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Determinants of Access to Bank Credit by Smallholder Agricultural Households in Uganda: Evidence from UNHS 2019/2020

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Agricultural credit plays a significant role in boosting cash and food crop production for household consumption, domestic and foreign markets. The purpose of this study was to investigate the determinants that affect smallholder farmer's access to bank credit in Uganda. The study used data from the Uganda National Household Survey 2019/2020 (UNHS). The study utilized a logit regression model for the analysis of data. The findings from the model showed that farmer's access to bank credit in Uganda was positively and significantly influenced by sex of the household head, income level of the household head, marital status of the household head, age of the household head and ownership of a bank savings account. The study's conclusions led to the development of key policy recommendations. These include promoting a savings culture through various initiatives, providing incentives such as special savings accounts or matching deposit programs, creating customized banking products to cater to farmers' needs and offering free tertiary education to graduates of Universal Primary Education, Universal Secondary Education, and Universal Post O Level Education and Training.

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INTRODUCTION

Access to bank credit enables agricultural households to increase food production, reduce hunger and boost incomes. The Food Agriculture Organization (FAO) regards agriculture as the essential foundation of human civilization worldwide, supporting food production, livelihoods and economic advancement (FAO, 2022). Credit access enables activities like crop cultivation, livestock rearing and raw material production vital for human sustenance all of which improve human welfare. Additionally, agricultural financing plays a crucial role in production and shaping societies preserving cultural heritage and influencing the environment (Alexandratos Jelle, 2012). The major players include smallholder farmers, agro-processing companies, agricultural input suppliers, exporters, development partners and various government agencies. Together, they contribute to the development and success of the agricultural industry in the world (Eriksen et al., 2019). Smallholder farmers make up the majority of farmers globally, comprising about 500 million farms, which account for over 90% of all farms. They manage around 60% of the world's agricultural land, underscoring their significant role in global food production (Lowder et al., 2019). In certain nations, the definition is primarily based on the extent of landownership, resulting in a wide spectrum of values observed across Asia and Africa (Adong et al., 2021). For instance, the land sizes considered for smallholder farmers ranges from 2.5 hectares in India to 4.6 hectares in Malaysia (Alam et al., 2020).

About 70% of Uganda's population, especially those living in rural areas, rely mostly on agriculture for their livelihood (MAAIF, 2020). Agriculture provided over 33% of Uganda's export revenue and roughly 24.1% of its GDP in the fiscal year 2019–2020 (Uganda Annual Revenue Performance Report, 2020). As per the Government of Uganda through its Ministry of

Agriculture, Animal Industry and fisheries (MAAIF), smallholder farmers are categorized as agricultural producers who possess or manage small plots of land and typically face limitations in terms of resources such as capital, technology, and information (MAAIF, 2020). Their primary activities involve growing crops and rearing livestock both for their own sustenance and for sale within local markets (Anderson et al., 2016). A survey conducted by the Uganda Bureau of Statistics Census of Agriculture identified smaller average farm size, which supports the selection of this specific target group. Depending on the location within Uganda, the average farm size ranges from 0.8 to 1.6 hectares (UBOS, 2015).

Smallholder farmers constitute a substantial portion of Uganda's agricultural sector and play a vital role in food production. Additionally, they actively participate in the cultivation of cash crops like coffee, tea, and tobacco, which are crucial commodities for export (Feyaerts et al., 2020). The MAAIF emphasizes the vital role of smallholder farming in Uganda's agriculture sector. It plays a significant role in providing essential employment opportunities and income to millions of citizens in the country (MAAIF, 2020). Uganda Bureau of Statistics (UBOS) reports that the majority of agrarian households in Uganda consist of smallholder farmers who typically farm land holdings averaging 1.6 hectares in size. These agriculturalists are involved in diverse farming activities such as cultivating crops, raising livestock and participating in the fishing activities (UBOS, 2015).

Enhancing access to bank finance is vital to boost productivity in Uganda's agricultural sector, which is vital for the nation's economy (Florence et al., 2020). Smallholder farmers in the country encounter numerous obstacles, including limited access to financial services, inadequate infrastructure, insufficient extension services and effect of climate change. As a result, these

challenges have contributed to low productivity, food insecurity and heightened poverty rates within smallholder farming communities (Nabuumu et al., 2021). As stated by the National Planning Authority, despite the obstacles they encounter, smallholder farmers in Uganda play a vital part in propelling the country's agricultural sector. They are responsible for the majority of the nation's food production, significantly contribute to export revenue and serve as the primary source of employment for the citizens of Uganda (NDP III, 2020). Accessing bank credit is of utmost importance for smallholder agricultural households since it empowers them to make vital investments in their farms, acquire necessary inputs like seeds and fertilizers, and enhance both their productivity and income levels (Mgbenka et al., 2016).

The Ugandan Government and international development partners have provided credit and other support to smallholder farmers to boost food production (Rwamigisa et al., 2018). In order to improve the efficiency and financial stability of these farmers, the government has implemented measures and programs like the National Agricultural Advisory Services (NAADS), Agriculture Credit Facility (ACF), Uganda Development Bank (UDB) credit facility, and the Operation Wealth Creation (OWC) program (Museveni, 2010). Multiple Non-Governmental organizations and International development partners, such as the International Monetary Bank (IMF), African Development Bank, Food Agriculture Organization (FAO), Care International Uganda, World Bank, Korea International Cooperation Agency (KOICA), World Food Program (WFP) among others, have enabled smallholder farmers to access credit in Uganda. Their support has involved training, capacity building, and facilitates access to financial resources (MAAIF, 2020). Currently, the government is actively implementing the Parish Development Model (PDM), a program specifically designed to benefit smallholder farmers access credit facilities (Nanswa, 2022).

Nonetheless, the ability to obtain bank credit continues to be a major obstacle for smallholder agricultural households in Uganda, as many struggle to secure loans from banks (Salami et al., 2010). These households have restricted access to bank credit due to a number of difficulties including absence of suitable collateral security, lack of financial literacy, incomplete credit information among others (Nabuumu et al., 2021). Moreover, the conventional banking system in Uganda primarily concentrates in urban areas, posing difficulties for smallholder agricultural households situated in rural regions to access credit (Salami et al., 2010). Access to bank credit plays a crucial role in improving the productivity of farmers and subsequently increasing their yields (Chandio et al., 2019). The provision of bank credit enables smallholder farmers to access essential resources like seeds, fertilizers and invest in modern technologies and equipment. However, according to Anderson et al., (2016), only a small fraction of smallholder farmers are able to secure credit from banks. The inability of these farmers to obtain bank credit has posed a negative impact on their output. As a result, they are challenged due to using outdated tools and technology, inadequate soil management, the effects of climate change, pest and diseases and limited market access. Specifically, the extent to which socio-economic and demographic characteristic determine access to credit facilities is less documented. Therefore, the objective of this study is to examine the socio-economic and demographic factors that influence the ability of smallholder farmers to access bank credit from commercial banks in Uganda.

LITERATURE REVIEW

Theoretical literature review

The theoretical framework of smallholder farmer access to bank credit can best be explained by the theory of Credit Rationing in Markets with Imperfect Information (Stiglitz & Weiss, 1981). Banks are faced with adverse selection and moral hazard problems due to asymmetric information in credit markets hence interest rates cannot play their market clearing role. Banks concerned with

risk of loan default and the expected return on loans have designed non-price mechanisms (such as collateral requirements, past credit history) to determine who accesses bank loans and who does not.

Let θ be the risk index of projects and let R be expected gross returns, distributed $F(R, \theta)$. If two projects have the same expected return but if $\theta_1 > \theta_2$, then θ_1 is considered a riskier project and will not have access to bank credit. If B is the loan amount, C the collateral and r^* the bank optimal interest rate, then loan default occurs when $C + R \leq B(1 + r^*)$. The net return to the borrower is $\pi(R, r^*)$, hence $\pi(R, r^*) = \max[R - (1 + r^*)B - C]$. The return to the bank is $\rho(R, r^*) = \min[R + C; B(1 + r^*)]$. It is projects that maximize the expected return to the bank that have access to bank credit (Stiglitz & Weiss, 1981). Borrowers with low net worth and collateral constraints have limited access to bank credit (Bernanke et al., 1999).

The farming sector in Uganda is considered to be highly risky due to exogenous factors (such as unpredictable rainfall patterns, pests and fluctuations of market prices for agricultural output) and so banks have to rely on a set criterion (such as collateral, net worth, socio-economic characteristics) to determine whether smallholder agricultural households access bank credit or not.

Empirical literature review

Earlier studies have revealed that smallholder farmers have multiple avenues to secure credit for their agricultural pursuits with banks being one of the potential sources. Lemessa & Gemechu, (2016), argue that the main cause of limited financial inclusion, especially with regard to access to banking services, in Ethiopia is the credit or loan policies implemented by these institutions themselves. In other words, the responsibility for the problem of limited loan availability in Ethiopia lies with the institutions themselves. The lending practices of banks, such as setting high minimum loan amounts, charging high interest rates, implementing complex application processes, and imposing restrictions on credit for specific purposes, frequently hinder people's

access to credit. According to Lemessa & Gemechu, (2016) study, the type and policies of banks are significant factors in the assessment of creditworthiness or credit evaluation. In addition, even if bank credit is offered, prospective borrowers can decide against applying if the terms of the loan, the repayment schedule, the need for collateral, and the supplementary services do not meet their needs. The problem is especially severe for farming households in rural areas, as they face limitations in their ability to reach banks and frequently encounter exclusion from formal financial markets.

Furthermore, the excessively high costs linked to obtaining loans from unreliable sources have obstructed their viability as feasible options. However, Sangwan & Nayak, (2021) have identified several institutional arrangements that can serve as suitable alternatives to personal collateral for these borrowers and offer cost-effective options for lenders to evaluate creditworthiness information. The study was carried out in India, and the investigators employed an Ordinary Least Squares (OLS) regression model to analyze their data.

In Uganda, Mwaura, (2014) conducted a study and determined that inadequate access to finance can be attributed to various factors, such as insufficient collateral, poor financial literacy, and inadequate infrastructure. This was demonstrated through the use of both Translog model and Propensity Score Matching techniques. According to the study done in Ethiopia by Gebremedhin & Swinton, (2003), smallholder farmers in underdeveloped nations face significant difficulties getting financing because of lack of collateral and a bad credit history.

Other determinants of access to credit by smallholder farmers

Several studies have examined the factors that determine access to credit by smallholder agricultural households.

Household head income level

Household income is the primary aspect of the various household characteristics that best represents clients' ability to repay loans and draws banks for loan disbursements. According to Dorfleitner et al., (2017), their study employed a binary logistic regression model, and found that a family that experiences more poverty is more likely to have credit problems in Ghana. Apart from declaring their earnings on loan applications, banks usually request their clients to reveal their assets, which can potentially serve as warranty for the lending institutions (Sangwan & Nayak, 2021). Additionally, income has a favorable impact on loan amount, as it is a primary factor in determining creditworthiness for banks. Income acts as security and suggests steady cash inflows and timely repayment, which is corroborated by the conclusions of Dorfleitner et al., (2017).

Household head Education level

Shu-Teng et al., (2015) conducted a research in Malaysia and found out that education helps with debt repayment. The process of applying for credit from lending organizations is time-consuming, making it more difficult for farmers with limited education to access loans from established lenders in Ghana (Owusu, 2017). A study by Dzadze et al., (2012) also conducted in Ghana found that education had a positive influence on a household's ability to secure loans. One possible inference is that educated farmers might already have high incomes and thus may not require credit. However, Ankrah Twumasi et al., (2020) presented evidence to the contrary, showing that educated farmers are more likely to acquire loan from the banks in Ghana.

Age of the Household head

The age of the borrower emerges as a crucial element in deciding the debt amount among the demographic features. According to a study conducted by Mpuga (2010), there exists a relationship between age and the approval of loan applications, as well as the requested loan amounts. The squared age term, however, displayed a negative sign, indicating a nonlinear link between age and credit request. Tobit, Probit,

and Multinomial Logit were among the models used in the study to assess these connections. In Uganda, Ssekiziyivu et al., (2018) finds that younger consumers are viewed as less credit-risky due to their potential for higher income and longer engagement in money-generating activities than older clients.

Sex or gender of the Household head

In the Afigya-kwabre District of Ghana, Ololade & Olagunju, (2013) reveal that gender roles and norms impact the likelihood of men and women accessing credit. The results indicated that being male has a positive impact on access to credit and is significant at a 10% level. As a result, men have a higher chance of accessing credit relative to women. In their respective studies, Gilligan et al., (2020) and Andersson Djurfeldt, (2020) both established a positive relationship between gender and the availability of bank credit. However, such behavior may be viewed negatively by society, as it may be seen as going against traditional gender norms. This idea was presented by Fletschner & Carter, (2008). In another study, Isaga (2018) in Tanzania, it was identified that female agriculturalists' chances of getting bank credit are negatively correlated.

Marital Status of the Household head

Lorbah (2017) conducted a study in Liberia's Suakoko district, while Ssekiziyivu et al., (2018) conducted a study in the same area. The findings showed that widows, divorcees, and unmarried farmers experience notable disadvantages when it comes to developing social connections, which ultimately affects their ability to access credit. According to Isaga, (2018) in Tanzania, the logistic regression model employed indicated that the marital status of smallholder agriculturalists had a minimal impact on their ability to get bank borrowing.

Distance from the bank

According to Komicha (2007) study, low-income farm households in southeastern Ethiopia are reluctant to seek credit from lenders located far away due to the transportation costs involved.

Komicha employed various models such as Tobit, multinomial logits, stochastic frontier analysis, and OLS regression to analyze the data.

Household Size

A study done by Owusu, (2017) argues that in Ghana a larger household size is associated with an increased likelihood of access to family labor, leading to a reduction in labor costs. In contrast, Tang & Guo, (2017) found that household size and access to loans have a negative correlation. They suggest that larger households tend to allocate a significant portion of credit towards supporting the welfare of elderly and children in the household. Mpuga, (2010) conducted a study in Uganda to investigate the linkage between household size and access to finance. The investigation employed three models, including probit, multinomial logit, and Tobit, to evaluate the data. The findings demonstrated that a person capacity to obtain bank credit for financing was not significantly impacted by household size.

Extension Contact

To enhance access to bank credit for farmers, extension contact is considered an important factor, as per Owusu, (2017) study conducted in Ghana using a probit model. The study suggests that extension services can help farmers acquire new farming techniques, improve their level of use of technology, and maximise their output, which in turn can lead to improved access to credit. Dzadze et al., (2012) identified that there was a statistically significant positive relationship between farmers who had contact with extension programs and their ability to obtain credit at a significance level of 1%.

Household Assets ownership

In Tanzania, Isaga (2018) conducted a study and found a positive association between asset ownership and economic well-being. Owning assets can contribute to increased income and wealth accumulation over time, providing individuals with a safety net during financial shocks and enabling them to invest in productive activities. Asset ownership is often considered a

measure of economic security and can facilitate access to credit and financial services. Contrary to the findings of Isaga's study, Mpuga, (2004) discovered contrasting results.

Farm Size

Accessing credit from banks often requires the use of land as collateral, and Owusu, (2017) in Ghana revealed that the size of a farm positively affects the ability to access credit. This influence was statistically significant at a 1% level. The study utilized a probit model and demonstrated that a one-unit increase in farm size led to a 39% increase in the likelihood of households obtaining credit. These findings align with the expectations and previous results of Binswanger et al., (1993). However, many peasant farmers residing in remote areas with absence admission to land, which can create challenges for them in meeting the collateral requirements set by lenders.

Membership of Farm Based Organization or farmer group

In their study, Asante-Addo et al., (2017) found that membership in a farmer-based organization (FBO) had a significant and positive impact on the likelihood of participating in credit initiatives, which was consistent with their initial hypothesis. Specifically, being a member of an FBO was associated with a 37.9% increase in the probability of a household participating in credit programs, after controlling for other factors. The study was conducted in Ghana and utilized Heckman's sample selection method. In contrast, Owusu, (2017) study in Ghana found that FBO membership was not statistically significant in accessing credit. The study used a probit model. Group lending is a way for creditors to differentiate between good and bad borrowers, according to (Ghatak, 2000).

Interest Rate

Mpuga, (2004) found that high interest rate on credit cards can discourage borrowers from accessing bank credit. This study was conducted in Uganda, and the researchers used Probit, multinomial Logit, and Tobit models to analyze

the data. Sebatia et al., (2014) conducted a study in Zambia and identified that the coefficient for the interest rate on borrowing was positive, but it was not statistically significant at conventional levels. This unexpected result may be due to the fact that rural borrowers may not fully comprehend financial market signals, such as interest rates. Moreover, according to Basu & Srivastava, (2005) high formal sector interest rates can negatively impact the ability of poor borrowers to obtain agricultural finance and may result in higher interest rates from informal lenders.

Bank Savings account

Saving refers to setting aside money or assets for future use or expenses. It helps farmers to prepare for unforeseen circumstances such as floods, droughts, and crop failures. However, many farmers struggle to save due to a lack of financial capacity. Owusu, (2017) conducted a study in Ghana using a probit model to investigate this issue. Tefera, (2004) conducted a study in Bangladesh and found that Islamic banks were able to promote saving habits among poor rural farmers by offering credit to those who demonstrated an effort to save with the financial institution

Collateral security

A study done by Owusu, (2017) in Ghana revealed that collateral security can take the form of tangible assets, chattel mortgages, legal mortgages, and life insurance policies, and is used by banks to lower the hazards associated with lending money to households. Using a regression

model, Chisasa, (2019b) found that the effect of security on the ability of smallholder agriculturalists in South Africa to access credit was insignificant as the coefficient for security was negative (-0.534) and not statistically significant. In a similar vein, Chisasa, (2015) contends that smallholder farmers in South Africa face difficulties in using their land as collateral for mortgages due to the absence of land titles.

RESEARCH METHODOLOGY

Study design and rationale

This is the strategy for the study, detailing the precise actions required by the researcher to address the issues and attain the objectives, as stated by Saunders et al., (2009). The research clearly defined its objectives and hypotheses. It utilized data from the Uganda National Household Survey (UNHS 2019/2020) to examine the determinants that influence smallholder agriculturalists' access to agricultural loans in Uganda.

Data source

The research utilized data from the Uganda National Household Survey, which was conducted by the Uganda Bureau of Statistics from September 2019 to February 2020 (UBOS, 2019/20).

Variable definition and expected sign

The definition of variables including their expected signs is presented in Table 1.

Table 1: Definition of variables and their expected signs

Variable	Type	Definition	Expected sign
Age of the household head	Continuous	Age of household age in years	+
Farmer Group	Categorical	The variable measures whether household head is a member of a farmers' association or not, (=1 if a member of a farmer group, 0 otherwise).	+
Gender of the household head	Binary	1 if male, 0 otherwise.	+ / -

Variable	Type	Definition	Expected sign
Income of the household head	Categorical	Categorization of individual's perception towards the level of household income (=1 high, 0 otherwise).	+
Household asset ownership	Categorical	Indicates household asset ownership (=1 if owns asset, 0 if otherwise)	+
Education level of the household head	Categorical	Education level of the household head (=1 if educated, 0 otherwise)	+
Marital status of the household head	Binary	Marital status of household head (=1 if Married, 0 otherwise)	+
Bank savings account	Categorical	Whether or not the household head owns bank savings account (=1 if the farmers has a bank saving account, 0 otherwise).	+
Household size	Categorical	Perception of household size (=1 if large, 0 otherwise).	+

Model specification and estimation

The study used a probit model to examine the determinants that impact the access to bank loans for smallholder agricultural households in Uganda (Greene, 2002). The probit model was chosen due

to the binary nature of the dependent variable, indicating it could result in two possible outcomes such as yes/no or 1/0. The probit model was first tested to determine whether it was best and if proved not to be the most appropriate, the logit model would be estimated.

$$Prob(y = 1|x) = \frac{e^{x\beta}}{1 + e^{x\beta}}$$

$$Prob(y = 0|x) = 1 - \left(\frac{e^{x\beta}}{1 + e^{x\beta}} \right)$$

Where $y = \text{access to bank credit} (= 1 \text{ if smallholder agricultural household accessed bank credit, or } 0 \text{ otherwise})$

$x = \text{Matrix of the independent variables}$

$\beta = \text{vector of the parameter estimates}$

The full model specifications:

$$\gamma = \alpha + \beta_1 GENDER + \beta_2 AGE + \beta_3 MRST + \beta_4 EDU + \beta_5 HSZE + \beta_6 \beta_6 HAO + \beta_7 FBO + \beta_8 BSA + \beta_9 HINCOME + \mu$$

γ = the dependent variable that determines whether smallholder agriculturalists access bank credit = 1 and 0 otherwise,

α = constant of the equation,

$GENDER$ = Gender of household head (1 if male, 0 otherwise),

AGE = age of household head (years),

$HINCOME$ = household income (perception of individual towards magnitude of household income (1 if high or stable; 0 otherwise),

HAO = household asset ownership (1 if the household owns asset, 0 if otherwise)

MRST = marital status of household head (1 if married, 0 if otherwise),

EDU = levels of education of household head (1 if educated, 0 otherwise)

HSZE = household size (1 if many; 0 otherwise)

BSA = bank savings account (1 if own a bank saving account, 0 otherwise),

FBO = household head membership of the farmer's organization (1 if member of farmer group, 0 otherwise),

μ = Error term

Data analysis

The study employed cross tabulation and frequency distribution to assess and compare outcomes. The findings were then displayed through table and percentages. Stata version 15 was utilized for data analysis using a logit model.

RESULTS AND DISCUSSION

In this study, a weighted sample of smallholder farmers was utilized. The weighting techniques were applied to ensure that the finding could be generalized to the entire population of the smallholder farmers in the country, which is estimated to be 27,886,226. The purpose of applying weighting to the sample was to obtain national representative estimates, allowing the study's conclusions to be more broadly applicable to the entire smallholder farming population in the country (UBOS, 2019/20).

Cross tabulation between socio-economic, demographic factors and access to bank credit.

The following tables display the cross- tabulation of smallholder farmer's access to bank credit and the factors influencing it. The study utilized weighted samples for all cross tabulations.

Table 2: Demonstrates a cross-tabulation between Gender of the household head and the bank credit access.

Gender of the household head	No access to bank credit	Access to bank credit	Total
Female	23,966,552 (86.29%)	36,474 (32.65%)	24,003,026 (86.07%)
Male	3807950 (13.71%)	75,251 (67.35%)	3883201 (13.93%)
Total	27,774,502 (100%)	111,724 (100%)	27,886,227 (100%)

Source: computation from UNHS 2019/2020

According to the results in Table 2, it shows a cross tabulation of smallholder farmers access to bank credit by gender of the household head. Out of 111,724 smallholder farmers who access bank credit, 67.35% were male while 32.65% were female. This indicates that a higher percentage of male-headed households in Uganda accessed bank credit compared to their female counterparts.

According to Nannyonga-Tamusuza, (2009), it becomes evident that traditional gender roles and societal norms in Uganda reinforce men as the primary decision makers and landowners within the households. This cultural context gives men greater control over resources, particularly land, which is often used as collateral for loan. As a

result, men are more likely to meet the banks eligibility criteria for accessing bank credit. The study highlighted a male participant who expressed the belief that marriage empowers him, granting him control over the woman he marries.

These findings are consistent with studies conducted by Gilligan et al., (2020) and Andersson Djurfeldt, (2020) in Uganda. These studies revealed that male household heads typically have more authority in decision making within the household, particularly in matters related to bank credit. They also take on the responsibility of managing borrowed credit and making investment choices.

Table 3: Cross tabulation between marital status of the household head and bank credit access.

Marital status of the household head	No Access to bank credit	Access to bank credit	Total
Married/cohabiting	3956734 (72.10%)	79,238 (86.29%)	4035972 (72.33%)
Divorced/separated	1404052 (25.58%)	8,595 (9.36%)	1412647 (25.32%)
Never married	127,117 (2.32%)	3,996 (4.35%)	131,113 (2.35%)
Total	5487902 (100%)	91,829 (100%)	5579731 (100%)

Source: computation from UNHS2019/2020

According to the results, 86.29% of married or cohabiting smallholder farmers had access to bank credit, while only 9.36% of divorced or separated farmers and 4.36% of single farmers accessed bank credit. These findings clearly demonstrate that married smallholder farmers were significantly more likely to access bank credit compared to individuals in the other groups. As per the research conducted by Ssekiziyivu et al.,

(2018) in Uganda, it was observed that married individuals bear heavier financial responsibilities due to their obligation to support their families. Consequently, they frequently have to seek credit options to engage in economic activities that generate income to meet their daily living costs. Hence, their findings are consistent with the results obtained in the study.

Table 4: Shows cross tabulation between age of the household head and bank credit access

Age of the household head	No access to bank credit	Access to bank credit	Total
“15-24”	328,416 (5.98%)	1,654 (1.80%)	330,070 (5.92%)
“25-34”	1,144,475 (20.85%)	12,875 (14.02%)	1157350 (20.74%)
“35-44”	1,277,077 (23.27%)	25,705 (27.99%)	1302782 (23.35%)
“45-54”	1195395 (21.78%)	36,155 (39.37%)	1231550 (22.07%)
“Above55years”	1542539 (28.11%)	15,441 (16.81%)	1557980 (27.92%)
Total	5487902 (100.00%)	91,830 (100%)	5579732 (100%)

Source: computation from UNHS 2019/2020

The results depict the fluctuating percentages of smallholder farmers who are able to access bank credit across various age groups. Among smallholder farmers aged 15-24 years, the bank credit access was 1.8%. This percentage increased to 14.02% for the 25-34 age groups and further rose to 27.99% for those aged 35-44. The highest access rate was observed in the 45-54 age range, reaching 39.37%. However, for smallholder farmers aged 55 years and above, the access to bank

credit declined to 16.81%. This trend suggests a general pattern of increased bank access as the age of the household head rises, although a decline is evident specifically in the 55 years and above age group. These findings align with previous research conducted by Shu-Teng et al., (2015) and Owusu, (2017), which also indicated that as individuals grow older they are more likely to access bank credit due to the accumulation of assets. However, it is important to highlight that there seems to be

a specific age at which the rate of accessing bank credit starts to decline.

Table 5: Cross-tabulation between education level of the household head and the access to bank credit

Education level of the household head	No access to bank credit	Access to bank credit	Total
No education	990,177 (18.08%)	2,104 (2.33%)	992,281 (17.83%)
Primary education	3098885 (56.59%)	26,448 (29.28%)	3125333 (56.15%)
Secondary education	1109442 (20.26%)	29,593 (32.76%)	1139035 (20.46%)
Post-secondary education	277,130 (5.06%)	32,189 (35.63%)	309,319 (5.56%)
Total	5475634 (100%)	90,333 (100%)	5565967 (100%)

Source: computation from UNHS 2019/2020

The findings indicate only 2.33% of farmers with no education, 29.28% with primary education, 32.76% with secondary education, and 35.63% with post-secondary education had access to bank credit. These results clearly show a positive relationship between education levels and the probability of smallholder farmers accessing bank credit.

Attaining a higher level of education typically leads to improved financial literacy and a deeper

comprehension of financial aspects, such as credit and loan management. Educated farmers are more likely to be well informed about the benefits and obligations linked to acquiring bank credit. This equips them with the essential abilities to navigate the credit application process and meet the criteria set by commercial banks. Studies by Akileng et al., (2018) and Mwebesa et al., (2018) reinforce these findings, as it demonstrates a notable positive correlation between education and credit access in Uganda.

Table 6: Cross tabulation between bank savings account and access to bank credit

Bank saving and borrowing	No access to bank credit	Access to bank credit	Total
No bank savings account	27,379,800 (98.58%)	53,254 (47.67%)	27,433,054 (98.37%)
With bank savings account	394,702 (1.42%)	58,470 (52.33%)	453,172 (1.63%)
Total	27,774,502 (100%)	111,724 (100%)	27,886,226 (100%)

Source: computation from UNHS 2019/2020

Based on the results above, 47.67% of smallholder farmers who did not have bank savings accounts were able to access bank credit, while 52.33% of smallholder farmers with bank savings accounts were able to access bank credit. The results imply that smallholder agriculturalists who consistently make bank deposits have a higher chance of getting bank credit than those who don't save. Saving money in banks demonstrates a favorable connection and

establishes a record of accomplishment of financial responsibility. These findings are in line with the study conducted by Sebatta et al., (2014), which indicated that saving had a notable and positive impact on productive investments, leading to higher income levels and increases household spending.

Table 7: Cross-tabulation between farmer group and access to bank credit

Farmer group	No access to bank credit	Access to bank credit	Total
Not farmer group	27,539,437 (99.15%)	105,551 (94.47%)	27,644,988 (99.13%)
In farmer group	235,065 (0.85%)	6,174 (5.53%)	241,239 (0.87%)
Total	27,774,502 (100%)	111,724 (100%)	27,886,226 (100%)

Source: computation from UNHS 2019/2020

The findings indicate that 5.53% of smallholder farmers who belonged to farm groups or farm-based organizations had access to bank credit, while the majority (94.47%) of those agriculturalists who were not members of such groups had higher access to bank credit. It is possible that some smallholder agriculturalists prefer individual loan applications due to the convenience and time saving aspect. They may

choose to avoid the complexities of group dynamics and decision-making processes that come with being part of farmer group or organization. However, these findings contradict the studies conducted by Midamba et al., (2022); Sekyi et al., (2020) and Assouto & Hounbeme, (2023). Their research demonstrated a strong positive correlation between group membership and credit access.

Table 8: Cross tabulation between the household size and access to bank credit.

Household size	No access to bank credit	Access to bank credit	Total
0-3	3494853 (12.58%)	12,992 (11.63%)	3507845 (12.58%)
4-6	12,906,786 (46.47%)	49,038 (43.89%)	12,955,824 (46.46%)
7-25	11,372,863 (40.95%)	49,695 (44.48%)	11,422,558 (40.96%)
Total	27,774,502 (100%)	111,724 (100%)	27,886,226 (100%)

Source: computation from UNHS 2019/2020

The results reveal that 11.63% of the household with 0-3 members accessed bank credit, in household with 4-6 members, the percentage rose to 43.89 and in household with 7-25 members the percentage further increased to 44.48. These results demonstrated a progressive trend, indicating that access to bank credit tends to rise as the number of household members increases. More people are usually engaged in income generating activities in homes with more members. As a result, their overall household income is usually higher which gives them a stronger capacity to meet repayment obligations. This observation concurs with the results of

Sebatta et al., (2014), who discovered that households with higher numbers of the family members tend to have greater access to bank credit compared to smaller households.

Contrarily, Twumasi et al., (2020) found a noteworthy negative correlation between household size and participation in loan programs, particularly in Ghana. They attributed this relationship to the presence of unproductive members within larger households, which imposes financial burden on the few members responsible for generating income.

Table 9: Cross tabulation between asset ownership and access to bank credit

Asset ownership	No access to bank credit	Access to bank credit	Total
With no asset ownership	21,065,656 (75.855)	79,611 (71.26%)	21,145,267 (75.83%)
Asset ownership	6708846 (24.15%)	32,113 (28.74%)	6740959 (24.17%)
Total	27,774,502 (100%)	111,724 (100%)	27,886,226 (100%)

Source: computation from UNHS 2019/2020

The results show that 71.26% of smallholder farmers without assets were able to access bank credit, whereas only 28.74% of those with assets had access to bank credit. These findings suggest that individuals without assets have a higher probability of accessing bank credit compared to their counterparts who own assets.

In general, when seeking loans, banks often require borrowers to provide collateral for security. However, smallholder farmers who do not possess traditional assets like land may have alternative options such as using their inventory or

anticipated crop yields as collateral. These findings contradict an earlier study conducted by Nguyen (2020) in Vietnam which indicated that owning land increases the probability of meeting the criteria set by financial institutions.

Regression results

The probit model was initially estimated using a robust stata command that generated robust standard errors free of heteroscedasticity. Then, the test was carried out to examine the normality of the residuals, with the objective of determining if they adhered to a normal distribution.

Table 10: Skewness / kurtosis tests for normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj_chi2(2)	Prob>chi2
Residuals	44,674	0.000	0.000	0.000	0.000

Source: computation from UNHS 2019/2020

According to the results in the table above, since the probability value of the chi-squared test was 0.000, the null hypothesis is rejected. This leads to the conclusion that the residuals from the probit model estimation do not conform to a normal

distribution. As a result, the study proceeded with the logit regression model for further analysis using the provided variables. The outcomes of the marginal effect analysis for the logit model can be found in Table 11 below.

Table 11: Results for the socio-economic and demographic factors that affect smallholder farmers to access bank credit.

Variables	Marginal effect (dy/dx)	Robust Standard error	Z	p>z
Income of the household head	0.0016088	0.0003007	5.35	0.000
Assets Ownership	0.0002689	0.000758	0.35	0.723
Age of the household head	0.0035429	0.0009842	3.60	0.000
Household size	0.0005604	0.000697	0.80	0.421
Gender Household head				
Male Household head	0.0026204	0.0009555	2.74	0.006
Bank Savings account	0.0085958	0.0010647	8.07	0.000
Farmers Group	0.0024407	0.0017969	1.36	0.174
Marital status of the household head				
Divorced Widow separated	0.0046226	0.0025139	1.84	0.066

Married	0.0058571	0.0022296	2.63	0.009
Education level of the household head				
Primary education	-0.0028705	0.0010529	-2.73	0.006
Secondary education	-0.000384	0.0008717	-0.44	0.660
Post-secondary education	0.0037506	0.0013961	2.69	0.007

Source: computation from UNHS 2019/2020

The significance levels of estimated parameters is at 5% level ($P > Z < 0.05$).

The results revealed that an increase in household income level has a significant positive impact on the ability of smallholder farmers to access credit from the banks. Those with higher income levels were more likely to access bank credit compared to those with lower incomes. Additionally, the results demonstrated that for each unit increase in the household income levels, the probability of accessing bank credit rises by 0.0016088. These findings align with a previous study by Isaga, (2018), which also noted that a smallholder agriculturalists ability to pay the bank the principal amount with interest is associated with their income levels.

The results showed a favorable marginal effect related to the gender of the household head. Male household head were found to have a greater probability of accessing bank credit compared to female smallholder farmers. According to the results, being male increases the probability of accessing bank credit by 0.0026204 in comparison to being female. These findings align with previous studies conducted by Nannyonga-Tamusuza, (2009) and Akpan, (2013), which emphasized that traditional gender roles and societal norms in Uganda tend to favor men as the primary decision makers and land owners within the households.

The results indicated that possessing a bank savings account had a notable and positive impact on the smallholder farmer's ability to access bank credit. The findings indicated that for every one unit increase in the saving rate, the probability of accessing bank credit increases by approximately 0.0085958. These findings are consistent with the research conducted by Sebatta et al., (2014), which also found that saving has a notable positive effect on productive investments, leading

to higher income levels and increases household expenditure.

The results also revealed a positive effect on educational level and access to bank credit. The results showed that for each increment in primary education, the probability of accessing bank credit decreases by -0.0028705. Conversely, for individuals with post-secondary education, the probability of accessing bank credit increases by 0.0037506. This can be attributed to the improved financial literacy that comes with higher education. As smallholder farmers attain education that is more advanced, they acquire additional skills and knowledge in financial and management areas, making them more appealing to banks as potential borrowers. These findings align with previous studies by Shu-Teng et al., (2015) and Owusu, (2017), which also concluded that education provides individuals with a better understanding of financial concepts, such as credit, interest rates, collateral, and loan terms.

The results indicated that the age of the household head positively influences the accessibility of bank credit. As the household heads age increases by one unit, the probability of gaining access to bank credit also increases by 0.0035429. This can be attributed to the natural tendency of individuals to accumulate assets like property as they advance in age. These results are consistent with earlier studies by Shu-Teng et al., (2015) and Owusu, (2017), which similarly concluded that as people get older, their probability of accessing bank credit rises due to the accumulation of assets like property, investments, or savings. Nonetheless, it is essential to acknowledge that there seems to be a specific age threshold at which the level of bank access begins to decline.

The results highlighted the statistical significance of the marital status of the household head concerning bank credit access. Accordingly, as one gets married, the probability of accessing bank credit increases by 0.005857. These findings suggest that married smallholder farmers have higher likelihood of obtaining bank credit compared to the other category. These results are consistent with other studies by Ssekiziyivu et al., (2018) and Lorbah, (2017), which also noted that married people typically have greater financial responsibilities as a result of their duties to provide for their family.

CONCLUSION AND POLICY IMPLICATIONS

The major goal of this study was to identify the factors that influence Ugandan smallholder agriculturalists' ability to obtain bank credit. Data from the Uganda National household survey (2019/20) was used and the logit regression model was employed. The results showed that household head income level, age of the household head, ownership of a bank savings account, marital status of the household head and gender of the household head significantly impact access to bank credit for these farmers. Evidence suggests that ownership of bank savings account has a positive and significant effect on smallholder farmers' access to bank credit. Therefore, initiatives that promote savings culture among farmers and provides incentives for savings such as special savings accounts or matching deposit programs should be implemented. Banks can also design tailored banking products that meet the specific needs of smallholder farmers. Empirical evidence suggests that higher levels of education (post-secondary education) have a positive and significant effect on smallholder farmer's access to bank credit. Government should adopt the policy of free tertiary education (post-secondary) to facilitate graduates of Universal Primary Education (UPE), Universal Secondary Education (USE) and Universal Post O Level Education and Training (UPOLET).

Limitations of the study and suggestions for further research

The study utilized data from the Uganda National Household Survey, which was conducted by the Uganda Bureau of Statistics from September 2019 to February 2020 (UBOS, 2019/20). This was the period when Uganda like the rest of the world was significantly affected by COVID19 pandemic and the country was restricted to lockdowns. Data collected during this period was affected by limited responses since movement of people and meetings were restricted. In addition, the study period was too short and only lasted for 6 months.

Therefore, further research should cover for periods where the country is free from major pandemics like COVID19 and also utilize panel and time series data sets to analyze the response of variables over time. There is also future need to study the determinants of access to bank credit by large holder agricultural households in Uganda.

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