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Public Expenditure On Agriculture And Poverty Alleviation In The East African Community

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Abstract: ***Over the last decade, the East African Community (EAC) partner states have sustained an increase in public expenditures. The underlying debate is the belief that budgetary expansion creates economic opportunities which translate in reduced poverty. However, Uganda, Tanzania and Burundi maintained lower average rates of increase in public expenditure compared to Kenya and Rwanda but realized more poverty reduction. This raises the question as to whether there exists any perceptible relationship between public expenditure and poverty. Therefore, this research sought to determine the relationship between public expenditure on agriculture and poverty in EAC. Consumption per capita was the proxy measure for poverty. The study was based on the Keynesian Macroeconomic theory which posits that an increase in public spending increases economic growth and reduces poverty. In order to measure the relationship between the variables, the study employed the correlational research design. The study used panel econometric data sourced from the economic surveys of the individual East African Countries between the year 2000 to 2015, i.e., from the year of inception. The Hausman test was used to determine the appropriateness of the FEM (Fixed Effects Model) or the REM (Random Effects Model) and the study settled on the latter. A panel unit root test was used to conduct the variables' stationarity. The long-run relationship was tested using the Pedroni Residual Cointegration Test. The results indicated that (GEA) was significant in lowering poverty levels (α_1=0.00000008; p=0.0404). The study, therefore, concluded that greater budgetary expenditure should focus more on the agricultural sector. These findings may contribute to the existing pool of knowledge on public spending consequences and poverty reduction strategies and benefit policymakers by providing a framework for budgetary allocations.***

Keywords: Public expenditure, Agriculture, Poverty, East African Community, Keynesian, Panel

I. INTRODUCTION

Public expenditure are the expenses incurred by the governing body of a nation on collective wants and needs (Akrani, 2011). Public expenditure includes expenditure on general public services, public order and safety, agriculture, infrastructure, education, health, social protection, environmental protection and recreation (East African Community, 2016). In this study, public expenditure is used interchangeably with government expenditure and refers to spending by the central government on agriculture.

The concept of poverty, on the other hand, has evolved to be multi-dimensional. Poverty ranges from the mere inability to secure basic needs to the lack of business opportunities (Birowo, 2011). World Bank defines poverty as living below $1.90 a day (World Bank, 2016). The current study adopted the per capita consumption definition of poverty provided by the World Bank. One is termed poor if his or her consumption expenditure falls below $1.90 a day, which is the poverty line.

At the inception of the East African Community (EAC) in 2000, the initial partner nations included Uganda, Kenya, and Tanzania. Burundi and Rwanda acceded to the EAC treaty in 2007 while South Sudan became a member in 2016 (EAC, 2016). Regional integration has been enhanced as evidenced by the impressive advancements in the Customs Union, formation of Common Market in 2010 and the operation of the East African Monetary Union Protocol (Ibid, 2016). In the

context of this study, EAC will refer to Kenya, Rwanda, Tanzania, and Uganda.

Generally, poverty has declined globally with some countries showing greater strides than others (World Bank, 2017). In EAC, there has been a mix of patterns with the member states. 22.5% more of Uganda's population fell into poverty in 2016 from a previous poverty incidence of 35.9% in 2012 (Ibid, 2017). This shows that despite observing a higher rate of increase in public expenditure than Tanzania and Kenya, she experienced escalating poverty levels. Moreover, within the regional bloc, Tanzania enjoyed the highest poverty alleviation rates which averaged at3.35% p.a. between 2000 and 2011. The notable improvement of welfare was at the backing of less increased expenditure on agriculture compared to Rwanda and Uganda. This questions the postulate that budgetary expansion will yield lower poverty.

The relationship between poverty and public spending is an important subject of review. The subject of debate is whether or not public spending improves the poverty situation of an economy. The classical theory of poverty posits that beyond a minimum level to prevent falling into poverty, state intervention may be harmful as it may encourage welfare dependence and disincentivizes productivity. Therefore, state intervention is only encouraged when it is directed toward increasing productivity (Davis & Sanchez-Martinez, 2014). Unlike classical economists, Keynesians opined that poverty does not solely stem from poor judgment by individuals, but from other factors such as market inefficiencies. Keynesian economists justify state intervention through macroeconomic policies to encourage growth, development and subsequently improve on welfare (Davis & Sanchez-Martinez, 2015).

With agriculture being the mainstay of most developing economies, most studies advocate for increased agricultural expenditure as a tool for combating poverty, e.g., Chidoko, Mapfumo, and Mushunje (2012) in Zimbabwe. This finding coincides with that of Lopez (2004) who finds that public expenditure on agriculture reduces poverty by encouraging agricultural productivity in Tanzania. However, the finding is not unanimous as a study in Nigeria by Udofia and Esang (2015) reveals a clear but insignificant response of poverty to growth in agriculture. The literature shows that the association between government expenditure on agriculture and poverty is still unclear.

STATEMENT OF THE PROBLEM

Over the years, EAC members have implemented a series of economic reforms aimed at improving the well-being of its people. To realize poverty alleviation in the EAC, policy makers emphasized the importance of public investments in the agricultural sector; which employs the majority of the poor people. As such, partner states of the Regional Economic Community sustained an increase in public expenditure in the sector in a bid to fight poverty. Since inception in 2000, the poverty Head Count Ratio in Tanzania reduced from 86% to 49% in 2011. 37% of her population moved out of poverty over the eleven years (3.4% per annum); an impressive annual decline compared to other members states of EAC (Uganda: 1.61%; Kenya: 0.69% p.a.; Rwanda: 0.11%). This indicates that despite Rwanda maintaining the highest increased expenditure on agriculture of 72% since 2000, she actually realized the least poverty alleviation effect. This questions the assumption that budgetary expansion generates a payoff for the poor. Furthermore, existing literature have failed to provide a corroborative front as to the nature of the relationship; even though most studies find a negative relationship between government expenditure on agriculture and poverty, some studies find a positive relationship with others revealing insignificant effects of public expenditure on poverty. The varied findings could be due to the difference in scope, methodology or variable definitions hence lack clear policies to address poverty. The study filled this existing knowledge gap.

OBJECTIVE

The general objective of this study was to establish the relationship between public expenditure on agriculture and poverty.

HYPOTHESIS

H_0: There is no relationship between public expenditure on agriculture and poverty.

II. LITERATURE REVIEW

Fan, Johnson, Saurkar and Makombe (2008) connotes that public spending on agricultural research affects poverty through two major ways. The first way is by reducing prices. Agricultural research leads to increased productivity which translates to more output. With increased output, prices fall. Reduced prices mean accessibility of food thus improved welfare. The second is by enhancing farmer's income. Higher incomes translate into improved nonfarm employment opportunities thereby reducing poverty further. Cervantes-Godoy and Dewbre (2010) explain that the poverty alleviating effects of falling prices depends on a number of factors including whether a majority of the poor are net buyers or sellers of food.

A panel data study of 44 countries from Africa, Asia and Latin America by Fan (2008) examined the nexus among public expenditures, poverty and economic growth in developing nations. Among agricultural growth, education and rural infrastructure, the expenditure with the greatest impact on poverty is agricultural research and development. Similar findings were realized by Fan, Breszka, and Shields (2007). The study was based on five countries; India, China, Vietnam, Thailand, and Uganda. The study found education, agricultural research, and rural infrastructure to be most effective in promoting agricultural growth and poverty alleviation. The study used cost-benefit ratio as a method of analysis. The drawback of the method is its inability to estimate relationships between variables.

A different approach was adopted by Lopez (2004) in investigating the effect of rural public spending on rural poverty of ten Latin American countries. Lopez (2004) recognized that the issue of concern in the relationship was whether structural changes were made to accompany any

expansion of public expenditure. Level of government expenditure influences rural poverty modestly while the structure of the expenditure has a more dramatic impact. The study found no direct effects of public expenditure on head count rural poverty. This suggests that the indirect effects must be significant. The database of the study is weak as the number of observations is low.

Using annual time series data from 1980 to 2009, Chidoko, Mapfumo and Mushunje (2012) revealed that in order to attain pro-poor growth, attention needs to be funneled towards productive sectors such as infrastructure and agriculture. The study sourced secondary data majorly from Central Statistics Offices, Ministry of Finance and Ministry of Agriculture. The study recommended channeling of resources towards the agricultural sector for rapid and sustained poverty reduction in Zimbabwe. Use of projected growth rates allows for several errors in the model because with estimates the assumptions of expected growth rate may not hold.

Contrary to previous findings, Udofia and Esang (2015) observed a positive and insignificant response of agricultural growth to agricultural expenditure in Nigeria. The time series data span from 1980 to 2012. The model was based on the Keynesian macroeconomic framework. The relationship between poverty and agricultural output was found to be negative and insignificant. The study attributed the insignificant implications to the increased importance and dominance of crude oil at the expense of the agricultural sector. The study recommends budgetary expansion in agriculture coupled with monitored credit facilities to stimulate agricultural output and reduce poverty.

The importance of the target region to poverty alleviation is emphasized by Fan, Nyange and Rao (2005) in Tanzania. The study used household budget survey data of 2000/01. The study shows that investments in agricultural research substantially reduce poverty. In addition, the study reveals that both target regions and the type of expenditure affect poverty. Agricultural research resulted in significant growth and greater poverty alleviation in Tanzania.

Although many scholars have been drawn into the debate relating public expenditure on agriculture to poverty, the findings of the studies vary. Economic theory dictates that agriculture plays a major role in improving the welfare of the poor; this coincides with findings of most studies (Fan et al., 2008; Fan, 2008; Chidokoet al., 2012). However, Udofia & Esang observed a negative and insignificant nexus between government expenditure on agriculture and welfare in Nigeria. Moreover, most of the studies relate central government spending on agricultural sector improvement to relieve poverty through agricultural growth, raising the question of whether direct effects exist.

III. METHODOLOGY

The study adopted a correlational research design, which according to Creswell (2008), observes is useful in determining the existence, nature, degree, and direction of relationships. The study was based on a 16-year period between 2000 and 2015. The target population was Kenya, Rwanda, Uganda and Tanzania. Burundi shall be excluded owing to non-availability of data. Panel econometric data was utilized in the study. Correlation was used to establish the bivariate association (size and direction) between public expenditure and poverty in EAC. Private per capita consumption was used as the proxy for poverty. The main source of data was the economic surveys.

MODEL SPECIFICATION

The model followed the Keynesian macroeconomic framework which posits that an increase in public spending increases economic growth and reduces poverty. This study adapted the allocation framework of expenditures by Omari and Muturi (2016), in which sectoral expenditure allocations affect consumption level.

The key consideration in designing the methodology is to effectively explain the effects of public expenditure on poverty situation in a panel data environment. Under these considerations, the following equation was estimated:

The functional relationship for this study is:

$Poverty = f(public\ expenditure)$ ..... (i)

Umo (2012) connotes that agricultural development is fundamental for economic growth, food security and poverty alleviation. Hence;

The Specific functional relationship was written as:

$P_{i,t} = f(EXPAgric_{i,t})$..... (ii)

Where: $P_{i,t}$ represents poverty situation at time t for country i

The REM model was found appropriate. Hence the model estimated assumed the form specified as:

$PC_{it} = \beta_{1i} + \beta_2 EXPAgric_{it} + \mu_{it}$..... (a)

Where μ_{it} is model specific error

But, $\beta_{1i} = \beta_1 + \varepsilon_i$ therefore, the equation above can be re-written as:

$PC_{it} = \beta_1 + \beta_2 EXPAgric_{it}\varepsilon_i + \mu_{it}$..... (b)

Where ε_i is random error (error for individual country)

The REM model, therefore, assumed the form:

$PC_{it} = \beta_1 + \beta_2 EXPAgric_{it} + \omega_{it}$ ..... (iv)

Where composite error term: $\omega_{it} = (\varepsilon_i + \mu_{it})$ and, both ε_i & μ_{it} are random.

$PC_{i,t}$ - Private per capita consumption;

β_i - Government expenditure on agriculture;

i - is the respective countries; and,

t - denotes the time.

IV. RESULTS AND DISCUSSION

DESCRIPTIVE STATISTICS

The descriptive statistics summary for the variables in the study is provided in Table 4.1. The summary includes the mean, maximum, minimum, standard deviation and skewness.

	CONEXP	GEA

Mean	494.2861	1.32E+08
Std. Dev.	154.4013	1.96E+08
Skewness	0.867079	2.268856
Kurtosis	2.660085	8.200380
Jarque-Bera	8.327595	127.0261
Probability	0.015548	0.000000
Observations	64	64

Source: Own computation, 2018

Table 4.1: Descriptive Statistics

The data used for analysis comprised 64observations from 2000 to 2015. The results for the mean were as follows; CONEXP (494.2861) and GEA (132,106,656.7). The measure of dispersion for the variables were: CONEXP (Ksh. 154.4013) and GEA (Ksh. 196 million). From the results above, CONEXPwas positively skewed while GEA was negatively skewed. From Table 4.1 above, GEA had a kurtosis of more than three meaning that they had a thick tail while CONEXP had a Kurtosis gravitating around 3. In the Jarque-Bera probability row, the ρ values were less than the critical values of 0.05 implying that the study accepted the null hypothesis, meaning that the observations were normally distributed.

TEST FOR STATIONARITY

Due to the nature of temporal characteristics in longitudinal data, the series was subjected to panel unit root tests using Levin, Lin & Chu test. The results are displayed below:

PANEL UNIT ROOT TEST AT LEVELS

Method		GEA		CONEXP	
Null: Unit root	Order of Integration	Stat	Prob.	Stat	Prob.
Levels	Order 0	2.82464	0.9976	1.53360	0.9374
1st Difference	Order 1	-2.61057	0.0045	-1.95189	0.0255

Source: Own computation, 2018

Table 4.2: Unit Root test

The results of Levin, Lin and Chu's tests presented in Table 4.2 above revealed that both CONEXP and GEA were integrated of order 1. Their p-value were significant at first difference implying that the panels were not stationary at levels. The series were thus differenced at first levels to make them stationary.

CORRELATION

A correlation test was done to study the linear association between the outcome and the predictor variables and the results were as provided before:

Correlation t-Statistic Probability	DCONEXP	DGEA
DCONEXP	1.000000	

DGEA	0.149384	1.000000
	1.150583	-----
	0.2546	-----

Source: Own computation, 2018

Table 4.3: Correlation

From Table 4.3 above, there was a weak and insignificant positive correlation between CONEXP and GEA (r=0.149384; p=0.2546) respectively. This implied that there was no influence in terms of movement of one variable to another.

COINTEGRATION

Since CONEXP and GEA were not stationary at levels, the series had to be differenced at first order. This made normal regression analysis lose long-run information. As a result, cointegration was conducted to capture existence of the long-run relationship. The error correction terms (ECM) were obtained and tested for stationarity using Levin, Lin & Chu test and the results in table 4.4 below obtained;

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-5.97593	0.0000

** Probabilities are computed assuming asymptotic normality

Source: Own Computation,2018

Table 4.4: Test for Unit roots of Residuals

The residuals were thus found to be stationary at levels as the Levin, Lin & Chu tau t statistics of 5.97593was found highly significant with p=0.0000.

The Pedroni Residual Cointegration Test was then used to test the Null hypothesis of no cointegration and the results below obtained;

Pedroni Residual Cointegration Test

Series: DCONEXP DGEA

Null Hypothesis: No cointegration

Trend assumption: No deterministic trend

User-specified lag length: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-0.794248	0.7865	-0.993539	0.8398
Panel rho-Statistic	-2.744243	0.0030	-2.098495	0.0179
Panel PP-Statistic	-4.857288	0.0000	-4.199228	0.0000
Panel ADF-Statistic	-3.126778	0.0009	-3.600718	0.0002

Source: Own computation,2018

Table 4.5 Test for Cointegration

This result signifies a long run relationship amongst the variables existed (Panel rho-statistic=0.0179) and the parameters of private consumption function could thus be interpreted as long run parameters. Since the private consumption function did form a long run relationship, its parameters could be interpreted as long-term parameters and

therefore a long run regression result will be consistent and meaningful. This means that the results would be good for interpretation and forecasting in the long run.

The existence of cointegration between CONEXP and GEA indicate that the variables have a long-term or equilibrium relationship. There however, may be disequilibrium in the short run and therefore the Table below gives the short-run estimation.

Dependent Variable: DCONEXP
Method: Panel EGLS (Cross-section random effects)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14.03817	2.594539	5.410660	0.0000
DGEA	2.28E-08	2.16E-08	1.055693	0.2959
ECM (-1)	-0.126524	0.176271	-0.717785	0.4760

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	18.65732	1.0000

Weighted Statistics

R-squared	0.029015	Mean dependent var	14.79624
Adjusted R-squared	-0.007626	S.D. dependent var	18.47760
S.E. of regression	18.54792	Sum squared resid	18233.34
F-statistic	0.791880	Durbin-Watson stat	1.876059
Prob(F-statistic)	0.458278		

Source: Own computation,2018

Table 4.6 Short Run Estimation

The results showed that in the short run, there was autonomous consumption (c=14.03817; p=0.0000) implying that even with no Expenditure to the Agricultural sector in EAC people still consumed 14.03 units in the short run. On the other hand, the Expenditure to the Agricultural sector did not affect Private consumption in the EAC in the short run.

The coefficient of the error correction term of about -0.126524 suggests that only about 11% of the discrepancy between long-term and short-term property index is corrected within a year suggesting a slow rate of adjustment to equilibrium.

Hausman Specification Test

Hausman Test was conducted to validate which method (between Random Effect and Fixed Effect) was most appropriate.

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	0.783867	1	0.3760

** WARNING: estimated period random effects variance is zero.

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
GEA	0.000001	0.000001	0.000000	0.3760

Source: Own computation,2018

Table 4.7 Hausman Specification Test

Since the cross section random had an insignificant probability (p=0.3760), the study accepted the Random Effect Model (REM) as the appropriate model to explain the independent variable.

EMPIRICAL RESULTS

The long run results of the REM are as below:

Dependent Variable: DCONEXP
Method: Panel EGLS (Cross-section random effects)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.20165	3.067602	4.955547	0.0000
DGEA (-1)	-2.97E-08	2.68E-08	-1.110632	0.2748
DGEA (-2)	4.06E-08	3.80E-08	1.066712	0.2938
DGEA (-3)	8.51E-08	3.99E-08	2.133065	0.0404

Effects Specification	S.D.	Rho
Cross-section random	1.07E-07	0.0000
Period fixed (dummy variables)		
Idiosyncratic random	17.12813	1.0000

Weighted Statistics

R-squared	0.380075	Mean dependent var	16.93503
Adjusted R-squared	0.117076	S.D. dependent var	17.86282
S.E. of regression	16.78463	Sum squared resid	9296.883
F-statistic	1.445160	Durbin-Watson stat	2.329135
Prob(F-statistic)	0.187666		

Source: Eviews Computation, 2018

Table 4.8: Long run Estimation

In the long run, autonomous consumption in the EAC was found to be 15.20165 units when public expenditure on Agriculture was zero. This is in conformity with Keynesian economic theory that gives a positive autonomous consumption even with zero income.

Using CONEXP as a proxy for poverty and GEA as a proxy for public expenditure on agriculture, the random effect model results indicated that GEA was significant when lagged 3 years with $\beta = 0.0000000851; p = 0.0404$ This indicated that within the east African countries, an increase in Government expenditure by 1 unit increases Private consumption by 0.0000000851 units hence reduction of Poverty. The R-square was found as 0.380075 meaning that the independent variables (GEA), contribute to 38% change in CONEXP. However, the insignificance of the F-Statistics (p=0.187666) implied that the sample chosen could not best explain the model for poverty in the East African Community.

This result corroborated what Fan, Johnson, Saurkar and Makombe (2008) found out and which stated that investment in Agricultural research leads to increased productivity which translates to more output. With increased output, prices fall. Reduced prices mean accessibility of food thus improved welfare/ reduction of poverty. Secondly, it is also in

consonance with the findings of Fan, Breszka and Shields (2007) in a research done in India, China, Vietnam, Thailand, and Uganda which also found that investments in education, agricultural research and rural infrastructure are most effective in promoting agricultural growth and poverty alleviation. Different from the above, Udofia and Esang (2015) observed a positive and insignificant response of agricultural growth to agricultural expenditure in Nigeria.

CAUSALITY

Causality was tested by using the Pairwise Dumitrescu Hurlin Panel Causality tests due to its suitability in examining individual coefficients and the results in the table below obtained.

Pairwise Dumitrescu Hurlin Panel Causality Tests
Date: 26/10/18 Time: 17:02
Sample: 2000 2015
Lags: 2

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
GEA does not homogeneously cause CONEXP	4.17471	0.92945	0.3527
CONEXP does not homogeneously cause GEA	3.37781	0.46748	0.6402

Source: Own computation

Table 4.9 Test for Causality

From the results, there was no Panel Granger causality between GEA and CONEXP and vice versa. Since the probabilities were insignificant in both cases, the result accepted the Null hypothesis that GEA does not Granger causes CONEXP and also, CONEXP does not granger cause GEA.

V. CONCLUSION AND RECOMMENDATIONS

The objective of this study was to establish the nexus between expenditure by government on agriculture and poverty. In concurrence with priori expectations, the estimation revealed a negative and significant poverty alleviation effects of public expenditure on agriculture. Increased expenditure on agriculture yielded reduced poverty levels. The findings implied that neglect of agricultural contribution to poverty alleviation could result in an increased number of people living in poverty. The study also revealed that there was no causality between the variables; poverty influenced government spending and vice versa. This is in tandem with economic theory which informs that with increased spending in the agricultural sector, agricultural output rises which results in increased income and reduced poverty levels.

The positive effect of increased spending on agriculture shows that it is imperative to have deliberate and concerted efforts aimed at improving the sector. Agriculture is the mainstay of the economic bloc and is largely carried out in rural areas. The poorest quintile of the population is principally found in the rural areas. This further indicates the need to ensure that pro-poor spending is appreciated and encouraged.

Policymakers should ensure that producers enjoy conducive environments; biologically and financially, to spur agricultural growth:

Setting aside monies for the development of the agricultural sector. This could include financial credit which could be loaned to producers at lower interest rates.

Participate in the harmonization of standards to encourage agricultural production for export.

Conducting sensitization forums on markets for various agricultural products per given region. The forums could also articulate any Non-Tariff Barriers (NTBs) and Technical Barriers to Trade (TBT) to actively engage in the elimination of the same.

Participating in expositions of partner states to encourage market penetration and test marketing for innovative agricultural products.

Setting up of innovation centers to spur technological advancements in the sector and value-addition of the produces.

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