

Analysis of Cost-Price Squeeze in Broiler Production Enterprise in Uyo Agricultural Zone of Akwa Ibom State, Nigeria

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Abstract

This study aimed at Analyzing the Cost-Price Squeeze in Broiler Production Enterprises in Uyo Agricultural Zone of Akwa Ibom State. Specifically, the study aimed at comparing the trends in feed costs and broiler meat prices in the study area. The study relied on monthly secondary data from the Akwa Ibom State Agricultural Development Project, complemented with primary data from some long standing feed merchants from January 2000 to December 2011. Agricultural price indices (API) and Ordinary Least Square (OLS) trend estimation procedure were adopted as analytical tools in the study. On the average, cost of broiler feeds increased by 2%, broiler meat increased by 1.3% per quarter. The index of prices received by broiler and index of cost paid out for feeds was consistently below 1 indicating the existence of cost-price squeeze in the broiler production enterprise. The result of the estimated regression parameters indicate a greater increase in broiler feed costs, relative to broiler meat prices. The research shows the existence of cost-price squeeze phenomenon in the broiler enterprise in the study area. The study recommends initiatives that would reduce the cost of poultry feed and/or boost the price of poultry products.

Keywords: Cost-Price Squeeze, Broiler Production Enterprises, Uyo Agricultural Zone, Akwa Ibom State, Nigeria.

INTRODUCTION

Input costs in agricultural production is hypothesized as increasing faster than output prices over time, a phenomenon known as cost-price squeeze. When farmers are caught in farm price-cost squeeze, they are faced with poor economic returns which eventually result in less overall food production (Paarberg, 1982). Shields (2009) stressed that when farm prices fail to keep pace with the cost of inputs, individual farmers begin making business decisions that affect the farm's output. The collective decision by farmers translates into a sector-wide supply response which, because of substantial lags in the production cycle for both crops and livestock, plays a large part in prices that farmers receive in future months.

Campiche, J.L. *et al.* (2006) examined the relationship between prices paid and prices received by farmers using cointegration techniques and also analyzed the response of prices paid and prices received to deviations from their long-run equilibrium relationship. The results of the first cointegrating vector indicate that cointegration between prices received and prices paid could not be rejected. Therefore, prices received and prices paid move together in the long run. These results are not completely consistent with previous findings.

Using agricultural index, OECD (2010) noted that while agricultural input cost increased by 15%, agricultural output price decreased by 3% between 2000 and 2009. It attributed the increased input cost to be largely driven by energy prices while the fall in output price was attributed to low growth in demand. The overall effect, it noted, was a decline in the income of the agricultural sector. Shields (2009) used output and input prices as captured in indices by the USDA to indicate that, since 2007, the livestock sector has seen dramatic changes in its farm prices relative to input cost, in part because producer prices have fallen and feed costs has remained very high.

For developing countries like Nigeria, prices of agricultural products have been static or declining because of the large number of producers producing small quantities of output. The large number of producers and small scale of operation induces competition among them, reduces their bargaining power, thereby keeping prices low (Okuneye, 2001). The case is worse in the poultry sub-sector of the livestock industry where there is competition by imported frozen chicken whose prices are sometimes lower than the cost of domestic production and resulting in declining income levels of consumers (Shittu, A.M., Olayode, G.O., Bamiro, O.M. and Fehintola, A.M., 2004). Thus, there is the perception that poultry farmers are being squeezed by the declining output prices and the increasing input (feed) cost – a phenomenon known as cost-price squeeze. The poultry business is cost-sensitive. Feed cost, for instance, account for between 65% and 70% of the total cost of raising poultry (Bamiro *et al.* 2001). This and other cost of poultry production has increased the price of broiler meat beyond the reach of most Nigerians.

This study therefore investigates the interrelationships or links with three input cost of chick starter mash, grower mash and broiler finisher. The presumption is that a close link exists between feed costs and broiler meat prices through the impact of feed on the cost of production.

Therefore, this research addresses the following questions;

- What is the trend in the different feed costs and broiler meat prices in the period January 2000

and December 2011)?

- Are the costs of broiler feed increasing faster than the prices of broilers in the study period?

Deriving from the research questions is the objective of the study which aimed at comparing the trends in feed costs and broiler meat prices in the study area. This study also addressed this hypothesis; H_0 : there is no significant difference in the annual growth of broiler feed cost (broiler starter and broiler finisher) and the annual growth of broiler meat price during the study period.

MATERIALS AND METHODS

The Study Area. The study was carried out in the Uyo Agricultural Zone of Akwa Ibom State. The Uyo Agricultural Zone is made up of Ibesikpo, Uyo, Uruan, Itu and Ibiono local government areas. The area falls under the rainforest zone with mean annual rainfall of about 2484mm, annual temperature is about 27°C and relative humidity ranges from 70 – 80 percent. Two distinct seasons are discernible; the dry season (November – March) and rainy season (April – October).

The study area is centrally located in Akwa Ibom state, and as the commercial nerve centre assumes extra importance in the state. Economic activities of the inhabitants are farming, trading, crafts, transportation, civil service, artisans etc. The area has a large concentration of poultry farms and large commercial poultry feed depots that serve as a hub of poultry production in Akwa Ibom and the neighboring states of Cross River, Abia and Rivers.

Data Collection. This study relied on secondary data from selected sources. Two long standing feed marketing firms in Uyo constituted the first set of sources of data for the feed cost. The average monthly prices of broiler starter, grower mash and broiler finisher of two major brands of poultry feed was collected from year 2000 to 2011. This study covered a period of One hundred and forty-four (144) months, from January 2000 to December 2011.

The second source of data for the average monthly broiler meat prices was obtained from the Akwa Ibom State Agricultural Development Project office in Uyo.

Data Analysis

Agricultural Price Indices was used to measure average changes in input cost and output prices of poultry production. According to FAO (2012) Agricultural Price Indices comprises (a) The Output Price Index which is based on the sales of agricultural products and (b) Input Price Index which is based on the purchases of the means of agricultural production.

Specifically the Dutot Price Index was used which is obtained by dividing the average price in period t by the average price in period 0.

$$P_D = \frac{\frac{1}{n} \cdot \sum(p_t)}{\frac{1}{n} \cdot \sum(p_0)} = \frac{\sum(p_t)}{\sum(p_0)}$$

Where P_D is the Dutot Price Index, P_t is average price in period t and P_0 is average price in period 0 (the base year) and n the number of observations in period t and period 0. It was then normalized to provide the values in percentages which indicate the relative changes from different periods ($t = 2000:2 \dots 2011:12$) and the base period 0 (2000:1).

The index of prices received and the index of input costs paid by farmers were compared by dividing the first index by the second one. Movements in this ratio essentially measures output price relative to input costs over a particular period of time. If the ratio increases over a certain period, farm prices are rising faster than input costs and are to the benefit of the farmer. A declining ratio indicates a financially unfavourable circumstance for the farmer (Shield, 2009).

Ordinary Least Squares regression was used to estimate the trend. The linear form shown below was used for analysis;

$$PY_i = \Psi_0 + \Psi_1 T_i + \varepsilon_i$$

Where PY_i is the average price of the variables (broiler meat and feed) measured in naira per kilogram and naira per 25kg bags respectively, T_i is the time trend measured in quarters, Ψ_0 is the intercept, Ψ_1 is the slope or trend coefficient, and ε_i is the error term. The slope coefficient, Ψ_1 , gives the average increase or growth rate.

The linear functional form was adopted because its coefficients appeared more realistic and was similar to those obtained using price indices. The r^2 and the adjusted r^2 values were also high.

Result and Discussions.

Analysis of Broiler Feed Cost and Broiler Meat Price Increases.

An understanding and discussion of the trend in costs of broiler feeds and prices of broiler meat will be made explicit by considering Table 1 (see appendix) and figure 1. The table summarizes the quarterly average costs of broiler feed (broiler starter and broiler finisher) and the corresponding price of broiler meat for the period of the study. It also contains the cost of the broiler feed and price of the output in an index form with the period 2000:1 as the base period. The index form is very useful in that the cost for the feed and prices of broilers are measured using the same criterion and therefore lends itself to comparison.

While the cost of broiler feed doubled within the study period (99%), broiler meat price increased by 63%. On the average, cost of broiler feeds increased by about 2% quarterly, broiler meat increased by about 1.3% quarterly. Given the high proportion of cost of production that is occupied by feed cost, such disproportional increase in feed cost relative to broiler meat price can only reduce the margin accruable to broiler farmers in the study area.

This is very similar to the findings of an EU report (2007) that between the period 2002 and 2007 prices for agricultural products decreased in almost all countries of the European Union, whereas in the case of input prices, the decrease was not as sharp as for output prices. It concluded that the decline in producer prices that had been affecting the sector for years and the growth in prices of input costs and services were having a negative impact on income from production in almost all EU states.

Similar findings were made in Pakistan by Chaudhry (1995) who observed that low prices of agricultural product had been associated with immense resource transfer from or implicit taxation of agriculture.

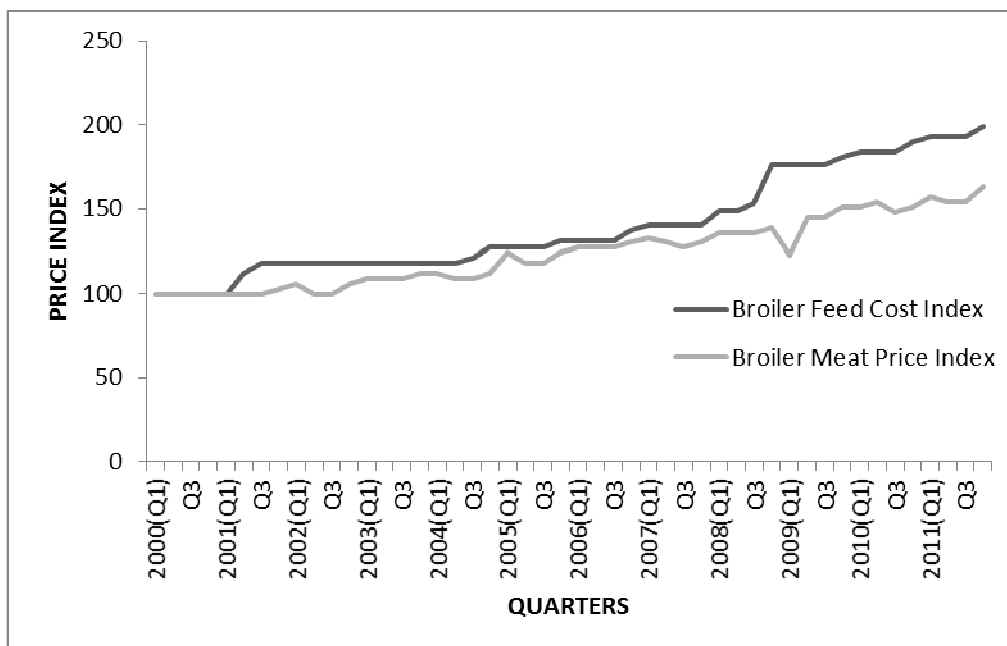


Figure 1: Quarterly Price Indices of Broiler Feeds and Broiler Meat

One obvious observation that can be seen in figure 1 is the closeness of the two indices up to about the 3rd quarter of 2008 and the divergence of the curves from that period onwards. This effectively divides the study period into two. The year 2008 witnessed a significantly high increase in the prices of food in general and grains in particular that became known as the food crises. The high prices did not seem to affect broiler meat, but affected feed cost through increased grain prices.

This suggests that spikes in prices negatively affect the fortunes of farmers because not only does broiler price increases lag behind feed cost increases, but that the broiler farmer cannot make up for increases in feed cost by increasing his product price in the same proportion. This fits in with Kohls and Uls, (1990) observations that for products with relative elastic demand curve such as broilers, increases in price reduce total revenue. The competitive market structure of broiler products does not allow for the broiler farmers to pass on the increased cost of production to the consumers.

The index of prices received by broiler farmers when compared with the index of prices paid out as input cost can also give an idea of the existence of cost-price squeeze. The index was consistently below 1 and decreasing (Figure 2) indicating that broiler feed costs increased faster than broiler meat prices, with the attendant negative effect on broiler farmers.

Analysis of Trends in Broiler Feed Cost and Broiler Meat Price.

Four functional forms of trend analysis (Linear, Semi-log, Double-Log and Exponential) were fitted to the data. The parameters for the models are shown in Table 2 and Figure 2.

The parameters for the four functional forms were significant and so the linear model was chosen because of the higher coefficient of determination (r^2) and adjusted r^2 values as the lead equation and formed the basis for analysis. The growth rates, as defined by the slopes (b_1) which is 0.198 and 0.118 were very close to the growth rate derived when Agricultural Price Indices (Input Price Index (and Output Price Index) were calculated.

Table 2: Estimated Regression Parameters for the Four Functional Models in broiler production Enterprise.

Item	b_0	b_1	r^2	adj r^2	F-ratio	p-value	d
<u>Broiler Feed</u>							
Linear	1028.8 (34.3)***	0.198 (10.52)***	0.946	0.925	672.8	0.000	1.89
Semi-log	871.69 (17.69)***	1.42 (0.51)***	0.718	0.702	117.3	0.000	1.78
Double-log	1212.3 (40.5)***	23.43 (21.97)***	0.823	0.791	482.6	0.000	1.80
Exponential	1120.4 (36.21)***	1.68 (0.72)***	0.913	0.891	153.7	0.000	1.92
<u>Broiler Meat</u>							
Linear	335.19 (50.89)***	0.118 (10.52)***	0.956	0.948	485.01	0.000	1.93
Semi-log	257.99 (12.93)***	0.837 (10.35)***	0.700	0.693	107.2	0.000	1.78
Double-log	289.71 (24.6)***	0.856 (11.31)***	0.736	0.730	128.1	0.000	1.80
Exponential	352.8 (67.58)***	0.555 (28.02)***	0.945	0.931	784	0.000	1.92

Values in parenthesis are calculated t-values. *** Significant at 0.01%

Thus, the estimated equations for the feed input cost and product price variables are;

$$\text{Broiler Feed Cost: } Y_i = 1028.8 + 0.198T_i$$

$$\text{Broiler Meat Price: } Y_i = 335.19 + 0.118T_i$$

The coefficient of the slopes for the broiler feed (0.198) is larger than that of the broiler meat (0.118) indicating a greater increase in feed (input) costs, relative to price of output (Broiler meat).

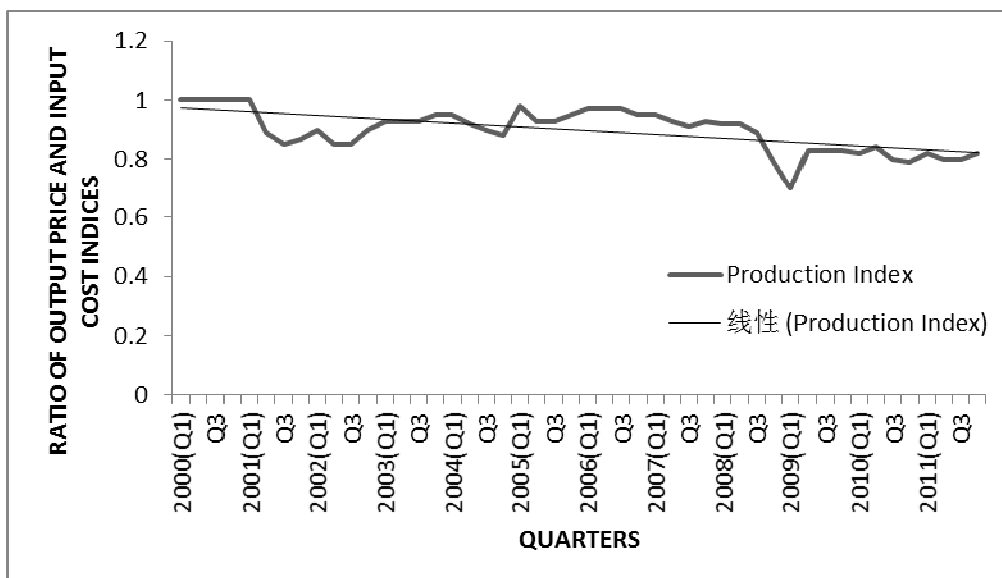


Figure 2: Ratio of Output Price and Input Cost of Broiler Production for the Study Period

The graph for the input cost and output price and their corresponding trend lines is given in Figure 3.

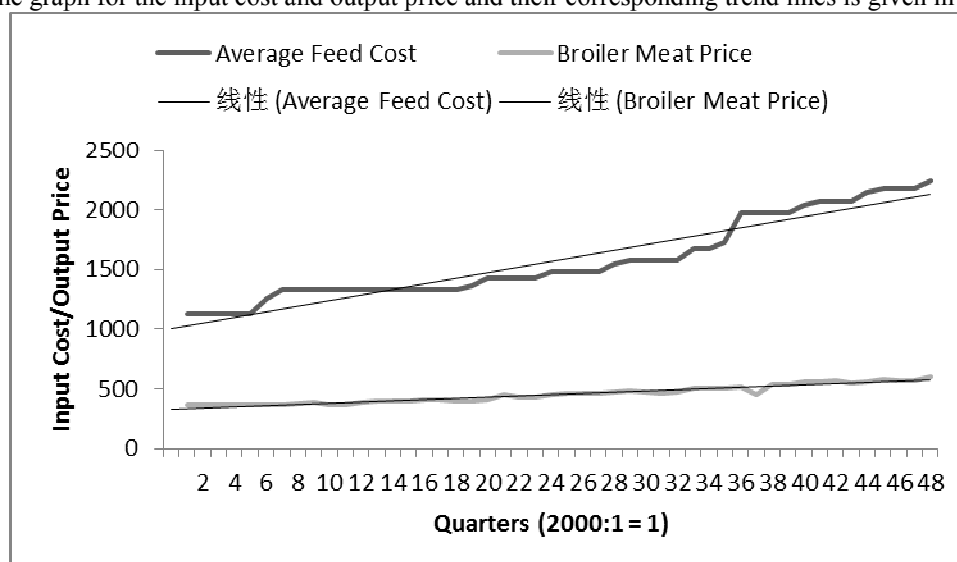


Figure 3: Quarterly Broiler Feed Cost and Broiler Meat Prices showing their Linear Trend in the Study Period

The increases in both the costs of broiler feeds and broiler meat was subjected to t-test analysis and result showed that there was a significant difference in the increases in the cost of broiler feeds and the increase in the price of broiler meat ($P < 0.01$).

Conclusion and Recommendations

While the cost of broiler feed doubled within the study period (99%), broiler meat price increased by 63%. On the average, cost of broiler feeds increased by about 2% quarterly, broiler meat increased by about 1.3% quarterly. Given the high proportion of cost of production that is occupied by feed cost, such disproportional increase in feed cost relative to broiler meat price can only reduce the margin accruable to broiler farmers in the study area.

The index of prices received by broiler farmers when compared with the index of prices paid out as input cost can also give an idea of the existence of cost-price squeeze. The index was consistently below 1 and decreasing, indicating that broiler feed costs increased faster than broiler meat prices, with the attendant negative effect on broiler farmers.

The parameters for the four functional forms were significant and so the linear model was chosen because of the higher coefficient of determination (r^2) and adjusted r^2 values as the lead equation and formed the basis for analysis. The growth rates, as defined by the slopes (b_1) which is 0.198 and 0.118 for feed cost and broiler meat price respectively were very close to the growth rate derived when Agricultural Price Indices (Input

Price Index and Output Price Index) were calculated.

The increases in both the costs of broiler feeds and broiler meat was subjected to t-test analysis and result showed that there was a significant difference in the increases in the cost of broiler feeds and the increase in the price of broiler meat ($P < 0.01$). The study therefore concluded that there is existence of cost-price squeeze phenomenon in the broiler enterprise in the study area.

Given the existence of cost-price squeeze in poultry production in the study area, study makes the following recommendations;

- Broiler producers should explore the option of formulating their feeds as a means of controlling feed price increases,
- A transfer payment system that compensates the farmers in terms of the difference between increase in feed cost and broiler meat price could be put in place to stabilize the income of farmers.
- The stagnation of broiler meat prices could be improved upon if cheaper and subsidized imports are discouraged or are taxed in such a way as to make them competitive
- As the study area has a high concentration of broiler farms, farmers should form themselves into cooperatives for a coordinated product marketing and financing of production.
- Broiler farmers could also explore the possibility of a cooperative feed mill in a form of backward integration.
- The Ministry of agriculture could explore a Public-Private sector initiative for the establishment of a feed mill in the study area.

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APPENDIX

Table 1: Quarterly Cost of Different Broiler Feeds, Prices of Broiler Meat and their Corresponding Indices

Quarters	Broiler Starter	Broiler Finisher	Average Feed Cost	Broiler Meat	Average Broiler Feed Index	Broiler Meat Index
2000(Q1)	1150	1100	1125	367	100.00	100.00
Q2	1150	1100	1125	367	100.00	100.00
Q3	1150	1100	1125	367	100.00	100.00
Q4	1150	1100	1125	367	100.00	100.00
2001(Q1)	1150	1100	1125	367	100.00	100.00
Q2	1283	1233	1258	367	111.82	100.00
Q3	1350	1300	1325	367	117.78	100.00
Q4	1350	1300	1325	378	117.78	103.00
2002(Q1)	1350	1300	1325	389	117.78	105.99
Q2	1350	1300	1325	367	117.78	100.00
Q3	1350	1300	1325	367	117.78	100.00
Q4	1350	1300	1325	389	117.78	105.99
2003(Q1)	1350	1300	1325	400	117.78	108.99
Q2	1350	1300	1325	400	117.78	108.99
Q3	1350	1300	1325	400	117.78	108.99
Q4	1350	1300	1325	411	117.78	111.99
2004(Q1)	1350	1300	1325	411	117.78	111.99
Q2	1350	1300	1325	400	117.78	108.99
Q3	1383	1333	1358	400	120.71	108.99
Q4	1450	1400	1425	411	126.67	111.99
2005(Q1)	1450	1400	1425	456	126.67	124.25
Q2	1450	1400	1425	433	126.67	117.98
Q3	1450	1400	1425	433	126.67	117.98
Q4	1500	1450	1475	455	131.11	123.98
2006(Q1)	1500	1450	1475	467	131.11	127.25
Q2	1500	1450	1475	467	131.11	127.25
Q3	1500	1450	1475	467	131.11	127.25
Q4	1567	1517	1542	478	137.07	130.25
2007(Q1)	1600	1550	1575	489	140.00	133.24
Q2	1600	1550	1575	478	140.00	130.25
Q3	1600	1550	1575	467	140.00	127.25
Q4	1600	1550	1575	478	140.00	130.25
2008(Q1)	1700	1650	1675	500	148.89	136.24
Q2	1700	1650	1675	500	148.89	136.24
Q3	1750	1700	1725	500	153.33	136.24
Q4	2000	1950	1975	511	175.56	139.24
2009(Q1)	2000	1950	1975	450	175.56	122.62
Q2	2000	1950	1975	533	175.56	145.23
Q3	2000	1950	1975	533	175.56	145.23
Q4	2067	2017	2042	555	181.51	151.23
2010(Q1)	2100	2050	2075	556	184.44	151.50
Q2	2100	2050	2075	567	184.44	154.50
Q3	2100	2050	2075	544	184.44	148.23
Q4	2167	2117	2142	555	190.40	151.23
2011(Q1)	2200	2150	2175	578	193.33	157.49
Q2	2200	2150	2175	567	193.33	154.50
Q3	2200	2150	2175	567	193.33	154.50
Q4	2267	2217	2242	600	199.29	163.49

Source: Composed from data obtained from AKADEP (2013)

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