

Comparative Study of Income Expenditure on Household Consumption of Food and Non-Food Items in Rural and Urban Areas of Nigeria: Non-Parametric Approach

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Abstract

Consumption is a compulsory activity for the survival of human existence, but income is the only element that sustains it. The consumption level of every household has a direct effect on a society's economy. The economy and wellbeing of a society or nation also depends on its general level of income and expenditure for adequate development and growth. Therefore, the study examined the income expenditure on household consumption of food and non-food items in the six geopolitical zones and the rural/urban areas using Kruskal Wallis and Mann Whitney nonparametric test statistics. The design adopted secondary source of data from National Bureau of Statistic to determine if the expenditure on household consumption of food and non-food items in the six geopolitical zones of Nigeria are the same, including the rural and urban areas respectively. Seventeen non-food items and ten food items were examined. The results showed that the expenditure on household consumption of food and non-food items in the six geo-political zones are significantly different and between the rural and urban areas.

Keywords: Consumption, Non-Food Items, Food Items, Pattern, Kruskal Wallis, Mann Whitney, Demographic

Introduction

The success of the economy of any nation is measured, among others, by its ability to provide for its citizen: to feed them, to clothe and shelter them, and to offer them access to good health, to education and to a wide range of consumer goods. Food and non-food consumption expenditure are major pre-requisite to measure poverty and to determine the living standard of a household; income and expenditure are the most popular approach. Access to food is an important element of food security which is a major concern especially in the rural households. The consumption pattern of various needs (food and non-food items), in recent time, has become a major concern, not only to the government, but to every concerned citizen. The production and distribution of food and non-food items remain a major issue. The continuous increase in demand for food in Africa generally, Nigeria in particular, can be attributed to urbanization, globalization and most importantly high population growth, and agricultural growth has not been able to meet this increase (Collier and Dercon, 2014).

Many judge the economic performance of a country mainly in terms of consumption level, which is distributed in the consumption of three categories of products, namely durable, nondurables and services (Samuelson and Nordhaus, 2005). The consumption pattern of a nation represents the aggregate demand of goods and services in the country and in most cases, it constitutes about 60 percent of its total GDP (Ogwo and Gazie, 2012). This, also interprets the level of welfare and poverty of the nation. Human life is nourished and sustained by consumption, and the abundance of this consumption is the life blood of human development and consumers in the economic empire. It was reported that despite widespread economic and agricultural growth during the last decade 13.5% of the population in developing countries remain recurrently undernourished (FAO, 2014). Consumption habits and pattern are determined by a complex set of socio-economic, cultural, religious, psychological, ethical and environmental factors. Typically, a country's consumption pattern reveals a clear picture of its standard of living, poverty level, human development and the nature of its economic growth. The types of food or non-food items consumed by different categories of people depend on how much of such they can afford. For example, in Nigeria

today an average household consumes food like grains, dairy, cereals, drink of different kinds and non-food items expenses such as fuel, light bills, car maintenance etc. are on the increase. Obisesan (2016) observed that particular patterns of expenditure of households on food items constituted the largest part of household expenditures at low income level. The demand for food and non-food items depends on the population, the dietary habits of the populace taste and the per capita income of the people under consideration. Consumption patterns differ from one zone to another. Zonal variation exists at a close examination of a state within one zone when compared with another state within another zone.

Food is key to sustaining life, as it provides nutrients essential for the maintenance of good health, improvement of wellbeing, and labour productivity (Ogundari, 2017). Food consumption pattern fundamentally reflects nutritional wellbeing of individuals and it is defined by culture and food availability. Dietary habits and food preference established early in life set the foundation for a child's lifelong eating behaviours and often their weight and health (Zuzana *et al*, 2019). The demand for food in Africa continues to be on the increase rapidly as a result of urbanization, globalization and particularly high population growth. The producer of most variety of food are found in rural areas and are mostly subsistence farmers who most often consumed leftover of their farm after selling food products from their farm (Mustapha, 2014). In addition, agriculture remains the economic engine of many African countries, contributing an average of 30% of GDP (Thornton *et al.*, 2011). It is documented in Nigeria General Household Panel (2016) that oil and fat products along with grains and flours are the most commonly consumed food items with over 97 percent of households consuming food items in these groups. This is closely followed by vegetables (96.7%), and meat, fish and animal products (88.9%). Fruits and dairy products continue to be reported as the least prevalent food consumed.

Literature Review

A country's consumption pattern reveals the picture of its standard of living, poverty level, human development and the nature of its economic growth. The measurement of food consumption and expenditure is a fundamental component of any analysis of poverty and food security and hence the importance and timeliness of devoting attention to the topic cannot be overemphasized. Jama (2002) asserts that a variety and balance of foods from all food groups and moderate consumption of all food items is very important in order to maintain healthful diets. National Bureau of Statistic (2012) observed that the expenditure pattern of rural households in developing countries has been largely skewed towards food consumption, yet rural households that provide the bulks of agricultural products still suffers from caloric and nutrition insufficiencies. Ogunniyi *et al* (2012) stated that the proportion of expenditure spent on food is inversely related to total income. Food consumption pattern fundamentally reflects nutritional wellbeing of individuals and the meal pattern is defined by culture and food availability, according to Archana & Begum (2013). Dobermann *et al* (2013) confirmed that the rural households experienced cycle of seasonal food shortage yearly

The analysis of food and non-food household consumption through an examination of income expenditure is a strategy to understand the relationships among geopolitical zones in Nigeria. Ogunniyi *et al* (2012) employed the Almost Ideal Demand System (AIDS), to show food consumption pattern in Ogbomoso metropolis of Oyo State, Nigeria. Obisesan (2016) explored Exponential Regression Model and the Ordered Probit Regression Models to determine food and non-food expenditure differential across Poor and Non-Poor Households in South-East Nigeria. All these models are parametric in nature as they assume underlying statistical distribution in the data. The genuineness of nonparametric test statistic in which data are not assumed to come from prescribed models and without knowing the distribution of the population motivated is used in this study.

Research Methodology

Nonparametric test statistics was used to examine and analyze the consumption level of food and nonfood items of six geopolitical zones of Nigeria including the rural and urban areas. Seventeen nonfood items were compared and 10 classes of food were also compared. Kruskal Wallis and Mann Whitney tests were used to test among the

geopolitical zones and between rural and urban areas respectively. Kruskal Wallis was adopted to determine if there exist difference in consumption pattern among the zones, while the choice of Mann Whitney to determine the consumption level of food and non-food in rural and urban areas is based on the fact that the two independent items (food and non-food) are from are from the same distribution.

Kruskal-Wallis Test

The Kruskal-Wallis test was derived from the F-test in 1952. This test statistic is used for the difference in the distribution of k-independent samples ($k \geq 3$). It is a non-parametric version of the one-way analysis of variance (ANOVA). Let us consider an investigation of a factor in an experiment occurring at r-levels. Let n_i denotes the number of observations in the i th sample (level of factor), $i = 1, 2, \dots, k$. Kruskal-Wallis test statistic is given by Kruskal and Wallis (1952)

$$H = \frac{12}{n(n+1)} \sum \frac{R_i^2}{n_i} - 3(n+1) \tag{1}$$

Where R_i is the sum of ranks of the i^{th} sample, n_i is the number of observations in the i^{th} sample i.e. the sample size. The calculated test statistic H is compared with the table value of the chi-square χ^2 statistic at $k-1$ degree of freedom and the null hypothesis is rejected if H is greater than χ^2_{k-1}

Mann Whitney

Mann and Whitney (1947) invented the Mann Whitney U test (Kerby, 2014). This test is used to examine if two independent samples come from the same population (i.e. if they have the same distribution). It is the most widely used test as an alternative to the t-test for two independent samples where t-test assumptions about the parent population is not made. The test statistic is denoted by U and given as

$$U = \min (U_x, U_y)$$

$$U_x = T_x - \frac{n_1(n_1 + 1)}{2} \quad \text{and} \quad U_y = T_y - \frac{n_2(n_2 + 1)}{2} \tag{2}$$

T_x is the sum of ranks of the observations of the first sample (x- values) in the combined sample.

T_y is the sum of ranks of the observations of the second sample (y- values) in the combined sample.

For a sufficiently large sample, we resort to the large sample approximation of U, denoted by U^* and given as

$$U^* = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}} \tag{3}$$

which is approximately standard normally distributed.

The value of U^* is therefore compared to the tabulated Z-value at the specified level of significance. The null hypothesis of no difference is rejected if U^* is found to be greater than the critical value of Z.

Data Presentation and Analysis

The data on household expenditure on food and non-food items in General Household Survey–Panel (GHS-Panel) 2015/2016 was collected from the National Bureau of Statistics (2016).

Table 1: Income Expenditure on Food Items Consumption by Place of Residence

Item	North Central (₦ 000)	North East (₦ 000)	North West (₦ 000)	South East (₦ 000)	South South (₦ 000)	South West (₦ 000)	Urban (₦ 000)	Rural (₦ 000)	NGA (₦ 000)
Grains and flours	868.9	1,740.90	1,646.30	455.2	836.9	631.3	1,082.20	932.4	994.2
Starchy roots, tubers,	388.9	467.7	327.1	539.6	721.6	379.2	574.1	374.1	456.5
Pulses, nuts and seeds	278.8	291	334.1	218.5	316	207.7	269.6	272	271
Vegetables	318.9	489.3	426.3	437.7	523.6	334.4	451.7	384.2	412
Meat, fish and animal pro	875.5	1,128.50	913.3	1,389.30	2,311.50	1,154.60	1,540.70	1,101.50	1,282.50
Fruits	34.9	72.8	74.6	91.6	127.3	53.7	100.4	56.5	74.6
Milk/milk products	55.7	43.3	101.8	159.6	153.9	51.4	106.4	84.4	93.5
Oil and fats	331.4	538.2	610.4	168.5	337.8	169.1	307.6	374.8	347.1
Sugar/sugar pro/honey	80	198.2	128.5	29.2	59.1	13.5	65.3	81.2	74.7
Spices/condiments	47.4	125.7	69.6	37.4	59.7	16.4	36.7	63.9	52.7
Total	3280.4	5,095.60	4,632.00	3526.6	5447.4	3011.3	4,534.70	3725	4058.8

Source: National Bureau of Statistics (2016)

Table 2: Income Expenditure on Non-Food Items Consumption by Place of Residence

Item	North Central (₦ 000)	North East (₦ 000)	North West (₦ 000)	South East (₦ 000)	South South (₦ 000)	South West (₦ 000)	Urban (₦ 000)	Rural (₦ 000)	NGA (₦ 000)
Carpet, rugs, drapes, curtain	1706	1921	448	1278	1865	856	2042	640	1219
Linen-towels, sheets blankets	376	620	284	730	1793	506	1024	459	692
Mat-sleeping or for drying maize flour	1247	3268	1612	502	576	736	1005	1311	1184
Mosquito net	165	797	733	99	191	404	385	412	401
Matrass	3572	6133	10447	2082	9244	2220	6938	4680	5612
Sports and hobby equipment	0	0	72	216	79	109	121	61	86
Camera	153	20	55	9	384	16	205	29	101
Building items – cement, bricks, timber, iron	188	8343	8261	31294	31691	24635	32915	8058	18313
Council rates	547	0	0	233	471	317	480	112	264
Health insurance	20	0	73	0	223	0	93	26	54
Auto insurance	603	0	79	3015	812	1006	1500	499	912
Home insurance	0	0	0	0	0	0	0	0	0
Life insurance	0	0	0	0	0	0	0	0	0
Fines and legal fees	0	0	0	309	0	118	178	0	74
Dowry costs	96	4348	1698	1076	1441	0	540	1644	1188
Marriage ceremony cost	8259	26142	27670	23015	8653	13976	20508	15696	17682
Funeral costs	5551	7347	886	84109	36917	40231	26656	31844	29704
Total	22483	58939	52318	147967	94340	85130	94590	65471	77486

Source: National Bureau of Statistics (2016)

Results and Discussion

Table 1 presents the income expenditure on household consumption of food and non-food items in all the geo-political zones in Nigeria. The table shows that there was a clear regional difference in income expenditure on household of food and non-food items, and highest expenditure on food items in all geo-political zones was on (meat, fish and animal feed), aside from North East and North West (grain and flour) as highest. Also, the consumption level of food item was seen to be generally high in the urban area except in oil and fat, sugar and spices. It reveals further that households in the northern part of the country spend more on food items (₦13,008,000,000) than household in the south (₦11,985,300,000).

Table 2 gives an overview of income expenditure on non-food item consumption in all geo-political zones in Nigeria. It can be seen from the table that in the southern part, the highest amount of household expenditure on non-food items was on funeral, while the Northern part is with the highest expenditure on marriage ceremony. The table shows that building materials has the highest amount of household expenditure on non-food items of both rural and urban area. ₦8,058,000,000 and ₦32,915,000,000 were spent on building materials by the rural and urban settlement respectively. Also, generally, expenditure on both food and non-food items were seen to be higher in the urban area than the rural area.

Kruskal Wallis Test (more than two sample test) among six geo-political zones

Decision Rule

Reject H_0 if P-value (calculated) is greater than 0.05.

Test of Hypothesis

H_0 : There is no significant difference in Income Expenditure on food and non-food items.

H_1 : Income Expenditure on food items is significantly different across the six regions. H_2 : Income Expenditure on non-food items is significantly different between the urban and rural areas Nigeria.

Output 1: The result from *Kruskal-Wallis H Test Statistic of the mean expenditure on food items.*

Statistics	Values
Chi-Square	1.397
Df	5
Asymp. Sig.	.925
a. Kruskal Wallis Test	
b. Grouping Variable: Geo political Zones	

Source: Author’s Computation (SPSS 16 Output)

Output 1 shows that the p-value of the test statistic (0.925) is greater than 0.05, hence, we conclude that there is significant difference in the income expenditure on food items across the six regions at 5% level of significance. This implies that the income expenditure on food items varies from one region to another. So many things can be attributed to this variation such as per capital income, size of household, source of income etc.

Output 2: The result from *Kruskal-Wallis H Test Statistic of the mean expenditure on Non-food items.*

Statistics	Values
Chi-Square	1.807
Df	5
Asymp. Sig.	.875
a. Kruskal Wallis Test	
b. Grouping Variable: Geo-political Zones	

Source: Author's Computation (SPSS 16 Output)

From output 2, since the p-value 0.875 is greater than 0.05, hence we conclude that there exist a significant difference between the income expenditure on non-food items in the six regions at 5% level of significance.

The findings of alternative hypothesis 1 revealed that significant difference exist in the income expenditure on household consumption of food and non-food items in Nigeria. That is, the consumption pattern of household in the six geopolitical zones differs from one zone to another. The findings conforms to the study of Nwanakwere & Ogwumike (2019) that income expenditure on non-food items differs from one region to another.

Mann Whitney (two sample test) between rural and urban

Output 3: The results from Mann-Whitney test for mean expenditure of non-food items for the urban and rural areas.

Statistics	Mean_Exp
Mann-Whitney U	123.000
Wilcoxon W	276.000
Z	-.742
Asymp. Sig. (2-tailed)	.458
Exact Sig. [2*(1-tailed Sig.)]	.474 ^a
a. Not corrected for ties.	
b. Grouping Variable: Region/Area	

Source: Author's Computation (SPSS 16 Output)

Output 3 shows the result of the Mann-Whitney U test of difference. From the output we see that the p-value of 0.458 is greater than 0.05, hence we reject H_0 and conclude that the income expenditure on non-food items in rural and urban area are significantly different at 5% level of significance.

Output 4: The result using Mann-Whitney U test Statistic of the mean expenditure on food items.

Test	Mean_Exp
Mann-Whitney U	44.000
Wilcoxon W	99.000
Z	-.454
Asymp. Sig. (2-tailed)	.650
Exact Sig. [2*(1-tailed Sig.)]	.684 ^a
a. Not corrected for ties.	
b. Grouping Variable: Area	

Source: Author's Computation (SPSS 16 Output)

Output 4 indicates that the p-values of the Mann-Whitney test statistic (0.650) is greater than 0.05. This implies that the result does not provide enough evidence to reject the null hypothesis, hence conclude that the mean the expenditure on food items in urban and rural areas are significantly different at 5% level of significance.

Alternative hypothesis 2 reveals that income expenditure on **non-food items** is more in the urban areas than the rural areas. This finding is in tandem with the study of Sharma & Gupta (2006), Gbolaham (2012), Ojonta (2015) and Jibril (2018), which argued that expenditure on non-food items was higher in urban areas. It was however, inconsistent with the study of Nwanakwere & Ogwumike (2019), which stated that non-food consumption is more in the rural areas than in the urban areas. Also, income expenditure on **food items** is relatively high in the urban areas compare to the rural areas. The findings justifies the claim of Sabur *et al* (1997), Obayelu & Okoruwa (2011).

Conclusion and Recommendation

Based on the results obtained, it is understood that the people in the rural area spend more on non-food items (mat sleeping, dowry, funeral) than the people living in urban areas. Also, expenditure level on food items (spices/condiment, sugar and oil and fat) is more concentrated in the rural settings than the urban areas. Meanwhile, the level of food and non-food items consumptions at the six geopolitical zones differs from one region to another, and the consumption level in the northern part is skewed to the non-food items, especially in the rural areas.

Emphasis have been placed, in the recent development economics literatures, on the use of income expenditure on household consumption to determine the welfare and standards of living of people. The study has established the existence of consumption inequality between the urban and rural sector, and among the six geopolitical zones in Nigeria. This study has shown the existence of inequality in income expenditure of household on food and non-food items inequality between the urban and rural sector, and among the six geopolitical zones in Nigeria. The results of this study have serious policy consequences that require immediate proactive measures by the government of Nigeria. Therefore, government at all levels, must implement policies aimed at addressing consumption inequality in the country. The policies could include subsidizing expenditures for the poor and vulnerable, especially in the rural areas. Similarly, government should consider implementing policies that will ensure a more equitable income distribution for all the citizens.

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