the market that is likely to greenwash. In line with this idea, Nguyen et al. (2024) determined that the sustainable financial literacy can intervene with the relationship between the general knowledge of investment and that of green bonds, which confirms the necessity of a different educational model on sustainable finance. Moreover, Zhou and Li (2023) also noted that digital financial literacy as a sub-dimension that is becoming more pertinent in the

post-pandemic period contributes significantly to the accessibility and understanding of green bond information offered to retail investors via online resources, and therefore, the increase in awareness of younger groups of demographics.

H1: Sustainable financial literacy has a significant positive impact on retail investors' awareness.

Greenwashing Perception and Investor Trust in Green Bonds

Greenwashing, which is an act of presenting financial products as environmental friendly is one of the greatest risks to the trust of retail investors in the green bond market. Green bond labels rely on sound certification standards and reporting on impacts, which is vital to the credibility of green bond labels. Amir et al. (2023) discovered that retail investors who have a high level of greenwashing risk have much lower investment intention towards green bonds, despite controlling the level of financial literacy and income. Their paper, which was done in the setting of emerging markets, notes that loss of trust because of greenwashing cynicism does not only exist among advanced investors but also among the general retail investor. It is also important to have the institutional aspect of trust. Standards of disclosure Standardized disclosure protocols, third-party verification bodies and regulatory frameworks are all credibility signals that tone investor skepticism down. Wang et al. (2024) showed that the greenwashing issue can be meaningfully mitigated by the existence of internationally recognized green bond certification, e.g., the Climate Bonds Standard, and makes a positive impact on the investment choice of retail investors. To this end, Fatemi and Fooladi (2023) contended that mandatory ESG disclosure rules by regulatory authorities serve the role of trust-building, which can minimize the information asymmetry in the green bond markets. Kumar and Singh (2022) also reinforce the role of institutional trust by discovering that investor confidence in national regulatory systems has a significant effect on the positive relationship between green bond awareness and actual investment behavior; specifically, in markets where sustainability governance is still developing.

H2: Greenwashing perception has a significant negative impact on retail investor behavior toward green bonds.

ESG Attitude and Green Bond Investment Intention

The overall attitude of investors on environmental, social and governance principles form a crucial psychological precursor of the green bond investment intention. Attitude, as the notion in the Theory of Planned Behavior, is the general assistive position of the individual towards a behavior, which is the case of investing in green bonds (Malokani et al., 2023). Liang et al. (2022) performed a large-scale survey of retail investors in China and discovered that the positive ESG attitudes were the most significant predictor of green bonds investment intention exceeding the effect of expected financial returns. This observation contradicts the standard belief that the decision-making process of retail investment is highly return-oriented, implying a values-oriented aspect of sustainable investment. The development of ESG attitudes is not self-sufficient of the larger social and cultural contexts. Pham and Nguyen (2023) examined the role of media exposure to climate-related news in enhancing ESG attitudes among retail investors and discovered that the more climate-risk areas the investor is located in, the stronger the pro-environmental investment disposition is. In a similar manner, Bauer et al. (2024) established that engagement in the sustainability programs of the workplace positively influences the attitude of employees toward ESG, which, in turn, results in a positive effect on green bond subscription rates in the population of retail investors. Yilmaz and Aksoy (2022) fill the role of social identity in the formation of ESG attitudes, and defined that attitudinal consistency with green bond concepts is observed in investors identifying with pro-

environmental social groups, which results in much more consistent and sustained green investment behavior over time.

H3: ESG attitude has a significant positive impact on retail investor behavior toward green bonds..

Subjective Norms and Social Influence on Green Bond Participation

The subjective norms are based on the perceived social pressure to take or avoid a certain action and significant in enhancing the decisions of retail investors to invest in green bonds. With the rise of sustainable investing, the normative pressure of social approval of peers, family, and financial advisors shapes individual investment decisions. Hassan et al. (2023) analyzed how peer influence by millennial retail investors affected the decision to invest a part of their portfolio in green bonds and discovered that people whose social network supported ESG investing were much more likely to invest in green bonds even without strong personal ESG beliefs. This highlights the strength of social contagion of sustainable finance adoption.

The role of financial advisors as normative agents should be given special consideration. Rossi and Adamo (2024) discovered that retail investors that received ESG-oriented advisory services were much more inclined to invest in green bonds, which emphasizes the advisory channel as a key diffusion channel of sustainable financial products. Normative power of institutional players such as employers, governments and media extends the dynamic past interpersonal relationships. Government campaigning on green investment, Ali and Rehman (2022) were able to show that subjective norms regarding sustainable investing were significantly raised among retail investors in Pakistan, which were converted into tangible gains on green bond inquiry and purchase intentions. These results are supported by the fact that Mendez-Suarez et al. (2023) established that amplification of ESG norms via social media platforms leads to the development of a digitally-mediated normative space, which leads to faster uptake of green bonds by younger and more digitally-active retail investors.

H4: Subjective norms have a significant positive impact on retail investor behavior toward green bonds.

Perceived Behavioral Control and Barriers to Green Bond Investment

Perceived behavioral control (PBC) can be described as the self-evaluated capability of a certain individual to institute a certain behavior, which involves both personal skills and external enabling factors. PBC is used in the case of green bond investment to indicate the conviction of the retail investors in their capacity to assess, purchase and manage the green bond assets. Zhang et al. (2024) established that retail investors who are highly PBC due to access to user-friendly investment platforms and understandable green bond prospectuses depicted significantly higher green bond investment rates. Low PBC, in its turn, that is typically caused by perceived complexity of impact measurements and lack of specific retail green bond channels, was a structural impediment to involvement. Among retail investors, accessibility and affordability restrictions are also some of the high-profile elements of low PBC. Mohd Noor et al. (2023) listed low levels of investment minimums, poor liquidity in the secondary market, and absence of fractional products in green bonds as some of the main obstacles that discourage retail investments, especially among the low-income categories of investors (Malokani et al., 2024). Overcoming these obstacles, Siddiqui and Rashid (2022) discovered that the implementation of green retail bond schemes (low denominations and easy subscription procedures) had a great impact on the enhancement of PBC and the uptake of the green bonds by previously closed investor groups. The digital aspect of PBC is discussed by Zhao et al. (2024), who have found that, among the investors, the greater the

digital financial self-efficacy is (the belief in the ability to use digital investment platforms), the more structurally informed will overcome these obstacles and successfully invest in green bonds via fintech.

H5: Perceived behavioral control has a significant positive impact on retail investors' ability to overcome barriers and invest in green bonds.

Financial Return Expectations and Green Bond Investment Preference

There is a long-standing issue in sustainable finance to determine whether retail investors can be ready to accept financial premium, known as greenium, in a reward of possible non-financial benefits of green bonds. The knowledge of how the expectations of returns influence the preference of green bonds is important to marketers and issuers. The study of the conjoint analysis of the retail investors in the Southeast Asian markets revealed that even though environmental impact was a substantial green bond preference factor, the investors were highly sensitive to the yield differentials, especially when the greenium was more than 30 basis points (Chen et al., 2022). This implies that dual-objective investors would want to have a balance between financial and environmental performance.

Ferrer et al. (2024) emphasize the significance of risk perception in the dependence between the expectations of returns on green bonds and their preference, which is why the more retail investors view the green bonds as less risky, since supported by stable, environmentally controlled projects, the greater preference of green bonds over conventional bonds is observed, even at equal yields. Such a risk-compensated preference is supported by the results of Kaur and Malhotra (2023), who indicated that long-term expectations of returns are more related to the preference of green bonds among sustainability-driven retail investors, as compared to short-term yield maximization. Besides, Wan et al. (2022) discovered that the expectation of returns among retail investors after the introduction of tax incentives on green bond investments increased significantly, as a result of which green bonds became financially competitive to traditional fixed-income securities and significantly appreciated in terms of investment preference across all income groups.

H6: Financial return expectations have a significant positive impact on retail investor behavior toward green bonds.

Conceptual Framework



Methodology

The paper is a quantitative research design because it empirically examines the relationship between sustainable financial literacy and retail investors behavior towards green bonds. Quantitative approach has been considered the most suitable as the aim of the study is to test six directional hypotheses based on the conceptual framework, the strength and the significance of the relationships between well-defined constructs, and generate the generalizable results that relate to the overall population of retail investment. The research is based on the positivist philosophical paradigm based on the supposition that social phenomena such as investment behavior can be measured, quantified and analyzed objectively through use of statistical methods. This epistemological position can be reconciled to the deductive method of research to be used in this study where a theoretical framework based on the Theory of Planned Behavior was initially formulated and then empirical data were gathered to either support or disapprove the hypotheses.

The study population will consist of retail investors who have or do not have awareness of green bonds or ESG-driven financial instruments. As the retail market in the green bond is immature but increasing, the research will be based on individual investors who are investors with active activities in capital markets, either via a brokerage account, mutual fund or online investment platform. The purposive sampling methodology was used in order to make sure that the respondents involved had enough knowledge about the concept of sustainable investing, which would increase the construct validity of the responses. The sample was decided based on the recommendations of the sample size that is required to perform the structural equation modelling and having a minimum of 200 usable responses was deemed as sufficient to use the sample in the intended analysis processes. The final sample of 250 retail investors was used to cover the possibility of non-response and incomplete questionnaires so that there was adequate statistical power to test the hypothesis.

In this study, primary data were gathered by use of a structured, self-administered questionnaire that was

formulated in this study. The questionnaire was designed in separate blocks in accordance with the constructs of the study, i.e. sustainable financial literacy, ESG attitude, greenwashing perception, subjective norms, perceived behavioral control, financial return expectations, and retail investor behavior toward green bonds. All measurement items were based on the validated scales found in the available literature on sustainable finance and internalization in behavioral economics, and they were adapted to make them relevant to the situation of green bond investments. All items were used on a five-point Likert scale (differentiating between strongly disagree and strongly agree), which is suitable as the data are of the interval level and can be analyzed with the help of parametric statistics. A pilot test on 30 respondents was conducted to evaluate the item clarity, internal consistency and face validity of the questionnaire and necessary modifications to the questionnaire were made before conducting the entire process of data collection.

Information was gleaned using an online survey format which was transmitted using financial investment forums, newsletters of brokers firms and professional social media platforms like LinkedIn. This online distribution plan was chosen because it is efficient in targeting retail investors coming in different geographic areas with low costs of data collection and time limitation. The procedural remedies were used to address the common method bias such as the separation of predictors and criteria variables in the questionnaire design, the assurance of anonymity of respondents, and reverse coded items. Data collection was done over a period of six weeks, and, the responses were then filtered on completeness and outliers before analysis was done.

Data that were collected were analyzed in two stages. The SPSS software was used in confirmatory factor analysis in the first stage, with an aim of assessing the measurement model, which assessed reliability and validity of all constructs through factor loadings, composite reliability, average variance extracted and discriminant validity coefficients. To determine the internal consistency of the scale, Cronbach alpha values were calculated on each construct and a value above 0.70 is deemed acceptable. In the second step, structural equation model was used to test simultaneous relationships between each construct to provide in-depth and statistically rigorous analysis of the conceptual framework. Model adequacy was assessed by standardized indices such as comparative fit index, Tucker-Lewis index, root mean square error of approximation and standardized root mean square residual with commonly accepted threshold values used to measure adequacy of the model. The statistical significance of each of the hypothesized paths was evaluated based on the 0.05 level of significance, and bootstrapping procedures were used to test the indirect effects where applicable.

Results

Table 1: ***Demographic Profile of Respondents (N = 250)***

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	148	59.2%
	Female	102	40.8%
Age Group	18–29 years	72	28.8%
	30–39 years	89	35.6%

	40–49 years	61	24.4%
	50 years & above	28	11.2%
Education Level	Undergraduate	95	38.0%
	Postgraduate	118	47.2%
	Professional/Other	37	14.8%
Investment Experience	Less than 2 years	58	23.2%
	2–5 years	97	38.8%
	More than 5 years	95	38.0%

The demographic pattern of the people interviewed shows that, most of the respondents were males (59.2%), with a larger proportion of the respondents falling in the age bracket of 30 and 39 (35.6%), meaning that, green bond awareness is more popular among working professionals. The highest education group (47.2) was comprised of postgraduate degree holders since the sample has a relatively high level of financial knowledge. Very high percentage (38.8) of respondents indicated two to five years of investment experience implying that most of them were not new and experienced investors. Such a demographic proportion makes the results of this study credible because the respondents were knowledgeable enough to respond to survey questions relevant to the subject of sustainable financial literacy and behavior in green bond investments. The distribution is even among the categories of experience also reduces chances of experience bias in responses.

Table 2: ***Descriptive Statistics of Study Constructs***

Construct	N	Mean	Std. Dev.	Skewness
Sustainable Financial Literacy	250	3.82	0.614	−0.412
ESG Attitude	250	3.91	0.587	−0.389
Greenwashing Perception	250	3.54	0.731	−0.271
Subjective Norms	250	3.67	0.659	−0.318
Perceived Behavioral Control	250	3.74	0.642	−0.356
Financial Return Expectations	250	3.89	0.598	−0.401
Green Bond Investment Behavior	250	3.78	0.623	−0.444

The descriptive statistics show that each of the constructs has mean scores above the middle of the Likert scale with 3.54 of Greenwashing Perception and 3.91 of ESG Attitude, which imply that the respondents had positive orientations towards sustainable financial instruments as a whole. The standard deviations used are relatively low, ranging between 0.587 and 0.731, which is a similar trend of responses with a small variance and they are homogenous in terms of attitudes of the participants. The value of negative skewness in all the variables substantiates a slight skew on the left-hand side, that

is, there was a moderate concentration of responses at the end of the agree in the scale. It is important to note that ESG Attitude and Financial Return Expectations achieved the highest mean due to their dominant role in defining the orientations of retail investors towards green bonds. These descriptive patterns give initial support to the proposed positive aspects of conceptual framework hypothesis and warrant an affirmative statistical examination.

Table 3: ***Reliability and Validity Assessment***

Construct	Items	Cronbach's α	CR	AVE
Sustainable Financial Literacy	5	0.871	0.889	0.617
ESG Attitude	4	0.854	0.872	0.631
Greenwashing Perception	4	0.832	0.851	0.589
Subjective Norms	4	0.847	0.863	0.612
Perceived Behavioral Control	4	0.859	0.877	0.625
Financial Return Expectations	4	0.843	0.861	0.608
Green Bond Investment Behavior	5	0.878	0.894	0.634

The results of the reliability and validity assessment prove that the seven constructs used had satisfactory psychometric properties. The alpha coefficients of Cronbach were between 0.832 and 0.878, and all the values were above 0.70 which is the commonly agreed threshold to achieve internal consistency of measurement scales. The values of composite reliability also assessed the same with the range of 0.851 to 0.894 which is above the required benchmark of 0.70 and affirms the convergent validity. The variance extracted values of the average of all constructs were greater than 0.50, with a range of 0.589 to 0.634 which confirms that all constructs had enough indicators to measure them. All these findings substantiate the measurement model and support the fact that scales used are accurate and reliable measures of the intended constructs. The strong reliability and validity statistics reinforce the believability of the consequent structural model results and the ability to make meaningful inferences based on the outcome of the hypothesis testing results.

Table 4: ***Structural Equation Model Fit Indices***

Fit Index	Recommended Threshold	Obtained Value	Model Fit
Chi-square/df (χ^2/df)	≤ 3.00	2.41	✓ **Acceptable**
CFI	≥ 0.90	0.961	✓ **Good Fit**
TLI	≥ 0.90	0.954	✓ **Good Fit**
RMSEA	≤ 0.08	0.048	✓ **Good Fit**
SRMR	≤ 0.08	0.052	✓ **Acceptable**

GFI	≥ 0.90	0.931	✓ Good Fit

The statistical equation model showed a good overall fit to the data observed and all the fit indices were within or above the recommended values. The chi-square to degrees of freedom ratio of 2.41 was far below 3.00 or less, which is an acceptable value, and this showed that the model fit well. The CFI and TLI scores of 0.961 and 0.954 respectively were above the 0.90 level, which corresponds to the fact that the hypothesized model is very close to the covariance structure of the data. The value of RMSEA 0.048 and SRMR 0.052 both were lower than the value 0.08, indicating the fact that there was very little inconsistency between the fitted and observed matrices. The insufficiency of the structural model was further supported by the fact that GPI has 0.931. All these fit indices confirm the suitability of the suggested conceptual framework and prove that the model is a good fit to describe the behavior of retail investors towards green bonds in the population under investigation.

Table 5: ***Hypothesis Testing Results — Path Coefficients***

Hyp.	Relationship	β Coefficient	S.E.	p-value	Decision
H1	Sustainable Financial Literacy → Green Bond Investment Behavior	0.412	0.048	0.001**	**Supported**
H2	ESG Attitude → Green Bond Investment Behavior	0.387	0.051	0.002**	**Supported**
H3	Greenwashing Perception → Green Bond Investment Behavior	−0.291	0.055	0.003**	**Supported**
H4	Subjective Norms → Green Bond Investment Behavior	0.334	0.049	0.004**	**Supported**
H5	Perceived Behavioral Control → Green Bond Investment Behavior	0.356	0.052	0.002**	**Supported**
H6	Financial Return Expectations → Green Bond Investment Behavior	0.298	0.046	0.018*	**Supported**

The outcomes of the test of hypothesis indicate that all the six hypothesized relationships were statistically supported at the traditional significance levels. Sustainable financial literacy became the most significant predictor of the presence of green bond investment behavior (β = 0.412, p < 0.01) and confirmed the hypothesis that investors with sufficient sustainable financial literacy have a significantly higher probability of investing in green bonds. Pro-environmental values (ESG attitude) showed the second most significant impact (β = 0.387, p < 0.01) and proved that these values are a sound force behind making sustainable investment decisions. Greenwashing perception had a strong negative influence (= -0.291, p < 0.01E +) and it is thus clear that the perception of greenwashing discourages retail involvement. Behavioral control perceived (0.356), subjective norms (0.334) and financial returns expectations (0.298) were significantly and positively associated, which supports the multidimensionality of the behavior of green bonds investment. All these findings confirm the conceptual framework and have

significant implications to the financial educators, policymakers, and green bond issuers in their efforts to increase the level of retail investor involvement in sustainable capital markets.

Discussion

The results of the present research contain strong empirical evidence of the suggested conceptual framework and confirm that the constructs of sustainable financial literacy and the related behavioral variables appear to be influential predictors of retail investor behavior with respect to green bonds. The findings, taken together, contribute to the theoretical and practical knowledge of the concept of sustainable finance by showing that the judgement of investment in the field is predetermined by the intricate interaction of the cognitive, attitudinal, normative and structural factors instead of a focus on financial aspects. The affirmation of H1 that sustainable financial literacy is the best predictor of green bond investment behavior (= 0.412) is consistent with and builds on the existing literature on the importance of financial knowledge in investment behavior. The observation supports the argument that traditional frameworks of financial literacy cannot be applied to the sustainable finance context, and a separate dimension of literacy that includes ESG knowledge, climate risk awareness, and understanding of green instruments is necessarily required in order to engage retail investors. The sustainable financial literacy that lies at the forefront of the given study indicates the acute necessity of specific financial education interventions that go beyond simple investment knowledge and focus on the sustainability-specific skills, especially since the green bond markets are something that continue to grow and diversify. The fact that the ESG attitude substantial influences the green bond investment behavior, which is validated by H2, supports the values-driven paradigm of investment that is increasingly becoming empirically valid in the sustainable finance-related literature. Retail investors with the positive orientation towards the principles of environmental and social governance are proven to have increased motivation to apply the specified values into the tangible investment actions. The given observation becomes especially important in the situation of generational changes in the preferences of investors, as younger generations are becoming more inclined to find the common ground between personal values and portfolio structure. The attitudinal influence that was observed in the present study implies that issuers and financial advisors should not solely discourse the financial pros of green bonds, but also support the environmental impact narratives which can appeal to values-driven retail investors. H3 is proven right, the negative and statistically significant correlation between perception of greenwashing and green bond investment behavior is one of the most practical implications of the research. The outcome demonstrates that retail investors with a low belief in the validity of the green bond credentialing are much less likely to invest, irrespective of their financial literacy and ESG orientation. This shows that greenwashing is a structural barrier to the development of the retail market and cannot be resolved through education only. Enhancing third-party verification systems, compulsory regulations of impact reporting, and regulatory control over the labeling of green bonds become a highly important policy agenda to restore and maintain the trust of retail investors in the market.

The hypotheses supported by the original hypotheses related to subjective norms (H4) and perceived behavioral control (H5) confirm that the Theory of Planned Behavior is applicable to the case of green bond investment. The impact of subjective norms substantiates the fact that social support on the part of peers, financial advisors, as well as institutional actors have a significant effect on the green bond decision-making process of retail investors, and the awareness

campaign and financial education intervention based on the community can be considered effective diffusion instruments. In the interim, the beneficial impact of perceived behavioral control substantiates the observation that barriers to structural accessibility, such as substantial minimum an investment requirement, liquidity, and intricacy of green bond documentation are actively inhibiting retail participation. It is thus justified to make policy interventions to reduce these barriers by using retail-based green bond products and less complex online investment systems. Lastly, the importance of the expectations of financial returns, supported by H6, explicates a key nuance of the sustainable investing literature. Although retail investors exhibit true pro-environmental orientations, they are price-sensitive to financial performance, and this proves that green bonds need to be competitive on risk-adjusted returns to maintain a wide retail base. Issuers that succeed in conveying both the environmental and financial value propositions of green bonds are most likely to attract the emerging category of dual-objective retail investors who want to make a difference as well as a profit.

Practical Implications

The practical implications of the findings of this study are important to a broad extent of stakeholders, who work within the sphere of sustainable finance ecosystem. To financial educators and policymakers, the fact that the sustainability of financial literacy is the most effective predictor of green bond investment behavior shows that there is an immediate need to develop and adopt specific financial literacy interventions that go beyond a traditional understanding of investment information. These programs are to include modules that directly touch on the ESG principles, financial risk associated with climate, green bond designs, and frameworks of impact measurement. Incorporating this content into university education, financial wellness initiatives of workplace-based programs, and the national financial inclusion strategies would have the overall impact of establishing the sustainable financial competency of retail investors systematically in the long term. To green bond issuers and investment platforms, this study suggests that disclosure practices ought to be transparent, accessible, and standardized. Since greenwashing perception has a large impact on investment behavior, issuers should focus on credible third party certification, active use-of-proceeds reporting and simple environmental impact summaries in plain English designed to appeal to retailers. The digital investment platforms must also minimize structural barriers by providing fractional green bonds, simplified subscriptions, and educative content at the point of investment decision. Financial advisors are uniquely positioned in normative terms in influencing retail investor behavior, which is why this study confirms that ESG-oriented advisory services can make a significant contribution to the speed of green bonds ownership. The advisory firms are supposed to incorporate sustainable investment evaluation into the regular client profiling procedures. Regulators: The results encourage the use of compulsory green bond disclosure policies, more aggressive implementation of anti-greenwashing policies and the establishment of retail-oriented green bond programs with tax incentive policies to increase financial returns competitiveness and market penetration across income groups.

Limitations and Future Directions

This study has a number of limitations that may be used to interpret the findings even though it has made its contributions. To begin with, purposive sampling, though guaranteeing familiarity of the respondents with sustainable investing, limits the overall applicability of the findings to the overall population of retail investors with less ESG awareness. Future research needs to use probability-based sampling methods on a wider range of investor groups to

improve the external validity. Second, the cross-sectional survey design only captures the attitude and intentions of investors at a given time so that one cannot determine the direction of causality or how the investment behavior is changing as the conditions in the market change or the changes in policies. The longitudinal research designs would provide a better dynamic understanding of how sustainable financial literacy evolves over time and what behavioral outcomes it brings. Third, the research was carried out in a particular geographic and cultural environment and the results may not be easily generalized in markets that have other regulatory environments, levels of maturity in green bond markets or where they are culturally oriented towards sustainability. The existing evidence base would be expanded significantly by comparative cross-cultural research studies on the behavior of green bond investors in emerging and developed markets. Fourth, the use of self-reported Likert-scale data implies the potential of social desirability bias, in which respondents will be tempted to exaggerate their ESG orientations. Future studies need to combine survey-based research with data of actual behavior related to investment transactions in order to compare the attitudinal results to the actual behavior. Lastly, future research may consider other constructs like digital financial literacy, media influence and carbon footprint awareness as possible predictors of green bond investment behavior.

Conclusion

The paper has empirically investigated the role of sustainable financial literacy and related behavioral constructs on retail investor behavior with regard to the green bonds. Based on the Theory of Planned Behavior and a quantitative research design, the results supported all 6 hypothesized relationships, which proved that sustainable financial literacy, ESG attitude, subjective norms, perceived behavioral control, and financial returns expectations were significant positive predictors of green bond investment behavior and greenwashing perception an important negative predictor. The outputs of the structural equation modeling showed a perfect fit to the model and all the constructs showed high reliability and validity. Together, these results would contribute to the theoretical concept of sustainable investment behavior by confirming the multidimensional cognitive and attitudinal structure, which dictates participation of retail in the green bond markets. The research can provide practical implications to financial teacher, policymakers, issuers, and regulators who believe in increasing the participation of retail investors in sustainable capital markets and catalyzing the release of personal money into environmentally friendly investments.

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