

IMPLICATIONS OF SEASONAL PRICE PATTERNS AND TRENDS OF TABLE EGGS, LAYERS MASH AND PULLET DAY-OLD CHICKS FOR EGG PRODUCERS IN OGUN STATE, NIGERIA

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Target Audience: Ogun State livestock services department, poultry farmers, feed millers.

ABSTRACT

The study investigated seasonal price patterns and price trends for table eggs, layers mash and pullet day-old chicks. It tested for shift in seasonal price patterns over the study period, and examined for similarity in seasonal price patterns, time lag in seasonal price patterns of table eggs and layers mash on one hand and that of table eggs and pullet day-old chicks on the other. Secondary data on the commodities retail price on monthly basis from Livestock Services Department, Ogun State Ministry of Agriculture and Natural Resources, Abeokuta, between 1987 and 1996 were used for the analysis. Annual average commodity retail price of each year was used as each year's base price and monthly price indices were calculated for each of the year.

Intra and inter-commodity comparisons, of ten-year and five-year mean price indices of table eggs and layers mash, showed that they are similar which indicated no shift in seasonal price patterns over the period and that prices of table eggs and layers mash move together, with instant response of egg producers to rise in layers mash price by an increase in the price of eggs. Annual percentage increase in price for layers mash were however higher than those of egg price indicating that profit level of egg producers is being eroded by rising cost of layers mash over time. It is concluded that this phenomenon is partly responsible for the rate at which egg producers exit the enterprise, and a solution to the problem is advocated.

Intra commodity comparison of ten-year mean price indices for pullet day-old chicks, showed similar patterns buttressing no shift in seasonal price pattern over the study time for the commodity. However, inter commodity comparison of the seasonal price patterns for table eggs and pullet day-old chick, showed lack of such similarity. The implication of the observed pattern is discussed.

Key words: Eggs, layers mash, pullet day-old chicks, seasonal price patterns, price trend, profit

DESCRIPTION OF PROBLEM

All food crops are harvested at specific times for immediate consumption and subsequent storage of excess for gradual consumption throughout the rest of the year. For these crops, prices are lowest at harvest period and gradually rise in response to storage cost until next harvest. Maize, a major component of poultry feed, belongs to this class of crops which exhibit seasonal price patterns. The price of maize was found to peak above annual average during the months of March through July while it is below annual average during the other months (1).

Olanloye (2) found layers mash to account for 65% of the cost of poultry production. Poultry feed price would therefore necessarily exhibit seasonal price patterns similar to that of maize, to some extent. Layers mash is fed to pullets to produce eggs. If layers mash exhibits seasonal price pattern, egg price too would exhibit seasonal price behaviour. Egg price is therefore expected to move with the price of layers mash. It is thus postulated that egg price and layers mash price exhibit similar seasonal price patterns.

Pullet day-old chicks are important and inevitable input in the enterprise of egg production, just as layers mash. Pullet day-old chicks are housed, fed and medicated for 5-6 months before coming to lay. Due to the effect of festivities which make demand to vary for the end product of pullet birds (i.e. culled pullets), and probably the preference of some months for raising pullet day-old chicks in order to achieve lower mortality, it is postulated that pullet day-old chicks too, exhibit seasonal price patterns. Given that pullet day-old chick is an input in egg production enterprise, its seasonal price pattern and price trend have significance for the profit of egg producers. Current price of eggs is not expected to be related to current price of day-old chicks though a lagged value of day-old chicks may be. In the event of faster rising price of day-old chicks (cost) than the price of eggs (revenue), further erosion of the profit level of egg producers is implied.

Trapp (3) observed that the use of index number in investigating seasonal price pattern is as reliable as using sophisticated econometric methods. Seasonal price behaviour of table eggs, layers mash and pullet day-old chicks were thus examined in this study using monthly average price indices over some years in order to investigate the implication of their relationship for egg producers' profit margin.

METHODOLOGY

Monthly time series retail price data for table eggs, layer's mash and pullet day-old chicks between 1987 and 1996 collected by Ogun state Ministry of Agriculture and Natural Resources, Livestock Services Department, form the secondary data used for this study. For each year, the annual average commodity retail price was calculated. The monthly retail prices in a given year were converted into indices by dividing a given month's retail price by

the annual average retail price and multiplying by 100 (4). The monthly indices were calculated for each of the ten years, 1987-1996. Ten-year and five-year average monthly price indices for the commodities were estimated by finding the mean index for each month using 1987-1996 and 1992-1996 commodity price indices respectively.

The standard deviations and standard error values for each month's indices and each month's mean index values respectively were calculated in order to provide means for evaluating the consistency of the seasonal price pattern represented by the average index values.

The ten-year and five-year average monthly price index values were used to investigate if there had been any shift in the average seasonal patterns. This was obtained by finding the difference between the corresponding months' ten-year and five-year average price indices and comparing with the sum of their standard errors (3).

The strength of the coincidence of the peak price index (defined as the ratio of the number of times the actual highest annual price fell in the same or adjacent month to the number of years of observation) was evaluated for an explanation of whether the patterns are due to seasonal forces (1)

The annual average price trends and percentage change in annual average prices for the period 1987 to 1996 are discussed for the three commodities. Monthly current retail price of eggs (P_{Et}) was regressed on current monthly retail price of layers mash (P_{Lt}) using Ordinary Least Squares linear model. Likewise, current monthly retail price of eggs (P_{Et}) was regressed on current monthly retail price of layers mash (P_{Lt}), current monthly retail price of pullet day-old chicks (P_{Ct}) and literately selected lagged monthly retail price of pullet day-old chicks (by 4,5 and 6 months), using also Ordinary Least Squares linear model to check for relationships.

RESULTS AND DISCUSSION

In Table 1, ten-year and five-year average monthly price indices for table eggs depict similar seasonal price pattern. The peak price was recorded in August while the trough occurred in January. The January trough price index rose gently but still below 100 till April. The rise continued between May and October with the price index being above 100. By November, a decline set in and price indices for November and December were below 100.

With respect to layers mash, the seasonal price pattern observed for the ten-year and five-year average indices were similar too. The peak price period was August while the trough price period was January. Starting from January price trough, layers mash price rose gently until April with the price index being below 100. By May, the index rose beyond 100, reached the peak in August where again it started declining but still above 100. By November and December the declining price index fell below 100.

Table 1: Average monthly price indices for table size eggs, layers mash and pullet day-old chicks (1987-1996)

Table size eggs	Jan	Feb.	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec.
Last 10-year avg. index	92.54	94.06	95.70	98.77	100.40	104.01	107.16	109.05	102.34	100.47	98.43	97.07
Standard error	0.67	0.56	0.67	0.55	0.47	0.62	0.58	0.64	0.68	0.62	0.69	0.82
Last 5-year avg. index	91.97	93.81	95.11	98.11	100.10	103.30	106.15	108.31	103.03	101.29	99.75	99.05
Standard error	0.80	0.60	0.61	0.58	0.73	1.02	0.88	0.84	0.35	0.49	0.67	0.95
Layer mash												
Last 10-year avg. index	92.02	94.68	96.66	99.34	101.22	103.62	105.27	106.87	102.19	100.32	92.15	98.35
Standard error	1.80	0.99	0.59	0.61	0.70	0.74	1.09	1.24	0.68	0.56	0.74	0.78
Last 5-year avg. index	92.10	94.21	96.70	99.50	101.64	104.08	106.37	107.57	101.98	99.91	98.35	97.58
Standard error	1.58	1.23	0.72	0.74	1.04	1.22	1.80	1.92	0.76	0.94	1.26	1.45
Pullet day-old chicks												
Last 10-year avg. index	88.76	91.66	95.46	95.46	96.86	100.46	103.25	105.48	108.38	110.71	104.01	101.43
Standard error	2.52	1.76	1.16	1.16	0.96	0.77	1.10	1.35	1.68	1.73	1.61	1.82
Last 5-year avg. index	85.46	88.88	93.60	93.60	95.46	99.59	103.53	105.95	109.91	112.67	107.55	105.40
Standard error	3.32	2.25	1.69	1.69	1.61	0.83	1.46	1.76	2.18	1.73	2.13	2.39

For the ten-year and five-year average monthly price index values for pullet day-old chicks, they showed a similar pattern as they recorded their peak and trough price of index values in the months of October and January respectively. With regards to the months in which the monthly average price index values were either above or below 100, the same pattern was obtained using the ten-year and five-year mean monthly index values for all the months except June, when the monthly price index value for the ten-year monthly mean price index value was above 100 while it was below for the five-year monthly mean price index value. The difference is however not statistically different from zero using t-test, at a = 0.05 level. Ten-year and five-year monthly price index values were above 100 for the months of July through December with peak in October while it was below 100 for the months of January through May, with the trough in January.

The test to find out whether or not there is a shift in the seasonal price pattern upheld the null hypothesis that there is no significant change in seasonal price pattern for the period under study for all the three commodities. It was observed that for all the months, the difference between ten-year and five-year average monthly price indices were smaller than the sum of their standard errors as suggested by Trapp (3).

Contrasting the seasonal price pattern for table eggs with layers mash, it was observed that they moved together. The months where price indices were below 100 coincide for the two commodities and likewise were those months when they were above 100. The only month where there was a slight difference in mean price index was the month of October for the five-year mean price index for layers mash. It was below 100 in contrast with the others, which were above 100.

The strength of coincidence of the peak monthly mean price index was 1.00 for 10-year and 5-year mean price indices of table eggs and layers mash which supports seasonal factor as being responsible for the observed patterns.

From the 10-year and 5-year mean price indices for eggs and layers mash therefore, one can infer that the prices for both table eggs and layers mash were least in January with the mean index of about 92. Between January and April the retail prices rose but below annual average. Between May and October retail prices of both commodities were above annual average and the peak average price index occurred in August with an index of 106. The months of May to October therefore represented high price months for the commodities. August rise was thus 6 percent above annual average. In the months of November through April, the commodity prices were on the average below annual average prices. No time lag was observed in price movement for both table eggs and layers mash. The correlation coefficient between the monthly retail price of table egg and layers mash was found to be 0.9775 showing a high degree of association.

For the period under study (1987-1999), annual mean retail price of a tray of eggs ranged between ₦10.78 and ₦168.30, an increment of 1466.14% while that

of 25kg layers mash ranged from N16.26 to N570.75, an increment of 3410.15% (Table 2). This simple analysis shows that the price of layers mash has been rising faster than that of eggs. A rise in the price of layers mash is an erosion of the profit of producers if it is not immediately followed by a concomitant rise in the price of eggs. Given however that more loss is sustained through increase in layers mash retail price than the increased revenue from increased retail egg price, the resultant effect is a drain on the revenue of egg producers and consequently an erosion of their profit. The implication of this is that the profit level of egg producers was greatly eroded by the rising cost of layers mash, but the tempo dampened between 1991 and 1992, 1993 and 1994 and 1995.

Table 2: Average Annual Price for a tray of Table Eggs, (N) 25kg layers mash (N), pullet day-old chick (N) and their annual percentage increase

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Table eggs	10.78	13.79	18.63	18.67	27.54	64.67	73.08	98.92	160.33	168.83
Annual Percentage increase, %		27.5	35.10	0.21	47.51	134.82	13.01	35.36	62.08	5.30
Layers mash	16.26	31.96	44.33	48.71	77.83	161.08	189.25	250.42	387.50	43.58
Annual Percentage increase %		96.56	38.70	9.90	59.78	106.96	17.49	32.52	58.73	43.58
Pullet day-old chick	1.50	1.95	4.86	5.03	7.52	18.87	13.30	30.33	55.08	56.17
Annual Percentage increase		30.00	149.23	3.50	49.50	150.93	29.52	128.05	81.60	2.00

The result of the regression of current monthly retail price of a tray of eggs (P_{Et}) on current monthly retail price of 25kg of layers mash (P_{Lt}) in Table 3 shows that price of layers mash explained over 95% of the variation in the monthly price of eggs. Further, the estimated regression parameters are significant at 5% level. These lend support to goodness of fit for the model used. The interpretation of the estimated slope parameter of N0.32, is that, one naira increase in the price of layers mash resulted in N0.32 increase in the price of a tray of eggs. This further corroborates the fact that the increase in price of layers mash outstripped the increase in price of eggs.

Table 3: Result of the Regression of current monthly retail price of a tray of eggs (N) (P_{Et}) on Current monthly retail price of 25kg layers mash N (P_{Lt}) (1987-1996)

P_{Et}	=8.1613* + 0.3208* P_{Lt} , $R^2 = 0.9557$; Adjusted $R^2 = 0.9553$
Standard error	(1.5859) (0.0064)
T-Statistics	5.146 50.42 n = 72
*Significant at	5% level

Contrasting the seasonal price pattern of table eggs with that of pullet day-old chicks, based on either the ten-year or the five-year monthly average index values (Table 1), price indices from January to April were below 100, for the two commodities. From July to October, the annual average price indices were above 100 for the two commodities. However for the months of November and December the monthly average price indices were below 100 for table eggs while they were above 100 for the pullet day-old chicks. In May, average

monthly price indices were above 100 for table eggs while they are below 100 for pullet day-old chicks during the period under review.

The annual average price trend for pullet day-old chicks in Table 2, shows an upward trend ranging between N1.50 and N56.17. Using 1987 as the base price with an index of 100, the price of pullet day-old chicks rose to an index of 3744.66 in 1996 which is an increment of 3644.66 percent. The annual percentage increase in price of pullet day-old chicks vis-a-vis the annual percentage increase in the price of table eggs shows that the price of pullet day-old chicks rose faster than that of table eggs. (Table 2) over the years except for between 1992 and 1993; and between 1995 and 1996 in which the annual percentage increase in price of table eggs was higher. However, the increase was not enough to off-set the faster rising price of pullet day-old chicks. This further shows another area of erosion of the profit margin of table egg producers.

The result of the regression of current monthly price of table eggs (P_{Et}) on current monthly price of layers mash (P_{Lt}) and current price of pullet day-old chicks (P_{Ct}) gave a good fit given the significance of the estimated parameters and the high adjusted coefficient of determination (R^2). However, only an additional 1.8% of the variation in the price of egg was explained by including the current price of pullet day-old chicks (Table 4) in the model. The regression of current monthly price of table eggs on each of the lagged variable of price of pullet day-old chicks by four, five and six months, (not reported), gave models with fairly good fit, but not as good as with only current price of pullet day-old chicks. The relatively poorer explanation of the variability in egg price, by each of these variables attests to the fact that lagged price of pullet day-old chicks by those lengths of months did not influence the price of table eggs considerably as expected.

Table 4: Result of the Regression of current Monthly Retail Price of Table Eggs on current Monthly Retail Price of Layers Mash and Monthly Retail Price of Day-Old Chicks

$$P_E = 9.9035^* + 0.1742^* P_{L_t} + 1.3117^* P_{C_t}, R^2 = 0.9738; \text{ Adjusted } R^2 = 0.9733$$

Standard error (1.2403) (0.01704) (0.1460)

T-Statistics 7.985 10.221 8.987 $n = 72$

*Significant at 5% level

The non-similarity in the seasonal price pattern of table eggs and pullet day-old chicks,, supports logical thinking because the price of pullet day-old chicks is a once and for all event in the egg production cycle and a lag should be expected in the response between the price of table eggs and price of pullet day-old chicks. However, because of the problem of multi-collinearity between the price of layers mash, pullet day-old chicks and lagged values of the price of pullet day-old chicks, most of the variability in the price of table eggs is explained by current price of layers mash (Tables 3 and 4). Inclusion of the price of pullet day-old chicks only improved the explanatory power of the model in Table 4 by just 1.8%.

The relatively higher price of pullet day-old chicks in July than the annual average price, the period when there was egg glut, indicates further erosion of the profit margin of egg producers, if the period coincided with high demand for pullet day-old chicks, which was likely to be so, given the high price that prevailed then.

CONCLUSION

1. The high price months for both table eggs and layers mash were found to be June, July, August, September and October while the low price months were November, December, January, February, March and April.
2. This did not completely tally with March-July high price months for maize as found by Afolami and Dipeolu (4), but there was an overlap in the months of June and July.
3. The joint movement of the prices of table eggs and layers mash as found in this study implies that there was a direct price relationship between table eggs and layers mash.
4. No time lag in price movement for the two commodities suggests instant response of egg producers to rise in layers mash price by an increase in price of eggs.
5. The price of trays of eggs rose less proportionately with increasing price of layers mash, thereby eroding the returns to investment of poultry egg producers, though no time lag was observed in the price of table eggs and layers mash.
6. The egg producers were off during the glut periods, because they continued feeding birds with layers mash whose price rose higher than the price of eggs which rose to a lower extent than the price of layers mash.
7. The price of pullet day-old chicks rose faster than that of table eggs, with the implication of further erosion of egg producers profit margin, although it was not as drastic as the effect of the price of layers mash.
8. Given the risks borne by egg producers with respect to heavy mortality of some breeds, egg glut at some periods of the year, the lower responsiveness of egg price to rising price of layers mash and the erosion of profit margin through rising price of pullet day-old chicks, there is need for an urgent measure to reduce the high price of layers mash and pullet day-old chicks to make the enterprise more attractive to would-be and practicing farmers. The preponderance of abandoned poultry houses in our community is a testimony to the numerous problems facing the farmers and seems to suggest low returns or outright loss being sustained by some of the entrepreneurs.
9. Poultry production which has been identified as a panacea to meeting the challenge of accelerated animal protein need of Nigerians would be a ruse except some urgent measures are taken to encourage poultry egg farmers to continue in production. This is only possible if the enterprise is seen to be profitable. The price of layers mash and the price of pullet day-old chicks play big roles in the determination of the level of profit of poultry egg producers. Policy makers, feed-millers and hatchery owners need to encourage egg producers through

measures that will alleviate seasonal price variation of layers mash and pullet day-old chicks.

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