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FINANCIAL LITERACY AND FINANCIAL WELL-BEING OF RURAL FARMERS: DOES FINANCIAL INCLUSION MATTER?

Tinashe Mangudhla
University of Science and Technology of China, Hefei, China
E-mail: timangu@mail.ustc.edu.cn
ORCID 0000-0003-4951-6617

Regina Naa Amua Dodoo
Hohai University, Nanjing, China
E-mail: lx20210613004@hhu.edu.cn
ORCID 0000-0002-9102-0087

Emmanuel Bosompem Boadi
University of Memphis, Memphis, USA
E-mail: eboadi@memphis.edu
ORCID 0000-0002-4290-4177

Reginald Masimba Mbona
Jiangsu University, Zhenjiang, China
E-mail: rmmbona@yahoo.com
ORCID 0000-0002-1070-762X

Mary Donkor
Jiangsu University, Zhenjiang, China
E-mail: mdonkor34@gmail.com
ORCID 0000-0002-9839-5797

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ABSTRACT. Financial literacy empowers individuals to make better financial decisions to stabilize their financial well-being while positively contributing to the economy. This study examined the link between financial literacy and financial well-being and added the mediating effect of financial inclusion among Zimbabwean farmers in three major districts in two provinces. This study utilized a questionnaire survey to retrieve answers from 526 Zimbabwean farmers recruited via convenience sampling. The partial least squares-structural equation modelling (PLS-SEM) was used to examine the information. The study's outcome revealed that financial inclusion and literacy significantly impact farmers' financial well-being. The study showed that financial inclusion plays a complementary mediating role in the connection between financial literacy and financial well-being. Our study suggests that financial literacy policies be implemented alongside programs and strategies to promote inclusive finance to enhance farmers' financial well-being and sustainability. In addition, financial institutions should base their services on strengthening financial education programs to enhance the financial behaviors of farmers. The novelty of our manuscript lies in using PLS-SEM approach as a method, the participants being farmers, a population with limited literature in finance. Also, the study is the first to assess the mediating role of financial inclusion on the financial well-being of Zimbabwean farmers.

JEL Classification: E2, G2, G4, Q1

Keywords: financial literacy, financial well-being, financial inclusion, agriculture, Zimbabwe

Introduction

Financial inclusion is a fundamental idea in inclusive finance that enables all people and organizations to access a wide range of financial products and services at reasonable costs, especially the unbanked who are not included in the formal financial system. The most important issue contributing to the financial exclusion of rural people is access to financial services. According to Chao et al. (2021), reducing poverty has a strong connection with financial inclusion. In recent years, discussions concerning financial inclusion (FI) among rural dwellers have increased (Miller et al., 2009; Omar & Inaba, 2020). Despite the widespread deployment of financial literacy (FL) programs, concerns have been expressed regarding the lack of adequate financial knowledge, leaving approximately 1.7 billion individuals financially excluded (Demirguc-Kunt et al., 2018). Financial literacy, as defined by the Organization for Economic Co-operation and Development (OECD), is the capacity to apply the knowledge and understanding of financial concepts to make sound financial decisions to improve the financial wellbeing (FW) of a person (Lusardi, 2019; OECD, 2020).

A study by Zins and Weill (2016) investigated the drivers of FI in 37 African countries and discovered that education and income had a greater impact on FI. Additional studies that focused on the African region highlighted the importance of education and financial security in enabling financial inclusion by focusing on rural dwellers and the role of financial intermediaries in promoting FL and FW (Okello et al., 2020; Twumasi et al., 2020). In support of these studies, Murendo and Mutsonziwa (2017) noted that urban dwellers have higher FL than rural dwellers due to their access to financial institutions. Thus affecting the savings ability of the rural residents, where the majority of low-income earners in Zimbabwe reside. Twumasi et al. (2022b) examined financial services access as a mediator between FL and household income and found that people with access to financial services and FL are more likely to see an increase in their household income.

Prior studies in Zimbabwe have primarily focused on urban populations and businesses (Kudakwashe et al., 2016; Mlambo & Bonga, 2016; Msimanga, 2017; Zhongming et al., 2020), overlooking the unique challenges and needs of rural dwellers. Most of these people are seasonal farmers who face several interrelated challenges, including inconsistent income, limited financial literacy, poverty, and lack of appropriate financial products. The frequent failure of financial institutions to provide specific financial products and services that meet the unique needs of these farmers aggravates financial exclusion and reduces their ability to invest in their farms and secure a consistent income. Hence, the need to adequately manage their finances is worsened by their reliance on seasonal rains and harvests. This problem is heightened by a lack of financial literacy, which limits their capacity to make sound financial decisions. As a result, poverty remains a major issue in many rural communities. Therefore, addressing this research gap is particularly significant considering the contribution of agriculture to Zimbabwe's economy and FI's potential to improve farmers' livelihoods. Also, the study brings to light the need for FL and tailored financial services to improve the farmers' FW.

In the fertile landscapes of Zimbabwe’s dynamic economy, rural farmers have consistently occupied a crucial position. The sustenance of livelihoods in Zimbabwean society is heavily dependent on the agricultural sector. It is noteworthy to highlight that a substantial percentage, approximately 67%, of the Zimbabwean populace depends on agriculture as a

primary source of income and to maintain their financial well-being (Food and Agriculture Organization, 2023). Enhancing the financial well-being of individuals residing in rural areas is of utmost importance in mitigating the impact of poverty and fostering economic development (Atkinson & Stern, 2017).

In this regard, the current study aims to address (1) the interplay between FL, FI, and FW among farmers in Zimbabwe.(2) By examining the mediating role of FI in the relationship between FL and FW, this study contributes to filling the identified gap in the existing literature. This paper is the first to apply the framework to rural farmers in Zimbabwe by enhancing our understanding of FI's crucial role in the relationship between FL and FW. Furthermore, the research presents a novel methodological contribution using partial least squares structural equation modeling (PLS-SEM) (Richter et al., 2015). In addition, the study has practical implications, as it identifies specific challenges and needs of rural farmers related to FL and FI. Hence, offering evidence-based policy recommendations which highlights the importance of a coordinated, multi-sectoral approach involving key stakeholders to create an enabling environment that improves rural farmers' FL, FI, and FW.

The study's contributions are as follows; first, the study expands research on how financial literacy influences rural farmer's financial well-being. Prior studies (Kudakwashe et al., 2016; Mlambo & Bonga, 2016; Msimanga, 2017; Zhongming et al., 2020) mainly focus on urban households, students, entrepreneurs, and teachers; however, this study considers rural farmers, which have received less attention. Additionally, this research enhances the existing body of knowledge by investigating the mediating influence of FI in the interplay between FL and FW. Furthermore, the research presents a novel methodological contribution using partial least squares structural equation modeling (PLS-SEM).

1. Literature review and hypothesis development

1.1. Financial literacy and financial inclusion

Financial literacy and financial inclusion are two essential pillars of economic empowerment and stability, playing a pivotal role in enhancing individuals' financial well-being and ensuring broader access to financial services for all. Kodongo (2018) stated that inadequate financial literacy hinders the use of financial services in Kenya, emphasizing the need for improved financial literacy. Koomson et al. (2020) concluded that FL training recipients have a higher propensity to open and save in formal institutions. Zhongming et al. (2020) found that urban adults in Zimbabwe had higher FL than rural adults due to the availability and access to FL and FI programs. Urban residents exhibit higher levels of participation in the formal financial sector, as evidenced by multiple studies (Bongomin et al., 2017; Kodongo, 2018; Murendo & Mutsonziwa, 2017). Research indicates that individuals with higher levels of financial literacy tend to display more responsible saving behaviors (Grohmann et al., 2018; Kodongo, 2018; Koomson et al., 2020; Lyons & Kass-Hanna, 2021; Mogilevskii & Asadov, 2018). In addition, Akpene Akakpo et al. (2022) found that FL enhances FI, while Braunstein and Welch (2002) suggested that FL aids unbanked individuals in comprehending conventional and contemporary financial products and services. Lyons and Kass-Hanna (2021) proposed that improving financial literacy could lead to better household financial behavior, enabling individuals to make informed financial decisions in the face of intricate financial products and volatile financial markets. The literature supports an established connection between financial literacy and financial inclusion, especially for those who have the ability to understand different financial products and services. The use of these concepts in Zimbabwe's rural farming

communities has not been extensively studied. Considering the discussion above, we can allude:
H1: Financial literacy positively impacts the financial inclusion of Zimbabwe's rural farmers.

1.2. Financial literacy and financial well-being

Financial literacy is important for people living in rural areas who experience ongoing economic challenges due to poverty. This comprehension is crucial in enabling individuals to evaluate financial products and services thoroughly, thereby empowering them with the requisite knowledge. This process allows Individuals to make informed decisions and maximize their benefits (Greenspan, 2002; Lusardi & Mitchell, 2009). Braunstein and Welch (2002) suggest that financial literacy can enhance farmers' understanding of formal financial services, leading them to avoid non-formal financing options. Financial literacy enhances decision-making processes, leading to increased savings and creditworthiness among disadvantaged farmers. This enhances their economic and social empowerment, aiding in reducing poverty (Bongomin et al., 2017).

Furthermore,Twumasi et al. (2022a) stated that financial literacy improves household financial decision-making, leading to increased savings and overall well-being. Enhanced financial literacy enables individuals to boost their savings and proficiently manage risks by obtaining insurance policies. Thus, Increased demand for household financial services can improve risk distribution and intermediation, reduce economic fluctuations, and accelerate overall financial progress. Kamakia et al. (2017), Anderson (2019), and Chijwani and Vidyapeeth (2014) had similar results in their studies of the correlation between FL and FW in agrarian settings. Moreover, Agyei (2018) found that financial literacy enhanced firm welfare among small and medium-sized enterprises (SMEs) in Ghana. Mlambo and Bonga (2016) highlight the importance of financial literacy and education in promoting financial stability at both individual and societal levels in Zimbabwe. Financial literacy is crucial for making informed financial decisions, particularly given the continuous development of financial products and services. Despite the importance of FL on FW, there is limited literature on farmers in Zimbabwe in this field (Brüggen et al., 2017). Thus, we propose the following hypothesis:
H2: Financial literacy positively affects the financial well-being of Zimbabwe's rural farmers.

1.3. Financial literacy, financial inclusion, and financial well-being

The relationship between financial literacy, financial inclusion, and financial well-being has significant implications for reducing poverty and improving livelihoods. Given the potential of financial inclusion to alleviate poverty and improve livelihoods (Demirgüç-Kunt & Klapper, 2012; Kim et al., 2018). Individuals with greater access to services are more inclined to invest in productivity-enhancing resources, improving their financial stability and income (Sarma & Pais, 2011). Lenka and Barik (2018) have demonstrated the beneficial impact of financial inclusion on the financial practices of rural farmers in Zimbabwe. Research has emphasized the significance of financial intermediaries such as microfinance and rural banks in facilitating financial inclusion and literacy in rural areas (Morgan & Long, 2020; Okello et al., 2020; Twumasi et al., 2020). FL and FI plays a crucial role in shaping the financial behavior and wellbeing of individuals in developing and developed countries. Twumasi et al. (2022a) found a positive relationship between FL, FI, and household income in rural Ghana. FL enables individuals to make informed decisions about FI (savings, investments, and debt management), which improves their FW (Lusardi, 2019). FL and FI levels in rural Zimbabwe are notably low

due to limited access and availability of financial institutions (Chitungo & Munongo, 2013). On the basis of the literature previously mentioned, the following hypothesis is put forth:
H3: Financial inclusion has a positive impact on the financial well-being of Zimbabwe's rural farmers.
H4: Financial inclusion mediates the nexus between financial literacy and the financial well-being of Zimbabwe's rural farmers.

2. Methodological approach

This study considered Murehwa District and Goromonzi District in Mashonaland East province and Zvimba District in Mashonaland West province of Zimbabwe. Goromonzi District has rich, fertile soils perfect for intensive, large-scale farming. Before 1999, people in the Goromonzi area made money mainly by growing flowers and special vegetables in greenhouses to sell in Europe. Due to the Statutory Land Reform programs, these farms went from commercial farming for the global market to subsistence farming, where chickens and grains are now grown for the local market. ZIMSTAT (2012) revealed that 239,873 people are living in the area. 17° 46’ 2” South and 31° 12’ 10” East is where the district is. The Murehwa district has 195,085 people living in it. In this area, farming activities are for commercial purposes. 17° 30’ 0” South and 31° 49’ 60” East is where the district is. Zvimba district’s subsistence economy is established on conservation agriculture and favorable crops grown in the area, including maize, millet, vegetables, groundnuts, and sorghum (ZIMVAC, 2017). With an estimated population of 67,591 as of 2012, the geographical coordinates of the area are: 17° 42’ 0.00” S, 30° 12’ 0.00” E (ZIMSTAT, 2012).

These selected areas’ farm produce is essential to the food supply chain for hotels, retail shops, and local vegetable markets. Moreover, these three districts have good roads connecting them with many cities and markets. Thus, production targets the population of people in the capital city (Harare) and neighboring towns. Consequently, the farmers in these districts became the best respondents for this study as they have experience in rural farming and city life while selling their produce to cities and town markets.

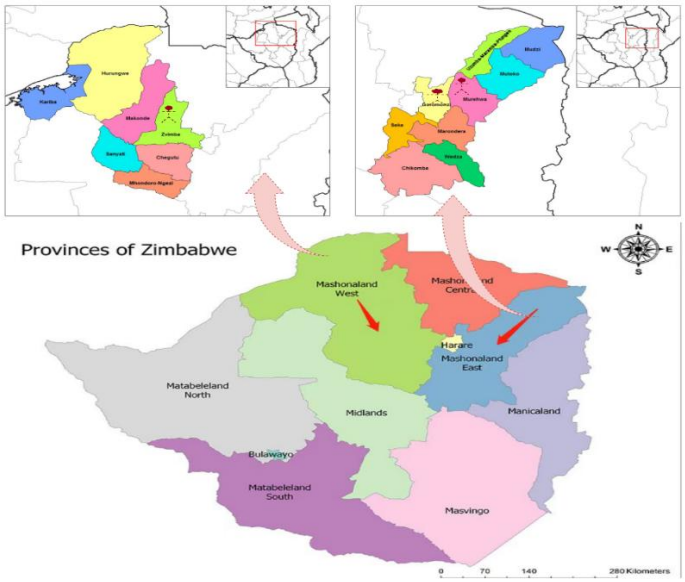

Figure 1. Study area

This quantitative study utilized a questionnaire survey to collect data from farmers in the designated districts. Fieldwork was conducted over a two-month period (July–August 2022). During this time, both the study's researchers and a team experts in agricultural economics administered standardized questionnaires at the respondents' residences. The target sample of the study comprised of rural farmers recruited via convenience sampling, a non-probability sampling approach. In the survey, there were no questions pertaining to participants' private information or sensitive themes. A total of 600 questionnaires were distributed, yielding 526 valid responses (87.7%) after excluding surveys with missing or duplicate entries. Sample adjustments ensured adequate representation of key subgroups, and the estimated margin of sampling error was approximately ±3.3% at a 95% confidence level. This final sample meets the acceptable margins of sampling error at a 95% confidence level and far exceeds the minimum thresholds of 80 samples as per G*Power's benchmark (3 predictors, medium effect size of 0.15, 80% predictive power, $\alpha = 0.05$) and the PLS-SEM's minimum sample requirement of 111 (Faul et al., 2009; Hair et al., 2017b).

Regarding the source and the basis of the questions, the questionnaire was adopted from past studies and reformed to suit the current study area and population. Specifically, studies on financial inclusion (Porteous, 2009; Zhongming et al., 2020), financial literacy (OECD, 2020; Okello et al., 2020), and financial well-being (Bongomin et al., 2017; OECD, 2020). The survey instrument comprised a total of 35 items provided in the Supplementary Materials. Additionally, the questionnaire underwent preliminary testing using a pilot sample of 50 household heads from the intended group of rural farmers to assess the efficacy of the questionnaire, leading to the deletion and adjustment of some question items. Positive methodological experiences included the effective adaptation of established measurement instruments and successful collaboration with local stakeholders. Conversely, negative experiences encompassed initial difficulties in questionnaire adjustment to suit the respondent s understanding, and unforeseen logistical constraints (limited access to internet, and other material) during the field data collection and long distance between households, all of which were systematically addressed to enhance the overall rigor of the study.

Data analysis was conducted using SPSS version 27.0 (IBM Corp, 2020) with SmartPLS version 4.0.6.7 (Ringle et al., 2022) employed to examine the data. Moreover, the variance-based structural equation model was chosen because it can predict causal links between construct variables and take the errors of indicator variables into account (Hair et al., 2017a). The structural equation model shows how to link exogenous and endogenous constructs, while the measurement model shows how measurement items display independent and dependent constructs. For PLS-SEM, the current sample size of 526 would be considered enough because studies have shown that the sampling threshold for PLS-SEM is 111 (Faul et al., 2009; Hair et al., 2017b). PLS-SEM is also the best way to do this investigation because it is a method that explains the causal relationship. Data quality was ensured through rigorous screening: prior to final analysis, sample errors, outliers, and missing values were addressed, and Hermann's single factor (HSF) test confirmed that common method bias did not affect the investigation. Inter-item correlations and regression analyses (with significance at $p < 0.05$) assessed variable relationships, while factor analysis retained only factors explaining at least 70% of the variance. Finally, the validity and reliability of the study model were evaluated by examining latent variables (LVs) and their associated items using composite reliability (CR), average variance extracted (AVE), and heterotrait-monotrait (HTMT) coefficients (Hair et al., 2017a).

3. Results

Before performing inferential analyses, the researchers assessed the dataset to ensure data quality and establish baseline characteristics. An overview of respondents' backgrounds is provided in *Table 1*, and the descriptive statistics in *Table 2* reveal the mean and standard deviation of the measurement items.

Table 1. Social profile of participants

Items	Scale	Frequency	Valid n	Percent (%)
Gender	Male	426	526	81.0
	Female	73	526	13.9
	I prefer not to say	27	526	05.1
Age	29 or below	31	526	05.9
	30 to 44	44	526	08.4
	45 to 59	99	526	18.8
	60 and above	231	526	43.9
	I prefer not to say	121	526	21.5
Educational Level	Ordinary level or below	253	526	48.1
	Advanced level	187	526	35.6
	tertiary level	86	526	16.3
Marital Status	married	359	526	68.3
	Not married	167	526	31.7
A household income (US$1 = 361.9 Z$)	≤ 60000	147	526	27.9
	100001-150000	102	526	19.4
	150001-300000	186	526	35.4
	300000-500000	91	526	17.3
	Above 500000	4	526	8.0

Source: Authors' calculation with Smart PLS (v. 4.0.6.7) software

Table 2. Descriptive analysis

Code	Item	Mean	Std. Deviation
FL 1	Financial decision-making	3.6	1.385
FL 2	Financial awareness	3.48	1.403
FL 3	Financial knowledge	3.46	1.328
FL 4	Financial experience	3.22	1.345
FL 5	Financial attitude	3.54	1.46
FL 6	Financial skill	3.1	1.474
FL 7	Financial behavior	3.1	1.474
FI 1	Access (Ability to use formal financial services)	3.66	1.364
FI 2	Quality (match the needs of customers)	3.1	1.488
FI 3	Usage (Actual usage of financial services/ products)	4.28	0.97
FW 1	Financial preparedness for emergency	3.98	1.04
FW 2	Perceived financial security	4.16	1.095

Source*: Authors' calculation with Smart PLS (v. 4.0.6.7) software*

3.1. Assessment of measurement model

The measurement method in this study was based on three distinct concepts: FI, FW, and FL. To determine the model's reliability, we calculated the loading of each indicator on its corresponding LV. The indicator's dependability is generally judged adequate when the loading is larger than 0.70 (Hair et al., 2017a). *Table 3* demonstrates that all indicator loadings on the LVs of respondents were greater than 0.70. This is because all indicator loadings below 0.7 for the study contrasts were eliminated to strengthen the contrasts and increase the indicator reliability. Internal consistency exists when the CR and Cronbach alpha coefficients, used to quantify construct reliability, are greater than 0.70. (Boadi et al., 2023; Chin, 2010; Hair et al., 2017a). *Table 3* demonstrates that the CR and Cronbach alpha of all LVs in the PLS path model were greater than 0.7 for each data set. These findings demonstrate the validity of the measurement model.

By examining convergent and discriminant validity, we confirmed the veracity of the results (Hair et al., 2011). For convergent validity to be demonstrated, the AVE of the reflective LVs must be greater than 0.5. (Chin, 2010; Hair et al., 2017a). *Table 2* demonstrates that the AVE of the constructs for each data group was more than 0.5. Last but not least, discriminant validity examines the degree to which each LV differs from other model concepts (Chin, 2010; Hair et al., 2017a). Recent evidence suggests that the heterotrait-monotrait (HTMT) ratio is a superior method for determining discriminant validity than more conventional methods such as the Fornell-Larcker criterion (Henseler et al., 2015; Voorhees et al., 2016). In previous research, the HTMT criterion for proving discriminant validity was assigned two distinct cutoffs of 0.85 and 0.90 (Boadi et al., 2022; Henseler et al., 2015). In this study, the more conservative cutoff of 0.85 is employed to assess discriminant validity (HTMT.85). Each group-specific model estimation has been demonstrated to be discriminantly valid since all HTMT findings (displayed in *Table 3*) are less than the cutoff value of 0.85.

Table 3. Results for the assessment of reflective measurement models, R^2 and Q^2

			Loading	Cronbach's Alpha	CR	AVE	R2 (Q2)
			>0.70	>0.70	>0.70	>0.50	
FI		Reflective		0.931	0.934	0.707	
	FI 1		0.870				
	FI 2		0.866				
	FI 3		0.826				
	FI 4		0.784				
	FI 5		0.834				
	FI 6		0.846				
	FI 7		0.856				
FL		Reflective		0.824	0.849	0.752	0.415
	FL 1		0.812				
	FL 2		0.767				
	FL 3		0.777				
FW		Reflective		0.857	0.904	0.734	0.435
	FW1		0.890				
	FW2		0.733				

Source: *Authors' calculation with Smart PLS (v. 4.0.6.7) software*

3.2. Assessment of the structural model

Each predictor's tolerance (VIF) value should be between 0.20 and 5. The results indicate absence of collinearity issue, as all VIF values fall between 0.20 and 5. The explanatory power of the exogenous LVs on the endogenous LVs can be assessed by examining the R^2 values of the latter. *Table 2* and *Figure 2* demonstrate that the proposed model has explanatory powers of 41.6% and 43.5% for financial inclusion and financial well-being, respectively. *Table 4* provides an estimation of the effect size, represented by f^2. According to Cohen (1988) classification, effect sizes ranging from 0.02 to 0.15 are moderate, those ranging from 0.15 to 0.30 are medium, and those above 0.30 are large. The FL has a significant effect on FI, as indicated by a large effect size of $f^2 = 0.812$. The impact of FI on FW is negligible, as indicated by a low f^2 value of 0.091. A medium effect size ($f^2 = 0.190$) exists between FL and FW. Assuming $Q^2 > 0$, then the latent exogenous constructs in the structural model are significant predictors of the latent endogenous constructs. Table 3 displays Q^2 values of 0.311 and 0.242 for FI and FW, respectively. The study's primary hypothesis is supported by this finding, indicating that the analyzed endogenous dimensions possess significant predictive values (Boadi et al., 2019; Chen et al., 2023).

Table 4. Testing the significance of the direct effect

Relationships		Path Coefficient	Standard deviation (STDEV)	Confidence intervals (Bias corrected)	T Values	Supported	HTMT	VIF	f^2
H1	FL -> FI	0.645	0.075	(0.342, 0.621)	0.000***	YES	0.746	1.108	0.812
H2	FI -> FW	0.297	0.055	(0.431, 0.618)	0.000***	YES	0.797	1.712	0.091
H3	FL -> FW	0.428	0.063	(0.024, 0.269)	0.000***	YES	0.837	1.712	0.190
H4	FL -> FI-> FW	0.620	0.063	(0.254, 0.501)	0.000***	YES			

Source*: Authors' calculation with Smart PLS (v. 4.0.6.7) software.*

The path coefficient analysis revealed a significant positive relationship between FL and FI (H1 = 0.645; p = .000). A significant correlation exists between FI and FW, indicating a strong positive relationship (H2; = 0.297; p = .000). The statistically significant correlation between FL and FW (r = 0.428, p < .001) supports the validity of H3. The PLS-SEM analysis results support H4, indicating that FI has a significant impact on the FL-FW link (H4 = 0.620; p =.000).

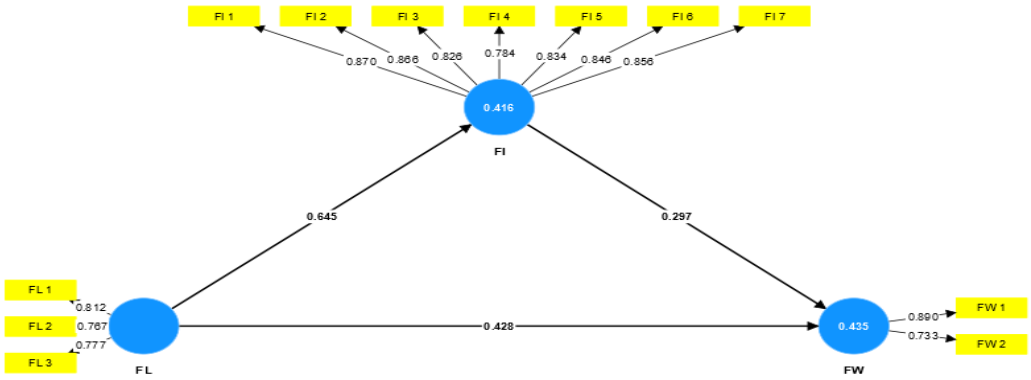

Figure 2. Final framework with significant coefficients
Source*: Authors' calculation with Smart PLS (v. 4.0.6.7) software.*

4. Discussion of results

Using partial least squares structural equation modelling (PLS-SEM), we explored the link between financial literacy (FL), financial inclusion (FI), and financial well-being (FW) among Zimbabwean farmers in Murehwa, Goromonzi, and Zvimba districts. The findings confirmed that FI and FL significantly impact farmers' FW. Our results indicated that FL is a predictor of FW, and FI plays a complementary mediating role between FL and FW. A novel data of this study was the analysis of how FI plays a mediating role in the connection between FL and FW.

The findings of this study demonstrate a robust relationship between FL and FI, confirming H1. According to path analysis, there is a direct link between the FL and FI of the respondents. According to research, having a favorable FL is associated with a higher intention of FI. The survey revealed how farmers with higher FL (knowledge, attitude, and behavior) are more likely to access financial services to improve productivity. This outcome may be because people with higher FL are more likely to effectively utilize financial products or services than those with low FL. The underlying reason for such a strong effect stems from the fact that unless an individual becomes knowledgeable about the availability of certain financial benefits, it is difficult to access the relevant financial products and services needed to enhance production. Affirming these study's findings, studies in Ghana (Agyei, 2018; Andoh et al., 2015; Twumasi et al., 2022b; Twumasi et al., 2020), Uganda (Bongomin et al., 2017; Okello et al., 2020), India (Lone & Bhat, 2022), Kenya (Kodongo, 2018), Zimbabwe (Mlambo & Bonga, 2016; Murendo & Mutsonziwa, 2017; Zhongming et al., 2020) and across various Asian and European countries Jungo et al. (2024) and Morgan and Long (2020) posited that FL is a strong predictor of FI. Therefore, improving FL among these farmers will enable them to adopt formal financial services to improve their productivity and livelihood. However, it is important to acknowledge that not all studies report a positive relationship between FL and FI. For instance, Schuhen et al. (2022) in Germany revealed an inverse link between FL and FI, implying that that demographic factors such as age and gender can influence how different generations perceive and engage in financial services.

The H2 of the study was to determine how FI influences the FW of rural farmers in Zimbabwe. As anticipated, we discovered that FI positively influences the FW of rural farmers in Zimbabwe. This finding supports the notion that access and optimal use of financial services improve individuals' FW. These findings are consistent with what other researchers have

shown, that is, as financial services are properly utilized, production is positively affected (Andoh et al., 2015; Koomson et al., 2020; Twumasi et al., 2020). The accessibility of financial services and products, such as credit and savings, for farmers can lead to elevated farm income by amplifying agricultural productivity. The access, usability, and quality of financial services for agricultural purposes in Zimbabwe can help improve farmers' livelihood and FW. In support of the study's findings, Swamy (2014) opined that tailored FI programs have a substantial effect on family income and well-being. Thus, advocating for FI (the availability, quality, and usage of financial services) among Zimbabwean farmers. This is important because it will boost their FW by enhancing their productivity, savings, and financial decisions, thus contributing to increased financial stability within rural communities and reducing the poverty rate in the country. However, the impact of FI on FW is not uniform across different economic environment. Demir et al. (2022) found that FI (financial services such as bank accounts and savings) helps reduce income inequality in high-income nations yet tends to have a negative impact on income equality in lower-middle and low-income countries. This contrasting evidence highlight the importance of considering contextual factors when implementing FI programs.

According to the findings, farmers' FL (knowledge, attitude, and behavior) is positively related to their FW, which confirms H3. The outcome could be due to the enormous lack of financial literacy programs in rural areas due to the lack of financial institutions and facilities in such areas, which limits farmers' capacity to make sound financial decisions. As a result, poverty and mismanagement of financial resources remain a major issue in many rural communities. Our research enhances the public's understanding of the connection between internal FL and FW in rural communities, especially among farmers. This indicates that the amount of knowledge a person has about financial services (loans, insurance policies, savings, pension plans, and others) has a positive effect on their productivity and consumption, which is in line with existing literature (Agyei, 2018). Additionally, our findings further show that the farmers' financial attitude influences their FW, consistent with studies by Okello et al. (2020) on Uganda and Twumasi et al. (2022a) on Ghana. Thus, their ability to make sound financial decisions and responsibly handle their financial matters will improve their personal and business productivity (Bongomin et al., 2017). In addition, the behavior of the farmers toward money, its use, and management has a good connection with their FW. Their ability to flow a budget, compare prices, and conduct secure transactions affects their consumption and productivity. It is, therefore, imperative to provide farmers with financial literacy programs to guide their financial decision, attitude, and behavior in other to mitigate poverty among rural farmers thereby improving their FW.

Overall, the outcome indicated that there was a complementary mediating effect of FI in the relationship between FL and FW. This confirms H4 of the study, which states that FI significantly mediates the relationship between FL and FW. FI enables these rural farmers to access and utilize financial products and services banks provide. FI, especially usage, improves as the farmers become financially literate. Therefore, since financial products and services are constantly being enhanced, most individuals may depend on several dimensions of FL to adequately utilize financial opportunities (Lusardi & Mitchell, 2009; Morgan & Long, 2020). Many countries have deregulated their financial markets to increase access to and utilization of financial services. However, the existence of numerous financial intermediaries may not necessarily increase demand and usage of their services due to the complexity of the financial products and services they offer (Grohmann et al., 2018; Kodongo, 2018; Murendo & Mutsonziwa, 2017). Research shows a strong link between FL and household welfare in developing countries (Twumasi et al., 2022a). The present findings are consistent with other research, which found that financial institutions are crucial in promoting FL and FI among rural

dwellers (Okello et al., 2020; Zhongming et al., 2020). This facilitates the acquisition of financial knowledge for rural households in a way that is relevant to their lives.

Conclusion

Financial inclusion is a crucial element of inclusive finance, as it provides affordable access to a range of financial products and services for both individuals and organizations. Financial literacy enables individuals to make prudent financial decisions that ensure future security and enhance financial well-being. This study aimed to assess the influence of FI as a mediator on FL and FW among rural farmers in Zimbabwe. The survey data was collected from three districts in two provinces. This study highlights the significance of financial literacy as a key factor in the financial sector, influencing farmers' decisions to utilize financial services to improve their livelihoods. This study is significant as there is a lack of research on Zimbabwean rural residents despite numerous studies being conducted on individuals from various backgrounds, such as urban dwellers, students, and high-income earners. The study utilized PLS-SEM to test the proposed hypotheses. PLS-SEM analysis indicated a positive relationship between FL, FI, and the FW of farmers. The mediation study found that FI significantly mediated the relationship between FL and FW. Thus, by directing our focus toward expanding rural farmers' access to and utilization of financial services, we are actively ensuring that these farmers possess the means to access and manage their own financial resources. This facet is of paramount significance in facilitating the economic empowerment of rural farmers, thereby equipping them with the necessary tools and resources to extricate themselves – along with their respective communities – out of extreme poverty. In promoting FI, it is essential to prioritize basic financial education initiatives that help individuals effectively use financial products like bank accounts and understand key financial concepts like interest rates. On the other hand, financial well-being aims to bring about positive changes that enhance the lives of individuals, families, communities, and society (Anderson, 2019). The study's findings suggest that proficient financial decision-making skills can enhance farmers' financial well-being by minimizing losses and boosting production. Farmers may improve their financial literacy because they gain wealth. Furthermore, while these findings are derived from a sample of rural Zimbabwean farmers, they offer valuable insights that can be implemented in other rural regions of Africa, Asia, and South America. Thus, local governments and financial institutions in these regions can collaborate to develop community-based training programs that utilize digital platforms for broader outreach and educational materials to meet local cultural and socioeconomic needs.

Implications

The present study has some implications**.** First, the findings from the study enlighten policymakers on the importance of creating and implementing tailored financial education programs to enhance financial literacy among rural populations, especially farmers in Zimbabwe. The practical implications drawn from the study are that financial institutions should focus on strengthening financial and educational programs to encourage regular saving habits among rural farmers in Zimbabwe. These implications can be extended to other rural areas in Africa, Asia, and South America.

Policymakers and practitioners can implement these strategies by leveraging mobile and digital technologies to disseminate financial education. Public-private partnerships can be established to provide localized financial services the people can access and trust. Additionally, governments can encourage financial institutions to develop products that cater specifically for

the challenges of rural communities, such as low-cost microcredit schemes and savings programs designed to support agricultural productivity.

Moreover, this study employs a novel approach to conducting empirical research in this field. This paper utilizes partial least squares structural equation modeling, instead of the commonly used regression methods or covariance-based structural equation modeling (CB-SEM). This novel quantitative methodology has not been widely utilized in prior studies. Therefore, it provides a comprehensive perspective on FL, FI, and FW in developing countries.

Limitations and suggestions for further research

The findings in this study on rural farmers are subject to at least four limitations. First, adopting a cross-sectional study design and quantitative methodology constrained the scope of this investigation. Future research could benefit from longitudinal studies and mixed methods approaches. Secondly, the research focused solely on rural farmers in two provinces in Zimbabwe. Consequently, future scholarly endeavors might explore rural farmers in other provinces, nationwide, or within the region. Moreover, incorporating a more diverse group of participants, including women, persons with disabilities, and young people, would enhance the representativeness of the findings and offer a more inclusive perspective. In addition, future studies could conduct a field experiment, allowing certain groups to access the FL and compare their financial well-being with a benchmark with no access to FL. Finally, this research did not examine the impact of financial literacy on savings decisions, a significant component of financial inclusion and well-being. Therefore, subsequent studies could investigate the effects of saving decisions among peasant farmers, taking into account diverse respondent characteristics. This would provide a more distinct understanding of the interplay between FL, FI, and FW in the context of rural communities.

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