Determinants of productivity among credit beneficiary and non-credit beneficiary farmers in Ikwuano Local Government Area of Abia State, Nigeria

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Abstract
The study was conducted in Ikwuano Local Government Area (LGA) of Abia State, Nigeria. A multi-stage randomized sampling technique was adopted for selecting the towns and villages while a purposive technique was used to select the farmers. In the first stage, four (4) towns were randomly selected from Ikwuano Local Government Area of Abia State. In the second stage, two (2) villages were randomly selected from each town giving a total of eight (8) villages. In the third stage, twenty (20) farmers (10 using credit and 10 not using credit) were purposively selected from each village giving a total of eighty (80) respondents; 40 farmers using credit and 40 farmers not using credit. Data collected were analyzed using Ordinary Least Square (OLS) models and z- test. The results from the analyses show that some socio-economic variables such as gender, farming experience, farm size, agro chemicals, labour cost and extension services influenced productivity of the farmers. Farmers that used credits had higher productivity than farmers without credit as there was a significant difference between their productivities. Based on the findings, it is recommended that variables that influenced productivity should be considered in policy issues on credit to farmers in order to enhance productivity.

Key words: determinants, productivity, credit beneficiaries.

Introduction
In Nigeria between 70 to 80% of the population live in the rural areas and a vast majority of this population totally depends on agriculture for their livelihood (Ezeugo, 1998). Agriculture provides between 80 to 90% of the country's food needs (Odife, 2002) and supports more than 70% of Africa's population.

Agricultural production is strongly conditioned by the fact that inputs are transformed into outputs with considerable time lags, causing the rural farming households to adjust budgets. According to Olayemi (1998), credit involves all advances released for farmers use to satisfy needs at the appropriate time and returned later. Credit can be in the form of cash or kind, obtained either from formal or informal sources.

When liquidity is a binding constraint, the amounts and combinations of inputs used by a farmer may deviate from optimal levels that in turn limit the optimum production and consumption choices. The marginal contribution of credits therefore brings input levels closer to the optimal levels, thereby increasing yield and output. (Feder*etal*,1990).

Agricultural credit is considered as one of the strategic resources for pushing crop production to the high horizons consequently raise the living standards of our rural poor farming

community. Hence, it plays a pivotal role on development of the economy. It has mainly two (2) sources; Informal and Formal. Informal resources normally consist of commission agents, input providers, village shop keepers, friends and relatives. Out of these sources, credit from commission agents, shop keepers and input suppliers has more baneful effects on the rural poor. Evidence suggests that such loans further aggravate rural poverty as the effective rate of interest on the informal credit is exorbitantly high (Nasir, 2007)

It is a general practice that small growers obtain loan in the form of cash or inputs like seeds, fertilizers and pesticides. These are tied loans in the sense that the farm farmers obtaining them have to deliver their produce to these commission agents who offer price of their produce much lower than the market price.

Omobolanle (2010), using a study in Ogun state, Nigeria explained that access to microcredits could improve the productivity of farmers and contribute to uplifting the livelihoods of disadvantaged rural farming communities but that the farmers needed to be shrewd at the utilization of such credit facilities in other to achieve the goal of output maximization. It was further observed from the study that the beneficiaries of microcredit in the study area were more productive than the non-beneficiaries.

Access to credit and volume of credit are principal components of rural development which helps to attain rapid and sustainable growth of agriculture. Rural credit is a temporary substitute for personal savings, which catalyzes the process of agricultural production and productivity. To boost agricultural production and productivity, farmers have to use improved agricultural technologies. However, the adoption of modern technologies is relatively expensive and small farmers cannot afford to self finance as a result the utilization of agricultural technologies is very low. It is argued that enhanced provision of rural credit would accelerate agricultural production and productivity (Briquette, 1999).

Adeyemi (2008) observes that across the globe, governments of various developing countries have sought to provide finance to the poor through the creation of agricultural development banks, special lending schemes and the support of the growth of co-operative and other self-help groups (SHGs). Provision of credit to the less-privileged has been a wonderful instrument for the reduction of poverty in the world.

An important institutional constraint is the absence of a clear title to land. Group ownership of land in Nigeria has been associated with such problems as tenure security, restricting farmer's mobility and the inevitable fragmentation of holdings among future heirs. It may also limit access to formal credit, since the farmer cannot use land as collateral. This reduces the incentives to invest on land quality maintenance and improvement. Because poor farmers cannot obtain alternative farmlands, and do not have customary access to land not inherited, they remain on depleted land and further degrade these resources. Thus, poverty and custom can constrain farmers' ability and willingness to mitigate land degradation, leading to the declining productivity.In view of the fore going, it is necessary to examine the factors influencing productivity for credit user farmers and non credit user farmers.

Objectives of Study
The specific objective of the study is to:
estimate the determinants of productivity among the beneficiaries and non-beneficiaries of credit and examine effect of credit on productivity of the farmers.

Methodology

The study was conducted in Ikwuano Local Government Area (LGA) of Abia State, Nigeria. A multi-stage randomized sampling technique was adopted for selecting the towns and villages while purposive techniques was used to select the farmers.

In the first stage, four (4) towns were randomly selected from Ikwuano Local Government Area of Abia State.

In the second stage, two (2) villages were randomly selected from each town giving a total of eight (8) villages.

In the third stage, twenty (20) farmers (10 using credit and 10 not using credit) were purposively selected from each village giving a total of eighty (80) respondents; 40 farmers using credit and 40 farmers not using credit.

The objective of the studywas analyzed by the use of Ordinary Least Square(OLS) regression model for beneficiaries and non-beneficiaries. The model is implicitly specified thus

$$Q = (W_1, W_2, W_3, W_4, W_5, W_6, W_7, W_8, W_9,)$$
$$(i = 1, 2)$$

Where i= 1 for farmers using credit

i=2 for farmers not using credit

Q=Total Output (₦)/Total input (₦)

W_1 = Age (in years)

W_2 = Gender (dummy variable) 1=male, 0=female

W_3 = Educational Status (in years)

W_4 = Farming Experience (in years)

W_5 = Labour Cost (N)

W_6 = Farm Size (Hectares)

W_7 = Number of Extension contacts

W_8 = Fertilizer and Chemicals (₦)

W_9=Depreciation on capital inputs

To test for significant differencies between the two groups, the Z-Test statistics was used.

The model is specified thus

Z– test formula

$$Z = \frac{\overline{X_T} - \overline{X_C}}{\sqrt{\dfrac{Var_T}{n_T} + \dfrac{Var_C}{n_C}}}$$

where $\overline{X_T}$= productivity of beneficiaries

$\overline{X_C}$ = productivity of non-beneficiaries

Var_T = variance of beneficiaries

Var_C = variance of non-beneficiaries

n_T = numbers of beneficiaries

n_C= number of non-beneficiaries

Results and Discussion

Determinants of Total Factor Productivity among Respondents in the study area

The results in Table 1 shows the regression estimates of the determinants of total factor productivity among beneficiaries of credit in the study area.

Table 1: Regression Estimates of the Determinants of Total Factor Productivity among Beneficiaries of Credit in the Study Area.

Variable	Linear	Exponential +	Coubb Douglas	Semi-log
Constant	6.908	2.258	12.802	54.632
	(4.275)***	(4.215)***	(0.814)	(1.209)
Age	0.027	0.010	-1.650	-6.829
	(0.767)	(0.858)	(-0.632)	(0.910)
Gender	-2.458	-0.655	1.348	4.712
	(-2.050)**	(-1.647)*	(0.580)	(0.705)
Educational Status	-0.135	-0.037	5.069	-3.521
	(-0.378)	(-0.314)	(2.372)**	(-1.275)
Farming experience	-0.121	0.040	0.940	2.830
	(-2.150)**	(2.153)**	(0.597)	(1.706)*
Labour cost	-1.880	-6.341	-0.413	-1.782
	(-0.290)	(-0.295)	(-0.667)	(-1.001)
Farm size	0.316	0.099	1.376	1.507
	(1.778*)	(1.684)*	(3.318)***	(1.239)
No of Ext. contact	0.144	0.057	0.160	1.230
	(0.371)	(0.445)	(3.277)***	(5.002)***
Fert. And chem.	0.000	0.000	0.045	0.222
	(-3.178)***	(-3.445)***	(0.162)	(-0.279)
Changes of capital income	0.000	0.000	0.490	-2.242
	(-0.210)	(0.459)	(-0.580)	(-0.923)
R^2	0.783	0.770	0.467	0545
Adj R^2	0.458	0.426	0.323	0.478
F-ratio	2.408**	2.238**	2.750***	3.533***

Source: Survey Data, 2012.
+ = Lead equation, *, **, * is significant at 10%, 5% and 1% level of probability respectively**

Exponential functional form was chosen as the lead equation based on a high R^2 value, number of significant factors and agreement with a priori expectations. The R^2 value of 0.770 indicates 77% variation in productivity was explained by the independent variables. The F-value of 2.238 was significant indicating goodness of fit of the regression line.

The coefficient for gender was negatively signed and significant at 10% level of probability. This implies that the female respondents were more productive than their male counterparts. This may be true because the females were more resource efficient than their male counterparts.

The coefficient for farming experience was positively significant. This implies that any increase in farming experience will lead to a corresponding increase in productivity. The coefficient of farm size was positively signed and significant. This implies that any increase

in farm size led to a corresponding increase in productivity. This is expected and in accordance with *apriori* expectations(Briquette, 1999).

The coefficient for fertilizer and chemicals was negatively signed and significant at 1% level of probability. This implies that as costs are incurred in fertilizer and chemical use, productivity reduce (Omobolanle (2010), Feder*et al,* 1990).

Determinants of Productivity among Non-Beneficiaries of credit in the Study Area

The results in Table 2 shows the regression estimates of the determinants of productivity among cassava farmers

Table 2: Regression Estimates of the Determinants of Productivity among Non-Beneficiaries of Credit in the Study Area.

Variable	Linear	Exponential	Cobb Douglas	Semi-Log +
Constant	5.761	1.905	8.096	29.500
	(1.668*)	(3.291)***	(3.171)***	(2.035)**
Age	0.021	-0.005	-0.458	-0.557
	(0.279)	(-0.351)	(-0.951)	(-0.204)
Gender	-1.088	-0.112	-0.065	-1.119
	(-.0913)	(-0.562)	(-0.353)	(-1.065)
Educational Status	0.042	-0.019	-0.197	-0.263
	(0.207)	-(0.566)	(-1.034)	(-0.243)
Farming experience	1.725	0.256 (2.739)	0.253	1.616
	(2.082)**		(1.531)*	(1.722)**
Labour cost	0.000	-9.643	0.644	-3.209
	(-2.623)***	(-3.870)***	(-4.576)***	(-4.016)***
Farm size	-1.002	-0.80	7.424	0.005
	(-0.889)	(0.425)	(4.62)***	(2.742)***
Number of ext. contact	-0.042	0.023	0.033	0.428
	(-0.060)	(0.194)	(0.289)	(0.662)
Fertilizers and chemicals	0.289	5.319	0.710	2.548
	(2.362)**	(1.686*)	(2.013)	(3.303)***
Changes on capital inputs	-0.001	0.000	-0.077	-0.396
	(-0.488)	(0.780)	(-0.459)	(-0.413)
R^2	0.597	0.688	0.704	R2= 0656
Adj R^2	0.48900	0.515	0.548	Adj R2= 0.515
F-ratio	3.279(***)	2.108(**)	2.980***	F-ratio=2.579**

Source: Survey Data, 2012.

+ = Lead equation, *, **, * ** is significant at 10%, 5% and 1% level of probability respectively

The semi-log functional form was chosen as the lead equation based on high R^2 value, number of significant factors and agreement with *apriori*expectation.

The R^2 value of 0.656 indicates 65.6% variation in the productivity was explained by the independent variables in the model. The F-value was significant at 5% level of probability indicating a regression of best fit.

The coefficient for farming experience was positively signed and significant. This implies that any increase in farming experience will lead to increase in productivity. This is expected and in accordance with a priori expectation. Farmers who are experienced are expected to

make efficient use of resources of inputs for increased productivity.

The coefficient for cost of labour was negatively signed and highly significant. His implies that increase in cost of labour led to decrease in productivity it is expected and in accordance with *apriori* expectations probably because of non-access to labour as a result of high cost of labour in the study area.(Feder*etal,* 1990).

The coefficient of farm size was positively signed and highly significant. This implies that increase in farm size led to increase in productivity.

The coefficient for number of extension contact was positively signed and highly significant. This implies that extension contact led to increase in productivity. It is in agreement with *apriori* expectation probably because with more extension contacts, farmers have access to modern technology that will lead to increase in yield.

Z -test Analysis of Productivity Between Beneficiaries and Non Beneficiaries.

	Mean	Standard Development	Standard error	Z
Beneficiaries	4.3355	3.93408	0.62203	2.01
Non-Beneficiaries	4.1578	3.8166	0.6.340	

The Z-test analysis showed a mean productivity of 4.33t/ha and 4.15t/ha cassava for beneficiaries and non-beneficiaries of credit respectively. The Z-test of 2.01 was significant at 10% level indicating a significant difference between the productivity of cassava for beneficiaries and non-beneficiaries of credit in the study area.

The beneficiaries of credit were more productive than their non-beneficiary counterparts probably due to availability of credit which they utilized to enhance their output and hence productivity.

Conclusion

The study analyzed the productivity of cassava based small scale farmers in Ikwuano LGA, Abia state. The results showed some determinants of productivity among the beneficiaries and non beneficiaries of credit. The beneficiaries of credit were more productive than their non-beneficiary counterparts.

The beneficiaries of credit were more productive than their non-beneficiary counterparts. The beneficiaries of credit were more productive than their non-beneficiary counterparts. The significant variables both for the farmers using credit and those not using credit should be taken into policy consideration in order to guide intervention for the farmers. This is necessary to enhance productivity of small scale farmers.

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