

## Producer response to retail egg price in Ogun State Nigeria: implications for increased egg production

C.A. Afolami and O. Oladimeji

Department of Agricultural Economics and Farm Management, University of Agriculture, Abeokuta, Nigeria.

### Abstract

Much has been said about farmers' responsiveness to price incentive with the inference that increasing producer price would be an effective incentive for increasing production. Against the backdrop that the nation's animal protein consumption is 5 grams / caput / day which is a far cry from the recommended level of 35 grams / caput / day of Food and Agriculture Organisation (FAO), this paper examined producer response to retail egg price which has been rising geometrically. This is to check whether there is price incentive for increased egg production to meet the nation's animal protein need through increased egg production.

The study location is Ado/Odo/ Ota LGA in Ogun State, an area with many commercial poultry farms. The exact study locations were Obasanjo, Oginni, Okegbenro, Kanmi and Evergreen farms, where the egg prices of five producers, five wholesalers and five retailers were collected weekly for a period of eight months and the average price for each category of marketers was used in the analysis. The analysis involved the regression of average producer egg price on location dummy variables and the average retail egg price. From the model, the producer average egg price elasticity with respect to the average retail egg price was estimated. Results showed that only 33 per cent of the increase in retail egg price is passed to producers. Producers are thus likely to run into financial difficulties in expanding their output particularly in the post SAP period when the costs of inputs for poultry production have increased tremendously.

An attractive and adequate credit scheme with good moratorium period and concessionary interest rate than hitherto available is suggested. In addition an overhaul of the egg marketing strategy to favour the producers is necessary, if the nation's animal protein problem is to be alleviated.

**Keywords:** Producer egg price, retail egg price, elasticity, Ogun State.

### Introduction

The poultry industry is an important part of the livestock industry in Nigeria. It has two main parts: egg and meat production. The hens are usually slaughtered and consumed as meat at the end of their laying periods.

Commercial poultry production in Nigeria is based on the rearing of exotic chickens with modern poultry equipment and facilities. From historical perspectives, the poultry industry in Nigeria has passed through several

developmental stages in the past three decades reaching its peak in 1983 when exotic poultry production stood at about 40 billion birds (Aboaba, 1997). In the Western Region, the government encouraged poultry production by subsidizing inputs, which were distributed to farmers, and producers who had interest in poultry production. By 1963, poultry production had grown in size. Specifically, there were 350 poultry farms and 25 feed mills producing 100,000 tonnes of feed and 116 million eggs.

per annum (David West, 1993). The industry attained its peak in 1983 with over 5,000 commercial poultry farms in existence in the country, and an estimated 40 billion birds in production. Also, there were 303 feed mills producing 1.8 million tonnes of feed per annum and with total output put at eight billion eggs and 0.32 million tonnes of poultry meat per annum. During this period, the industry was completely import dependent. Small-scale producers constituted 65 per cent of the producers. Medium-scale operators and large-scale producers constituted 34.5 percent and 0.5 percent, respectively (David West, 1993).

The introduction of the Structural Adjustment Programme (SAP) in 1986 had grave effect on the largely import-dependent livestock industry. The economic deregulation led to serious devaluations of the Naira and to unprecedented increases in prices of production inputs. The placement of ban on the importation of maize, rice, wheat, and barley further compounded the misery in the industry with major grain users having to source their raw materials locally. It also increased the competition for cereals among the operators in the poultry industry, the confectionary, brewery industry, industrial starch producers and textile manufacturers, among others.

The poultry industry though an important component of the nation's livestock industry, it is far short of experiencing a sufficient supply of poultry products with the express purpose of augmenting the per caput consumption of animal protein by an average Nigerian. The per caput consumption of animal protein in the country has been put at 5gm/day. This is a far cry from the FAO's recommended level of 35gm/caput/day (Aboaba, 1997).

The poultry industry portends a great future for Nigeria and Nigerians. If developed, it can provide adequate animal protein for the entire population. Poultry meat has a wide acceptance with little or no limitation in terms of tradition and religious taboos as compared to pork, which is rejected by Muslims. The latter attribute thus places commercial poultry production on a very important level especially in achieving the

national objective of providing the required proteins of animal origin. Keen interest has even been shown in the development of poultry industry in the country because of the growing awareness of the nutritive value of poultry products particularly eggs.

Furthermore, in comparison with other livestock meat (e.g. beef, mutton, pork), poultry meat is considered to be more palatable, having lower level of cholesterol, and high protein value (Adegbola, 1987). For developing countries, poultry contributes up to 32 percent of total animal protein intake. However, in Nigeria it contributes just about 15 percent, of total animal protein intake, with approximately 1.3kg of poultry products consumed per head per annum (NLDC, 1992). The World Health Organization (WHO) and Food and Agriculture Organization (FAO) recommended 3.6kg per capita intake of poultry products per annum. Therefore to meet the basic minimum of the dietary needs of Nigerians, the country requires an annual production of 10 – 20 billion eggs and 0.3 – 0.6 million tonnes of poultry meat (NLDC, 1992).

A lot has been said about the problem of increasing food (including poultry egg and meat) production in Nigeria. Much has also been said about farmers' responsiveness to price incentives. The inference often drawn is that increasing producer prices would be an effective incentive for increasing agricultural production in the country (Olayemi and Olatunbosun, 1975).

For the poultry industry, egg price has been increasing steeply at least at the retail level in Nigeria. For instance, in 1984, a tray of eggs sold for ₦3.00 but by 1999 a tray of eggs sold for ₦200.00 - an increase of 566 per cent over the base year price. Also, the indices of production for the livestock sub-sector rose from 100 in 1984 to 176 in 1996. Further more, the growth indices of the crop sub-sector for the same period rose from 100 to 226 (CBN, 1996). While the crop production indices in Nigeria during the 12-year period rose by 126 per cent, livestock production indices only increased by 76 per cent. If farmers are responsive, albeit positively, to prices in the livestock sub-sector,

why has the production indices not improved immensely-in response to the prevailing prices so as to make the overt problem of deficit in egg supply largely non-existent?

In an effort to fully clarify on this poser, the hypothesis which states that increases in egg prices are not passed to producers and if passed, the proportion passed is too small to trigger any significant producer response will be tested in the study. Specifically, this paper examines producer price response to retail egg prices with a view to making recommendations for improvements in egg and poultry production in Ogun State in particular, and in Nigeria in general.

### Materials and methods

Sampling technique and data sources.

Primary data were used in the study. The data were drawn from a field survey conducted for eight months spanning February – September 2000 and covering five locations. The locations are Obasanjo, Oginni, Okegbenro, Evergreen and Kanmi farms, all in Ado Odo/ Ota Local Government Area (LGA), Ogun State. The choice of the local government area was based on the existence of many poultry farms there, which provided middlemen the opportunity to buy eggs for trading. Besides, the LGA forms a major egg producing area in Ogun State, going by the membership list of Commercial Egg Producers Association of Nigeria (CEPAN), which was the sample frame used in the random selection of the surveyed poultry egg producers. In each of the locations, and on every week, five each of the egg producers, as well as wholesalers and retailers were sampled and the average price of a tray of egg at each marketing level (producers, wholesalers and retailers) were taken, and used for the subsequent analysis. However, prices could not be collected on all the three grades of egg size (i.e. large, medium and small) because most of the farms had hens laying only eggs of the big size. Price data on small/ medium size eggs were only available for very short span of the survey; thus, they were not used in the analysis. Sourcing information on wholesaler and retail price for small/ medium

size eggs was also difficult. Wholesale and retail prices were thus collected only for eggs of the big size. In totality, 150 observation points (i.e. on producer price, wholesale price and retail price) for the big size eggs were used in the subsequent analysis.

### Analytical Techniques

The primary interest in this study is to find out what becomes of the gap in egg price between producers and retailers as the producer or retail price changes; the price gap between producer and wholesaler as the producer and wholesale price change and that between wholesaler and retailer as the wholesale and retail egg price change.

A number of things can happen when price changes along the marketing channel. For example, if there is a change in retail price, the change may be shared between producer and the middlemen in such a way that both producers and middlemen maintain a constant percentage of the consumers' naira. This would happen where the price elasticity of demand at the producer level is equal to that at the retail level (Olayemi and Olatunbosun, 1975). Alternatively, the change in retail egg price may be shared in such a way to keep the absolute gap between the producer and the retailer constant. This would happen where the price elasticity at the producer level is lower than that at the retail level (Waugh, 1964; Olayemi and Olatunbosun, 1975).

An important methodological issue in the specification of the regression equations is the identification of the regressand (the dependant variable) and the regressors (the independent variables). Depending on the type of the marketing system, prices can be determined by the consumers at the retail level, by the producers at the farm level or by the middlemen between the producers and the consumers. According to Waugh (1964), it is only in the short run that food prices can be expected to be determined at the farm and wholesale levels. He opined that in the long run, consumer demand is the decisive and dominant force. This means that in the long run, it is the retail price, which

determines the wholesale price and the producer price. In this case, food prices are determined at the retail level by what the consumers can and will pay for what is offered. This means that price at the farm level is a function of price at the retail level. Analyses in this study are based on this conceptual framework. As such, retail price is made a regressor in the regression equation. Because of the likely difference in price by location, the other regressors included in the model are the dummy variables for location. In this regard, the base dummy variable for location is the Obasanjo farm.

The form and the length of time lag between changes in prices at the producer level and retail level are other important considerations in the study. Olayemi and Olatubosun (1975) noted that it is plausible to expect producer prices to lag behind retail price but the period of the lag is not known. In this study, un-lagged prices, and lag prices of one, two, three, and four weeks were tried so as to determine the most appropriate model of egg price response.

The final consideration in the study relates to the choice of the appropriate functional form. Many functional forms can be tried, amongst which are linear, double- logarithmic and semi-logarithmic functions. In this study, the focus is on linear and double -logarithmic functional forms. The linear form was tried because of the simplicity in terms of the interpretation of the results. The double- logarithmic functional form was also tried because the regression slope coefficient is the producer price elasticity with respect to the retail price.

The models in explicit forms are given as below:  
Linear form:

$$P_{pt} = \alpha_0 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + \beta P_{rt-i} + u \dots\dots\dots (1)$$

Where,  $P_{rt-i}$  is the retail egg price in time t-i; i = 0, 1,2,3,4 weeks

$P_{pt}$  is the producer egg price at time t.  
 $D_1$  to  $D_4$  are location dummy variables for Evergreen, Kanmi, Oginni and Okegbenro farms respectively,  
 $u$  is the random error,  
 $\alpha_i$ , i = 1,2, 3, 4 locations ; and  
 $\beta$  are the parameters of the model.

Double- logarithmic form:

$$\ln (P_{pt}) = \alpha_0 + \alpha_1 (D_1) + \alpha_2 (D_2) + \alpha_3 (D_3) + \alpha_4 (D_4) + \beta \ln ( P_{rt-i}) + \ln (u) \dots\dots\dots (2)$$

In computing the extent to which changes in producer price of egg respond to changes in retail price, our estimate in respect of the linear functional form is given by

$$\frac{dP_{pt}}{dP_{rt-i}} \times \frac{P_{rt-i}}{P_{pt}} \dots\dots\dots (3)$$

where  $\frac{dP_{pt}}{dP_{rt-i}} \times \frac{P_{rt-i}}{P_{pt}}$  is the first derivative of equation (1) with respect to the retail egg price. Expression (3) and the directly estimated slope parameter of retail egg price in equation (2) i.e.  $\beta$ , should be equal, and it measures the producer price elasticity for eggs with respect to the retail egg price.

**Results and discussion**

In Table 1, the results of the regression of the producer egg price on the location dummy variables and the retail egg price for the linear and the double- logarithmic functional forms, respectively, for eggs of large size are presented.

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**Table 1:** Regression of producer egg price on location dummy variables and retail egg price

(a) Linear functional form:

Variable	$\alpha$ or $\beta$	SE of $\alpha$ or $\beta$	T
Evergreen	10.1667	0.8848	11.4900
Kanmi	4.7809	2.3268	2.0550
Oginni	5.7466	1.4145	4.0630
Okegbenro	7.6706	2.5152	3.0500
Retail Price	0.2420	0.1104	2.1930
(Constant)	128.9120	28.7009	4.1920
$R^2 = 0.63$ ;      Adjusted $R^2 = 0.62$			

(b) Double-logarithmic form:

Variable	$\alpha$ or $\beta$	SE of $\alpha$ or $\beta$	T
Evergreen	0.5153	0.0435	11.8510
Kanmi	0.2412	0.1201	2.0080
Oginni	0.2916	0.0073	4.0020
Okegbenro	0.3823	0.0113	2.9540
Retail Price	0.3342	0.1549	2.1570
(Constant)	3.3982	0.8614	3.9450
$R^2 = 0.64$ ;      Adjusted $R^2 = 0.63$			

The results for the lagged models were not better than those of the un-lagged model, while models estimating the relationship between producer and wholesaler prices were poor; thus they are left out in the subsequent discussion.

In respect of the two models, our results showed that the location dummy variables and the retail egg price variable explained 63 and 64 percent of the total variations in the producer egg price for linear and double-logarithmic functional forms respectively.

In both models, the intercept and the slope coefficients were significant at 5 percent level, ( $\alpha = 0.05$ ). The significance of the estimated parameters for the location dummy variables attests to their relevance in the model. The retail price in a particular location thus influences significantly the producer price for eggs. The relative size of influence however varies. Using the linear form results, it was highest (10.17) for Evergreen farms and lowest (4.78) for Kanmi farms.

The estimated slope parameter for the linear model was 0.242. The mean retail big egg price for the sample was ₦270.17/tray while the mean producer egg price was ₦199.97/tray. Using

equation (3), producer egg price response with respect to retail egg price is:

$(0.242) (270.17/199.97) = 0.327$ . Similarly the producer egg price response with respect to retail egg price for the double-logarithmic functional form is 0.334.

The results based on the two functional forms tried in the study therefore indicate that producer egg price response with respect to retail egg price is approximately 0.33. This means that 100 per cent change in the retail egg price produces 33 percent change in producer price. Producer egg price is thus price inelastic with respect to retail egg price. Egg price elasticity is thus lower at the producer level than at the retail level.

### Implications of results for increased egg production:

The empirical findings supported the hypothesis that increases in retail egg price, though passed to the producers; the proportion passed is small to trigger significant producers' response to increasing retail egg price. Moreover, the Structural Adjustment Programme (SAP) of 1986 considerably increased the cost of the

poultry enterprise. Input costs affected are those of feed, day-old chicks, veterinary drugs, vaccines, poultry equipment and poultry house. Entrepreneurs freshly entering the business have to contend with the high costs of these inputs. Given the result that increase in retail egg price is not significantly passed to producers, the unattractive prices could curtail the expansion in the poultry enterprise. This is because of the inability of producers to accrue enough savings towards this goal. Furthermore, new entrants would be faced with the problem of obtaining the huge capital required to start the business thereby dampening interest in the poultry enterprise.

Egg producers therefore suffer under the present marketing system. The present arrangement where producers do not get a sizeable proportion of increases in retail egg price needs to be overhauled. Egg marketing requires an aggressive strategy. Further-more, a loan scheme that would allow substantial flow of capital to the livestock sub-sector than hitherto experienced, with good moratorium period and concessionary interest rate will be required for the poultry sub-sector, if increased poultry egg and meat production, to meet the national animal protein needs of the teeming population in Nigeria, is to be achieved.

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(Received 09 August 2001; Accepted 22 July 2002)