DISCRIMINANT ANALYSIS OF LIVESTOCK FARMERS CREDIT WORTHINESS POTENTIALS UNDER RURAL BANKING SCHEME IN ABIA STATE, NIGERIA

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ABSTRACT

The study was designed to analyse the Livestock rural credit worthiness potentials under rural banking scheme in Abia State. Data were collected from 62 Livestock rural credit beneficiaries. The data were analysed using the Discriminant function model. The differences between the credit worthy and non-credit worthy Livestock farmers were examined using their socio-economic characteristics. The result shows that farm income, value of assets, loan amount and total expenditure were the most valuable variables in determining Livestock farmers' credit worthiness potentials in the area. The classification performance of the model was 95.16% which is very adequate when compared with previous studies. Financial institutions in Abia State are strongly urged to pay strict attention to the above socio-economics variables of intending credit applicants in order to minimize default.

Key Words: Discriminant Analysis, Livestock Farmers, Credit Worthiness

INTRODUCTION

Livestock farmers play vital socio-economic roles in the Nigeria economy. These include the provision of meat, milk and eggs for human consumption, hides and skins for domestic industry. The continuous population growth, with the accompanying accelerated rural urban migration and the rise in living standards have caused enormous increases in the demand for livestock products (Mbanasor and Nwosu, 2003). Government neglect of the Livestock sector in Nigeria is usually reflected in the distribution of credit granted by public financial institutions which tend to focus more on arable crops and other industrial activities (CBN, 2005). Ijere and Mbanasor (1998) noted the indispensability of credit in rural Livestock production, and have identified it as a major factor to energize or motivate other factors of production. In other words credit acts as a catalyst or elixir that activates the engine of growth and enables other factors to mobilize their inherent potentials and, to advance the sector in the planned or expected direction. It follows therefore that the greater the influx of capital the more the propensity of the Livestock sector to move in its given path. Conversely, if the sector receives less than its due share of credit input, its potentials would become dormant.

However, it is regrettable that upon all the good government policies like rural banking programme, Agricultural Credit Guarantee Scheme, concessionary interest rate as well as portfolio prescription of loan designed to entice banks to lend to Livestock farmers, seem not to have yielded the desired results. As at 2007 the crop sub sector received about 84% of the amount of loans guaranteed to agriculture while the Livestock enterprises received about nine percent (CBN, 2006).

According to Usman (1999), most banks have described farmers as being non-credit worthy especially as they are in a habit of diverting the credit to unproductive sectors and social functions like marriages, parties and settling of debts. Thus Lending Agencies in Nigeria are faced with the teething problems of identifying credit worthy potentials in a sociological set-up where government properties and financial assistance are erroneously considered as share of National "cakes". Added to this problem is the inherent retrogressive banking bureaucracy in processing and disbursing of Livestock credit to farmers which constitute formidable economic impediments to successful credit utilization (Arene, 1993).

Governments in Nigeria have consolidated banks with great asset base of not less than N25 billion and with strict banking rules and regulations to ensure real banking business. Rural banks are expected to play this

role by ensuring a continuous flow of funds into the Livestock.

In order to strengthen the banks in achieving this objective in the face of competitive banking business requires minimization of losses arising from loan defaults, maintenance of high repayment rate among existing beneficiaries, as well as determining prompt and accurate detection of potential socio-economic features of bad debtors prior to the time credit is about being granted to them.

The study is designed to examine the socio-economic characteristics of Livestock farmers who are beneficiaries of rural banks credit in Abia State. The characteristics identified would be used in categorizing beneficiaries of Livestock credit into credit worthy potentials and Non-credit worthy potentials. This will enhance the influx of capital to Livestock farmers by the detection of bad debtors' socio-economic characteristics at the time of application.

METHODOLOGY

The study was conducted in Abia State, Nigeria. The State has an average population density of 364 per sq. km and comprises 17 Local Government Areas (LGAs). The State was divided into three agricultural zones namely Aba, Ohafia and Umuahia.

Data were collected from both primary and secondary sources. These were collected using two sets of structured questionnaires and information schedule for both the banks staff and Livestock farmers who were granted credit in 2006 Farming Seasons. The banks identified as at then were Union Bank PLC, First Banks PLC, Afribank PLC and United Bank for Africa PLC. The list of Livestock beneficiaries was collected from the banks in each of the zones namely, Aba, Ohafia and Umuahia. A total of 62 beneficiaries were randomly selected from the three zones.

Data Analysis

Discriminant function analysis was used to categorize the socio-economic characteristics of beneficiaries into two namely:- credit worthy potentials and non-credit worthy potentials. In this the beneficiaries were divided into two, credit worthy and non credit worthy beneficiaries based on "u" which is the repayment rate (%) of the beneficiaries.

U	$\geq$	50%	group I: Credit worthy Potentials
U	$<$	50%	group 2: Non-credit worthy potentials

The model classified the Livestock credit beneficiaries into the two groups according to previous studies (Arene, 1993, Agu, 1998, Eze, 2003)

The discriminant Linear model was specified thus:

$$Z = d_1x_1 + d_2x_2 \ldots dnxn$$

Where Z is the total score on the discriminant function.

$d_1, d_2 \ldots xn$ are discriminant coefficients

$x_1, x_2 \ldots xn$ are value of the discriminating variables used in the model

The independent variables used in the analysis were defined as follows:

X_1	=	Age (years)
X_2	=	Gender (1 for male, 0 for female)
X_3	=	Number of years spent in school
X_4	=	Farming experience (years)
X_5	=	Distance between home and Bank (km)

X_6 = Amount of loan obtained (N)
X_7 = farm Expenditure (N)
X_8 = Farm Income (N)
X_9 = Value of Assets (N)
X_{10} = Farm Size (Number of Livestock)
X_{11} = Expenditure / Income Ratio
X_{12} = Outstanding Debt / Asset ratio
X_{13} = Off Farm Income

The discriminant function is a statistical technique that classified an observation into one of several grouping based on observed individuals characteristics. The technique attempted to derive a linear combination of these socio-economic characteristics which "best" discriminated between the two groups. The importance of the derived discriminant function for the study was assessed using the squared canonical correlation, Wilk's Lambda and an associated chi-square statistics and the percent of Livestock credit beneficiaries correctly classified into group (Madukwe and Ayichi, 1997, Klecka, 1975).

RESULTS AND DISCUSSION

a. Determination of Credit Worthiness Potentials of Livestock borrowers

The result presented in Table 1 classifies the Livestock borrowers into credit worthiness and non credit worthiness using the discriminating powers of the independent variables included in the model.

Table 1: Standardized Canonical Discriminant Function Coefficients Among Livestock Borrowers

Variables	Discriminant Coefficients
Age X_1	0.01 (1.007)
Gender X_2	-0.195 (0.548)
Level of Education X_3	-0.016 (9.239)***
Farming ExperienceX_4	-.036 (23.713)***
Distance between home and source of loan X_5	-.377 (53.878)***
Loan Amount X_6	-0.450 (22.603)***
Total Expenditure X_7	-.111 (11.48)***
Farm Income X_8	.701 (3.911)**
Value of Assets X_9	0384 (8.09)***
Farm Size X_{10}	-0.756 (12.812)***
Total Expenditure/Total Asset ratio X_{11}	0.040 (1.08)
Outstanding loan/Total Asset ratio X_{12}	0.305 (.074)
Off-Farm Income X_{13}	0.914 (146.64)***
Group Centroids: Credit Worthiness Potentials 1.270	
Non-Credit Worthiness Potentials –3.652	

Source: Field Data, 2007
** Significant at 5%; *** Significant at 1% Figures in brackets are F values

The set of socio-economic characteristics involved in the study are Age, gender, educational level, farming experience, distance between home and source of loan, loan amount, total expenditure, farm income, value of assets, farm size, total expenditure / Asset ratio, outstanding loan to total asset ratio, and off-farm income.

The cut-off point for the purpose of classification was taken as the mid-point of total discriminant score for each of the groups because discriminant function model assumes equal cost of misclassification (Green and Tull, 1975, Arene, 1993).

The estimated function for the Livestock farmers using the stepwise discriminant analytical procedure identified only nine variables as being significant in discriminating between the two groups of livestock farmers. They are level of education, farming experience, distance between home and source of loan, loan among, total expenditure, farm income, value of assets, farm size and off-farm income.

The estimated centroid for credit worthy Livestock farmers was found to be 1.27 while that of non-credit worthy Livestock farmers was 3.65. This implies that the higher the composite score of any Livestock farmer, the higher the probability that the Livestock farmer will be classified as being credit worthy. While the lower the composite score of any livestock farmers, the higher the farmer will be classified as being non-credit worthy (Eze, 2003, Nwankwo, 2004).

b. Relative Contribution of the Significant Variable to the Total discriminant Score.

The percentage contribution of the significant variables to the total discriminant score is presented in Table 2.

Table 2: Contribution of Individual Variables to the Total Discriminant Scores.

Variables	Coefficients	Mean Differences	Product	% Contribution
Level of Education				
Farm Experience	-0.016	2.04	.033	<1
Distance	-0.076	12.38	0.446	<1
Loan Amount	-0.377	21.33	8.044	<1
Total Expenditure	-0.450	271945.69	122375.56	14.49
Farm Income	-0.111	466540.87	51786.04	6.13
Value of Asset	0.701	492589.13	345304.98	40.88
Farm Size	0.384	844107.61	324137.32	38.38
Off-farm Income	-0.756	1325.91	1002.39	1.18
	0.912	44.42	40.56	<1

Source: Field Data, 2007

The result shows that all the significant socio-economic characteristics in the model made relative contributions to the Livestock farmers' credit worthiness potentials. Value of Assets, Farm income and Off-farm income made positive significant contributions while level of education, farming experience, Distance between home and loan source, total expenditure and farm size made negative contributions to the total discriminant score. The positive signs obtained for farm income, value of assets and off-farm income suggests that a livestock farmer's chance of belonging to the group of credit worthy customers improves as his farm income, value of Assets and off-farm income increase. This is inconsonance with previous studies (Arene, 1993, Ezeh, 2003). Also the negative signs obtained for level of education, farming experience, Distance between home and source of loan, loan amount, total expenditure and farm size suggests that the Livestock farmers chances of belonging to the group of credit worthy Livestock farmers decreases as these variables are increased and also increases their chances of belonging to the group of non-credit worthy customers.

The result further shows that Farm income, Value of assets, loan amount and total expenditure accounted more to the total discriminant score with about 41%, 38%, 15% and 6% respectively. The implication is that they are the most valuable variables in determining loan applicants' credit worthiness potentials in the area.

c. Test of Significance for the Discriminant Function

The group means and differences in mean between the credit worthy and non-credit worthy beneficiaries are presented in Table 3. The result shows that credit worthy beneficiaries have more positive socio-economic characteristics than non-credit worthy beneficiaries.

The statistical test of significance of the estimated function shows a high canonical correlation coefficient of 0.910 and low Wilks' lambda value of 0.173. These values are indication that the discriminant function used in this study provided the high significant amount of information's required for determining credit worthiness of the Livestock farmers. The result provided a better test when compared with previous studies.

Table 3: Group Means, Mean difference and Test of Significance for the Discriminant Function

Variables	Credit Worthy Livestock Farmers	Non-Credit Worthy Livestock Farmers	Means Difference
X_1	46.8125	44.6957	2.1168
X_2	0.8125	0.7174	0.095
X_3	13.000	15.0435	2.0435
X_4	27.3750	15.0000	12.375
X_5	27.5000	6.1739	21.326
X_6	391250.00	119304.35	271945.69
X_7	667250.00	200709.13	466540.87
X_8	1028656.30	536067.17	492589.13
X_9	1563125.00	719017.39	844107.61
X_{10}	1689.6875	363.7826	1325.9047
X_{11}	0.7772	0.5612	0.216
X_{12}	0.4468	0.5228	-0.10932
X_{13}	36.1250	80.5435	-44.4189

Test of Significance	
Canonical correlation:	0.910
Wilk's Lambda	0.173
Chi-Square	93.99%***

Note *** **Significant at 1%**
Source: Field Data, 2007

Arene (1993), Onyenucheya (2005) and Ezé (2003). Also the Chi-square test was found to be significant at one percent implying that all the discriminant coefficients were not equal to zero, thereby confirming that the estimated function can be used to discriminate between credit worthy and non-credit worthy Livestock borrowers as originally defined.

d. Classification Performance of the Livestock Credit Beneficiaries

The result of the classification performance of the model is presented in Table 4.

Table 4: Classification Performance of the Estimated Discriminant Function

Actual Group	No. of Cases	Predicted group Membership	
		1	2
Group 1			
Credit Worthy Livestock Farmers	46	44 (95.65%)	2 (4.35%)
Group 2			
Non-Credit Worthy Livestock Farmers	16	1 (6.25%)	15 (93.75%)
Percentage of Group Cases correctly classified			95.16%

Source : Derived from Field Data, 2007

The result presented above shows how well the function used performed in classifying Livestock credit borrowers. The function was predicted using a fresh sample of 62 Livestock farmers. Since the focus of the model lies in its power to classify correctly, then the higher this rate is the better is the predictive power of the function.

Originally in using the repayment rate 46 were found to be credit worthy while 16 were found to be non-credit worthy. But on the application of the model, 45 borrowers were found to be credit worthy while 17 were found to be non-credit worthy. This kind of error constitutes the greatest risk in Livestock credit administration. Whereas the 6.25% misclassification of credit-worthy Livestock farmers for non-credit worthy will mainly affect interest earnings forgone, while 4.35% non-credit worthy classified as credit worthy Livestock farmers may default in the repayment of accruable interest as well as the principal loans. The implication of this may be high enough to reduce the amount of the loan available for other Livestock farmers in the area. More so, due to the dual nature of losses to rural banks, misclassification errors may lead eventually to loan shrinkage, ineffectiveness and liquidation. The classification performance of the function was 95.16% which is very adequate when compared with 75% obtained by Bauer and Jordan (1971), 74% recorded by Matiezo, 1978, 93.68% obtained by Arene (1993) and 75.6% obtained by Onyenucheya (2005).

CONCLUSION AND RECOMMENDATION

Credit worthiness of Livestock farmers in Nigeria has remained an intractable issue in Nigerian agriculture. The study has identified Livestock farmers credit worthiness as being directly related to some socioeconomic characteristics namely farm income, value of assets and amount of loan borrowed and inversely related to total expenditure and off-farm income. The most significant discriminator of credit worthiness among Livestock farmers is income. Considering the immense benefits that could be derived from a well administered Livestock credit, rural banks and other financial institutions are strongly urged to pay strict attention to the above socio-economic features of intending credit beneficiaries.

The Livestock farmers are also advised to increase their farm income level through efficient production and marketing systems so as to enhance their chances of securing Livestock credit.

Finally, financial institutions should consider re-structuring the contents of their application forms hitherto in use by placing more emphasis on these Livestock socio-economic features, as these are likely to improve the financial institutions' overall performance.

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