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FINANCIAL EDUCATION, RISK TOLERANCE AND FINANCIAL BEHAVIOUR OF RURAL TRADERS IN UPPER EAST REGION OF GHANA; DOES FINANCIAL LITERACY MATTER?

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ABSTRACT

Inadequate savings and poor saving habits among rural traders suggest that many may struggle to navigate the increasingly complicated financial markets. The study explores the connection between financial education, financial behaviour, financial literacy and risk tolerance among rural traders. We used structured questionnaires to collect data from 489 participants in the Upper East Region of Ghana and performed multiple regressions and mediation analysis. Our findings reveal a strong positive link between financial education and financial behaviour. Furthermore, financial literacy is found to mediate the financial education and financial behaviour nexus. We also identified a significant link between risk tolerance and financial behaviour. Stakeholder groups, such as the Association of Ghana Industries and the National Board for Small Scale Industries, should organise financial education programmes for rural traders to improve their financial literacy and decision-making.

Keywords: Financial education, financial literacy, financial behaviour, risk tolerance, rural, Ghana.

INTRODUCTION

Research increasingly shows that financial literacy exerts a positive influence on financial behaviour and well-being. (Kumar *et al*., 2023; Lone & Bhat, 2022; Lührmann *et al*., 2018; Lusardi *et al*., 2017). Consequently, implementing national measures of financial literacy and the advancement of financial education initiatives has become a global concern (Lusardi, 2019; Faulkner, 2022). Despite several initiatives aimed at promoting and improving financial literacy, the effectiveness of financial education remains under scrutiny. Early rigorous experimental impact studies yielded mixed outcomes in a few cases, contributing to a perception of inconsistent data regarding the effectiveness of financial education (Talwar *et al*., 2021). However, recent years have seen a surge in empirical research on this topic. While there is a wealth of research on financial literacy, particularly on students and young adults (Ingale & Paluri, 2022; Liu & Zhang, 2021; Amagir *et al*., 2020; Sarpong-Danquah *et al*., 2018; Ergün, 2018), a significant gap persists in understanding the financial behaviours of rural traders in developing economies like Ghana. Moreover, the need to address gaps in financial literacy within these communities has not received sufficient attention. Rural traders in Ghana, with a significant representation of women (Lyon, 2003; Owusu & Lund, 2004; Amu, 2005), are integral contributors to the informal sector and play a crucial role in fortifying local economies (Panuccio, 2019; Owusu & Lund, 2004). Despite their importance, these traders often lack access to formal financial education and services, making them vulnerable (Kyeyune & Ntayi, 2025; Czech, Ochnio, Wielechowski, & Zabolotnyy, 2024). They face unique challenges related to resource management, financial decision-making and long-term planning (Neves & Du Toit, 2013; Dzisi & Obeng, 2013; Basu, 2006). Meanwhile, their financial choices directly impact local economic stability, food distribution, and poverty alleviation in rural communities (Owusu & Lund, 2004). Hence, an in-depth examination of the financial literacy of these traders is not only timely but also essential for informing impactful policy recommendations aimed at enhancing their economic resilience and empowering rural economies. Access to financing, in particular, remains a significant challenge for rural traders in Ghana (Dzisi & Obeng, 2013), who are often classified as high-risk borrowers, making them susceptible to various Ponzi schemes that promise inflated returns. Between 2015 and 2019, Ghana's financial sector witnessed a surge in Ponzi schemes, leading to the collapse of several financial institutions, including notable ones like Little Drops Financial Services, DKM, Jaster Motors, and God is Love Fun Club and Investment Limited (Bank of Ghana, 2019b). These schemes offered high-interest investment contracts, far surpassing the risk-free rate provided by government securities, which attracted rural traders seeking quick profit (Cross, 2024; Chen *et al*., 2019; Larbi, 2016). In the end, many investors lost their money as these institutions failed due to their unsustainable promises and the inability of investors to make informed financial decisions. Although the government intervened by revoking licences and compensating some investors (Ofori, 2023), long-term solutions addressing financial literacy and the behaviour of rural traders remain unaddressed in the literature. Financial literacy is 'the capacity to apply financial information to enhance financial situations' (Struckell *et al*. 2022; Huhmann, 2014; Lusardi & Mitchell, 2014). Despite numerous programmes aimed at improving financial literacy, the efficacy of financial education remains debatable. Previous studies indicate that financial education improves financial literacy and promotes good financial habits (Koomson *et al*., 2021; Jayanthi & Rau, 2019; Banor, 2017; Allgood & Walstad, 2016). Furthermore, research demonstrates

that improved financial literacy benefits both general and special groups (Oteng, 2019; Lusardi, 2019; Wagner, 2015; Xiao *et al*., 2014).

The current study explores rural Ghanaian traders' financial education, literacy, and behaviour within the Upper East Region of Ghana. Most prior research focuses on student literacy and financial education (De Beckker *et al*., 2021; Cordero *et al*., 2022). Studies including data from rural trade communities have received less attention despite recent attempts (Son & Park, 2019; Koomson *et al*., 2021; Mutlu & Ozer, 2021). It is interesting to note that even though financial literacy is prevalent in developing economies (Beckmann, 2013), evidence has been relatively scant, with rural traders largely ignored in the literature (De Beckker *et al*., 2021; Grohmann, 2018; Lusardi & Mitchell, 2014). Furthermore, many studies on financial literacy and financial behaviour have inadequately considered the role of risk tolerance (See e.g., Grohmann, 2018; Oteng, 2019; Son & Park, 2019; Mutlu & Ozer, 2021), which is essential for understanding the financial decision-making process. In addressing this research gap, our study aims to provide empirical evidence on the impact of risk tolerance on the financial behaviour of rural traders. Again, existing literature often presents a direct relationship between financial education and financial behaviour, neglecting the potential mediating role of financial literacy. We propose that higher levels of financial literacy, which may be enhanced through financial education, play a critical mediating role in shaping the financial education-behaviour nexus. This study thus contributes to the literature by unpacking the complex interplay between these variables, offering insights that are currently absent from empirical research.

The study is organised as follows: Section 2 reviews relevant literature. Section 3 elucidates the methodology employed for the research. Section 4 presents the empirical results, followed by a discussion of their implications. Section 5 offers a concluding summary of findings, and Section 6 identifies the limitations of the study and suggests areas for future studies

REVIEW OF LITERATURE AND DEVELOPMENT OF HYPOTHESIS

Financial education and financial literacy

In examining the connection between financial education and financial literacy, we utilise Bandura's Social Learning Theory. This theory offers a framework for analysing how individuals develop behaviours, attitudes and emotional responses through the observation and imitation of others. Bandura (1986) argues that learning is not solely a product of direct experience but can occur through modelling, where individuals mimic the behaviours they observe in others. This theory was illustrated by Bandura's Bobo Doll experiment, where children, after watching a video of an adult behaving aggressively toward a Bobo doll, replicated the aggressive actions they had observed. Applying social learning theory to financial education and financial literacy highlights the role of observation and imitation in learning financial concepts and skills. Financial education activities such as classroom interactions and hands-on workshops serve as environments where individuals observe and practice financial management behaviours. Through observation, explanation, and imitation, individuals are equipped with the understanding and knowledge necessary for effective money management. This theoretical approach suggests that exposure to financial concepts through instructional and practical learning methods helps individuals internalise financial skills, thereby fostering financial

literacy. The existing empirical literature on the impact of financial education on financial literacy presents a complex landscape that warrants further investigation, particularly within the context of developing economies like Ghana. While several studies indicate a positive relationship, there are notable variations in the findings. Cordero *et al*. (2022), for instance, provide strong evidence that students' financial education enhances their financial literacy, particularly pointing out the effectiveness of specialised instructors from non-governmental and private institutions. Their findings underscore the importance of quality, context and the expertise of the educator in delivering financial education. However, the benefits of specialised instruction raise questions about the accessibility and equality of such educational opportunities, especially in rural areas where resources may be limited. The effectiveness of financial education might thus not just depend on the content but also on the delivery method and institutional affiliations, suggesting that similar studies are needed to evaluate these differences in more diverse educational settings. Similarly, Wagner (2019) observes that individuals who have partaken in financial education programmes tend to achieve higher scores in financial literacy compared to those lacking such educational experiences, regardless of their income levels or educational background. This reinforces the argument that targeted financial education can yield positive cognitive outcomes across diverse population segments. Brugiavini *et al*. (2020), while confirming improvements in both actual and self-assessed financial literacy following an educational intervention among university students, also highlight a notable discrepancy: in some cases, increases in perceived literacy did not correspond with actual knowledge gains. This distinction between self-assessed confidence and objective competence suggests that educational interventions may sometimes inflate confidence without ensuring real skill development, thus raising concerns about measurement validity. The inconsistent findings demonstrate that while financial education tends to be associated with improvements in financial literacy (Cordero *et al*., 2022; Wagner, 2019), the effectiveness may depend on other factors such as learner characteristics, instructional quality and contextual influences. De Becker *et al*.'s (2021) findings demonstrate a complicated pathway between financial education and literacy outcomes. Again, Brugiavini *et al*.'s (2020) distinction between perceived and actual literacy calls into question the depth and retention of knowledge gained through such interventions. Most of the existing research is conducted in developed countries and focuses on formal school-based education among adolescents or university students. Little attention is paid to informal education settings and marginalised groups in low-resource environments such as rural populations in developing countries. We therefore draw on the social learning theory and the mixed empirical findings to hypothesise that:

H1: Financial education is strongly and positively associated with the financial literacy of rural traders

Financial literacy and financial behaviour

More complex financial products are becoming increasingly available (Grohmann, 2018) even in developing financial systems. The need to make good financial decisions has become increasingly important, even more so following the negative effects of the pandemic (COVID-19) on household income and expenditure. As a result, the need to make good and sound financial decisions such as savings, borrowing and risk-taking has become crucial. According to the theory of planned behaviour (TPB), individuals are more inclined to intend to

take a specific action when they perceive that they have the necessary resources and support from their environment to carry out that behaviour (Ajzen, 1991). In the context of financial behaviour, individual financial literacy plays a critical role in shaping financial decisions and is likely to influence overall financial conduct. Financial literacy provides knowledge about financial instruments and market resources, thereby enhancing decision-making abilities (Altman, 2012). This knowledge equips individuals with the skills to analyse information effectively, facilitating more rational investment choices (Lusardi & Mitchell, 2014). Grohmann (2018) and Zulaihati, Susanti, & Widyastuti (2020) both emphasise the broad influence of financial literacy on behavioural outcomes of middle-class individuals residing in Bangkok, an urban Asian economy. Grohmann (2018) identifies a strong link between financial literacy and various savings and borrowing behaviours, while Zulaihati *et al*. (2020) observe the effect on shopping behaviours, long-term planning, saving behaviour and short-term planning of secondary school teachers in Greater Jakarta, Indonesia. These findings support the notion that financial literacy enables individuals to manage resources more prudently over time. Oteng (2019) and Lusardi and Mitchell (2017) extend the discussion to investment and retirement planning, noting that individuals with higher levels of financial knowledge are more likely to engage in prudent investment choices and retirement preparation. This indicates that financial literacy supports not only short-term decision making but also equips individuals to make complex, long-term financial decisions. In the educational domain, Gerrans and Heaney (2019) provide evidence from a thorough evaluation of a semester-long personal finance unit offered to undergraduates at an Australian university. The authors observe that female students exhibit lower levels of both objective and self-reported financial literacy. Furthermore, the performance of positive financial behaviours and the intention to engage in such behaviours were positively correlated with successful completion of the course, showing that targeted education can improve literacy, attitudes and behavioural intentions among students. This implies that interventions aimed at increasing financial literacy can translate into meaningful behavioural change, at least within formal educational settings. However, findings in the literature are not entirely consistent. For example, Purwidianti & Tubastuvi (2019), who studied SMEs in Indonesia, found no significant association between financial literacy and financial behaviour. This contradiction suggests that the relationship may be context-dependent, influenced by institutional, cultural, or economic conditions. Moreover, many studies focus either on students in higher education (e.g. Gerrans and Heaney, 2019; Grohmann, 2018) or general consumers in developed economies (e.g. Lusardi and Mitchell, 2017), leaving a gap in how financial literacy affects financial behaviour among informal sector actors such as rural traders in developing countries. We therefore hypothesise that:

H2: Financial literacy is significantly and positively correlated with the financial behaviour of rural traders.

Mediating financial literacy in the financial education-financial behaviour nexus

Theoretically, financial education is expected to enhance the financial literacy of individuals and consequently improve their financial decision-making (Koomson *et al*., 2021; Jayanthi & Rau, 2019). Most studies have attempted to study the direct associations between financial education, financial literacy and the financial behaviour of individuals. However, most of these studies have either studied the nexus between financial literacy and financial education (Wagner, 2019;

Brugiavini *et al*., 2020; De Beckker *et al*., 2021; Cordero *et al*., 2022), financial behaviours and financial literacy (Kaiser & Menkhoff, 2017; Grohmann, 2018; Oteng, 2019) or financial literacy and risk tolerance (Bayar *et al*., 2020; Kawamura *et al*., 2021). Some studies have demonstrated an indirect connection between financial education, financial literacy and risk tolerance (Mutlu & Ozer, 2021; Pahlevan *et al*., 2020; Son & Park, 2019; Adomako *et al*., 2016; Hayat & Anwar, 2016). Nonetheless, none of these studies have examined the moderating or mediating roles of financial literacy in the context of financial education and financial behaviour. For example, Mutlu and Ozer (2021) explore the moderating role of financial literacy in the locus of control and financial behaviours nexus. Their findings indicate that financial literacy influences the connection between an internal locus of control and financial behaviour. Similarly, Son & Park (2019) investigate the mediating effect of financial literacy in the relationship between financial education and sound personal finance, aiming to evaluate how financial education impacts the effectiveness of personal finance management. Utilising data from the 2014 Consumer Empowerment Index survey administered by the Kora Consumer Agency, the series of mediation analyses underscores that financial literacy acts as a mediator between financial education and sound personal finance in both high-income and middle-income groups. Additionally, Hayat & Anwar (2016) analyse the moderating impact of financial literacy on the relationship between behavioural biases and investment decision-making in Pakistan. Employing a survey questionnaire to gather data from 158 investors engaged in trading on the Pakistan Stock Market, their study reveals that financial literacy negatively moderates the relationship between herding bias while positively influencing the effects of overconfidence bias in investment decisions. Furthermore, Adomako *et al*. (2016) leverage the resource-based view to investigate the moderating role of financial literacy in the relationship between access to finance and firm growth in Ghana, concluding that financial literacy strengthens the link between access to finance and the growth of firms. The existing literature clearly demonstrates that financial education and financial literacy have a direct and independent impact on financial behaviour (Gerrans & Heaney, 2019; Kaiser & Menkhoff, 2017; Grohmann, 2018). Particularly, Lusardi (2019) notes that the ability to make sound financial decisions largely hinges on an individual's level of financial literacy and education (Lusardi, 2019). It is clear from the above discussion that the effects may not be independent of each other, as the level of financial literacy depends to an extent on the level of financial education. Kaiser and Menkhoff (2017) conducted a meta-analysis of 126 impact evaluation studies and concluded that financial education has a substantial effect on financial behaviour, with an even greater influence on enhancing financial literacy. Financial education will most likely make people financially literate. Financially literate individuals will, in turn, be more likely to make good financial decisions. We propose that the connection between financial education and financial behaviour is an indirect one, with financial literacy as the mediating variable, a phenomenon that has not been empirically tested in the literature. Hence, we hypothesise that:

H3: Financial literacy significantly mediates the connection between financial education and the financial behaviour of rural traders.

Risk tolerance and financial behaviour

Risk tolerance, defined as the extent to which an individual is prepared to accept risk, significantly influences decisions regarding household investment portfolios (Sung & Hanna, 1996). This concept carries significant implications not only for individuals but also

for financial service providers (Hallahan *et al*., 2004). The financial behaviour of an individual may be influenced by the level of risk they are willing to tolerate. In the context of financial risk tolerance and financial behaviour, the theory of planned behaviour (TPB) helps explain how an individual's risk tolerance influences their financial decisions. A person with a high tolerance for risk is more likely to have a positive attitude toward high-risk financial behaviours, such as investing in volatile markets, due to a perception of potential high rewards. Subjective norms may also play a role if the individual's social circle, family values, or practices risk-taking in financial decisions. Additionally, high-risk tolerance enhances perceived behavioural control by fostering a sense of confidence in navigating uncertain financial environments. Consequently, the combination of a positive attitude toward risk-taking, supportive social influence, and self-assurance in managing risky financial behaviours strengthens the intention to pursue such behaviours, resulting in actions such as investing in stocks, engaging in entrepreneurial ventures, or experimenting with high-yield financial products. In efficient markets, investors can anticipate a higher return in exchange for taking on increased risk. Consequently, those with greater tolerance for risk are more inclined to invest in riskier assets, such as stock, to achieve superior long-term returns and accumulate greater wealth (Yao *et al*., 2004; Neelakantan, 2010). Conversely, an investor with a lower risk tolerance necessitates additional compensation to accept the uncertainty associated with investments that offer variable payoffs (Hanna *et al*., 2008). The financial behaviour of a person is, therefore, influenced by the risk-return trade-off, which reflects the individual's risk tolerance. Pratt (1978) posits that individuals with a higher degree of risk aversion are likely to allocate a smaller share of their wealth to riskier investments. This suggests that an individual's financial choices are significantly shaped by their tolerance for risk. Nevertheless, the connection between risk tolerance and financial behaviour has been largely overlooked in scholarly discourse, especially in developing economies. Only a limited number of recent studies, such as Kawamura *et al*. (2021), Bayar *et al*. (2020) and Nguyen *et al*. (2019), have explored the relationship between these factors. Utilising data from a purpose-built Japanese survey conducted in 2018, Kawamura *et al*. (2021) analysed the financial behaviours and perspectives of households. Their findings suggest that factors such as risk aversion, loss aversion, and discount rates significantly influence financial decision-making. In a related study, Nguyen *et al*. (2019) explore the combined effect of risk perception and risk tolerance on individual investment strategies. They reveal that the allocation of risky assets is impacted both directly and indirectly by risk tolerance as it interacts with risk perception. Furthermore, Nguyen *et al*. (2016) examine the role of risk tolerance in shaping investment decisions within the framework of financial advice, concluding that a positive correlation exists between risk tolerance and investment decision-making. Little attention has been given to the link between risk tolerance and financial behaviour, with most studies focusing on the assessment of financial literacy levels (Ergün, 2018; Amagir *et al*., 2020; Liu *et al*., 2021) and how it influences decision-making (Lührmann *et al*., 2018; Lusardi *et al*., 2017). Also, studies on risk tolerance largely focus on the assessment of demographic determinants of financial risk tolerance (Nguyen *et al*., 2019; Gibson *et al*., 2013; Hallahan *et al*., 2004) or the influence of financial literacy on risk tolerance (Bayar *et al*., 2020). The influence of risk tolerance on financial behaviour has not been adequately examined, especially in a developing economy context. The question now is: does risk tolerance influence the financial behaviour of rural dwellers?

H4: Risk tolerance is strongly and positively related to the financial behaviour of rural traders.

METHOD

The study Context

The study focused on the Upper East Region of Ghana, situated in the northeastern corner of the country. It is the third smallest of the 16 regions of Ghana, bordered by Burkina Faso to the north and Togo to the east, covering a total land area of 8,842 square kilometres (Ghana Geographic Information Systems, 2024). The region is subdivided into 15 districts (see Figure 1) with Bolgatanga serving as the regional capital. Notably, the Upper East Region is the least urbanised in Ghana, with only 21% of its population residing in urban areas, making it primarily rural; the majority, 79%, are scattered across dispersed settlements (Ghana Statistical Service, 2012; Modern Ghana, n.d). The educational attainment levels in the region are significantly below the national average, contributing to its classification as one of the smallest and poorest regions in the country (Ghana Statistical Service, 2015; Modern Ghana, n.d). According to the Ghana Statistical Service (2015), Ministry of Food and Agriculture, Ghana, n.d, Modern Ghana, n.d, the region's economic activity is mainly farming and trading. The primary economic activities in the region are farming and trading, with major occupations consisting of agriculture and related workers (66.4%), production and transport equipment workers (14.7%), sales workers (9.6%), service workers (4.0%) and professional, technical and related workers (3.8%). Furthermore, Modern Ghana (n.d) notes that only 21.2 per cent of the population aged 15 years and older is literate, with illiteracy rates reported as 12.9 per cent for English only, 6.6% for both English and the Ghanaian language and 1.7% for the Ghanaian language only. The region's illiteracy rate of 78.1% is considerably higher than the national average of 45.9%. While there is limited information available regarding the region's financial literacy, it is recognised for its low levels of financial inclusion, which may be linked to a lower level of financial literacy. Given the region's unique characteristics, it is essential to conduct a dedicated study to explore the relationship between financial education, financial behaviour, financial literacy and risk tolerance.

Data

The population of the study consists of the total number of traders in the Upper East region of Ghana. The Upper East region is one of the smallest and poorest regions among the 16 regions of Ghana (Ghana Statistical Service, 2015. We conveniently sampled 500 rural traders operating in the Srigu market in the Kassena Nankana West District, the Navrongo market in the Kassena Nankana East and the Bolga market in the Bolgatanga Central Municipal. The study adopts Ghana Statistical Service's (2021) classification of rural areas as those with limited access to formal infrastructure, lower population densities and economies based primarily on agriculture and informal trading. Although Bolga and Navrongo markets are in municipal and urban districts, the majority of the traders who patronise these markets come from surrounding rural communities (Lyon, 2003; Karg, Bellwood-Howard, Akoto-Danso, Schlesinger, Chagomoka, & Drescher, 2019; Ghana Statistical Service, 2021; Addai, Suh, & Bardsley, 2023; Addai, Amponsah, & Dinye, 2023). Srigu market is situated in a predominantly rural area. For the purpose of this study, we refer to rural traders as market participants who live and /or operate within rural or peri-urban communities characterised by informal economic activity.

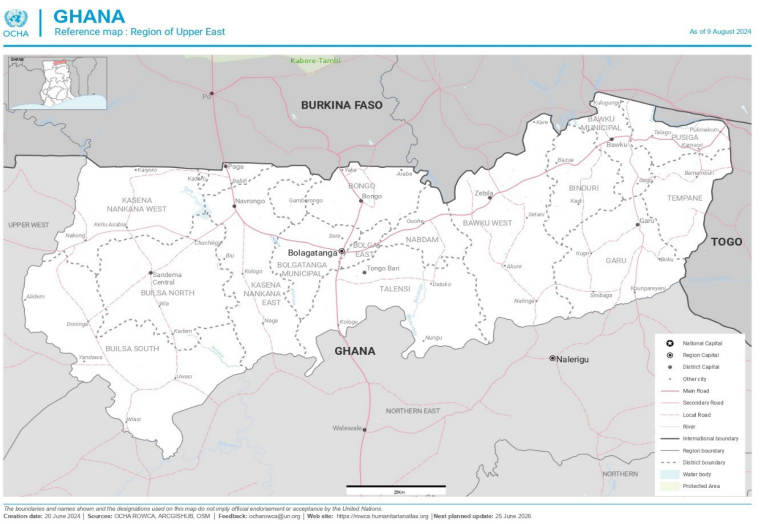

Figure 1: Map of the Upper East Region

Source: United Nations Office for the Coordination of Humanitarian Affairs (OCHA, 2024)

Questionnaires adapted from Grable and Lytton (1999) and Xiao & Porto (2017) were developed and administered to the traders to measure their financial literacy, risk tolerance, financial behaviour and financial education. The questionnaires were structured in a way that participants could rate how well they agreed or not on a seven-point Likert scale ranging from (1) "strongly disagree" (2) "disagree", (3) "slightly disagree", (4) "neutral", (5) "slightly agree", (6)"agree" to (7) "strongly agree." In all, a total of 500 questionnaires were conveniently administered to petty traders in the Bolga, Navrongo, and Srigu markets. We administered the questionnaires to traders who had operated for at least 1 year within those markets. The questionnaires were administered to the respondents face-to-face by a trained field team who could speak the local language. The study was conducted in accordance with ethical research standards. Ethical approval was obtained from the Ethics Committee of Kwame Nkrumah University of Science and Technology. All participants were informed about the purpose of the study and provided their voluntary informed consent before participating. Respondents were assured of anonymity and confidentiality. No identifying information was collected, and all data were securely stored and used solely for academic purposes. No ethical concerns were encountered during the data collection process. The questionnaire was structured into three distinct sections. The initial section collected the demographic information about the respondents. The second section focused on assessing the respondents' level of risk tolerance. The final section gathered information on the level of financial literacy, financial education and financial behaviour of sampled rural traders. The results were summarised through frequencies, percentages, means, standard deviations, correlation and regression. Subsequently, these findings were examined, and interpretations were drawn. The reliability of the results was assessed using Cronbach's Alpha, with a threshold of 0.70 established as the minimum benchmark for acceptable internal consistency; values falling below this indicate inadequate reliability within the generic range.

Variable measurement

The dependent variable of the study is financial behaviour. The construct is extracted from literature related to financial behaviour; particularly, we adapted most of our items from Xiao & Porto (2017). Seven (7) statements, including 'I keep my expenditures under control' and '*Before big purchases, I analyse my financial situation*', were used. These items were measured utilising a 7-point Likert scale, which ranged from "strongly disagree", "disagree", "slightly disagree", "neutral", "slightly agree", "agree" to "strongly agree." The main dependent variables are financial education and risk tolerance. Financial education is measured with five (5) items such *as 'I have been taught something of finance back in school'*, and '*I have participated in some financial management programmes in the past'*. This was also sourced from (Xiao & Porto (2017). Each item is measured on a seven-point Likert scale with anchors ranging from '*strongly disagree'* to '*strongly agree'*. Risk tolerance was measured with eleven (11) objective multiple-choice questions sourced from Grable and Lytton (1999). The mediating variable-financial literacy, was measured with five (5) items sourced from (Xiao & Porto (2017). Statements such as '*I know what inflation and interest rate changes*' mean and '*I know how to calculate interest rates when applying for a loan'* were used. The scale is measured on a 7-point Likert scale ranging from '*strongly disagree'* to '*strongly agree'*.

Estimation Strategy

In investigating the influence of financial education on financial behaviour, we perform a multiple regression where the relationship is first tested without control variables (equation 1) before including control variables (equation 2). The models employed are specified below.

$$FB_i = \alpha_i + \beta FE_i + \varepsilon_i \quad \textbf{eqn 1}$$

$$FB_i = \alpha_i + \beta FE_i + \gamma_j Z_j + \varepsilon_i \quad \textbf{eqn 2}$$

Where FB_i is financial behaviour, FE_i is financial education, Y_jZ_j is the vector of control variables, a_i is the constant and ε_i is the error term. Further, we examine the mediating effect of financial literacy on the nexus between financial education and financial behaviour by estimating a series of cross-sectional regression models.

To establish the mediating role of financial literacy in the relationship between financial education and financial behaviour, we used Hayes (2018), Hayes (2013), Hayes (2009) and Preacher and Hayes (2004) bootstrap mediation methodology. Bootstrapping is a non-parametric approach that overcomes the problem of questionable distributional assumptions of the traditional approaches to mediation (Hayes, 2018). Bootstrapping enables an accurate estimate of the indirect effect of the independent variable on the dependent variable (Shrout and Bolger 2002). It also provides more power in detecting indirect effects than traditional methods (Hayes, 2018, Hayes and Scharkow, 2013). The macro process supplement (version 3.3) for SPSS was employed to analyse the mediation pathway. Unlike the conventional method proposed by Baron and Kenny (1986) for assessing mediation, Hayes (2018)'s macro process calculates the direct, total, and indirect effects of the independent variable on the dependent variable. Utilising 10,000 bootstrapped samples, we established bias-corrected and accelerated confidence intervals at a 95% confidence level to estimate the direct, total, and indirect effects of financial education on financial behaviour.

Four conditions must be present to establish the presence of mediation (Baron and Kenny, 1986; Hayes, 2018):

First, the independent variable (financial education) must significantly affect the mediator (financial literacy) in equation 3.

$$FL_i = \alpha_i + \beta FE_i + \gamma_j Z_j + \varepsilon_i, \quad \textbf{eqn 3}$$

Second, the independent variable (financial education) must significantly influence the dependent variable (financial behaviour) in equation 4.

$$FB_i = \alpha_i + \beta FE_i + \gamma_j Z_j + \varepsilon_i, \quad \textbf{eqn 4}$$

Third, the mediating variable (financial literacy) must significantly affect the dependent variable (financial behaviour) in equation 5.

$$FB_i = \alpha_i + \beta FL_i + \gamma_j Z_j + \varepsilon_i, \quad \textbf{eqn 5}$$

Fourth, if all three preceding conditions are satisfied in the anticipated directions, and the relationship between the independent variables (financial education) and the dependent variable is weaker in equation 6 (becoming insignificant) than in equation 2, this indicates evidence of partial mediation (or full mediation).

$$FB_i = \alpha_i + \beta FE_i + \beta FL_i + \gamma_j Z_j + \varepsilon_i \quad \textbf{eqn 6}$$

In our final model, we examine the influence of risk tolerance on financial behaviour as specified in equation 7. In a series of estimations of equation 7, we investigate how financial behaviour is influenced at low risk tolerance, high risk tolerance and average risk tolerance levels.

$$FB_i = \alpha_i + \beta FRT_i + \varepsilon_i, \quad \textbf{eqn 7}$$

Where FB is the dependent variable, financial behaviour; a_i is the constant, FRT_i is risk tolerance and ε_i is the error term.

RESULTS AND DISCUSSION

Demographic Factors

With a response rate of 97.8%, 489 questionnaires were retrieved from respondents. From Table 1, the majority of the respondents were women. Also, more than half of the respondents (58.5%) have some sort of formal education, with 41.5% having no formal education. The table, nonetheless, shows that most respondents can at least read and write and also make some important financial decisions. About 71.4% of the respondents are married, while about 76.9% of the respondents have dependents.

Table 1: Demographic Information

Particulars		Frequency	Percent
Gender	Male	72	14.7
	Female	417	85.3
	Total	489	100
Level of Education	Secondary Education	211	43.1
	Diploma	3	0.6
	Degree	70	14.3
	Postgraduate	2	0.4
	Never	203	41.5
	Total	489	100
Years in Operation	Less than 5 years	124	25.4
	5 - 10 years	190	38.9
	10 - 20 years	134	27.4
	Over 20 years	41	8.4
	Total	489	100
Marital Status	Married	349	71.4
	Single	140	28.6
	Total	489	100
Dependents	Yes	376	76.9
	No	113	23.1
	Total	489	100
Formal Education	Yes	277	56.6
	No	212	43.4
	Total	489	100
Weekly Sales Turnover	Less than GHS 500	134	27.3
	GHS 500 – 1,000	136	27.9
	GHS 1,001 – 1,500	56	11.5
	GHS 1,501 – 2,000	73	15.0
	More than GHS 2,000	90	18.4
	Total	489	100.0
Loan Taking	Yes	272	53.8

	No	217	46.2
	Total	489	100
Understanding of Loan Agreement	Not really	118	43.4
	absolutely	154	56.6
	Total	272	100.0

Source: Field data (2024)

Variable Measure and Reliability

The results of the reliability test are presented in Table 1. All the variables have a Cronbach alpha greater than 0.70 (Hair *et al*., 2019). We conclude, therefore, that the measures employed in the study are suitable and valid.

Table 2: Validity Test

	Cronbach's Alpha	No. of Items
Financial Education	0.716	5
Financial Literacy	0.703	5
Financial Behaviour	0.751	7
Risk Tolerance	0.729	11

Source: Authors' Computation (2024)

Correlation Analysis

Table 3 presents the matrix of correlations of our variables. Multicollinearity is present if the correlation between any two independent variables is equal to or greater than 0.9. From Table 3, the highest correlation is 0.626. We conclude, therefore that multicollinearity has no effect on this study. The correlation between financial literacy and financial behaviour is positive, suggesting that an increase in financial literacy may be associated with improved financial behaviour. Similarly, financial education is positively correlated with financial behaviour. This also means that an increase in financial education may be linked with an improvement in financial behaviour. Moreover, financial literacy and financial education have positive correlations with risk tolerance. These correlations imply that higher financial literacy and financial education have the tendency to increase the risk tolerance levels of individuals.

Table 3: Pearson Correlation Analys

	Financial Education	Financial Literacy	Financial Behaviour	Risk Tolerance
Financial Education	1			
Financial Literacy	0.626	1		
Financial Behaviour	0.498	0.598	1	
Risk Tolerance	0.381	0.360	0.240	1

Source: Authors' Computation (2024)

Financial education and financial behaviour

We examine the link between financial education and financial behaviour using a multiple regression. The result of the analysis is reported in Table 4[1]. The first model is without controls. In model two, we add control variables, namely Marital Status (MS), Dependent Relatives (DR), Highest Educational Attainment (HEA) and Weekly Sales Turnover (WST). Table 4 shows that the F-statistic is statistically significant at the 1% significance level, indicating that our model is adequate. Also, the R-squared of 0.248 in model 1 and 0.260 in model 2 suggests that about 24% to 26% of the variations in financial behaviour can be explained by the independent variables employed in the model. From the table, financial education is observed to be statistically significant and positively related to financial behaviour. This means that an increase in financial education significantly leads to an improvement in the financial behaviour of individuals.

Table 4: Financial Education and Financial Behaviour

	1	2
Financial Education	0.391***	0.361***
	(0.031)	(0.034)
Marital Status		0.124
		(0.087)
Dependent Relatives		0.059
		(0.062)
Educational Level		-0.025
		(0.020)

Weekly Sales Turnover		0.045*
		(0.026)
Constant	3.326***	3.164
	(0.127)	(0.193)
F-Statistic	160.129***	160.129***
R-Squared	0.248	0.260

Notes: *, **, *** denote significance at the 10%, 5% and 1% significance level, respectively. Standard errors are in brackets. **Source:** Authors' Computation (2024)

[1]In model 1, the regression is performed without any control variables, while we include control variables in model, as specified in equations 1 and 2, respectively. This is done to establish the robustness of the results.

Higher financial education equips individuals with relevant knowledge and concepts. This also increases their awareness of financial issues and causes them to be conscious about their finance and make informed financial decisions, consequently leading to improved financial behaviour. It is inferred from this evidence, therefore, that having knowledge in financial management improves the financial decision-making of traders. This finding is consistent with previous studies by Agustina & Mardiana (2020), Kaiser & Menkhoff (2017), Grohmann (2018), who also find a significant positive link between financial education and financial behaviour. The findings, however, contradict De Beckker *et al* (2021). Fernandes *et al*. (2014) demonstrate that financial education is helpful in targeting certain financial behaviours like savings, insurance, budgeting, tax planning, retirement planning, among others. While none of the added control variables in model 2 were individually significant, their collective inclusion led to a statistically significant improvement in the model's explanatory power, with the p-value for the F-statistic significant at a 1% significance level and an R-squared increment from 0.243 in model 1 to 0.260 in model 2. This suggests that, although weak individually, the control variables may jointly account for meaningful variation in financial behaviour and also help reduce omitted variable bias, thus reinforcing the robustness of the observed relationship between financial education and financial behaviour.

The mediating role of financial literacy in the financial education-financial behaviour nexus

To analyse the mediating role of financial literacy in the financial education-financial behaviour nexus, the mediation model was examined using Process Macro for SPSS (Hayes, 2018). The result indicates that financial education significantly predicts financial literacy, with a coefficient of a=0.6518, SE=0.0368, 955 CI [0.5794, 0.7241], p-value=0.0001. This positive and statistically significant relationship suggests that an increase in financial education leads to a considerable enhancement in individuals' financial literacy levels, confirming the social learning theory, which posits that through observation, explanation and imitation, individuals gain the understanding and knowledge necessary for effective money management. Financial education, therefore, serves as a crucial driver of financial literacy. It was also revealed that financial literacy significantly predicts financial behaviour, with b=0.3533, SE=0.0344, 95% CI [0.2858, 0.4208], P-value=0.0001. This finding implies that improvement in financial literacy translates to

better financial behaviour among individuals. These results support the mediation hypothesis, indicating that financial education remains a significant predictor of financial behaviour after controlling for the mediator, financial literacy, c'=0.160, SE=0358, 95% CI [0.0897, 0.2303], p-value=0.0001, consistent with partial mediation. Approximately 38% of the variation in financial behaviour is explained by the independent variable (R^2=38%). It is inferred from this evidence, therefore, that, financial education is a key driver of financial behaviour. This means that having knowledge in financial management improves the financial decision-making of traders. This confirms the findings of Agustina & Mardiana (2020), Kaiser & Menkhoff (2017), Grohmann (2018), who also find a significant positive link between financial education and financial behaviour. The indirect effect was tested using a percentile bootstrap estimation method based on 10000 samples as outlined by Shrout & Bolger (2002). We implemented it using the PROCESS Macro Version 3.3 developed by Hayes (2018). The result shows that the indirect coefficient is significant, a*b=0.2303, SE=0.0325, 95% CI [0.1684, 0.2959]. The result suggests that having access to financial education has the tendency to improve the financial behaviour of the respondents, and it is 0.23 points higher as mediated by financial literacy. This evidence suggests that financial education influences financial behaviour through financial literacy, confirming the theory of planned behaviour that individual financial literacy plays a critical role in shaping financial decisions by enhancing decision-making abilities. Our evidence supports the findings of Son and Park (2019). Rural traders in Ghana become financially literate as they gain increased financial education, which eventually improves their financial behaviour. The findings suggest that knowledge of Ponzi schemes, cost-benefit analysis, inflation, exchange rate, budgeting and savings are important determinants of financial behaviour. Financial literacy, which is mainly concerned with the comprehension of economic and financial principles as well as knowledge of financial tools, has been found to affect both financial education and financial behaviour, as well as saving and investment behaviour (Goyal & Kumar, 2021; Hastings & Mitchell, 2020). Financial education therefore, enhances financial literacy and fosters positive financial behaviours (Bayer *et al*., 2009; Bernheim and Garrett, 2003).

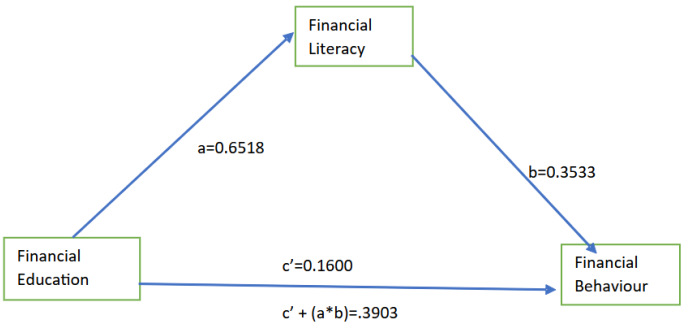

Figure 2: The mediating role of financial literacy in the connection between financial education and financial behaniour

Table 5: Effects, path and regression results

			95%	confidence	interval			
Effect	path	label	Estimate	SE	t	p	LLCI	ULCI
Direct	FE → FL	a	.6259	.0368	17.709	0.000	1.5208	2.114
Direct	FL → FB	b	.3533	.0344	10.2801	0.000	.2858	.4208
Direct	FE → FB	c'	.1600	.0358	4.471	.000	.0897	.2303
Indirect	FE → FB	a *b	.2303	.0325			.1684	.2959
Total	FE → FB	c' + (a*b)	.3903	.0308	12.685	.000	.3298	.4507

To establish the robustness of our results, we test the mediating effect of financial literacy in the financial education-financial behaviour nexus in the presence of the control variables. The results are presented in Tables 6, 7 and 8. The results confirm the partial mediation established in Table 5 and Figure 2 above.

Table 6: The impact of financial education on financial literacy

	Estimate	**SE**	**T**	**P**	**LLCI**	**ULCI**
constant	2.2267	.2191	10.1630	0.000	1.796	2.657
Financial Education	.543	.0384	14.1420	0.000	.4676	.6185
Marital status	.2690	.0983	2.7355	0.007	.0758	0.462
Dependent relatives	-.0225	.0705	-.3189	.7499	-.1610	.1160
Highest education	-.1657	.0230	-7.188	.000	-.2109	-.1204
Weekly sales	.0707	.0294	2.404	.0166	.0129	.1284
R^2	0.459					
F-value	82.037***					
N	482					

Dependent variable Financial Literacy

Table 7: The impact of financial education on financial behaviour

	Estimate	**SE**	**T**	**P**	**LLCI**	**ULCI**
constant	3.1637	.1932	16.3718	0.000	2.784	3.543
Financial Education	.3606	.0339	10.6481	0.000	.2941	.4272
Marital status	.1242	.0867	1.4321	.1528	-.0462	.2946
Dependent relatives	.0589	.0622	.9471	.3441	-.0633	.1810
Highest education	-.0254	.0203	-1.2521	.2111	-.0654	.0145
Weekly sales	.0453	.0259	1.7462	.0814	-.0057	.0962
R^2	0.259					
F-value	33.821***					
N	482					

Dependent variable Financial behaviour

Table 8: The connection between financial education financial literacy and financial behaviour

	Estimate	SE	T	P	LLCI	ULCI
constant	2.337	.1934	12.086	0.000	1.957	2.7167
Financial Education	.1590	.0366	4.347	0.000	.0871	.2309
Financial Literacy	.3713	.0365	10.179	0.000	.2996	.4430
Marital status	.0243	.0794	.3065	.759	-.1316	.1803
Dependent relatives	.0672	.0565	1.191	.234	-.0437	.1781
Highest education	.0361	.0194	1.857	.064	-.0021	.0742
Weekly sales	.0190	.0237	.8036	.422	-.0275	.0656
R^2	0.3909					
F-value	51.450***					
N	481					

Dependent variable Financial Behaviour

Risk Tolerance and Financial Behaviour

We show the link between risk tolerance and financial behaviour in Table 9. Risk tolerance is divided into 3; which are represented in the various models. Model 1 deals with the connection between low risk tolerance and financial behaviour, Model 2 looks at the link between high risk tolerance and financial behaviour, and finally, Model 3 draws the relationship between overall or mean risk tolerance and financial behaviour. From model 1, the connection between low risk tolerance and financial behaviour is observed to be negative and significant at the 1% significance level. This suggests that traders with low risk tolerance are at a high level of carefulness when it comes to financial decision-making. Low risk tolerance relates to traders who do not like to take risks or are risk-averse. The findings suggest that the idea of high risk makes them less involved in financial decisions and reduces prudent financial behaviour. However, this finding is contrary to expectation since risk-averse individuals are typically more cautious in their financial decisions because they are particularly not to lose money, which should lead to desirable and prudent financial behaviour. This implies that their reluctance to take on more risks makes them less involved in financial decisions. Model 2 shows a significantly positive connection between high risk tolerance and financial behaviour. Similarly, Model 3 suggests a strong and positive relation between mean risk tolerance and financial behaviour. These models indicate that an increase in high-risk tolerance and mean risk tolerance will have a positive impact on financial behaviour, that is, will increase the tendency to make prudent financial decisions. This finding confirms previous studies by Lührmann *et al*.(2018), Huhmann (2014) and Xiao *et al*. 2014). Here, traders who are high-risk lovers, as well as the average risk lover, will consider the effect of the level of risk before making financial decisions and are, therefore, more likely to make prudent financial decisions. This form of risk analysis helps to improve financial behaviour and financial decisions. Risk, therefore, is one of the key factors to consider in making investment decisions. More risk-

loving investors are more ready to participate in other enterprises that have the potential to increase their profits. As noted by Kawamura *et al* (2021), factors including risk aversion, loss aversion, and discount rates significantly influence financial decision-making processes.

Table 9: Risk Tolerance and Financial Behaviour

	Model 1	Model 2	Model 3
	FB	FB	FB
Constant	4.924***	4.683***	3.955***
	(0.047)	(0.083)	(0.204)
Low risk tolerance	-0.251***		
	(0.096)		
High risk tolerance		0.238**	
		(0.095)	
Mean risk tolerance			0.397***
			(0.087)
R^2	0.014	0.013	0.041
F-value	6.871***	6.232***	20.710***
N	488	488	488

Standard error in parenthesis. **** p<0.01, ** p<0.05, * p<0.1 represent 1%, 5% and 10% significance levels FB=financial behaviour.* **Source:** *Authors' Computation (2024)*

CONCLUSION AND IMPLICATIONS

Rural traders are considered as high-risk borrowers, making financing harder to come by. Many of these traders fall for Ponzi schemes that offer large returns on money. Although the government and regulators have sought to protect individuals from such schemes, there still remains a part to be played by the people. This study sought to investigate how financial education and financial literacy could equip individuals to protect themselves against Ponzi schemes through an improvement in their financial behaviour. Specifically, we sought to investigate the interrelationship between financial education, financial literacy and financial behaviour. We also examined the influence of risk tolerance on financial behaviour. Using structured questionnaires, we gather data from 489 participants in the Upper East Region of Ghana. The data is analysed quantitatively using regression analysis. We find a significantly positive connection between financial education and financial behaviour, suggesting that an increase in the financial education of rural dwellers helps to improve their financial behaviour, regarding financial decision making. Financial education therefore, enhances the ability of rural traders to make sound financial decisions. Interestingly, we find that educational level does not significantly improve financial behaviour. This means that general knowledge does not necessarily improve the financial behaviour of individuals, necessitating the inclusion of financial education at all levels of education. Again, we find that financial

literacy mediates the link between financial education and financial behaviour, meaning that an increase in financial education makes rural dwellers financially literate and causes their behaviour towards financial matters to improve. The relationship between low risk tolerance and financial behaviour is negative and significant. However, average to high financial risk tolerance is positively associated with financial behaviour, indicating that risk lovers are more willing to make financial decisions than low risk tolerance individuals. Our findings suggest that there is an urgent need for financial education targeted at rural traders to improve the financial behaviour of such individuals. Therefore, governments, employers, and all stakeholders must implement financial education programmes for rural dwellers who are often the victims of Ponzi schemes. Specifically, the Ministry of Finance and the Bank of Ghana should collaborate with academia to design and fund community-based financial literacy campaigns that focus on identifying fraudulent schemes and promoting sound financial behaviour. The Association of Ghana Industries (AGI), the National Board for Small Scale Industries (NBSSI) and the Ghana Enterprises Agency (GEA) must organise periodic financial education programmes to enhance the financial decision-making of rural traders. Non-Governmental Organisations (NGOs) working in rural development should integrate financial literacy modules into their livelihood and empowerment programmes. Delivering financial education to such individuals will also go a long way to shield them from financial catastrophes and improve their financial decision-making and their total well-being in the long run. Financial educational courses such as money management, budgeting, savings, liquidity, inflation, interest rate, and tax planning, among others, should be taught by trade unions and government agencies to improve the financial literacy and education of local traders to enhance their financial behaviour. Microfinance institutions and rural banks should provide practical financial education to their clients during onboarding and group meetings, emphasising due diligence before investment decisions. District Assemblies and the National Commission for Civic Education (NCCE) should lead grassroots sensitisation efforts using local languages through radio platforms and market gatherings to educate rural populations about financial risk and safe practices.

Limitations and areas for future studies

Given that participants were selected through convenience sampling, the findings of this study may not be fully generalizable to the wider population, as the sample may not be representative; therefore, interpretations should be made with caution. To improve the generalizability of the findings, future studies should broaden the scope of this study by including a wider geographical area, specifically considering other impoverished regions in Ghana and rural areas in other African countries. Additionally, employing a longitudinal approach could allow researchers to collect data at multiple points in time, enabling them to observe changes and trends in financial behaviour which would lead to more enriched research findings In terms of measuring variables, the current study relied on subjective/self-reported measures for variables such as financial literacy, financial education and financial behaviour. Future studies should employ objective measures or complement the subjective measures with objective ones, such as financial records, bank statements, etc., where feasible. This can help mitigate potential biases such as overestimation or underestimation of financial behaviours resulting from social desirability or recall biases. Finally, future studies can adopt a more holistic and comprehensive framework by exploring both direct and indirect connections between financial

literacy, financial behaviour, financial education, financial inclusion, risk tolerance and financial well-being.

Declaration of interest

None

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