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A comparison of the socio-economic status of female-headed and male-headed households in Kenya: Use of Ordinal Logistic Regression

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ABSTRACT

With the many challenges facing the nations in sub-Saharan Africa, such as epidemics, civil wars, among others, there is an upsurge in the number of female-headed households. The socio-economic status of such households is low. Many studies in the recent past have attempted to identify the determinants of poverty in Kenya but did not do a comparison of these determinants across female-headed and male-headed households. This study has conducted a comparative analysis of the socio-economic status of the two types of households in Kenya applying an ordinal logistic regression model using data from Kenya Demographic and Health Survey (2008-2009). The results obtained indicate that education is the key determinant of socio-economic status. Both female-headed and male-headed households in rural Kenya are less likely to rise up the wealth index categories unlike in urban Kenya. Female-headed households in Nairobi are less likely to rise through the wealth index categories unlike the male-headed households in the same region. Also, both types of households in Western and North Eastern Kenya are the least likely to move up the categories of wealth index as compared to other regions. Formulation and implementation of proper policies would address these disparities.

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1. Introduction

1.1 Background

Many nations in the sub-Saharan Africa are plagued with a myriad of challenges ranging from natural to man-made. Some of these challenges are: epidemics, civil wars, natural disasters, social injustices, displacements of persons from their ancestral land, just to mention but a few. These are a constant threat to sustainable economic development and compromise the socio-economic status of households which is reflected in the high poverty levels as witnessed in most households. The head of the household is burdened with the responsibility of keeping the household afloat in the wake of these challenges.

In the African family set up, households were headed by men. However, in the face of epidemics, civil wars, social injustices, among others, there is the emergence of female-headed households as well as child-headed households. The aftermath of these factors is that widowed grandmothers and mothers take up the responsibility of caring for their grandchildren and orphans albeit facing severe economic constraints [17]. As such, it is hypothesized that many female-headed households are in higher poverty levels as compared to the male-headed households. The World Bank report estimated the fraction of the female-headed households in Kenya as one-quarter [10]. However, the Kenya Demographic and Health Survey Report cited the fraction to have risen to about a third of all households in Kenya [16].

As a result of all these, a better understanding of the socio-economic status of the female-headed households is necessary in order to first identify the key factors that determine their poverty levels and then empower them accordingly. A comparison of the effect of each of the determinants of socio-economic status of the female-headed households with that of the male-headed households would uniquely point out the disparities, which if addressed through policies, would alleviate the poverty levels in the female-headed households.

The objectives of the paper were, therefore, to (1) identify the economic factors, socio-cultural factors and demographic factors affecting the socio-economic status of female-headed and male-headed households across regions in Kenya, and (2) draw a comparison

of the effect of each of the determinants of the socio-economic status of the female-headed households with respect to the male-headed households in Kenya.

1.2 Overview

The research in [1] considered the gender inequality, poverty and human development in Kenya using indicators of poverty as defined by United Nations Development Program (UNDP). Though internationally accepted, these indicators do not capture the actual socio-economic status of households in Kenya. A household level comparative analysis would be more reflective of the real state of affairs across households. Another research considered a household level analysis of determinants of poverty using the 1994 Welfare Monitoring Survey data [2]. However, the economy of Kenya has since improved and so have the living standards of households with the introduction of devolved funds to the constituency levels. A household level analysis using more recent data would reveal the impact of the improved economy on the socio-economic status of households and also allow for a comparison across female-headed and male-headed households in Kenya in order to identify any disparities.

Not many researchers have analyzed the socio-economic status of women in different regions across Kenya. A research conducted on poverty levels and food security among female-headed households pointed out that female-headed households are living in abject poverty in Western Kenya [4]. The research was confined in only one region of Kenya. However, a study conducted in all the regions of Kenya would allow for comparative analysis of all types of households across the regions in order to identify the gaps and put in place policies geared towards bridging such gaps.

According to World Bank Kenya Poverty Report, poverty incidence in Nairobi and Central was below the national average and higher in Coast and Western Kenya as at 2006 [13]. This reflected regional disparities across households. A comparative analysis of the socio-economic status of the female-headed households with respect to the male-headed households across the regions using the households' wealth index, which is determined using more recent household level gender disaggregated data, would enable to identify disparities, if any. The socio-economic status of households in this paper is described by the category of wealth index a household belongs to. Using the ordinal logistic regression model with the wealth index as the response variable, the measure of effect of each of

the key factors determining the socio-economic status of households allows for the comparative analysis for the female-headed as well as the male-headed households.

1.3 Determinants of Socio-economic Status

1.3.1 Education Level

According to Millennium Development Goals Kenya Report, Kenya has achieved the Universal Primary Education through the Free Primary Education Programme (2003) [6]. The Constitution of Kenya guarantees all children the right to basic education [3]. However, many women across the regions of Kenya still remain semi-illiterate. It is noted that providing accessible schooling is a very effective way of addressing gender inequalities in education [5]. Improvement of literacy levels in any region combats poverty and improves the socio-economic status of the members of the society [7]. This reduces the dependency on the central government. Such resources can be used to develop the region like in construction of roads, health facilities and also construction of water dams to improve the agricultural sector.

Female-headed households are more likely to be poor than the male-headed households. As such, empowering the women through formal education and entrepreneurial skills majorly contributes to their quality of life. As witnessed in Nepal, primary, secondary and tertiary education has played a significant and crucial role in economic growth [8]. According to this research, the result gives the message to the developing countries that there is a high contribution of education to economic growth and ultimately socio-economic development of developing countries especially in Africa and Asia. Poverty is a global problem that affects millions of people across the globe with women being the most vulnerable as compared to men. This leads to hunger, disease and death. To fight it, there is need for an accumulation of human capital in education and health with availability of public health services [9]. In this research on reducing poverty through education planning and policy formulation in Swaziland, it is evident that with higher levels of education, there is a likelihood of women choosing to have smaller families, sending their children to school, reduced fertility, decreased infant and child mortality, increased work force participation and relatively higher income.

1.3.2 Occupation

To enter into prestigious occupations in the social system, education is generally observed to be a prerequisite. Some of the highly prestigious occupations include medical functions, managerial positions, legal services and financial functions. It follows that lawyers, bankers, medical specialists and corporation executives are highly rewarded in the society owing to the functions within the jobs they do [18]. The occupation of both men and women determines the socio-economic status of the household. Employment is a major source of income in Kenya. In Facts and Figures on inequality in Kenya, employment is singled out as an important dimension, among other dimensions, of inequality [13]. As observed, most poor people are employed in the agriculture sector, majority of them being women. The more professional the occupation is, the higher the income.

1.3.3 Income

In any society, an individual who has a regular income, whether from an employment, offering services or farming, is considered to be well-to-do and regarded as of higher status. As such, income is seen as one of the indicators of socio-economic status as well as a predictor of good health and ensures food security and good education [20]. This can only predict a higher socio-economic status and a secure future. However, men generally have higher income as compared to women owing to the fact that, more often than not, they undertake the technical courses which have better rewards.

1.3.4 Sex of Household Head

According to The World's Women by United Nations, unmarried women with children as well as older women in one-person households in developed and developing regions have higher poverty levels as compared to men with similar characteristics [14]. The World Bank Report on Kenya Poverty showed that one-quarter of all households were headed by a woman but that fraction keeps increasing [10]. Such households tend to be significantly large with poverty levels averaging five percent points higher than those of male-headed households.

1.3.5 Age of Household Head

Some of the challenges experienced in sub-Saharan Africa, such as civil wars and epidemics, leave a trail of death of humanity at the prime age. The persons who bear the consequences are mostly the orphaned children who take up the role of family heads at a very tender age. In the case of epidemics, such as HIV/AIDS, research has shown that when the man succumbs to the unfortunate eventuality, the wife follows shortly thereafter and the children are left as orphans with limited or no resources at all [19]. Such children heading households are deprived of their opportunity to attend school therefore plunging the household into deeper poverty.

1.3.6 Type of Place of Residence

Poverty is highly concentrated in rural areas in Kenya where most people are farmers in the agricultural sector [2]. According to this research, there is need for the government to direct more resources to this sector to improve the quality of land to not only reduce poverty levels but also to ensure that every person across all regions in Kenya is not denied of his or her right to be free from hunger and to have adequate food of acceptable quality according to the Constitution [3]. Interestingly, urbanization is one of the many causes of poverty in the rural areas [4]. This is because the able-bodied population migrate to the major urban towns in search of employment leaving behind land which is a main resource for food production. Reduced workforce poses a major challenge for this exposes the households to food insecurity. The Kenya Integrated Household Budget Survey (2005-2006) showed that almost half of the population (forty-seven percent) lived below poverty line of which eighty-five percent were in rural areas as reported by World Bank [10]. Poverty incidence was significantly lower in urban than in rural areas.

1.3.7 Geographical Region

Agriculture plays a very important role in the livelihood security of households especially in the rural areas. Livelihood security in this case referring to the secured ownership of resources and income-generating activities [21]. The households in the arable lands are better placed as compared to the households in the semi-arid and arid regions. Female-

headed households in arable regions rarely produce cash crops as compared to the male -headed households. This attributes to the difference in the farm output even though in such regions the female-headed households are not less productive [23].

1.3.8 Religion

In most communities in Africa, the religion dictates the position of women in the society. Across most religions in Kenya, women do not have any right to own land or movable property. The right to property is usually pegged on their relationship to their husbands, fathers or brothers who possess and control the land as noted by Federation of Women Lawyers (FIDA) in Kenya [11]. This leaves the female heads more exposed to lower socio-economic status as compared to men who control the economic resources. However, significant efforts are needed to implement the Constitution which guarantees gender equality in ownership of land and property [12].

1.3.9 Number of Household Members

Africans believe in living in communities and have relatively large families which may include relatives who may extend their stay longer than is necessary. The budget of consumption therefore increases compromising the quality of life for the household. According to World Bank Report, the female-headed households tend to be significantly larger in size, especially for women who are divorced, never married or whose husbands are away [10]. Their poverty incidence averages five percent points higher than those of the male-headed households. There is need to promote family planning to ensure that economic gains made and reduced burden on households as a result of free and subsidized education and health services do not translate to higher population growth rate [15].

1.3.10 Number of Children in the Household

The number of dependent children in a household largely determines the family budget. The more the number of children in a household, the more the expenses on education, food and health care. Where women have a higher level of education, it is observed that such a household has fewer number of children. Education of females and their fertility are correlated negatively [2]. The less educated a woman is, the more the number of

children, more so, following each other closely compromising the quality of life of the household.

1.3.11 Marital Status

Marital status largely influences the socio-economic status of a woman. Most females heading households are either widowed, separated, divorced, or never married single mothers. Unmarried women lack social, financial and economic security in a male-dominated world [22]. These female-headed households are deprived of the basic needs, not to mention that the widows are sometimes denied of their entitlement to the land resources left behind by their deceased husbands. However, not all women heading households are unmarried. In the African culture, polygyny is accepted and recognized. In such a polygynous household, the man, more often than not, lives with the first wife but occasionally visits the other households for the purpose of fulfilling his duty to them. In essence, though the other wives are married, they are the household heads by default. They go through similar struggles just as for the other female-headed households though not as severe.

2. Methods

The wealth index is the response variable in the model used because it is the basic measure of a household's socio-economic status. The ordinal logistic regression model with the interaction of the variable sex of household head with the other predictor variables is the most appropriate model. The predictor variables used in the model were selected using Random Regression Forest and the literature review. This method of selection categorized the variables in order of significance with respect to the association of each predictor variable with the wealth index. From the results, a comparison of the female-headed households with respect to the male-headed households is drawn.

2.1 Data

The research has used data from Kenya Demographic and Health Survey (KDHS 2008-2009) which was collected using sample survey in all the eight provinces of Kenya (now subdivided into counties). It comprises 6,079 observations. The 2008 - 2009 KDHS is one of the population and health surveys conducted in Kenya every five years by Kenya National Bureau of Statistics (KNBS). The 2008 - 2009 KDHS household-based survey was

conducted on population households living in Kenya. A representative sample of 10,000 households was drawn at random to form the national master sample frame. The sampling technique used is multistage. This is a sampling method used in large surveys where primary units are selected in the first stage and then secondary units are selected from the primary units. Stage 1 involved selecting clusters from the national master sample frame. A total of 400 clusters, 133 from urban areas and 267 from rural areas, were selected. Stage 2 involved systematic sampling of households within the clusters using an updated list of households.

2.2 Survey Instruments

The instruments used for the survey were questionnaires. The 2008 - 2009 KDHS used three sets of questionnaires to collect survey data, namely Household, Women's and Men's Questionnaires. The questionnaires reflected relevant issues in Kenya. The questionnaires were then translated from English to Kiswahili and to 10 other local languages. Training of field staff and pre-testing of the questionnaires was done through pilot surveys for the purpose of refining them in order to set up strong, logistical arrangements thereby ensuring the success of the survey. With the finalized survey instruments, the Household Questionnaire was filled first. This captured the data on the basic characteristics such as age, sex and education for all household members. Also captured by this questionnaire was data on characteristics of household's dwelling unit, ownership of various durable goods, ownership of agricultural land and ownership of domestic animals. The household heads in the survey were between 15 years and 92 years of age.

The Household's Questionnaire provided data on the wealth index of each household in either of the five categories which include poorest, poorer, average, richer and richest. The wealth index reflects the living standard of the households. It is a measure of the socio-economic status of each household and therefore it is used as the response variable in the estimated model. In the Kenya Demographic and Health Survey (KDHS) 2008 -2009 data set, the wealth index is based on the data of the household's ownership of consumer goods (which include durable goods, non-durable goods and services), type of toilet facilities, dwelling characteristics and the type of drinking water source.

The model estimated has included type of place of residence, level of education of household head, age of household head, occupation of household head, geographical region and body mass index of the household head as some of the most significant predictor variables influencing the wealth index of a household. Using Random Regression Forest and the literature review, about 40 variables from the sample data were identified to be associated to the wealth index. However, only six of the most significant variables are used in the model estimated.

2.3 The Ordinal Logistic Regression Model

Unlike the multinomial logistic regression model which gives several binary logistic models each with its own intercept and regression coefficients, the ordinal logistic regression estimates the cumulative probabilities of an event of interest which has an ordered ranking. By this it preserves the information about the ordering of the categories in the response variable. The cumulative odds of an event in the ordinal logistic model given a response variable with J categories is given by the expression:

$$\text{cumulative odds} = \frac{p_1 + p_2 + \ldots + p_j}{p_{j+1} + p_{j+2} + \ldots + p_J} \quad (1)$$

where $P_1 + P_2 + \ldots + P_j$ is the cumulative probability of an event occurring and $P_{j+1} + P_{j+2} + \ldots + P_J$ is the cumulative probability of an event not occurring.

This can be expressed as:

$$\text{odds}\ (Y \leq j) = \frac{P(Y \leq j)}{P(Y > j)} = \frac{P(Y \leq j)}{1 - P(Y \leq j)} = \frac{p_1 + p_2 + \ldots + p_j}{p_{j+1} + p_{j+2} + \ldots + p_J} \quad (2)$$

where

$$P\ (Y \leq j) = p_1 + p_2 + \ldots + p_j = \sum_{k=1}^{j} p_k \quad (3)$$

and

$$1 - P\ (Y \leq j) = p_{j+1} + p_{j+2} + \ldots + p_J = \sum_{r=j+1}^{J} p_r \quad (4)$$

where k = 1, 2, …, j and r = j+1, j+2, …, J

Taking the natural logarithm of the cumulative odds (also known as cumulative logit) we get:

$$\text{logit}\ (Y \leq j) = \ln\left[\frac{P(Y \leq j)}{1 - P(Y \leq j)}\right] = \ln\left[\frac{p_1 + p_2 + \ldots + p_j}{p_{j+1} + p_{j+2} + \ldots + p_J}\right] \quad (5)$$

The ordinal logistic regression model is hence represented as:

$$\ln\left[\frac{P(Y \leq j)}{1 - P(Y \leq j)}\right] = \beta_{0j} - (\beta_{1j}X_1 + \beta_{2j}X_2 + \ldots + \beta_{kj}X_k) \quad (6)$$

The linear predictor function of this model is related to the cumulative probabilities by the cumulative logit link function.However, the predictors do not depend on the category level of the response variable since the probabilities of the lower categories are nested in the cumulative probability of the next higher ordered category. As such, the expression for the ordinal logistic regression model is represented as:

$$\ln\left[\frac{P(Y \leq j)}{1 - P(Y \leq j)}\right] = \beta_{0j} - (\beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k) \quad (7)$$

Such is called a proportional odds model. The overall odds of an event of interest may differ but the effect of the predictor variables on the odds of the event in the subsequent category is the same for every category. The odds ratio for the association between the response variable and predictor variable, X_j, holding all other predictor variables in the model constant is given by:

$$\text{odds ratio} = e^{\beta_j} \quad (8)$$

The model expression for the cumulative probabilities is given by:

$$P_m = \frac{\exp\left(\beta_{0m} - (\beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k)\right)}{1 + \exp\left(\beta_{0j} - (\beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k)\right)} \quad (9)$$

3. Results

3.1 Male-headed Households

The odds ratios obtained from the estimates of the model show the relative comparison of each category of the predictor variables with respect to the reference category. For the male-headed households results in Table 1, there is quite a disparity across the regions considered.

Table 1: Male-headed Households Estimates. Significant p-values (p < 0.05).

Variable	Category	Estimates	Standard error	Odds ratio	95% confidence interval		t-value	p-value
Intercept	Intercept 1	-2.247	0.179				-12.566	0.000
	Intercept 2	-1.048	0.179				-5.846	0.000
	Intercept 3	0.150	0.178				0.838	0.402
	Intercept 4	2.039	0.175				11.617	0.000
Region	Rift Valley	Reference						
	Central	1.386	0.128	4.000	3.115	5.137	10.868	0.000
	Coast	0.187	0.116	1.206	0.961	1.512	1.62	0.105
	Eastern	0.522	0.111	1.686	1.356	2.096	4.699	0.000
	Nyanza	0.242	0.099	1.274	1.048	1.547	2.437	0.015
	Nairobi	3.133	0.381	22.95	10.87	48.47	8.215	0.000
	Western	-0.105	0.104	0.900	0.735	1.103	-1.013	0.311
	North Eastern	-0.561	0.168	0.571	0.411	0.793	-3.342	0.001
Residence	Urban	Reference						
	Rural	-3.604	0.104	0.027	0.022	0.033	-34.809	0.000
Body mass index	Underweight	Reference						
	Normal weight	0.304	0.102	1.355	1.110	1.654	2.989	0.003
	Overweight	0.922	0.127	2.515	1.960	3.227	7.249	0.000
	Obese	1.225	0.204	3.405	2.282	5.083	5.996	0.000
	Clinically obese	0.450	0.207	1.569	1.045	2.355	2.172	0.030
Education	No education	Reference						
	Primary	1.677	0.108	5.347	4.326	6.610	15.499	0.000
	Secondary	2.596	0.131	13.407	10.38	17.33	19.844	0.000
	Tertiary	4.233	0.234	68.904	43.55	109.0	18.080	0.000
Age	31-40 years	Reference						
	15-20 years	1.023	0.610	2.783	0.842	9.200	1.678	0.093
	21-30 years	0.201	0.080	1.223	1.046	1.429	2.524	0.012
	41-50 years	-0.124	0.086	0.883	0.747	1.045	-1.448	0.148
	51-60 years	-0.496	0.118	0.609	0.484	0.767	-4.216	0.000
	61-100 years	-0.274	0.129	0.760	0.591	0.978	-2.131	0.033
Occupation	Office job	Reference						
	Unemployed	-0.021	0.073	0.979	0.848	1.130	-0.291	0.771
	Manual	0.097	0.146	1.102	0.828	1.465	0.666	0.506
	Self-employed	-0.205	0.098	0.815	0.672	0.988	-2.087	0.037
	Services	0.532	0.179	1.702	1.199	2.416	2.977	0.003

Male-headed households in Nairobi are 23 times more likely to move to the next higher ordered category of wealth index as compared to the households in the Rift Valley. The center of power and economy in Kenya is in Nairobi. Men in this region have the most opportunities of transacting businesses and engaging in many economic activities. This may possibly be the reason why male-headed households in Nairobi are most likely to rise through the categories of wealth index as compared to households in other regions.

The male-headed households in Central Kenya are 4 times more likely to move to the next higher ordered category of wealth index as compared to the households in the Rift Valley. Male-headed households in Eastern Province are 69% more likely to move up the wealth index categories while male-headed households in Coast and in Nyanza are 21% and 27%, respectively, more likely to move to the next higher ordered category of wealth index as compared to the households in the Rift Valley. However, male-headed households in Western and North Eastern Kenya are 10% and 43%, respectively, less likely to move to the next higher ordered category of wealth index as compared to the households in the Rift Valley. This may be attributed to the frequent droughts experienced in North Eastern Kenya every so often. This reduces their livestock which is their main source of livelihood.

Of interest to note is that male-headed households in rural Kenya are 97% less likely to move to the next higher ordered category of wealth index as compared to the households in urban Kenya. This indicates that there is little, if any, economic activities being carried out in rural Kenya. Households headed by males of normal weight and those who are clinically obese are 36% and 57%, respectively, more likely to move to the next higher ordered category of wealth index as compared to household whose heads are underweight. Households headed by males who are overweight and obese are 2.5 times and 3.4 times, respectively, more likely to move to the next higher ordered category of wealth index as compared to the household whose heads are underweight. Though being overweight is detestable in the developed countries, it is considered as an indicator of wealth in Africa and as such, little effort is put to shed it off. These results attest to it.

The education level of heads of households plays a very important role in determining the probability of households rising up the categories of wealth index. This is reflected in the results in which households headed by males with primary education, secondary

education and tertiary education are 5 times, 13 times and 69 times, respectively, more likely to move to the next higher ordered category of wealth index as compared to the households whose heads have no education.

In comparison to households whose heads are in the age group 31-40 years, households headed by males aged 41-50 years, 51-60 years and 61-100 years are 12%, 39% and 24%, respectively, less likely to move to the next higher ordered category of wealth index. Households headed by males aged 21-30 years are 22% more likely to move up the categories of wealth index as compared to the households whose heads are in the age group 31-40 years. The results clearly point out that the most productive age for males heading households is 21-40 years.

Households headed by males offering services as an occupation are 70% more likely to move to the next higher ordered category of wealth index as compared to the households whose heads are office employees. Interestingly, of the sample considered, the households headed by males in manual labour are 10% more likely to move to the next higher ordered category of wealth index as compared to the households whose heads are in office employment. Households headed by unemployed and self-employed males are 2% and 19%, respectively, less likely to move up the categories of wealth index as compared to households headed by office employees.

3.2 Female-headed Households

Table 2 shows the results obtained for the female-headed households considered in the model. Comparing the female-headed households from different regions in Kenya to the households in the Rift valley, those in Central and in Nairobi regions are 3 times and 6 times, respectively, more likely to move to the next higher ordered category of wealth index. The women in these regions have an advantage over other regions because of their proximity to business centers. This may explain why female-headed households in these regions are more likely to rise up through the wealth index categories as compared to households in other regions. Female-headed households in Eastern Kenya are 82% more likely to move to the next higher ordered category of wealth index as compared to the households in the Rift Valley. The female-headed households in Nyanza region have almost an equal probability of moving up the categories of wealth index with the households in the Rift Valley. The female-headed households in the Coast, in Western

and in North Eastern regions are 38%, 19% and 63%, respectively, less likely to move to the next higher ordered category of wealth index as compared to the households in the Rift Valley. The results from these three regions may be attributed to the existing customary laws which restrict women's access to property.

Table 2: Female-headed Households Estimates. Significant p-values (p < 0.05).

Variable	Category	Estimates	Standard error	Odds ratio	95% confidence interval		t-value	p-value
Intercept	Intercept 1	-2.247	0.179				-12.566	0.000
	Intercept 2	-1.048	0.179				-5.846	0.000
	Intercept 3	0.150	0.178				0.838	0.402
	Intercept 4	2.039	0.175				11.617	0.000
Region	Rift Valley	Reference						
	Central	1.192	0.207	3.293	2.196	4.939	5.762	0.000
	Coast	-0.470	0.181	0.625	0.439	0.891	-2.595	0.009
	Eastern	0.598	0.171	1.819	1.301	2.544	3.495	0.000
	Nyanza	0.073	0.163	1.076	0.781	1.483	0.450	0.653
	Nairobi	1.760	0.516	5.811	2.114	15.97	3.411	0.001
	Western	-0.205	0.189	0.815	0.563	1.180	-1.084	0.278
	North Eastern	-0.98	0.241	0.375	0.234	0.602	-4.063	0.000
Residence	Urban	Reference						
	Rural	-3.639	0.159	0.026	0.019	0.036	-22.88	0.000
Body mass index	Underweight	Reference						
	Normal weight	0.607	0.148	1.835	1.373	2.452	4.100	0.000
	Overweight	0.911	0.186	2.486	1.727	3.580	4.896	0.000
	Obese	1.383	0.280	3.989	2.305	6.903	4.943	0.000
	Clinically obese	1.461	0.343	4.312	2.202	8.444	4.262	0.000
Education	No education	Reference						
	Primary	1.267	0.148	3.549	2.654	4.746	8.544	0.000
	Secondary	2.262	0.185	9.603	6.676	13.81	12.197	0.000
	Tertiary	3.552	0.352	34.868	17.50	69.49	10.093	0.000
Age	31-40 years	Reference						
	15-20 years	-0.148	0.247	0.863	0.532	1.399	-0.599	0.549
	21-30 years	-0.218	0.119	0.804	0.637	1.015	-1.831	0.067
	41-50 years	-0.282	0.163	0.754	0.548	1.038	-1.731	0.083
	51-60 years	-0.607	0.185	0.545	0.379	0.784	-3.277	0.001
	61-100 years	-0.372	0.186	0.689	0.479	0.992	-2.006	0.045
Occupation	Office job	Reference						
	Unemployed	-0.014	0.114	0.986	0.789	1.233	-0.123	0.902
	Manual	-0.098	0.209	0.907	0.602	1.366	-0.467	0.640
	Self-employed	-0.459	0.159	0.632	0.463	0.863	-2.887	0.004
	Services	0.552	0.223	1.736	1.121	2.689	2.472	0.013

Similar to the male-headed households, the female-headed households in rural Kenya are 97% less likely to move to the next higher ordered category of wealth index as compared to the households in urban Kenya. Households in rural Kenya need to engage more on economic activities and possibly embrace new agriculture technology which

enhances better yields. This would ensure food security and the surplus sold thereby improving the quality of life in rural Kenya.

Households headed by females of normal weight are 84% more likely to move to the next higher ordered category of wealth index as compared to households whose heads are underweight. The households headed by females who are overweight, obese and also the clinically obese are 2.5 times, 4 times and 4.3 times, respectively, more likely to move up the hierarchy of wealth index as compared to the households whose heads are underweight. These results concur with the misinformed common belief in Sub Saharan Africa that the plus-size woman is both healthy and wealthy.

Similar to the households headed by males, households headed by females who have attained primary education, secondary education and tertiary education are 3.5 times, 10 times and 35 times, respectively, more likely to move to the next higher ordered category of wealth index as compared to the households whose heads have no education. The head of household's education level is a key determinant of the socio-economic status of any household.

Comparing the households headed by females in their respective age groups with the households whose heads are in the age group 31-40 years, households headed by females in the age groups 15-20 years, 21-30 years, 41-50 years, 51-60 years and 61-100 years are 14%, 20%, 25%, 46% and 31%, respectively, less likely to move to the next higher ordered category of wealth index. Unlike the men, the most productive age for women is 31-40 years according to these results.

The households headed by females providing services are 74% more likely to rise up the categories of wealth index as compared to the households whose heads are in office employment. However, the households headed by females who are in manual jobs and in self-employment are 9.3% and 37%, respectively, less likely to move to the next higher ordered category of wealth index as compared to the households whose heads are office employees. From the results, both female and male heads of households should be encouraged to venture more into providing services as opposed to working in offices for there is more hope of moving to the next higher category of wealth index in rendering services as an occupation.

3.3 Comparative Analysis Across Households

Having analyzed the factors within the two types of households, we need to compare the same across the households to identify the categories of the factors with significantly different log-odds ratios. Table 3 gives the results for the comparison.

Table 3: Comparative estimates. Significant p-values (p < 0.05).

Variable	Category	Log odds ratios for male-headed households	Log odds ratios for female headed households	Absolute difference	Standard error for absolute difference	t-value	p-value
	Rift Valley	Reference					
	Central	1.386	1.191	0.195	0.242	-0.806	0.420
	Coast	0.187	-0.47	0.657	0.215	-3.058	0.002
Region	Eastern	0.522	0.598	0.076	0.204	0.373	0.709
	Nyanza	0.242	0.074	0.168	0.191	-0.881	0.379
	Nairobi	3.133	1.761	1.372	0.642	-2.138	0.033
	Western	-0.105	-0.205	0.100	0.216	-0.463	0.644
	North Eastern	-0.561	-0.981	0.420	0.294	-1.429	0.153
Residence	Urban	Reference					
	Rural	-3.604	-3.639	0.035	0.178	-0.198	0.843
	Underweight	Reference					
Body mass index	Normal weight	0.304	0.607	0.303	0.180	1.686	0.092
	Overweight	0.922	0.910	0.012	0.225	-0.052	0.958
	Obese	1.225	1.383	0.158	0.346	0.456	0.648
	Clinically obese	0.450	1.461	1.011	0.401	2.524	0.012
	No education	Reference					
Education	Primary	1.677	1.267	0.410	0.183	-2.244	0.025
	Secondary	2.596	2.262	0.334	0.225	-1.486	0.137
	Tertiary	4.233	3.552	0.681	0.419	-1.627	0.104
	31-40 years	Reference					
	15-20 years	1.023	-0.148	1.171	0.658	-1.78	0.075
Age	21-30 years	0.201	-0.218	0.419	0.143	-2.926	0.003
	41-50 years	-0.124	-0.282	0.158	0.184	-0.858	0.391
	51-60 years	-0.496	-0.607	0.111	0.219	-0.505	0.613
	61-100 years	-0.274	-0.372	0.098	0.226	0.436	0.663
	Office job	Reference					
	Unemployed	-0.021	-0.014	0.007	0.135	0.055	0.956
Occupation	Manual	0.097	-0.098	0.195	0.255	-0.764	0.445
	Self-employed	-0.205	-0.458	0.253	0.187	-1.356	0.175
	Services	0.532	0.552	0.020	0.286	0.070	0.944

In Table 3, a p - value < 0.05 indicates that the odds ratios are significantly different and hence reflecting the disparities existing between male-headed households and female-headed households in Kenya. The results for Coast and Nairobi regions show that there is a significant difference in the log-odds ratios. This implies that female-headed

households in the Coast and in Nairobi regions have a lower probability of moving to the next higher ordered category of wealth index as compared to the male-headed households in these regions. Both the female-headed households and the male-headed households in Central, in Eastern, in Nyanza, in Western and in North Eastern regions have relatively equal probabilities of rising up the categories of wealth index because the log-odds ratios for each of these regions are not significantly different across households. However, individual odds for households in Western and in North Eastern regions indicate that the households have very low probabilities of moving up the categories of wealth index. The female-headed households and male-headed households living in rural Kenya have almost equal probabilities of rising up the categories of wealth index. However, the independent odds for each type of households show that the households in rural Kenya are very unlikely to move to the next higher ordered category of wealth index as compared to households in urban Kenya.

There is a significant difference in the log-odds ratios of households headed by females and those headed by males who are clinically obese. The households headed by females in this category have a higher probability of moving to the next higher ordered category of wealth index as compared to the households headed by males in the same category of body mass index. There is no significant difference in the log-odds ratios of households whose heads are of normal weight, the overweight and the obese indicating that the households headed by females and males in each category have relatively equal probabilities of rising up the levels of wealth index. The households headed by females who have attained primary education have lower probability of rising up the levels of wealth index as compared to the households headed by males having attained the same level of education. However, there are no disparities for the households headed by both females and males who have attained secondary education and those who have attained tertiary education because the log-odds ratios are not significantly different.

Households headed by females in the age groups 15-20 years and in the age group 21-30 years have lower probability of moving to the next higher ordered category of wealth index as compared to households headed by males in the same age groups. However, there is no significant difference in the probabilities of rising up the categories of wealth index for households whose heads are in the age group 41-50 years, in the age group 51-60 years and in the age group 61-100 years. The independent odds for households whose heads are in these age groups also show that they are less likely to move to the next

higher ordered category of wealth index. For all categories of occupation, there is no significant difference between the probabilities of rising up the levels of wealth index for households headed by females and those headed by males.

4. Conclusion

From the analysis done, the key indicators that predict the socio-economic status of a household are: level of education of the head of household, the type of place of residence, the region where the household lives, occupation of household head, age of household head and, interestingly, the body mass index. The results from across the regions clearly indicate that households living in Nairobi have the highest probability of moving to the next higher category of wealth index as compared to households in all the other regions. This suggests that there is a great disparity of resources across the regions in Kenya and some regions are underprivileged. The most underprivileged regions as observed are Western and North Eastern regions. However, both types of households in Western Kenya are equally less likely to move to the next higher category of wealth index.

Education for both men and women plays the most vital role in predicting the socio-economic status of households across Kenya. However, it influences the status of male-headed households more than it does for the female-headed households. Households headed by males who have attained tertiary education are 69 times more likely to rise up the levels of wealth index as compared to households whose heads have no education while households headed by females with tertiary education are 35 times more likely to rise up the levels of wealth index as compared to households whose heads have no education. Surprisingly, households whose heads provide services as an occupation are better placed than for those who are in office employment. The returns are more promising in improving the household's socio-economic status as compared to a monthly salary. Household heads in the age group 31-40 years are at the prime of productivity and have a higher probability of moving to the next higher ordered category of wealth index. As noted, households whose heads are above 40 years are less likely to rise up the levels of wealth index as compared to households whose heads are in the age group 31-40 years. From the comparative analysis done across the households, it is evident that the female-headed households in Nairobi and in Coast are underprivileged as compared to the male-headed households in the same regions. However, the disparity across

households is insignificant in all the other regions even though they are less likely to move to the next higher ordered category of wealth index as compared to households in Nairobi which have the highest probability of upgrading the socio-economic status.

Of great concern is the households headed by both females and males in rural Kenya because they are 97% less likely to move up the categories of wealth index as compared to households in urban Kenya. High poverty levels are concentrated in the rural areas. There may be some other factors contributing to this very low probability of rural households improving on the socio-economic status as compared to the urban households. Having analyzed the socio-economic status of households using household level gender disaggregated data, the results obtained give a clearer picture of the socio-economic status of households in Kenya.

From the findings of this research, there is evidence of great disparities between households living in rural Kenya and households living in urban Kenya which need to be addressed. There is therefore need to consider formulating policies that would enhance the improvement of the socio-economic status of households, especially where disparities have been identified from the findings. Policies on economic development, expansion and promotion of service industry, and review of secondary school curriculum so as to give more emphasis on technical subjects are recommended. Economic development initiatives such as light industries and income generating activities devolved across all regions of rural Kenya, especially in Western and North Eastern regions, would ensure an improvement in the economic and social well-being of households. Service industry, such as in finance, hospitality, information technology, transport, among others, if promoted and expanded, would attract a significant number of service providers. This would in turn improve the quality of life of the households across the regions of Kenya. Agriculture, if included as one of the core subjects in the secondary school curriculum, would equip the high school graduates with the necessary skills to engage in agricultural economic activities and in turn improve the socio-economic status of households across the regions.

This research has used Kenya Demographic and Health Survey 2008-2009 data set which was collected before the promulgation of the new Constitution of Kenya. Included in the constitution is devolution of power and resources to the counties, which are subdivisions of the former provinces. This was aimed at developing all regions of Kenya in order to

eradicate poverty. Further research using more recent household level gender disaggregated data set would measure the impact of devolution on the socio-economic status of households in Kenya.

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