

Full Length Research Paper

Food expenditure and household welfare in Ghana

Samuel A. Donkoh^{1*}, Hamdiyah Alhassan¹ and Paul K. Nkegbe²

¹Department of Agricultural and Resource Economics, University for Development Studies, Tamale, Ghana.

²Department of Economics and Entrepreneurship Development, University for Development Studies, Ghana.

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The main objective of this study was to investigate the determinants of household food expenditure and its effects on welfare. As a result of potential simultaneity between food expenditure and welfare, a simultaneous equations model was estimated using the two-stage least squares method. The findings confirm the theoretical and empirical evidences that households reduce the percentage share of their food expenditure as they become richer. Also, increases in the food budget share lead to a reduction in welfare. Different households which spent greater percentages of their incomes on food were as follows: female headed households; households headed by the aged; households whose heads had little or no formal education; households whose heads were married; smaller households; rural households; households in the forest and savannah belts; and households living farther from the nation's capital. Also, welfare was greater for the following households: female headed households; households headed by the aged, households whose heads had formal education, smaller households, households who owned assets; households living in the urban centres, as well as those living closer to the nation's capital. Households that must be targeted for support include male-headed households, households headed by the relatively young, larger households, rural households and households farther from the nation's capital, including those in the savannah belt.

Key words: Food expenditure, Ghana, households, two stage least squares, welfare.

INTRODUCTION

The Food and Agriculture Organization (FAO, 2011) noted that even though world food supply is enough to

feed the population, there are profound disparities across countries, towns and households, in terms of access to

*Corresponding author. E-mail: sammidonkoh@yahoo.com. Tel: +233 (0)245728465.

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Abbreviations: 2SLS, Two stage least squares; BECE, Basic Education Certificate Examination; FAO, Food and Agriculture Organization; GSS, Ghana Statistical Service; LCH, life cycle hypothesis; MDG, millennium development goal; MSLCE, Middle School Level Certificate Examination; OLS, ordinary least squares method; PIH, permanent income hypothesis; SSA, Sub-Saharan African; UNDP, United Nations Development Programme; UNEP, United Nations Environment Programme; VSCE, Vocational School Certificate Examination; WFP, World Food Programme; WHO, World Health Organization.

food. For instance, in 2010, while the average caloric intake per person per day in least developed and developing countries were 2,120 and 2,640 kcal, respectively, that of developed countries was 3,430 kcal. The FAO (2012) stressed that despite the considerable efforts taken to curb global hunger, 925 million people were undernourished in 2010, while the number of obese people rose to 1.5 billion in 2008. The World Health Organization (WHO, 2011) noted that these discrepancies call for much concern.

The irony is that while the rich spend more on food than the poor in absolute terms, the latter allocate high proportions of their income to food consumption with smaller portions left for the consumption of high quality non-food items (Engel, 1857) necessary for a higher standard of living. The over consumption of the rich and the under nourishment of the poor have significant health, economic and environmental implications (UNEP, 2012).

The main objective of this study was to investigate the socioeconomic determinants of food consumption and the effects on the living standards of Ghanaian households. Specifically, we sought to investigate the extent to which the Engel's law applies to the consumption behaviours of Ghanaian households.

Economic performance of the Ghanaian economy

Over the past two decades, the Ghanaian economy is viewed as a model of development. The country has experienced strong and sustained economic growth in a relatively stable and democratic political environment. Ghana became the first African country to achieve the first Millennium Development Goal (MDG) by halving the poverty of the 1990s even before the targeted year of 2015 (UNDP, 2008). Between 2000 and 2010, Ghana's growth rate at 4.9% was higher than the sub-Saharan African (SSA) average, and more than twice the growth rate of a decade earlier. Similarly, Ghana was more effective in translating the economic growth into poverty reduction than her counterparts in the developing world. However, the Ghana Statistical Service (GSS, 2007) reported that even though poverty has reduced since the 1990s, inequality has not changed. Poverty is the main cause of food insecurity (WFP, 2012). In its comprehensive food security and vulnerability analysis, WFP (2012, p.17) found that "poorer households have lower levels of education, spend a larger share of their limited means on purchasing food, have smaller harvests, and are more often buying their staple foods when the market prices are highest when compared with wealthier households".

Household expenditure in Ghana in 2006/2007

In 2006/2007, the average annual household expenditure in Ghana was GH¢1,918.00 whilst the mean annual per

capita consumption expenditure was GH¢644.00.

Food expenditure accounted for 40% of total household expenditure, while the imputed value of own-produced food consumed by households represents a further 10.5%. At the time of the survey, Ghanaian households were spending on an average, about GH¢2,680 million per annum on food (including non-alcoholic beverages). This represented about a third of the total expenditure while non-food expenditure represented about 70% of the total household expenditure.

Food accounted for about half of the total expenditure of households in the highest quintile and also formed about 60% of the expenditure of households in the lowest quintile. In the localities, households in urban centres spent about 44% on food (actual and imputed), while households in the rural areas spent more than 60% on food. In terms of regions, household expenditure represented more than 70% of the budget in Volta, followed by the Northern Region (65.2%). The figure for the Greater Accra was 40%.

MATERIALS AND METHODS

Theoretical framework: Consumption theory

The theory of consumption is central to the model of Keynes' General Theory, which is often considered to be the origin of macroeconomics. Keynes specified a simple linear consumption function in which consumption is a positive function of disposable income. Though consumption depends on disposable income, there is a part of consumption which does not depend on disposable income and this is called autonomous consumption. The portion of the consumption function which depends on disposable income is called induced consumption and the marginal propensity to consume shows how much consumption will change when income changes. Three points can be deduced from the consumption function stipulated by Keynes. First, the value of marginal propensity to consume is constant and less than one, thus consumer increases their consumption as their income increases, but not as much as the increase in their income. Secondly, the average propensity to consume which is the ratio of total consumption to total income falls as the level of income increases. For Keynes, individuals consider saving as a luxury and this explains why the rich save a higher proportion of their income than the poor. The third deduction from Keynes' consumption postulated that current consumption depends only on current income. Consumption models built on the initial work by Keynes are as follows: Irving Fisher's Inter-temporal choice model; The Life Cycle Hypothesis (LCH) developed by Modigliani and Brunberg (1954); and the Permanent Income Hypothesis (PIH) by Friedman (1957).

The Engel curve

The Engel curve describes the relationship between household expenditure and income. Engel (1857) initiated the studies on household food expenditure survey and found that food expenditure was an increasing function of income and family size, but the food budget shares declined with income. This finding led to the formulation of the Engel's law which states that "the poorer a family is, the larger the budget share it spends on nourishment" (Engel, 1857, pp. 28-29). Thus, the Engel's law can be used to evaluate the

general welfare of households and in particular the conditions of poor households.

According to Engel (1857), food expenditure is an essential expenditure which dominates low income household expenditure patterns; a fall in households' income thus, tends to crowd out expenditure on other non-essential goods. However, when households' incomes increase, a smaller percentage of it is spent on food while a large portion goes into non-food items. Similarly, the finding by Engel (1857) shows that the proportion of income allocated to food is directly related to household size, where larger households spend a higher share of their income on food than smaller households.

Analytical approach

Some food expenditure studies (Yemer, 2011) estimate a Tobit model with the explanation that a significant number of households record zero values. Thus, in the case where there are no zero values the ordinary least squares method (OLS) is appropriate. Also, most of these studies (Ayo et al., 2012; Begum et al., 2010; Umeh and Asogwa, 2012) estimate a single equation with income as one of the main explanatory variables. The problem with the single equation estimation is that income is assumed to be exogenous, yet income is not truly exogenous; while income determines food expenditure, it is determined itself by other variables including food expenditure. This means that estimating a single equation and making income exogenous results in simultaneous bias (Koutsioyannis, 1977; Gujarati, 2004). The right model should be a simultaneous equation involving two equations, each for food expenditure and income. The most appropriate estimator for a simultaneous equation model involving two equations is that of the two stage least squares (2SLS). Lastly, even though in practice, income is equivalent to welfare as defined by the Ghana Statistical Service (2007), in principle, welfare is broader than income because the former includes other indicators of wellbeing in addition to income. Besides, people tend to underestimate their incomes and so the use of expenditure as a measure of welfare as used in the GLSS is preferred.

Simultaneous equations: Two stage least square (2SLS)

Gujarati (2004) shows that when we estimate a single equation by OLS, but the equation has one or more explanatory variable(s) that is/are endogenous, it results in simultaneous equation bias. The right approach is to develop a simultaneous equation system and estimate it by a two stage or three stage least squares depending on the number of endogenous variables. Given the following structural equations:

$$y_1 = b_{12}y_2 + \gamma_{11}x_1 + \gamma_{12}x_2 + \dots + \gamma_{1i}x_i + u_1 \quad (1)$$

$$y_2 = b_{22}y_1 + \gamma_{21}x_1 + \gamma_{22}x_2 + \dots + \gamma_{2i}x_i + u_2 \quad (2)$$

where y_1 and y_2 are endogenous variables; x_i are predetermined variables; b_{12} and b_{22} are coefficients of the endogenous variables and γ_{ji} 's are coefficients of predetermined variables; u_1 and u_2 are the random terms with zero mean, constant variance and zero covariance, but non-zero covariance between the y_i and the u_i .

The reduced form of the structural model is obtained by solving the structural equations simultaneously as follows:

Substituting Equation 2 into 1 we obtain:

$$y_1 = b_{12}(b_{22}y_1 + \gamma_{21}x_1 + \gamma_{22}x_2 + \dots + \gamma_{2i}x_i + u_2) + \gamma_{11}x_1 + \gamma_{12}x_2 + \dots + \gamma_{1i}x_i + u_1$$

$$y_1 = \frac{1}{(1-b_{12}b_{22})} [b_{12}(\gamma_{21}x_1 + \gamma_{22}x_2 + \dots + \gamma_{2i}x_i + u_2) + \gamma_{11}x_1 + \gamma_{12}x_2 + \dots + \gamma_{1i}x_i + u_1] \quad (3)$$

Thus;

$$y_1 = \pi_{11}x_1 + \pi_{12}x_2 + \pi_{13}x_3 + \dots + \pi_{1i}x_i + v_1$$

where

$$\pi_{11} = \frac{b_{12}\gamma_{21} + \gamma_{11}}{(1-b_{12}b_{22})}; \pi_{12} = \frac{b_{12}\gamma_{22} + \gamma_{12}}{(1-b_{12}b_{22})}; \pi_{1i} = \frac{b_{12}\gamma_{2i} + \gamma_{1i}}{(1-b_{12}b_{22})} \text{ and } v_1 = \frac{b_{12}u_1}{(1-b_{12}b_{22})}$$

Similarly, substituting Equation 1 into 2 we obtain:

$$y_2 = b_{22}(b_{12}y_2 + \gamma_{11}x_1 + \gamma_{12}x_2 + \dots + \gamma_{1i}x_i + u_1) + \gamma_{21}x_1 + \gamma_{22}x_2 + \dots + \gamma_{2i}x_i + u_2$$

$$y_2 = \frac{1}{(1-b_{12}b_{22})} [b_{22}(\gamma_{11}x_1 + \gamma_{12}x_2 + \dots + \gamma_{1i}x_i + u_1) + \gamma_{21}x_1 + \gamma_{22}x_2 + \dots + \gamma_{2i}x_i + u_2]$$

The reduced form is represented as;

$$y_2 = \pi_{21}x_1 + \pi_{22}x_2 + \pi_{23}x_3 + \dots + \pi_{2i}x_i + v_2$$

where

$$\pi_{21} = \frac{b_{22}\gamma_{11} + \gamma_{21}}{(1-b_{12}b_{22})}; \pi_{22} = \frac{b_{22}\gamma_{12} + \gamma_{22}}{(1-b_{12}b_{22})}; \dots; \pi_{2i} = \frac{b_{22}\gamma_{1i} + \gamma_{2i}}{(1-b_{12}b_{22})} \text{ and } v_2 = \frac{b_{22}u_1}{(1-b_{12}b_{22})}$$

Thus, the reduced forms of the structural model for the two endogenous variables are:

$$y_1 = \pi_{11}x_1 + \pi_{12}x_2 + \pi_{13}x_3 + \dots + \pi_{1i}x_i + v_1 \quad (4)$$

$$y_2 = \pi_{21}x_1 + \pi_{22}x_2 + \pi_{23}x_3 + \dots + \pi_{2i}x_i + v_2 \quad (5)$$

It can be observed that y_i are correlated with u_i because from the reduced-form y_i are correlated with v_i . Hence we cannot obtain consistent estimates of the coefficients of the structural equations if we estimate them by OLS. The equations need to be estimated by the two-stage-least squares (2SLS).

Using the two stage least squares method to estimate the simultaneous equations system, we need to first apply the ordinary least squares to the reduced form Equations (4) and (5) to obtain estimates of the $\hat{\pi}$'s. Using the reduced form coefficients we obtain a set of computed values for the endogenous variables \hat{y}_1 and \hat{y}_2 .

In the second stage the estimated endogenous variables \hat{y}_1 and \hat{y}_2 are substituted into the structural Equations (1) and (2) to obtain the transformed equation as:

$$y_1 = b_{12}\hat{y}_2 + \gamma_{11}x_1 + \gamma_{12}x_2 + \dots + \gamma_{1i}x_i + u_1^* \quad (6)$$

$$y_2 = b_{22}\hat{y}_1 + \gamma_{21}x_1 + \gamma_{22}x_2 + \dots + \gamma_{2i}x_i + u_2^* \quad (7)$$

where

$$u_1^* = u_1 + b_{12}v_2; u_2^* = u_2 + b_{12}v_1$$

Solving the transformed structural Equations (6) and (7) by using the ordinary least squares we obtained the 2SLS estimates of the structural parameters. However, to be able to estimate the model by 2SLS it must satisfy the order and rank conditions. These are well spelt out in Koutsioyannis (1977) and Gujarati (2004).

Table 1. Summary definition of variables.

Variable	Description
Sex of household head	Dummy variable; 1 if head is male and 0 if female
Age of household head	No of years(in logarithm)
Age squared	No of years squared (in logarithm)
Education of household head	No of years of formal education
Marriage of household head	Dummy; 1 if head is married, 0 otherwise
Household size	No of members in the household(in logarithm)
Land	Dummy; 1 if household own land; 0 if otherwise
vehicle	Dummy; 1 if household own a commercial vehicle, 0 if otherwise
Durable assets	Total value in millions of Cedis of household durable assets(in logarithms)
Locality	Dummy; 1 if household lives in urban center and 0 if in rural area
Coastal zone (Coastal)	0 if household lives in forest zone and 1 if otherwise
Savannah zone (Savannah)	0 if household lives in forest zone and 1 if otherwise
Regional distance	Distance in kilometres from Accra (the national capital) to the capital of the region in which a household lives
Welfare	Household total nominal expenditure divided by the product of Accra price index and the national equivalence scale
Food Expenditure	Percentage of household expenditure on food
Poverty status	Categorical; 0 if welfare is below the lower poverty line; 1 if welfare is between the lower and upper poverty lines; 2 if welfare is above the upper poverty line

10,000 (old) Cedis = (New) Gh ¢ 1; Exchange rate at the time was \$1= Gh ¢1.

Table 2. Descriptive statistics of continuous variables used in the model.

Variable	No.	Minimum	Maximum	Mean	Std. deviation
Age	3941	15	99	45.53	15.820
Household size	3941	1	27	4.18	2.823
Educational level	3941	0	16	6.18	5.326
Durables	3941	0	127000000	971743.59	4421766.889
Food expenditure	3941	00.369117	95.79412	56.9049777	16.06479846
Welfare	3941	75020.39	81700000.00	2209776.84	2499793.64

Empirical model

The empirical model for this present study consists of two main equations, namely, the food expenditure and welfare equations as specified below. Note that they satisfy both the order and rank conditions.

$$Pfexp = \alpha_0 + \alpha_1 Sexhead + \alpha_2 Agehead + \alpha_3 Agesqd + \alpha_4 Educhead + \alpha_5 Marhead +$$

$$\alpha_6 HHsize + \alpha_7 Locality + \alpha_8 Coastal + \alpha_9 Savanna + \alpha_{10} Region + \alpha_{11} Welfare + u_1$$

(Food Expenditure)

$$Welfare = \beta_0 + \beta_1 Sexhead + \beta_2 Agehead + \beta_3 Agesqd + \beta_4 Educhead + \beta_5 HHsize +$$

$$\beta_6 Land + \beta_7 Vehicle + \beta_8 Durables + \beta_9 Locality + \beta_{10} Region + \beta_{11} Pfexp + u_2$$

(Welfare)

The variables are defined in Table 1.

Data and descriptive statistics of continuous variables

The study uses data from the fifth round of the Ghana Living Standards Survey (GSS, 2008). From Table 2, the average age of a household head was 45 years while the average size of a household was 4. This is exactly the national average. Generally, rural households are larger than urban households. In terms of ecological zone, rural savannah recorded the highest average household size (5.4) in 2007, followed by rural forest (4.1), and the rural coastal (GSS, 2008). GSS (2008) noted that a combination of

Table 3. Frequency Distribution of Percentage of food expenditure.

Class interval	Frequency	Percentage
0-19	56	1.4
20-39	517	13.1
40-59	1549	39.3
60-79	1551	39.4
80-99	268	6.8
Total	3941	100.0

Table 4. Two stage and OLS estimation results of food expenditure equation.

Variable	2SLS		OLS	
	Coefficient	Standard Error	Coefficient	Standard Error
Constant	88.0407	3.1915	75.3627	3.1457
Sexhead	-1.4569**	0.5270	1.5166***	1.4993
Agehead	-0.6062***	0.0773	-0.5299***	0.0789
Agesqd	6.2095***	0.7410	5.6218***	0.7561
Eduhead	-0.4701***	0.0542	-0.8568***	0.0487
Marriage Head	1.0464***	0.0030	1.0464***	0.0030
Household size	-2.0748***	0.1511	-0.5128***	0.1124
Locality	-5.7584***	0.6043	-11.4464***	0.4826
Coastal	-10.1243***	0.6127	-8.8675***	0.6202
Savannah	18.7627***	1.2422	14.8633***	1.2414
Region	0.0689***	0.0129	0.0463***	0.0131
Welfare	-4.5086***	0.3413	0.1944***	0.1420

Adjusted R-Squared = 0.99.

factors determines the household size in Ghana. The main ones are a desire, especially on the part of traditional families, to have large families. In the case of urban families, it is the extended family system, which compels them to take care of dependants, other than their immediate family members.

The average number of years that a household head spent in school was 6. This means that on average household heads completed primary six which takes a minimum of six years. The national statistics (as of 2008) was as follows: about 31% of all adults had never been to school; less than 17.1% attended school but did not obtain any qualification; 39% had MSLCE/BECE/VSCE certificate as their highest qualification, while a small percentage of 13.6 had secondary or higher qualification (GSS, 2008). The average wealth of durable assets (such as television set, bicycles and sewing machines) was GH¢997.00 an equivalent of about \$500.00 today. Also the average value of welfare was GH¢220.97 an equivalent of about \$110.00 in current terms. Lastly, the mean percentage of income spent on food was 65%. However, from Table 3, the majority of the respondents (78.7%) spent between 40 and 79% of their incomes on food.

Estimation results of the 2SLS and OLS compared

From Tables 4 and 5 we notice some differences in the 2SLS and the OLS estimation results. For instance, in Table 4 while the welfare variable is negative in the 2SLS it is positive in the OLS. Also, while sexhead has a negative coefficient in the 2SLS, it is positive in the OLS. Similarly, in Table 5, region has a negative

coefficient in the 2SLS but is positive in the OLS. Obviously, the true relationship between food expenditure and welfare would have eluded us if we had used OLS estimator instead of the 2SLS.

The determinants of food expenditure

All the variables that were suspected to influence household food expenditure were significant (Table 4), most of them maintaining their expected signs. The Adjusted R-squared of 0.99 shows that the explanatory variables were able to explain 99% of the variation in food expenditure. Thus, the model was good. Also, the negative significant coefficient of the welfare variable means that an increase in household welfare leads to a reduction in the percentage of household budget on food expenditure. This is consistent with the Engel theory (1885) that households reduce their budget share of food as they become richer. At this stage, it is important a distinction is drawn between the findings of studies that used absolute food expenditure values (Begum et al., 2010; Yimer, 2011; Akpan et al., 2013) and those which used the budget share of food expenditure like our present study (Umeh and Asogwa, 2012).

Generally, in the former studies, income had a positive effect on the level of consumption, though in some instances, the relationship was negative. For instance, in Yimer (2011) study in Ethiopia, while income had a positive effect on the consumption of teff, it had a negative effect on maize consumption. Similarly, in Akpan et al. (2013) study, while workers' salaries had positive effects on food consumption in Southern Nigeria, other sources of income such as farm and non-farm income as well as income from other family

Table 5. Two stage and OLS estimation results of welfare equation.

Variable	2SLS		OLS	
	Coefficient	Standard error	Coefficient	Standard error
Constant	9.7659	0.5883	3.6695	0.3407
Sexhead	-0.3458***	0.0512	-0.5681***	0.0490
Agehead	-0.0806***	0.0078	-0.0306***	0.0069
Agesqd	0.7835***	0.0753	0.2698***	0.0645
Educhead	0.0246***	0.0068	0.0786***	0.0054
Household size	-0.3784***	0.0114	-0.3505***	0.0114
Vehicle ownership	0.3148***	0.0444	0.3609***	0.0451
Land ownership	0.0169***	0.0019	0.0126***	0.0019
Durable assets	0.0002	0.0003	0.0029***	0.0017
Locality	0.7420***	0.0604	1.2299***	0.0474
Region	-0.0041***	0.0011	0.0007***	0.0011
Food Expenditure	-0.0632***	0.0051	-0.0025***	0.0016

Adjusted R-Squared = 0.99.

members had negative effects on food consumption. However, in the study by Umeh and Asogwa (2012) where the dependent variable was food consumption budget, the variable was consistently negatively related to household income, consistent with our study and for that matter the Engel theory.

Other variables like education and household size appeared to go the same direction as income depending on whether the study used absolute or percentage share of food expenditure (Yimer, 2011; Meng et al., 2012; and Akpan et al., 2013). To sum up, the findings in Table 4 indicate that households which spent greater percentages of their incomes on food were as follows: female headed households; households headed by the aged, households whose heads had little or no formal education; households whose heads were married; smaller households; rural households; households in the forest belt as opposed to those in the coastal zone; households in the savannah belt; households living farther from the nation's capital; and poorer households. As indicated earlier most of these findings are consistent with that of the above mentioned studies.

The determinants of welfare

The welfare model was also good in explaining the variations in household welfare, considering the 99% Adjusted R-Squared value reported in Table 5. It can also be observed that all the variables were significant, except durable assets. The negative sign of the food expenditure variable shows that as the percentage of a household income spent on food increased, the welfare of that household reduced. In general, in this study, welfare was greater for the following households: female headed households; households headed by the aged, households whose heads had formal education, smaller households, households who owned assets such as land and commercial vehicles; households living in the urban centres, as well as those living closer to the nation's capital. These findings are also consistent with that of similar studies (Gibson and Rozelle, 2003; Datt and Jolliffe, 2005; Coulombe, 2008).

RESULTS AND DISCUSSION

As noted earlier, many theoretical and empirical studies have established a negative relationship between food

expenditure and income, implying that the higher the income of a household the lower the percentage of the income spent on food, and the lower the income the higher the proportion allocated to food consumption. In this present study, the negative relationship between households' welfare and their food budget share implies that poorer households spend a greater percentage of their incomes on food than richer households. In line with Engel (1885), Umeh and Asogwa (2012) noted that poorer households spend large percentage of their incomes on necessities, including food. However, as their incomes increase they divert more of their incomes to buying higher quality goods and services, thereby reducing the proportion that goes into food. It should be noted that the emphasis is on the proportion of income that goes into food and not the absolute income. Obviously, the absolute income spent on food by a rich household is greater than that of a poorer household, *ceteris paribus*, but in terms of the percentage of income spent on food, that of the latter is likely to be higher. This is validated further by Figure 1a and b. It can be observed that in terms of the percentage of food expenditure, poorer households recorded higher, but in terms of food expenditure in absolute terms they recorded lower than their richer counterparts. The implications of this for research is what we mentioned earlier that a distinction should be drawn between studies that use the absolute food expenditure value and those that use the budget share of food expenditure as the dependent variable. While the former generally establish a positive causal relationship between income and food expenditure, the latter, like our present study establish a negative relationship.

The negative sign of food expenditure in the welfare equation also confirms the fact that higher food expenditure makes households poorer *ceteris paribus*. This is understandable, considering the fact that a

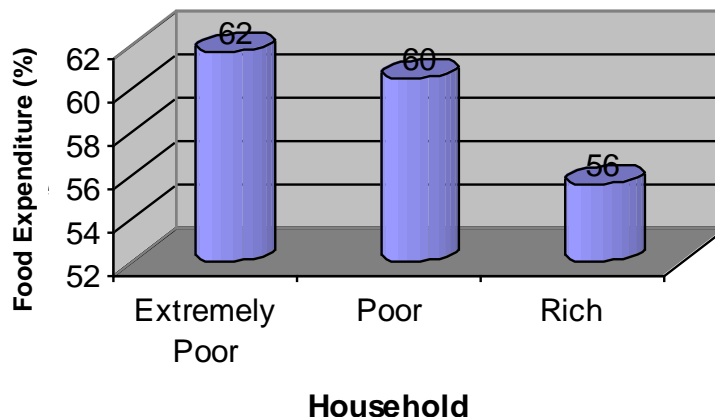


Figure 1a. Poverty status of households and percentage food expenditure.

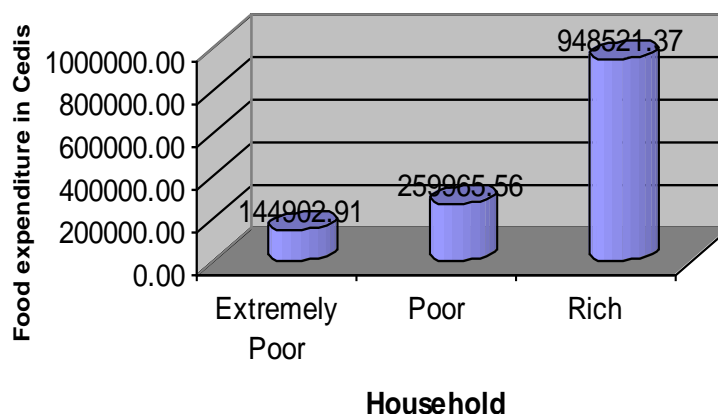


Figure 1b. Poverty status of households and food expenditure.

household spending a greater percentage of its income on food means that it has a smaller percentage left for other goods and services which are vital for its welfare. In Umeh and Asogwa (2012) study, while per capita income negatively influenced the share of food expenditure, the relationship between per capita income and the share of non-food expenditure was positive, confirming the fact that as a household’s income rises it increases its share of expenditure on housing, clothing, education and health, among others, to improve upon its standard of living.

A close study of the results from the two equations reveals two main categories of households; (i) households who spent a greater percentage of their income on food but were richer (female headed households, households headed by the old and smaller households) and (ii) households who were poorer and also spent a smaller percentage of their income on food (male-headed households, households headed by the relatively young, larger households, rural households and households living farther away from the nation’s capital).

The latter group must be targeted for support. Other households that need support are households living in the savannah zone as well as households that had no assets such as land and commercial vehicles.

Female-headed households emerging as richer than male-headed households were contrary to our *a priori* expectations. We also observe in Figure 2a and b that in terms of both the food budget shares and the absolute food expenditure, they recorded higher figures than their male counterparts. Thus, the finding of the present study does not support the issue of feminization of poverty as found by Rodriguez (2000). Following the Beijing Conference on gender inequality a lot of support from both governmental and non-governmental organizations has been given to women in Ghana. Perhaps, this explains why female-headed households are now doing better in terms of welfare, than their male-headed counterparts in Ghana. While the support for women and for that matter, female-headed households should continue, their male counterparts should also be supported since by the findings of this study, they are not

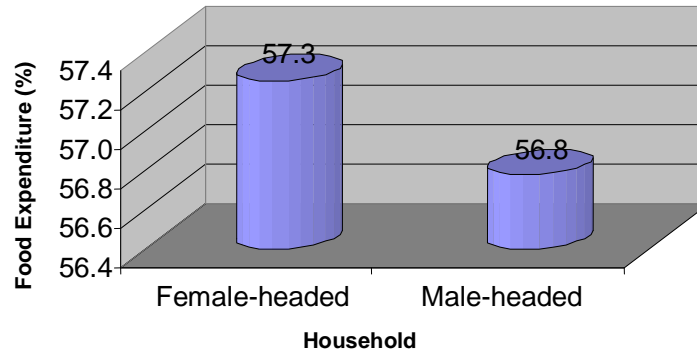


Figure 2a. Sex of Household Head and Percentage of Food Expenditure

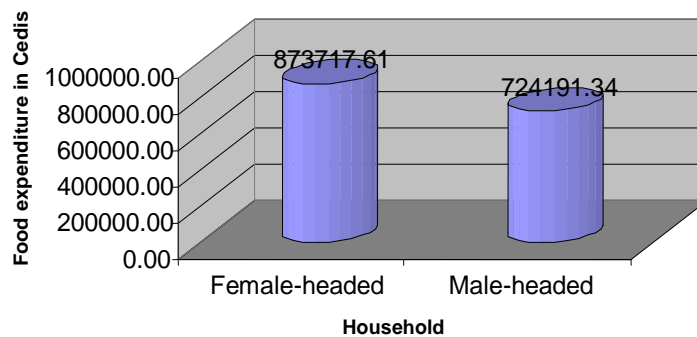


Figure 2b. Sex of Household Head and Food Expenditure.

only poorer but have smaller budget share of food expenditure.

An equally important group that needs support, as per these findings, is large households. As argued by Umeh and Asogwa (2012), the budget share of food expenditure for large households is smaller because they are likely to spend more on non-food items such as education and health. Recall that in the welfare model, larger households were poorer than smaller households, which means that the non-food expenditure here is not a sign of affluence but a necessity. Thus, by virtue of the household size being large, they are forced to cut down the budget share of food expenditure in order to take their children to school or seek medical attention. This is different from an affluent household spending more on luxurious or high quality products because they have a significant increase in their income. For instance, from Figures 3a, b, 4a and b we notice that even though the budget share of food expenditure for households headed by illiterates and households in the rural areas were higher, in terms of the absolute food expenditure, their figures were lower than households headed by literates as well as those in the urban centres, respectively. It is also important that the gap, in terms of economic resources and opportunities, is closed between the nation's capital and those farther away. This calls for

equitable distribution of the national cake and the implementation to the letter of the decentralization policy that is being pursued. Again, Figures 5a, b, 6a and b reveal that while the savannah zone and the three northern regions in general, recorded high percentages of food expenditure, the absolute food expenditure figures for these regions were lower than their counterparts in the south. For a long time, the economic disparity between the south and the north of the country has caught the attention of many analysts and policy makers. Consistently, the Ghana Living Standards Survey data have established that in addition to the central region, the three northern regions are the poorest, of the ten regions of Ghana (GSS, 2007). Food insecurity is associated with poverty or lack of wealth (WFP, 2012). According to WFP(2012), the Upper East has the highest proportion of households who are food insecure (28%), followed by Upper West (16%) and the Northern region (10%).

Conclusion

The main objective of this study was to investigate the determinants of household food expenditure and its effects on welfare. Specifically, the study sought to find out the extent to which household budget share of food

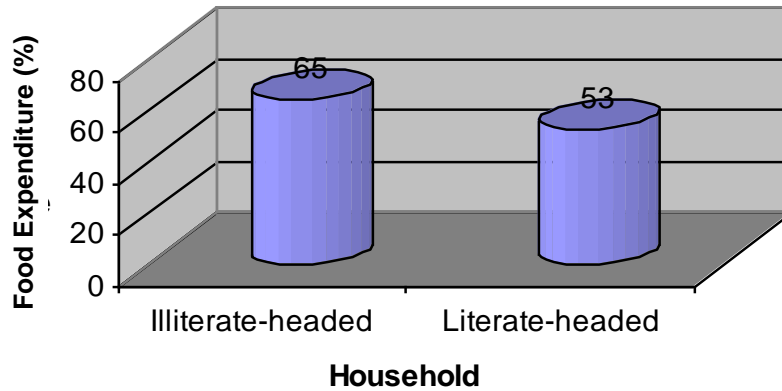


Figure 3a. Household heads' educational background and percentage of food expenditure.

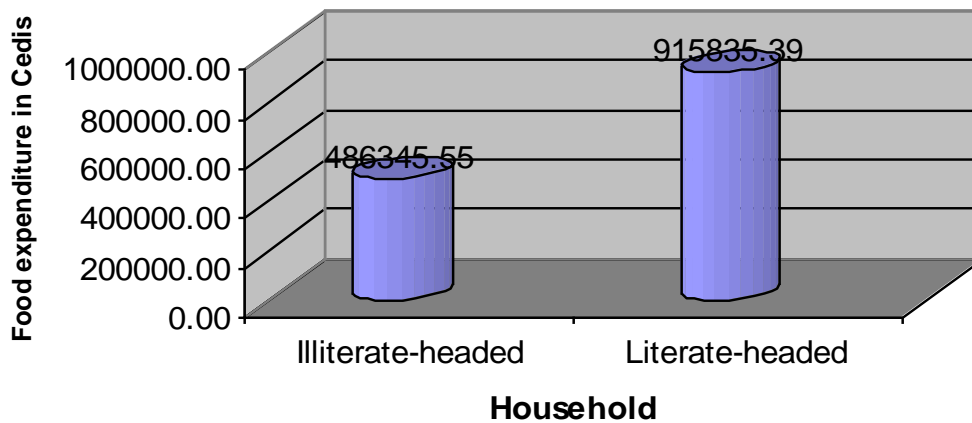


Figure 3b. Household heads' educational background and food expenditure.

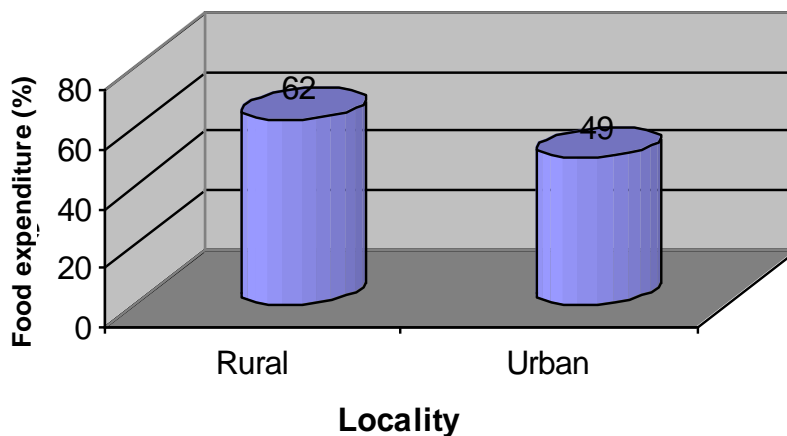


Figure 4a. Locality and percentage of food expenditure.

expenditure (percentage of income spent on food) determined their welfare and *vice versa*. As a result of the simultaneity between food expenditure and welfare, we

estimated a simultaneous equations model by the two-stage least squares method. The negative and significant coefficients of the food expenditure and welfare variables

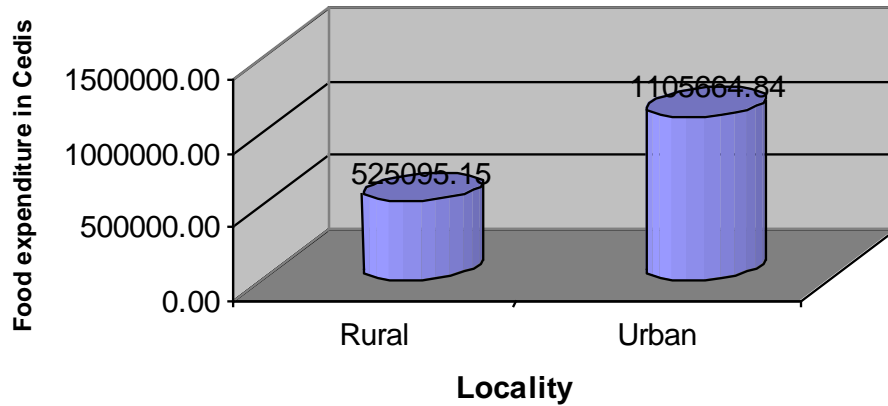


Figure 4b. Locality and Food Expenditure.

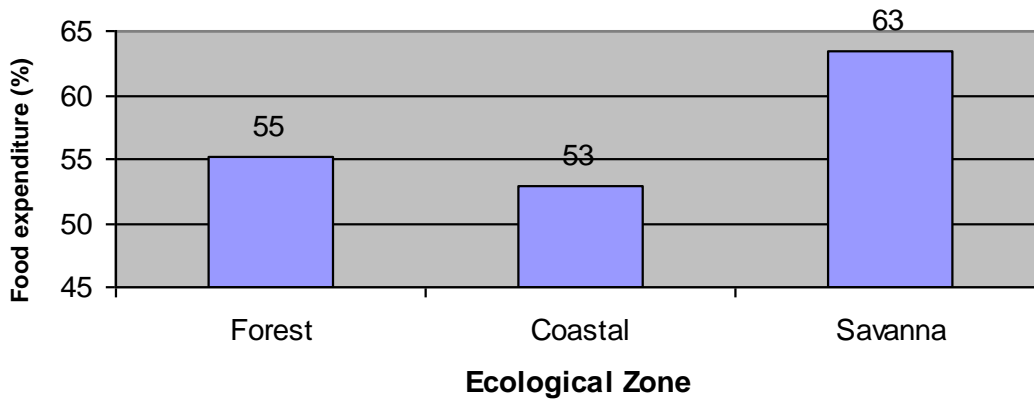


Figure 5a. Ecological zone and percentage of food expenditure.

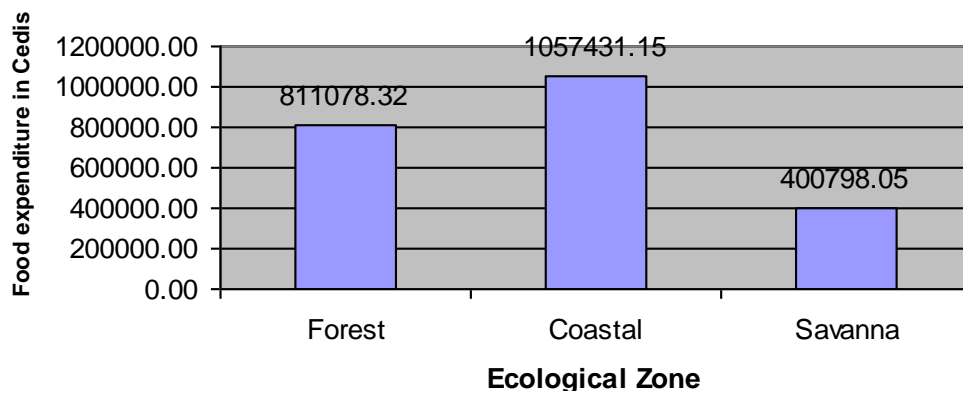


Figure 5b. Ecological zone and food expenditure.

confirm the theoretical and empirical evidence that households reduce the percentages of their incomes allocated to food expenditure as they become rich.

The relatively rich households were as follows: female headed households; households headed by the old;

households headed by literates; smaller households; households who owned land, commercial vehicles and other durable assets; and households in the urban centres or closer to the nation's capital. Generally, apart from female-headed households and households headed

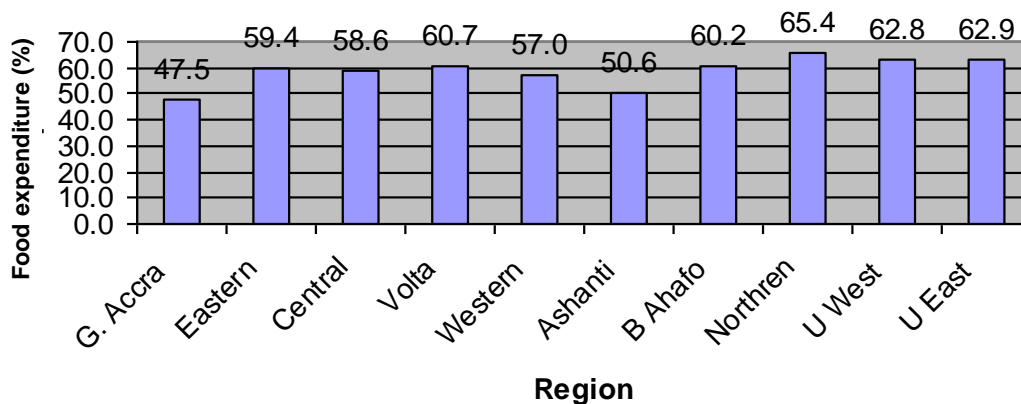


Figure 6a. Region and percentage of food expenditure.

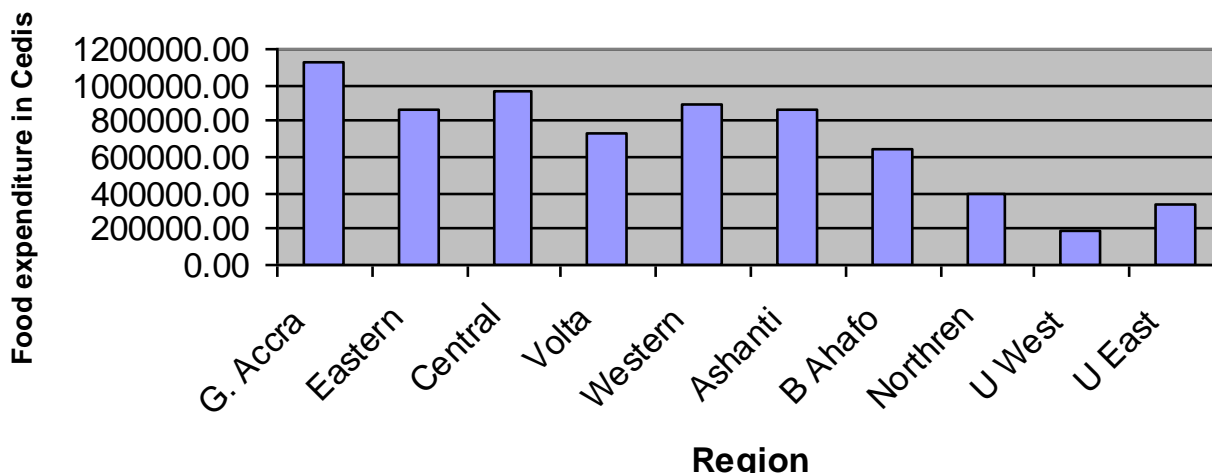


Figure 6b. Region and food expenditure.

by the old, these households spent smaller percentages of their incomes on food, but their absolute food expenditure figures exceeded their relatively poor counterparts such as male-headed households, households headed by the relatively young, larger households, rural households and households farther from the nation’s capital, including those in the savannah belt. This latter group must have priority in terms of support.

The contribution of this study to existing literature is three-fold; first while many studies used absolute food expenditure as the dependent variable, we have used the budget share of food expenditure (percentage of household income spent on food). Second, in place of income, we have used welfare, which in principle is broader in scope and much more realistic than income which respondents tend to underestimate. Finally, instead of a single equation, we have estimated a simultaneous equation system; because food expenditure and welfare are both endogenous.

Conflict of Interests

The author(s) have not declared any conflict of interests.

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