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Analysis of the Performance of Paddy Rice Marketing in Benue State, Nigeria

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Abstract

This study analysed the performance of paddy rice marketing in Benue State, Nigeria. The population of the study was made up of rice farmers in the three (3) geopolitical Zones of the State. Multi-stage sampling procedure was used for this study. One Local Government Area was selected from each of the geopolitical Zones. A total of two hundred and forty questionnaires were administered to the respondents. The objectives were achieved using descriptive statistics and Gross Margin analysis while the hypotheses were tested using multiple regression analysis, student t-test and Pearson's Product Moment Correlation. Majority (68.1%) of the respondents have attained some formal education, (66.9%) have market experience of over ten years, (50.7%) have household size between 6 and 10, (87.3%) are less than fifty years of age, (89.3%) are male while, (65.4%) are small holder farmers with sales income of 200,000 Naira or less per annum. The study also found that Gross Margin per hectare for paddy production in the study area was 112,123.56 Naira while paddy rice marketing was 126% price efficient. The study accepts the alternate hypotheses that states that: the socio-economic characteristics of respondents have significant effect on efficiency; rice marketing in Benue State is profitable and the null hypothesis which states that the rice market in Benue State is not integrated. The study recommends that government should rehabilitate rural feeder roads to enable easy movement of produce and provide credit to encourage increase in farm sizes while marketers should form unions to enable them benefit from economy of scale and enrol for training on entrepreneurship.

Keywords

Market Performance, Paddy, Rice, Marketing, Costs and Returns, Price Efficiency, Market Integration

1. Introduction

Rice has become the most important staple food and the most common cereal food crop in Nigeria (Akpokodje *et al.*, 2001; NCRI, 2004). It is the fastest growing commodity in Nigeria's food basket (Akande, 2003) with an annual consumption growth rate of 4.4% (IFDC, 2008). In West Africa sub-region, Nigeria is the largest producer of rice (Oyinbo *et al.*, 2013). About 5.4 million metric tons of rice is consumed annually in Nigeria. However, local production accounts for only 2.3 million metric tons per annum while the remaining 3.1 million metric tons is imported. Increasing rice production could therefore, contribute to domestic food security and foreign exchange earnings for the nation.

Rice marketing entails all the activities involved in moving rice from the point of production to where it is needed by the final consumer (Bassey *et al.*, 2013), in the desired form and at the appropriate time. Rao *et al*. (2012) stated that agricultural marketing plays an important role in stimulating production and consumption and in accelerating economic development. According to Onu and Okunmadewa (2001), market performance includes the relative efficiency of production (that is, price relative to the average cost of production).

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Rice production in Nigeria has been unable to keep up with increases in demand over the years. Marketing ought to provide all that is required (access to irrigated land, appropriate farm inputs and market information including agricultural best practices and pricing need etc) to transform the Nigerian rice market. The inability of Nigeria to achieve self-sufficiency in rice production is therefore, due to inefficiency of rice marketing in the nation. The demand for rice is rising speedily at an estimated rate of 10% per annum (NRDS, 2009), due to population growth and urbanization (Adejumo-Ayibiowu, 2010; Inuwa *et al.*, 2011). Even though, there is growing demand for rice in Nigeria, corresponding increase in supply is lacking thereby leading to persistent demand - supply gap. Market performance is a reflection of the impact of structure and conduct on product prices, costs, volume and quality of output (Hill, 1997). Efficient marketing system promotes economic development by encouraging specialization and leading to output enhancement (Olukosi and Isitor, 1990; Tura *et al.*, 2010).

In various attempts to provide information on the rice market in Nigeria and to recommend appropriate solutions on how to improve rice marketing, many scholars have carried out studies on aspects of the performance of rice marketing in the country. However, the scholars' works on the, performance of local rice marketing in Nigeria are still limited. This study seeks to achieve the following objectives: (i) to describe the socio-economic characteristics of rice producer marketers in Benue State; (ii) to estimate the costs and returns from paddy rice marketing in Benue State; and (iii) to determine the price efficiency of paddy rice marketing in Benue State. The following hypotheses were formulated and empirically tested based on the objectives: (i) the socio-economic characteristics of respondents have no significant effect on efficiency; (ii) rice marketing in Benue State is not profitable; and (iii) the paddy rice market in Benue State is not integrated.

2. Methodology

2.1. The Study Area

The study area is Benue State. Benue State is one of the 36 States of Nigeria. There are 23 Local government Areas in the State and its Headquarter is Makurdi. The State lies in the Southern Guinea Savanna between latitudes 6°25'N and 8°8'N and longitudes 7°47'E and 10°E' (Onlinenigeria, 2003) and is generally low land estimated to be 5.09 million hectares. The arable land in the State is estimated to be 3.8 million hectares (Benkad, 1998). The State has a population of 4,219,244 people according to 2006 census figures (NPC, 2007), 413,159 of which are made up of farm families (BNARDA, 1998).
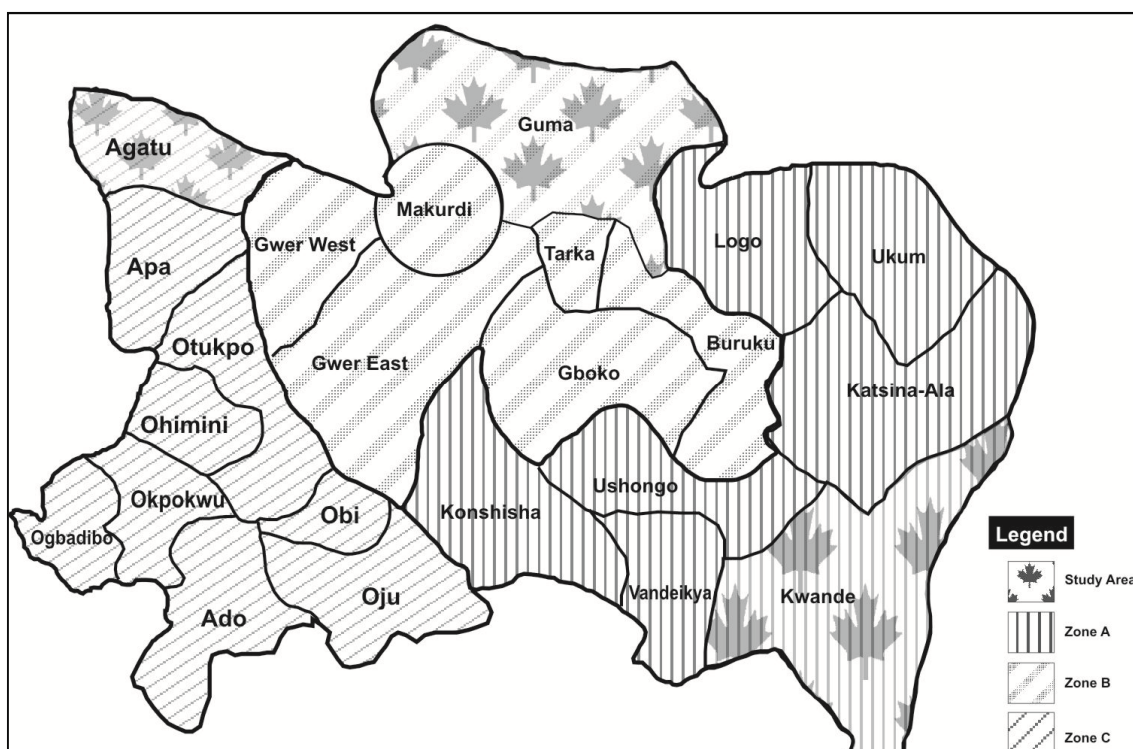

Figure 1. Map of Benue State Showing the Study Area.

Source: Modified from https://www.onlinenigeria.com (2003)

Benue State is divided into three geopolitical zones sometimes referred to as agricultural zones namely; Zone A, Zone B and Zone C. Kwande Local Government Area is located in Zone A while Guma Local Government Area and Agatu Local Government Area are located in Zone B and Zone C respectively. Farming is the major occupation of the indigenes of the State and Kwande (Zone A), Guma (Zone B) and Agatu (Zone C) are the Local Government Areas with the highest intensification in rice production in the State. The map of Benue State showing the Local Governments is shown in Figure 1.

2.2. Population and Sampling Procedure

The population of this study is the rice farmers in Benue State. This population is made up of rice farmers (producer marketers) in the three geopolitical Zones of the State namely Zone A, Zone B and Zone C. Multi-stage sampling procedure was adopted for this study. The first stage was the purposive selection of one Local Government Area each from the three geopolitical Zones of Benue State based on rice intensification. The second stage was the purposive selection of two markets in each of the three Local Government Areas earlier selected based on rice intensification. The third stage was the random selection of respondents from the rice farmers in the markets earlier selected. A total of 240 questionnaires were administered proportionately in the study area as shown in Table 1.

Table 1. Sample Procedure and Sample Size.

Agricultural Zone	LGA	Markets	Rice Marketers	Sample Size	Percentage (%)
A	Kwande	Jatoaka	42	84	35
		Ikyogen	42		
B	Guma	Daudu	36	72	35
		Gbajimba	36		
C	Agatu	Obagaji	42	84	30
		Ochigbudu	42		
Total	3	6	240	240	100

Source: Researcher's sample design, 2014.

2.3. Data Collection Techniques

Data were obtained from primary source with the aid of structured questionnaire and personal interviews. The total number of questionnaires administered in this study was two hundred and forty (240). However, two hundred and thirteen (213) respondents returned their questionnaires while twenty seven (27) failed to return. Out of the questionnaires returned, sixteen (16) were either defaced or improperly filled and were therefore discarded. This puts the total valid questionnaires returned in this study at one hundred and ninety seven (197).

2.4. Validation and Reliability of Research Instrument

The data collection instrument for this study was validated by passing the research instruments through scholars in both colleges of Management Sciences and Agricultural Economics and Extension, University of Agriculture, Makurdi. Reliability of the data collection instrument was achieved by pilot testing and by Cronbach's alpha (α) analysis.

2.5. Measurement of Variables

Sex was measured using dummy variables; 1 = male, 2 = female;

Educational attainment was measured in number of years;

Years of experience was measured in number of years;

Household size was measured in number of persons;

Age was measured in number of years;

Sales income was measured in Naira per annum;

Efficiency was measured in percentage (%);

Transport cost was measured in Naira (₦);

Gross Margin was measured in Naira (₦);

Land was measured in number of hectares (ha);

Labour was measured in man-days (md);

Seeds were measured in kilogram (kg);

Fertilizer was measured in kilogram (kg);

Herbicide was measured in litres (lit);

Bag was measured in number/100 kg; while,

Taxes and levies were measured in Naira (₦).

2.6. Model Specification

The following model used to achieve hypothesis (i);

$$E = f(X_1, X_2, X_3, X_4, X_5, X_6, e) \qquad (1)$$

Where,

E = Efficiency$= \frac{a}{b} \times 100$ (From Shepherd Futrell's formula)

a = Value of product (price per 100 kg bag of paddy rice)

b = Marketing costs (sum of cost of transport, storage, labour, other costs per 100 kg bag of paddy rice)

X_1 = Years of experience in rice farming and marketing (in years);

X_2 = Educational attainment (in years);

X_3 = Household size (No. of persons);

X_4 = Age (in years);

X_5 = Sales income (Naira);

X_6 = Sex (Male = 1, Female = 0)

e = Stochastic error term

Three functional forms of the model were tried and the double log form was selected for the analysis based on conventional econometric criteria namely; number of significant variables, the F – ratio, the sign, the Coefficient of Determination (R^2) and the adjusted R^2. The explicit forms of the functional forms were as follows:

Linear function

$$E = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + \quad (2)$$

Semi –log function

$$E = b_0 + b_1logX_1 + b_2logX_2 + b_3logX_3 + b_4logX_4$$
$$+ b_5logX_5 + b_6logX_6 + e \quad (3)$$

Double log function

$$LogE = b_0 + b_1logX_1 + b_2logX_2 + b_3logX_3$$
$$+ b_4logX_4 + b_5logX_5 + b_6logX_6 + e \quad (4)$$

2.7. Data Analysis Techniques

To achieve the stated objectives of the study, the data generated were analysed using descriptive statistics such as tables, frequency distribution, and percentages, and inferential statistics such as regression analysis, correlation analysis, and student t-test. Gross Margin was also used. Descriptive statistics was used to achieve objective (i) and (ii). Objective (iii) was achieved by calculating the Gross Margin of the respondents in this study while objective (iv) was achieved by using price efficiency measures. F-statistic from multiple regression analysis was used to test hypothesis (i), student t-test was used to test hypothesis (ii) while, Pearson's Product Moment Correlation (PPMC) was used to test hypothesis (iii).

The following formulae were used;

(a). Gross Margin is expressed as follows:

$$GM = TR - TVC$$

Where,

G.M = Gross Margin,

TR = Total Revenue ie price per 100 kg bag of rice X number of bags sold,

TVC = Total Variable Cost.

Gross Margin is used when fixed cost is negligible.

(b). Price Efficiency is expressed as follows:

$$E_p = \frac{O}{I} \times 100$$

Where,

E = Price Efficiency

= Value added to the marketing system (net margin per 100 kg bag of rice)

I = Marketing costs (sum of cost of transport, storage, labour, other costs per 100 kg bag of rice paddy)

Marketing efficiency of 100% is perfect efficiency while that above 100% is excess profit.

(c). Student t-test 't' is expressed as follows:

$$t = \frac{d}{s/\sqrt{n}}$$

Where,

i. d = mean difference

ii. s = standard deviation of differences

iii. n = sample size

The following assumptions were observed for the paired sample t-test: (i) the population distribution is normal; (ii) samples were randomly selected; (iii) samples are from one individual; (iv) dependent variable is a continuous variable measure at the interval or ratio level; (vi) there were two levels of the independent variable; (vii) there exist differences in values. If the calculated t is less than the tabulated t, the null hypothesis is accepted. Otherwise, it is rejected.

3. Results and Discussion

3.1. Socio – Economic Characteristics of Rice Marketers in Benue State

The socio-economic characteristics of rice marketers studied in this research work include experience, educational level, household size distribution, age distribution, income distribution and sex distribution of respondents. The distribution of respondents by economic characteristics is

shown in Table 2. The distributions of educational attainment of respondents in the study area showed that majority (68.1%) of the respondents attained some formal education. This implies that most rice farmers in the study area can read and write. Education is an advantage for training and skill enhancement planning and implementation for rice farmers by extension service providers since it is easier to train farmers who are literate. Furthermore, education has positive effect on the business acumen of entrepreneurs (Afolabi, 2009). This study is in agreement with the findings of Akpokodje *et al.* (2001); Akarue and Ofoegbu (2012); Umeh and Ataborh (2007) who stated that most rice farmers can read and write.

The distribution of years of rice farming and marketing experience of respondents indicate that majority (66.99%) of the respondents had over 10 years' experience in rice farming and marketing. Experience plays a very important role in the performance of any enterprise. The higher the experience in an enterprise, the more informed and skilled, entrepreneurs become. This suggests that the efficiency of rice farmers in the study area would be high. The result is in consonance with Umeh and Ataborh (2007).

The household size distributions of respondents in the study area showed that majority of the rice farmers (50.76%) had household size of between 6 and 10. The result indicates a large household size which can be a source of cheap farm labour. This agrees with the findings of Umeh and Ataborh (2007) and Nwalieji*et al*. (2014).

Table 2. Distribution of Respondents by Socio –economic Characteristics in Benue State (N=197).

Variables	Zone A		Zone B		Zone C		Pooled Data	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Education distribution of respondents								
No formal education	16	26.22	20	31.25	27	37.50	63	31.98
Primary education	20	32.79	17	26.56	19	26.39	56	28.43
Secondary education	10	16.39	13	20.31	12	16.67	35	17.11
Tertiary education	5	08.20	4	06.25	5	06.94	14	07.11
Adult education	10	16.39	10	15.63	9	12.50	29	14.72
Total	61	100.0	64	100.0	72	100.0	197	100.0
Years of experience of respondents								
0-5	9	14.75	10	15.63	12	16.67	31	15.74
6-10	10	16.39	10	15.63	14	19.44	34	17.26
11-15	14	22.95	13	20.31	13	18.06	40	20.30
16-20	13	21.31	15	23.44	12	16.67	40	20.30
21-25	5	8.20	5	7.81	7	9.72	17	8.63
26-30	3	4.92	3	4.69	4	5.56	10	5.08
>30	7	11.48	8	12.5	10	13.89	25	12.69
Total	61	100.0	64	100.0	72	100.0	197	100.0
Household size distribution of respondents								
0-5	15	24.59	15	23.44	19	26.39	49	24.87
6-10	30	49.18	33	51.56	37	51.39	100	50.76
11-15	10	16.39	9	14.06	10	13.89	29	14.72
>16	6	09.84	7	10.94	6	08.33	19	9.64
Total	61	100.0	64	100.0	72	100.0	197	100.0
Age distribution of respondents								
11-20	0	0.00	0	0.00	0	0.00	0	0.00
21-30	5	08.20	6	09.38	10	13.89	21	10.66
31-40	35	57.38	35	54.69	34	47.22	104	52.79
41-50	14	22.95	15	23.44	18	25.00	47	23.86
>50	7	11.48	8	12.50	10	13.89	25	12.69
Total	61	100.0	64	100.0	72	100.0	197	100.0
Sex distribution of respondents								
Female	5	08.20	7	10.94	9	12.5	21	10.66
Male	56	91.80	57	89.06	63	87.5	176	89.34
Total	61	100.0	64	100.0	72	100.0	197	100.0
Income distribution of respondents								
≤100,000	26	42.62	12	18.75	19	26.39	57	28.93
100,001 – 200,000	23	37.70	12	18.75	37	51.39	72	36.55
200,001 – 300, 000	2	03.28	27	42.19	4	05.56	33	16.75
300,001 – 400,000	9	14.75	13	20.31	11	15.28	33	16.75
≥401,000	1	01.64	0	00.00	1	01.39	2	01.02
Total	61	100.0	64	100.0	72	100.0	197	100.0

Source*:* Field Survey, 2014

The percentage distribution of respondents by age showed that majority (87.30%) of the respondents in the study area into the age of 50 years and below (11 – 20, 21 – 30, 31-40 and 41-50). This result implies that most rice farmers are within their middle, active and productive ages (Nwalieji *et al*, 2014) and suggests that rice farming is rigorous and requires able bodied young men. The result is in consonance with earlier studies by Umeh and Ataborh (2007); Afolabi (2009); Shabu and Gyuse (2011); and Akarue and Ofoegbu (2012).

The result of the analysis of sex distribution of respondents showed that there were more male rice farmers (89.34%) in Benue state than Females (10.66%). This is due to the rigorous nature of farm work associated with rice farming which makes females to avoid the enterprise in favour of less rigorous aspects of the rice value chain. The result indicates that gender influences technical efficiency. This result is in consonance with earlier study by Umeh and Ataborh (2007) and Afolabi (2009).

The sales income distribution of respondents in the study area also showed that majority (65.48%) of respondents make 200,000 naira or less in sales income/annum. This implies that most of the farmers are small holder farmers with small market share of the paddy rice market in the study area. This study agrees with the finding of Nwalieji *et al.* (2014).

The double log functional form of the three regression equations highlighted in chapter three was selected as the lead equation and used to test the hypothesis which states that the socio-economic characteristics of respondents have no significant effect on efficiency. In Table 3, the Multiple Correlation Coefficient (R) of 0.928 indicates a good level of prediction of efficiency of paddy rice marketing in Benue state. The Coefficient of Determination (R^2) value of 0.861 indicates that paddy rice marketing experience, education, household size, age, sales income and sex of respondents explained 86.1% of variation in efficiency of rice marketers in Benue State.

Table 3. Efficiency as a Function of Socio-economic Characteristics of Paddy Rice Marketers in Benue State.

Zone	Zone A			Zone B		
Functional Form	Linear Log	Semi -Log	Double Log	Linear Log	Semi -Log	Double Log
Constant	43.273 (2.871)*	66.880 (6.083)*	4.218 (44.544)*	38.418 (3.592)*	35.203 (2.825)*	4.025 (53.778)*
X_1	3.040 (1.635)	2.485 (0.517)	0.051 (1.233)	12.853 (6.215)*	40.669 (4.597)*	0.259 (4.866)*
X_2	3.500(4.267)	16.641 (5.096)*	0.160 (5.702)*	1.778 (2.946)*	10.789 (2.971)*	0.079 (3.639)*
X_3	-0.844(-0.017)	0.614 (0.124)	0.000(-0.005)	-1.628(-0.781)	0.108 (0.019)	0.011 (0.321)
X_4	5.081 (1.637)	8.542 (0.921)	0.112 (1.404)	7.063 (3.082)*	19.615 (1.883)	0.141 (2.260)*
X_5	19.709 (5.127)	50.962 (8.541)*	0.334 (6.489)*	11.224 (3.293)*	12.101 (1.096)	0.234 (3.526)*
X_6	1.529 (0.171)*	0.461 (0.042)	0.002 (0.020)	-15.268(-2.430)*	-18.039(-1.526)	-0.113(-1.596)
R	0.913	0.939	0.932	0.95	0.909	0.95
R^2	0.834	0.883	0.868	0.902	0.827	0.903
Adjusted R^2	0.815	0.869	0.854	0.891	0.808	0.893
F-Statistic	44.332	66.372	58.312	85.852	44.544	86.98

Table 3. Continue.

Zone	Zone C			Pooled Data		
Functional Form	Linear Log	Semi -Log	Double Log	Linear Log	Semi -Log	Double Log
Constant	0.791 (0.067)	12.459 (0.961)	3.726 (41.636)*	28.530 (4.048)*	35.955 (5.056)*	3.965 (77.354)*
X_1	4.936 (2.242)*	14.410 (1.734)	0.174 (3.028)*	6.260 (5.407)*	15.094 (3.732)*	0.146 (5.012)*
X_2	3.067 (3.348)*	10.434 (2.111)*	0.085 (2.486)*	3.390 (7.624)*	15.571 (6.764)*	0.134 (8.047)*
X_3	-0.261(-0.109)	3.870/ (0.696)	0.014 (0.363)	0.680 (0.459)	3.860 (1.160)	0.025 (1.047)
X_4	15.907 (4.058)*	41.740 (2.868)*	0.412 (4.101)*	8.270 (4.915)*	22.027 (3.423)*	0.223 (4.814)*
X_5	12.607 (3.034)*	38.915 (3.871)*	0.266 (3.837)*	13.993 (7.065)*	34.185 (7.596)*	0.259 (7.970)*
X_6	3.338 (0.549)	11.562 (1.128)	0.073 (1.036)	-5.729(-1.404)	-3.751(-0.507)	-0.049(-0.928)
R	0.947	0.927	0.953	0.922	0.904	0.928
R^2	0.897	0.86	0.907	0.85	0.817	0.861
Adjusted R^2	0.888	0.847	0.899	0.845	0.811	0.857
F-Statistic	93.344	65.627	104.411	177.856	140.483	195.904

Note: values in brackets are t-ratios; values marked with * are significant at 5% level
Source: Computed from Field Data, 2014

In Zone A, the individual t-tests for the independent variables showed that education (X_2) and sales income (X_5) are significant. The positive (+ve) sign indicates that for any one year increase in education or any one naira increase in sales income of the paddy rice marketers, there will be an increase

of 1 % in efficiency of paddy rice marketing in Zone A. This is a priori expectation.

In Zone B, the individual t-tests for the independent variables showed that years of experience (X_1), education (X_2), age (X_4)

and sales income (X_5) are significant. The positive (+ve) signs indicate that for any one year increase in experience or one year increase in education or one year increase in age or one naira increase in sales income of paddy rice marketers, there will be an increase of 1 % in the efficiency of paddy rice marketing in Zone B. This is a priori expectation.

In Zone C, the individual t-tests for the independent variables showed that years of experience (X_1), education (X_2), age (X_4) and sales income (X_5) are significant. The positive (+ve) signs indicate that for any one year increase in experience or one year increase in education or one year increase in age or one naira increase in sales income of paddy rice marketers, there will be an increase of 1 % in the efficiency of paddy rice marketing in Zone C. This is a priori expectation.

The individual t-tests for the independent variables for the pooled data showed that years of experience (X_1), education (X_2), age (X_4) and sales income (X_5) are significant. The positive (+ve) signs indicate that for any one year increase in experience or one year increase in education or one year increase in age or one naira increase in sales income of paddy rice marketers, there will be an increase of 1 % in the efficiency of paddy rice marketing in Benue State. This is a priori expectation. The individual t-tests for the independent variables also showed that household size (X_3) and sex (X_6) were not significant at 0.05 level. This indicates that household size and sex of paddy rice marketers did not contribute to the model at 0.05 level of significance. Therefore, once all the independent variables (experience, education, household size, age, sales income and sex) are taken into account, there is no longer a mean difference between household sizes or between sexes of paddy rice marketers in Benue State.

From the analysis, the overall F-calculated data value for the Zones A (58.312), B (86.98), C (104.411) and pooled data (195.904) are significant. Hence, the F-calculated values (58.312, 86.98, 104.411 and 195.904) are greater than the F-tabulated (2.2754, 2.2656, 2.2440 and 2.1468). Therefore, the study rejects the null hypothesis which states that "the socio-economic characteristics of respondents have no significant effect on efficiency". This result confirms the finding in objective (i) that the socio-economic variables affect profitability and efficiency, and is consistent with earlier findings by Ezeh (2006); Agwu (2009); Agwu and Ibeabuchi (2011) and Odoemenem and Otanwa (2011) who opined that various socio-economic variables influence profitability

3.2. Costs and Returns from Paddy Rice Marketing in Benue State

The result of the computation of costs and returns of rice farmers in Benue State is shown on Table 4. The result showed that the Total Revenue (TR) is ₦346,479.76/ha while the Total Variable Cost (TVC) is ₦234,356.19/ha respectively while the Gross Margin (GM) is ₦1120,123.56/ha. The return on investment for rice farming in the study area is positive (1.49) indicating that there is greater benefit than cost.

Table 4. Descriptive Analysis of Costs and Returns of Paddy Rice Marketing in Benue State.

	N	Minimum	Maximum	Mean	Std. Deviation
Total Revenue	197	282373	419712	346479.76	39608.358
Total Variable Costs	197	185880	299884	234356.19	31742.836
Gross Margin	197	17785	220779	112123.56	43059.352
Return on Investment	197	1.06	2.18	1.49	0.23003

Source: Field Data, 2014
Note: Fixed cost is negligible.

Table 5. Student t-test of Total Revenue (TR) and Total Variable Cost (TVC) of Rice Producer Marketers in Benue State.

Variables	TR-TVC
Mean	112,124
Standard Deviation	43059.35261
Degrees of freedom	196
t-value	36.548
p-value	0.000
Confidence interval	95%

Source: Field Data, 2014

The student t-test was used to test the hypothesis which states that rice marketing in Benue State is not profitable. In Table 5, the t- value is 36.548 at 0.05 level of significance of error. The p- value (0.000) is less than 0.05 indicating that positive significant difference exists between the Total Revenue (TR) and the Total Variable Cost (TVC). Therefore, the study rejects the null hypothesis and accepts the alternative hypothesis which states that rice marketing in Benue State is profitable. The result is in agreement with earlier findings by Ohajianya and Onyenweaku (2003) who opined that rice farming in Ebonyi State is profitable.

3.3. Price Efficiency of Paddy Rice Marketing in Benue State

The computation of efficiency in the study area showed that paddy rice was 126% price efficient in the study area with a minimum efficiency of 50.68% and maximum efficiency of 221.43% (Table 6). This is an indication of the extent to

which the price of paddy rice reflects the wishes of the buyers in the study area (Olukosi and Isitor, 1990). Further breakdown showed that the price efficiency for paddy rice in Zone A (131.96%) was higher than those of Zone B (128.1%) and Zone C (119.66%). This result implies that the cost in Zone A was the lowest relative to revenue as compared to the costs in Zones B and C. This indicates how effectively prices reflect the costs of moving the outputs through the marketing system in the study area (Olukosi and Isitor, 1990).

The Pearson's Product Moment Correlation (PPMC) was used to test the hypothesis which states that the rice market in Benue State is not integrated. The correlation analysis is shown in Table 7. The result showed that the value of correlation of price efficiency between Zone A and Zone B is 0.193 while correlation of Zone A and C is 0.069. The t-calculated values are 1.238 and 1.572 respectively. There is no significant correlation between Zone A and Zone B or between Zone A and Zone C. The value of correlation of price efficiency between Zone B and Zone C is 0.178. The t-calculated value for correlation of Zone B and Zone C is

1.039. Also, there is no significant correlation between Zone B and Zone C. The level of correlation of prices in two markets can be used as a measure of the extent of market integration (Roehner, 1989; Olukosi and Isitor, 1990; Petrovich, 2013). Therefore, the markets in Zone A and Zone B and Zone C are not integrated. Based on the result, the study accepts the null hypothesis which states that "the markets for rice in the study area is not integrated". Therefore, the market for paddy rice in Benue State can be described as imperfect market (Lutz, 1994). Goletti and Christina-Tsigas, (1995) opined that due to its simplicity, correlation analysis remains the most common approach to measuring market integration. The units of measurement as well as the names for the same rice varieties differ across the markets in the three Zones of the State. This study therefore agrees with Olukosi and Isitor (1990) that existence of transport bottlenecks, lack of marketing information and lack of scientific grading of produce with the result that prices do not refer to equivalent grades in the markets account for low or lack of market integration in the State.

Table 6. Descriptive Analysis of Price Efficiency of Paddy Rice Marketing in Benue State.

	N	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Zone A	61	58.06	216.91	131.9589	5.57617	43.55130	1896.716
Zone B	64	59.40	221.43	128.1042	5.39749	43.17994	1864.507
Zone C	72	50.68	218.46	119.6619	5.83271	49.49221	2449.479
Pooled data	197	50.68	221.43	126.2123	3.26063	45.76519	2094.453

Source: Field Data, 2014

Table 7. Pearson's Product Moment Correlation (PPMC) of Efficiency Estimates of Paddy Rice Marketing in Benue State.

	Pooled Data	Zone A	Zone B	Zone C
Pooled Data	1			
Zone A	0.012(0.929)	1		
Zone B	0.025 (0.847)	0.193(1.238)	1	
Zone C	0.048(0.874)	0.069 (1.572)	0.178(1.039)	1

Source: Computed from Field Data, 2014
Note: there is no significant correlation; values in parentheses are t-calculated values

4. Conclusion and Recommendations

The study concludes that the market for paddy rice in Benue State is profitable and efficient. The socio-economic characteristics of respondents have significant effect on the efficiency of rice farming. Furthermore, the market is not integrated. The study makes the following recommendation based on findings:

i. Paddy rice marketing is profitable. The study recommends that the paddy marketers should form unions and/or reorganize the ailing unions to enable them benefit from economy of scale and seek alternative markets to sell their

produce. This will reduce the buyer influence on pricing and increase profitability.

ii. The paddy rice market is price efficient. However, the markets in the study area are not integrated. This is mostly due to transport bottlenecks, lack of marketing information and lack of scientific grading of produce with the result that prizes do not refer to equivalent grades across the markets. The study recommends that rural feeder roads should be rehabilitated by government to enable easy movement of produce. Also, scientific grading of produce should be enforced across the markets by government. These will improve market integration.

iii. The marketers are encouraged to acquire more training. This will increase their efficiency and enhance their skill.

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