



Effect of Credit on Cassava Productivity in Kintampo South District Using Cobb-Douglas Production Function Model

Maxwell Amedi¹

Moses Dumayiri²

Mohammed Abdul-Rashid Suhuyini³



(✉ Corresponding Author)

¹ Food Security & Resilience Technical Program Manager, World Vision International, Ghana.

Email: maxzy5030@gmail.com

² Lecturer, Department of Banking and Finance, School of Business and Law, University of Development Studies, Ghana.

³ PhD Candidate, Department of Agricultural Economics, University of Development Studies, Ghana.

Abstract

The study estimated the effect of credit on cassava productivity in Kintampo South District using Cobb-Douglas Production function model. Primary data was collected from 60 small-scaled cassava farmers while secondary data was gathered from literature. Snowball sampling technique was used to obtain the sample size of 60 small-scaled cassava farmers. Data obtained were analyzed using descriptive statistics and Cobb-Douglas Production function model. Results from the study showed that majority of the farmer's accessed credit from VSLA groups. The study found that, credit has significant effect on cassava output level with an elasticity of 1.83 implying that a percentage increase in credit supply will lead to 1.83 % increase in cassava output. The study concludes that, the output of cassava could be increased considerably by obtaining credit. The study recommends the Ministry of Agriculture to use VSLA groups as vehicle of administering loans/credit to small-scaled farmers to increase productivity of farmers. Secondly, small-scaled farmers in Kintampo South District should be part of VSLA and other co-operate groups to acquire credit which will enable them purchase necessary input required for cassava farming activities.

Keywords: Cassava, Productivity, Credit, Cobb-Douglas production function model, Kintampo South District.

Citation | Maxwell Amedi; Moses Dumayiri; Mohammed Abdul-Rashid Suhuyini (2020). Effect of Credit on Cassava Productivity in Kintampo South District Using Cobb-Douglas Production Function Model. *Agriculture and Food Sciences Research*, 7(1): 16-21.

History:

Received: 11 November 2019

Revised: 16 December 2019

Accepted: 20 January 2020

Published: 19 February 2020

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Publisher: Asian Online Journal Publishing Group

Acknowledgement: All authors contributed to the conception and design of the study.

Funding: This study received no specific financial support.

Competing Interests: The authors declare that they have no conflict of interests.

Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study was reported; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained.

Ethical: This study follows all ethical practices during writing.

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Contribution of this paper to the literature

This study contributes to existing literature by estimating the effect of credit on cassava productivity in Kintampo South District using Cobb-Douglas Production function model.

1. Introduction

Cassava remains to be one of the most important crops grown in Ghana because of its adaptability to different ecological zones and its economic values [1]. Cassava farming creates employment for about 20% percent of the population in Ghana in different forms of livelihood activities and serves as a major source of income for households. In spite of the relevance to the economy, most farmers' find it difficult to access credit [2] to go into its production to ensure food security [3]. This is because generally agriculture cash flows are seasonal in nature (i.e. cash inflows and outflows seldom occur at the same time; therefore farmers are left with no option than getting external source of funding to meet their expenditures which they do not even get at all or record low yield [4]. Agricultural credit therefore plays short-circuiting role in individual savings process to increase investment in agriculture [5]. In a research done by Jan and Khan [4] and Sial, et al. [6] it came out clear that agricultural credit plays crucial role in procuring agricultural equipment's and machineries, purchase of raw materials, payment of wages, acquisition of farm inputs (stem, weedicide, pesticides, herbicides) to increase agricultural productivity.

In view of this, Government's strategy over the years to increase agriculture productivity and economic growth has been through agricultural programmes supported by the Government or donors [7]. Such programmes have overall goal of raising farmer-household income and reducing poverty through private sector-led and agribusiness development. Recent research by ISSER [8] revealed that the volume of credit given by bank in the Ghana is on decline whiles the non-agricultural sector is higher. From literature, the few studies that exist include; factors that influence demand of formal savings and lending facilities in Ghana by Aryeetey and Gockel [9] examination of credit supply from different sectors of the economy, agricultural credit and production response. In Kintampo South District limited or no empirical studies exist on the effect of credit on cassava productivity. The study therefore seeks to ascertain the effect of credit on cassava productivity. This paper, therefore intends to fill the knowledge gap. The relevance of this study cannot be over emphasized. It is hoped that the facts and findings of the study will be relevant to the district assembly, policy makers and other government and non-governmental organizations. The study will help provide a better understanding of whether credit has any impact on cassava productivity. Findings in the district will help in the design of policies that will alleviate poverty, reduce vulnerability, and improve household wellbeing. The study will also be very useful to the intellectual community as it adds to the available literature on the above subject matter.

2. Problem Statement

Cassava producers in the Kintampo South District are mostly small-scaled farmers. Most of these farmers cultivate land sizes not more than five acres. Farmers, therefore, can barely have surplus on their generated income and thus, save little or none for investment in their farm operations. Low savings among small-scaled farmers do not encourage major investment in agriculture in terms of mechanization and therefore contribute little output. Percentage credit provided by the Deposit Money Banks (DMB) to Cassava producers in the Kintampo South District has been on a persistent decline compared to the volume of credit to the non-agricultural sectors. District Farmers who are fortunate to receive credit from these commercial banks receive low amount which scarcely have the propensity to increase production. The tedious and bureaucratic procedures encountered by the farmers when accessing such credits from financial institutions in the Kintampo South District discourages farmers from taking credit. In spite of government efforts to facilitate credit deepening and credit widening among farmers through financial institutions, most farmers are restricted to accessing credit or shun completely from taking credit from formal financial institutions. They, therefore, rely primarily on informal credit sources that supply low amount.

These concerns raise the following research questions;

1. What proportions of small -scaled cassava farmers in Kintampo South District have access to credit from financial institutions?
2. Does credit for small scale-scale cassava farmers in Kintampo South District have any significant effect on their productivity?

2.1. Objectives of the Study

The objective of the study is to assess the effect of credit on cassava productivity in Kintampo South District of the Brong Ahafo Region of Ghana

2.2. Specific Objectives of the Study

1. To estimate the proportion of small scale cassava farmers in Kintampo South District those have access to credit from financial institutions.
2. To estimate the effect of credit on cassava productivity in the Kintampo South District.

3. Methodology

3.1. Theoretical Framework

The Cobb-Douglas production function of the form $Y = AD\alpha H\beta e\epsilon$ was also used to access the effect of credit on cassava output. This equation is widely used to represent the relationship of an output to inputs. The α , and β , are the output elasticity of the inputs and the ϵ is the error term.

The effect of Credit on cassava Output.

The Cobb-Douglas production function is employed to estimate the effect of credit on the production output by the small-scale cassava farmers in Kintampo South District. The Cobb-Douglas production function is of the form:

$$Y = AD\alpha H\beta L\gamma F\bar{a}$$

The production function is linearized to obtain:

$$\ln Y = \ln A + \alpha \ln D + \beta \ln H + \gamma \ln L + \bar{a} \ln F + \dot{Y} \dots\dots\dots(\text{Eqn -1})$$

Where;

Y denotes total production of cassava (Kg/acre).

D denotes credit (amount in GHS).

H denotes land (acres).

L denotes labour input (GHS).

F denotes Fertilizer inputs (Kg).

A denotes total factor productivity.

\dot{Y} denotes error term which accounts for the random disturbances.

α , β , γ , and \bar{a} are the parameters to be estimated.

The parameters α , β , γ , and \bar{a} are the output elasticities of credit, land, labour and fertilizer respectively. These values are constants determined by available technology. Output elasticity measures the responsiveness of output to a change in levels of credit, land, labour or fertilizer used in production, ceteris paribus. α , β , γ , and $\bar{a} > 0$, implying that, each of credit, land, labour, and fertilizer has positive correlation with output. The efficiency or the total productivity factor of the available technology will be shown by the constant intercept, A.

3.2. Methods of Analyses

Objective 1

In order to estimate the proportion of small scale cassava farmers in Kintampo South District that have access to credit from formal financial institutions, descriptive statistics was used to describe the proportion of farmers in the study area that are currently using credit from formal financial institutions. Percentages were mainly used to describe results and then presented in tabular form.

Objective 2

In order to assess the effect of credit on cassava productivity in the Kintampo South District Cobb-Douglas Production Function Model was used.

3.3. Sample Size and Sampling Technique

The Snowball sampling technique was used to obtain the sample size of 60 small- scaled cassava farmers. One of the small- scaled cassava farmers who was available and ready to speak to was first contacted. After answering my questions, he directed me to the next farmer who then also directed me to another farmer after responding to my questions till I had a total of 60 small-scale cassava farmers. Primary data was collected from the cassava farmers by administering structured questionnaires.

3.4. Method of Data Collection

Interviews using structured questionnaire were the main techniques used in the gathering the requisite data. Open and close-ended questions were used. Some of the information collected from farmers includes age, sex, marital status, level of education, household size and farming experience e.t.c. The open- ended questions were to bring out understanding of the situation on the ground.

3.5. Study Area

The study was conducted in Kintampo South District of Brong Ahafo Region of Ghana. Kintampo South District is a political and administrative entity which shares boundaries with Kintampo North Municipality to the north, to the south by Nkoranza and Techiman, to the east by Atebubu and Pru Districts and to the West by Wenchi Municipal. It lies within longitude 10° 20° West and 20° 10° East and latitude 80° 15° north and 70° 45° South. The District which is one of the 27 in Brong Ahafo has Jema as its capital with an estimated population of 6300 [10].

The District is mainly inhabited by the Mo and Bono together with a multiplicity of other ethnic groups such as the Dagaabas, Dagombas, frafra, Ashantis, Lobi and Wala in the district. The District has 122 communities many of which are hard to reach especially in the wet or rainy season. The district has three (3) major weekly markets located at Jema (Tuesday), Apesika (Thursday) and Anyima (Monday). These markets are patronised mainly by farmers and middlemen from Kintampo, Techiman, Tamale, Wenchi and other areas. Products sold at these markets are mainly food crops and household items.

4. Result and Discussions

4.1. Sex Distribution of Respondents

The Sex distribution of the respondents as indicated in Figure 1 revealed that, 67% of the farmers are males and 33% are females indicating that cassava farming in Kintampo South district is dominated by men. This agrees with the findings of Olaleye [11] that small scale farming are being carried out mostly by men while females involve in light farm operation such as weeding, processing and harvesting and marketing of cassava.

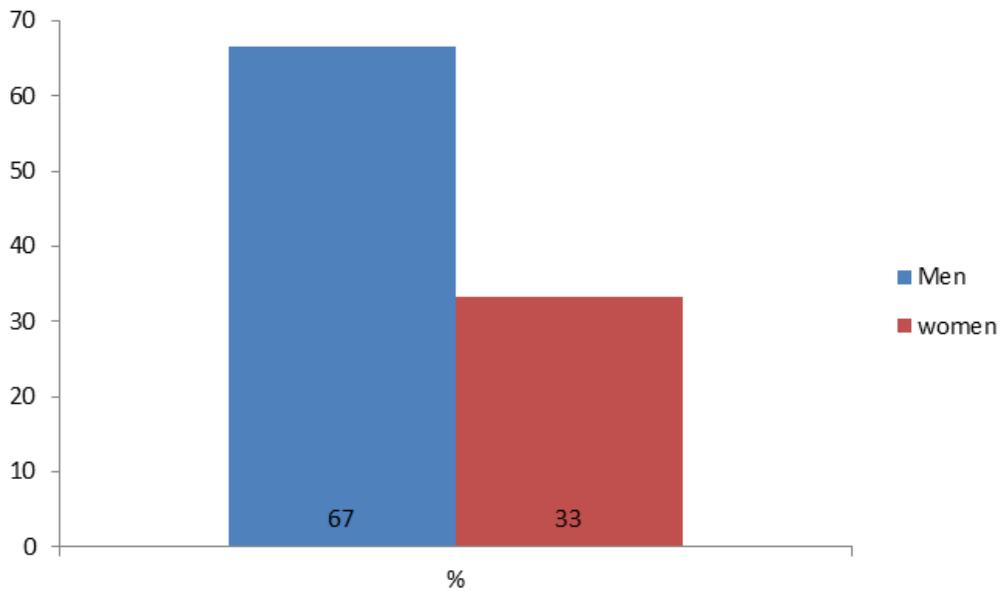


Figure-1. Sex distribution of respondents.

Source: Field survey, 2018.

4.2. Marital Status and Household Size of Respondents

The result from Table 1 shows that 58% of respondents are married and 20% are single whilst 22 % are widowed. About 23% of small scaled cassava farmers have household sizes between 0 and 5 whilst 13% of them have household size above 10 persons per family with majority of the farmers’ having household size between 5 and 10 representing 64%. This is consistent with Adebayo and Adeola [12] whose study also reveals that majority of the respondents have large family sizes which fall within the range of 6-10 persons per family.

Table-1. Households marital status.

Marital Status	Frequency	Percentage
Married	35	58.3
Single	12	20.0
Windowed	13	21.7
Total	60	100.0

Source: Field survey, 2018.

Table-2. Household sizes of cassava farmers.

Household Size	Frequency	Percentage
1-5	14	23.3
6-10	38	63.3
≥10	8	13.3
total	60	100.0

Source: Field survey, 2018.

Table-3. Age distribution of respondents.

Age	Frequency	Percentage
18-30	13	21.7
31-40	18	30.0
41-50	23	38.3
≥50	6	10.0
total	60	100.0

Source: Field survey, 2018.

Most of the small-scaled farmers are between the ages of 41-50 representing 38.3% as indicated in Table 3. The farmers above 50 years represent 10% of small-scaled cassava farmers sampled. Also 21.7% of the farmers are between 16-30 years whilst 30% are between 31-40 years. The economically active labour force engaged in small-scaled cassava farming at Kintampo South District is in the range of 31-50 representing 68.3% which is approx. 68%. This agrees with finding from MoFA [13] that 67% of similar age are engaged in small scaled cassava farming.

Table-4. Educational level of respondents.

Level	Frequency	Percentage
None	21	35
Primary	18	30
JHS/MSLC	15	25
SHS/TECH/VOC	6	10
total	60	100

Source: Field survey, 2018.

The result from Table 4 shows that 35% of the farmers engaged in small- scaled cassava farming do not have any formal education. About 30% had primary education whiles 25% had junior high school and middle school certificate examination. It was only 10% that had Senior secondary school education.

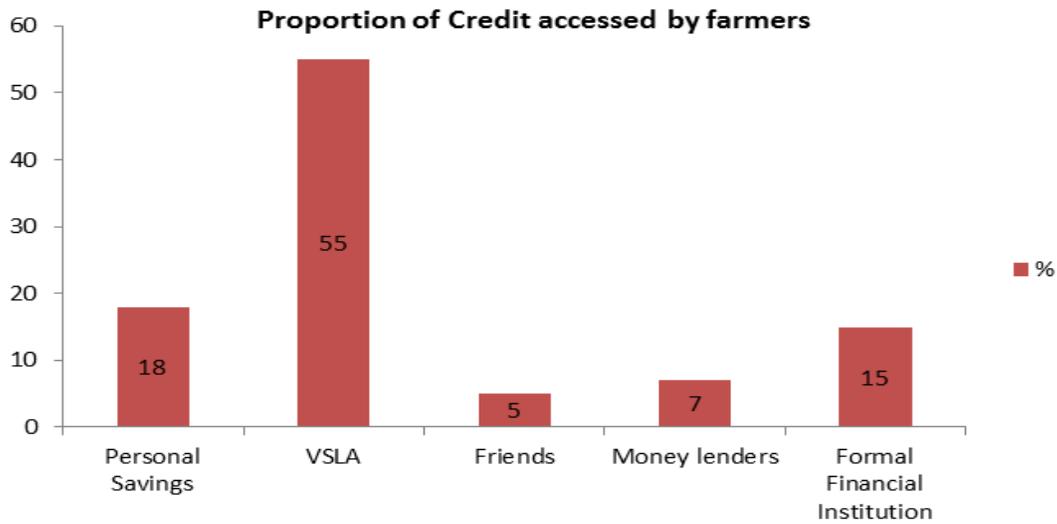


Figure-2. Proportion of small scale cassava farmers' who access credit from formal financial institutions. Source: Field survey, 2018.

From Figure 2, the main source of funding for small-scaled cassava farmers in Kintampo South District is through Village savings and Loans Associations (VSLA). The next available source of credit is from their personal savings. About 18% of farmers carry out their cassava farming activities using their own resources. About 5% of the respondents secure their credit from friends. The high percentage of farmers taking credit from the VSLA was evident from the field because most of them were members of VSLA groups and their participation was great. Beyond this, the high figure recorded stems from the fact that, is quite easier to borrow from the group and the interest on the loans will be shared back among members during share out session by close of the year.

4.3. Effect of Credit on Cassava Output

The Cobb-Douglas production function model was used to access the effect of credit on the output of cassava produced by the small-scaled cassava farmers. The estimated R-sqaure means that jointly, credit, labour; land fertilizer explained 70% of the total variation in the output of cassava produced. The estimated F- value also suggested that the joint effect of the explanatory variables included in the model is significant at 1% percent.

4.4. Results of the Linear Cobb- Douglass Production Function

Table-5. Results of effect of credit on cassava output.

Dependent variable: Log (Output)				
Method Least Square				
Sample (adjusted):660				
Included observation: 12 after adjustment				
Variables	Coefficient	Robust Std. Err	T	P> t
Log (credit)	1.830853	.0708182	2.58	0.0362**
Log (Fert)	0.250387	.721253	0.35	0.490
Log (Land)	0.341130	.725430	0.47	0.096
Log (Labour)	0.074659	.598665	0.125	0.722
C	-4.518687	3.900769	-1.158	0.083
Goodness of fit				
Number of obs = 60		Pseudo R ² = 0.807042		
Adjusted R-Square = 0.696781				
F (10, 110) = 2.83		Prob. > F = 0.012070		

Note: ***, **and * are significant at 1%, 5% and 10% respectively.

The output elasticity of credit was 1.83 implying that a percentage increase in credit supply will result in 1.83 percentage increase in cassava output. Those of fertilizer, land and labour were 0.25, 0.34 and 0.07 respectively. The magnitude of output elasticity of credit shows that under the circumstances and the existing system of cassava farming at Kintampo South District, credit supply will have a significant influence on output.

That is, the production of cassava is considerably responsive to credit. This implies that the output of cassava could be increased considerably by obtaining credit without necessarily increasing the land size, fertilizer application and hiring more labour since they were not statistically different from zero. The credit supply will enable the farmers to acquire the necessary inputs such as fertilizer, weedicides, improved planting materials and modern implements required for production expansion.

5. Conclusion

It is worth concluding from the study that;

- Majority of the small scale cassava farmers need credit to enhance their productive farming activities.
- The output of cassava is responsive to credit and the output could be increased significantly by obtaining credit without increasing land size, fertilizer and labour.

6. Recommendation

- Based on the findings from the study, the following recommendations are therefore suggested:
- The government through Ministry of Agriculture should use VSLA groups as vehicle of administering loans/credit to small scaled farmers to achieve high recovery rate and increase productivity of farmers.

- The small scaled farmers in Kintampo South District should be encouraged to be part of VSLA and other co-operate groups to enable them acquire credit which will enable them purchase the necessary input required to for cassava farming activities.

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