ACCESSIBILITY TO CREDIT FOR FARMERS IN RURAL AREAS: A CASE STUDY IN PHU GIAO DISTRICT, BINH DUONG PROVINCE

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ABSTRACT

Agriculture and rural area are central to Vietnam's industrialization and modernization strategy, with credit policies playing a key role in fostering rural economic growth. This study identifies the barriers to credit access faced by agricultural households in rural areas, focusing on Phu Giao district, Binh Duong province. Using binary logistic regression analysis, 14 factors were found to influence credit access, including household characteristics (age, gender, education, income, labor force, loan purposes, technology) and institutional factors (transaction costs and collateral). The findings inform policy recommendations to enhance credit accessibility for farmers in the region.

Keywords: *Credit Access, rural development, agricultural households.*

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1. INTRODUCTION

The industrialization and modernization of agriculture in Vietnam's rural areas are progressing rapidly across the country. This trend suggests that in the coming years, an influx of foreign investment and goods into Vietnam will be inevitable. However, prioritizing urban economic development without corresponding investments in rural economies could hinder the nation's broader industrialization and modernization goals.

In many developed countries, the financial system is characterized by the coexistence of both formal and informal financial sectors. The formal financial sector typically accounts for 30% to 80% of rural credit supply, yet access to formal credit remains limited for farmers globally - only 5% in Africa, 15% in Latin America, and 25% in Asia [8]. In Vietnam, approximately 15 million farming households constitute nearly 80% of the population, with more than half (6.7 million) classified as low-income. According to the 2019 survey on living standards in Vietnam, only 47% of households reported borrowing from formal financial institutions. This statistic underscores the underdevelopment of the rural credit market, despite agriculture employing nearly 80% of the labor force.

A robust rural credit system is crucial for improving socio-economic conditions in rural areas and meeting the capital needs necessary for economic activities that enhance rural livelihoods. The Vietnamese government's Decree No. 55/2015/ND-CP, dated April 12, 2010, emphasizes the importance of encouraging credit institutions to provide loans and investments in the agricultural and rural sectors [3]. This policy aims to facilitate economic restructuring, infrastructure development, poverty eradication, and the gradual improvement of living standards in these areas. The state's focus on enhancing formal credit access for rural households reflects its commitment to the overall development of agriculture and rural regions.

In Phu Giao district, there has been a recent trend toward expanding production and transitioning from traditional crops and livestock to those with higher commercial value. However, farmers in this district face significant challenges in accessing formal credit, primarily due to poverty and the inability to meet the basic requirements of credit institutions, such as collateral and clear loan purposes. Additionally, the loan amounts

available from credit institutions are often insufficient to support production needs.

This study aims to analyze the current state of credit access and the factors influencing farmers' ability to obtain formal credit in Phu Giao district. By identifying the barriers to credit access, the study seeks to propose solutions that enhance credit accessibility, making credit capital a driving force for economic development among farmers. Ultimately, the study intends to strengthen the relationship between banks and farmers, thereby contributing to the socio-economic development of the locality.

2. THEORETICAL BASIS AND LITERATURE REVIEW

The demand for credit and the accessibility of formal credit among households, as conceptualized by Stiglitz and Weiss [19] in the context of an imperfect credit market, suggests that credit distribution through non-price mechanisms is influenced not only by government interventions but also by the behaviors of lenders and borrowers in an environment characterized by asymmetric information. Diagne [4], in the context of the lifetime income hypothesis, posits that the gap between income and expenditure, and hence the propensity to save or borrow, is determined by households' optimal consumption choices within intertemporal budget constraints. When the present value of expected income is anticipated to rise, it is considered optimal to reduce savings; households may reduce assets or seek borrowing if assets are insufficient. Conversely, households are likely to save when future income is expected to decline. Kochar [9] further elaborates that income tends to follow a "hump-shaped" trajectory, being low during the early and later stages of life when individuals are partially or fully withdrawn from the labor market. This model predicts higher borrowing rates among younger households and increased saving behaviors among middle-aged households preparing for retirement.

Li, Gan, and Hu [10] argue that formal credit access is influenced not only by income and assets but also by the socio-economic characteristics of farmers, which reflect their credibility to lenders and, consequently, determine their access to formal credit. In the context of developing countries, the credit supply in rural areas, particularly formal credit, often falls short of demand, necessitating that lenders ration limited credit among borrowers. Credit rationing occurs when individuals are either unable to borrow or can only borrow less than the amount they request. According to Stiglitz and Weiss [19], the supply of formal credit is constrained by moral hazard and adverse selection issues in an environment of asymmetric information. Credit institutions typically prefer lending to individuals who are well-informed, trustworthy, and believed to utilize capital efficiently and repay their debts. The lack of information is a significant reason why lenders often fail to meet borrowers' needs [9]. Borrowers are considered credit-constrained when they cannot satisfy the lenders' requirements or when lenders cannot fulfill the borrowers' needs [7].

Hoff and Stiglitz [7] underscore the importance of borrower information in lenders' decision-making processes by highlighting the steps involved in assessing a loan applicant's creditworthiness. Lenders must evaluate various aspects of the applicant, including the loan's purpose, the ability to generate income, and the capacity to produce sufficient cash flow from household income and assets. Barslund and Tarp [11] further emphasize that credit transactions are based on observable characteristics. In addition to using the borrower's social relationships, credit institutions consider household characteristics when evaluating loan applications. Asymmetric information, combined with transaction costs, often leads credit institutions to restrict credit access for many applicants. The difficulty of obtaining accurate information and controlling debt repayment increases as the geographical distance between credit institutions and borrowers grows. When lenders are closer to borrowers, they have a better understanding of the borrowers' creditworthiness; when information is lacking, lenders select borrowers based on predetermined criteria, creating barriers that many borrowers cannot overcome, leading to the rejection of their loan requests.

In Vietnam, several factors have been identified as influencing credit access, including the educational level of the household head, land area, household income, collateral assets, and loan purposes, all of which affect the amount of credit available to rural farmers. Additional factors such as labor force, income, loan purposes, interest rates, savings, loan procedures, and collateral assets also play significant roles. State policies, including time spent in the profession (production experience), household loan interest rates, and the frequency of loan transactions with credit institutions, are also important determinants of credit access [1, 5, 6, 14, 15, 17, 18]. Moreover, research indicates that the rural credit market is often constrained by issues related to property

ownership rights and high transaction costs. Despite these challenges, some farmers continue to engage in small-scale production for both consumption and trade purposes [12]. Credit remains a vital tool for increasing household income by providing the financial resources necessary to enhance production capacity [13].

Mahmoud et al. [12] found that lending interest rates negatively impact access to and utilization of funds from formal credit sources or debt relief and poverty reduction programs. In the informal sector, households with better education tend to have lower credit demand, while a larger number of dependents and a history of bad credit increase the demand for informal household credit. The study also highlights that land is a statistically significant determinant of overall credit demand, as formal credit is primarily aimed at production purposes and asset management [16].

3. RESEARCH METHOD

3.1. Data Collection

The primary data for this study were collected through focused group discussions and direct interviews with officials and staff from the local Department of Labor and Social Affairs, commune or ward representatives, and branch managers of banks. A structured questionnaire was employed to gather essential information regarding the current status of credit provision to farmers at formal credit institutions in Phu Giao district. Additionally, expert surveys were conducted to assess the feasibility of the proposed solutions.

The sample size for the sociological survey was determined using the formula provided by Cochran [2], which is designed to estimate a proportion when the population size is unknown.

$$n = z^2_{1-\alpha/2} * P(1-P)/d^2$$

P: estimated proportion of households accessing loan capital

d: desired absolute accuracy, usually taken as d = 0.05 (5%)

Z: corresponding to the desired statistical significance level, usually taking 95% - 95% CI, 2-side test Z = 1.96

Since the estimation only has 40% of households capable of accessing loan capital, the minimum sample size is n = 1.96 * 0.4 * 0.6 / 0.052 = 188 research samples. To ensure the research objective as well as the existing survey list, the study selects 320 samples.

Farmers in the district were interviewed directly using a pre-structured questionnaire designed to collect detailed information for the study. The questionnaire covered a range of topics including demographic characteristics of the households, such as ethnicity, age, gender, education level, and number of dependents. It also addressed land-related factors, including certified land use rights and land area. Additional information collected encompassed labor force, credit relationships, loan purposes, average income, application of scientific and technological advancements, participation in savings groups, loan terms, bank interest rates, transaction costs, credit application procedures, the amount of credit requested and received, and challenges encountered when borrowing from credit institutions.

The primary data, after processing, are input into a binary logistic regression model to test hypotheses regarding the relationships between the dependent variable and the independent variables. The dependent variable in this model is binary, indicating whether or not a loan is received from formal credit sources. The regression model is specified as follows:

$$\log_e\left(\frac{P(Y=1)}{P(Y=0)}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \ldots + \beta_n X_n$$

Since the dependent variable is a binary variable with two values, 1 and 0, the appropriate research model is Binary Logistic regression. Y: The dependent variable has two states (0,1); X1, X2...Xi are the values of the independent variables; β_0 is the estimated value of Y when the variables X have a value of 0; β_i are the regression coefficients; u is the residual.

Table 1. Construction of the research scale

Research variables	Definition of the scale	Expected sign	Reference source
Dependent variable			
TCAN (Y)	This variable is a dummy variable, 1 indicating receipt of a loan and 0 indicating no loan received.		[1, 8, 11]
Independent variable			
GTINH (X1)	Dummy variable, 1=male, 0=female		[14-16]
DTOC (X2)	Dummy variable, 1=ethnic minority, 0=ethnic majority	+	[15]
TUOI (X3)	Age of the household (years).	+	[5, 6, 15]

TRDO (X4)	Number of years of education of the household head (years)	+	[8, 11, 14, 15]
THNHAP (X5)	Average monthly household income (unit: thousand dong)	+	[1, 11, 14, 15]
LDONG (X6)	Average monthly household income per person (persons/household)	+	[14, 15, 17]
PTHUOC (X7)	Number of non-working individuals (persons/household)	+	[11, 14, 15]
TSAN (X8)	Value of collateral for bank loans	+	[15 - 18]
DTICH (X9)	Includes the area of residential property and agricultural land (m^2)	+	[14, 15]
KYHAN (X10)	Loan term includes 6 months, 12 months, and 24 months	+	[15, 17]
LSUAT (X11)	The interest rate for loans based on different terms (%/year)	-	[8, 11, 14, 16]
TKIEM (X12)	Participation in savings association, 1=participating, 0=not participating	+	[10]
TTUC (X13)	Dummy variable for credit application procedures: 1 = streamlined procedures, 0 = cumbersome procedures.	+	[15, 18]
CPGDICH (X14)	Transaction costs at banks, 1= reasonable, 0= unreasonable	-	[8]
CNGHE (X15)	Application of scientific and technological advancements in production, 1= high level, 0= low level	+	[11]
QHTDUNG (X16)	Borrowing relationships with other credit institutions, 1= yes, 0=no.	+	[1, 11]
MDICH (X17)	Purpose of loan capital utilization, 1 = agricultural production loan, 0 = business loan.	+	[14, 15, 17]

Source: from previous studies

3.2. Method of data analysis implementation

The study utilizes a simultaneous combination of both Excel and SPSS 22 software for data cleaning and research data analysis.

This paper uses Binary logistic model to conduct the research, the Chi-square test is used to test the hypothesis Ho: p1= p2 = …. = pk = 0. Based on the significance level, SPSS provides in the Omnibus Tests of Model Coefficients table to decide whether to reject or accept H0.

Binary logistic regression requires testing the hypothesis that the regression coefficients are not equal to zero, implying that the probability of the event occurring differs from the probability of it not occurring. To assess the statistical significance of the overall regression model, the Wald Chi-Square statistic is used. A significance level of $p<0.05$ for the Wald test indicates the rejection of the null hypothesis that all regression coefficients are equal to zero.

The model's goodness of fit is evaluated using the -2 Log Likelihood (-2LL) criterion, where a smaller value signifies a better fit, with the minimum possible value of -2LL being 0, which denotes a perfect model fit. The Nagelkerke R-Square coefficient measures the proportion of variance in credit accessibility explained by the variables included in the model.

Additionally, the model's predictive performance is assessed through a classification table, which compares the actual and predicted values for each category, allowing for the evaluation of the overall prediction accuracy.

In logistic regression modeling, the Beta coefficients indicate the direction and magnitude of the impact of the factors on the dependent variable, which in this case is the credit accessibility of farmers at financial institutions in Phu Giao district. Factors with statistically significant values (significance < 0.1) contribute to explaining the model.

4. RESEARCH RESULTS

4.1. Research Tests

The test of the model's explanatory power is a method of predicting the probability of credit accessibility for the subjects under investigation, specifically for farmers in Phu Giao district.

Table 2. Research Model

Observation	Credit accessibility		Accuracy of forecasted results (%)
	Not eligible for borrowing	Eligible for borrowing	
Not eligible for a loan	133	6	95.7
Eligible for a loan	8	173	95.6
Accuracy of forecasted ratio			95.6

Source: self-computation

Among the 320 farmers with loan records in Phu Giao district, the model accurately predicted the likelihood of borrowing for 173 out of 181 surveyed subjects, achieving an accuracy rate of 95.6% (see Table 2). For the 133 out of 139 subjects who were not eligible for borrowing, the model's prediction accuracy was 95.7%. Overall, of the 350 farmers surveyed who engaged in loan transactions with credit institutions, 306 individuals were accurately predicted regarding their credit accessibility, resulting in a prediction accuracy of 95.6%. This high level of accuracy demonstrates the effectiveness of the logistic regression model in analyzing factors influencing farmers' access to loan capital in Phu Giao district.

The regression results presented in Table 3 indicate that the theoretical model identifies variables that significantly impact farmers' credit accessibility in Phu Giao district. The significance levels of these variables meet the statistical thresholds of 1%, 5%, and 10%. The Beta coefficients provided in the model elucidate the direction and magnitude of the impact of these factors on changes in the dependent variable.

Table 3. Research model regression results

No.	Factor	Beta	S.E.	Sig.	Exp (B)
1.	**GTINH** (X1)	-0.302	0.689	0.661	0.739
2.	**DTOC** (X2)	0.234	0.636	0.713	1.264
3.	**TUOI** (X3)	-0.111	0.045	0.013	0.895
4.	**TRDO** (X4)	0.619	0.169	0.000	1.857
5.	**THNHAP** (X5)	0.596	0.243	0.014	1.816
6.	**LDONG** (X6)	0.674	0.377	0.074	1.962
7.	**PTHUOC** (X7)	0.455	0.483	0.346	1.575
8.	**TSAN** (X8)	0.038	0.008	0.000	1.039
9.	**DTICH** (X9)	0.001	0.000	0.024	1.001
10.	**KYHAN** (X10)	0.356	0.150	0.018	1.427
11.	**LSUAT** (X11)	-609.695	221.086	0.006	0.000
12.	**TKIEM** (X12)	6.289	1.204	0.000	538.486
13.	**TTUC** (X13)	1.569	0.737	0.033	4.800
14.	**CPGDICH** (X14)	1.438	0.668	0.031	4.211
15.	**CNGHE** (X15)	1.232	0.637	0.053	3.429
16.	**QHTDUNG** (X16)	1.373	0.684	0.045	3.945
17.	**MDICH** (X17)	2.159	0.713	0.002	8.666
	Coefficient	30.092	19.126	0.116	1171
-2 Log likelihood: 87.062a					
Adjusted R-squared: 0.893					
Hosmer and Lemeshow Test: Chi-square = 1.718 (p = 0.988)					
Omnibus Tests of Model Coefficients: p = 0.000					

Source: research results from SPSS software

The results of binary logistic regression analysis with a sample of 320 households involved in loan transactions show that 14 out of 17 factors are statistically significant at the 1%, 5% and 10% levels.

The Interest Rate factor has the strongest negative impact on the credit accessibility of households (β11 = -609.695; 5%). This means that as the interest rate increases. the credit accessibility of households for loans from credit institutions decreases.

Savings Deposit has a positive relationship with the dependent variable of capital accessibility (β12 = 6.289; 1%). It can be observed that customers with savings deposits are more likely to borrow from banks.

The procedural factor of loan application positively impacts the credit accessibility of farmers. It can be observed that the more streamlined and simplified the procedures are. the easier it is for farmers to access loans (β13 = 1.569; 5%).

The purpose of borrowing has a positive impact on the credit accessibility of farmers (β17 = 2.159; 1%). Specifically. farmers who borrow for production and business purposes have a higher probability of accessing

loans compared to those who do not utilize borrowing for this purpose.

The reasonable transaction costs of banks make it easier for farmers in the area to access bank loans (β14 = 1.438; 5%).

Farmers who regularly participate in training or receive technology transfer have a higher probability of accessing loans (β15 = 1.232; 5%).

Farmers who have borrowing relationships with other credit institutions have a higher probability of accessing bank credit (β14 = 1.373; 5%).

Households with more labor tend to generate higher income. thus increasing their ability to access bank loans (β6 = 0.674; 1%).

Educational level has a positive impact on the dependent variable of the research model (β4 = 0.619. 1%).

Income has a positive relationship with the credit accessibility of farmers (β5 = 0.596; 1%).

Regular households often have a need for long-term loans. so it is understandable that customers borrowing from banks with terms exceeding 12 months is common (β10 = 0.356, 1%).

The older the farming households are. the more limited their capacity and business production mindset. making it more difficult for them to access bank loans (β3 = -0.111; 5%).

Higher collateral value usually makes it easier to access credit loans from banks (β8 = 0.038; 1%).

Land area has a positive relationship with the probability of farming households accessing loans (β9 = 0.001; 1%).

With an explanatory coefficient R^2 = 0.893 and the results of the analysis confirming that the research model on credit accessibility of farming households in Phu Giao district is quite appropriate and scientifically significant.

4.2. Discussion of research results

The research model is grounded in the theoretical framework of credit supply and asymmetric information theory in credit operations. A comprehensive review of relevant international studies includes works by Barslund and Tarp [11]; Ibrahim and Aliero [8]; Ololade and Olagunju [16]; Khoi [17]; and Anang et al. [1]. Additionally. domestic foundational research on factors influencing farmers' credit access has been examined. including studies by Nguyen Quoc Oanh and Pham Thi My Dung [15]; Anang et al. [1]; Barslund and Tarp [11]; Nguyen Dinh Khoi [17]; Nguyen Hong Thu [14]; and Phan Ngoc Bao Anh and Huynh Thi Cam Tho [18].

To identify the factors influencing farmers' credit access in Phu Giao district and the extent of their impact. this study employs the binary logistic regression model as described by Greene. The analysis. conducted on a sample of 320 borrowing households in Phu Giao district. reveals that 14 out of 17 factors are statistically significant at the 1%; 5% and 10% levels.

Among these 14 significant factors. 12 have a positive effect on farmers' credit accessibility from credit institutions. These factors include savings. loan purpose. application procedures. credit relationships. transaction costs. training and technology transfer. loan term. labor force. education level. income. collateral value. and land area.

The findings are similar to previous studies such as Nguyen Hong Thu's study on loan purpose, loan term and income [14]. In addition. some other factors such as education level. collateral value. and land area are similar to the studies of Nguyen Dinh Khoi [17]; Phan Bao Anh and Huynh Thi Cam Tho [18].

Conversely. the loan interest rate and the age of farmers negatively impact the likelihood of accessing agricultural credit. The findings suggest that the research model effectively captures the determinants of credit accessibility for farmers in Phu Giao district and possesses both scientific and practical relevance.

5. CONCLUSION AND POLICY IMPLICATIONS

This study identifies 14 out of 17 factors as significant barriers to farmers' access to credit in rural areas such as Phu Giao district. These barriers include both farmer-related factors such as age. gender. education level. labor force. dependents. and income status and institutional factors. including transaction costs and savings interest rates.

Based on these findings. Ceveral recommendations are proposed to improve credit accessibility for farmers. Firstly. adoption of innovative production models. Farmers should explore new production models. such as large-scale farming collaborations. By pooling land and resources to form extensive fields. farmers can enhance the efficiency of modern machinery and improve their production capabilities. Additionally. gaining expertise in rice cultivation. horticulture. and aquaculture through technical training offered by agricultural promotion centers will further benefit their operations.

Secondly. to mitigate the adverse effects of overproduction and price drops. Farmers should adopt cooperative production methods. This approach can enhance market participation and negotiating power. as well as build credibility with banks. Ensuring compliance with loan procedures and repayment schedules will help establish a reliable credit profile.

Thirdly. effective use of borrowed funds. fFrmers should use borrowed funds strictly for their intended purposes and establish a clear repayment plan from the outset. This plan will facilitate monitoring of repayment status. remaining debt. and interest payments. thereby improving financial management and efficiency.

Fourthly. strengthening bank relationships. Stablishing a good relationship with banks involves transparent disclosure of financial information. timely repayment of loans. and maintaining deposit accounts. Participation in community-based self-saving and capital assistance groups. such as Farmers' Associations or Youth Unions. can also strengthen credit profiles.

Fifthly. improving credit policies and procedures. Credit institutions should revise their policies to offer more flexible interest rates and simplify procedures to better accommodate farmers' needs. Educating farmers about lending activities and establishing customer care groups can help alleviate concerns and promote borrowing.

Sixth. simplification of loan procedures. Simplifying and expediting confirmation and notarization procedures will reduce waiting times and enhance farmer satisfaction. Reducing reliance on collateral by exploring alternative guarantees. such as associations or groups. can also facilitate access to credit.

Seventh. expansion of transaction offices. Increasing the number of transaction offices in rural areas will provide farmers with better access to capital. supporting the development of the rural agricultural economy and ensuring adequate production financing.

Next. policy attention and local support. Local authorities should streamline loan procedures and provide technical support for agricultural and livestock farming. Promoting successful production models and organizing training sessions can enhance local economic development. Regular meetings between farmers and bank officials can help assess capital needs and address loan application concerns.

Finally. strengthening local relationships. Enhancing collaboration with local authorities and organizations will enable credit institutions to manage a broad geographical area effectively. thereby benefiting both the institutions and the farmers they serve.

These recommendations aim to address the barriers identified in the study and improve the overall accessibility of credit for farmers in Phu Giao district. thereby contributing to the sustainable development of the agricultural sector.

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