

Price Effect on Short, Long quality Local Rice quantity demanded and Consumer's Preference in Niger State.

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Abstract

The research assessed the effect of price on short, long quality local rice quantity demanded expenditure share and consumer's preference. Multi – stage sampling method was used to get 125 household consumers. The respondents were sampled from zones A, B and C of Niger State. Primary data were got through the use of structured questionnaires. Mean, frequency, and percentages were used to describe the socio – economic characteristics. The household size has mean of 6 and years in school stood at 17. The annual income mean was ₦414, 000. Almost Ideal Demand System (AIDS) was used to estimate the expenditure share, compensated and uncompensated price elasticity. The result shows that increase in the price of short grain rice will reduce household expenditure share of short grain and vice versa for long grain. Long and short grains were normal goods and expenditure inelastic. Compensated and uncompensated price inelastic.

Keywords: Local rice, Price, Consumer's preference, Elasticity, Normal goods.

1. Introduction

Local rice grain qualities are vital among household consumers in Niger. Consumer's choice of local rice is guided by satisfactions, as well as quality. The qualities like clean white, stone free and taste of rice were important to the consumers, with higher premium paid for it. Consumers derived their needs from the quality of the products, not from products utilized. The tastes and size of the grain may be very importance and are not left out of the study.

Households need constant supply of quality local rice, this may have positive impact on the utilization for local rice. Consumers obtained less satisfaction from poor quality local rice, but cheaper than imported rice. The foreign rice has highest utility value and higher consumer preference but beyond the reach of common man. Its demand may be reduced due to high price.

Low patronage of local rice were due to poor packaging, poor texture and unattractiveness to the consumers. The consumers may be willing to pay high prices for making local rice attractive and quality of the commodity when maintained. Olurunfemi (2014) revealed that consumers preferred rice without foreign matter as the first criterion, followed by whiteness. Price was the least, indicating that consumers were ready to pay high prices for clean rice that is of high quality.

Gideon *et al.*, (2014) observed that local rice is of poor quality and that was why Ghanaians prefer imported rice to locally produced rice, largely because imported rice is free from foreign materials and has better grain quality. The study want to consider the price of short, long and qualities of local rice as they affect household preference and expenditure in Niger State.

2. Materials and Methods

This study used primary data, in obtaining primary data, a multistage sampling method was employed in the selection of respondents. First, purposive selection of two local government areas from each of the three (3) agricultural zones of the state due to predominant production of local rice in these areas. Simple random sampling technique was adopted in the selection of two communities from each local government area especially communities where rice cultivation is highly predominant. The third stage was simple

random selection of 125 household heads from sample frame of 165,697 selected from each two communities chosen from 6 local governments in the state using Taro Yamane’s formula at 9% precision.

Using Yamane, T. (1967) formula stated as $n = \frac{N}{1+N(e)^2}$

Where n = sample size

N = population size

e = margin error

Primary data were collected using structured questionnaire. Information regarding socio-economic characteristics of respondents, disposable income. Expenditure on long local rice, Short local rice and total expenditure on both local rice were calculated

3. Analytical Tools

Descriptive statistics like mean, frequency and percentages were used to describe the socio – economics of the sampled respondents in the study area, Almost Ideal Demand System (AIDS) model was also used. The AIDS model is specified as follows

$$W_i = \alpha_1 + \sum_j Y_{ij} \text{Log}P_j + \beta_i \text{Log}(X/P_i) + \sum_j \delta_{ij} D_s \quad (1)$$

Where

W_i = Expenditure share associated with i^{th} rice good in ₦/kg

Y_{ij} = slope coefficient associated with j^{th} rice good in the i^{th} rice expenditure share equation

P_j = Price of the j^{th} rice good (price/Kg paid per consumer for a particular rice Category/quality.

X = Total consumption expenditure by all consumers on various qualities of rice in /Kg

P_i = Price index = $p \cdot \sum w_i \text{Log}P_i$

D_s = Disposable income and consumer quantity needed

$\alpha_1, Y_{ij}, \beta_i$ and δ_{ij} = parameters to be estimated

3.1 Hick Sian Price Elasticity

This will be used in estimating the adjustment that consumer will make in the consumption of rice with one characteristic as a reaction to change in price of another rice. The model was stated as follows;

$$e_{ij}^h = e_{ij}^m + w_j e_i \quad (2)$$

3.2 Expenditure elasticity

This measures the responsiveness of consumers’ expenditure on different rice quality due to change in consumer’s income. Specified as;

$$e_i = 1 + \beta_i / w_i \quad (3)$$

3.3 Own price elasticity

This measure the response of the consumer’s quantity of rice bought as a result of price of different characteristics in question holding utility fixed while minimizing expenditure. Specified as;

$$e_{ii} = 1 + (\gamma_{ii} / w_i) - \beta_i \quad (4)$$

3.4 Uncompensated price elasticity.

This measure the response of the consumer’s quantity of rice bought as a result of price of different characteristics in question holding price fixed while maximizing utility.

$$e_{ij}^m = \gamma_{ii} / w_i + \beta_i w_j / w_i \quad \square_{ij} \quad (5)$$

4. RESULT AND DICUSSION

Socio –economic characteristics of the local rice consumers in Niger State.

The socio –economic characteristics of local rice consumers varies and have impact on consumption pattern of local rice. Some of the socioeconomic characteristics considered in the study were age, gender, household size, education level and annual income levels as presented in Table.1 It is true that as the age of human increases the household size also increases. The result presented in table1 shows that household heads were within the age range of 41 - 50 years in Niger with 44% Age of household heads could have influence on quantity of rice demanded; this is because as age increases the household size increases. The mean age of the households in Niger was 45. This work corroborates that of Oyinbo, (2014) and Salihu *et al*, (2017).

Gender of the household head has great impact on rice consumption pattern this was also noted by Agboola, (2003). The result in the table.1 shows that all the respondents (100%) were male. This could be the influence of the two common religions practiced in the northern part of Nigeria. These religions belief that only male should be the head of the family. The research agrees with the work of (Ibrahim, 2014).

Table 1. Socio-economics characteristics of local rice consumers

	Frequency	Percentage
Age		
20 -30	4	3
31 – 40	34	27
41 – 50	54	44
51 – 60	33	26
Total (mean)	125(45)	100
Gender		
Male	125	100
Female	-	-
Total	125	100
Household size		
1 – 10	118	94.4
11 – 20	7	5.6
21 – 30	-	-
Total (mean)	125(6)	100
Edu.level		
Primary	13	10.4
Secondary	35	28
tertiary	41	32.8
Non formal	36	28.8
Total (mean)	125 (6)	100
Annual income		
201,000 -300,000	20	16.8
301,000 – 400,000	14	11.2
401,000 – 500,000	58	46.2
501,000 – 600,000	12	9.6
601,000 – 700,000	7	5.6
701,000 – 800,000	4	3
801,000 - 900,000	4	3
901,000 – 1,000,000	6	4.8
Total (mean)	125(414)	100

Source: Field survey, 2017

Household size determines the quantity of local rice to be bought and used. The household size was high among the respondents. Majority of the respondents have household size of 1-10 persons in Niger 94.4%.

The mean household sizes was 6 and 8 for Niger. This also agrees with the study of Salihu *et al.*, (2017) and Ehiakpor, (2017)

It is assumed that a well-educated respondent can easily get access to information concerning nutritional value of all kind of local rice available in the market. This information could have positive or negative effects on the use of local rice. Qualitative local rice that is clean may be favoured while low quality local rice may be affected negatively. Majority of the respondents attended secondary and tertiary education. 60.8 percent. This is to say that all the respondents were educated in one way or the other. This agrees with the works of Ahmad *et al.*, (2010), Ahmad *et al.*, (2011) and Olurunfemi, (2014).

Income is a vital factor that influences household food consumption. As income of household increases the food consumption also increases. Although there could be exceptional situations that as the income increases the respondents may change to foreign rice. The result presented in table 1 shows that the respondents were low income earners. The mean income for Niger State were 414, this agrees with the studies of Salihu *et al.*, (2017), Kassali *et al.*, (2010) and Ahmad *et al.*, (2011).

4.1 Estimates Effect of Short and Long Grain local Rice Prices on their Respective Expenditure Shares

The estimated parameters of the AIDS models for short and long grain rice in the study area are presented in Table 2. The F-statistics of the estimated short and long grain rice equations in the study area data were all significant at 1% significance level and this indicates the joint significance of the explanatory variables included in the various equations respectively. The R-squared values of 0.8961, for short grain rice equations in Niger, implies that 89.61%, variation in the households' monthly budget share of short grain rice in the monthly food expenditure were explained by the variables included in the models. Also, the R-squared values of 0.7938, for the long grain rice equations implies that 79.38%, variation in the monthly budget share of long grain rice in the monthly food expenditure of household in Niger, data were explained by the variables included in the models.

In Niger state, the result presented in Table 2 revealed that the price of short grain rice at $p < 0.01$, price of long grain rice at $p < 0.01$, household expenditure at $p < 0.01$, respondents' perception on taste and texture at $p < 0.05$ and household monthly income were all significantly influencing the proportion of households expenditure on short grain rice. The result for long grain rice equation indicated that the price of short grain rice at $p < 0.01$, price of long grain rice at $p < 0.01$, household expenditure at $p < 0.05$ and household size were the significant variables that influences the proportion of households expenditure on long grain rice.

The result revealed that the price of short grain local rice at $p < 0.01$, price of long grain local rice at $p < 0.01$, household expenditure at $p < 0.01$, respondents' perception on aroma of the local rice at $p < 0.10$ and taste and texture of local rice at $p < 0.10$ as well as the household size at $p < 0.05$ were all significantly influencing the share of households expenditure on short grain rice. Also, the long grain function revealed that price of short grain rice at $p < 0.01$, price of long grain rice at $p < 0.01$, respondents' perception on the taste and texture of the local rice at $p < 0.10$ as well as the household size at $p < 0.05$ were the significant variables that influences the proportion of households expenditure on long grain local rice. It is noteworthy that the coefficient of the price of short grain local rice was significantly negative and that of the substitute long grain local rice was significantly positive in influencing the share of the expenditure on short grain rice. This implies that an increase in the prices of short grain local rice will reduce households' expenditure share of short grain local rice while increase in the price of the substitute, long grain local rice will lead to increase in the households' expenditure share of short grain rice *ceteris paribus*. Similarly, coefficient of the price of long grain local rice was significantly negative and that of the substitute short grain local rice was significantly positive in influencing the share of the expenditure on long grain rice. This implies that *ceteris paribus*, an increase in the prices of long grain local rice will reduce households' expenditure share of long grain local rice while increase in the price of the substitute, short grain rice will lead to increase in the expenditure share of long grain rice. More so, household size was found to influence the share of both the short and long grain rice expenditure share. This finding is similar to those of Omonona *et al.*, (2009) and Oyinbo, (2014) who reported that price of the commodity and household size significantly influences the expenditure share of rice in Kaduna State.

Table 2. Estimates of the Almost Ideal Demand System (AIDS) Model

Area	Rice category	A	γ_i (price of short grain rice)	γ_j (price of long grain rice)	β_i (expenditure)	(aroma)	(taste and texture)	α_{ij} (household size)	α_{ij} (monthly disposable income)	R ²	F-value
iger	Short grain	-0.8822 (-3.52***)	0.0921 (6.38***)	0.1874 (13.19***)	-0.1235 (-11.29***)	0.0097 (0.47)	0.2324 (2.27**)	0.0065 (1.46)	0.0102 (4.79***)	0.8961	144.20***
	Long grain	1.2716 (3.62***)	0.0685 (14.78***)	-0.0285 (-12.00***)	-0.0515 (-2.48**)	-0.0094 (-0.32)	-0.1945 (- 1.34)	0.0155 (2.53**)	0.0006 (0.17)	0.7938	64.34***

Note: *** = p<0.01, ** = p<0.05 and * = p<0.10 probability level; figures in parenthesis are t-values

Source:

field

survey,

2017

4.2 Expenditure elasticity of short and long grain rice in the study area

The expenditure elasticity measures the responsiveness of consumer’s expenditure on certain commodity with respect to change in income. The short and long grain rice expenditure elasticity estimates are presented in Table 3. The results indicates that both short local grain and long local grain rice are normal goods as shown by the positive sign of their expenditure elasticities. It also further indicated that the two commodities were expenditure inelastic as their expenditure elasticities were less than one in the study area. This means that both the short and long grain rice are normal goods in the households’ food basket in the area. The implication of this is that an increase in the households’ monthly income will lead to a less than proportionate increase in their demand for short and long local grain rice. This result is in contrast of that of Omonona *et al.*, (2009) who reported that rice is an inferior good in South-West Nigeria. It however conforms to the findings of Oyinbo (2014) who reported that rice is a normal good in the food basket of households in Kaduna State, a necessity and expenditure inelastic in Borno and Ogun States respectively.

Table 3. Expenditure elasticity of short and long grain rice within the demand system

Rice category	Niger
Short grain	0.5349
Long grain	0.9298

Source: field survey, 2017.

4.3 Marshallian (uncompensated) demand elasticity of short and long grain rice in the area

The result presented in Table 4 shows that the uncompensated own price elasticities of short and long grain rice in Niger, Benue and pooled data all had the expected negative signs and were price elastic except for Niger where both commodities were found to be price inelastic. This implies that a unit increase in the prices of short and long grain rice in the area will lead to more than proportionately decrease their demand by a unit of their respective elasticity values *ceteris paribus*. However, a unit increase in the price of short and long grain rice in Niger will yield less than proportionately decrease the demand for the commodities respectively. This finding is in contrast to the findings of Oyinbo (2014) who reported that rice and its substitutes were price inelastic in Kaduna States.

The result in Table 4 further revealed that all the estimated cross-price elasticities of short and long grain rice were found to be positive. The positive cross-price elasticities of short and long grain rice indicated substitutability implying that an increase in the price of short grain rice causes an increase in the quantity of long grain rice demanded and vice versa.

Table 4. Estimated Marshallian (uncompensated) own and cross price elasticities of short and long grain rice

Area	Rice category	Own price elasticity	Cross price elasticity
Niger	Short grain	-0.5296	1.0474
	Long grain	-0.9873	0.1119

Source: field survey, 2017.

4.4 Hicksian (compensated) demand elasticity of short and long grain rice

The result presented in Table 4 shows that the uncompensated own price elasticities of short and long grain rice in the Niger had the expected negative signs and were price inelastic except for short grain rice in Benue that was found to be price elastic. This implies that a unit increase in the prices of short and long grain rice in the area will less than proportionately decrease their demand by a unit of their respective elasticity values *ceteris paribus*. However, a unit increase in the price of short grain rice in Benue will more than proportionately decrease its demand. This finding is similar to the findings of Oyinbo (2014) who reported that rice and its substitutes were price

inelastic in Kaduna States. It is also similar to of Baba (2007) and Otunaiya and Shittu (2014) who both reported that fruits and vegetables were price inelastic in Borno and Ogun States respectively.

Also, the result further revealed that all the estimated cross-price elasticities of short and long grain rice were found to be positive. These positive cross-price elasticities of these commodities indicated substitutability and implying that an increase in the price of short grain rice causes an increase in the quantity of long grain rice demanded and vice versa in the study area

Table 5. Estimated Hicksian (compensated) own and cross price elasticities of short and long grain rice

Area	Rice category	Own price elasticity	Cross price elasticity
Niger	Short grain	-0.3876	1.4402
	Long grain	-0.3044	0.3588

Source: field survey, 2017.

Conclusion

The study revealed that short and long local rice are close substitute of each other because their cross price elasticity were positive. Increase in the price of one leads to increase in the quantity demanded of another. It is concluded that local rice is a normal goods, price inelastic and expenditure inelastic

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Biography

NMA DAUDA SANCHITA Was born to the family of Alhaji Muhammad Sancita in Katcha local Government Area in Niger State, Nigeria, in 1970 He obtained his Bachelor degree in Agriculture in 1996 and M.sc Agricultural Economics and Extension in 2010 from Usmanu Danfodiyo University Sokoto. Currently on his Ph'D programme in Federal University of Technology Minna at the same time a senior Research Officer in National Cereals Research Institute Badeggi Niger State.

Biography

Mr David Opaluwa was born into the family of chief and Mrs Fidelis Isa Opaluwa of Oyodu district in Omalla local Government of Kogi State, Nigeria on the 5th of Novenber 1973. He obtained a Bachelor degree in Agricultural Economics and Extension in 1995 from Federal University of Agriculture Makurdi and a Master of Science (M.sc) degree in Development Economics from Benue State University, Makurdi in 2010. I am presently an Agricultural Research Officer in the Department of planning, Monitoring and Evaluation in NCRI Badeggi.

DATA ATTACHED

S/no	SHORT LOCAL RICE			LONG LOCAL RICE		
	Commodity	Price	Total Price	Commodity	Price	Total Price
1	6.5	346.1538	2250	10	346.1538	4500
2	6.5	346.1538	2250	10	346.1538	4500
3	0			90	346.1538	40500
4	13	346.1538	4500	40	346.1538	18000
5	13	692.3077	9000	35	346.1538	15750
6	6.5	346.1538	2250	15	346.1538	6750
7	19.5	346.1538	6750	15	346.1538	6750
8	6.5	346.1538	2250	25	346.1538	11250
9	6.5	346.1538	2250	10	346.1538	4500
10	6.5	346.1538	2250	15	346.1538	6750
11	3.9	346.1538	1350	16	346.1538	7200
12	6.5	346.1538	2250	12	346.1538	5400
13	6.5	346.1538	2250	15	346.1538	6750
14	10.4	346.1538	3600	16	346.1538	7200
15	6.5	346.1538	2250	15	346.1538	6750
16	0			40	346.1538	18000
17	6.5	346.1538	2250	28	346.1538	12600
18	6.5	346.1538	2250	20	346.1538	9000
19	3.9	346.1538	1350	8	346.1538	3600
20	6.5	346.1538	2250	10	346.1538	4500
21	5.2	346.1538	1800	16	346.1538	7200
22	6.5	346.1538	2250	15	346.1538	6750
23	6.5	346.1538	2250	35	346.1538	15750
24	3.9	346.1538	1350	12	346.1538	5400
25	6.5	346.1538	2250	30	346.1538	13500

26	6.5	346.1538	2250	10	346.1538	4500
27	6.5	346.1538	2250	12	346.1538	5400
28	13	346.1538	4500	25	346.1538	11250
29	6.5	346.1538	2250	10	346.1538	4500
30	5.2	346.1538	1800	10	346.1538	4500
31	6.5	346.1538	2250	15	346.1538	6750
32	7.8	346.1538	2700	14	346.1538	6300
33	6.5	346.1538	2250	10	346.1538	4500
34	13	346.1538	4500	25	346.1538	11250
35	6.5	346.1538	2250	10	346.1538	4500
36	6.5	346.1538	2250	15	346.1538	6750
37	13	346.1538	4500	15	346.1538	6750
38	13	346.1538	4500	30	346.1538	13500
39	6.5	346.1538	2250	15	346.1538	6750
40	13	346.1538	4500	15	346.1538	6750
41	0			25	346.1538	11250
42	3.9	346.1538	1350	18	346.1538	8100
43	26	346.1538	9000	30	346.1538	13500
44	0			36	346.1538	16200
45	18.2	346.1538	6300	16	346.1538	7200
46	6.5	346.1538	2250	25	346.1538	11250
47	3.9	346.1538	1350	7	346.1538	3150
48	19.5	346.1538	6750	15	346.1538	6750
49	13	346.1538	4500	20	346.1538	9000
50	32.5	346.1538	11250	50	346.1538	22500
51	13	346.1538	4500	40	346.1538	18000
52	26	346.1538	9000	30	346.1538	13500
53	13	346.1538	4500	35	346.1538	15750
54	32.5	346.1538	11250	30	346.1538	13500
55	13	346.1538	4500	10	346.1538	4500
56	13	346.1538	4500	15	346.1538	6750
57	6.5	346.1538	2250	40	346.1538	18000
58	13	346.1538	4500	20	346.1538	9000
59	13	323.0769	4200	15	346.1538	6750
60	13	346.1538	4500	40	346.1538	18000
61	13	346.1538	4500	30	346.1538	13500
62	0			60	346.1538	27000
63	13	346.1538	4500	28	346.1538	12600
64	15.6	346.1538	5400	12	346.1538	5400
65	32.5	346.1538	11250	40	346.1538	18000
66	26	346.1538	9000	28	346.1538	12600

67	26	346.1538	9000	28	346.1538	12600
68	39	346.1538	13500	30	346.1538	13500
69	32.5	346.1538	11250	35	346.1538	15750
70	6.5	346.1538	2250	5	346.1538	2250
71	0			60	346.1538	27000
72	0			60	346.1538	27000
73	39	346.1538	13500	30	346.1538	13500
74	0			60	346.1538	27000
75	36.4	346.1538	12600	60	346.1538	27000
76	7.8	346.1538	2700	70	346.1538	31500
77	7.8	346.1538	2700	65	349.1124	29500
78	0			28	346.1538	12600
79	39	346.1538	13500	30	346.1538	13500
80	6.5	346.1538	2250	20	346.1538	9000
81	6.5	346.1538	2250	20	346.1538	9000
82	6.5	346.1538	2250	25	346.1538	11250
83	6.5	346.1538	2250	5	346.1538	2250
84	13	346.1538	4500	55	346.1538	24750
85	6.5	346.1538	2250	10	346.1538	4500
86	6.5	346.1538	2250	20	346.1538	9000
87	13	346.1538	4500	40	346.1538	18000
88	13	346.1538	4500	25	346.1538	11250
89	6.5	346.1538	2250	10	346.1538	4500
90	6.5	346.1538	2250	25	346.1538	11250
91	13	346.1538	4500	30	346.1538	13500
92	13	346.1538	4500	40	346.1538	18000
93	0			60	346.1538	27000
94	6.5	346.1538	2250	20	346.1538	9000
95	6.5	346.1538	2250	30	346.1538	13500
96	6.5	346.1538	2250	30	346.1538	13500
97	6.5	346.1538	2250	20	346.1538	9000
98	6.5	346.1538	2250	35	346.1538	15750
99	6.5	346.1538	2250	25	346.1538	11250
100	13	346.1538	4500	45	346.1538	20250
101	13	346.1538	4500	30	346.1538	13500
102	0			15	346.1538	6750
103	13	346.1538	4500	25	346.1538	11250
104	6.5	346.1538	2250	35	346.1538	15750
105	6.5	346.1538	2250	35	346.1538	15750
106	26	346.1538	9000	45	346.1538	20250
107	0			10	346.1538	4500

108	6.5	346.1538	2250	25	346.1538	11250
109	0			60	346.1538	27000
110	26	346.1538	9000	20	346.1538	9000
111	19.5	346.1538	6750	35	346.1538	15750
112	26	346.1538	9000	40	346.1538	18000
113	0			40	346.1538	18000
114	0			60	346.1538	27000
115	0			32	346.1538	14400
116	0			32	346.1538	14400
117	0			40	346.1538	18000
118	0			40	346.1538	18000
119	0			20	346.1538	9000
120	0			40	346.1538	18000
121	0			12	346.1538	5400
122	0			40	346.1538	18000
123	0			40	346.1538	18000
124	0			48	346.1538	21600
125	0			40	346.1538	18000