ANALYSIS OF THE FACTORS INFLUENCING THE CHOICE OF LOCALLY PRODUCED WEANING FOODS MARKETED IN ENUGU STATE, NIGERIA

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ABSTRACT

This paper examined the factors influencing the choice of locally produced weaning foods marketers in Enugu State, Nigeria. Data used for the study were collected from a cross- sectional survey of 18 markets through the use of a structured questionnaire. A multi-stage sampling procedure was used to select 207 respondents for the study. Data collected were analyzed using descriptive statistics and Multinomial Logit (MNL). Results of the study showed that akamu-oka (maize thin gruel), akamu-okiri (guinea corn thin gruel) and agidi (maize thick gruel) were the dorminant local weaning foods while selling price, total revenue, years of marketing experience and levels of education were the factors that affected the choice of these local weaning foods marketed. However, selling price and total revenue were the major factors. In other words, the results of the multinomial logit indicated that the higher the total revenue, the higher the odds of marketing local weaning foods while the higher the selling price, the lower the odds of the marketer which means that total revenue had a positive significant effect while selling price had a negative significant effect on the choice of a marketer choosing among the local weaning foods. Therefore, reduction in selling price and increase in total revenue are highly recommended.

Keywords: Choice, Factors, Weaning foods, Multinomial Logit (MNL) model, Enugu State.

INTRODUCTION

This paper at hand delves into the factors influencing the choice of locally produced weaning foods marketed in Enugu State. Weaning, more scientifically known as complementary feeding is the first major proactive step in the infant's life towards "growing up". The need to introduce weaning foods to infants cannot be over-emphasized as every child needs to be weaned either with indigenous or foreign weaning foods or both provided it is affordable to the target market (FAO, 2006). Marketing of locally produced weaning foods which can be prepared easily from available raw materials like maize, millet, guinea corn and soyabean using simple processing technology is of great importance here since most consumers prefer locally produced weaning foods due to its perceived freshness (Ezenduka *et al.*, 2018). The dominant locally produced weaning foods identified in Enugu State were *akamu-oka* (maize thin gruel), *akamu-okiri* (guinea corn thin gruel) and *agidi* (maize thick gruel).

The purpose of this study is to assess the factors influencing the choice of these locally produced weaning foods marketed in Enugu State, Nigeria. Especially in this era of technological advancement and increasing competition, buyer's needs and preferences keep changing which means that researchers, manufacturers, marketers and consumers of infant weaning foods must keep abreast of these changes and constantly modify and improve their offerings

and demand hence there is need for a thorough understanding of the marketing system of these local weaning foods.

The theoretical model that guided this study rests on the theory of rational choice also known as the choice theory. This theory focused on the determinants of the individual choices which assumes that an individual has preference among the available choice alternatives that allow them to state which option they prefer. This theory of rational choice does not describe the choice process, but rather, it predicts the outcome and pattern of choices (Foley, 2004). The study therefore approached the different categories of local weaning foods marketers *vis-à-vis* their determinant factors using the multinomial logit (MNL) model, which is one of the most widely used models in analyzing decision making (Hashimoto *et al.*, 2020). According to Liang *et al.* (2020), multinomial logit model is used to model relationships between a polytomous response variable and a set of regressor variables. It handles explanatory variables that are continuous or take different values for different categories of responses.

METHODOLOGY

The study was carried out in Enugu State, Nigeria. Enugu State lies within the geographical coordinates of Latitudes 05^0 56" North and 07^0 06" North of the Equator and Longitudes 06^0 53" East and 07^0 55" East of the Greenwich Meridian. It has a land mass of approximately 7,625km^2 with a total projected population of 5,396,098 (National Population Commission, NPC, 2022) spread across the 17 Local Government Areas (LGAs) of the State with the capital city in Enugu. The State is divided into three agricultural zones namely: Nsukka zone which comprises of Igbo-Etiti, Nsukka, Uzo-Uwani, Udenu, Igbo-Eze South and Igbo-Eze North LGAs; Enugu zone which comprises of Enugu North, Enugu East, Isi-Uzo, Nkanu East, Nkanu West and Enugu South LGAs; and Awgu zone which comprises of (Awgu, Oji-River, Aninri, Udi and Ezeagu

LGAs) (Enugu State Agricultural Development Project, ENADEP, 2012).

Economically, the State relies on trading and services along with agriculture. The people are mainly agrarian, producing crops such as yam, cassava, cocoyam, rice, maize, guinea corn and oil palm some of which are raw materials for the local weaning foods. The study covered the three agricultural zones in Enugu State.

Primary data used for the study were collected from a cross-sectional survey of selected markets in the study area through the use of a structured questionnaire. A multi-stage sampling procedure was used in selecting the respondents for the study. The first stage was a random selection of three blocks (LGAs) from the three agricultural zones in Enugu State which gave a total of nine LGA's. The selected blocks (LGAs) in Enugu State were Enugu North, Enugu East and Isi-Uzo LGAs from Enugu zone, Nsukka, Igbo-Etiti and Uzo-Uwani LGAs from Nsukka Zone, Agwu, Oji-River and Aninri LGAs from Agwu zone. The second stage was the purposive selection of two major markets from each block which gave a total of eighteen markets and this was based on the level of marketing activities of local weaning foods in the markets. The selected markets were Ogbete main market, New market, Eke Obinagu market, Oye Emene market, Eke Eha-Amufu main market, Nkwo Neke market, Ogige main market, Afor Opi market, Nkwo Ogbede central market, Eke Aku market, Eke Akiyi Umulokpa market, Adani market, Orie Agwu market, Oye Agbogugu market, Oji River main market, Nkwo Inyi market, Orie Oduma central market and Ndeaboh market. The third stage was a proportionate random selection of 75% of marketers from the selected markets from the sampling frame obtained from the preliminary survey given a total sample size of 220 marketers. This is based on rule of thumb and central limit theorem which states that sample sizes greater than or equal to 30%, should provide enough information to make a statistically sound conclusion about a

population. However, only 207 copies of the questionnaire were valid for analysis. Data were collected on selling price, total revenue, years of marketing experience and levels of education of *akamu-oka* (maize thin gruel), *akamu-okiri* (guinea corn thin gruel) and *agidi* (maize thick gruel) marketers.

Data collected were analysed using Multinomial Logit (MNL) model for the choice categories and its relationship with the determinant factors influencing the choice of the marketers.

Model Specification

The model is specified, in its generic form as used by Ojo *et al.* (2013) and Bandara and Thiruchelvam (2010):

$$E(Wij/Pi) = \frac{\exp(X_i \, \beta_j)}{\sum_{k=1}^{J} \exp(X_i \, \beta_j)}, j = 1,2,3 \dots \dots \dots k \dotfill (1)$$

Where W_{ij}, is the observed outcome of jth factor on the choice of local weaning foods by the ith individual marketer.

X_i is a vector of the ith explanatory variables (determinant factors).

is the unknown ith parameter. The logit form is specified as:

$$In\left(\frac{p_i}{1-p_i}\right) = \alpha + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots \dots + \beta_k \, x_{ik} \dotfill (2)$$

Where P_i is the probability that $Y_i = 1$, for k explanatory variables, and i = 1….. n observations.

$In\left(\frac{p_i}{1-p_i}\right)$ is the logit or simply the log odds, and to determine P_i, a common representation of this equation is

$$P_i = \frac{\exp\left(\alpha + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots\dots + \beta_k \, x_{ik}\right)}{1 + \exp\left(\alpha + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots\dots + \beta_k \, x_{ik}\right)} \dotfill (3)$$

In practice, when estimating the model, the coefficients of the reference category are normalized to zero because the probabilities for all the choices must sum up to unity (Greene, 2012). So, for K number of choices (dependent variables) only (K-1) distinct sets of parameters can be identified and estimated. The goal of multinomial logit is to construct a model that explains the relative effect of the differing explanatory variables on the logit or observed outcome. When using multinomial logistic regression, one category of the dependent variables is chosen as the reference or base category which in this case study, the marketers selling *akamu oka* together with *akamu okiri*

were chosen as the reference or base category. The exponential beta coefficient $[E(W_{ij}/P_i)]$ represents the change in the odds of the dependent variable being in a particular category *vis-à-vis* the reference category associated with a unit change of the corresponding independent variable. Standard interpretation of the multinomial logit is that for a unit change in the predictor (independent or explanatory) variable, the logit of outcome, relative to the reference category is expected to change by its respective parameter estimate, (which is in log-odds units), given the variables in the model are held constant.

Here, the dependent (response) variables were:
Y_1 = The choice of a marketer belonging to *akamu-oka* combined with *akamu-okiri* category which is the reference or base category.

Y_2 = choice of a marketer belonging to *akamu oka* category,

Y_3 = choice of a marketer belonging to *akamu okiri* category,

Y_4 = choice of a marketer belonging to *agidi* category, while the independent (explanatory or predictor) variables were the factors that predicts the marketer's choice of local weaning foods and these were:

X_1 = Selling price (N)

X_2 = Total revenue (N)

X_3 =   Marketing experience (years)

X_4 = Primary level of education

X_5 = Secondary level of education

X_6 = Vocational education

X_7 = Tertiary level of education

Note that the local weaning food estimated coefficients for each choice will reflect the effects of X_i's on the likelihood of the local weaning food marketer choosing that alternative relative to the reference category.

RESULTS AND DISCUSSION
  The results in Table 1 showed the set of significant explanatory variables as compared with the reference or base category.

As presented in Table 1, the multinomial logistic regression results showed that for *agidi* category relative to the reference category, the selling price had a negative effect (-2.58) with an odd ratio of 0.9676 that is statistically significant at 1% , the total revenue had a positive effect (3.27) with an odd ratio of 1.0010 and is statistically significant at 1%, years of marketing experience was positively signed with an odd ratio of 1.4553 but not statistically significant, the four levels of education attained were all positively signed with odd ratios of 5.9547e+05, 3.2245e+05, 1.6256e+06 and 1.5697e+06 that were not statistically significant. This result implies that a unit increase in selling price will have an effect of reducing or decreasing the odds of choosing to market *agidi* by 0.9676 unit while a unit increase in total revenue will have an effect of increasing the odds of choosing to market *agidi* by 1.0010 unit given that the other variables are held constant.

Table 1: Factors Influencing the Choice of Local Weaning Foods Marketed in Enugu State (Multinomial Logit Result)

Variables	Akamu oka Coefficients	Z ratios	Exp(ß)	Agidi Coefficients	Z ratios	Exp(ß)	Akamu okiri Coefficients	Z ratios	Exp(ß)
Selling Price	-0.0019 (0.0034)	-0.55	0.9981*** [0.00]	-0.0329 (0.0127)	-2.58	0.9676*** [0.01]	-0.0257 (0.0104)		0.9746** [0.01]
Total revenue	0.0008 (0.0002)	4.81	1.0008*** [0.00]	0.0009 (0.0002)	3.27	1.0010*** [0.00]	0.0009 (0.0002)		1.0010*** [0.00]
Years of Marketing experience	1.3972 (1.0383)	1.34	4.0439 [0.20]	0.3752 (2252.104)	0.00	1.4553 [1.00]	0.2009 (1898.033)		1.2225 [1.00]
Levels of Education:									
Primary education	0.0581 (0.6015)	0.10	1.0599 [0.90]	13.2971 (1042.053)	0.01	5.9547e+05 [0.90]	12.8229 (684.4563)		3.7063e+05 [0.90]
Secondary education	-0.6684 (0.6290)	-1.06	0.5125 [0.30]	12.6837 (1042.053)	0.01	3.2245e+05 [0.90]	12.0676 (684.4563)		1.7415e+05 [0.90]
Tertiary education	1.2344 (0.8636)	1.43	3.4365 [0.20]	14.3014 (1042.053)	0.01	1.6256e+06 [0.90]	12.8754 (684.4568)		3.9059e+05 [0.90]
Vocational education	0.1136 (0.7364)	0.15	1.1204 [0.90]	14.2663 (1042.053)	0.01	1.5696e+06 [0.90]	14.4520 (684.4569)		1.8900e+06 [0.90]
Constant	-4.8783 (1.4084)	-3.46	0.0076 [0.00]	-4.6988 (1042.070)	-0.00	0.0091 [0.90]	-7.0491 (684.4738)		0.0009 [0.90]
Log Likelihood	= - 162.1119								

For *akamu- oka* category relative to the reference category, the selling price had a negative effect with an odd ratio of 0.9981 and is statistically significant at 1%, the total revenue had a positive effect with an odd ratio of 1.0008 and is statistically significant at 1%, years of marketing experience was positively signed with an odd ratio of 4.0439 but not statistically significant. The primary, tertiary and vocational levels of education were positively signed with odd ratios of 1.0599, 3.4367 and 1.1204 respectively while secondary level of education was negatively signed with an odd ratio of 0.5125 but not statistically significant. This result implies that a unit increase in selling price given that the other variables are held constant will have an effect of reducing or decreasing the odds of the marketer choosing to market *akamu oka* by 0.9981unit while a unit increase in total revenue given that the other variables are held constant will have an effect of increasing the odds of the marketer choosing to market *akamu oka* by 1.0008unit. For *akamu okiri* category relative to the reference category, the selling price also had a negative effect with an odd ratio of 0.9746 and is statistically significant at 5% , the total revenue had a positive effect with an odd ratio of 1.0010 and is statistically significant at 1%, years of marketing experience was positively signed with an odd ratio of 1.2226 but not statistically significant, the four levels of education attained were all positively signed with odd ratios of 3.7064e+05, 1.7415e+05, 1.8900e+06 and 3.9058e+05 but not statistically significant. This result implies that a unit increase in selling price given that the other variables are held constant will have an effect of reducing or decreasing the odds of choosing to market *akamu okiri* by 0.9746unit while a unit increase in total revenue given that the other variables are held constant will have an effect of increasing the odds of the marketer choosing to market *akamu okiri* by 1.0010unit. These results

also showed that the higher the selling price, the lower the probability of the marketer choosing to sell a particular local weaning food because in general, when prices rise, buyers will automatically buy less and this will invariably affect the sales of the marketer because they will seek other alternatives to the product. The price of a product determines how much margin that product will make, a portion of which can be re-invested in marketing. If a product has high margins, marketers will definitely invest more money to market the product. The results of Exp(β) on total revenue which indicated that a unit increase in total revenue of marketers *ceteris paribus* would lead to an increase in the odds of the marketer choosing from either the *agidi, akamu oka* or *akamu okiri* category. These results imply that the higher the total revenue, the higher the probability of the marketer choosing to market a particular weaning food and this agrees with the fact that revenue growth illustrates sales increase or decrease over time which can be used to measure "turn over" that is, how fast a business is expanding. This collaborates with the findings of Ani *et al.* (2016), that a higher revenue generates more profit which in turn lures marketers towards that business venture.

CONCLUSION
The study examined the factors (variables) that influenced the choice of local weaning foods marketed using Multinomial Logit (MNL) model on data from a cross-section of two hundred and seven local weaning foods marketers in Enugu State, Nigeria. The dominant locally produced weaning foods identified were *akamu-oka* (maize thin gruel), *akamu-okiri* (guinea corn thin gruel) and *agidi* (maize thick gruel) which made up the different categories of marketers while their determinant factors were selling price, total revenue, years of marketing experience and levels of education.

Selling price and total revenue had a significant effect on the choice of local weaning food marketed in the study area. Increase in selling price of a particular local weaning food would result in a decrease in the odds of a marketer while an increase in total revenue would result in an increase in the odds of a marketer. In other words, the higher the total revenue, the higher the odds of marketing that particular local weaning food while the higher the selling price, the lower the odds of the marketing that particular local weaning food. It is possible to conclude that the total revenue had a positive significant effect while selling price had a negative significant effect on the choice of a marketer choosing among the local weaning foods marketed in Enugu State, Nigeria. Reduction in selling price and increase in total revenue are highly recommended in the marketing of local weaning foods in the study area. Further studies are also recommended to guide marketers on how to take advantage of all the identified investment potentials in this study.

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