Economic Analysis of Return on Investment and Solvency of Small-Scale Agro-Processing Enterprises in Benue State, Nigeria

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Abstract
The study was carried out to assess the interactions between annual return on investment and solvency positions of small-scale agro-processing enterprises in Benue State, Nigeria. Data were collected by means of structured questionnaires. Data for the study were collected from a sample of 38 respondents selected through Multi-stage sampling technique. Descriptive statistics, financial ratios, multiple regression analyses were used for realizing the objectives of the study. F-statistics was used to test hypotheses of the study. The results revealed that, most (89.5%) of the agro–processing enterprises had annual return on the investment less than or equal to one (i.e ≤ 1.00) with the mean annual return on investment of 0.45kobo. Agro–processing enterprises that use cereals as their raw materials had the highest return on investment of 0.65kobo. This is followed by those that use fruits (0.48), root crops (0.23), and tuber crops (0.22). The coefficient of total revenue was significant at 1% and positively related to return on investment, while the coefficient of total fixed cost was significant at 5% and negatively related to return on investment. There was a significant difference (F = 2.596; P< 0.1) in the return on investment of agro–processing enterprises that use tuber crop, root crop, cereal crop, and fruit crop as raw materials. Majority (60.5%) of the agro–processing enterprises had solvency position less than or equal to 0.5 (i.e ≤ 0.5) with the mean solvency position of 2.73, indicating that on average, ₦ 2.73 of every Naira worth of assets owned by agro–processing enterprises was financed with borrowed money in 2021. In conclusion, Agro – processing in the study area is profitable with an average return of 45 kobo for every ₦1 invested. Based on the findings, the study recommended that efforts should be made for the agro–processors to come together and form cooperative societies in order to easily access available credit facilities for their processing business and policies that will ensure that soft loans or grants be made available to the agro–processors in order to increase their capital base, should be put in place.

Key words: *Return on Investment, Solvency, Agro-processing Enterprises, Benue State, Nigeria*

INTRODUCTION

In Nigeria, Over 80% of the population engages in agricultural activities such as arable, pastoral, fish and plantain farming. However, about 90% of Nigeria farmers engage in subsistence agriculture without adequate capital to expand their farms and store their farm produce after harvest so that agro-processing industries could access them all year around. Nigeria has the human and required material resources, relatively big market and energetic private sector that are suitable for the involvement of a strong industrial base for the long term growth and development (Dawanka and Sani, 2011). At the outset, domestic investment capital was very small and the indigenous private investors interested in large returns were pre-occupied with trading, transport and construction business (Central Bank of Nigeria (CBN), 2000). The agro-processing sector is by far the most significant component in the agro food industry. The processing industries serve as an important link between agriculture and industry (Angeline *et al.* 2015). This is because agro-processing makes agricultural products useable as food, fuel or industrial raw material (Mahmood, 2011). The conventional approach to a firm's performance assessment has been to emphasize profitability most frequently measured by return on investment (Ambler *et al*, 2004). Oluwasola and Ige (2015), however criticized the validity of this measure as the sole indicator of performance. It is believed that four major measures of performance exist and they are: solvency, liquidity, profitability and efficiency. Profitability is pertinent to enterprises, as it indicates to investors and financial market that a firm is worthy of funding through equity capital. Return on investment shows the ability of the company to measure the income generated on investment relative to the amount of money invested (Anthony *et al*, 2011).

Solvency reflects the company's ability to repay long-term obligations including principal payments and its benefits (Robinson, *et al.* 2015). Solvency is the state or ability of a firm to stay financially afloat (that is, the state of being liquid) meeting every financial obligation as they fall due without hindrance and the need to borrow further. Solvency is another word for liquidity and in the words of Vijayalakshmi and Srividya (2014), it is the lifeline of a business organization upon which its sustained growth depends. It is a proven fact over and throughout the entire history of business entrepreneurship that the overall success and continued sustenance of a business enterprise depends largely on the solvency status of the business (Krishnamoorthi, 2016).

Study Objectives

i. assess the annual return on investment of the agro-processing enterprises in the study area;
ii. determine the solvency position of the small-scale agro-processing enterprises;

Methodology

Study Area

The study was conducted in Benue State, Nigeria. Benue State was carved out of old Plateau State on 3rd February 1976 and is located in the North-Central geo-political zone.. The State lies between latitudes 6^0 25' and 8^0 8' North of the equator and longitudes 7^0 47' and 10^0 0' East of the Greenwich Meridian (Okwu et al, 2011). According to the National Population Commission of Nigeria (NPC, web 2022), National Bureau of Statistics (NBS 2022), the State has a population of 6,141,300 million (NPC 2022). Benue State occupies a land mass of 33,955 Square kilometres and it is divided into three agricultural zones.

Population of the Study

The population for this study comprised registered small-scale agro-processing enterprises in Benue state with particular interest in fruits, root and tuber and cereal based enterprises.

However, since it was impractical to study the entire populations, a sample of forty-two (42) registered enterprises were taken for the study using structured questionnaire

Sampling Technique and Data Collection

The Taro Yamane's formula (1967) as cited in Arumugam *et. al.* (2011) sample determination formula was employed to determine the sample size used for the study as shown below:

The formula was stated as: $n = \frac{N}{1+N(e^2)}$

Where;

n = sample size
N = population size
e = level of sampling significance (5% or 0.5)

From the sample population of forty-two (42) registered small-scale agro-processing enterprises, a confidence level of 95% and tolerable level of 5% was set. Using the Taro Yamene formula, the sample size was determined thus:

n = ?
N = 42
e = 5%
Therefore,

$$n = \frac{42}{1 + 42(0.05)^2}$$

$$n = \frac{42}{1 + 42(0.0025)}$$

$$n = \frac{42}{1.105}$$

$n = 38$

Structured questionnaires were used to collect primary data for the study.

Analytical Techniques

i. Descriptive Statistics

Descriptive statistics and financial ratios were used to analyze the data collected. The descriptive statistics were frequency, percentage, mean, while the financial analysis employed simple return on investment (ROI) and solvency ratio models to achieve objective (i) and (ii) of the study.

ii. Return on investment

To realize objective (i) of the study, return on investment model was used as specified as follows:

$$ROI = \frac{NP - TI}{TI}$$

Where,

ROI = return on investment
NP = Net profit
TI = Total investment

NP was computed as the difference between total revenue (TR) and total cost (TC).

The components of total cost are total fixed cost (TFC) and total variable cost (TVC)

The straight line method was used to depreciate the fixed assets.

iii. Solvency ratio of financial analysis.

To realize objective (ii) of the study, the solvency ratio of financial analysis was used. This study adopted the debt-to-asset ratio as a measure of solvency ratio. In line with the procedure adopted by Daryanto *et al* (2018), the technique was specified as follow:

$$DAR = \frac{\sum D}{\sum A}$$

Where,
DAR = debt-to-asset ratio of the agro-processing enterprises
ΣD = debt of the agro-processing enterprises
ΣA = assets of the agro-processing enterprises

iv. F-statistic of multiple regression analysis:

The F-test captured in the multiple regression analysis was used to test hypotheses of the study. Three different functional forms of multiple regression analyses were fitted and the best fit was selected to test hypotheses one to three. The functional forms are linear, semi-log and log.

Linear functional form:

$Y = bo + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + ui$ ……

Semi-log functional form:

$LogY = bo + b_1 logX_1 + b_2 logX_2 + b_3 logX_3 + b_4 logX_4 + b_5X_5 + b_6 logX_6 + ui$ ……

Double-log functional form:

$LogY = bo + b_1 logX_1 + b_2 logX_2 + b_3 logX_3 + b_4 logX_4 + b_5 logX_5 + b_6 logX_6 + ui$……

Exponential functional form:

$Log\ Y = bo + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + ui$ …….

Where,
Y_i = return on investment (₦), solvency status (%), ….Where Y_i=1,2,
X_1 = Age of agro-processors (years)
X_2 = Manager's Sex (1=male, 2=female)
X_3 = Manager's Education (number of years of formal education)
X_4 = Marital status (1=Married, 0 otherwise)
X_5 = Household size (Number)
X_6 = Agro-processing experience (years)
X_7 = Initial capital outlay (₦)
Ui = Error term

Results and Discussion

Annual Return on Investment of Agro – Processing Enterprises

The annual return on investment (RIO) of agro – processing enterprises in the study area are presented in Table 1. Analysis of the result shows that majority (89.5%) of the agro – processing enterprises in the study area had annual return on the investment less than or equal to one (i.e ≤ 1.00) with the mean annual return on investment of 0.45, indicating that on average, for every ₦1 invested in agro – processing a return of 45 kobo was realized. This implies that agro – processing in the study area was profitable. This conforms to the findings of Ani *et al*. (2019) who revealed that processing of cassava into garri, chips and fufu/ akpu was profitable in Benue state, Nigeria. The most profitable agro - processing enterprise had an annual return on investment of 1.83. The owner of this agro – processing enterprise is a 44 years old male, married with 10 persons in his household, had 13 years food processing experience and he processed paddy (rice). The owner also had undergone formal education and had spent 16 years in formal school. His start up amount was ₦ 1,811,210.

The least profitable agro – processing enterprises had an annual return on investment of – 0.72. The owner of this agro – processing enterprise who processed cassava, is 41 years old male, married with 8 persons in his household and had 9 years of food processing experience. The owner also had undergone formal education and had spent 12 years in formal school. His start up amount was ₦911,101.

Table 1: Annual return on investment of small-scale agro-processing enterprises in the study area (n = 38)

Variable	Frequency	Percentage	Mean	Minimum	Maximum
Annual Return on Investment(₦)			0.45	- 0.72	1.83
≤ 1.00	34	89.5			
1.01 – 1.41					
≥ 1.42	3	7.9			
	1	2.6			

Source: Field Survey Data, 2021

Determinants of Annual Return on Investment

Analysis of the determinants of annual return on investment of small – scale agro- processing enterprises in the study area are presented in Table 2. The multiple regression model was selected in the analysis of effect of socio – economic characteristics on annual return on investment determinants among agro – processing enterprises in the study area. The semi – log function was selected as the lead equation. The selection was based on the magnitude of R^2, the *a priori* expectation, and the large number of statistical significance of the estimated regression coefficients. The result in Table 2 shows that 32.50% of the variation in the level of return on investment was explained by the independent variables included in the semi – log regression model as shown by the R^2. The implication is that 67.5% of the variation in the level of return on investment was caused by factors not included in the model.

The F- value (5.46) as shown in Table 2 was significant at 1% level. Hence, the null hypothesis that economic factors have no significant effect on the return on investment of small-scale agro-processors in the study area was rejected. Analysis of Table 2 shows that the coefficient of total revenue was significant at 1% and positively related to return on investment. The positive sign of the coefficient conforms to the *a priori* expectation, implying that as total revenue increases by 1%, return on investment increases by 0.29 units. This is possible as total revenue boosts the net profit of the enterprise and hence increasing the return on investment. This is in agreement with Zamfir *et al*. (2016) who reported a positive relationship between return on investment and revenue. Also, analysis of Table 2 shows that the coefficient of total fixed cost was significant at 5% and negatively related to return on investment. The negative sign of the coefficient agrees with the *a priori* expectation, implying that as total fixed cost increases by 1%, return on investment decreases by 0.17 units. This can be attributed to total fixed cost decreasing the net profit of the firm and thereby translating to reduced return on investment. This finding agrees with Zamfir *et al*. (2016) who reported a negative relationship between costs and return on investment.

Table 2: Determinants of annual return on investment of small – scale agro – processing enterprises.

Variables	Linear	Exponential	Semi – log^{+}	Double–log
Total revenue 2021	$1.44x10^{-9NS}$ ($1.27x10^{8}$)	$7.79x10^{-9NS}$ ($2.16x10^{8}$)	0.29^{***} (0.073)	0.54^{**} (0.25)
Total fixed cost 2021	$1.86x10^{-9NS}$ ($4.56x10^{8}$)	$4.97x10^{-8NS}$ (7.7410^{8})	-0.17^{**} (0.078)	-0.27^{NS} (0.18)
Total variable cost 2021	$6.64x10^{9NS}$ ($1.47x10^{8}$)	$2.07x10^{-8}NS$ ($2.51x10^{8}$)	-0.084^{NS} (0.080)	-0.19^{NS} (0.18)
Constant	0.43^{***} (0.079)	-0.98^{***} (0.13)	-0.62^{NS} (0.63)	-2.84^{**} (1.38)
R^2	0.0927	0.0934	0.3250	0.1259
$\bar{R}^2$	0.0127	0.0084	0.2654	0.0439
F – value	1.16^{NS}	1.10^{NS}	5.46^{***}	1.54^{NS}

Source: Field Survey Data, 2021 *** = Sig@ 1%, **= Sig@5%; NS = Not Significant. Values in parentheses are standard errors, + = lead equation

Solvency Position of Small–Scale Agro–Processing Enterprises

The solvency position of small – scale agro – processing enterprises in the study area is presented in Table 3. The result shows that majority (60.5%) of the agro – processing enterprises had solvency position less than or equal to 0.5 (i.e ≤ 0.5) with the mean solvency position of 2.73 indicating that on average ₦ 2.73 of every Naira worth of assets owned by agro – processing enterprises was financed with borrowed money in 2021. This implies that in 2021, creditors put up 273 percent as much money as the owners of agro – processing enterprises in the study area had invested in the enterprises. Proshare (2021) reported a higher leverage ratio which indicates that a company is using debt to finance its assets and operations. Hence, agro – processing enterprises in the study area are using debt to finance their assets and operations. This is in agreement with Katchora (2010) who revealed that a debt – to – asset ratio that exceeds 55% is considered being in the critical zone.

Agro- processing enterprises with the best solvency position in the study area had a leverage ratio (debt- to- asset ratio) of 0.00. The owner of this agro – processing enterprise is 51 years old male, married with 12 persons in his household, and had 11 years food processing experience. The owner also had undergone formal education and had spent 18 years in formal school. His start up amount was ₦10,600,000.

The agro – processing enterprises with the worst solvency position had a leverage ratio of 88.14. The owner of this agro – processing enterprises is 49 years old male, married with 9 persons in his household, and had 12 years food processing experience. The owner also had undergone formal education and had spent 16 years in formal school. His start up amount was ₦2,880,339.

Table 3: Solvency Position of small – scale agro processing enterprises in the study area (n = 35)

Variable	Frequency	Percentage	Mean	Minimum	Maximum
Solvency position (Debt -to- asset both in naira)			2.73	0.00	88.14
≤ 0.50	23	60.5			
0.51 – 1.50	14	36.8			
≥ 1.51	1	2.6			

Source: Field Survey Data, 2021

Socio- economic Determinants of Solvency Ratio

Analysis of the determinants of solvency ratio of small – scale agro – processing enterprises in the study area is presented in table 4. The multiple regression model was used in the analysis of solvency ratio determinants among agro – processing enterprises in the study area. The semi – log function was selected as the lead equation. The selection was based on the magnitude of the R^2, the *a priori* expectation, and the large number of statistical significance of the estimated regression coefficients.

The result in Table 4 shows that 64.43% of the variation in the level of solvency ratio was explained by the independent variables included in the semi – log regression model as shown by the R^2. The implication is that 35.57% of the variation in the level of solvency ratio was caused by factors not included in the model. The F – value (4.53) as shown in Table 4 was significant at 1% percent level. Thus, the null hypothesis that socio-economic factors have no significant effect on solvency ratio of small-scale agro-processors in the study area was rejected. The result in Table 4 shows that the coefficient of age was significant at 10% and positively related to solvency ratio. The positive sign of the coefficient agrees with the *a priori* expectation, implying that as age of the agro – processor increases by 1%, solvency ratio of the agro – processing enterprise increases by 22.52 units. Older owners/managers of agro – processing enterprises are more likely to be involved in entrepreneurial activities which increase their demand and use of borrowed capital and thus, increasing their solvency position. This finding corroborates Olatomide and Omowumi (2015) who revealed that the older owners/managers of agribusiness, the more they are involved in entrepreneurial activities in agribusiness. Analysis of Table 4 shows the coefficient of years spent in school was significant at 10% and positively related to solvency ratio. The positive sign of the coefficient conforms to the *a priori* expectation, implying that as years spent in school of the agro – processor increases by 1%, solvency ratio of the agro – processing enterprise increases by 15.65 units. Agro – processors who are well educated are more likely to take on larger amounts of debt to run their operations in order to leverage up and thus, increasing their solvency position. This finding is in consonance with Katchora (2010) who reported that higher educational levels of farmers are associated with higher likelihood of being in the critical zone for the financial efficiency ratio. Table 4 further reveals that the coefficient of total assets was significant at 1% and negatively related to solvency ratio. The negative sign of the coefficient is in line with the *a priori* expectation, implying that as total assets of the agro – processing enterprises increases by 1%, solvency ratio of the enterprise decreases by 7.96 units. Agro- processing enterprises with larger assets are less likely to take up debt to run their operations thereby reducing their solvency position. This finding is at variance with Katchora (2010) who revealed that larger farms are more likely to have liquidity and solvency issues.

Table 11: Determinants of Solvency Ratio of Small – Scale Agro – Processing Enterprises

Variables	Linear	Exponential	Semi-log^{+}	Double-log
Sex	-0.61^{NS}	0.31^{NS}	-3.11^{NS}	0.09^{NS}
	(7.62)	(0.57)	(4.53)	(0.35)
Marital status	-0.40^{NS}	0.10^{NS}	-0.19^{NS}	0.10^{NS}
	(8.64)	(0.65)	(5.46)	(0.44)
Age	0.23^{NS}	0.02^{NS}	22.52****	1.15^{NS}
	(0.45)	(0.03)		(1.02)
Household size	0.90^{NS}	0.14^{NS}	8.59^{NS}	0.84^{NS}
	(1.45)	(0.11)	(8.05)	(0.65)
Food processing experience	-0.71^{NS}	-0.03^{NS}	-9.28^{NS}	-0.11^{NS}
	(0.71)	(0.05)	(6.12)	(0.50)
Years spent in school	-0.057^{NS}	-0.02^{NS}	15.65****	0.86^{NS}
	(1.12)	(0.08)	(8.94)	(0.72)
Start up amount	3.43x10^{-8NS}	4.17x10^{-9NS}	0.31^{NS}	0.17^{NS}
	(1.55x10^{7})	(1.17x10^{8})	(1.80)	(0.14)
Total assets 2021	1.8x10^{-7NS}	6.62x10^{8**}	-7.96***	-0.65*****
	(1.38x10^{7})	(2.84x10^{8})	(1.26)	
Quantity of input used	1.27x10^{5NS}	1.52x10^{6NS}	4.28^{NS}	0.39^{NS}
	(2.03x10^{5})	(1.54x10^{6})	(4.73)	(0.38)
Output	1.71x10^{6NS}	1.63x10^{8NS}	-0.96^{NS}	-0.19^{NS}
	(1.9x10^{5})	(1.43x10^{6})	(4.53)	(0.36)
Constant	-4.12^{NS}	-2.91^{NS}	-39.14^{NS}	-4.42^{NS}
	(29.19)	(2.20)	(47.31)	(3.82)
R^2	0.1180	0.2297	0.6443	0.6507
$\overline{R^2}$	-0.2348	0.0913	0.5020	0.5052
F- value	0.33^{NS}	0.72^{NS}	4.53***	4.47***

Source: Field Survey Data, 2021 *** = significant @ 1%; ** = Sig @5%; * = Sig@ 10%; NS = Not Significant; + = lead equation, Values in parentheses are standard errors.

Conclusion and Recommendations

Evidence from the study reveals the following that the, Agro – processing in the study area is profitable with an average return of 45 kobo for every ₦1 invested. Agro – processing enterprises in the study area had plenty of current assets to pay their bills and thus, were solvent. The determinants of return on investment of small – scale agro – processing enterprises in the study were total revenue and total fixed cost of these enterprises. The determinants of solvency ratio of small – scale agro – processing enterprises in the study area were age and years spent in school of the agro – processors, and the total assets of these agro – processing enterprises. Based on the findings of this study, the following recommendations were made:

i. Agro-processors in the study area should come together and form cooperative societies in order to easily access available credit facilities for their processing business and to reduce frequent taxes and commission.
ii. Policies that will ensure soft loans or grants be made available to the agro – processors in order to increase their capital base, should be put in place by the government or non-governmental organization.

iii. Agro-processors in the study area should organize workshops that focus on financial management training which will help them to achieve high profitability, financial efficiency, and adequate repayment capacity.

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