Household Social Expenditure in Ghana: Examining the Ex-post Effects and
Vulnerability to Poverty

Authors:

1. **Richard Kwabena Nkrumah[1]**

   Institute of Statistical, Social and Economic Research (ISSER),

   University of Ghana, Legon

   https://orcid.org/0000-0002-7806-3058

2. **Samuel Kobina Annim**
   School of Economics, University of Cape Coast

   https://orcid.org/0000-0002-3449-0912

3. **Benedict Afful Jnr**
   School of Economics, University of Cape Coast

   https://orcid.org/0000-0002-7461-2275

---

[1] Corresponding author; juderichards2020@gmail.com

Abstract

We estimate the effect of household social expenditure on vulnerability to poverty using the four latest cross-sectional waves of Ghana Living Standard Survey (GLSS) from 1999 to 2017. Using a 3-Stage Least Square and Quantile Regression, our results show a widening consumption ex-post welfare gap between the poorest households and the non-poor households in a per-cedi social expenditure. Also, we estimate the probability of an ex-ante poverty using vulnerability to expected poverty. The results, however, indicate that regardless of poverty status, household vulnerability to poverty increased consistently between 1999 and 2017, and the very poor households showing the severest vulnerability. Hence, it is concluded that social expenditure increases the chances of a poor household falling into chronic poverty a non-poor household into transient poverty in the future.

1. Introduction

Mankind interact, communicate, and share parts of their lives with others from their immediate to the farthest relations (Sen 1985, Shefrin and Thaler 1988). Such communal sharing often come in the form of social assemblies referred to as social functions, gatherings, events, or simply social ceremonies. Social events, in most circumstances, have brought people together for ceremonies that would rarely happen in one's lifetime and are usually ceremonies for the passage of time. Therefore, social events are activities that an individual participates and derives satisfaction on the account of so many others participating as well. The interest is a shared or a common one. It could either be for shared happiness, commemoration, community development, solidarity, and so on. They include funerals, weddings, festivals, parties, and other ceremonies that often bring two or more people together for a shared interest. However, the elaborate nature of consumption in some of these social events cannot be overemphasised.

At the global stage, the Goal 1 of the Sustainable Development Goals (SDGs) of the United Nations (UN) talks about ending poverty in all of its forms with the targets of eradicating extreme poverty and reducing absolute poverty for all people by the year 2030. Goal 12, on the other hand, focuses on ensuring sustainable consumption and production patterns. The latter goal also focuses on sustainable consumption and consumer behaviour which ensure the prudent use of resources, cut back on wastes, and promote sustainable lifestyles. This is intended to eliminate any form of consumption and production excesses that harm the environment, society, and, by extension, the attainment of any of the SDGs. It could be argued, therefore, that eradicating extreme poverty would also mean promoting sustainable consumer behaviour and consumption lifestyle in social expenditure as well.

World statistics show that the global economy is rapidly expanding with increasing population and high expenditures on the necessities of life, (World Health Organization 2016), as well as on entertainment, goods of ostentation, and luxury (Chen 2014, Chen and Zhang 2012). As some of these soaring expenditures could be said to be justifiable others like expenditure on wedding parties, festivals and funerals are confounding. Social expenditure, nowadays, commands high expenditure as a result of changing lifestyle and social preferences (Mazzucato, Kabki and Smith 2006). Increasing expenditure on events as mentioned above means more pressure on household budgets for food and other necessities, especially for low-income households that are struggling to come out of poverty (Chen and Zhang 2012). The phenomenon cuts across developed and developing countries as expressed in the works of Aker and Sawyer (2016), Banerjee and Duflo (2007), Bloch, Rao, and Desai (2004), Woodthorpe (2012).

In the UK, for instance, in 2014, funeral costs went up seven times faster than living costs (Royal

London 2015). By 2017, funeral costs had risen by 70.6 percent whilst wages had increased by only 20 percent over the previous decade (Royal London 2017). Also, the Royal London National Funeral Cost Index, 2017 showed an increase in the cost of funerals ahead of inflation. Unfortunately, it is reported that the UK's most vulnerable citizens are those taking on these increased levels of funeral debt (Quarker Social Action 2017). Gradually, "public health funerals" or "paupers' funerals" which are organised by local authorities for deceased persons who neither have relatives nor friends are rising because there is evidence that the cost of funerals now prevents some families from having funeral services for their deceased (Quarker Social Action 2015, 2017). Likewise, in the US, the average funeral cost is between $7,000 - $10,000 ("How Much Does the Average Funeral Cost?" 2018), and a lot of poorer households are being put under financial distress ("Funeral Poverty in the 21st Century" 2014). Also, in Eastern Europe and many parts of Russia, the average cost of weddings ranged from $1,000 in Slovakia to $15,000 in Russia ("Survey Compares Countries Wedding Spending Habits" 2013).

The situation is widespread in developing countries. In China, Chen (2014), Chen and Zhang (2012) have found that social spending on funerals and festivals militate against early child development in rural China. Likewise, Bloch et al. (2004), Rao (2001) have shown that elaborate social expenditure perpetuates rural poverty in India. Yet, the practice is largely indispensable in the lives of the poor. Banerjee and Duflo (2007) indicated that festival expenses took a significant share of the budget for the majority of poor households in developing countries.

So according to the study by Banerjee and Duflo, in Udaipur, about 99 percent of the very poor families expended on weddings, funerals, or religious festivals, and the average household expended about 10 percent of its yearly budget on festivals. In South Africa, 90 percent of families who live on less than $1 a day spent money on festivals. In Pakistan, Indonesia, and Cote d'Ivoire, more than 50 percent did likewise (Banerjee & Duflo 2007). According to Aker and Sawyer (2016), households in Niger who are often unable to save for education, health, or agriculture purposes did spend to celebrate the Tabaski holiday. Similarly, South African households could also spend about a year's income to bury a departed member of the family (Shimeles and Woldemichael 2013).

In Ghana, according to Ghana Statistical Service's report on the poverty profile in 2008, about 32 percent of Ghanaians were poor living below $2 a day. Yet, the average funeral in Ghana then costs between US$2000 and US$3500 (Butu 2013, Ghana Statistical Service 2008); costing between 1000 and 1750 percent-fold of the poverty line. By 2013, more than 2.2 million Ghanaians (based on 2010 Population and Housing Census (PHC) projections) could not afford to feed themselves with 2,900

5

calories per adult equivalent of food per day, even if they were to spend all their incomes on food (Ghana Statistical Service 2014).

Funerals have become an avenue for the display of wealth (Butu 2013, Jufare 2008). It is, therefore, expected that the elaborate consumption of these social events is likely to overstretch the budget of some households within a cohort that has wide income disparities. Interestingly, such high expenditure cut across all types of households including the poor ones. Moreover, these social events are a source of merry and relaxation as well as prestige and esteem which form part of the needs of individuals and households–specifically, their social needs. These social needs, according to Maslow (1943, 1954) theory of human needs, form part of the pyramidal needs of an individual. Social ceremonies on the pyramid constitute a higher need apart from the basic human needs such as food, shelter, clothing, sex, and housing.

Martin (2016) argued that "We mistakenly assume that there's no way a person can or should possibly worry about self-esteem if they're hungry". According to Martin, it is not surprising to find the poor in deprived regions who are active on social media even in times of unmet basic needs. It is therefore not surprising to find lavish expenditure on funerals, weddings, and festivals in poor homes and regions.

According to Mazzucato et al. (2006), money and death are inextricably interwoven. Every death triggers a flow of money and the funeral business flourishes. The elaborate funeral celebrations during which no trouble or expense is spared contrast sharply with the daily struggle for the primary necessities of life. They have become great public events, where families compete for prestige and respect by showing off wealth, and by publicly conforming to norms of solidarity and respect for the dead. Families would spend whatever assets possible just to bury the dead regardless of the lasting consequences for posterity. Similarly, marriage ceremonies in Ghana have become westernised to the very extent that the couples-to-be usually hold two separate marriage ceremonies before they are socially accepted to be properly married. To some extent, some religious organisations do not recognise a traditional marriage as legitimate until one performs a 'western-style' wedding ceremony.

The implications of these social expenditure are not far-fetched, especially in the context of mass poverty and poor standard of living. Non-productive expenditures like these would likely aggravate the disease of poverty and misery among the people. In situations where one could sell off productive lands and plantations just to organise lofty weddings and funerals (Case et al. 2008, De Witte 2003), there is nothing to expect from unnecessary hardships for the household. Newly wedded couples would have to necessarily restart their whole lives as a bountiful amount of life savings would have been expended on

their wedding parties as Aker and Sawyer (2016) have found.

In the United Kingdom, for example, in 2014, funeral cost rose exponentially far more than the rise in the cost of living (Royal London 2015). By 2017, the average cost of a funeral had risen by almost 71 percent whilst wages had increased by only 20 percent over the previous decade (Royal London 2017). Unfortunately, it is reported that it is the country's most vulnerable citizens who are taking on these increased levels of funeral debt (Quarker Social Action 2017). Also, in other parts of Eastern Europe, the average wedding cost ranged from $1,000 in Slovakia to $15,000 in Russia ("Survey Compares Countries' Wedding Spending Habits" 2013).

Likewise in the US, the cost of an average funeral was between $7,000 - $10,000 ("How Much Does the Average Funeral Cost?" 2018), and a lot more poor households are being put under financial distress ("Funeral Poverty in the 21st Century" 2014). In China, Chen and Zhang (2012) found that social expenditure on funerals and festivals militate against early child development in rural China. Likewise, Rao (2001) and Bloch, Rao, and Desai (2004) have shown that elaborate social spending perpetuates rural poverty in India. Furthermore, Banerjee and Duflo (2007) indicated that, more surprisingly, expenditure on festivals forms an important part of the budget for many extremely poor households in developing countries. Households in Niger spend to celebrate the holiday of Tabaski but are often unable to meet savings goals for education, health, or agriculture expenses (Aker and Sawyer 2016). Similarly, South African households could also spend about a year's income to bury a departed member of the family (Case, Garrib, Menendez, and Olgiati 2008).

The first of the Sustainable Development Goals (SDGs) is about ending poverty in all of its forms with the targets of eradicating extreme poverty and reducing absolute poverty for all people by the year 2030. However, according to Chaudhuri (2003), any anti-poverty intervention must, of first importance, be "necessarily going beyond the catalogue of who is currently poor, how poor they are, and why they are poor to an assessment of households' vulnerability to poverty – who is likely to be poor, how likely are they to be poor, how poor are they likely to be, and why are they likely to be poor". In this regard, the assessment of future poverty aligned with household social expenditure becomes essential to policy much more than focusing on current poverty levels. Hence, the SDGs will be well achieved if policies are targeted at issues that threaten the vulnerability of both the poor and the non-poor in society, especially in the light of social expenditure which commands high shares of household expenditure and savings.

2. Results and Discussion
2.3 Determinants of Household Welfare – Quantile Regression

Household welfare measured by consumption expenditure per adult equivalent scale (Annim, Mariwah, and Sebu 2012; Asenso-Okyere et al. 2000; Donkoh, Alhassan and Nkegbe 2014; Ghana Statistical Service 2014) is influenced by household idiosyncratic characteristics and, sometimes, external variables (Deacon 1992; Diallo and Wodon 2007). Following the works of Browning and Lusardi (1996), Chaudhuri (2003), Coulombe and Wodon (2007), Diallo and Wodon (2007) and Shimeles and Woldemichael (2013), variables such as age, sex, marital status, education, working status of household head as well as durable assets which serve as a store of wealth were included in the determination of household welfare. One of the most profound ways of analysing the effect of social expenditure is to estimate arbitrarily to represent categories of households from the bottom percentile to the highest, as shown in Table 1, at different quantiles (10th, 25th, 50th, 75th and 90th percentiles) of welfare. These quantiles are chosen first, report coefficients of exogenous variables in the currency unit (₵, cedi), and elasticity effect for social expenditure only. Elasticity coefficients for control variables have been omitted for the sake of parsimony, which could be made available to any interested party upon request.

To begin with the analysis of results, Table 1 shows a positive relationship between household welfare and social expenditure. Similar results for 2012/2013, 2005/2006 and 1998/1999 and presented in Table S1, Table S2, and Table S3, respectively. A household in the 10th percentile that observed an expenditure on social events averagely increases the household welfare by about ₵892 more than other households in the same percentile that did not incur social expenditure. This is no surprise since social expenditure is also captured as part of the total welfare estimate for each household. Hence, the welfare of households that make social expenditure is, on average, higher than those that did not spend on such social events like funerals, weddings, parties, etc. Also, households in the 25th percentile add ₵987 to their consumption welfare more than households that did not make expenditure on social events, an increase over the average for the 10th percentile households. Likewise, households in the 50th, 75th and 90th percentiles increasingly have ₵1161.7, ₵1572.5, and

8

₵1685.2, respectively, more than households that did not expend on social events. The increasing amount added to household welfare as over the percentile indicates that as households get richer greater sums of cedis are spent on funerals, weddings, and the like.

Table 1: Quantile effect of social expenditure on household welfare, 2016/2017

Variable	Welfare Quantiles									
	10th		25th		50th		75th		90th	
	Actual (₵)	Elasticity	Actual (₵)	Elasticity	Actual (₵)	Elasticity	Actual (₵)	Elasticity	Actual (₵)	Elasticity
Social expenditure	892.2***	0.656***	987.0***	0.632***	1161.7***	0.592***	1572.5***	0.482***	1685.2***	0.381***
Age	16.50*		24.78***		46.45***		64.89***		86.05***	
Square of age	-0.172*		-0.256***		-0.471***		-0.585***		-0.774**	
Household size	-89.94**		-292.2***		-576.1***		-880.4***		-1584.0***	
Square of household size	4.045*		16.03***		32.71***		52.91***		97.87***	
Sex of head (Base=Female)										
Male	-51.19		-61.26		-58.93		-101.9		-92.53	
Marital status of head (Base=Never married)										
Married/co-habiting	104.6		-148.8*		-346.6***		-481.7***		-440.6*	
Divorced/separated/Widowed	-188.9**		-301.1**		-545.4***		-732.7***		-775.6**	
Education of head (Base=No education)										
Basic	141.8**		233.1***		309.3***		441.3***		723.8***	
Secondary	337.8***		567.6***		751.0***		1178.2***		1810.4***	
Tertiary/Higher	874.8***		1426.7***		2433.9***		4445.6***		8584.5***	
Industry of head (Base=Agriculture)										
Mining	215.7		437.8		617.7*		1034.7*		1270.3*	
Manufacturing	39.37		-11.12		99.97		227.0*		515.2	
Electricity and utilities	-132.2		-93.89		-122.5		89.09		328.7	
Construction	137.6		60.76		88.17		217.3		476.8	
Commerce	216.5***		222.0**		303.3***		622.1***		907.0**	
Transportation, storage and										

communications	266.7	440.2***	431.4**	432.6	994.3
Financial, insurance and real estate	425.9	662.2	1628.8***	2773.3**	5088.8**
Services: public administration	218.0**	243.8***	487.5***	949.5***	1263.6***
Others	132.3	27.45	-53.99	237.9	6088.8
Ownership of house (Base=No)					
Yes	-130.9***	-127.6**	-77.13	-55.86	225.5
Ownership of car (Base=No)					
Yes	61.68	396.5*	743.4***	1566.5***	2538.0***
Locality (Base=GAMA)					
Other Urban	-1703.3***	-1806.3***	-1993.0***	-2459.1***	-3428.1***
Rural Coastal	-1901.2***	-2227.6***	-2568.5***	-3338.0***	-4814.6***
Rural Forest	-1952.3***	-2198.2***	-2512.1***	-3117.1***	-4549.6***
Rural Savannah	-2045.4***	-2395.0***	-2785.6***	-3305.5***	-4589.6***
Constant	-3683.8***	-3126.3**	-2816.0*	-3995.1*	-846.6

$^{*}p < 0.05,$ $^{**}p < 0.01,$ $^{***}p < 0.001$

An important aspect of this analysis is to consider the trend of the elasticity effect of social expenditure on household welfare. According to Table 2, the elasticity effect on welfare increases horizontally as the welfare also increases from the 10th to the 90th percentiles. That is, addition to welfare is greater among poorer households than richer households. This is because as poor households spend on funerals, weddings, or religious festivals every year, the amounts spent represent a significant proportion of their budget. Therefore, for richer households, social spending would rather represent a smaller proportion of their entire household budget compared with poor ones. For instance, in 2016 the percentage (elasticity) of welfare due to social spending decreased from about 66 percent for the bottom 10% to 38 percent for the top 10%. Similarly, the elasticity effect of social expenditure on welfare for all preceding years to 2016/2017 also increased as welfare percentiles increased. Most importantly, each percentile consistently increased their social expenditure as a proportion of household welfare. Therefore, Table 2 shows that, for example, the 10th percentile of households between 1999 to 2017, increased their social expenditure as a proportion of welfare from about 16 percent to about 66 percent, whereas that of the 25th percentile households increased from 12 percent to 63 percent. The 50th percentile households also increased from 13 percent to 59 percent while social expenditure as a proportion of welfare jumped from 10 percent to 48 percent for households in the 75th percentile; and lastly, that of households in the 90th percentile rose from less than one percent to 38 percent.

Table 2: Elasticity effect of social expenditure on household welfare

Year	Elasticity effect of social expenditure on welfare				
	10th	25th	50th	75th	90th
2016/2017	0.656***	0.632***	0.592***	0.482***	0.381***
2012/2013	0.646***	0.517***	0.377***	0.392***	0.324***
2005/2006	0.203***	0.194***	0.194***	0.177***	0.111***
1998/1999	0.160***	0.124***	0.133***	0.103***	0.09

2.4 Testing of Effect sizes between Quantiles

This section now discusses the results of the hypothesis tests conducted on the coefficients of social expenditure across different quantiles of the simultaneous quantile regression estimates above using linear combination (lincom) tests. First, 2016/2017 is considered followed by 2012/2013, 2005/2006, and then 1998/1999, in that order. Table 3 presents a composite hypothesis testing results of the effect of social expenditure on household welfare between lower and upper welfare quantiles. Only significant tests are shown in Table 3.

Results from Table 3 shows that for all years, that is, 2016/2017, 2012/2013, 2005/2006, and 1998/1999, there were differences in the effect of social expenditure on household welfare between the 10th and the 25th, 50th, 75th, and 90th percentile; and between the 25th and the 50th, 75th and 90th percentile. These statistical differences imply that the extremely poor households (10th percentile) have more addition to welfare for a cedi spent on social events than the very rich households (75th and 90th percentile). This could be explained in the sense that, in the ex-post, poor households have smaller consumption expenditure such that an additional cedi would have high effect on household welfare than rich households. Hence, poor households in the 10th percentile of welfare in 2016/2017, for example, have approximately 25 percent and 32 percent more than the 75th and the 90th percentiles respectively. Also, the tests for the upper percentiles (that is, 25th, 50th, 75th, and 90th percentiles) indicate that even between the median and the rich households, the poorer ones have greater addition to welfare than the richer households in the ex-post analysis. The reasons are just as is in the case between the 10th, 75th, and 90th percentiles.

Table 3: Linear combination tests of the effects of social expenditure on welfare between lower and upper quantiles

Year	Linear combination test	Coefficient	Standard Error	t-statistic
2016/2017	Between q10 and q25	0.129	0.062	2.090
	Between q10 and q50	0.269	0.074	3.610
	Between q10 and q75	0.254	0.078	3.250
	Between q10 and q90	0.322	0.090	3.560
	Between q25 and q50	0.140	0.043	3.290
	Between q25 and q75	0.125	0.050	2.490
	Between q25 and q90	0.193	0.071	2.710
2012/2013	Between q10 and q75	0.174	0.047	3.700
	Between q10 and q90	0.276	0.060	4.580
	Between q25 and q75	0.151	0.037	4.120
	Between q25 and q90	0.252	0.051	4.940
	Between q50 and q75	0.110	0.027	4.150
	Between q50 and q90	0.212	0.045	4.690
2005/2006	Between q10 and q90	0.091	0.026	3.490
	Between q25 and q90	0.083	0.024	3.530
	Between q50 and q90	0.082	0.019	4.310
1998/1999	Between q10 and q90	0.150	0.047	3.210
	Between q25 and q90	0.115	0.046	2.500
	Between q50 and q90	0.124	0.036	3.430

The implication of the above hypotheses is straightforward. That is, the effect of social expenditure on welfare between the poorest households and others increases towards higher quantiles of welfare. Thus, in the neighbourhood of the 10th percentile of welfare, there is no evidence of differences in the effect of social expenditure. However, extending the neighbourhood towards higher quantiles like 50th, 75th, and 90th quantiles reveal such differential effect. This suggests that in the ex-post, poor households benefit from social expenditure than rich households. The latter statement would lead one to argue social expenditure as a form of social investment which yields welfare returns. As this argument may be partly true, in the presence of functional, resourceful social networks, it may not be true if such expenditure does not yield commensurate benefits. According to Case et al. (2008), Haq et al. (2009), Mazzucato et al. (2006), and Chen and Zhang (2012), household social expenditure tend to be an unproductive venture with the possibility of squeezing out essential components of

household consumption like food, health, education and so forth at a different period. In this regard, the next section discusses the future vulnerability to poverty as a result of the household's engagement in social expenditure as a step further to examine the ex-ante effect apart from the ex-post gains.

2.5 Vulnerability to Expected Poverty

This section discusses the vulnerability to poverty due to social expenditure. The process followed the works of Chaudhuri (2003) and Shimeles and Woldemichael (2013) using the Full Generalised Least Square process for the consumption expenditure than to the generation of probabilities. It is worthy to restate that in the results that follow, each year, a baseline scenario estimated vulnerability to poverty without social expenditure dummy while the second scenario included the dummy variable for social expenditure. The approach is intended to contrast households' level of vulnerability without a 'shock' of social expenditure and the other scenario where social expenditure is captured as a household 'shock' variable. In this regard, the difference between the scenarios of households' vulnerability estimates gives the rise in vulnerability between a baseline scenario and the aftermath of social expenditure. These household vulnerability estimates are discussed beginning with the latest round of GLSS data, 2016/2017 to the preceding rounds of the survey.

First and foremost, a weighted baseline household vulnerability in 2016/2017 is shown in Table 4 where 62 percent of all households were vulnerable to poverty. This comprised 80 percent of very poor households, 96 percent very poor households, 91 percent poor households and 51 percent of non-poor households. In this case, there are a lot of households that are prone to poverty even the non-poor is not fully spared.

15

Table 4: Vulnerability without Social Expenditure, 2016/2017

	Vulnerability to poverty								
Poverty status	Not vulnerable			Vulnerable			Total		
	No.	%	Prob	No.	%	Prob	No.	%	Prob
Very poor	53	4.41	0.3773	1148	95.59	0.9512	1201	100	0.9259
Poor	144	8.87	0.3187	1480	91.13	0.9503	1624	100	0.8943
Non poor	4030	48.62	0.1356	4259	51.38	0.8621	8289	100	0.5089
Total	4227	38.03	0.1448	6887	61.97	0.8959	11114	100	0.6102

Source: Authors (2020) using GLSS 7

Comparatively, estimates captured in Table 5 indicate a slight reduction in vulnerability for all categories of households as social expenditure dummy is added to the consumption model. However, the decline in vulnerability is mainly influenced by a decrease in the percentage of vulnerable non-poor households, that is, from 51 percent in Table 4 to 50 percent in Table 5 whereas the very poor and the poor households saw an increase in their vulnerabilities to 97 percent and 92 percent, respectively. The implication could be that the poverty levels of poorer households are likely to be negatively affected in the future as they incur social expenditure compared to those who did not make such social expenditure.

Table 5: Vulnerability with Social Expenditure, 2016/2017

	Vulnerability to poverty								
Poverty status	Not vulnerable			Vulnerable			Total		
	No.	%	Prob	No.	%	Prob	No.	%	Prob
Very poor	39	3.25	0.3814	1162	96.75	0.9450	1201	100	0.9267
Poor	124	7.64	0.3206	1500	92.36	0.9352	1624	100	0.8883
Non poor	4133	49.86	0.1501	4156	50.14	0.8652	8289	100	0.5086
Total	4296	38.65	0.1571	6818	61.35	0.8942	11114	100	0.6093

Source: Authors (2020) using GLSS 7

Next, Table 6 shows the fact that for the total sample of households, 29 percent became vulnerable after observing social expenditure as an exogenous (shock) variable for 2016/2017. This represents a

rise in the sample average from 27 percent to 29 percent. Again, there was about a 1 percent increase in the number of vulnerable households for all poverty status or categories. It suggests, therefore, that social expenditure increases slightly the vulnerability to poverty of all, especially the very poor households. By this, one could argue that, although in the ex-post analysis, poor households may have had a more positive effect than the rich households, social expenditure does not seem good for the very poor in future analysis.

This argument is true especially when consumption of social events are often tied to societal norms and relative consumption, poor households that stretch their budgets to meet present expenditure on social events may be counted to have improved their welfare by increasing consumption expenditure but would have to face the dire consequences in the future. So, this finding points out the negative future effect that social expenditure brings on households that are poor but would still want to follow the herd. In the wake of extravagant funerals, festivals and weddings in developing countries, the ex-ante analysis points to future permanent or transitional poverty for poor households that would venture what is the preserve of the rich.

From Table 6 which contains estimates of vulnerability without social expenditure, a greater number of households (that is, 64.14%; 9939 households), including the non- poor, were vulnerable to poverty compared with others who were not. It could be seen that the very poor and poor households form the majority, as usually known.

Table 6: Vulnerability without Social Expenditure, 2012/2013

Poverty status	Vulnerability to poverty								
	Not vulnerable			Vulnerable			**Total**		
	No.	%	Prob	No.	%	Prob	No.	%	Prob
Very poor	89	5.67	0.3497	1480	94.33	0.9237	1569	100.00	0.8813
Poor	231	10.30	0.3134	2012	89.70	0.9173	2243	100.00	0.8449
Non poor	5236	44.82	0.1574	6447	55.18	0.8704	11683	100.00	0.5350
Total	5556	35.86	0.1683	9939	64.14	0.8881	15495	100.00	0.6149

Source: Authors (2020) using GLSS 6

On the other hand, Table 7 shows the fact that for the total sample of households, 63.81 percent are vulnerable after social expenditure was introduced as an exogenous (shock) variable. This

represents a drop in the sample average from 64.14 percent to 63.81 percent which looks good. However, considering the constituents of the sample average, it could be seen that the decline in vulnerability for the entire sample was as a result of a fall in the vulnerability of the Non-poor only (that is, 87.04% in Table 6 to 85.90% in Table 7). This means that vulnerability rather increased from 92.37 percent in Table 6 to 92.51 percent in Table 7 for the Very poor while for the Poor, it rose from 91.73 percent in Table 6 to 91.80 in Table 7. It suggests, therefore, that social expenditure increases slightly the vulnerability to poverty of the Very poor by 0.14 percent and the Poor by 0.07 percent.

Table 7: Vulnerability with Social Expenditure, 2012/2013

| Poverty status | Vulnerability to poverty | | | | | | | | |
| | Not vulnerable | | | Vulnerable | | | **Total** | | |
	No.	%	Prob	No.	%	Prob	No.	%	Prob
Very poor	78	4.97	0.3290	1491	95.03	0.9251	1569	100.00	0.8962
Poor	221	9.85	0.3024	2022	90.15	0.9180	2243	100.00	0.8568
Non poor	5309	45.44	0.1755	6374	54.56	0.8590	11683	100.00	0.5487
Total	5608	36.19	0.1826	9887	63.81	0.8810	15495	100.00	0.6285

Source: Authors (2020) using GLSS 6

In 2005/2006, nonetheless, Table 8 shows no vulnerability without social expenditure. This is because none of the probabilities exceeded 0.5. This does not seek to suggest that in the said year no household in Ghana was vulnerable, except that data and our model could not show evidence of household vulnerability.

Table 8: Vulnerability without Social Expenditure, 2005/2006

| Poverty status | Vulnerability to poverty | | | | | |
| | Not vulnerable | | | **Total** | | |
	No.	%	Prob	No.	%	Prob
Very poor	1292	100.00	0.0941	1292	100.00	0.0941
Poor	639	100.00	0.0222	639	100.00	0.0222
Non poor	5821	100.00	0.0139	5821	100.00	0.0139
Total	7752	100.00	0.0280	7752	100.00	0.0280

Source: Authors (2020) using GLSS 5

Yet in Table 9, results indicate that, once again, vulnerability increases, this time, for all categories of the household. So, while the total sample vulnerability increased by 52.19 percent, the Very poor shot up their vulnerability by 52.52 percent while the 50.73 was for the Poor and the Non-poor recording 51.19 percent vulnerability. It is instructive to note that all manner of households are vulnerable to either permanent poverty in the case of the Very poor and the Poor or transitory poverty for the Non-poor which is likely to nullify the present gains in welfare in the future. The mean vulnerability for all households was 5.2 percent.

Table 9: Vulnerability with Social Expenditure, 2005/2006

| Poverty status | Vulnerability to poverty | | | | | | | | |
| | Not vulnerable | | | Vulnerable | | | Total | | |
	No.	%	Prob	No.	%	Prob	No.	%	Prob
Very poor	1277	98.84	0.1341	15	1.16	0.5252	1292	100.00	0.1386
Poor	637	99.69	0.0760	2	0.31	0.5073	639	100.00	0.0773
Non poor	5819	99.97	0.0298	2	0.03	0.5119	5821	100.00	0.0300
Total	7733	99.75	0.0508	19	0.25	0.5219	7752	100.00	0.0520

Source: Authors (2020) using GLSS 5

Last but not least is the vulnerability test for 1998/1999. Table 10 presents the vulnerability estimates without social expenditure. It is seen from here that 72.86 per- cent of the sampled households are vulnerable which is constituted by 78.06 percent vulnerable Very poor, 76.81 vulnerable Poor and 65.45 vulnerable Non-poor households.

Table 10: Vulnerability without Social Expenditure, 1998/1999

| Poverty status | Vulnerability to poverty | | | | | | | | |
| | Not vulnerable | | | Vulnerable | | | Total | | |
	No.	%	Prob	No.	%	Prob	No.	%	Prob
Very poor	271	28.35	0.4016	685	71.65	0.7806	956	100.00	0.6731
Poor	227	42.51	0.3673	307	57.49	0.7681	534	100.00	0.5977
Non poor	2739	80.94	0.1782	645	19.06	0.6545	3384	100.00	0.2689
Total	3237	66.41	0.2101	1637	33.59	0.7286	4874	100.00	0.3843

Source: Authors (2020) using GLSS 4

Table 11 also shows the vulnerability of households to poverty after consuming social events such as weddings, funerals, and festivals. This table indicates that vulnerability to poverty for the entire sample increased from 38.43 percent to 39.53 percent in Table 10 and Table 11 respectively. It is evident here that vulnerability for the non-poor has increased to 28.84 percent while the probabilities for the very poor and poor declined slightly to 66.24 percent 59.41 percent respectively. However, it could be seen that despite the drop in vulnerability for the very poor compared with Table 10, about 27 more households in that category became vulnerable to poverty.

Table 11: Vulnerability with Social Expenditure, 1998/1999

Poverty status	Vulnerability to poverty								
	Not vulnerable			Vulnerable			Total		
	No.	%	Prob	No.	%	Prob	No.	%	Prob
Very poor	244	25.52	0.4053	712	74.48	0.7505	956	100.00	0.6624
Poor	232	43.45	0.3735	302	56.55	0.7636	534	100.00	0.5941
Non poor	2708	80.02	0.1985	676	19.98	0.6485	3384	100.00	0.2884
Total	3184	65.33	0.2271	1690	34.67	0.7120	4874	100.00	0.3953

Source: Authors (2020) using GLSS 4

The results of the hypothesis tests also showed that the effect of social expenditure on welfare between the poorest households and others increases towards higher quantiles of welfare. This suggests that in the current poverty analysis, poor households benefit from social expenditure than rich households. Thus, in the neighborhood of the 10th percentile of welfare, there is no evidence of differences in the effect of social expenditure. However, extending the neighbourhood towards higher quantiles like 50th, 75th, and 90th quantiles reveal such differential effect. Hence, it could be said that social expenditure contributes significantly to the welfare of very poor than non-poor households and that this difference in effect widens between the poorest and other households of higher levels of welfare.

On the contrary, vulnerability estimates show the negative repercussions of household social expenditure behaviour to future poverty for all years of the survey. By comparison across the years, it is seen that baseline vulnerability to poverty without social expenditure increased from 38.43 percent to 64.14 percent of the sampled population. As a result, vulnerability to poverty including social expenditure also increased from 38.43 percent in 1999 to 63.81 percent in 2017. This is an indication

that vulnerability among the populace rose despite Ghana's middle-income status achieved over the same period.

By this, it could be argued that even though in the current poverty analysis, poor households may be seen to have increased their welfare through social expenditure, the practice is not good for the poor in the future poverty analysis. As a result, the notion of social investment through social expenditure may not be entirely true for the poor in these instances, especially without a compensating reciprocation. This argument is true especially when consumption of social events is tied to the societal norms and relative consumption, poor households that outstretch their budget in order to meet present expenditure on social events may be counted to have improved their welfare but would have to face the dire consequences in the future. By this finding, we point out the negative future effect that social expenditure brings on poor households. In the wake of extravagant funerals, festivals, and weddings in developing countries, the ex-ante analysis points to future permanent or transitional poverty for poor and non-poor households respectively.

3. Conclusion

Directly from the hypotheses tested in this study, it is concluded that very poor households benefit more in terms of welfare than non-poor households and that the difference in the effect of social expenditure widens between the poorest and other households, moving towards higher levels of welfare. On the other hand, vulnerability to poverty estimates has shown that households may suffer permanent or transitory poverty in the future, especially the very poor. To this end, we recommend that the central government, local assemblies, traditional authorities, and other public agencies like the National Commission for Civic Education (NCCE) and NGOs should organise informal educational campaigns against the rising social expenditure and its effect on future poverty just as has been started by Quaker Social Action, Marie Curie, Citizens Advice, among others, in the UK and USA.

Secondly, the Government of Ghana could make additional cash transfers to- wards poor households to relieve them of the burden of poverty arising out of events like funerals, through its Livelihood Empowerment Against Poverty (LEAP), like the Scottish Government does through its Social Fund Funeral Payment (SFFP). Lastly, the government and local authorities may formulate policies to set guidelines for the indicative costs of organising and running social events aimed at combating the rising social expenditure at events like weddings, funerals, and festivals. This is possible since the governments of Tajikistan and India have already gone so far with such policies on wedding celebrations (Aker and Sawyer 2016, Danzer 2013).

4. Methods

The effect of social expenditure on household welfare is presented into two main parts. First, is the usual poverty analysis which computes the effect of an exogenous factor (social expenditure) on an outcome variable (household welfare)? In this study, this was achieved using a three-stage least square (3SLS) estimator and simultaneous quantile regression (Sqreg) approaches. This is explained in a moment. The second part of the study analyses the effect of social expenditure on future poverty levels (vulnerability to expected poverty) of households, adopting the vulnerability approach proposed by Chaudhuri (2003). This approach, too, is explained in detail in succeeding paragraphs after brief discussions on 3SLS and Sqreg.

To begin with, the 3SLS estimator is used to estimating the effect of social expenditure on household welfare due to the potential endogeneity, specifically, bi-causality, between the outcome variable and social expenditure. That is the likelihood of households with higher welfare incurring higher social expenditure, and higher social expenditure influencing higher household welfare. The stochastic process generating the consumption welfare of a household h is given as:

$$lnW_h = X_h\beta + \epsilon_h \qquad (1)$$

Where lnW_h is the log of household consumption welfare, X_h represents a set of observable household and household head's characteristics (*Social expenditure dummy, Age, Square of age, Household size, Square of household size, Sex, Marital status, Education level, Industry, House ownership, Car ownership, and locality*)); β is a vector of parameters; and ϵ_h is expected to be a mean-zero, constant disturbance term that captures idiosyncratic factors (shocks) that contribute to different consumption welfare of households that are otherwise observationally equivalent.

However, ϵ_h in most instances are correlated with the outcome variable, leading to endogeneity challenges. Literature exists in the treatment of such a relationship of the model using a two-stage least square estimator (2SLS). However, unlike a 2-stage least squares approach, a 3-stage least square is more efficient, according to Cameron and Trivedi (2005). In a system of equations where an explanatory variable becomes an outcome variable in other reduced equation(s), the error terms among the equations are expected to be correlated. 3SLS uses an instrumental-variables approach to produce consistent estimates and generalized least squares (GLS) to account for the correlation structure in the disturbances across the equations (Cameron and Trivedi 2005, Zellner and Theil 1962).

According to Zellner and Theil (1962), three-stage least squares estimates are obtained by estimating a set of nonlinear (or linear) equations with cross-equation constraints imposed, but with a

diagonal covariance matrix of the disturbances across equations. This is the constrained two-stage least squares estimator. They further explained that the parameter estimates thus obtained are used to form a consistent estimate of the covariance matrix of the disturbances, which is then used as a weighting matrix when the model is re-estimated to obtain new values of the parameters.

Subsequently, simultaneous quantile regression (Sqreg) was used to estimate the effect of social spending (using predicted values from the 3SLS estimation above) on household welfare at various welfare quantiles. Simultaneous quantile regression is a quantile regression technique that estimates different quantiles concurrently (Cameron and Trivedi 2005, Zellner and Theil 1962). The reported standard errors are similar to a singular quantile regression but obtain an estimate of the variance-covariance matrix of the error terms (VCE) via bootstrapping, and the VCE includes between-quantile blocks (Koenker and Hallock 2001). Thus, we can perform hypothesis testing of coefficients both within and across equations.

Hence, this technique was required to estimate and test the significance of the coefficients of social expenditure between different welfare quantiles. Such would offer the opportunity to determine whether the addition to welfare is the same for all quantiles or otherwise towards achieving objective one. Afterward, a linear combination test is conducted to ascertain the differences in social expenditure between different welfare quantiles.

On the other hand, vulnerability to expected poverty is estimated following the methods used in the works of Chaudhuri (2003), Dercon (2002), Hoddinott and Quisumbing (2010). Vulnerability is considered as the probability of consuming below an established welfare threshold Z. Thus, the probability that a household at time t would consume below the absolute poverty line. Vulnerability, V, is given as:

$$\hat{V} = \hat{P}_r\left(lnC_{\{h\}} < lnZ \big| X_{\{h\}}\right) = \Phi\left(\frac{\{lnZ - X_{\{h\}\{\beta\}}\}}{\{\hat{X}_{h\hat{\Theta}}\}}\right) \tag{2}$$

Where lnC_h is the logarithm of the household's consumption expenditure per equivalent scale at time t and Z is the absolute poverty line. The stochastic process generating the consumption of a household h is assumed as:

$$lnC_h = X_h\beta + e_h \tag{3}$$

Where lnC_h is the logarithm of consumption expenditure per equivalent scale, X_h represents a set of observable household and household head's characteristics; β is a vector of parameters; and e_h is a mean-zero, constant disturbance term that captures idiosyncratic factors (shocks) that contribute to different

23

per capita consumption levels for households that are otherwise observationally equivalent (Chaudhuri 2003). Further, it is also assumed that the variance of e_h is given by:

$$\sigma^2_{\{e,h\}} = X_h \Theta \qquad (4) \text{ We}$$

estimate β and θ using a three-step feasible generalized least squares (FGLS) procedure as in Chaudhuri (2003) and Shimeles and Woldemichael (2013). First, equation (3) is estimated using an ordinary least squares (OLS) procedure. Then, the estimated residuals from equation (2) to estimate the following equation using OLS.

$$e^2_{\{OLS,h\}} = X_{\{h\}\theta} + \eta_{\{h\}} \qquad (5)$$

The predictions from equation (5) are used to transform the equation (5) as follows:

$$\frac{\hat{e}^2_{OLS,h}}{X_h \hat{\theta}_{OLS}} = \left(\frac{X_h}{X_h \hat{\theta}_{OLS}}\right)\theta + \left(\frac{\eta_h}{X_h \hat{\theta}_{OLS}}\right) \qquad (6)$$

This transformed equation is estimated using OLS to obtain an asymptotically efficient FGLS estimate, $\hat{\theta}_{FGLS}$ which is consistent with $\sigma^2_{e,h}$ the variance of the idiosyncratic component of household consumption. The estimates:

$$\sigma_{e,h} = \sqrt{X_h \hat{\theta}_{FGLS}} \qquad (6)$$

are then used to transform equation (3) as follows:

$$\frac{lnC_h}{\hat{\sigma}_{e,h}} = \left(\frac{X_h}{\hat{\sigma}_{e,h}}\right)\beta + \frac{e_h}{\hat{\sigma}_{e,h}} \qquad (7)$$

OLS estimation of equation (7) yields a consistent and asymptotically efficient estimate of β. Using the estimates $\hat{\beta}$ and $\hat{\theta}$ to directly estimate expected log consumption:

$$\hat{E}[lnC_h|X_h] = X_h\hat{\beta} \qquad (8)$$

and the variance of the log consumption is also given as:

$$\hat{V}[lnC_h|X_h] = \sigma^2_{\{e,h\}} = X_h\hat{\beta} \qquad (9)$$

By assuming that consumption is log-normally distributed, it becomes possible to form an estimate of the probability that a household with the characteristics, X_h, will be poor. Letting $\Phi(.)$ denote the cumulative density of the standard normal, we obtain the probability values given by equation (2). As

24

according to literature (Chaudhuri 2003, Hill and Porter 2017, Hoddinott and Quisumbing 2010; Shimeles and Woldemichael 2013), this study considers a household as vulnerable to poverty if $\hat{V}_h$ is greater than a probability threshold P:

$$\hat{V}_h = \begin{cases} 1, & if\ \hat{V}_h > P \\ 0, & if\ \hat{V}_h \le P \end{cases}$$

Also, the study adopts the commonly used threshold of 0.5 for P such that a vulnerable household is one whose probability exceeds 0.5.

4.3 Source and Type of Data

We use secondary data sourced from Ghana Statistical Service's Living Standard Survey (GLSS $4 - 7$) which is Ghana's version of a regular international Living Standard Surveys designed to generate information on the living conditions of people in their respective countries. It collects household and individual information on demographic characteristics, education, health, employment and time use, migration and tourism, housing conditions, household agriculture, access to financial services, asset ownership, and so on (Ghana Statistical Service 2014). The final household sample size used in the study for the fourth, fifth, sixth, and seventh rounds were 5,556, 7,759, 15,568, and 11114, respectively.

Author Contribution:

Conceptualization, Richard Kwabena Nkrumah; Data curation, Richard Kwabena Nkrumah; Formal analysis, Richard Kwabena Nkrumah; Methodology, Richard Kwabena Nkrumah and Samuel Kobina Annim; Supervision, Samuel Kobina Annim and Benedict Afful Jr; Writing – review & editing, Samuel Kobina Annim and Benedict Afful Jr.

Conflict of Interest: The authors declare no conflict of interest

References

Aker, J. C., and Sawyer, M. (2016). Get your goat: Planning, saving, and ceremonial spending.

Annim, S. K., Mariwah, S., and Sebu, J. (2012). Spatial inequality and household poverty in ghana. *Economic Systems*, *36*(4), 487–505.

Asenso-Okyere, W., Twum-Baah, K., Kasanga, A., Anum, J., and Pörtner, C. (2000). Ghana living standards survey. *Report of the Fourth Round (GLSS 4). Ghana Statistical Service, Accra, Ghana.*

Banerjee, A. V., and Duflo, E. (2007). The economic lives of the poor. *Journal of economic perspectives*, *21* (1), 141–168.

Bloch, F., Rao, V., and Desai, S. (2004). Wedding celebrations as conspicuous consump- tion signaling social status in rural India. *Journal of Human Resources*, *39* (3), 675–695.

Browning, M., and Lusardi, A. (1996). Household saving: Micro theories and micro facts. *Journal of Economic Literature*, *34* (4), 1797–1855.

Cameron, A. C., and Trivedi, P. K. (2005). *Microeconometrics: Methods and applications*. Cambridge university press.

Case, A., Garrib, A., Menendez, A., and Olgiati, A. (2008). *Paying the piper: The high cost of funerals in South Africa*. National Bureau of Economic Research.

Chaudhuri, S. (2003). Assessing vulnerability to poverty: Concepts, empirical methods and illustrative examples. *Department of Economics, Columbia University, New York.*

Chen, X., and Zhang, X. (2012). *Costly posturing: Relative status, ceremonies and early child development in china*. WIDER Working Paper.

Coulombe, H., and Wodon, Q. (2007). Poverty, livelihoods, and access to basic services in Ghana. In *Ghana CEM: Meeting the challenge of accelerated and shared growth. Washington, DC: World bank.*

Danzer, A. M. (2013). *Can anti-poverty policies reduce conspicuous consumption: Evidence from wedding expenditures in Tajikistan*. Mimeo.

Dercon, S. (2002). Income risk, coping strategies, and safety nets. *The World Bank Research Observer*, *17* (2), 141–166.

Diallo, A. B., and Wodon, Q. (2007). Demographic transition towards smaller household sizes and basic infrastructure needs in developing countries. *Economics Bulletin*, *15*(11), 1–11.

Donkoh, S. A., Alhassan, H., and Nkegbe, P. K. (2014). Food expenditure and household welfare

in Ghana.

Funeral Poverty in the 21st Century. (2014, October 29). Retrieved from http :// www.us-funerals.com/funeral- articles/funeral- poverty- in- the- 21st- century. html#.W08X4OSBztQ

Ghana Statistical Service. (2014). Ghana living standards survey. *Report of the sixth Round (GLSS 6). Ghana Statistical Service, Accra, Ghana.*

Haq, R., Arshid, N., and Anwar, T. (2009). Inequality and welfare by food expenditure components [with comments]. *The Pakistan Development Review*, 755–768.

Hill, R. V., and Porter, C. (2017). Vulnerability to drought and food price shocks: Evidence from Ethiopia. *World Development*, *96*, 65–77.

Hoddinott, J., and Quisumbing, A. (2010). Methods for microeconometric risk and vulnerability assessment. In *Risk, shocks, and human development* (pp. 62–100). Springer.

How Much Does the Average Funeral Cost? (2018, January 23). Retrieved from

https://www.parting.com/blog/how-much-does-the-average-funeral-cost/

Koenker, R., and Hallock, K. F. (2001). Quantile regression. *Journal of economic perspectives*, *15*(4), 143–156.

Martin, P. (2016). Turning Maslow's hierarchy on its head. Retrieved from

https://www.ideo.org/perspective/turning-maslows-hierarchy-on-its-head

Mazzucato, V., Kabki, M., and Smith, L. (2006). Transnational Migration and the Economy of Funerals: Changing Practices in Ghana. *37*(5), 1047–1072.

Quarker Social Action. (2017). *Funeral poverty briefing.* Quaker Social Action.

Rao, V. (2001). Celebrations as social investments: Festival expenditures, unit price variation and social status in rural India. *Journal of Development Studies*, *38* (1), 71–97.

Royal London. (2015). *Rising funeral costs – the elephant in the room.* The Royal London Mutual Insurance Society Limited.

Royal London. (2017). *A False dawn: Funeral costs rise again after a one year respite.*

The Royal London Mutual Insurance Society Limited.

Sen, A. (1985). A sociological approach to the measurement of poverty: A reply to `Professor Peter Townsend. *Oxford Economic Papers*, *37* (4), 669–676.

Shefrin, H. M., and Thaler, R. H. (1988). The behavioral life-cycle hypothesis. *Economic inquiry*, *26* (4),

609–643.

Shimeles, A., and Woldemichael, A. (2013). Rising food prices and household welfare in ethiopia: Evidence from microdata.

Survey Compares Countries' Wedding Spending Habits. (2013, July 24). Retrieved from https://astanatimes.com/2013/07/survey-compares- countries- wedding- spending-habits/

Zellner, A., and Theil, H. (1962). Three-stage least squares: simultaneous estimation of simultaneous equations. *Econometrica: Journal of the Econometric Society*, 54–78.

Table S1: Quantile effect of social expenditure on household welfare, 2012/2013

Variable	Welfare Quantiles									
	10th		25th		50th		75th		90th	
	Actual (₵)	Elasticity	Actual (₵)	Elasticity	Actual (₵)	Elasticity	Actual (₵)	Elasticity	Actual (₵)	Elasticity
Social expenditure	640.4***	0.646***	895.5***	0.517***	1130.5***	0.377***	1325.7***	0.392***	1432.6***	0.324***
Age	3.365		10.42**		7.775		9.091		13.92	
Square of age	-0.0394		-0.0944**		-0.0642		-0.0604		-0.109	
Household size	-70.26***		-134.1***		-291.0***		-609.5***		-1119.1***	
Square of household size	3.165**		7.095***		16.28***		34.80***		66.14***	
Sex of head (Base=Female)										
Male	50.05		10.73		-7.505		-55.99		128.0	
Marital status of head (Base=Never married)										
Married/co-habiting	-10.85		-126.6**		-282.1***		-145.4		75.10	
Divorced/separated/Widowed	-31.73		-203.2***		-370.7***		-337.3**		-24.20	
Education of head (Base=No education)										
Basic	4.040		12.64		26.68		99.78		198.4*	
Secondary	82.44**		119.6***		213.9***		450.5***		725.0***	
Tertiary/Higher	409.5***		687.8***		1222.5***		2288.3***		3806.7***	
Non-formal	51.95		62.06		88.91*		151.8*		125.4	
Industry of head (Base=Agriculture)										
Mining	129.6	0.656***	180.8	0.632***	280.3	0.592***	437.3	0.482***	768.4*	0.381***
Manufacturing	72.85		84.32		135.1		244.2*		250.4	
Electricity and utilities	-69.74		45.29		14.45		768.6		568.1	
Construction	54.03		62.65		54.96		10.64		-135.6	
Commerce	115.2***		150.3***		325.7***		415.3***		675.3***	

Transportation, storage and communications	-50.12	-50.40	104.6	53.07	429.6
Financial, insurance and real estate	-49.86	713.2**	753.3	2956.7	10128.2***
Services: public administration	5.815	100.4	421.5*	464.0*	891.7
Others	30.32	-8.610	150.1*	398.6**	545.5**
Ownership of house (Base=No)					
Yes	-53.65*	-61.92**	17.59	80.68	105.6
Ownership of car (Base=No)					
Yes	96.88***	73.07*	105.1*	272.8***	450.1**
Locality (Base=GAMA)					
Other Urban	-438.2***	-533.7***	-732.8***	-1095.7***	-1360.3***
Rural Coastal	-553.1***	-673.0***	-938.3***	-1399.1***	-1664.2***
Rural Forest	-557.1***	-679.2***	-933.1***	-1404.3***	-1910.2***
Rural Savannah	-660.5***	-737.6***	-964.7***	-1378.0***	-1875.5***
Constant	-3127.4***	-4412.2***	-4733.2***	-4143.1***	-2382.8

Table S2: Quantile effect of social expenditure on household welfare, 2005/2006

Variable	Welfare Quantiles									
	10th		25th		50th		75th		90th	
	Actual (₵)	Elasticity	Actual (₵)	Elasticity	Actual (₵)	Elasticity	Actual (₵)	Elasticity	Actual (₵)	Elasticity
Social expenditure	15.86***	0.203***	18.09***	0.194***	24.12***	0.194***	28.53***	0.177***	32.46***	0.111***
Age	0.0109		-0.00841		0.203		1.211		3.413**	
Square of age	-0.00101		0.000647		-0.00240		-0.0124		-0.0311*	
Household size	-13.05***		-19.84***		-32.90***		-58.33***		-92.41***	
Square of household size	0.524***		0.899***		1.688***		3.164***		5.197***	
Sex of head (Base=Female)										
Male	-4.405		-9.989**		-10.84*		-15.18*		-17.19	
Marital status of head (Base=Never married)										
Married/co-habiting	-0.859		-12.37		-20.80**		-32.03**		-34.96	
Divorced/separated/Widowed	-12.86		-29.46***		-39.86***		-55.71***		-63.89**	
Education of head (Base=No education)										
Basic	5.721		6.886**		5.946		6.785		2.103	
Secondary	14.46***		23.09***		20.25***		21.39***		24.06**	
Tertiary/Higher	58.00***		85.58***		106.7***		166.5***		234.9***	
Non formal	7.056*		9.169**		7.086*		8.849		10.50	
Industry of head (Base=Agriculture)										
Mining	11.70		18.28		36.15**		37.13**		120.5	
Manufacturing	12.77**		14.24***		21.71***		21.57*		30.04*	
Electricity and utilities	43.56*		31.21*		34.90		90.88		45.82	
Construction	18.59**		15.49**		10.01		4.510		-6.154	
Commerce	21.02***		23.16***		32.69***		38.31***		52.00***	

Transportation, storage and communications	7.867	11.51	23.29*	12.47	29.95
Financial, insurance and real estate	7.645	27.17*	58.70*	80.14***	62.85
Services: public administration	6.976	17.09	33.03**	27.98	71.54**
Others	12.92	12.87*	25.19***	14.43	32.62
Ownership of house (Base=No)					
Yes	2.072	-0.801	2.492	13.13***	20.44**
Ownership of car (Base=No)					
Yes	102.2***	127.3***	205.6***	348.3***	656.9***
Locality (Base=GAMA)					
Other Urban	8.698	16.64**	29.78***	33.61**	47.30**
Rural Coastal	-8.352	-15.24**	-21.62**	-41.24***	-44.93*
Rural Forest	-8.994	-14.35**	-23.59***	-46.32***	-55.51**
Rural Savannah	-32.10***	-37.31***	-46.01***	-65.47***	-69.28***
Constant	-96.82***	-64.04**	-60.60*	17.59	83.84

Table S3: Quantile effect of social expenditure on household welfare, 1998/1999

Variable	Welfare Quantiles									
	10th		25th		50th		75th		90th	
	Actual (₵)	Elasticity	Actual (₵)	Elasticity	Actual (₵)	Elasticity	Actual (₵)	Elasticity	Actual (₵)	Elasticity
Social expenditure	8.315***	0.160***	11.40***	0.124***	12.32***	0.133***	13.96**	0.103***	9.334	0.00934
Age	-0.407		-0.0700		-0.380		-0.740		-2.867*	
Square of age	0.00447		0.00205		0.00546		0.00632		0.0258	
Household size	-12.59***		-21.94***		-38.99***		-66.64***		-111.6***	
Square of household size	0.641***		1.184***		2.213***		4.046***		7.197***	
Sex of head (Base=Female)										
Male	-6.256*		-9.459***		-13.70***		-17.76**		-15.53	
Marital status of head (Base=Never married)										
Married/co-habiting	-10.57		-11.23		-3.491		-17.82		7.624	
Divorced/separated/Widowed	-18.00**		-22.34**		-22.16*		-37.87*		-6.104	
Education of head (Base=No education)										
Basic	1.077		6.212*		8.352*		6.257		12.61*	
Secondary	9.617***		15.27***		19.19***		24.04***		36.59***	
Tertiary/Higher	24.63***		33.79***		44.90***		67.97***		87.03***	
Non-formal	-0.193		3.310		3.816		0.965		21.53	
Industry of head (Base=Agriculture)										
Mining	48.10*		66.48***		97.38***		106.5***		102.4	
Manufacturing	11.18**		14.31***		30.27***		52.35***		53.47***	
Electricity and utilities	37.91***		33.30*		24.65*		-7.499		-15.73	
Construction	5.952		-1.309		6.627		5.372		3.711	
Commerce	11.45***		16.13***		28.09***		45.27***		62.03***	

Transportation, storage and communications	25.12**	32.41***	43.84***	49.72***	38.99**
Financial, insurance and real estate	38.47**	46.43**	63.90**	112.4*	161.5
Services: public administration	22.86***	31.41***	48.41***	51.60***	70.87*
Others	14.23***	13.20**	23.77***	30.53***	47.65***
Ownership of house (Base=No)					
Yes	0.409	1.412	6.345*	10.91**	19.10**
Ownership of car (Base=No)					
Yes	63.09***	63.15***	103.5***	174.3***	253.3***
Locality (Base=GAMA)					
Other Urban	-37.00***	-45.44***	-43.27***	-30.53**	3.274
Rural Coastal	-48.76***	-59.89***	-66.59***	-62.42***	-54.53***
Rural Forest	-40.90***	-51.76***	-55.42***	-52.77***	-45.79***
Rural Savannah	-55.46***	-70.85***	-82.78***	-84.43***	-76.99***
Constant	47.91	58.91	135.1***	263.7***	518.7***