



**ANALYSIS OF URBAN HOUSEHOLD DEMAND FOR POULTRY PRODUCTS IN OGBOMOSO NORTH AND SOUTH LOCAL GOVERNMENT AREA OYO STATE, NIGERIA**

**[ANALISIS DE LA DEMANDA URBANA DE PRODUCTOS AVICOLAS EN OGBOMOSO NORTE Y SUR, OYO, NIGERIA]**

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**SUMMARY**

The study analyzed the urban household demand for poultry products in Oyo state, Nigeria. Data were drawn from two local governments on 200 households with the aid of well-structured questionnaire in 2010. These were subsequently analyzed using the Almost Ideal Demand System. The study revealed that there was an inverse relationship between the household expenditure and the budget share of egg, a direct relationship between the price of egg and its budget share while an increase in the price of fish led to an increase in its budget share in the home.

Keywords: AIDS; poultry; elasticity; expenditure.

**RESUMEN**

El estudio analizó la demanda urbana de productos avícolas en el estado de Oyo, Nigeria. Los datos fueron obtenidos de dos gobiernos locales y 200 casas-habitación a través de un cuestionario estructurado y aplicado en 2010. La información se analizó empleando el Sistema de Demanda Casi Idealizada. El estudio reveló que existió una relación inversa entre el gasto de la casa y la proporción que representa la compra de huevo, una relación directa entre el precio del huevo y su nivel de consumo, mientras que un incremento en el precio del pescado incrementó su participación el presupuesto del hogar. Se concluyó que a medida que se incrementa el gasto de la casa, existe un decremento en la participación del huevo y carne de ave en el presupuesto del hogar.

Palabras clave: Sistema de demanda casi ideal; carne de ave; elasticidad; gasto.

**INTRODUCTION**

Since the 1970s, global production, consumption trade of poultry meat has grown faster than that of any other meat. During the 1990s, when demand growth slowed for other meats, including fish, demand growth for poultry meat accelerated and poultry continue to lead the expansion of meat trade. Although demand for poultry meat was strong relative to demand for other meats in developed countries during the 1990s, the rapid global gains in poultry meat supply, demand and trade were led by gains in developing countries. (USDA, 1999). The poultry sector is crucially important in the context of agricultural growth and improvement of diets of people in Nigeria. The sub-sector is particularly important in that it is a significant source for the supply of protein and nutrition, in a household's nutritional intake. It is an attractive economic activity as well, especially to woman and poor population. Livestock farming has remained an essential component of the agricultural sector of the Nigerian economy. This is true, because livestock is a good source of animal protein which is needed for

proper and balanced diet. Adeshinwa *et al.*, (1999) observed that the Food and Agricultural Organization (FAO) recommended that an average of 200 g animal protein is required per day for healthy living in the developing countries. This therefore, means that the general wellbeing of the people is directly dependent on the amount of animal protein consumption available to them. Although, FAO (2000) recommended the average protein requirement for healthy living and maintained that the meat protein consumption in most African countries is very low, at a level of 25g. Yet in Nigeria, the consumption is even lower especially in the southern and eastern parts of Nigeria, where in recent times human nutritionist have observed that the production of animal protein has not been high enough to meet the demand of the rapid population growth (Obi, 2003). He asserted that much of the animal protein intake available to the southern and eastern parts of Nigeria, comes from the north in the form of cattle, rams, dogs and goats.

Comparative Statistics by Ademosun (2000) puts Nigeria's total meat production at 810,000 ton for a

population of about 110 million, resulting in a meat production index of 22 g per caput, per day. Sonaiya (1982), had rightly envisaged that as consumers become more articulate and organized; their demand for wholesome animal protein will exert a powerful influence upon quality, production method and strategies. He added that recent increases in expendable income of urban dwellers have tendencies to stimulate greater demand, not only for quality but also quantity of meat products. Today, the increasing human population in the face of inelastic production, strategies appears to have widened the demand supply gap and accentuates society of meat products. Regmi (2002) supported this view and noted that, the unprecedented growth that has occurred in the last half-century has created an additional demand for meat and general food in developing countries. Beside the failure of meat production capacity to match with the human population growth, the distribution of livestock in Nigeria is apparently lopsided. Composite transportation cost incurred, coupled with remote distance between major meat producing areas and consuming urban centers together make the value of wholesome beef, mutton, pork, chicken and dog meat often unaffordable (Mdafri and Brorsen, 1993).

As poultry industry is expanding with increasing number households involved in the raising of domestic fowls, turkey, goose, ducks and all the likes; the problems of malnutrition persists. It is very difficult for an average of Nigeria, to consume any of the poultry products either chicken meat or egg, on the scale of international nutritional requirement. This can be traced to the high price of the products which makes poultry products appear infrequently on many of our tables, except during the festive periods. This low level of consumption makes the malnutrition problem to be persistent. Another observation is the fact that the demand for these products is still far higher than the supply, this arises from high pricing and importation of both, chicken and eggs from other countries. Nigeria has the largest population in sub-Saharan Africa. About 47% reside in the urban areas where the population growth rate is estimated at three times that in rural areas (World Bank, 2004). This suggests a shift in increased food demand from the rural to the urban areas. Government policies tend to favor the urban dwellers to the detriment of the rural areas. Over the past three decades, rural households have been significantly poorer than urban households. However, while urban poverty has increased, rural poverty has decreased, especially after the post-adjustment period: 1995 to date (Canagarajah and Thomas, 2001). Urbanization is therefore a key non-income factor explaining the change in demand for animal protein (Ahmed and Gruhn, 1995). Consumption of animal protein has been found to be higher in urban areas than in rural areas (Hussain, 1990). Rising incomes, changing tastes and

preferences are likely to shift the demand for meat and meat products. Differences in consumer behavior and demand for meat products, particularly dairy products, exist in Nigeria because the country is diverse and characterized by regional, physical, agro climatic, socioeconomic, and cultural/ethnic differences in food habits (Jabbar and Di Comenico, 1993).

The objective of this study is to fill a gap in the literature by estimating demand functions for urban households in Nigeria. Income and price elasticities are needed to formulate policies, set priorities, and engender investments in the livestock sector. Hence, an understanding of household consumption patterns of meat and meat products, especially the effects of income and price on meat demand and the impact of demographic factors on urban household meat consumption (Young and Hamdok, 1994) could provide important policy insights for Nigeria.

## METHODOLOGY

Data was collected from 200 household in two local government areas of the state, using a multistage method. The two local government areas selected in Ogbomoso metropolis were, Ogbomoso south and north and these were taken as the sampling unit as the first stage of sampling. At the second stage, five wards were randomly selected at each local government, making a total of ten wards. The last stage involved random selection of twenty household in each ward making a total of 200 respondents.

The study employed the Almost Ideal Demand System (AIDS) developed by Deaton and Muellbauer (1980). The model is flexible enough to allow the assumptions of homogeneity and symmetry to be tested or successfully imposed during empirical analysis. It is easy to estimate, gives arbitrary first order estimation to any demand system, and satisfies the axioms of choice. Many of these good attributes have contributed tremendously to the application of the model to demand equation estimation in many parts of the world.

The AIDS model can be specified as

$$w_i = \alpha_i + \sum_j \gamma_{ij} \ln P_j + \beta_i \ln \left( \frac{X}{P} \right) + e_i \quad (1)$$

where  $w_i$  = budget share of  $i$ th commodity

defined by  $P_j Q_j / X$

$P_j$  = price of  $j$ th commodity

$\gamma_{ij}$  = estimated coefficient of prices

$\beta_i$  = estimated expenditure coefficient

$X$  = total expenditure on all commodities in the system

$P$  = price index

The price index can be further defined as:

$$\ln P = \alpha_0 + \sum_k \alpha_k \ln P_k + \frac{1}{2} \sum_j \sum_k \gamma_{jk} \ln P_k \ln P_j \quad (2)$$

The price index makes equation 1 to be non-linear. In order to linearize it, the Stone's index has been incorporated.

$$\ln p = \sum w_j \ln p_j \quad (3)$$

Homogeneity, symmetry, and adding up are respectively imposed on the system through the following parameter restrictions:

$$\sum_j \gamma_{ij} = 0; \gamma_{ij} = \gamma_{ji}; \sum_i a_i = 1; \sum_i a_{is} = 0; \sum_i \beta_i = 0; \sum_j \gamma_{ij} = 0. \quad (4)$$

Following Chalfant (1984) and Ahmed and Shams (1994), the Marshallian and Hicksian elasticities are computed from the estimated parameters of the Linear Approximation AIDS model (LAAIDS) in equation 4 as follows;

#### Marshallian (Uncompensated)

$$\varepsilon_{ij} = -1 + \left( \frac{\gamma_{ij}}{w_i} \right) - \beta_i \text{ (own- price)} \quad (5)$$

$$\varepsilon_{ij} = \left( \frac{\gamma_{ij}}{w_i} \right) - \beta_i \left( \frac{w_j}{w_i} \right) \text{ (cross-price)} \quad (6)$$

#### Hicksian (compensated)

$$\delta_{ij} = -1 + \left( \frac{\gamma_{ij}}{w_i} \right) + w_i \text{ (own-price)} \quad (7)$$

$$\delta_{ij} = \left( \frac{\gamma_{ij}}{w_i} \right) + w_j \text{ (cross-price)} \quad (8)$$

The expenditure elasticity is derived as

$$E_i = -1 + \beta_i / w_i \quad (9)$$

## RESULTS AND DISCUSSION

### Substitute for Meat

The information in table 1 show that 54.5percent, amounting to more than half of the respondents, took only fish as their close substitute for chicken, while the lesser percentages consume either egg, and cheese as their substitute. This fish was in all people consulted like substitute. This might be due for the easy accessibility of fish, in terms of relative distribution and cost per unit, in comparison with the other available substitute. The cheese is also an important food for people diet with fish (17.5%).

### Almost Ideal Demand System

Following Deaton and Muellbauer (1980), the demand equation for egg and chicken were estimated without

imposition of any restrictions. The results of the analysis are presented in table 2. From the table, the test for homogeneity was carried out. The results of the tests showed that in both, egg and chicken, homogeneity conditions is significantly violated. This result is in line with the findings of Deaton and Muellbauer (1980), Ahmed and Shams (1994) and Awoyemi *et al.*, (2006).

Table 2 also shows that, all the Durbin-Watson statistics were within the plausible region. In all one can effectively say that the dependent and independent variables, have effectively performed their role.

In the first equation using the budget share of egg as the dependent variable, it was clear that, three of the variables were significant at I percent level of significance. The significant variables are the price of egg, fish and total food expenditure. Expenditure has a negative relationship with budget share for egg. This showed that budget share for egg tends to decrease with increase in household expenditure. There is also a positive relationship between the price of egg and its budget share. As the price of fish increases by 1%, the budget share for egg increases by 0.009%.

For chicken as the second equation, four independent variables were also significant, which are the prices of egg, chicken, fish and total food expenditure respectively at 1% level. There is a positive relationship between the budget share for chicken and the price of egg, chicken and fish. This shows that a 1% increase in price of fish, leads to a 0.011% increase in budget share for chicken in the home.

### Marshallian (Uncompensated) Own Price and Cross Price Elasticities

Table 3 presents the full matrices of the uncompensated (Marshallian), own price and cross price elasticities. All the estimates of own price elasticities conform to the law of demand of negative signs. The estimated own price elasticities of poultry products ranged between - 0.274 (egg) and - 0.683 (chicken). It is noteworthy that the own-price elasticity for egg (- 0.274) is the least elastic followed by chicken (-0.683). This probably indicates the preferential importance of chicken in the diet of household in Ogbomoso metropolis, above egg. This study is in line with earlier findings by Ma *et al.*, (2004) who reported a negative and less than one own price elasticity for egg and chicken for urban households in China. Also from the table, all the estimated values for the cross price elasticities have a positive sign, which implies substitution effect. This implies that all products are in substitute type of relationship with poultry products.

Table 1. Distribution of Respondents by Substitute for Chicken

Substitute	Frequency	Percent	Cumul. percent
Fish	109	54.5	54.5
Fish and egg	39	19.5	74.0
Fish, egg and cheese	35	17.5	91.5
Fish, egg, cheese & others (meat)	2	1.0	92.5
Fish, egg & others (meat)	1	0.5	93.0
Fish and cheese	6	3.0	96.0
Egg	3	1.5	97.5
Meat	3	1.5	99.0
No substitute	2	1.0	100.0
Total	200	100.0	

Source: Field survey, 2010

Table 2. Unconstraint Parameter Estimates and Test of Homogeneity

Commodity	Constant	Egg	Chicken	Meat	Fish	Expenditure	R <sup>2</sup>	DW
Egg	0.235*** (10.756)	0.059*** (20.471)	-0.004 (-0.019)	0.001 (0.072)	0.009*** (3.461)	-0.069*** (-46.290)	0.938	1.960
Chicken	0.413*** (12.849)	0.010** (2.332)	0.046** (11.541)	0.002 (0.807)	0.010*** (2.692)	-0.091*** (-93.959)	0.987	1.874

Source; Field survey, 2010

Note: Values in parenthesis represents t-values,

\*\*\* represent significant at 1% level,

\*\* represent significant at 5% level,

**Hicksian (Compensated) Own Price and Cross Price Elasticities**

From Table 4, the own price elasticity for the two products are negative, which conform to *a priori* expectation. Egg has the most inelastic own- price elasticity ( $\epsilon=-0.253$ ) among the two poultry products, considered in the study. This indicates that households in Ogbomoso metropolis, are insensitive to changes in the price of egg. That is, if the price of egg comes down, or there is increase in the per capita income of the household, consumption will not be much affected. Huq and Arshad(2010) calculated compensated own price elasticity for meat at -0.482 and hence in line with this study.

Hicksian cross price elasticities are higher than that of the Marshallian though not up to unity and positive. This implies that Hicksian cross price elasticity for all products are substitutes for each other.

Table 3. Marshallian (Uncompensated) Own Price and Cross Price Elasticities

Commodity	Egg	Chicken	Meat	Fish
Egg	-0.274	0.110	0.194	0.250
Chicken	0.091	-0.683	0.119	0.135

Source: Field Survey, 2010.

Table 4. Hicksian (Compensated) Own Price and Cross Price Elasticities

Commodity	Egg	Chicken	Meat	Fish
Egg	-0.253	0.156	0.251	0.295
Chicken	0.140	-0.572	0.251	0.242

Source: Field Survey, 2010.

**Expenditure and Income Elasticities**

The estimates of income elasticity are yielded by multiplying the estimated expenditure elasticities with the responsiveness of expenditure on egg and chicken by income change from Engel’s curve. The income elasticities for egg and chicken were less than one, which implies that the poultry products are income inelastic. In other words, they are normal and necessity goods. This finding is in line with previous work by Seale *et al.*, (2003) who reported less than one income elasticities for meat for all categories of income groups in Indonesia. Huq and Arshad(2010) calculated expenditure elasticity for meat at 2.461 based on AIDS model and hence could be considered as a luxury. When the expenditure elasticity is less than one, there is weak reference for demand by a particular household. This leads to less consumption of poultry products by such household. This study is in consonance with the findings of Ma *et al.*,(2004)

for egg(less than one), while it is not for chicken (greater than one).

Table 5. Estimated Expenditure and Income Elasticities

Product	Expenditure elasticity	Income elasticity
Egg	0.228	0.0048
Chicken	0.550	0.0115

Source: Field Survey, 2010

### CONCLUSION AND RECOMMENDATION

It was concluded that as the household expenditure increases, there is a decrease in the budget share to egg and chicken. It shows that, the poor people depend in extreme of egg for their consumption of protein, its means that prices of egg is a very important variable in the household. The public policy should be carefully with price, production and consume of egg. The poverty status of the area should be addressed by the government, this will go a long way in increasing the living standard of the people and change the mentality that poultry meat belong to the few except on festival days.

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*Submitted April 13, 2011 – Accepted May 30, 2011*  
*Revised received August 10, 2011*