Financial Service usage and Rice Commercialization of Smallholders Farmer in Kilombero District: The Role of Institutional Law and Regulation

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ABSTRACT

This survey study was conducted in Tanzania to assess the effect of financial service usage on agriculture commercialization of smallholder rice growers in Kilombero District. Primary data were collected using survey questionnaires from 358 smallholder farmers. Data were analysed using hierarchical multiple regression analysis and Hayes PROCESS macro with the help of IBM SPSS software. The results obtained suggest that financial services usage had a positive effect on rice commercialization. The results also confirm that institutional law and regulation had a negative significant moderating effect on the relationship between financial service usage and agriculture commercialization. This implies that high laws and regulations in accessing and using financial services hinder smallholder farmers' usage of financial services. The study recommends that to improve the level of agriculture commercialization, policymakers and Government are required to set policies which reduce the cost of accessing and using financial services and improve the efficiency of rules and regulations governing financial services usage.

***Keywords**: Financial service usage, agriculture commercialization and institutional law and regulations*

INTRODUCTION

Smallholder farming is a means of livelihood for majority of rural households in developing countries including Tanzania, and it has been the mainstay of the rural economy, mainly saving as the source of income and food supply

(Omiti et al., 2007). Similarly, smallholder farming dominates the agriculture sector which has significant contribution to the Tanzania economy. It contributes to 26.9% of the country's GDP, 65.5% of the employment and 30% of the export earnings (ASDP, 2017; BOT, 2021). Also agriculture sector provides 80.4% of the employment in Kilombero District (NBS, 2012). Despite of its significant role to national economy, majority of smallholder farmers in Tanzania are constrained by different problems (Tesso, 2017). Some of the problems are inadequate infrastructure (energy, water and market access), inadequate extension services, difficulty regulator system, inadequate land tenure system, planning and enforcement and limited access to credit or finance and insurance, (ASDP, 2017). Moreover, the sector's growth rate compared to other sectors had not been promising. Available data show that, between 2006-2014 average growth rates of the sector was 3.9% per annum compared to that of the service sector 8% and the industry sector 7.8% (ASDP, 2017).

In addition, among the 2.3 Million ha classified as high potential, only 461,326 ha had improved irrigation in 2015, accounting for only 1.6% of the total land with irrigation potential (ASDP, 2017). To address the problem facing smallholder farmers and the entire agricultural sector many countries have been focusing on modernization and commercialization of the agriculture sector in order to enhance food security and reduce poverty among smallholders farmer (Tesso, 2017; Chandio et al., 2020). Likewise, in Tanzania, the government established agriculture sector development programme (ASDP) phase I & II (URT Report, 2015). Among the objectives of ASDP II, which cover the period 2015-2025, is to achieve agriculture growth rate of 6% per annum, improve access to credit and transfer the sector into modern, high productive and commercial sector (ASDP, 2017). Also, efforts are made at international and national level to improve financial inclusion. World Bank made a call for universal financial access by require countries to ensure that they capture unbanked citizens into formal financial service by 2020 (Achugamonu et al., 2020). In Tanzania, the Government established the National Financial Inclusion Framework (NFIF) phase I & II (NFIF, 2018). Phase I of NFIF cover the period from 2014-2017 intend to increase financial service access and Phase II cover the period from 2018-

2022 intend to increase the level of financial service usage by 2022. Even with the effort made to improve financial service usage and agriculture commercialization, studies indicate that 1.7 billion adults globally remain unbaked, with most living in developing countries (Demirguc-Kunt et al., 2018). According to Demirguc-Kunt et al. (2018), account ownership is high in developing countries, where 94% of adults own accounts but less in developing countries, where in Tanzania, adults with accounts are 47%. Also, studies show that agricultural households use formal financial services at extremely low rates, with many households using no financial products or services at all (Mohammed et al., 2020). Prevailing data show that in Ghana more than half (56.4%) of the agricultural households do not use any formal financial service or product (Mohammed et al., 2020). While in Tanzania, the regions of Tabora, Simiyu, Kagera and Morogoro have 31% of committed farmers who are financially excluded (Jeckoniah et al., 2020). Studies suggest that availability of finance for Africa farmers could lead to an increase of over 300% of agriculture output i.e. from $280 billion to $ 880 billion by the year 2030 (McKinsey Global Institute, 2010).

However, high transaction costs such as bank fees, collateral requirement, minimum balance requirement, lack of physical access and strict documentation are mentioned as the challenges hinder smallholder farmer commercialization (Okeye et al. 2016; Bongomin et al., 2018). Existence of financial institutions like branches, offices and personal in rural areas where majority of smallholders farmer dwell can promote access to finance (Demirguc-Kunt et al., 2018; Bongomin et al., 2018). Because a bank in a community reduce transaction cost in accessing financial service such as long distance to financial institution cost associated with opening account, saving and requesting for credit (Abu and Haruna, 2017). So reduction of these costs may encourage smallholder farmers to access credit in order to finance their farming activities and participate in commercial farming. According to institutional theory (IT), Institutions' structure, political, economic or social interactions (North, 1990). According to North (1991) institutions are made up of formal constraints (rules, laws and constitutions) and informal constraints (norms, convention and self-imposed code of conduct). Financial institutions such as banks and microfinance institutions operate under certain

rules and regulations. The rules and regulations may act as incentives or disincentives for access and use of financial services. A study by Kodongo (2018) show that regulations such as agency banking improves financial inclusion but know your customer and capital and Liquidity macro-prudential regulation harm FI. Also, Naegels et al. (2017) show that female entrepreneurs in Tanzania mainly use informal sources because formal sources bear higher interest rates, require high collateral and personal guarantee, so they are more expensive compared to the informal source. Empirically significant number of studies has been done on financial inclusion and or agriculture commercialization. Studies on financial inclusion include those looks on determinant of financial inclusion (Asuming et al., 2018; Lott, 2018; Chikalipah, 2017), financial inclusion and rural development (Lal, 2019), mobile money and financial inclusion (Evans, 2018).

Also, include studies examine financial inclusion and economic growth (Sethi and Acharya, 2018), access to finance and firm growth (Adomako et al., 2016) and financial literacy and financial inclusion under moderating role of institutional pillars (Bongomin et al, 2020). On the other hand, studies on agriculture commercialization include those examine drivers of commercialization and productivity (Arymo et al., 2019), determinants of commercialization (Yaseen et al., 2018; Rubhara and Mudhara, 2019; Rabbi et al., 2019; Mihretie, 2020; Ayale et al., 2021). Other include those examine commercialization and food security (Radchenko and Correl, 2018; Kissoly et al., 2020; Bolarinwa et al., 2020). However, to the researcher best knowledge no studies look on the link between financial service usage and commercialization or the moderating effect of institutional law and regulation in the relationship between financial service usage and commercialization. So the current study intends to examine moderating role of institutional law and regulation in the relationship between financial service usage and commercialization. Furthermore, majority of studies done on commercialization (Abu & Haruna, 2017; Ayele et al., 2021; Kabit et al., 2016; Kissoly et al., 2020; Mihretie, 2020), use commercialization index as dependent variable, thus use Tobit or Logit regression analysis to analyse factors influence commercialization and commercialization intensity.

However, Tobit or Logit model is recommended when the dependent variable is censored from below, above or both (Kissoly et al., 2020). Since in this study dependent variable was not censored, the study switched from previous studies by employing hierarchical multiple regression technique to analyse the relationship between FI and AGC and the moderation effect of institutional law and regulation in such relationship. Also, the study is the first of its kind to apply Hayes PROCESS macro with the help of Johnson-Neyman to assess the moderating effect of institutional law and regulation in the relationship between FI and AGC. Johnson Neyman enables us to identify the conditional effect of the moderator in the relationship between independent and dependent variables.

Financial Service usage and Agriculture Commercialization

Financial service usage refers to the use of different available financial services (Demirguc-Kunt & Klapper, 2012). Also, according to Sarma (2008), as cited in Pham et al. (2018), usage indicates whether those available and accessible financial services are in fact, utilized. The existence of a bank in a community is like an implicit and explicit advertisement strategy for farmers to participate in financial services such as opening bank accounts, saving, and requesting access to credit (Abu and Haruna, 2017). This implies that the existence of financial institutions affects commercialization by providing a chance to receive and save proceeds from sales and eventually encourage farmers to engage with the institution to access credit. In addition, It has been demonstrated that having an account with a formal financial institution increases access to credit, savings, and consumption (Kasebele and Lopez, 2015; Demirguc-Kunt and Klapper, 2013). Also, it makes it simple to send and receive payments (Demirguc-Kunt and Klapper, 2013). Additionally, credit availability enables farmers to purchase seeds of improved variety, high efficiency pesticides, fertilizers and acquisition of machinery for farm operations (Akudugu, 2016; Abdul-Rehman et al., 2017). Thus uses of credit allow smallholder farmers to better utilize both fixed and working capital, as they are able to invest in better inputs and improve agriculture practice after controlling for other factors such as education, family size gender etc (Abdallah, 2016; Chandio et al., 2018; Martey et al. 2019; Rahman et al., 2014). Moreover, the use of savings account has been

shown to increase consumption, productivity, income and investments as well as reduce vulnerability to unexpected events (Dupas and Robison, 2013). Savings are therefore essential to farm household activities as they affect potential future production and consumption (Sand, 2002). Additionally, a study by Issahaku et al. (2020) discovered that joining a saving association raises smallholder chances of getting credit by 20%. Therefore, usage of financial services promote human capita and allow an individual to invest in different areas, including agriculture (Matekenya et al, 2020), thus encourage engage in commercial farming.

H1: Financial service usage positively affects agriculture commercialization

Moderating role of Institution Law & Regulation on the Relationship between Financial service usage and Agricultural Commercialization. Financial institutions are financial intermediaries which create link between the part with surplus funds and the part which face deficient (Candiya et al., 2017). However the institutions operate under certain rules and regulations set by international and national financial bodies, Government and financial institution themselves. The existing law and rules regarding financial market in a particular national environment promote certain types of behavior or restrict other for accessing and using financial services (Bongomin et al., 2015). World Bank, (2002) as cited in Bongomin et al. (2015), suggest that financial market can work efficiently if they have rules and laws which influence future behaviour. Know your customer (KYC) is one of the regulations governing financial institution operation set by IMF and World Bank (Mugarura, 2013). KYC require banks to identify who their customer are and continuously generate data about them (Mugarura, 2019).

Among the factors mentioned to affect account ownership in Cameroon include too much requirement such as proof of identification and other document needed to open account (Ojong, 2017). Thus, KYC may be one of the barriers for financial access, and usage as people with no official government document tend to be discriminated or prevented from access to mainstream banking services (Mugarura, 2019; Kodongo, 2018). Another factor caused by tight bank regulation is collateral requirement. According to Sekyi et al. (2017) lack of collateral in form of property and stable

employment reduce the possibility of accessing and using bank credit facilities offered by financial institutions due to the fact that financial institutions are often reluctant to lend money in absence of collateral. However, collateral requirement is important for financial institutions because they utilize it to clear borrowers' defaulted loans (Twumasi et al., 2019). Thus, farmers with no collateral are considered as risk clients to financial institutions and lack access to credit. Kodongo (2018) propose for simplification or exemption of regulation in certain category of financial services. For example, the legislative reform that permitted flexible agency banking in Kenya resulted in a notable expansion in supply of banking services, with the number of bank agents rising by 148.5% over the three years 2012 to 2015 (Kodongo, 2018).

However, the increase in banking agency service has not promoted credit facilities access or encouraged the use of investment products (Kodongo, 2018). According to Karikati et al. (2021), a national quality financial regulatory system helps to reduce opportunistic bank behaviour of profit-making, such as minimizing deposit interest rates and maximizing lending interest rates. Therefore regulations that allow a greater supply of financial services boost countries' formal financial inclusion efforts. Lastly, a change in government law, regulation and policy may support certain economic sectors. Among the strategies used to ensure farmers market for their produce is contract farming. Contract farming is the institutional arrangement under which agribusiness firm contracts the production of agriculture commodities output to farmers (Bellemare & Novak, 2017). A study by Reardon et al. (2019) show that contract farming is a mechanism which helps farmers overcome pervasive market failure. Studies also show that to reduce transaction cost, buyers of agriculture produce tend to sign contracts with formal or informal produces organisation or group of farmers (Mugwagwa, 2020).

H2: Institutional laws and regulation significantly moderate the relationship between financial usage and agriculture commercialization.

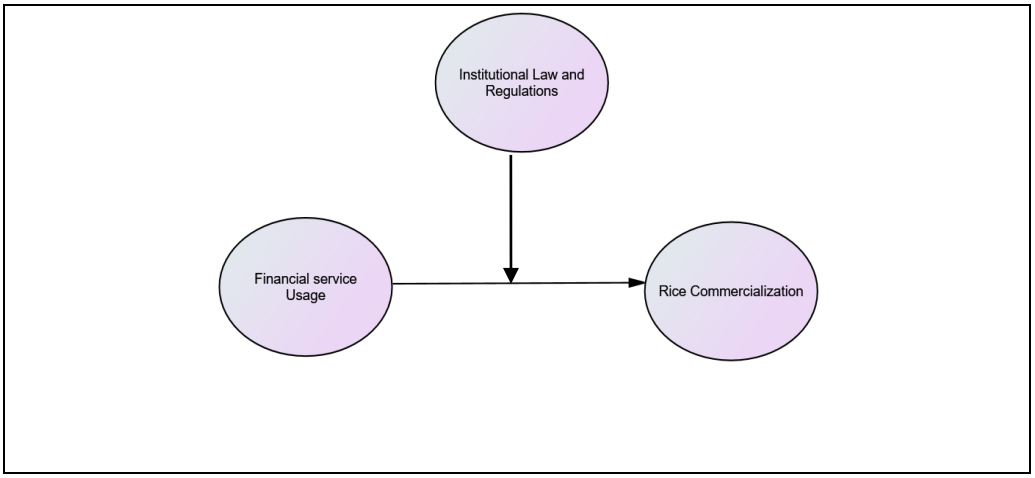

Figure 1: Coneptual framework.

Methodology

This study adopted post-positivism reach paradigm which is a refined version of positivism. The paradigm was adopted because it allows the researcher to make reasonable inference about the phenomena by combining both empirical and logical reasoning (Bhattacherjee, 2012). Also the paradigm sees research as never ending process, so other research can judge the validity of our findings in future studies (Rubin and Babbie, 2011). Also the study adopted cross-sectional research design as it enables to measure both independent and dependent variables at the same point in time. In addition, the design has the ability to capture and control for a large number of variables and to study the problem from multiple perspective using multiple theory (Bhattacherjee, 2012; Leavy, 2017). The population of this study comprises of smallholder rice growers in Kilombero district, which is estimated to be 55,484 households. The sample size was computed using the formula derived from Yamane (1973), given as n= [N/1+N (e) ^{2}] where n= sample size, N= targeted population, and e= tolerance error (5% or 95%). Therefore, a total of 397 smallholder rice grower farmers were selected. Multistage random sampling technique was used to select division, ward, village and household surveyed. The sample selection process involves four multistage clustering techniques. The first stage involves random selection of two divisions from the list of divisions with rice grower farmers were

Mangula and Kidatu division were selected. The second stage involves random selection of three wards from Mangula were Kiberege, Mkula and Mangula was selected. Then random selection two wards from Kidatu division were Kidatu and Sanje was selected. Third stage involve random selection of two village from each ward were a total of ten village were selected. Then the last stage involve random selection of around 35 to 47 smallholder rice growers from each village which resulting to a sample of 397 household rice growers. In addition Kilombero District was selected because among seven district of Morogoro Region, Kilombero lead in rice production in 2019 where more than half (57.4%) of region production comes from Kilombero (URT, 2019). In addition, it is sought that rice commercialization is the primary force behind economic growth, poverty reduction, and improvement of both men and women's standard of living in the study area (Jeckoniah et al., 2020). Rice production, account for 73% of the average total income in Kilombero (Mosha et al., 2018).

Variable Measurement

Financial service usage (FU): refers to how client use available financial services and frequency or extent of use of the available service (Midra& Moya, 2017, Mohammed et al., 2019). To measure financial service usage among smallholder rice growers in the study area we use four usage indicators used by Mindra and Moya (2017) and Mohammed et al. (2019). The indicators include (i) account ownership (ii) account usage (iii) saving (iv) sources of borrowing (i.e. formal or informal).

Law and regulations (LR): Refer to rules and regulations of financial institutions and other supporting institution which promote or discourage smallholder behaviour toward usage of financial services and commercialization (Scott, 2001). The variable was proposed by Scott (2001) and adopted by other scholar such as Bongomin et al. (2018). Institutional law and regulation was measure using nine items include (i) six items of Institutional law and regulative barriers or incentives for usage of financial services (ii) three items of institutional law & regulative for supporting commercialization and irrigation availability.

Agriculture commercialization: Refer to the proportion of agriculture production that is sold (Govereh et al., 1999). Scholars (Ochieng et al., 2016; Abu & Haruna, 2017; Rubhara & Mudhara, 2019; Ayele et al., 2021) measured commercialization using index proposed by Govereh et al., (1999), which is known as commercialization index. The index is given as a proportional of total crop output sold to the total output crop produced (Abu and Haruna, 2017; Ayele et al., 2021). However other scholars such as Yaseen et al. (2018) and Rabbi et al. (2019) use endowment of crop production and household market participation characteristics to measure commercialization. According to Rabbi et al. (2019) a farmer is said to commercialize if he sells part of his output in the market. Poor recording keeping by farmers resulted to difficulty in obtaining data on amount of rice produced and sold, thus led us to adopt market participation indicators.

Three items relating to reasons for involving in rice production were measured using five point Likert scale. *Control Variables*: Based on previous studies (Ademe et al., 2017; Kidane and Zegey, 2018; Mariyono, 2019; Rubhara and Mudhara, 2019; Sekyi et al., 2017), we tested for number of non-hypothesized variables to account for factors other than the theoretical construct of interest that can explain variance in the dependent variable (Agricultural commercialization). Farming experience and age have been found to influence agriculture commercialization. We measured farming experience as years spend in rice farming and Age as the age of the household head.

Table 1: **Summary of the Measurement Variables**

Variables	No of items	Code	Measurement items	Measurement	Source
Control variables	2	AGE	Age of household head	Years	Rubhara and Mudhara (2019), Mariyono (2019)
		FE	Farming experience	Years spend in rice farming	
Financial service usage	6	FU1-FU2	Account ownership	Ordinal scale 1= strongly disagree 2=Disagree 3= Not sure 4= Agree 5=Strongly Agree	Mindra& Moya (2019); Mohammed et al. (2019)
		FA3-FU4	Account usage		
		FA5-FU6	Source of borrowing		
Institutional law and regulation	9	LR1-LR6	Regulative barriers/incentives for accessing and usage of financial services	Ordinal scale 1= strongly disagree 2 = Disagree 3= Not sure 4 = Agree 5=Strongly Agree	Bongomin et al (2018); Silong and Gadanakis (2020)
		LR7-LR9	Law & regulation support commercialization/irrigation		
Commercialization	3	RC1-RC3	Reason for involving in rice production	Ordinal scale 1= strongly disagree 2 = Disagree 3= Not sure 4 = Agree 5=Strongly Agree	Rabbi et al. (2019); Yaseen et al (2018)

Data Analysis

Field data collection was checked for accuracy, precision, and mistakes. Serial numbers were assigned to the completed questionnaires before they were loaded into IBM SPSS/23. Then frequencies were generated to locate missing values, and a box plot was used to locate outliers in the data. The results obtained demonstrate that our data does not contain any outliers. Then, we use normality, linearity, Homoscedasticity, and multicollinearity to test the regression assumption. The histogram plot and the p-p plot of the standardized residual and standardized predicted value were used to test for normality and linearity. The results demonstrate that there were no problems with normality or linearity because the histogram was well-bell-shaped and all of the dots on the typical p-p plot were very close to one another and fell along the diagonal (Keith, 2019; Hair et al., 2014). Then, using a scatter plot of the standardized residual against the standardized predicted value, we checked for homoscedasticity. As all points fall within the threshold range of ±3, the results obtained show no significant homoscedasticity issues. In the end, we used the tolerance value (TV) and variance inflation factor (VIF) to test for multicollinearity. Researchers (Field, 2005; Hair et al., 2014) suggest a cutoff value for VIF 5 and TV > 0.2 to indicate absence of multicollinearity. These requirements were met, as shown in Table 2. So all the assumption was met and allows us to proceed with hierarchal multiple regression analysis.

Table 2: Multicollinearity Diagnoses

	Collinearity Statistics	
Variable	**Tolerance (TV)**	**VIF**
FE	0.800	1.250
Age	0.792	1.262
Cent_FU	0.987	1.013
Cent_LR	0.936	1.068
FUXLR	0.971	1.030

Reliability and Validity

We evaluate the issue of reliability and validity before conducting regression analysis and hypothesis testing. The degree of consistency between numerous measurements of a variable is known as reliability (Bongomin et al., 2018).

Cronbanch alpha was used in this study to evaluate the internal consistency of the instrument used (Cronbanch, 1951). Internal consistency is attained, when cronbanch alpha exceed 0.7 (Abdullahi et al., 2021; Jensen and Kristensen 2021). All values of cronbanch alpha for FU, LR and RC obtained in Table 3 below were above 0.7 so internal consistency was achieved. In addition, content and convergent validity was also achieved as the result of exploratory factor analysis obtained indicated that all the items correlated and loaded with each other refer Table 4.

Table 3: Reliability Analysis

Variables	No of items	Reliability
Financial service usage (FU)	4	0.882
Law and regulation (LR)	8	0.946
Rice commercialization (RC)	3	0.770

Table 4: Exploratory Factor Analysis

	Pattern Matrix[a]		
	Component		
	1	2	3
LR5	.948		
LR3	.922		
LR4	.903		
LR8	.896		
LR6	.893		
LR7	.893		
LR9	.845		
LR2	.605		
FU1		.884	
FU4		.856	
FU6		.856	
FU5		.839	
RC3			.889
RC1			.828
RC2			.759

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Hierarchical Regression Analysis

This study use interaction moderation analysis so hierarchical multiple regression analysis was adopted in this study because the approach has received much endorsement as model estimator in many moderation interaction studies (Bongomin et al., 2018; Adil et al., al., 2021; Yang et al., 2022). Before creating the interaction term it is advised to first centering the variable of interest in order to avoid unnecessary collinearity (Jose, 2008; Keith, 2019). Centering simply mean subtracting the variable mean score and resulting to new variable with mean zero and standard deviation equal to original standard deviation (Keith, 2019). Three steps were involved in the hierarchical regression analysis. The control variables were estimated in the equation 1. The second equation entails the introduction of the main effect variables (FU and LR), and the estimation of the interaction term (FUxLR) nestled within the main effect model constitutes the third equation. The regression equation model for all three equations is as shown hereunder.

$$Rc = Age + FE + e \text{.....1}$$

$$Rc = Age + FE + (FU + LR) + e \text{ ... ...2}$$

$$Rc = Age + FE + (FU + LR) + (FUXLR) + e \text{ ... ... .3}$$

Where

RC= Rice commercialization

Age= Age of the household head

FE= farming experience

FU= Financial service usage

LR= Law and regulations

e= error term.

Table 5: Hierarchical Regression Analysis

Variable	**Step 1**	**Step 2**	**Step 3**
Control			
Age	-0.141**(0.041)	-0.098*(0.040)	-0.091*(0.040)
FE		0.188***(0.039)	0.179*** (0.039)
	0.225*** (0.040)		
Main effect			
FU-cent		0.118**(0.035)	0.123***(0.035)
LR-cent		0.179***(0.041)	0.195***(0.041)
Interaction			
FUXLR			-0.094*(0.037)
R^2	0.081	0.150	0.163
ΔR^2		0.073***	0.015*

**P<0.05, **P< 0.01; ***P<0.001*

The result obtained in Table 5 above represent, the results of hierarchical regression model for smallholder rice growers commercialization. As shown in step 1 both two non-hypothesized variables age (β = -0.141, *P*<0.01) and farming experience (β = 0.225, *P*<0.001) were statistical significant associated with rice commercialization. In addition, the results obtained in step 2, which involve introduction of the main variable (FU and LR) revealed that both FU and LR had significant positive effect on commercialization (β = 0.118, *P*<0.01) and (β = 0.179, *P*<0.001) respectively thus hypothesis H1 was supported. Also the result obtained in step 3 which involve introduction of the interaction variable (FU x LR) revealed that the interaction term has significant negative effect on commercialization (β = -0.094, *P*<0.05) thus lead to support hypothesis H2.

Further Moderation Analysis with Hayes PROCESS Macro

We also intended to confirm the result obtained in hierarchical regression analysis by employing Hayes PROCESS macro v4.1 technique for IBM SPSS/23 and above. According to Hayes (2022), PROCESS is a tool for IBM SPSS, which make it easier to analyse hypothesized model by providing a relative simple way to analyse relative complex models using bootstrapping confidence intervals (CIs). Thus in this study, we used a standardized estimation of 5,000 bootstrap samples for 95% CI. The result of the interaction between FU and LR is shown in Table 6.

Table 6: The Interaction Effect of LR and FU

	Coefficient	**se**	**t**	**P**	**LLCI**	**ULCI**
Constant	3.96	0.0409	96.7697	0.0000	3.8795	4.0405
FU	0.1389	0.0355	3.918	0.0001	0.0692	0.2087
LR	0.2267	0.0412	5.4976	0.0000	0.1456	0.3078
Int_1	-0.1095	0.0377	-2.9052	0.0039	-0.1837	-0.0354

The result obtain Table 6 above show that the interaction result between FU and LR was statistically significant but negative with $P< 0.05$. This means that the relationship between FU and RC is weakened by law and regulation. We also employed Jonson-Neyman simple slope analysis technique to establish a level at which moderator will have moderating effect in the relationship between financial service usage and agriculture commercialization. The result obtained in Table 7 below indicate that the moderator LR moderate the relationship between financial service usage and agriculture commercialization within the range of LR= -1.0035 to LR = 1.0035. The result suggest that at low level of LR (i.e. LR= -1.0035) the effect of FU on AGC is higher but as we increase the level of LR to 1.0035 the effect of FU on AGC is reduced. Thus the result confirms that the effect of FU on AGC is weakened by high level of LR.

Table 7: Conditional Effect of the Predictor (FU) at Value of Moderator (LR)

LR	Effect	se	t	p	LLCI	ULCI
-1.0035	0.2488	0.0528	4.7111	0.000	0.145	0.3527
0.000	0.1389	0.0355	3.918	0.0001	0.0692	0.2087
1.0035	0.0290	0.0509	0.571	0.5683	-0.071	0.1291

Also Johnson-Neyman helps us to identify the range of value at which the slope of the predictor is significant vs not significant at a specified alpha level as Hayes (2022) suggested. The results are provided in Table 8 and Figure 2.

Table 8: Range of Value at which Predictor is Significant vs not Significant

LR	**Effect**	**SE**	**T**	**P**	**LLCI**	**ULCI**
-2.674	0.432	0.108	3.994	0.000	0.219	0.644
-2.474	0.410	0.101	4.058	0.000	0.211	0.609
-2.274	0.388	0.094	4.128	0.000	0.203	0.573
-2.074	0.366	0.087	4.205	0.000	0.195	0.537
-1.874	0.344	0.080	4.290	0.000	0.186	0.502
-1.674	0.322	0.074	4.382	0.000	0.178	0.467
-1.474	0.300	0.067	4.481	0.000	0.169	0.432
-1.274	0.278	0.061	4.583	0.000	0.159	0.398
-1.074	0.257	0.055	4.680	0.000	0.149	0.364
-0.874	0.235	0.049	4.759	0.000	0.138	0.332
-0.674	0.213	0.044	4.792	0.000	0.125	0.300
-0.474	0.191	0.040	4.735	0.000	0.112	0.270
-0.274	0.169	0.037	4.528	0.000	0.096	0.242
-0.074	0.147	0.036	4.120	0.000	0.077	0.217
0.127	0.125	0.036	3.514	0.001	0.055	0.195
0.327	0.103	0.037	2.782	0.006	0.030	0.176
0.527	0.081	0.040	2.033	0.043	0.003	0.160
0.545	0.079	0.040	1.967	0.050	0.000	0.159
0.727	0.059	0.044	1.350	0.178	-0.027	0.146

0.927	0.038	0.049	0.768	0.443	-0.059	0.134
1.127	0.016	0.054	0.287	0.774	-0.091	0.122
1.327	-0.006	0.060	-0.105	0.916	-0.125	0.112

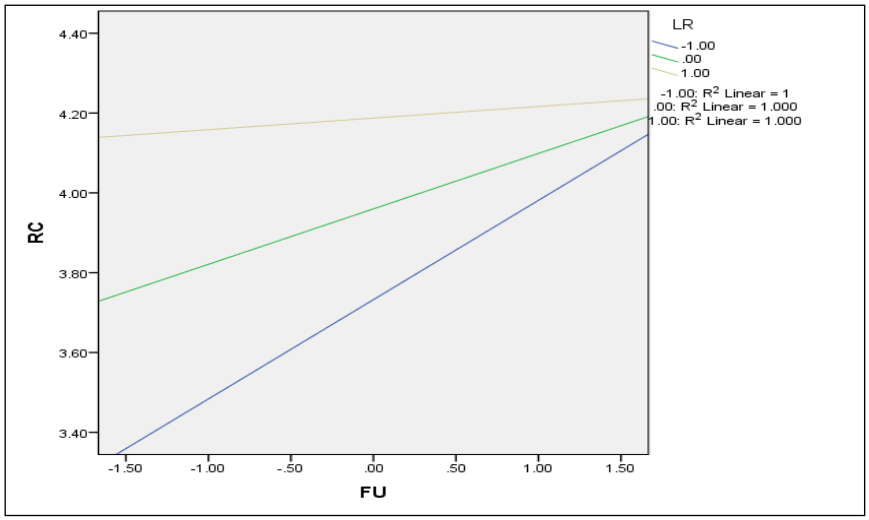

Figure 2: Interaction Effect between FU and LR

The result obtained in Table 8 above suggest that if we keep on increasing the level of LR and reduce FU then above the value of LR = 0.545 the effect of FU on AGC will no longer be significant. In addition the result obtained in Figure 2 above suggest that at low value of LR i.e. -1.00 the effect of FU on AGC is stronger as the gradient in the relationship between AGC and FU is much steeper. However, at high level of LR i.e. =1.00 the effect of FU on AGC is weaker as the gradient of the relationship between AGC and FU is much flatter. So the results confirm that LR has significant negative moderating effect in the relationship between FU and AGC.

Discussion of the Findings

The results obtained show that control variables, including farming experience and household age had significant effect on commercialization. The findings are in line with a number of earlier empirical studies (Ele et al., 2013; Ademe et al., 2017; Kabit et al., 2016; Rabbi et al., 2019; Kissoly et al., 2020; Mihretie, 2020) that found farming experience had a significant positive impact on commercialization. Farming experience refers to the number of years an individual has spent in farming activities (Kabit et al., 2016). According to Rabbi et al. (2019) more experienced farmers have more knowledge of farming as well as changes in weather, pesticides, and production. The argument was also supported by Kabit et al. (2016) who observed that increase in farming experience increase perfection due to increased knowledge of farming techniques which result into production efficiency and commercialization. Thus increasing farming experience increase productivity and farmer participation in the market thus positively affect the welfare of household farmers. However, the results were inconsistent with those of Mariyono (2019) who find negative relationship between farming experience and commercialization.

Furthermore, the findings show negative relationship between age and commercialization. Also the result are consistent with previous empirical findings (Kissoly et al., 2020; Rubhara and Mudhara, 2019; Abafita et al., 2016) who also found negative relationship between age and commercialization. This is due to the fact that older people are more risk averse than younger people so they might not be willing to venture into food crop selling to guard against volatility of food prices, thus creating a negative relationship with commercialization. Additionally, young farmer are more creative, cognizant of current requirement and aware of the benefit of commercialization (Randela et al., 2008). However, results were inconsistent with those of Rabbi et al. (2019), and Mariyono (2019) who found positive relationship between age and commercialization. According to Rabbi et al. (2019) older farmers are more experience with farming activities as well as market for output crops. The results also find that financial service usage positively and significantly affect commercialization thus support hypothesis H1. The results are consistent with previous empirical findings (Abu and

Haruna, 2017; Agbodji and Johson, 2019; Ayele et al., 2021; Issahaku et al., 2020; Ochieng et al., 2019; Sand, 2002) which found that financial service usage support agriculture commercialization. According to Ayele et al. (2021), credit use by farmers has significant effect commercialization because it contribute to productivity and farmers participation to market for those with access to credit compare to those with no access (Agbodji and Johson, 2019). The notion was also backed by Abu and Haruna (2017), who noted that the use of credit and other financial sources allows farmers to expand production above what is necessary to meet family food security requirements and sell the surplus. In addition, access and use of credit boost productivity and net income of a farmer thus reduce smallholder poverty (Khandker and Koolwal, 2016; Ogundeji et al., 2018), because credit enable farmer to adopt contemporary technology, and in turn increase marketable surplus and participation in the market (Bhattarai et al., 2013). Moreover, a study by Sand (2002) found that saving is essential to farm household activity as it affect potential future crop production and farmer consumption.

Also Issahaku et al. (2020) discovered that joining in saving association enable farmers to get chance of getting credit by 20%. Thus usage of financial service can encourage smallholder farmer to expand to expand their investment in farming activities thus boost productivity and participation in the output crop market. Additionally, the empirically results of this study demonstrated that law and regulation indeed facilitate the relationship between financial services usage and agricultural commercialization, thus support hypothesis H2. However, the interaction effect between FU and LR was negative, suggesting that as the level of LR is decreased, the effect of FU on commercialization is higher but as the level of LR increases, the effect of FU on commercialization is reduced. The findings are consistent with earlier empirical findings (Mariyono, 2019; Ogundeji et al., 2018; Demirguc-Kunt et al., 2018). According to Mariyono (2019), easing the requirement for obtaining microcredit can benefit farmer who choose to engage in commercial farming. The author recommend for Government in collaboration with commercial sector to ensure easy access of finance to farmers. In addition Ogundeji et al. (2018) observe that higher interest rate lessen farmer chance of getting credit from formal financial institution. Also, Mohammed

et al. (2019), revealed that more than half (56.4%) of Ghanaians household farmers use informal financial services despite the fact that agriculture is the main source of employment for more than half of the Ghanaian labour force. This could due to the fact that majority of smallholder farmers are poor so lacking collateral, thus they cannot access credit provided commercial banks (Raifu and Aminu, 2020). Moreover, the findings were inconsistent with Seman (2016), who find that strength of legal right and government laws and regulations has positive effect on financial inclusion. In addition Rojas-Suarez (2016) finds that low of institutional quality and lack of enforcement of the rule of law reduces investors' incentive to entrust their funds to formal financial institutions. Thus, strong and strict regulation can improve safety and soundness of the financial system and quality of the service provided by financial institution to its users including smallholder farmers.

Conclusion

This study established that the use of financial services has a strong, positive relationship with agriculture commercialization. Therefore the study concludes that using financial service for commercial farming is a crucial component for facilitating farmers' participation in the market. The study also confirms that institutional law and regulation are crucial in moderating the relationship between the use of financial services and agricultural commercialization among smallholder rice growers' farmers in Tanzanian. The results are noteworthy because there is a lack of theoretical support for how institutional law and regulation affects the relationship between financial services usage and agriculture commercialization. The study suggests that financial law and regulation should be reduced or revised in order to increase the level of financial service usage so as to promote commercialization.

Limitation and Scope for Future Research

First, the current study omits longitudinal research in favor of a cross-sectional approach. Future research using a longitudinal methodology and a national representative sample may help us better understand how institutional law and regulation factors affect the relationship between financial service usage and agriculture commercialization. Second, the current study measures the variable under study using quantitative data while

ignoring qualitative data. Future research may be done with mixed data or qualitative data. Finally, this study excludes medium- and large-scale rice producers and uses data gathered from smallholder farmers. Future research might take into account medium and large rice producers.

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