Effects of credit rationing on the returns of poultry farmers in Ogun State, Nigeria

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Abstract

In Nigeria, agricultural credit has long been identified as a major input in the development of the agricultural sector. Thus, the study was carried out in order to examine the effects of credit rationing on the returns of poultry farmers in Ogun state, Nigeria. In the study, primary data obtained from 120 farmers through the use of questionnaires were used. The data were analysed using descriptive statistics, multinomial logit model and gross margin analysis. The result revealed that 59.22% of the sampled farmers obtained their capital from personal savings while 18.45% and 14.56% of them sourced theirs from cooperative organisations and banks, respectively. The study also affirmed that many of the farmers who source for credit outside their personal savings preferred getting credit from cooperative associations/savings associations because the source was less collateral-demanding, charges relatively lower interest rates, required bearable procedures and conditions for borrowing credit. The multinomial logit analysis showed that interest rate was significant at 5% level under cooperative/savings association sources. This implied that interest rate was a determining factor for sourcing credit from cooperative associations. The regression result also showed that interest rate on credit and distance of the farm households from credit source, contributed negatively, while gender and collateral contributed positively to the returns of poultry farmers. The result of the gross margin analysis showed that the total variable cost incurred by the farmers increased as the amount of credit/loan received increased. Hence, the informal finance providers were the backbone of small scale farmers. It is therefore recommended that the bureaucratic procedures for obtaining credit, from formal sources, should be made flexible enough to accommodate small scale farmers.

Keywords: Collateral, Credit Rationing, Finance, Interest rate, Multinomial-logit

Introduction

Agriculture is a major contributor to Nigeria's GDP and small-scale farmers play a dominant role in this contribution, but their productivity and growth are hindered by limited access to credit facilities (Rahji and Fakayode, 2009). Most developing countries depend on their agricultural sectors for economic growth, food security and poverty reduction, while some literature also suggest that gross domestic product (GDP) growth deriving from agriculture is twice as effective in reducing poverty compared to GDP growth associated with non-agricultural sectors (Miller *et al.*, 2010). However, agriculture in developing countries generates on the

average 29% of GDP and employs over 65% of the labour force (World Bank, 2008).

Agricultural credit is the present and temporary transfer of purchasing power from a person who owns it to a person who wants it, allowing the later opportunity to command another person's capital for agricultural purposes, but with confidence in his willingness and ability to repay at a specified future date with or without interest (Nwaru, 2011). In Nigeria, agricultural credit has long been identified as a major input in the development of the agricultural sector. Credit or loanable fund is considered to be more than just another resource like labour, land, equipment and

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raw materials, hence credit is viewed from its ability to energize or motivate other factors of production. It can make the latent potential of underused capacity function. In such situation, credit acts as a catalyst that activates the engine of growth, enables it to mobilize its inherent potentials and to advance in the planned or expected direction (Oladebo, 2008). The crucial role of credit in agricultural production and development can also be appraised from the perspective of the quantity of problems emanating from the lack of it. In modern farming business in Nigeria, provision of agricultural credit is not enough but efficient use of such credit has become an important factor in order to increase productivity. Employment generation in the small/micro-business is hinged on adequacy of investment outlay and working capital. Such capital is difficult to get in a low level income and poverty stricken society. Hence, loan advancement in such circumstance can assist micro entrepreneur to invest in income and employment generating activities. The formal credit institutions have not been supportive in meeting credit need of self-employed persons due to their stringent loan terms and conditions as well as the cumbersome loan application procedures. These formal institutional arrangements have constituted a major barrier to the growth of small-scale enterprises (Fasoranti *et al.*, 2006). Also, Rahji and Fakayode (2009) believed that agricultural credit access has particular salience in the context of agricultural and rural development in Nigeria as it has serious implication on farmers operation. Majority of smallholder farmers lack access to formal credit and this has continued to be a constraint limiting smallholders' ability to adopt agricultural technologies and increase productivity (Mohamed and Temu, 2008). Credit rationing can cause a

misallocation of resources in farm production. The misallocation of inputs in agricultural production may cause the credit rationed or constrained farmer to have lower profit than the credit unconstrained farmer (Carter, 1989; Feder *et al.*, 1990). In spite of the importance of loan in agricultural production, its acquisition and repayment are fraught with a number of problems especially in the small holder farm (Awoke, 2004). Institutional problems such as the lending conditions which limit access of investors to credit facilities have not been adequately addressed (Vargese, 2005). This is supported as part of the determinants of credit constraint by Hussain *et al.* (2008), who noted that a large majority of needy, willing and able to borrow farmers generally cannot avail agricultural credit because of procedural and bureaucratic lending process that favoured and thus skewed toward influential farmers in the rural sector. Therefore, the wedge between what credit providers are willing and able to lend causes credit rationing. In the light of this, the study tends to find answers to the following research questions: What are the different sources of credit available to poultry farmers in the study area? What factors influence rationing of credit among the poultry farmers? Does credit rationing affect the returns of credit constrained and unconstrained farmers? Therefore, the objective of this study was to examine the effects of credit rationing on the returns of poultry farmers in Ogun State, Nigeria.

Materials and methods

Study area

The study was conducted in Ogun State, one of the states in south west Nigeria. The state has 20 local government areas and has an estimated land area of about 16,409.26 square kilometers and a population of 3,728,098 (NPC, 2006). It is located on the coordinates 3.0°E to 5.0°E and latitudes

6.2°N to 7.8°N. It is bounded in the West by the Benin Republic, in the South by Lagos-State and the Atlantic Ocean, in the east by Ondo State and in the north by Oyo-State. The climate of Ogun state follows a tropical pattern with raining season starting around March/April and ending in October/November then followed by dry season which lasts for the rest of the year. The mean annual rainfall varies from 128mm in the southern parts of the state to 105mm in the northern areas. The average monthly temperature in the state ranges from 23°C in July to 32°C in February while relative humidity ranges between 76% and 95% during dry and wet seasons respectively. A purposive sampling technique was adopted for the study and it involved two stages. Firstly, two agricultural zones were selected from the four agricultural zones in the state because of the predominance of poultry production in these zones. Secondly, three Local Government Areas (LGAs) were selected from one of these two agricultural zones while two Local Government Areas (LGAs) were selected from the other being the highest poultry-producing local government areas in the zone. The questionnaires were administered to the farmers individually during group meetings. A total of one hundred and twenty questionnaires were administered while one hundred and three were completely filled.

Statistical analysis

Descriptive statistics such as means, frequency distribution and percentages which may be adequate for some exploratory studies were used to describe socio-economic characteristics of the farmers, sources of their agricultural credit, amount of credit applied for and received. Both descriptive and econometric techniques have been used in most past works involving credit rationing. The

descriptive method essentially involved the use of frequency distribution tables, while the econometric methods were used to measure empirically the relationship between the dependent variable and the identified explanatory variables.

Multinomial model

Multinomial logit regression is used when the dependent variable in question is nominal. Separate relative risk ratios are determined for all independent variables for each category of the independent variable with the exception of the comparison category of the dependent variable, which is omitted from the analysis. Relative risk ratios, the exponential beta coefficient, represent the change in the odds of being in the dependent variable category versus the comparison category associated with a one unit change on the independent variable.

Model

$$\Pr(y_i = j) = \frac{\exp(X_i \beta_j)}{1 + \sum_j^J \exp(X_i \beta_j)}$$

and

$$\Pr(y_i = 0) = \frac{1}{1 + \sum_j^J \exp(X_i \beta_j)}$$

Where for the i th individual, y_i is the observed outcome and x_i is a vector of explanatory variables. The unknown parameters β_j are typically to be estimated by maximum likelihood. Therefore, for this study, the dependent variable D_{it} can take on one of j categories 1,2,3... k (the different alternative choices/sources of credit. Let $\Pr(D_{it} = M/X)$ be the probability of observing outcome M given X

$$\Pr(D_{it} = M/X) = \frac{\exp(\beta_0 + \beta_1 X_{2i} + \dots + \beta_k X_{ni})}{\sum_{j=1}^k \exp(\beta_{0j} + \beta_{1j} X_{2i} + \dots + \beta_{kj} X_{ni})}$$

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The relative preference of different credit sources were modelled as a function of socio-economic characteristics of farmers and other explanatory variables.

$$D_{it} = f(SEX_{it}, AGE_{it}, MST_{it}, EXP_{it}, INT_{it}, COLL_{it}, EDU_{it}, FWBC_{it}, FWAC_{it})$$

Where:

SEX = Gender (Female=0, Male=1)

AGE = Age (years)

MST = Marital status (Married 1: 0 otherwise)

EXP = Poultry farming experience (years)

INT = Interest rate (%)

COLL = (1 if required, 2 if not required)

EDU = Education (years)

FWBC = Farm worth before credit utilization (naira)

FWAC = Farm worth after credit utilization (naira)

From multinomial model assumption, dependent variables were defined to have more than two possible values. To estimate the parameters, those of the first choice category $j = 1$ to be all zero: $\alpha_1 = \alpha_{11} = \alpha_{kl}$.

Lastly, Gross Margin Analysis was applied to determine the level of return from different amounts of credit received. $GR = TR - TVC$

Where GR = Gross margin

TR = Total revenue

TVC = Total variable cost

Results and discussion

Table 1 presents the statistics of the socio-economic characteristics as well as inputs and output quantities of the respondents. It showed that the average age of respondents was 41 years which showed that on average, the farmers were adult individuals and still in their active and productive age. The average years spent on education was 14 years, which showed the farmers were educated individuals with post-secondary

education on average. The average flock size was 3674 birds. The farmer with the smallest number of birds had 100 while the one with the highest had 50,000 birds. The credit amount requested by the farmers from their various credit sources was ₦1,253,126.00 on average with the minimum being ₦0.00 for those that did not source for credit or requested but received nothing while the highest credit amount requested was ₦25,000,000. However, the average credit received was ₦1,063,107.00 which reveals that on average the farmers were being credit rationed. The minimum and maximum amounts received still being ₦0.00 and ₦25,000,000 respectively. The average unit cost of birds was ₦455.8252, the minimum unit cost being ₦15.00 for cockerels and maximum being ₦1000.00 for layers which were at their point of lay. The average cost of feeds per bag was ₦2,168.398, the minimum being ₦1,725 and the maximum, ₦2,450 while the average quantity of feeds used per year was 5039 bags. The unit price of eggs produced (per crate) was ₦534.077, the minimum being ₦0.00 for those not producing eggs and the maximum price per crate being ₦650.00 while the average quantity of eggs produced per year is 26,407 crates.

Amount of credit requested

Table 2 shows the distribution of respondents according to the amount of credit applied for from their respective sources of finance. It showed that 57.28% of the farmers did not apply for credit in the past one year for their production, 17.48% applied for credit below ₦1,000,000 (<1M), 16.5% of them did apply for credit between ₦1,000,000 and ₦5,000,000 (1-5M) while only 8.74% requested for credit above ₦5,000,000 (>5M) from their respective sources of finance.

Table 1: Descriptive Statistics of Farmers' Socio Economic Characteristics and Production

Variable	Observation	Mean	Std. Dev.	Min	Max
Age (years)	103	41.76699	11.30175	20	69
Education(years)	103	14.74757	3.286092	6	21
Flock Size	103	3674.369	6910.402	100	50,000
Credit requested(₦)	103	1253126	3431114	0	25,000,000
Credit received(₦)	103	1063107	3086712	0	25,000,000
Unit cost of birds(₦)	103	455.8252	362.1607	15	1,000
Unit cost of feeds(₦)	103	2168.398	120.9262	1725	2,450
Quantity of feeds/year	103	5039.272	9975.945	90	72,000
Price of eggs(₦)	103	534.0777	195.325	0	650
Quantity of eggs/year	103	26407.57	55794.34	0	396,000

Source: Field survey, 2014

Table 2: Distribution of respondents by amount of credit requested

Credit requested (M)	Frequency	Percentage (%)	Average Amount Req.
(No credit requested)	59	57.28	0
<1	18	17.48	530,555.6
1-5	17	16.50	2,500,000
>5	9	8.74	11,333,333
Total	103	100	

Source: Field survey, 2014.

Amount of credit received

The actual amount of credit granted to the farmers from their application in the last year of production is shown by Table 3 and it revealed that 58.25% of the farmers received no credit (which was higher than the initial 57.28% who did not apply for credit), 19.42% of them received below ₦1,000,000 (<1M) which was also higher than the 17.48% who actually

requested for credit below ₦1,000,000. Also, 20.39% of these farmers received credit between the range of N1,000,000 and ₦5,000,000, a percentage which was different from the actual 16.5% that applied for credit between this range and lastly, only 1.94% out of the 8.74% that applied for credit above ₦5,000,000 were indeed able to receive credit above the ₦5,000,000 each.

Table 3: Distribution of respondents by amount of credit received

Credit received	Frequency	Percentage (%)	Average Received
(No credit received)	60	58.25	0
<1M	20	19.42	390,000
1-5M	21	20.39	2,747,619
>5M	2	1.94	10,500,000
Total	103	100	

Source: Field survey, 2014.

Level of credit rationing

Table 4 reveals that majority of the farmers, 58.25% actually financed their production with their personal money or only sourced for credit from their friends and relatives in the last production year. Among those that

sourced for credit from financial organisations, 25.24% got credit below the amount they actually requested for which indicates that there was credit rationing while 16.51% were able to receive the amount of credit they requested.

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Table 4 Distribution of respondents by level of credit received

Credit received	Frequency	Percentage (%)
No credit (requested/received)	60	58.25
Below credit requested	26	25.24
Exact credit requested	17	16.51
Total	103	100

Source: Field survey, 2014.

Relative preference of different sources of credit by the farmers

The result of multinomial logit showed that interest rate was significant at 5% level under cooperative/savings association sources which showed that interest rate was a determining factor for sourcing for credit here. Also, among those who source for credit from government sources, age is an important factor which is significant at 10% level. The farmers who are still in their

active and productive age are more favoured by these finance providers. Farming experience is also significant at 5% probability level, which shows that farming experience is a determining factor of where the farmers source credit from while interest rate which is significant at 1% probability level under government credit sources, is an important factor determining the preference for this source of credit by the farmers.

Table 5: Relative preference of the Sources of Credit using Multinomial Logit

Banks Variables	Cooperative		Government		Coefficient	Probability
	Coefficient	Probability	Coefficient	Probability		
Sex	23.1271	1.000	-1.4337	0.406	-1.1189	0.521
Age	2.5358	0.999	-.0918	0.344	-.2089	0.072*
Marital Status	6.9264	1.000	-1.3964	0.391	2.4677	0.216
Farming exp.	-3.6282	0.999	.0504	0.642	.4079	0.018**
Interest rate	9.6363	0.997	3.0454	0.011**	3.4341	0.007***
Collateral	2.4559	1.000	.5130	0.884	2.9520	0.114
Education	13.3206	0.999	-.2301	0.320	-.0873	0.703
Farm worth A	-4.98e-06	1.000	-1.04e-07	0.543	2.19e-08	0.944
Farm worth B	5.52e-06	1.000	3.20e-07	0.232	-1.33e-06	0.278
Constant	-401.2072	0.998	4.3814	0.466	-4.1933	0.412

Source: Field survey, 2014.

Chi-squared= 185.89; Prob> chi2= 0.0000; Log likelihood= -16.10; Pseudo R. sq. = 0.8524;

*** Significant at 1%; ** Significant at 5%; *significant at 10%

Farm worth A = Farm worth before credit use; Farm worth B = Farm worth after credit use.

Factors influencing credit rationing among the farmers

The determinants of credit rationing among the poultry farmers in the area was carried out using logit regression model as specified in the methodology. The regression model as presented in table 6 produces a good fit for the data because the chi-square (0.0000) is statistically significant at 1% level. The marginal effect

also shows that the included variables explain 93% of the variation in the level of credit rationing among the farmers. The sign on each explanatory variable shows the effect of the variable on credit rationing among the respondents. The result shows that interest rate on credit and distance of the households from credit source, are negatively significant at 5% and 10% levels, respectively while sex and collateral

are positively significant at 10% and 5% levels, respectively. The negative and positive signs on the explanatory variables indicate inverse and direct relationships respectively with level of credit rationing. A lower interest rate increases the number of loan applicants and thereby increasing the probability of being credit-rationed, while only the credit-worthy applicants benefit most. The distance of households from credit source has a negative relationship with credit access. The farther away a credit source location is to the farm households, the more the inaccessibility of the household to such credit facility. This discourages farmers from sourcing for credit from such credit provider or even

prevents them from having access to such credit source. Therefore, a longer distance between farm household and credit source has a negative impact on credit accessibility. However, the result shows that collateral has a positive /direct relationship with credit rationing. The more the collateral required for obtaining credit, the higher the probability of being credit rationed. From the study, obtaining credit from formal sources (such as commercial banks, microfinance banks) require more collateral than obtaining it from informal sources (such as from friends and relatives, savings associations, money lenders). The result reveals also that sex is a significant variable determining credit rationing among the farmers.

Table 6: Factors Influencing Credit Rationing among the Farmers

Variables	dy/dx	Std. Err.	P> z
Sex	.12409	.07670	.106*
Age	-.0018	.00310	.547
Marital status	-.0428	.033020	.194
Household size	-.0203	.0130	.118
Education	.0070	.00750	.348
Main occupation	.0310	.02450	.206
Experience	.0061	.00400	.130
Flock size	-2.3e-06	.00000	.555
Interest rate	-.0123	.0061	0.042**
Collateral	.14517	.07050	.040**
Timelag	.01268	.01030	.219
Distance	-.0118	.00640	.063*

Source: Field survey, 2014.

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Marginal effects after logit: $y = \text{Pr}(\text{farmrst})$ (predict) = .9332280;

Number of obs.= 104; Prob>chi2 = 0.0000; *** 1%; ** 5%; and *10% significant, respectively

The influence of credit rationing on farmers returns

Gross margin analysis was used to determine the effect which credit rationing has on the returns the farmers made on their production. Table 7 shows the different levels of gross margin for the various amounts of loan obtained by the farmers. It showed that the total variable cost incurred by farmers increase as the amount of credit/loan received increases. The farmers who received higher amounts of credit were

able to invest more into their production and invariably made higher amounts in their returns which resulted in higher gross margin for them. The result showed that majority of the farmers were those who received/requested no loan, they had a gross margin of ₦102,145,000. Those who received below ₦1,000,000 had the lowest gross margin of ₦24,706,200 while those that got between ₦1,000,000 and ₦5,000,000 had the highest gross margin of ₦270,201,300. The group who received

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₦5, 000,000 and above had the lowest number of farmers, however, their gross margin of ₦123,745,800 was still higher than the gross margin of the first group with highest number of farmers. Therefore, the result suggests that (all things being equal)

the higher the amount of credit received by the farmers, the more they could invest in their production and the more their returns. Farmers with higher access to credit facilities therefore have higher returns on their productions.

Table 7: Influence of Credit Rationing on Farmers Returns

Production Items	0 (no loan)	<1 NM	1 NM -5 NM	>5 NM
Birds	36432700	9051000	89680000	55000000
Feeds	266995800	72948000	534396000	206824000
Vet.	4106000	950000	8812000	2960000
Water	314000	106000	808000	150000
Electricity	2567700	422600	2186700	475000
Transport	4094600	973000	5646000	760000
Family.lab	4932000	1536000	1080000	240000
Hired lab.	10423000	2530000	24000000	16512000
Others	1410400	135400	1271400	100000
TVC	331276200	88652000	667880100	283021000
Produce	0 (no loan)	<1 NM	1 NM-5M	>5 NM
Eggs	364754400	94243200	814044000	354646800
Spent Layers	57208050	15915000	119191000	51160000
Others	11458750	3200000	4846400	960000
TR	433421200	113358200	938081400	406766800
Credit Rationing Effect	0 (no loan)	<1 NM	1 NM-5 NM	>5 NM
TVC	331276200	88652000	667880100	283021000
TR	433421200	113358200	938081400	406766800
GM	102145000	24706200	270201300	123745800

Source: Field Survey, 2014.

- M= Million (Naira), all values are in naira.

Conclusion

The findings of this study revealed that majority of poultry farmers in Ogun state were males (72%) who were mostly in their economic active age and were educated, with 76% of them having tertiary education. At least, half of them had poultry farming as their main occupation while about half were engaged in poultry production as their secondary income-generating activity. Majority (70%) of the farmers were mainly egg-producing poultry while others combined egg production with broilers/cockerels production, but very few (14%) produced broilers/cockerels alone. The farmers generally had little access to credit. The

multinomial logit analysis of the relative preference of the different sources of credit to the farmers showed that interest rate was high. The farmers who were still in their active and productive age were favored by the finance providers.

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