

Factors that Determine Farmers' Access to Credit: Insights from Farmers in Kosovo

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Abstract: - This study analyses the determinants of access to credit: Results from five regions of Kosovo (Prishtina, Prizreni, Peja, Gjilani, and Mitrovica). The data at the farm level will be collected between March and July 2023. A sample of 350 farms was selected for the survey using a multi-stage random sampling method. This study used a linear regression model, frequency counts, chi-square tests, and percentages to analyze the data. Access to agricultural credit is relatively low in Kosovo. The results of the study show that the interest rate is the most important factor when it comes to obtaining a loan from farmers, while land ownership has a negative association and reduces the constraints in accessing credit. The results of this study also show that institutional lenders prefer agricultural credit to educated and young farmers to allocate resources efficiently as they are more inclined to adopt new agricultural technologies to improve agricultural production.

Key-Words: - agriculture, credit, interest rate, competition, farmers, institution lenders, Kosovo

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1 Introduction

Access to agricultural credit is still a challenge in developing countries. The inadequate financing of agriculture prevents producers from acquiring the modern technologies that are essential for the development of their activity.

Agriculture must be a key sector of the Kosovar economy. This sector is considered the most important source of food, employment, and income. The agricultural sector contributes almost 7% to the gross domestic product [1] and creates more than 40% of jobs. Due to its importance, public institutions have declared the development of the country's agriculture a national priority, especially the previously neglected food sectors.

However, the productivity of the agricultural sector in Kosovo is still very low. Poor equipment and outdated machinery are the biggest obstacles to increasing labor productivity, [2]. Large areas of arable land have remained unused. The improvement in agricultural productivity in the post-war years (2000-2022) was disappointing. Although the level of agricultural productivity in Kosovo has increased, it still lags far behind that of European countries.

However, forecasts show that the next decade will be characterized by rapid population growth, rising incomes, and urbanisation, which will

increase the pressure on the demand for food. Recent production lines clearly show that this growing demand cannot be met, [3]. These stylized facts present the challenge of improving global agricultural productivity.

The empirical literature identifies several factors that can explain low productivity. Since [4], it has been shown that credit is the key to improving agricultural productivity. The low productivity of smallholder farmers is seen as a consequence of credit constraints. Theoretically, credit constraints hurt agricultural productivity.

Poor farmers without sufficient collateral are usually excluded from formal financial services because the high transaction costs and information asymmetries increase the reluctance of formal banks to offer them these financial services, [5]. As a result, most poor smallholder farmers are often unable to invest in new technologies or in the purchase of inputs such as fertilizers, improved seeds, etc., [6], [7], [8]. For [9], loans allow producers to have the necessary funds to cover the financing needs of the production cycle. This agricultural production cycle is particularly long due to the period between sowing and harvesting. The availability of credit enables higher consumption and better utilization of purchased inputs, which increases farmers' production and thus their income.

2 Literature Reviews

Based on the fact that about 61% of Kosovo's population lives in rural areas, we can say that the agricultural sector is considered a sector with a fundamental impact on poverty reduction, [10].

Within the agricultural financing mechanism, credit is increasingly accepted as an effective tool to lift the rural poor out of extreme poverty, [11]. It plays a crucial role in increasing agricultural productivity through the creation of productive assets, [12]. It also enables smallholder farmers to invest in soil improvement and introduce new agricultural technologies such as high-yielding seeds and fertilizers that increase their efficiency and income, [13]. Credit improves the welfare of the rural poor by financing consumption reducing the opportunity cost of high-value assets and introducing of labour-saving technologies, [14]. Credit also helps to reduce the vulnerability of the rural poor to shocks (floods, droughts, and other natural disasters) by reducing the costs incurred by farmers in coping with these shocks. It is therefore not surprising that much of the literature demonstrates the positive impact of producer access to credit on agricultural productivity, [15], [16], [17], although some studies show that this impact is sometimes limited, [18], [19]. Nevertheless, a number of recent studies question the many benefits of agricultural credit and show that the effects are not as predictable as one might think, [20], [21], [22]. [20] for example, come to the opposite conclusion and emphasize a negative impact of cash loans on productivity. [21] point out that credit enhancement measures are not sufficient to ensure higher productivity. Access to credit is also seen as an important tool to increase consumption and boost production, especially for poor households, [23], [24], [25], [26], [27]. This means that access to credit can significantly increase the ability of households to save little or nothing to meet their financial needs for agricultural inputs; especially agricultural inputs that are urgently needed to control weeds, pests, and diseases.

Various researchers in different regions investigated the impact of access to credit on agriculture and the factors that influence the provision of agricultural credit, [28], [29], [30], [31], [32]. They found that age, interest rate, transaction costs, distance of banks, complexity of the lending process, time delay in loan disbursement, and lack of collateral and guarantors have a significant negative impact on farmers' access to formal credit. Some studies suggest that smallholder farmers' limited access to credit is

mainly due to institutional constraints [33], [34], [35], [36].

3 The Research Methodology

The research methodology and methods were adapted to analyze the factors that influence access to credit for agriculture in Kosovo. Our research relied on data from primary sources that were either directly obtained or discovered, and from secondary sources that contain existing information.

Empirical Model

Linear regression was developed to derive results and draw conclusions. We used linear regression with multiple independent variables. This allowed us to assess the correlation between "Credit taking" (dependent variable) and "age", "education", "Farm size", "competition", "loan interest rate" and "conditions for taking credit" (independent variables). The aim of the study was to investigate and quantify the factors that influence the utilization of agricultural loans in Kosovo. The analysis was intended to shed light on the importance of the factors that play a role in lending in order to facilitate informed decision-making by stakeholders and guide appropriate action in local agricultural finance policy.

We used the generalized model to perform the linear regression analysis including the specified variables:

$$CT = X_0 + X_1A + X_2E + X_3FS + X_4C + X_5CI + X_6CC + \varepsilon$$

where:

CT – stands for Credit-taking

X1A – stands for Age

X2E – stands for Education

X3FS – stands for Farm size

X4C – stands for Competition

X5 CI - stands for Credit interest

X6CC – stands for Credit conditions

ε – Error term

These hypotheses were tested using the model described:

H0 (null hypothesis): The independent variables (A, E, FS, C, CI, and CC) either have no influence on credit taking or show no relationship with the included variables;

$$H0: X_0 = X_1 = X_2 = X_3 = X_4 = X_5 = X_6 = 0$$

H1 (alternative hypothesis): The independent variables (A, E, FS, C, CI, and CC) impact credit

taking, or there is a relationship between the included variables;

$H1: X_i \neq 0$, where $i=1,2,3,4,5,6$

The chi square test as part of the research, we have included two chi-square tests to assess whether there is a significant relationship or dependency between the variables:

1. Chi square test 1 – “Credit taking” and “increase in sales”
2. Chi Square test 2 – “Credit taking” and “increase in agricultural yield”

These tests were created by comparing observed and expected frequencies within the model:

$$X^2 = \sum(O_i - E_i)^2/E_i \quad [37].$$

Where:

O_i – stands for Observed values

E_i – stands for Expected values

Through the described model, this research was based on testing these hypotheses:

H_0 (Null Hypothesis): The increase in sales/agriculture yield is independent of access to credit;

$H_0: P > 0.05$

H_1 (Alternative Hypothesis): The increase in sales/agriculture yield is dependent on access to credit;

$H_1: P \leq 0.05$

4 Results and Discussion

The main objective of this study is to analyze the factors that determine farmers' access to credit in Kosovo. Descriptive statistics and linear regression analysis were used to analyze the determinants of credit constraints. "Age," "Education," "Farm size," "Competition," "Credit interest rate," and "Conditions for taking credit

CT- Credit taking (dependent variable) and X1- Age, X2- Education, X3- Farm size, X4- Competition, X5- Interest rate, X6- Credit conditions (independent variables);

4.1 Socio-economic Characteristics of the Respondents

The socio-economic characteristics of the respondents, including age, education level, household size, and farm size, are summarised in Table 1 (Appendix). Table 1 (Appendix) shows that farmers are on average 48.16 years old. This means that the majority of farmers in the study area are

middle-aged and have enough energy to cope with the challenges of agricultural production.

Table 1 (Appendix) Socio-economic characteristics of the farmers surveyed. As part of the linear regression model, an analysis was carried out with seven variables. In this context, "Credit taking" was selected as the dependent variable for farmers in Kosovo. This choice was determined by the research focus on improving the credit portfolio within the local agricultural sector. The remaining six variables "age", "education", "farm size", "competition", "loan interest rate" and "conditions" for taking credit were treated as independent variables in the analysis. Table 2 (Appendix) From the results we conclude that the model is effective. In this context, the coefficient of determination (R) indicates a robust relationship between credit taking and the independent variables: age, education, farm size, competition, credit interest rates, and credit terms. With an R value of 0.241, it indicates a significant correlation between these variables. To summarise, it can be said that borrowing in these businesses is explained to a considerable extent by the independent factors included in the model, as shown by the R-squared value of 58%. The remaining percentage represents factors that were not included in the model, Table 3 (Appendix).

The model with the included variables proved to be highly statistically significant, with a significance level of Sig = .000.

If we visualize the model using Table 1 (Appendix), we get:

$CT = 1.722 + 0.040X_1 - 0.062X_2 + 0.032X_3 + 0.050X_4 - 0.072X_5 + 0.012X_6$, we assume that the probability of credit approval for these farms is 17% if all variables are set to 0.

Table 4 (Appendix) shows that if variable X1 (age) is increased by 1 % and the other variables are held constant, credit taking in these businesses would probably increase by 40 %.

If variable X2 (education) increases by 1 % while holding the other variables constant, borrowing in these establishments is likely to increase by 62 %.

If the establishment size increases by 1 % while the other variables remain constant, borrowing in these establishments is likely to increase by 32.

If the variable X4 (competition) increases by 1 % while the other variables remain constant, borrowing in these establishments is expected to increase by 50 %. The significant and positive correlation between credit-taking and competition indicates that an increase in competition is likely to lead to an increase in lending. This correlation could be due to the fact that increased competition

stimulates growth in the sector and encourages credit institutions to develop policies favorable to farmers. This symbiotic relationship benefits both lenders, who realize higher profits, and farmers, who gain more investment opportunities through improved access to credit.

Should X5 (interest rate) increase by 1% while the other variables remain constant, the expected result is a 72% decrease in credit taking for these farms. The calculated relationship between these variables is negative but significant. This means that an increase in the interest rate is associated with a decrease in borrowing and vice versa. From this, it can be deduced that higher interest rates have a deterrent effect and discourage farmers from borrowing.

In the scenario in which X6 (credit conditions) increases by 1% while the other variables remain constant, the expected result is a 12% increase in credit taking for these farms. Although the relationship is positive, its significance is moderate. It seems that regardless of the general conditions for obtaining loans, the interest rate is a decisive factor. If the interest rate is considered inappropriate, it may be difficult for businesses to use bank loans as a source of financing for their business investments. After analyzing and processing the data, we conclude that when competition increases and credit conditions are favorable, farmers tend to improve their access to the credit portfolio, leading to increased borrowing. Conversely, this is not true for the interest rate, as an increase in the interest rate leads to less access to credit.

To summarise, both competition and interest rate, regardless of their specific relationships, show greater significance at the 0.001 level than the credit terms factor.

Next, we tested the chi-square in Table 5 (Appendix) to see whether "Credit taking" influenced the "increase in sales" of the farmers surveyed.
 $X = 15.33 \mid p = .000$

The calculated test statistic is 15.33, which indicates a considerable chi-square value that implies a remarkable discrepancy between the observed and expected frequencies.

With a p-value of 0.000, we reject the null hypothesis, as any value above 0.05 leads to the acceptance of H1 and the rejection of H0. Consequently, we claim that the escalation of agricultural sales is significantly dependent on borrowing. This assertion is logically consistent with the idea that an increase in financial resources directly leads to higher investment, production, and

sales, thus indirectly contributing to higher farm profitability.

The Figure 1 (Appendix) opposite provides a descriptive analysis of sales growth in two categories: Farms with credit and Farms without credit. Farms with credit reported a significant increase in sales, with only a minimal percentage of farmers with credit reporting otherwise. In contrast, farms without credit primarily struggled to increase their sales.

In Table 6 (Appendix), we tested the chi-square to see whether "Credit taking" influenced the "increase in agricultural yield" of the farmers surveyed.

$X = 11.59 \mid p = .003$

The calculated test statistic is 11.59, which indicates a considerable chi-square value that implies a remarkable discrepancy between the observed and expected frequencies.

With a p-value of 0.003, we reject the null hypothesis, as any value above 0.05 leads to the acceptance of H1 and the rejection of H0. This indicates that there is a remarkable and favorable relationship between the two variables. As borrowing increases, the rate of return also increases significantly. This correlation is consistent with the expectation that access to financial resources obtained through borrowing can contribute positively to agricultural activities and lead to higher returns. The strength of the correlation indicates a robust relationship, which supports the assumption that borrowing plays an important role in increasing agricultural productivity and yields.

The correlation between the relationship between borrowing and yields was illustrated in Figure 2 (Appendix). In general, it can be said that farms that had access to credit were able to increase their yields, while farms without credit had difficulties increasing their yields due to limited financial resources. In this question, the farms without credit are given greater consideration in order to emphasize the importance of access to credit for agricultural performance. This also explains the graphical results as, all other things being equal, the increase in yields is significantly higher for farms with credit.

5 Conclusion

This study analyses the factors that influence access to credit for agriculture in Kosovo. The results of the linear regression model indicate that age, education, farm size, competition, credit interest rate, and conditions for loan disbursement are the

most important factors for obtaining a loan from financial institutions. The study also concluded that there is a negative relationship between loan interest rates, which means that there is an inverse relationship with the demand for loans, i.e. when the interest rate decreases, the number of loans increases and vice versa. In our study, this shows a 12% increase in credit demand for a 1% decrease in the interest rate.

These factors therefore reduce the likelihood of rural households falling into distress. It is observed that institutional lenders generally favor well-educated and young farmers for financing. This could be due to the fact that they are able to properly utilize agricultural credit for agricultural production and are better motivated to adopt better and more modern agricultural practices.

We also confirm that the increase in agricultural sales is highly dependent on borrowing. This statement is logically consistent with the idea that an increase in financial resources directly leads to an increase in investment, production, and sales, and thus indirectly contributes to an increase in farm profitability.

Based on the results of this study, some suggestions are listed below

The short time taken to disburse the loans: The time taken to disburse the agricultural loan needs to be shortened. The time lag between the application for an agricultural loan and the actual approval should be shortened by simplifying the loan disbursement policy.

- Lenders should appropriately reduce the interest rate on agricultural credit and introduce a special interest subsidy policy for agriculture, as production profit is low and agriculture is the most important sector for economic development.
- Appropriate lending: The institutional sources must provide agricultural loans according to the needs of rural households. This is because if fewer credit are disbursed than demanded, rural households will not be able to carry out their agricultural activities to improve agricultural production.
- Appropriate credit is also necessary: Institutional resources must be sufficient to grant agricultural credit according to the needs of rural families. If more credit is granted, farmers will be able to carry out their agricultural activities for better agricultural production.

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Declaration of Generative AI and AI-assisted Technologies in the Writing Process

During the preparation of this work the authors used Grammarly/Chat GPT/Language Tool for language editing. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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Contribution of Individual Authors to the Creation of a Scientific Article

The authors equally contributed in the present research, at all stages from the formulation of the problem to the final findings and solution.

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Conflict of Interest

The authors have no conflicts of interest to declare.

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APPENDIX

Table 1. Socio-economic characteristics of the farmers surveyed

Variables	Std. Deviation	Mean
Age	11.769	48.16
Education	0.933	12.19
Experience	114.227	10
Household size	3.598	6.56
Farm size	0.97234	1.76

Table 2. Model Summary Linear Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.241	.058	.049	.469

Predictors: (Constant), age, education, farm size, competition, credit interest, credit conditions

Table 3. ANOVA Model

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	4.453	3	1.484	6.745	.000
Residual	72.174	328	.220		
Total	76.627	331			

a. Dependent Variable: Have you acquired a loan?

b. Predictors: (Constant), age, education, farm size, competition, credit interest, credit conditions

Table 4. Coefficients-Linear Regression

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta	T	Sig.	Lower Bound	Upper Bound
1 (Constant)	1.722	.078		21.981	.000	1.568	1.876
Age	.040	.005	.172	2.214	.001	.009	.070
Education	.062	.012	.218	2.263	.001	.020	.044
Farm size	.032	.041	.070	.788	.005	-.015	.039
Competition	.050	.015	.182	3.224	.001	.019	.080
Interest	-.072	.022	-.228	-3.273	.001	-.030	.054
Credit conditions	.012	.021	.040	.568	.571	-.115	-.029

a. Dependent Variable: Have you acquired a loan?

Table 5. Chi Square - Loans & Sales

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.337 ^a	2	.000
Likelihood Ratio	16.375	2	.000
N of Valid Cases	360		

a. 0 cells (0%) have expected count less than 5. The minimum expected count is 5.60

Table 6. Chi square - loans and yield

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.591 ^a	2	.003
Likelihood Ratio	12.765	2	.002
N of Valid Cases	360		

a. 1 cells (16.7%) have expected count less than 5. The min. expected count is 4.55

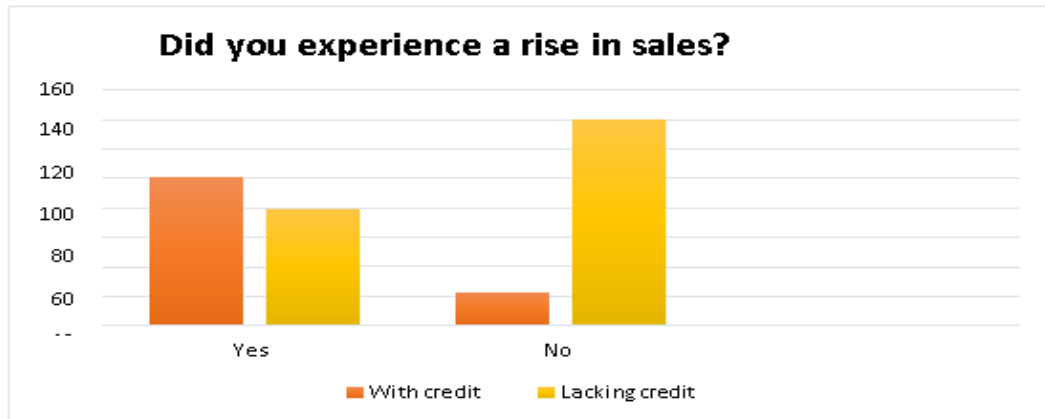


Fig. 1: Descriptive Analysis – Sales

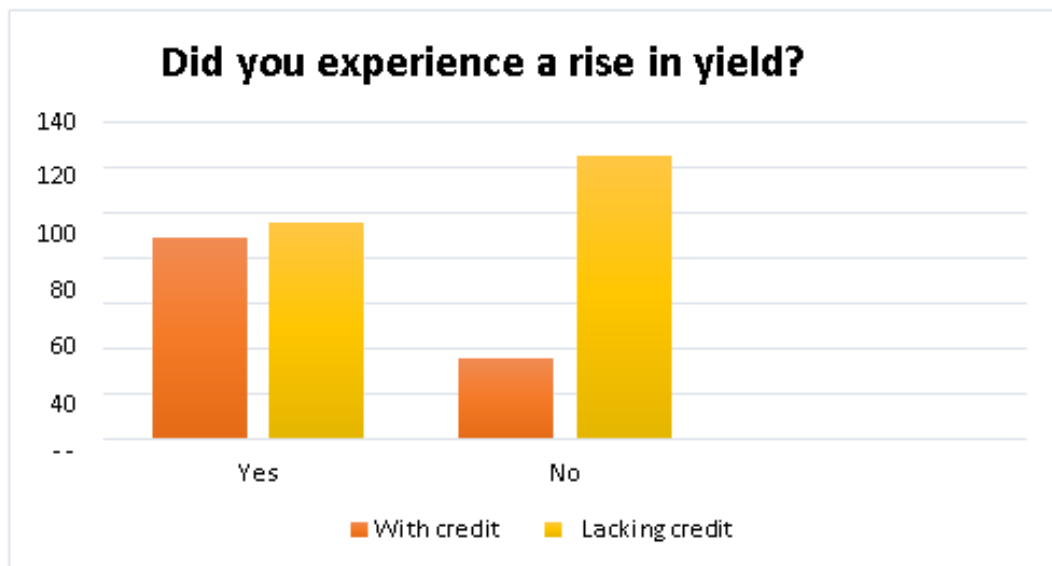


Fig. 2: Descriptive Analysis- yield