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Analysis of Market Prices of Selected Agricultural Commodities in Akwa Ibom State (1996-2014)

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Abstract
The study analyzed the market prices of selected agricultural commodities in Akwa Ibom State (1996 – 2014). Specifically, a trend analysis of prices of selected agricultural commodities in Akwa Ibom State from 1996 – 2014 was carried out. Secondary data were obtained from the Statistics Division, Ministry of Finance and Economic Development Uyo, Akwa Ibom State. Data obtained was analyzed using descriptive and inferential statistics. The study revealed that the retail market prices of the selected agricultural commodities moved in the same direction. The mean annual percentage changes in the retail market prices of the selected agricultural commodities were high as the trend analysis showed a strong upward trend in prices overtime. Based on the findings, it was recommended that, there is need for current information especially in the area prices as it affects production and distribution of these commodities as this shapes expectations about future prices thus enabling the markets to function effectively. Also, policy measures that will encourage the collection of information on food stock should be adopted as this would better inform market participants and help avoid panic-induced price surges resulting from misinformation.
Keywords: agricultural commodities, market prices, trend analysis

1.0 INTRODUCTION

Prices act as an indicator or signal for scarcity or surpluses which helps farm firms respond to changing market situations. Agricultural commodity price is an ongoing concern among policy makers as well as all the participants along the food supply chain. Thus, understanding the market price movement of agricultural commodities is one way of promoting farm resource use efficiency and curbing some of the spilled over vices such as unemployment. This implies that, good and efficient pricing system will enhance commodities production which in turn could help to correct some distorted situation in the economy. Market prices are crucial in determining efficient distribution of resources in a market system.

Effective price system is a major hinged on the sustainability of agricultural activities which causes long-term and short term price fluctuations in agricultural commodities between productions seasons in Nigeria "International Monetary Fund, 2000". Several factors have been seen to be responsible for the volatility in price of agricultural commodities in Nigeria. This has to do with variances in bargaining power, seasonality of production, cyclical income fluctuation among sellers and consumers, inappropriate response by farmers to price signals and natural shocks "Gilbert, 1999"; Udoh & Sunday (2007); Adebusuyi, (2004). Instability in commodity prices among markets is highly detrimental to the marketing system and the economy as a whole as it has cause inefficiency in the allocation of resources depending on the source of variability. Thus, the major determinants of quantity of goods supplied and demanded by consumers is the agricultural retail commodity price "Akpan, 2007". In developing countries, a unified product price among markets is irrational owing to its increased cost of externalities, deteriorating infrastructural amenities and the nature of the products which results in differences in total variable costs incurred. In Nigeria today, there is a growing concern for food security with particularly focus on agricultural products due to increasing population (Chen, 2003). With income as a constraint, food consumption is to very large extent determined by prices of food items. In the face of and low per capita income, increase in population, low agricultural productivity resulting in demand for food outstripping supply and leading to high prices of food items, a large percentage of the income of consumers is spent on food, further worsening economic hardship faced by the people. This led to a number of studies carried out by researchers over the years on price transmission or market integration of food stuff in Nigeria's markets aimed at addressing these problem. Some of which include: "Adekanye (1988), Ejiga (1988), Dittoh (1994), Okon (1999), Okoh and Akintola (1999), Okon and Egbon (2005), Akpan and Aya (2009), Akpan *et al.,* (2014)" amongst others.

Comparison of results of various methods has not been used in these studies, but most studies have been carried out in other regions with southern region of Nigeria being exceptional "Dittoh 1994: Okoh and Egbon, 2005: Adenegan & Adeoye, 2011" with results used to generalize for other regions in the country. Wrong signals for price transmission system was seen which led to faulty marketing policies and programs in southern region of the country. Hence, the purpose of this research is to fill these identified gaps in the literature with particular reference to Akwa Ibom State. Specifically, the study sets to;

- Assess the movement of annual mean retail market prices of selected food items in Akwa Ibom State between 1996 – 2014,
- Estimate annual percentage change in the retail market prices of selected commodities across the state

1996 – 2014 as the means of comparing retail market price increases of selected food items,

- Estimate the trend of the selected commodities (1996 – 2014).

2.0 METHODOLOGY

Study Area

The study area basically covered rural markets in ten Local Government Areas in Akwa Ibom State namely; Abak, Eket, Etinan, Ikono, Ikot Abasi, Ikot Ekpene, Itu, Oron, Ukanafun and Uyo, from 1996 to 2014). These markets serve as the price collection centers for the Ministry of statistics and economic planning, Akwa Ibom State. Akwa Ibom State is located between latitudes 4°32 and 5°33 north and longitudes 7°25 and 8°25 east. It covers a total land area of 7,249,000km^2 and is bordered on the east by Cross River State and Abia State and on the south by Atlantic Ocean with a population of about 3,902,051 (NPC, 2006).

Source and Method of Data Collection

Secondary data of average retail market prices of garri, rice, yam, maize, plantain, egg, palm oil and beans were obtained from the Statistics Division, Ministry of Finance and Economic Development, Uyo, Akwa Ibom State for the period of (1996-2014).

Data Analysis

Data were analyzed using:

(a) Co-efficient of Variation (CV)= $\frac{S.D}{\bar{x}} \times \frac{100}{1}$

This explains the extent of variation in the price of the products;

Where;
C.V=Co-efficient of Variation
S.D= Standard deviation
$\bar{x}$ = Mean price (Frend & William, 1983).

While standard deviation was computed using the formula below;

$$SD = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$$

Where;
x= Price of item
$\bar{x}$= Grand Mean
n= Number of months

Three functional forms were used in order to obtain the lead equation thus;

(i) Linear form: $P=b_0 + b_1 T + \mu t$

Where;
P= Retail market price trend value
b_0= Constant term
b_1= Regression Coefficient
T= Trend (indicating time)
μt= Error term

(ii) Semi log form; $Lnp = b_0 + b_1 T + \mu t$

(iii) Double log form; $Lnp = b_0 + b_1 LnT + \mu t$

The trend elasticity were computed from the three functional forms of the regression using then formula shown below;

For the linear form,

$Ep = b_1 . \frac{\bar{X}}{Y}$

Where;
Ep= Trend elasticity
b_1= Regression coefficient
$\bar{x}$ = Mean of independent variable
y= Mean of dependent variable

For semi log form,

$Ep = b_1 \bar{X}$

Where; Ep = Trend Elasticity
b_1 = Regression coefficient
x = Mean of then independent variable

For the double log form;

$Ep = b_1$

Where; the trend elasticity Ep is equal to the regression coefficient (b_1). (Olayide & Heady, 1982).
Computation of annual percentage change for the period (1996-2014) as the means of comprising the retail market price trend. The mathematical model used was percentage change in price.
The formula is given as;

$$\frac{Pt_1}{Pt_0} \times \frac{100}{1}$$

Pt_1 = present price
Pt_0 =Previous price or past price (Udom, 1990).

3.0 RESULTS AND DISCUSSIONS

3.1 Assessment of movement of annual mean retail market prices of selected food items in Akwa Ibom State (1996 to 2014)

Table 1 shows the yearly mean average prices of rice, garri, yam, palm oil, beans, egg, maize and plantain. These prices were 25.495, 15.006, 198.728, 120.638, 24.179, 213.084, 20.794 and 13.292 respectively.

The lowest average yearly retail price of rice for the period of study was recorded in 2000 with ₦10.625/7cm cup while the highest average price was in 2014 with ₦42.538/7cm cup.

For garri, the lowest average yearly price was recorded in 1999 with ₦3.722/7 cm cup and the highest average yearly price was recorded in 2013 with ₦23.291/7cm cup respectively.

For yam, the lowest average year price was recorded in 1996 with ₦30.755/kg and the highest average yearly price was in 2004 with ₦1096.3021kg respectively.

For palm oil, the lowest yearly average yearly prices were recorded in 1998 with ₦10.259/*luzocade* bottle while the highest price was in 2013 with ₦52.619/*luzocade* bottle. For beans the lowest average yearly prices was recorded in 1998 with ₦10.259/7cm cup, while the highest price was in 2013 with ₦52.619/7cm cup.

For egg, the lowest average yearly prices was recorded in 1996 with ₦83.198/dozen while the highest yearly prices was in 2014 with ₦356.396/dozen.

For maize, the lowest average yearly prices was recorded in 1996 with ₦6.624/7cm cup while the highest yearly prices was recorded in 2012 with ₦39.706/7cm cup.

For plantain, the lowest average yearly retail prices was recorded in 1996 with ₦24.591/bunch while the highest average yearly prices was in 2013 with ₦230.735/bunch respectively.

3.2 Estimated Annual Percentage Change in the Retail Market Prices of Selected Commodities across the State 1996 – 2014.

The highest average annual percentage change in price for the period was observed for yam (35.946%) (Table 2). Bulkiness, transportation and handing costs of this commodity contributed this observed high variability in price. Price instability in yam is also associated with its perishable nature and the seasonal pattern of production which is influenced by weather condition.

Garri, beans, plantain, palm oil had an average percentage change in retail prices of 25.108%, 15.131%, 13.449%, 10.489% and 9.949% respectively.

Maize and rice had an average annual percentage change of 9.326% and 9.949% respectively for the period, 1996 – 2014. This observed moderate percentage changes in retail prices of grains may have resulted due to the massive importation of these commodities resulting in decrease in price thereby stabilizing the price of these commodities.

Egg had the least average annual percentage change of 7.248%, several farms in Akwa Ibom State that are involved in egg production all year round.

3.3 Estimated Trend Analysis of the Selected Commodities (1996 to 2014).

Trend analysis was carried out by fitting the retail market prices of selected commodities in Akwa Ibom State for the periods 1996 – 2014 as a function of trend in a regression analysis. The estimated linear, semi- log and double log trend line equations are shown in table 3. The lead equations were chosen based on statistical significance of the trend coefficient and the magnitude of the adjusted R^2.

3.4 Estimated Trend Elasticities

The lead equation chosen among the three functional forms was used to compute the trend elasticity shown in table 4.

The estimated trend elasticity for rice, beans, palm oil, egg, maize and plantain are 0.493, 0.676, 0.782, 0.693, 0.746, and 0.118 respectively indicating that these commodities are price inelastic. That is one percent change time will bring about 0.493%, 0.676%, 0.782%, 0.693%, 0.746%, and 0.118% change in prices of rice, beans, palm oil, egg, maize and plantain respectively.

However, the estimated trend elasticity for garri and yam were 1.370 and 1.674 indicating that these

commodities are price elastic. That is a unit change in time will bring about 1.370% and 1.674% changes in retail market price of garri and yam respectively.

4.0 Conclusion and Recommendations

The retail market prices of selected food commodities like rice, garri, yam, maize, palm oil, egg, bens and plantain in Akwa Ibom State all showed an increasing trend in prices overtime. However, there was no uniformity in terms of the periods during which these prices increases occurred for the selected agricultural commodities during the study period (1996-2014).

In order to check the increasing price trend of these commodities, there is need for current information especially in the area prices as it affects production and distribution of these commodities as this shapes expectations about future prices thus enabling the markets to function effectively. Also, policy measures that will encourage the collection of information on food stock should be adopted as this would better inform market participants and help avoid panic-induced price surges resulting from misinformation.

Conflict of interest

The authors declares no conflict of interest

Table 1: Average yearly prices of some selected commodities in Akwa Ibom State (1996 – 2014).

YEAR	RICE	GARRI	YAM	PALM OIL	BEANS	EGG	MAIZE	PLANTAIN
1996	11.955	5.168	30.755	41.547	13.041	83.198	6.624	24.591
1997	12.583	6.153	41.705	36.813	11.878	96.813	8.195	28.422
1998	11.902	4.651	35.962	44.869	10.259	98.83	9.429	28.564
1999	12.668	3.722	34.034	60.235	11.105	105.008	10.202	28.006
2000	10.625	7.735	141.25	80.2	10.65	126	11.5	60.25
2001	13.658	12.783	233.9	93.9	14.888	146.725	14.15	72.875
2002	15.211	11.146	228.85	96.9	13.056	155.575	15.975	116.255
2003	18.129	9.753	227.909	118.697	15.629	164.492	14.877	108.032
2004	22.978	11.091	1096.302	99.597	20.325	210.34	19.49	114.325
2005	29.558	15.446	341.13	97.824	26.427	180.728	19.571	130.036
2006	28.861	15.514	118.27	144.995	21.702	265.497	25.425	112.302
2007	29.333	13.532	171.511	144.958	17.104	276.964	21.073	174.809
2008	35.453	18.216	168.521	159.5	30.169	261.216	25.866	148.105
2009	37.282	24.561	153.73	155.868	34.198	271.871	26.401	139.462
2010	33.345	27.433	158.62	174.568	31.423	275.466	29.167	151.955
2011	29.662	17.362	125.553	166.472	25.921	267.975	32.099	146.444
2012	46.282	23.626	159.483	184.848	50.607	354.764	39.706	159.246
2013	42.388	32.291	169.859	192.577	52.619	356.135	33.91	230.735
2014	42.538	24.928	138.484	198.617	48.41	356.396	31.417	178.13
ΣX	484.411	285.105	3775.828	2292.985	459.411	4048.593	395.077	2152.544
X	25.495	15.006	198.728	120.683	24.179	213.084	20.794	113.292

Source: Computed with Data from Akwa Ibom State Ministry of Finance and Economic Development, 2015.

Table 2: Estimated Average Annual Percentage Change in Retail Prices of selected food items in Akwa Ibom State (1996 - 2014).

Commodities	Estimated Average Annual Percentage (%) Change (1996 – 2014)
Rice	9.949%
Garri	25.108%
Yam	35.946%
Palm oil	10.489%
Beans	15.131%
Egg	7.248%
Maize	9.326%
Plantain	13.449%

Source: Derived from table 1

Table 3: Result of Estimated Retail Market Price Trend Equations for Selected Food items in Akwa Ibom State (1996 – 2014)

	Trend Line Equation	R^2	R^{-2}	F-Statistic
Rice	(a) $P_1 = 8.90 + 1.66^T$ (7.09) + (15.04)	0.546	0.544	226.32
	(b) $Lnp_1 = 2.42 + 0.0705^T$	0.560	0.558	239.54
	(c) $Lnp_1 = 2.10 + 0.493^{LnT*}$ (29.99) (15.56)	0.564	0.562	242.06
Garri	(a) $P_2 = 1.31 + 1.37^{T*}$ (2.07) (24.62)	0.763	0.762	606.04
	(b) $Lnp_2 = 1.49 + 0.102^T$ (27.24) (21.28)	0.707	0.705	452.78
	(c) $Lnp_2 = 0.750 + 0.832^{LnT}$ (8.49) (20.96)	0.700	0.699	439.17
Beans	(a) $P_3 = 2.21 + 2.20^T$ (2.06) (23.31)	0.743	0.742	543.53
	(b) $LnP_3 = 2.14 + 0.0883^T$ (41.78) (19.65)	0.673	0.671	386.27
	(c) $LnP_3 = 1.5859 + 0.675253^{LnT*}$	0.5918	0.5896	272.555
Yam	(a) $P_4 = 165 + 3.34^T$ (4.81) (1.11)	0.6	0.1	1.22
	(b) $Lnp_4 = 4.20 + 0.0707^T$ (34.66) (6.63)	0.19	0.186	44.00
	(c) $Lnp_4 = 3.27 + 0.770^{LnT*}$ (18.73) (9.80)	0.339	0.336	96.06
Palm Oil	(a) $P_5 = 28.0 + 9.27^T$ (6.87) (25.94)	0.782	0.781	673.08
	(b) $P_5 = 3.76 + 0.00921^T$ (119.97) (33.38)	0.857	0.856	1114.43
	(c) $P_5 = 3.02 + 0.782^{LnT*}$ (84.55) (48.63)	0.927	0.927	2365.17
Egg	(a) $P_6 = 52.0 + 16.1^T$ (9.89) (34.95)	0.866	0.866	1221.63
	(b) $Lnp_6 = 4.41 + 0.0851^T$ (207.64) (45.59)	0.917	0.917	2078.09
	(c) $Lnp_6 = 3.79 + 0.693Ln^{T*}$ (109.52) (44.58)	0.914	0.914	1987.68
Maize	(a) $P7 = 3.99 + 1.68^T$ (4.67) (22.40)	0.728	0.728	501.94
	(b) $Lnp7 = 1.99 + 0.909^T$ (49.15) (25.57)	0.778	0.778	653.64
	(c) $Lnp^7 = 1.31 + 0.746Ln^{T*}$ (20.73) (26.21)	0.786	0.785	686.71
Plantain	(a) $P_8 = 15.4 + 9.79^T$ (3.30) (23.83)	0.751	0.750	567.79
	(b) $Lnp_8 = 3.34 + 0.118^{T*}$ (58.65) (23.69)	0.749	0.748	561.02
	(c) $Lnp_8 = 2.34 + 1.03Ln^T$ (32.78) (31.94)	0.844	0.844	1020.14

Note: a b c indicates linear, semi log and double log equation respectively.

i. Figures in parenthesis are standard errors.
ii. Asterisk (*) indicate the chosen lead equation

Table 4: Estimated Trend Elasticities for the selected Agricultural Commodities in Akwa Ibom State (1996 – 2014)

S/N	Selected Commodities	Trend Elasticities
1.	Rice	$Ep_1 = 0.493$
2.	Garri	$Ep_2 = 1.370$
3.	Beans	$Ep_3 = 0.746$
4.	Yam	$Ep_4 = 1.674$
5.	Palm oil	$Ep_5 = 0.782$
6.	Egg	$Ep_6 = 0.693$
7.	Maize	$Ep_7 = 0.746$
8.	Plantain	$Ep_8 = 0.118$

Source: Derived from estimated equation (Table 3)

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