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Household Consumption of Cassava Products in Oyo State

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Abstract - This paper analyses household consumption of cassava products in Oyo State using Almost Ideal Demand System. Information on different type's cassava products consumed by the household was obtained using a multistage random technique. The result showed that demand for gari and fufu are elastic than demands for lafun meaning that lafun is a price inelastic cassava products. Expenditure elasticities of all the cassava products were examined and were found to be less than one. The highest expenditure elasticity is found for fufu suggesting that its demand will grow faster than the demand for other products as the economy develops and income increases.

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I. Introduction

Cassava was probably first cultivated by the Maya from which its use as food was introduced to many parts of the tropical world. The starchy root was considered of low food value hence its use as slave food. This was prejudicial to the emergence of cassava as an essential food crop with commercial potential (Mroso, 2003).The large population of the inhabitants in the tropics depends on tuber crops for the supply of carbohydrate in their diet. This is more so in the rain forest zone of the tropics where the growing of cereal is difficult (Akanbi *et al*., 2004).

Cassava is a very versatile commodity with numerous uses and by-products. Each components of the plant can be valuable to its cultivator. The leaves may be consumed as a vegetable, or cooked as a soup ingredient or dried and fed to livestock as a protein feed supplement. The stem is used for planting propagation and grafting. The roots are typically processed for human and industrial consumption. Various products can be gotten from cassava which includes gari, lafun, wet pulp, starch, smoked cassava balls ("Kumkum"), dried cassava among others. (Truman *et al*., 2004).

According to Tonukari (2004), cassava ranks very high among crops that convert the greatest amount of solar energy into soluble carbohydrates per unit of area. Nigeria is the largest cassava producing country in the world, Nigeria's production is 19% of world output, 34% of Africa's output and 46% of West African countries output (West Africa's countries accounts for 75% of Africa's output).Among the starchy staples, cassava gives a carbohydrate production which is about 40% higher than rice and *25%* more than maize, with the result that cassava is the cheapest source of calories for both human nutrition and animal feeding. A typical composition of the cassava root is moisture (70%), starch (24%), fiber (2%), protein (1%) and other substances including minerals (3%). A recent study on cassava shows that it accounts for about 70% of the total calories intake of more than half of the population (Nneoyi *et. al.,* 2008).

Household consumption of cassava products is not possible without processing of cassava parts to finished products. Fresh cassava roots cannot be stored for long because they rot within 3-4days of harvest. They are bulky with about 70% moisture content and roots and leaves which contain varying amounts of cyanide which is toxic to humans and animals, while the raw cassava roots and uncooked leaves are not palatable. Reasons for processing cassava are to increase the shelf life of the products, facilitate transportation and marketing, reduce cyanide content and improve palatability, to also improve the nutritional status through fortification with other protein rich crops, to reduce food losses and stabilize seasonal fluctuations in the supply of the crop. (Hahn,1989).

World's processed products commonly known are Gari, Lafun, Fufu a dry granular meal made from moist and fermented cassava commonly used in West Africa (FAO, 1999) and are produced for human consumption(Kormawa and Akoroda,2003). It is produced mainly by small farmers especially in South and Central Nigeria and cultivated as a food and cash crop (TARCA, 2005).

Cassava therefore performs 5 major roles according to Nweke *et al*., (2002) namely; Famine reserve crops, rural food staple, cash crop for urban consumption, industrial raw materials and earner of foreign exchange.

There exists a well-developed literature on the relationship between consumer theory and demand functions, and on empirical specification of demand functions. Deaton and Muellbauer (1980b) provide excellent reviews of both the consumer theory's implications on demand and empirical specifications. Other works on the same subjects, with somewhat different focuses, are Barten and Böhm (1982), Deaton (1986), Blundell (1988), Pollak and Wales (1992) and Barten (1993). Pollak and Wales (1992) also give a thorough treatment of functional forms used in analyses

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of demand systems. In this analysis, I employ the linear approximate almost ideal demand system's (LA-AIDS) technique (Deaton and Muellbauer, 1980a) via a cross-sectional model. The AIDS technique was preferred to alternative functional forms (such as the Rotterdam and translog systems) because it has the advantage that it is linear and formulated in levels. It may accordingly be encountered as more intuitive and easier to use.

In view of the above, this study therefore examined the household consumption of cassava product in Oyo State, Nigeria.

II. Methodology

The data for this study were obtained from Oyo state of Nigeria. Multistage random sampling technique was employed in the selection of respondents for the study. In the first stage the study area was stratified into four strata based on agricultural zone. The second stage involved purposive selection of two zones due to the high number of cassava product consumers. In the third stage, two local government areas (LGAs) were randomly selected from each of the zone making a total of four LGAs. The fourth stage involved random selection of two villages from each LGA making a total of eight villages. The last stage involved random selection of fifteen households in each village making a total of one hundred and twenty (120) respondents.

The study employed the Almost Ideal Demand System (AIDS) developed by Deaton and Muellbauer (1980a). 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 (Almost Ideal Demand System) AIDS model of Deaton and Muelbauer (1980b) has enjoyed great popularity in applied demand analysis. Starting from a specific cost function, the AIDS model gives the share equations in an n-good system as

$$w_i \quad \alpha_i + \sum_j^n \gamma_{ij} \ln P_j + \beta_i \ln(\frac{X}{P*}) + e_i \qquad (1)$$

where w_i = budget share of ith commodity

defined by

$$P_j Q_i / X$$

P_j = price of jth commodity within the group

γ_{ij} =estimated coefficient of prices

β_i =estimated expenditure coefficient

X= total expenditure on the group of goods being analyzed

P=price index for the group

The price index can be further defined as:

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

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

$$\ln P* \quad \sum w_j \ln p_j \qquad (3)$$

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

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

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

Marshalian (Uncompensated)

$$\varepsilon_{ij} \quad -1 + (\gamma_{ij} / w_i) - \beta_i \text{ (Own-price)} \qquad (5)$$

$$\varepsilon_{ij} \quad (\gamma_{ij} / w_i) - \beta_i (w_j / w_i) \text{ (Cross-price)} \qquad (6)$$

The expenditure elasticity is derived as

$$E_i \quad -1 + \beta_i / w_i \qquad (7)$$

III. Results and Discussions

Consumption of Cassava Products

Table 1 shows that majority of the respondents consume gari, lafun and fufu with a percentage of 79.2%, 92.5% and 71.7% respectively. From this finding, one can say that cassava products are highly consumed in the study area. The Table also shows that 20.8% of the respondents did not consume Gari, 28.3% of the respondents did not consume fufu while 7.5% did not consume Lafun. This implies that Lafun is the major staple food of the respondents.

Table 1 : Distribution of Respondents by Gari Consumption

Cassava products	Yes	No
Gari	95(79.2)	25(20.8)
Lafun	111(92.5)	9(7.5)
Fufu	86(71.7)	34(28.3)
Starch	47(39.2)	73(60.8)
Tapioca	59(49.2)	61(50.8)
Total	120	100.00

Source : Field Survey; 2010

Note : The figures in parentheses are percentages Almost Ideal Demand System.

The almost ideal Demand Systems (AIDS) was derived by Dealton and Muelbauer (1980a) from expenditure or cost function. Using this model i.e. AIDs, the demand equation for cassava products were estimated without imposition of any restrictions. From the table, the test for homogeneity was carried out. The results of the tests showed that in the consumption of cassava products, there is a significant violation of the homogeneity conditions. This result is in line with the findings of Deaton and Muellbauer (1980a), Ahmed and Shams (1994), Tsegai and Kormawa(2002) and Awoyemi *et al.,* (2006).The result of the analysis present in Table 2 shows the unconstraint parameter estimates All the Durbin –Watson statistics were shown to be within the plausible region in Table 2. The dependent and the independent variable can therefore be said to have performed their roles.

Using the budget share of Gari as the dependent variable, three variables were found to be significant which are soup at 5%, rice at 5% and expenditure at 1% level of significance. It simply implies that as the household expenditure increases, there is a decrease in the budget share of Gari. Also, there is an indirect relationship between the price of Gari and its budget share. A 1% increase in the price of soup will lead to a 0.012% increase in their budget share. Also a 1% increase in the price of rice will lead to a 0.025% increase in their budget share.

Using the budget share of Lafun as the dependent variable, five variables were found to be statistically significant at the 10%,5% and 1% level of significance. The significant variables are the prices of Lafun, Fufu, Soup, yam and total food expenditure. There is a direct relationship between the prices of Lafun, Fufu, Soup, yam and the budget share of Lafun while there is an indirect relationship between total food expenditure and budget share of Lafun. This implies that as household expenditure increase, there is a decrease in the budget share of Lafun while as the price of Fufu and soup increases the budget share of Lafun increases. In other words, the budget share of Lafun increases with increase in the price of Fufu, soup and yam. There is also a direct relationship between the price of Lafun and its budget. A 1% increase in the prices of Fufu and Soup will lead to 0.005% and 0.04a% increase in their budget share respectively.

Also using the budget share of Fufu, three variables were found to be significant which are stew at 1%, rice at 5% and expenditure at 1% level of significance. This shows that as the household expenditure increases, there is a decrease in the budget share of Fufu. There is also an indirect relationship between the price of Fufu and it's budget share. A 1% increase in the price of Stew will lead to a 0.013% increase in their budget share and a 1% increase in the price of Rice will lead to a 0.034% decrease in their budget share.

Table 2 : Unconstraint parameter estimates and test of homogeneity

Comm-odities	Const	Gari	Lafun	Fufu	Veg	Soup	Fish	Meat	Rice	Yam	Exp	R2	DW
Gari	0.075 (2.131)	-0.002 (-1.094)	0.002 (0.737)	0.002 (1.002)	0.012 (0.870)	0.012** (2.009)	0.015 (0.183)	0.030 (0.758)	0.025** (2.070)	-0.045 (-0.652)	-0.016*** (-3.031)	0.53	1.987
Lafun	0.529 (0.000)	0.002 (0.760)	0.012*** (3.245)	0.005** (2.020)	0.007 (0.029)	0.049*** (6.075)	-0.013 (-0.922)	-0.010 (-1.494)	0.028 (1.317)	0.002* (1.911)	-0.103*** (-32.663)	0.937	1.959
Fufu	0.174 (0.000)	0.001 (1.025)	0.002 (1.006)	-0.003 (-1.591)	0.012 (0.682)	0.013** (2.133)	0.020 (0.217)	-0.526 (-1.184)	-0.034** (-2.516)	0.011 (1.521)	-0.028*** (-5.151)	0.323	2.176

Source : Field survey, 2010.

NOTE : Value in parenthesis represents t-value

*Represents significant at 10% level of significance

** Represents significant at 5% level of significance

***Represents significant at 1% level of significance

Own Price and Cross Price Elasticities

Table 3 presents the full matrices of the uncompensated (Marshallian) own price and cross price elasticities. The own-price elasticities of all cassava products under study show a negative sign (as expected), which is consistent with the law of demand. This is in line with earlier findings by Tsegai and Kormawa(2002) and Jumah *et al.*, (2008).

The estimates of own price elasticities of lafun is less than one while that of Fufu and Gari are greater than one. The own-price elasticity of lafun is equal to -0.834, meaning that an increase in the price of lafun by 10percent would decrease lafun consumption by 8.34 percent. To compensate for such consumption, household would increase gari and fufu consumption by 0.2% and 0.36% respectively. So lafun is a price inelastic cassava products and the indication of this is that households in Oyo State are insensitive to changes in the price of lafun because it serves as their major staple food. Gari and fufu however have elastic own price elasticities which means that households in Oyo State are sensitive to changes in the price of gari and fufu as they are secondary to Lafun as a staple food. The implication of this is that if the price of lafun comes down, or there is an increase in the per capita income, household consumption will not be so much affected.

The cross price elasticities are recorded as non-diagonal elements in Table 3. Yam, fufu, lafun and rice have a positive sign with respect to Gari which shows that, they bear a substitute relationship with gari. Also, fish has a negative sign implying its complementary relationship with Lafun other commodities have a substitute relationship with lafun owing to their positive signs.

Rice and meat both have negative signs indicative of their complementary relationship with fufu while other commodities have positive signs which implies that they are substitute to fufu

The gari-to lafun, the gari-to-fufu, the lafun-to-fufu etc cross-price elasticities are positive showing that they are strong substitute goods. Since all the products are substitute, higher prices for gari will lead to an increase in demand for fufu and lafun. Given that all the products are produced from cassava, an increase in the price of cassava leads to an increase in the prices of all products simultaneously, and a subsequent rise in the consumption of all products. This study is not consistent with earlier findings by Jumah *et al.*, (2008).

Table 3 : Own Price and Cross Price Elasticities

Commodities	Gari	Lafun	Fufu	Veg	Soup	Fish	Meat	Rice	Yam
Gari	-1.092	0.272	0.123	0.684	0.727	0.916	1.708	1.420	2.351
Lafun	0.021	-0.834	0.036	0.059	0.308	-0.004	0.107	0.192	0.167
Fufu	0.089	0.429	-1.148	0.772	0.913	1.374	-30.776	-1.868	0.868

Source: Field survey, 2010

Expenditure Elasticity

As shown in Table 4, the expenditure elasticities are all positive suggesting that all the cassava products are normal goods whose consumption will increase with increasing total expenditure on cassava products (see also, Abdulai and Jain, 1999: Jumah *et al.*,2008). The expenditure elasticity of all the cassava products is less than one. Cassava products are expenditure inelastic. The consumption of each of these products will decline as per capita income increases. According to the AIDS setting, the sign of the coefficient for the expenditure variable establishes whether a product group is a luxury good or a necessity. These revelations suggest that all the cassava products are necessities. This implies that as total expenditure on cassava food products increases, consumers tend to spend proportionately less on gari, lafun and fufu. The expenditure elasticity obtained for this study were not similar to that obtained by Tsegai and Kormawa (2002) for the Kaduna area and Jumah *et al.*,2008 for Lagos.

The mean budget share is considered. The highest percentage of budget for cassava product went for Lafun (84%) followed by Gari (8.2%) while Fufu had 7.8%.

Table 4 : Elasticities of Cassava Product

Commodities	Mean Budget Share (%)	Expenditure Elasticity
Gari	8.2	0.135
Lafun	84.0	0.455
Fufu	7.8	0.647

Source: Field Survey; 2010.

IV. Conclusion

The study conclude that all the estimates of own price elasticities conform to the law of demand with negative signs. Using the estimated coefficients, uncompensated price and expenditure elasticities are evaluated at the sample means. Own-price elasticity for gari is -1.092 and that of fufu is 1.148, which is relatively more elastic than that for lafun. This result indicates that demand for gari and fufu are elastic than demands for

lafun in this study. All the cassava products are expenditure inelastic with fufu having the highest expenditure followed by lafun and gari respectively. Based on findings, it can be concluded that cassava products are well established staples among the inhabitants of Oyo State.

References Références Referencias

1. Ahmed, A.U. and Y. Shams. 1994. Demand Elasticities in Rural Bangladesh: An Application of the AIDS Model, IFPRI, Washington, D.C., USA.
2. Akanbi,W.B., Olabode, O.S.,Olaniyi, J.O and Ojo O.A. (2004):"*Roots and Tuber Crops*". *Introduction to Tropical Crops.* Published by Raflink Computers, Eleyele, Ibadan P. 15, 16.
3. Awoyemi T.T., Amao, A.O and Fatogun, O.O,(2006). "Household Expenditure Pattern on Food in Ibadan Oyo State, Nigeria". *Journal of Rural Economics and Development*, 15(1):79-86.
4. Barten, A.P. (1993)."Consumer Allocation Models: Choice of Functional Forms", *Empirical Economics*, 18, 129-158.
5. Barten, A.P. and Bohm V.(1982). "Consumer Theory" in K. J. Arrow & M.D. Intrilligator (eds.) *Handbook of Mathematical Economics*, North Holland, pp.381-429.
6. Blundell, R.W.,(1988). "Consumer Behaviour: Theory and Empirical Evidence - A Survey", *Economic Journal*, 98, 16-65.
7. Abdulai, A. and Jain D.K.(1999). "Using Microlevel Data to Analyse Consumption of Milk and Milk Products in India", *Quarterly Journal of International Agriculture*, 38, 53-64.
8. Chalfant, J (1984):" A Globally Flexible Almost Ideal Demand Systems*" . Journal of Business and Economic Statistics*, 5:233-242
9. Deaton, A.S. (1986). "Demand Analysis" in Z. Griliches and M.D. Intrilligator (eds.) *Handbook of Econometrics*, North Holland, pp.381-429
10. Deaton, A. and Meulbauer, J. (1980a): "An Almost Ideal Demand System". *The American Economic Review* 70 (3):312-326.
11. Deaton, A. and Meulbauer, J. (1980b): *Economics and Consumer Behaviour*. Cambridge University Press, New York.
12. FAO. (1999): "Food Outlook April" 1999, No. 2, P. 1.
13. Hahn, S.K. (1989): "An Overview of Traditional Processing and Utilization of Cassava in Africa" *Outlook on Agriculture*, 4: 2.
14. Jumah, A., Dipeola, A.O., Ayinde, I.A. and Adebayo, K.(2008): "An La- AIDS Analysis of Cassava Food Products Demand in Lagos". *Journal of Developing Areas*, the spring.
15. Kormawa, P. and Akoroda, M.O. (2003): Cassava Supply Chain Arrangement for Industrial Utilization in Nigeria. IITA, Ibadan, Nigeria.
16. Mroso, P.V. (2003): "Cassava: An emerging food product: The Consequence of its Popularity in Canning and Preserving", www.suite101 com/ article. cfm/African - food…./99964.
17. Nneoyi, I.O., M.N. Henry, A.M.Walter and E.E. Ebingha. 2008. Group Dynamics and Technology Use among Female Cassava Farmers in Akpabuyo Local Government Area, Cross River State, Nigeria. *Agricultural Journal.* 3 (4): 292-298.
18. Nweke, F.I., Spencer, D.S.C., and Lynam , J.K.. (2002): The Cassava Transformation: Africa's best kept secret. Michigan State University, East Lansing Michigan. 273 Pp.
19. Pollak, R.A. and Wales T.J.(1992). "Demand System Specification and Estimation", Oxford University Press.
20. Technical Assistance to the House of Representative on Agriculture, (2005): "Promoting Value Adding in Nigerian Agriculture: The Cassava Industry Example" Policy Brief No. 3 P. 4.
21. Tonukari, N.J. 2004. Cassava and the future of starch. *Electronic Journal of Biotechnology.* 7(1): Issue of April 15.
22. Truman,P.P., Daphnes, S.T., Lateef, S. and Malachy, O.A.(2004): The Global Cassava Development Strategy, A Cassava Industrial Revolution in Nigeria. The Potential for a New Industrial Crop". International Fund for Agricultural Development Food and Agriculture Organization of the United Nations P. 9, 16.
23. Tsegai, D and Kormawa, P(2002): Determinants of urban households' demand for cassava and cassava products in Kaduna, northern Nigeria: The application of AIDS model. Conference on International Agricultural Research for Development. Deutscher Tropentag – Witzenhausen, 9-11 October 2002.

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