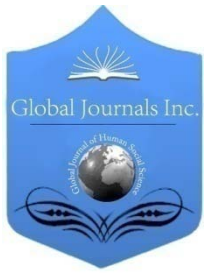
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The Effect of Government Sectoral Expenditure on Poverty Level in Kenya

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The Effect of Government Sectoral Expenditure on Poverty Level in Kenya

Loyce V. Omari [α] & Willy Muturi [σ]

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

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I. Introduction

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

In between the government continued to implement new policies among them the District Focus for Rural Development (DFRD) in 1983 which sought to stimulate rural economies to contribute to the national output and to reduce rural poverty. This was followed by Sessional Paper No.1 of 1986 on Economic Management for Renewed Growth whose preparation was informed by poor economic performance and worsening poverty levels. It reinforced the implementation of SAPs with more focus on economic growth and the subsequent results was that Kenyans were economically hurt by the programs especially liberalization that saw commodity prices go up and cost sharing of services like healthcare and education. However, a study done by Kabubo-Mariara and Kiriti (2002) found that macroeconomic policies put in places through SAPs resulted to decreased poverty levels attributed to improvement in economic growth. The need by government to cushion the poor resulted to launching of the Social Dimension of Development (SDD) Programme in 1994. This programme was not effective due to lack of political good will, under-budgeting and diversion of funds.

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

In 2002 there was change of government whose key promise was economic growth and the new

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

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

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

II. Literature Review

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

On the other hand, the Keynesian theory of poverty hold that poverty is as a result of structural factors which could be economic or social or political. The proponents of this theory acknowledge that the poor are impoverished due to external reasons mostly beyond their control. Marshall and Keynes explain poverty to have been caused by economic underdevelopment and lack of human capital (Jung & Smith, 2006). There also exist market failures such as uncertainty which may perpetuate one's economic situation given that the poor are more vulnerable to shocks that affect their income. According to this liberal approach; market distortions, institutional rigidities and general underdevelopment do cause poverty rather individual choices. Intervention by the government is viewed as a means to promote economic development and welfare (Davis & Sanchez-Martinez, 2014). During the Great Depression of the 1930s, J M Keynes, a British economist argued that government intervention through expansionary fiscal policies was necessary to stimulate aggregate demand and create jobs thus reducing unemployment. Increasing employment is critical given the poor gain income by offering their labour as their sole asset (Hull, 2009). In such situation, government intervention would be necessary to stimulate the economy and via multiplier effect reduce poverty.

The Marxist theory of poverty, which is a radical theory, shifts from the orthodox economic theories of poverty and focus on the role of the nature of demand for labour, non-individual characteristics that determine wage levels and the duality of labour markets. The Marxists explains the existence of poverty from a political economy approach in which poverty is as a

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result of capitalism and related social and political factors based on class division. According to Marxism, the market is inherently dysfunctional (Blank, 2003; Bradshaw, 2006) in which in capitalist economies, the owners of capital which is the ruling class will earn more while owners of labour will earn much less since the cost of labour is kept unnaturally lower than its valued added through the threat of unemployment by maintaining a 'reserve army of unemployed' (Davis & Sanchez-Martinez, 2014). Low wages prevent the poor labourers from saving and makes it highly probable that these labourers would slide further into poverty in the event of shocks.

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

a) Agriculture Sector Expenditure and Poverty

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

Thurlow et al. (2007) applied dynamic Computable General Equilibrium (CGE) micro simulation model to analyse growth and distributional changes in Kenya. Without taking the cost of accelerating growth in the different sectors, the impact of sectoral growth on poverty reduction and inequality is analysed using three scenarios. A baseline scenario, a scenario which compares poverty reduction due to agricultural and industrial growth and a scenario that examines the agriculture sector and estimates the poverty reducing impact of accelerating growth in the sector. From the micro simulation, a faster agricultural growth in the agriculture-led scenario results to rising income and expenditure for those in extreme poverty with most effect being felt by the rural poorest. On the other hand, faster non-food manufacturing growth in the formal and informal sectors under the industry-led scenario has most impact in reducing poverty in the less-poor households. It was also found that agriculture had larger income multipliers that created more jobs and raised incomes and its economy wide linkages were more pro poor. In studying the effect of increasing budget allocation to agriculture, increasing agriculture spending by 10 per cent as per Maputo Declaration, would lift 1.5 million people out of poverty as defined by the poverty line by 2015. The 10 percent increase in agriculture was still found not be adequate to meet the expected growth in agriculture and to meet the MDG poverty by 2015. Therefore, increased spending on agriculture coupled with non-agricultural investments that are pro poor would be essential.

b) Health Sector Expenditure and Poverty

In 2001 the Members of the African Union countries pledged to allocate to the health sector at least 15 per cent of their annual budget in what is known as the Abuja declaration (World Health Organisation, 2011). Janson et al. (2009) found that more households

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fell in to poverty due to poor health than those that that escaped poverty through employment due to formal education. Specifically 40 per cent of households sampled across Kenya fell into poverty due to poor health and debilitating health care expenses. The income of the poor is very vulnerable to shocks and these shocks among them drought, political instability, economic shocks like high inflation and health related shocks drastically affect incomes of the poor and may have insufficient or no means of smoothing their consumption. Scheil-Adlung et al. (2006) conducted a comparative analysis on the impact of social health protection on access to health care, health expenditure and impoverishment for South Africa, Senegal and Kenya using 2003 household survey data. The health insurance coverage is low in these countries with South Africa having 12.3 per cent of population covered, Kenya the coverage is 9.1 per cent and Senegal 4.2 per cent and in all the three countries the lower income group has very few people covered. Applying a multiple logistics regression, the study established that across the three countries the likelihood of descending into poverty due medical expenditure is between 1.5 per cent and 5.4 per cent of the households. It was also found that health related expenditure widens the poverty gap; in South Africa the poverty gap increased from 37 per cent of the poverty line to 41 per cent; in Kenya it increased from 25 per cent to 27 per cent; and in Senegal it increased from 54 per cent to 64 per cent.

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

c) Education Sector Expenditure and Poverty

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

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

d) Infrastructure Sector Expenditure and Poverty

Seetanah, Ramessur and Rojid (2009) conducted a study to answer whether transport and communication infrastructure alleviated urban poverty in developing countries. The study covers twenty developing countries and uses panel data for years 1980-2005. From running a cross section regression, length of paved road was found to be statistically significant and negatively related to poverty head count ratio. Fixed telephone line per 1000 people is used as a measure of communication infrastructure and is found to negatively relate to poverty headcount ratio but not significantly. Thus, infrastructure is seen to increase participation by the poor in economic activities and increase access for the poor to more economic activities. Moreover, infrastructure investment increases

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economic growth and number of jobs available for the poor. However, no clear explanation for the choice of regressors used in the study; the study takes various variables shown by research to determine poverty and includes length of paved road and fixed telephone line per 1000 people as proxies for infrastructure. Further, a dynamic panel analysis is conducted to mitigate the problem of endogeneity and control for lagged and feedback effects. The findings from the dynamic panel analysis are consistent with those of fixed effect model.

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

III. Research Methodology

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

The estimated model followed the Keynesian framework in which an increase in government expenditure results to increased consumption and economic growth thus leading to poverty reduction. Using the expenditure allocation framework of Ferroni and Kanbur as modified by Paternostro, Rajaram and Tiongson (2005) in which allocations seek to maximise the welfare effect; the level and composition of public spending affects basic social indicators, poverty incidence and national income. In the framework poverty (P) is a function of expenditure allocation to social sector(S), infrastructure sector (K), other sectors (O) and national income (Y) i.e.

$$P=f(S,K,O,) \quad (3.1)$$

The functional relationship defined for this study is as follows:

$$\text{Poverty}=f(\text{Sectoral Expenditure}) \quad (3.2)$$

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

The estimated Ordinary Least Square (OLS) multiple linear regression model for this study took the following form:

$$PC = \beta_0 + \beta_1 {AGR}/{TGE} + \beta_2 {HEA}/{TGE} + \beta_3 {EDU}/{TGE} + \beta_4 {INFR}/{TGE} + \varepsilon_t \quad (3.3)$$

Transforming Equation 3.3 into natural log, the log linear form is as follows:

$$LN_PC = \beta_0 + \beta_1 LN_AGR + \beta_2 LN_H + \beta_3 \text{LN_ EDU} + \beta_4 LN_{INFR} + \varepsilon_t \quad (3.4)$$

Where:

PC = Private consumption per capita

AGR= Agriculture sector expenditure

HEA= Health sector expenditure

EDU= Education sector expenditure

INFR= Infrastructure sector expenditure

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TGE = Total government expenditure

βi are parameters and εt is the Error term.

Vector error correction model (VECM) was applied to established existence of short and long run relationships from sectoral expenditure allocations to private consumption per capita as a proxy measure of poverty. The general error correction model for this study is as follows:

$$\Delta LN_PC_t = \beta_0 + \beta_1 \Delta LN_AGR_t + \beta_2 \Delta LN_HEA_t + \Delta LN_EDU_t + \beta_4 \Delta LN_INFR_t + ECM_{t-1} + \varepsilon_t \quad (3.5)$$

Before the VECM was run diagnostic tests including unit root test and co-integration test were done. The variables were tested for unit root by use of Augmented Dickey-Fuller (ADF). Independent variables were tested for multi-collinearity by use of correlation coefficient. The descriptive statistic of the error term was generated to ensure that its probability distribution follows a normal distribution; its mean is approximately zero and that there is zero covariance between the error term and independent variables. The expected result is that all independent variables have a positive effect on the dependent variable i.e. public spending in agriculture, health, education and infrastructure leads to reduction in poverty level in Kenya.

IV. Research Findings

The nominal data series was converted to real values with 2009 being the base year i.e. 2009=100 before data analysis was carried out. Consumer Price Index (CPI) was used to convert private consumption data to real values while GDP deflator was used to convert sectoral expenditure data. The p values for the Jacque-Bera (JB) statistics for the explanatory variables in Table 4.1 show that the JB statistics is not significantly different from zero at 5 per cent level of significance. Therefore, the variables are normally distributed implying that they are uncorrelated and independently distributed. Table 4.2 is a correlation matrix for the explanatory variables which shows all correlation coefficient to be less than 0.80. It is clear that there is no perfect nor severe multi-collinearity among the explanatory variables.

Table 4.1 : Descriptive Statistics

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	15.445	0.0004

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

The variables were then subjected to unit root testing using the ADF Test. The test showed that all variables have unit roots i.e. were non stationary at level and became stationary after first differencing as shown in Table 4.3. A linear regression model with non-stationary variables gives spurious results. However, if the regression model results to residuals that are stationary the variables could be integrated.

Table 4.3 : Unit root tests

	Level				First Difference			
Variable	ADF Value	Critical Value 1%	Critical Value 5%	Remarks	ADF Value	Critical Value 1%	Critical Value 5%	Remarks
LN_PC	-1.1884	-3.5812	-2.9266	Non stationary	-5.9569	-3.5847	-2.9281	Stationary
LN_AGR	-2.8290	-4.1705	-3.5107	Non stationary	-8.1547	-4.1756	-3.5131	Stationary
LN_HEA	-2.0855	-3.5812	-2.9266	Non stationary	-5.6346	-3.5925	-2.9314	Stationary
LN_EDU	-2.7351	-3.5812	-2.9266	Non stationary	-6.6467	-3.5847	-2.9281	Stationary
LN_INFR	-1.6147	-3.5812	-2.9266	Non stationary	-7.2407	-3.5847	-2.9281	Stationary

The OLS regression model was ran for Equation 3.4 and the residuals series was found to be stationary at 5 per cent level of significance as shown in Table 4.4; an indication of presence co-integration. The variables

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were then tested for co-integration using the Johansen test of co-integration.

Table 4.4 : Residual Unit Root Test

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

The lag length of 3 was selected by Vector Autoregressive (VAR) model using the sequential likelihood ratio (LR) test. In Table 4.5 both the trace test and Max Eigen test indicate presence of one co-integrating equation at 5 per cent level of significance. Therefore, the variables are integrated to order I(1). This is an indication of presence of long run equilibrium among the study variables.

Table 4.5 : Johansen Test of Co-integration

		Trace		Max Eigen Statistic	
Number of Co-integration	Hypothesis	Trace Statistic	5% critical value	Max statistic	5% critical value
None	Ho; r=0, H1; r≥1	112.3175*	69.819	67.70857*	33.877
At most 1	Ho; r=1, H1; r≥2	44.60898	47.856	23.94142	27.584
At most 2	Ho; r=2, H1; r≥3	20.66756	29.797	11.94213	21.132
At most 3	Ho; r=3, H1; r≥4	8.725429	15.495	8.33356	14.265
At most 4	Ho; r=4, H1; r≥5	0.391869	3.841	0.391869	3.841

The presence of a long run equilibrium having been established, then in the short run the relationship among study variables may be characterized by disequilibrium. The error correction term (ECT) corrects gradually the deviation from long-run equilibrium through a series of partial short-run adjustments. Running VEC model for this study resulted to co-integrating equation shown by Equation 4.1. The model was adequate to explain the variation in the dependent variables as shown in Table 4.8. The R squared of 64.56 per cent is sufficient to explain variation in private consumption per capita, while other variables not included in the estimated model explain 35.44 per cent of the variation. Durbin Watson of 2.0476 implies absence of serial correlation of the error term and p-value of the F statistic being less than 5 per cent shows that the model is reliable in showing the relationship between sectoral government spending and poverty in Kenya. The residual diagnostic tests in Tables 4.6 show that error term, εt in Equation 3.5 is normally distributed, has no serial correlation and has no heteroskedasticity further confirming the model is a good fit for the study.

Table 4.6 : Residual Diagnostic Tests

Test	Chi-square /JB	P-value	Remarks
Heteroskedasticity Test: Breusch-Pagan-Godfrey	18.9652	0.5214	No heterokesdaticity
Breusch-Godfrey: Serial Correlation LM Test	3.2376	0.3564	No serial correlation
Normality Test: Jacque Bera	0.0338	0.9833	Normally distributed error term

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Table 4.7 : Granger Causality Results based on VECM

Dependent Variable	Independent Variables: χ^2 -statistics of lagged 1st differenced term (p-value)					ECT_{t-1} coefficient
	ΔLN_PC	ΔLN_AGR	ΔLN_EDU	ΔLN_HEA	ΔLN_INFR	[t-ratio]
ΔLN_PC	-	1.011 (0.799)	5.229 (0.156)	1.662 (0.646)	9.807** (0.020)	-0.239** [-3.175]
ΔLN_AGR	3.655 (0.301)	-	4.146 (0.246)	1.913 (0.591)	11.636*** (0.009)	0.529** [2.358]
ΔLN_EDU	4.941 (0.176)	0.172 (0.982)	-	7.306 (0.063)	5.435 (0.143)	0.001 [0.007]
ΔLN_HEA	10.428 (0.015)**	3.888 (0.274)	5.760 (0.124)	-	2.369 (0.499)	0.228 [1.958]
ΔLN_INFR	1.250 (0.741)	2.762 (0.430)	3.862 (0.277)	4.183 (0.242)	-	0.568 [1.606]

*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*

Table 4.7 shows that ECT is negative and significant confirming that there exists a stable long run causality from sectoral government expenditure to poverty at 5 per cent significance level. Private consumption per capita adjusts to government sectoral expenditures in health, education, agriculture and infrastructure with a lag and only about 23.9 per cent disequilibrium is corrected within a year.

$$LN_PC = 14.8845 + 0.2700LN_AGR - 0.0489LN_EDU + 1.4518LN_HEA - 0.4286LN_{INFR} \quad (4.1)$$

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	-0.2427	0.405041
LN_HEA	1.4518	0.4014	3.6170	0 .000432
LN_INFR	-0.4286	0.0937	-4.5663	0.000025
R^2 = 0.6456 DW=2.0476 F-statistic=2.9604 (p-value=0.006)				

The estimated long run equation given in Equation 4.1 shows that government expenditure on agriculture and health have a positive and significant effect on private consumption per capita and thus leads to reduction of poverty level. This is consistent with priori expectation and similar to findings by Awe (2013). Mendali and Gunter (2013), Oni (2014) and Thurlow et al. (2007) found higher agricultural output led to increased poverty reduction and so support increased investment in agriculture like this study. A one per cent increase in agriculture expenditure and health leads to a 0.27 per cent and 1.45 per cent respectively increase in private consumption per capita. Government expenditure on education has an insignificant effect on private consumption per capita thus on poverty level contrary to priori expectation. This may be explained by reduced access for post primary education for class eight candidates who are beneficiaries of Free Primary Education (FPE) program. Post primary education is more crucial in the fight against poverty as shown by studies by Dollar and Kraay (2002); Janjua and Kamal (2011); Weber, Marre, Fisher, Gibbs and Cromartie (2007); and Awan, Malik, Sarwar and Waqas (2011). Government expenditure on infrastructure has a negative and significant effect on private consumption per capita and consequently on poverty reduction also contrary to priori expectation. A one per cent increase in government expenditure on infrastructure results to 0.42

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per cent decrease in private consumption per capita implying increased level of poverty. However, in the short run there is a significant direct causation from government expenditure on infrastructure to private consumption per capita as shown in Table 4.7. This may be as a result of creation of many casual jobs during construction and setting up of the various infrastructure projects in the short run. In the long run the debt servicing burden may cause private consumption per capita to decrease since the infrastructure projects are financed by public debt.

V. Conclusion

The main objective of this study was to investigate the effect of sectoral government expenditure on poverty level in Kenya. Private consumption per capita, a proxy measure for poverty reduction, was the independent variable while education sector expenditure, health sector expenditure, agriculture expenditure and infrastructure sector expenditure were the independent variable. Co-integration analysis and error correction mechanism were used to establish presence of long run and short run relationships among the study variables. The co-integrating order of variables was tested using ADF test and all variables were found to be integrated to I(1). The ECT for the VEC model was found to be negative and significant an indication of presence of a stable long run equilibrium. The study finds that the composition of government budget expenditure has an effect on poverty level in Kenya. Both the coefficients of agriculture and health expenditures were found to be positively related to private consumption per capita and thus poverty reduction. Education expenditure was found to have an insignificant relationship with poverty. This implies that the expected benefits of increasing employability and wage level provided by attaining formal education do not result to poverty reduction for Kenya. The coefficient of infrastructure expenditure was found to be negatively related to private consumption per capita and thus poverty reduction. However, it was found in the short run government expenditure on infrastructure was significant to poverty reduction. The model was a good fit for the study and therefore is reliable in showing the effect of government sectoral expenditure on poverty reduction.

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

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