

# 1 The Effect of Government Sectoral Expenditure on Poverty Level 2 in Kenya

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## 7 **Abstract**

8 This study investigated the effect of sectoral government expenditure on poverty level in  
9 Kenya. Private Consumption per capita, a measure of poverty, was the independent variable  
10 while education, health, agriculture and infrastructure expenditures were the independent  
11 variables. Time series data for the period of 1964-2010 was used and was tested for unit root  
12 using Augmented Dickey Fuller test whereby all variables were found to be integrated to I(1).  
13 A lag length of three was selected using Vector Autoregressive model. Presence of  
14 co-integration was confirmed using the Johansen test which showed there was one  
15 co-integrating equation. Vector Error Correction model indicated that there was a stable long  
16 run relationship between poverty level and sectoral government expenditure in Kenya. The  
17 regression results indicated that agriculture and health expenditures have a positive and  
18 significant effect on poverty level while infrastructure expenditure has a negative and  
19 significant effect on poverty level. The effect of education expenditure on poverty level was  
20 insignificant. It is recommended that the government in Kenya increases expenditure  
21 allocation to agriculture and health sectors.

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23 *Index terms*— poverty, government sectoral expenditure, vector error correction.

## 24 **1 Introduction**

25 uring the pre-independence period Kenya like many other African Colonies at that time was characterized by  
26 deprivation of the natives. Upon attainment of independence the government decided to pursue poverty alleviation  
27 alongside economic growth. First of those efforts were in the Sessional Paper No. 10 of 1965 and the Sessional  
28 Paper No.10 of 1973. The Sessional Paper No. 10 of 1965 was the launch pad for the country's economic and  
29 social development with focus on elimination of poverty, disease and illiteracy. The Sessional Paper No.10 of 1973  
30 set out strategies based on objectives spelt out in sessional paper no 10 of 1965 one of the being the enabling of  
31 the most poor to share in the country's economic benefits. There are various literature that show that poverty  
32 worsened after independence especially when the economic performance took a nose dive which resulted into  
33 Structural Adjustment Programs (SAPs) in 1980s by the World Bank and International Monetary Fund ??IMF).

34 In between the government continued to implement new policies among them the District Focus for Rural  
35 Development (DFRD) in 1983 which sought to stimulate rural economies to contribute to the national output  
36 and to reduce rural poverty. This was followed by Sessional Paper No.1 of 1986 on Economic Management  
37 for Renewed Growth whose preparation was informed by poor economic performance and worsening poverty  
38 levels. It reinforced the implementation of SAPs with more focus on economic growth and the subsequent results  
39 was that Kenyans were economically hurt by the programs especially liberalization that saw commodity prices  
40 go up and cost sharing of services like healthcare and education. However, a study done by Kabubo-Mariara  
41 and ??iriti (2002) found that macroeconomic policies put in places through SAPs resulted to decreased poverty  
42 levels attributed to improvement in economic growth. The need by government to cushion the poor resulted to

### 3 LITERATURE REVIEW

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43 launching of the Social Dimension of Development (SDD) Programme in 1994. This programme was not effective  
44 due to lack of political good will, underbudgeting and diversion of funds.

45 Since 1966 the government drew up National Development Plans of which each covered a five-year period  
46 except the 1994 plan which spanned three years and the 2001 plan which spanned seven years. These plans  
47 contained policies towards poverty eradication some of which were not implemented or were duplications. In  
48 1999 a single long-term plan was unveiled by the name of the National Poverty Eradication Plan (NPEP)  
49 covering the period 2000-2015 adopted in line with the International Development Goals to halve global poverty  
50 (Republic of Kenya, 2001). The NPEP was implemented through short-term strategies called Poverty Reduction  
51 Strategy Papers (PRSPs). World Bank and IMF initiated the PRSPs in a bid to make country members own  
52 the reform programmes and increase focus on poverty reduction efforts. Other than the PRSPs being crucial in  
53 the attainment of the MDG poverty target, the PRSPs informs the World Bank and IMF concessional lending  
54 policies in the Highly Indebted Poor Countries (HIPC) initiative in which debt relief is seen as key to poverty  
55 reduction. The first PRSP paper was for the period 2001-2004, this and later PRSPs were formulated as pro  
56 poor and pro-growth with the recognition that economic growth alone was not enough to reduce poverty.

57 In 2002 there was change of government whose key promise was economic growth and the new government  
58 realigned policies and plans towards fulfilling this promise. In addition to the existing plans and policies, the  
59 Economic Recovery Strategy (ERS) was unveiled in 2003 to put Kenya on an economic recovery road after a  
60 slump in economic growth for over two decades with worsened poverty situation (Republic of Kenya, 2003). The  
61 ERS aimed to revitalize growth and create employment which in turn would reduce poverty. In the blueprint, it  
62 was recognized that interventions will be required through education, healthcare, housing, social security among  
63 others to directly address the poverty situation while pursuing pro-poor growth. Through the ERS the economy  
64 improved from a growth of 0.5 per cent in 2003 to 7 per cent and poverty declined from 56.8 per cent in 2000 to  
65 46 per cent in 2006 (International Monetary Fund, 2010).

66 Replacing the ERS was the Kenya Vision 2030 a long term economic blueprint towards becoming "a globally  
67 competitive and prosperous country with a high quality of life by 2030" (Republic of Kenya, 2008). Kenya Vision  
68 2030 is divided into three parts i.e. economic, social and political pillar with each containing the means by which  
69 to attain middle income status in which the economy would grow at a projected rate of 10 per cent per annum.  
70 The particular activities termed as flagship projects to be undertaken are contained in Medium Term Plans  
71 (MTPs) which are strategic five-year plans towards attaining Vision 2030 and are used to guide the budgeting  
72 process. The MTPs are also presented to the World Bank and IMF as the country's PRSPs. Under the social  
73 pillar, Kenya is to achieve a reduction in poverty by between 3 and 9 per cent from 46 per cent level of poverty as  
74 at 2006 (Republic of Kenya, 2008). The achievement of ERS and the Kenya Vision 2030 were also to contribute  
75 towards the achievement of the Millennium Development Goals (MDGs) for Kenya.

76 Kenya was expected to halve its poverty incidence from 43.3 per cent in 1990 to 21.7 per cent by 2015 as per  
77 her MDG target of poverty (Republic of Kenya, 2012). The share of poorest quintile i.e. 20 per cent in national  
78 consumption ought to have been at 9.6 per cent in 2015 expected to have increased from the baseline of 4.8 per  
79 cent in 1990. The objective of this paper then is to investigate the effect of government sectoral expenditure  
80 on poverty in Kenya which will serve to show whether economic benefits in terms of poverty reduction differ  
81 by the level of funds allocated to a particular sector. The rest of this paper is organised follows: section two is  
82 the literature review; section three discusses methodology; section four presents the research findings and finally  
83 section five concludes the paper.

## 84 2 II.

### 85 3 Literature Review

86 Various literature have classified theories of poverty in different ways and the theories have evolved over time.  
87 The theories explain poverty: what brings about poverty, what perpetuates poverty and how to address poverty.  
88 Classical theory of poverty is the oldest theory and according to classical economics, the market is self-regulating  
89 and resources are efficiently assigned to production units. Redistribution of output is also as a result of free  
90 market and wages reflect one's productivity and as such poverty results from individual choices about work.  
91 Therefore, poverty is seen not to be as result of market failure but poor economic decisions of individuals such  
92 as being lazy or being uneducated (Davis & Sanchez-Martinez, 2014). Further, living in deprivation is as a  
93 result of individual decisions and that hard work and better choices are sufficient to lift one out of poverty. It  
94 is generally viewed by the non-poor that people who live in poverty deserves it and the poor tend to choose  
95 and nurture a culture of poverty which leads to intergenerational poverty i.e. 'poverty begets poverty' (Davis  
96 & Sanchez-Martinez, 2014). Bradshaw (2006) notes that the American Values of Individualism is based on the  
97 fact that hard work, motivation and persistence can cause one to succeed and therefore failure is as result of  
98 individual decision, so is poverty. This implies society or government has no part in one's plight of poverty and  
99 thus it should not intervene.

100 On the other hand, the Keynesian theory of poverty hold that poverty is as a result of structural factors  
101 which could be economic or social or political. The proponents of this theory acknowledge that the poor are  
102 impoverished due to external reasons mostly beyond their control. Marshall and Keynes explain poverty to  
103 have been caused by economic underdevelopment and lack of human capital (Jung & Smith, 2006). There also

104 exist market failures such as uncertainty which may perpetuate one's economic situation given that the poor  
105 are more vulnerable to shocks that affect their income. According to this liberal approach; market distortions,  
106 institutional rigidities and general underdevelopment do cause poverty rather individual choices. Intervention by  
107 the government is viewed as a means to promote economic development and welfare (Davis & Sanchez-Martinez,  
108 2014). During the Great Depression of the 1930s, J M Keynes, a British economist argued that government  
109 intervention through expansionary fiscal policies was necessary to stimulate aggregate demand and create jobs  
110 thus reducing unemployment. Increasing employment is critical given the poor gain income by offering their labour  
111 as their sole asset (Hull, 2009). In such situation, government intervention would be necessary to stimulate the  
112 economy and via multiplier effect reduce poverty.

113 The Marxist theory of poverty, which is a radical theory, shifts from the orthodox economic theories of poverty  
114 and focus on the role of the nature of demand for labour, non-individual characteristics that determine wage levels  
115 and the duality of labour markets. The Marxists explains the existence of poverty from a result of capitalism  
116 and related social and political factors based on class division. According to Marxism, the market is inherently  
117 dysfunctional (Blank, 2003;Bradshaw, 2006) in which in capitalist economies, the owners of capital which is the  
118 ruling class will earn more while owners of labour will earn much less since the cost of labour is kept unnaturally  
119 lower than its valued added through the threat of unemployment by maintaining a 'reserve army of unemployed'  
120 (Davis & Sanchez-Martinez, 2014). Low wages prevent the poor labourers from saving and makes it highly  
121 probable that these labourers would slide further into poverty in the event of shocks.

122 A more recent theory is the theory of social exclusion and social Capital. Social sciences have identified poverty  
123 to be exacerbated due to social exclusion and lack of social capital inherent in the structural characteristics of  
124 society. Social exclusion occurs when an individual or a community is wholly or partially excluded from full  
125 participation in the society in which they live. Sirovatka and Mares (2008) summarise various definition of social  
126 capital 'as a quality, as a social resource or a social glue that is the property of a group, a community or a society,  
127 and as such it is available to its members.' Morazes and Pintak (2007) as cited in Davis and Sanchez-Martinez  
128 (2014) regarding poverty note that, there is general consensus that exclusion is non-participation in consumption,  
129 production and political engagement. Socially excluded individuals and communities fail to access opportunities  
130 and resources that are necessary to improve their economic welfare. One form of social exclusion may lead to  
131 another form of exclusion resulting to multiple permanent disadvantages (Sameti, Esfahani, & Haghghi, 2012).  
132 Low levels of social capital worsen the possibility that one can climb out of poverty and reinforces unemployment  
133 and economic distress among low income earners. Intervention through expansion of public expenditure and  
134 provision of public goods would be expected to provide a form of bridging to rest of the society particularly  
135 investment in social welfare. The next subsections discusses empirical literature based on the hypothesized  
136 variables.

## 137 4 a) Agriculture Sector Expenditure and Poverty

138 The poor in Kenya engage mainly in agricultural activities and poverty is more prevalent in rural areas where the  
139 main source of livelihood is agriculture. Geda, Jong, Mwabu and Kimenyi (2001) using 1994 household level data  
140 collected in the Welfare Monitoring Survey and applying binomial and polychotomous logistics models found  
141 that being employed in the agriculture sector increased probability of being poor and concluded that investing  
142 in the sector would be vital in reducing poverty in Kenya. Accelerating growth in agriculture has the direct  
143 impact of raising the nominal incomes of the poor through employment creation and real incomes of the poor  
144 through reduced food prices that comprise the largest portion of the poor's budget. Thurlow, Kiringai and  
145 Gautam (2007) and Christiaensen, Demery and Kuhl (2012) note that the contribution of a sector to poverty  
146 reduction depends on the sector's own direct growth, the indirect growth arising from spillover sector linkages;  
147 the participation by the poor in that sector, reflecting the responsiveness of overall poverty to the sector of origin  
148 of GDP growth; and the relative size of the sector in the economy. Janson, Mango, Krishna, Rademy and Johnson  
149 (2009) used the asset based approach and participatory methodology at household and community level to study  
150 poverty dynamics in Kenya. Their study established crop and livestock diversification and commercialization of  
151 agriculture played a role in helping some households escape poverty while other households fell into poverty due  
152 to crop loss or livestock death caused by drought and diseases.

153 Thurlow et al. ( ??007) applied dynamic Computable General Equilibrium (CGE) micro simulation model  
154 to analyse growth and distributional changes in Kenya. Without taking the cost of accelerating growth in  
155 the different sectors, the impact of sectoral growth on poverty reduction and inequality is analysed using  
156 three scenarios. A baseline scenario, a scenario which compares poverty reduction due to agricultural and  
157 industrial growth and a scenario that examines the agriculture sector and estimates the poverty reducing impact  
158 of accelerating growth in the sector. From the micro simulation, a faster agricultural growth in the agriculture-led  
159 scenario results to rising income and expenditure for those in extreme poverty with most effect being felt by the  
160 rural poorest. On the other hand, faster non-food manufacturing growth in the formal and informal sectors under  
161 the industry-led scenario has most impact in reducing poverty in the less-poor households. It was also found  
162 that agriculture had larger income multipliers that created more jobs and raised incomes and its economy wide  
163 linkages were more pro poor. In studying the effect of increasing budget allocation to agriculture, increasing  
164 agriculture spending by 10 per cent as per Maputo Declaration, would lift 1.5 million people out of poverty as  
165 defined by the poverty line by 2015. The 10 percent increase in agriculture was still found not be adequate to

## 7 D) INFRASTRUCTURE SECTOR EXPENDITURE AND POVERTY

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166 meet the expected growth in agriculture and to meet the MDG poverty by 2015. Therefore, increased spending  
167 on agriculture coupled with non-agricultural investments that are pro poor would be essential.

### 168 5 b) Health Sector Expenditure and Poverty

169 In 2001 the Members of the African Union countries pledged to allocate to the health sector at least 15 per  
170 cent of their annual budget in what is known as the Abuja declaration (World Health Organisation, fell in to  
171 poverty due to poor health than those that escaped poverty through employment due to formal education.  
172 Specifically 40 per cent of households sampled across Kenya fell into poverty due to poor health and debilitating  
173 health care expenses. The income of the poor is very vulnerable to shocks and these shocks among them drought,  
174 political instability, economic shocks like high inflation and health related shocks drastically affect incomes of  
175 the poor and may have insufficient or no means of smoothing their consumption. Scheil-Adlung et al. ( ??006)  
176 conducted a comparative analysis on the impact of social health protection on access to health care, health  
177 expenditure and impoverishment for South Africa, Senegal and Kenya using 2003 household survey data. The  
178 health insurance coverage is low in these countries with South Africa having 12.3 per cent of population covered,  
179 Kenya the coverage is 9.1 per cent and Senegal 4.2 per cent and in all the three countries the lower income group  
180 has very few people covered. Applying a multiple logistics regression, the study established that across the three  
181 countries the likelihood of descending into poverty due medical expenditure is between 1.5 per cent and 5.4 per  
182 cent of the households. It was also found that health related expenditure widens the poverty gap; in South Africa  
183 the poverty gap increased from 37 per cent of the poverty line to 41 per cent; in Kenya it increased from 25 per  
184 cent to 27 per cent; and in Senegal it increased from 54 per cent to 64 per cent.

185 Asghar, Hussain and Rehman (2012) studied the long run impact of government spending in various sectors on  
186 poverty reduction in Pakistan for the period of 1972-2008 applying co-integration and Error Correction Mechanism  
187 (ECM). Poverty as the dependent variable was measured using headcount index while the independent variables  
188 were: government spending on health; government spending on education; government spending on law and  
189 order; government spending on economic and community service and budget deficit. The study found that  
190 the coefficient for government spending on health was insignificant. A similar study conducted for Lao PDR  
191 by Sourya, Sainasinh and Onphanhdala (2014) using panel regression analysis found domestic health funding  
192 to have a positive and significant coefficient meaning that poverty increased with spending on health sector.  
193 Foreign health funding was found to be insignificantly related to poverty. Awe (2013) and Osundina, Ebere  
194 and Osundina (2014) also examined the effect of government health expenditure on poverty in Nigeria using  
195 co-integration analysis of time series data and a case study applying chi-square respectively. Awe (2013) found  
196 expenditure on health to have a significant and positive impact on poverty reduction while for Osundina et al.  
197 (2014) found expenditure on health to be insignificant to poverty reduction. The results from these studies maybe  
198 different due scope, choice of variables and research methodologies but are still crucial in informing this study  
199 given no similar studies have been done in Kenya.

### 200 6 c) Education Sector Expenditure and Poverty

201 Education is said to affect poverty directly through increasing wages and increasing chances of employment.  
202 Janson et al. (2009) established that in 28 per cent of the household that escaped poverty, education played a  
203 vital role in getting a job. Education increases the value and efficiency of the labour force thus the higher the  
204 education level of the labour force the lower the expected number of the poor in that economy. In Kenya, the  
205 level of education is the most influencer of poverty (Geda et al, 2001) and since a female headed household is more  
206 likely to be poor; investment in female education is recommended to reduce poverty. In the study conducted by  
207 Asghar et al. (2012), the impact of government expenditure on education on poverty was found to be negative.  
208 These findings are consistent with those of Awe (2013) in his case study of the Ekiti State of Nigeria. Osundina  
209 et al. (2014) found that government spending on education in Nigeria to be insignificant to poverty reduction.  
210 As per author's knowledge, the effect of education expenditure on poverty has not been studied for Kenya.

211 In an analysis of how Kenya can achieve the MDGs from a baseline scenario, the results show that an efficient  
212 and optimal allocation of public expenditures play a key role on whether the MDGs will be achieved by 2015  
213 (Kiringai & Levin, 2008). The study concluded that investment through higher budgetary allocation to the  
214 education sector needs to increase and even a further increase on higher education level is required. Due to the  
215 economy wide implication of MDGs, it is expected that education will influence the composition of the labour  
216 force by raising its average educational level thus increasing labour productivity; incomes will be expected to  
217 increase also and the general economy performance is expected to improve. The total effect would be to accelerate  
218 the achievement of MDGs including eradication of extreme poverty.

### 219 7 d) Infrastructure Sector Expenditure and Poverty

220 Seetanah, Ramessur and Rojid (2009) conducted a study to answer whether transport and communication  
221 infrastructure alleviated urban poverty in developing countries. The study covers twenty developing countries and  
222 uses panel data for years 1980-2005. From running a cross section regression, length of paved road was found to be  
223 statistically significant and negatively related to poverty head count ratio. Fixed telephone line per 1000 people  
224 is used as a measure of communication infrastructure and is found to negatively relate to poverty headcount ratio

225 but not significantly. Thus, infrastructure is seen to increase participation by the poor in economic activities and  
226 increase access for the poor to more economic The Effect of Government Sectoral Expenditure on Poverty Level  
227 in Kenya activities. Moreover, infrastructure investment increases economic growth and number of jobs available  
228 for the poor. However, no clear explanation for the choice of regressors used in the study; the study takes various  
229 variables shown by research to determine poverty and includes length of paved road and fixed telephone line per  
230 1000 people as proxies for infrastructure. Further, a dynamic panel analysis is conducted to mitigate the problem  
231 of endogeneity and control for lagged and feedback effects. The findings from the dynamic panel analysis are  
232 consistent with those of fixed effect model.

## 233 8 III.

### 234 9 Research Methodology

235 The research design used in this study was a diagnostic research study design with a quantitative approach which  
236 involves an investigation of association among variables. The study used annual econometric data covering the  
237 period 1964-2010 for Kenya collected from the Kenya National Bureau of Statistics. The study used private  
238 consumption per capita, a poverty measure, as the dependent variable as also used by Ogun (2010). The  
239 independent variables were agriculture, infrastructure, and health and education sectoral expenditures, each as  
240 a ratio of total government expenditure to control for level of public spending. Regression analysis was used  
241 to test the dependence relationship between the dependent variable and the independent variables. The data  
242 was analysed with the help of data analysis software specifically E-views 7 to generate a regression model of the  
243 variables given herein.

244 The estimated model followed the Keynesian framework in which an increase in government expenditure  
245 results to increased consumption and economic growth thus leading to poverty reduction. Using the expenditure  
246 allocation framework of Ferroni and Kanbur as modified by Paternostro, Rajaram and Tiengson (2005) in which  
247 allocations seek to maximise the welfare effect; the level and composition of public spending affects basic social  
248 indicators, poverty incidence and national income. In the framework poverty (P) is a function of expenditure  
249 allocation to social sector(S), infrastructure sector (K), other sectors (O) and national income (Y) i.e.  $P=f(S,K,O,Y)$   
250 The functional relationship defined for this study is as follows:  $Poverty=f(Sectoral\ Expenditure)$  (3.2)

251 The choice of the independent variables was informed by various studies which have shown that the poor  
252 interact most with these sectors. Moreover, these sectors are among the six Sector Working Groups (SWG)  
253 under the Medium Term Expenditure Framework (MTEF) that guide resource allocation based on strategic  
254 priorities. Particularly under the 2014/15-2016/17 MTEF these sectors form part of the key priorities areas for  
255 achievement of shared prosperity (Republic of Kenya, 2014).

256 The estimated Ordinary Least Square (OLS) multiple linear regression model for this study took the following  
257 form:  $Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \epsilon$  (3.3)

258 Transforming Equation 3.3 into natural log, the log linear form is as follows: The Effect of Government Sectoral  
259 Expenditure on Poverty Level in Kenya  $Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \epsilon$  (3.4)

260 The main objective of the study by Osundina et al. (2014) was to examine the relationship between government  
261 spending on infrastructure and poverty reduction in Nigeria. Per capita income was used as a proxy measure of  
262 poverty reduction. The expenditure on infrastructure was disaggregated into government spending on building  
263 and construction and government spending on road transport. The study found that government spending  
264 on building and construction to be positively and significantly related to poverty reduction while government  
265 spending on road transport to negatively and significantly related to poverty reduction. In the earlier study  
266 by Awe (2013) where public spending on infrastructure had a wide scope to include road network, access to  
267 electricity and water and public utilities. The study found that public expenditure in infrastructure played a  
268 significant role in reducing poverty in Ekiti State. Sourya et al. (2014) found that both domestic and foreign  
269 expenditure on infrastructure did not have a significant impact in reducing poverty in Lao PDR. They explain  
270 that this may be due to skewed distribution of funds between rich and poor provinces. In Kenya there are not  
271 many studies in relation to the effect of physical infrastructure on poverty. Thurlow et al. (2007) introduced  
272 an increase in government spending in rural feeder roads in their micro simulation model for analysing growth  
273 and distributional changes in Kenya. In a scenario where road expenditures in government spending increase by  
274 2.7 percent, national poverty declines by 2 percent. This study will thus bridge the existing gap in literature as  
275 in regard to the effect of increasing government spending in physical infrastructure.  $TGE = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \epsilon$  (3.5)

276 Vector error correction model (VECM) was applied to established existence of short and long run relationships  
277 from sectoral expenditure allocations to private consumption per capita as a proxy measure of poverty. The  
278 general error correction model for this study is as follows:  $\Delta Y_t = \alpha_0 + \alpha_1 \Delta X_1 + \alpha_2 \Delta X_2 + \alpha_3 \Delta X_3 + \alpha_4 \Delta X_4 + \epsilon_t$  (3.5)

279 Before the VECM was run diagnostic tests including unit root test and co-integration test were done. The  
280 variables were tested for unit root by use of Augmented Dickey-Fuller (ADF). Independent variables were tested  
281 for multi-collinearity by use of correlation coefficient. The descriptive statistic of the error term was generated

## 12 CONCLUSION

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286 to ensure that its probability distribution follows a normal distribution; its mean is approximately zero and  
287 that there is zero covariance between the error term and independent variables. The expected result is that all  
288 independent variables have a positive effect on the dependent variable i.e. public spending in agriculture, health,  
289 education and infrastructure leads to reduction in poverty level in Kenya.

## 290 10 IV.

## 291 11 Research Findings

292 The nominal data series was converted to real values with 2009 being the base year i.e. 2009=100 before data  
293 analysis was carried out. Consumer Price Index (CPI) was used to convert private consumption data to real  
294 values while GDP deflator was used to convert sectoral expenditure data. The p values for the Jacque-Bera  
295 (JB) statistics for the explanatory variables in Table 4.1 show that the JB statistics is not significantly different  
296 from zero at 5 per cent level of significance. Therefore, the variables are normally distributed implying that they  
297 are uncorrelated and independently distributed. Table 4.2 is a correlation matrix for the explanatory variables  
298 which shows all correlation coefficient to be less than 0.80. It is clear that there is no perfect nor severe multi-  
299 collinearity among the explanatory variables. The variables were then subjected to unit root testing using the  
300 ADF Test. The test showed that all variables have unit roots i.e. were non stationary at level and became  
301 stationary after first differencing as shown in Table 4.3. A linear regression model with nonstationary variables  
302 gives spurious results. However, if the regression model results to residuals that are stationary the variables  
303 could be integrated. The OLS regression model was ran for Equation 3.4 and the residuals series was found to be  
304 stationary at 5 per cent level of significance as shown in Table 4 The Effect of Government Sectoral Expenditure  
305 on Poverty Level in Kenya were then tested for co-integration using the Johansen test of co-integration. The  
306 lag length of 3 was selected by Vector Autoregressive (VAR) model using the sequential likelihood ratio (LR)  
307 test. In Table 4.5 both the trace test and Max Eigen test indicate presence of one cointegrating equation at  
308 5 per cent level of significance. Therefore, the variables are integrated to order I(1). This is an indication of  
309 presence of long run equilibrium among the study variables. The presence of a long run equilibrium having been  
310 established, then in the short run the relationship among study variables may be characterized by disequilibrium.  
311 The error correction term (ECT) corrects gradually the deviation from long-run equilibrium through a series of  
312 partial short-run adjustments. Running VEC model for this study resulted to cointegrating equation shown by  
313 Equation ???.1. The model was adequate to explain the variation in the dependent variables as shown in Table  
314 4.8. The R squared of 64.56 per cent is sufficient to explain variation in private consumption per capita, while  
315 other variables not included in the estimated model explain 35.44 per cent of the variation. Durbin Watson  
316 of 2.0476 implies absence of serial correlation of the error term and pvalue of the F statistic being less than  
317 5 per cent shows that the model is reliable in showing the relationship between sectoral government spending  
318 and poverty in Kenya. The residual diagnostic tests in Tables 4. 6 show that error term,  $\hat{t}$  in Equation 3.5  
319 is normally distributed, has no serial correlation and has no heteroskedasticity further confirming the model  
320 is a good fit for the study. The estimated long run equation given in Equation ???.1 shows that government  
321 expenditure on agriculture and health have a positive and significant effect on private consumption per capita  
322 and thus leads to reduction of poverty level. This is consistent with priori expectation and similar to findings  
323 by Awe (2013). Mendali and Gunter (2013), Oni (2014) and Thurlow et al. (2007) found higher agricultural  
324 output led to increased poverty reduction and so support increased investment in agriculture like this study. A  
325 one per cent increase in agriculture expenditure and health leads to a 0.27 per cent and 1.45 per cent respectively  
326 increase in private consumption per capita. Government expenditure on education has an insignificant effect  
327 on private consumption per capita thus on poverty level contrary to priori expectation. This may be explained  
328 by reduced access for post primary education for class eight candidates who are beneficiaries of Free Primary  
329 Education (FPE) program. Post primary education is more crucial in the fight against poverty as shown by  
330 studies by Dollar and Kraay (2002); Janjua and Kamal (2011); Weber, Marre, Fisher, Gibbs and Cromartie  
331 (2007); and Awan, Malik, Sarwar and Waqas (2011). Government expenditure on infrastructure has a negative  
332 and significant effect on private consumption per capita and consequently on poverty reduction also contrary to  
333 priori expectation. A one per cent increase in government expenditure on infrastructure results to 0.42 per cent  
334 decrease in private consumption per capita implying increased level of poverty. However, in the short run there is  
335 a significant direct causation from government expenditure on infrastructure to private consumption per capita  
336 as shown in Table 4.7. This may be as a result of creation of many casual jobs during construction and setting  
337 up of the various infrastructure projects in the short run. In the long run the debt servicing burden may cause  
338 private consumption per capita to decrease since the infrastructure projects are financed by public debt.

339 V.

## 340 12 Conclusion

341 The main objective of this study was to investigate the effect of sectoral government expenditure on poverty level  
342 in Kenya. Private consumption per capita, a proxy measure for poverty reduction, was the independent variable  
343 while education sector expenditure, health sector expenditure, agriculture expenditure and infrastructure sector  
344 expenditure were the independent variable. Cointegration analysis and error correction mechanism were used to  
345 establish presence of long run and short run relationships among the study variables. The cointegrating order of

346 variables was tested using ADF test and all variables were found to be integrated to I(1). The ECT for the VEC  
347 model was found to be negative and significant an indication of presence of a stable long run equilibrium. The  
348 study finds that the composition of government budget expenditure has an effect on poverty level in Kenya. Both  
349 the coefficients of agriculture and health expenditures were found to be positively related to private consumption  
350 per capita and thus poverty reduction. Education expenditure was found to have an insignificant relationship with  
351 poverty. This implies that the expected benefits of increasing employability and wage level provided by attaining  
352 formal education do not result to poverty reduction for Kenya. The coefficient of infrastructure expenditure was  
353 found to be negatively related to private consumption per capita and thus poverty reduction. However, it was  
354 found in the short run government expenditure on infrastructure was significant to poverty reduction. The model  
355 was a good fit for the study and therefore is reliable in showing the effect of government sectoral expenditure on  
356 poverty reduction.

357 This study recommends that budget planning and execution should continue being pro-poor and pro-growth.  
358 In particular the government should increase its expenditure allocation to the agriculture sector and enhance  
359 an agriculture-led growth. To date the greatest contributor of GDP in Kenya is the agricultural sector and in  
360 the last five-year contribution to the GDP by the sector averaged at 26.18 per cent (Republic of Kenya, 2015).  
361 The government should also increase allocation to the health sector since it would reduce out-of-pocket health  
362 expenses for the poor and enable them to resume productive activities. The newly revamped universal health  
363 care through the National Health Insurance Fund is a big step in the right direction. Education expenditure  
364 was not found to enhance poverty reduction however the government needs to invest in post primary education  
365 similar to FPE. Wilhelm and Fiestas (2005) noted low access of children from poor households to secondary  
366 schools in the developing countries they studied. Public spending in infrastructure has not been found to  
367 be poverty reducing but the government should continue to invest in infrastructural development as a pro  
368 growth measure. Wilhelm and Fiestas (2005) also noted that investment in infrastructure to have a tendency to  
369 disproportionately benefit the richest segment of a country. This further makes the issue of poverty targeting of  
370 public expenditure a policy concern. Agénor, Bayraktar and El Aynaoui (2005) indicates that public expenditure  
371 constitutes both in investment in "service" for example in education and health and investment in "growth" for  
372 example in infrastructure and agriculture. Therefore, it is crucial for the government to formulate a framework  
for determining an optimal allocation of government budget expenditure across sectors and within sectors. <sup>1</sup>



Figure 1:

373

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## 12 CONCLUSION

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Variable	Observations	Mean	Std. Dev.	Max	Min	JB	P-value(JB)
LN_AGR	46	-0.0310		0.201	0.458	-0.665	3.915 0.14
LN_EDU	46	0.0157		0.120	0.363	-0.217	4.066 0.13
LN_HEA	46	0.0024		0.110	0.212	-0.341	6.061 0.05
LN_INFR	46	0.0084		0.266	0.844	-0.687	3.276 0.19
LN_PC	46	-0.0070		0.078	0.214	-0.260	15.4450.0004

Table 4.2 : Test of Multi-collinearity

	LN_AGR	LN_EDU	LN_HEA	LN_INFR
LN_AGR	1.000			
LN_EDU	0.242	1.000		
LN_HEA	0.194	0.534	1.000	
LN_INFR	0.200	0.443	0.308	1.000

Figure 2: Table 4 . 1 :

43

Variable	ADF	Level		Remarks	ADF Value	First Difference		Remarks
		Value	Critical Value			Critical Value	5%	
LN_PC	-	-3.5812	-	Non	-	-3.5847	-	Stationary
	1.1884		2.9266	stationary	5.9569		2.9281	
LN_AGR	-	-4.1705	-	Non	-	-4.1756	-	Stationary
	2.8290		3.5107	stationary	8.1547		3.5131	
LN_HEA	-	-3.5812	-	Non	-	-3.5925	-	Stationary
	2.0855		2.9266	stationary	5.6346		2.9314	
LN_EDU	-	-3.5812	-	Non	-	-3.5847	-	Stationary
	2.7351		2.9266	stationary	6.6467		2.9281	
LN_INFR	-	-3.5812	-	Non	-	-3.5847	-	Stationary
	1.6147		2.9266	stationary	7.2407		2.9281	

Figure 3: Table 4 . 3 :

44

ADF Value	5% Critical Value	P-Value
-3.014	-2.9266	0.041

Figure 4: Table 4 . 4 :

45

Number of Co-integration	Hypothesis	Trace	Trace 5% critical	Max	Max Eigen Statistic
		Statistic	value	statistic	value
None	$H_0: r=0, H_1: r \geq 1$	112.3175*	69.819	67.70857*	33.877
At most 1	$H_0: r=1, H_1: r \geq 2$	44.60898	47.856	23.94142	27.584
At most 2	$H_0: r=2, H_1: r \geq 3$	20.66756	29.797	11.94213	21.132
At most 3	$H_0: r=3, H_1: r \geq 4$	8.725429	15.495	8.33356	14.265
At most 4	$H_0: r=4, H_1: r \geq 5$	0.391869	3.841	0.391869	3.841

Figure 5: Table 4 . 5 :

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Figure 6: Table 4 . 6 :

47

Dependent Variable	Independent Variables				ECT coefficient	t-1
	-statistics of lagged 1 st differenced term (p-value)					
$\hat{I}^* \ln\_PC$	$\hat{I}^* \ln\_PC \hat{I}^* \ln\_AGR$	1.011 (0.799)	$\hat{I}^* \ln\_ED \hat{I}^* \ln\_HEA$	5.229 (0.156)	1.662 (0.646)	9.807** (0.020)
$\hat{I}^* \ln\_AGR$	3.655 (0.301)	-	4.146 (0.246)	1.913 (0.591)	11.636*** (0.009)	0.529** [2.358]
$\hat{I}^* \ln\_EDU$	4.941 (0.176)	0.172 (0.982)	-	7.306 (0.063)	5.435 (0.143)	0.001 [0.007]
$\hat{I}^* \ln\_HEA$	10.428 (0.015)**	3.888 (0.274)	5.760 (0.124)	-	2.369 (0.499)	0.228 [1.958]
$\hat{I}^* \ln\_INFR$	1.250 (0.741)	2.762 (0.430)	3.862 (0.277)	4.183 (0.242)	-	0.568 [1.606]

Figure 7: Table 4 . 7 :

4

$$\text{????\_????} = 14.8845 + 0.2700\text{????\_??????} ? 0.0489\text{????\_??????} \\ + 1.4518\text{????\_??????} ? 0.4286\text{????\_?????????} \quad (4.1)$$

Table 4.8 : VECM Coefficients

Variables	Coefficient	Standard Error	t-statistic	P-value
LN_AGR	0.2700	0.0844	3.1986	0.001392
LN_EDU	-0.0489	0.2013	-	0.405041
			0.2427	
LN_HEA	1.4518	0.4014	3.6170	0
				.000432
LN_INFR	-0.4286	0.0937	-	0.000025
			4.5663	
R <sup>2</sup> = 0.6456	DW=2.0476	F-statistic=2.9604	(p-value=0.006)	

[Note: s -Year 2016 Note: \*\*\* and \*\* denotes significant at 1% and 5% significance level, respectively. The figure in the parenthesis (?) denote as p-value and the figure in the squared brackets (?) represent as t-statistic]

Figure 8: Table 4 .

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