DBA AFRICA MANAGEMENT REVIEW

VOLUME 10 NO 2

2020

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A Quarterly publication of the Department of Business Administration,
School of Business,
University of Nairobi

ISSN NO: 2224-2023

http://journals.uonbi.ac.ke/damr
June 2020 Vol 10 No 2 Pgs 125-146

ISSN - 2224-2023

DBA Africa Management Review

Received Date
28/05/2020
Accepted Date
11/07/2020

MODERATING EFFECT OF FINANCIAL EFFICIENCY ON THE RELATIONSHIP BETWEEN ECONOMIC GROWTH AND POVERTY LEVELS IN THE EAC COUNTRIES

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Abstract

The main objective of the study was to examine the moderating effect of financial efficiency on the relationship between economic growth and poverty levels in the East Africa countries. The hypothesis was that financial efficiency has no effect on the link between economic growth and poverty levels in East African Community countries. The study adopted descriptive research designs. The study population was the five countries of EAC countries which included Kenya, Rwanda, Uganda, Burundi, and Tanzania. Annual data for 30 years beginning 1989 to 2018 was gathered for the study purpose. Secondary data, which consisted of annual data, was utilized in the study. The data was analyzed using both descriptive and inferential statistics with the help of excel and STATA version 14. The Descriptive statistics included the mean, standard deviation, minimum and maximum. The study then performed diagnostic test including normality, heteroscedasticity, multicollinearity, serial correlation and unit roots tests to establish the robustness of the models chosen. Inferential statistics involved Feasible Generalised Least Squares (FGLS) panel data regression models to ascertain the causal effect relationship between economic growth, financial efficiency and poverty levels in EAC member countries. The test of hypothesis was examined at 5% significance level. The study revealed that financial efficiency has no significant moderating effect on the link between economic growth and poverty levels in East African Community countries. Given that economic growth has a significant effect on poverty levels in EAC countries, the finding implies that improvement of economic growth was crucial in enhancing poverty reduction among countries in east Africa. The study therefore recommends that the government in general and ministries of planning and economic affairs of EAC countries should put down concrete plans and concerted actions aimed at improving economic growth rates. Additionally, the EAC countries' central banks and the government ministries of finance and treasury should keep the rate of inflation at one-digit level to ensure that economic growth is not eroded by increased general price level in the economy. Increased economic growth means improved income for the general population, especially the poor masses. Finally, concerning financial

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efficiency, it was established that financial efficiency has no significant effect on the link between economic growth and poverty levels in East African Community countries. However, the effect of financial efficiency on poverty was positive hence the study recommends to EAC governments and regulatory authorities to put down plans and policies aimed at making the financial sector efficient. Efficient financial sector is associated with reduced cost of financial intermediation and a banking sector that is not efficient is linked with high cost of financial intermediation.

Key terms: Economic growth, financial efficiency and poverty levels

Introduction

The association between economic growth, financial efficiency and poverty levels in national economies has been an area of concern for scholars in both the developed nations and developing counterparts (Sinha, Pearson, Kadekodi & Gregory, 2017). Financial system tends to increase the breath and access to funds while on the other hand; a financial system that is underdeveloped limits the access to funds by people (Otieno, 2013; Obuya & Olweny, 2017). Generally, the economies in financial and general sectors in particular in the member states of the East African Community (EAC), have been growing with the exception of 2012 that was severely affected by the effects of global financial crisis (Rousseau & Wachtel, 2017). The financial sector's average growth rate has been at about seven percent. However, the poverty status has remained quite high at the ranges of 46%. Few studies such as Jalilian and Kirkpatrick (2002) and Odhiambo (2015) investigated this relationship between economic growth, financial efficiency and poverty levels. However, growth, finance and poverty studies have not attracted much research in this area; hence, the link between financial efficiency and poverty reduction has not been adequately addressed by research (Ncube, Anyanwu & Hausken, 2014).

Efficiency is a term used to describe minimization of wastages and improving output/input ratio (Choong, 2012). Financial Efficiency describes the capability of financial markets to provide high quality financial products at minimal cost. Kanghwa (2010) stated that a quantitative proxy of efficiency that help in evaluation of efficiency of financial system is the total cost of financial intermediation to total assets ratio (Iwasaki and Tokunaga, 2014). Elements of cost of financial intermediation include cost of operations, loan loss provision, taxes, net profits and other intermediation costs (Próchniak, 2011). Gohou and Soumaré (2012) argued that financial efficiency in capital markets refers to a situation where spot prices of financial assets reflect fully available market intelligence. Therefore, in a financial system which is efficient, daily variations of market prices of financial assets is random and information possessed by investors on past prices may not aid in forecasting future price movements in the market (Bazot, 2017).

This study, therefore, attempted to address a number of knowledge gaps. Firstly, most of the studies that examine the effects of economic growth on reducing poverty in the EAC region focus on individual countries. They have limited application in the context of EAC countries as a whole (Pérez-Moreno and Weinhold, 2012; Waiyaki, 2013 Kakwani and Son, 2016; Keho, 2017; Williams, Adegoke and Dare, 2017). Secondly, the majority of studies on the relationship between economic growth and poverty have omitted the moderating effect of financial efficiency (Hasana, Koetter, Lensink, & Meesters, 2009); Ferreira, 2012). In this respect, this study examined the link between economic growth, financial efficiency and poverty levels in EAC countries.

1.1 Study Objective

To examine the moderating effect of financial efficiency on the relationship between economic growth and poverty levels in the EAC countries.

1.2 Hypothesis of the Study

Study tested the following null hypothesis:

H_0: Financial efficiency has no effect on the link between economic growth and poverty levels in East African Community countries.

Literature Review

2.1 Theoretical Review

The study relied on liberal theory and information asymmetry theory to underpin the relationship between economic growth, financial efficiency and poverty levels. Liberal Theory revolves around the idea that poverty in an economy is caused by both market distortions and underdevelopment in various areas. This theory was formulated by Keynes (1936) who believed that market forces were capable of promoting economic growth and in turn was able to eradicate poverty. Based on this belief, Keynes justified government's interventions at macroeconomic level especially in handling involuntary unemployment. From a liberal perspective, poverty is defined as the misfortune of a small group of people who cannot work even if they wished to work. As a consequence, governments should regulate as opposed to impose its rule on poverty reduction (Bradshaw et. al., 2000). The liberal theory argues that poverty can be used to reflect the extent to which market forces fail to justify redistributive taxation in kind and cash.

While economic growth may be critical in reducing absolute poverty by simply raising income levels, the relative benefits of relative poverty especially those relating to expansion in economic activities are only applicable so long as increases in income levels is accompanied by reduction in inequalities in income distribution (Granville and Mallick, 2006). In this respect, wage growths that are accompanied by GDP growth may force relative poverty to surge (Dickens and Ellwood, 2001). The effects on absolute poverty though may not necessarily be clear so long as the average wages increase as well. This hypothesis is in line with the argument that poverty levels may persist and even grow even when economic growth is recorded so long as deprived people are not included in the growth wagon (Dickens and Ellwood, 2001). In line with the argument above, liberal theory was of great importance to the study because it presumes that economic growth leads to development that in turn leads to poverty eradication. Economic growth has the tendency to improve per capita income of the population that results in reduced poverty levels. An expanding economy through economic growth also leads to reduced unemployment that enables households to afford basic goods needed to support life. Economic growth thus is very critical in poverty reduction at the microscopic and macroeconomic level.

The information asymmetry theory proposed by Akerlof (1970), Stiglitz and Weiss (1981) made significant contribution to its formulation. The theory is based on the assumption that borrowers of funds possess more information compared to lenders on the inherent risks of their investment for which funds are sought. The information asymmetry between borrower and lender of funds to the advantage of borrower may result in the twin problems of adverse selection and moral hazard (Matthews & Thompson, 2008). Both problems reduce the efficiency of the flow of funds in the money market from lenders to borrowers. Financial intermediaries can overcome these problems by creating a relationship of long-term commitment with current and

prospective customers of information sharing via credit reference bureaus (McDonald & Schumacher, 2007). Moral hazard problem is a risk that a party to a transaction that has better information about a transaction provides information that is misleading. The party may also have high appetite for risk due to promised incentives premiums hence they may take on unusual risks in a desperate move to get large sum of profit before the contract settles. It is postulated in the Information Asymmetry theory, that moral hazard problem is usually occasioned by information asymmetry that makes it extremely difficult for lenders to differentiate between good borrowers who can be trusted and bad borrowers who cannot be trusted (Stoughton, 1993). The theory further maintains that moral hazard problem leads to heightened credit risk with the quality of financial assets, especially bank loans falling erratically (Hausmann, 2004; Obuya & Olweny, 2017).

Information asymmetry theory is considered relevant in this study on the effect of economic growth, financial efficiency on poverty levels in that the theory explains how credit information opaqueness reduces the efficiency of financial intermediation and access to finances. The differential in information concerning the risks involved in business ventures may put the financial institutions on the disadvantaged side, as they do not possess enough information about the risks of different investments of their clients. The information asymmetry makes banks to incorporate a risk on the cost of finances making the financial products costly and this therefore discourages borrowing for investment. Although a very useful theory, information asymmetry theory only considers information asymmetries in one direction, while in the real world however, there exist also information differences, which is bi-directional in nature (Fuhrmann, Ott, Looks, & Guenther, 2017).

2.2 Empirical Review

Ewah, Esang and Bassey (2009) examined the association between capital market efficiency and economic growth in Nigeria for the period beginning 1961 and ending in 2004. The study adopted OLS, which were multiple regressions in nature. The study ascertained that Nigerian economic growth had not been affected much by capital market efficiency. Ewah et al. (2009) however, used economic growth as the dependent variable instead of independent variable in addition to ignoring poverty in the model. Hasan et al., (2009) evaluated the link between bank efficiency, financial depth and economic growth. It tested the link between quality finance measured by economic growth and financial efficiency for a highly wide-ranging sample comprising over 100 countries covering the study period between 1996 and 2005. The research ascertained that the quality of financial deepening and development had statistically significant effect on economic growth, suggesting that the association between deeper capital market and better banking was indeed most beneficial for economic growth. Hasan et al., (2009), however, used economic growth as dependent variable instead of independent variable in addition to the study being carried out outside East African Community. Hasan et al., (2009) also ignored poverty as a variable in the study.

A paper by Ferreira (2012) analyzed the influence of efficiency of banking institutions on growth of an economy. The investigation examined data from 27 EU

nations for the period between 1996 and 2008. The investigation examined the impact of bank efficiency on Gross Domestic Product (GDP). The findings demonstrated a positive impact of bank cost effectiveness on development of an economy based on the GDP estimates. Ferreira (2012) utilized bank efficiency as independent variable instead of moderating variable in addition to using economic growth as dependent variable instead of independent variable. Ayadi, Arbak, Naceur and De Groen (2014) analyzed the link between growth in economy and financial sector development in selected nations found in the northern and southern part of the Mediterranean Sea for the period between 1985 and 2009. The study established that financial deepening is inversely related to growth of the economy and credit to the private segment is adversely related with development. Ayadi et al., (2014) however, ignored poverty as the dependent variable in addition to study being carried out outside East African Community. Belke, Haskamp and Setzer (2016) sought to establish whether areas of the country with banks that have high quality financial intermediation were growing faster during economic booms and were more stable compared to regions with banks that have poor quality financial intermediation. The findings established that banks that are relatively more efficient in terms of intermediation quality stimulated growth in economy of the regions of their existence. Belke et al., (2016) used economic growth as dependent variable instead of independent variable. The study also ignored poverty as a variable and even used financial efficiency as an independent variable instead of a moderating variable.

2.3 Conceptual Framework

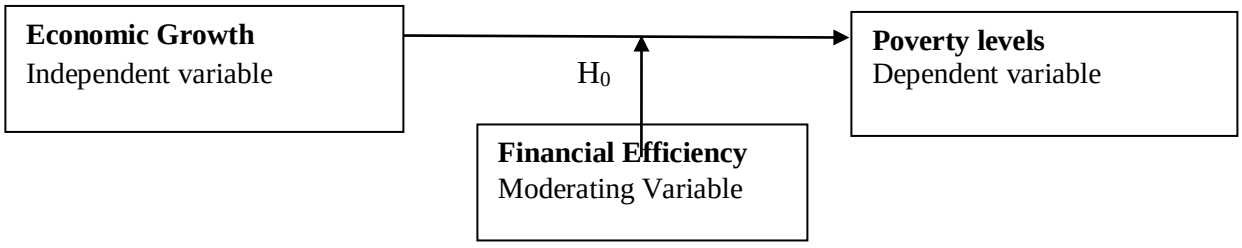

Figure 1: Conceptual Model

In the conceptual framework, the independent variable is Economic growth, the moderating variable is financial efficiency and the dependent variable is poverty levels. Literature has identified the link between economic growth, financial efficiency and poverty levels.

Methodology

The study adopted a descriptive research designs. The design was preferred as the study attempts to investigate the link between economic growth, financial efficiency and poverty levels in EAC countries. The study population was five

countries in the EAC, which included Kenya, Rwanda, Uganda, Burundi, and Tanzania. South Sudan was omitted because it is not a full member of the EAC. Annual data for 30 years beginning 1989 to 2018 was gathered for the study purpose. Secondary data, which consisted of annual data, was utilized in the study. The data relating to credit to the private sector was obtained from respective websites of central banks of the EAC countries. The real GDP data was gathered from World Bank's website whereas data on cost efficiency of the respective banking sector was gathered from the website of Central Banks of EAC countries and IMF. Data on headcount ratio and Gini coefficient was acquired from the World Bank and African Development Bank websites. The study collected annual data for 30 years from 1989 to 2018 from five EAC countries. The variables were operationalised as shown in Table 1.

Table 1: Definition and Measurement of Variables

Variable	Notation	Proxy	Unit of Measurement	Expected Sign
Dependent Variable				
Poverty	Y	Head Count Ratio	Ratio of the population earning less than USD.2 per day to the total population within a country.	
Independent Variable				
Economic growth	X	Real GDP	Natural logarithm of real GDP	Negative
Moderating Variable				
Financial efficiency	Z	Operational cost efficiency	Ratio of operational cost to operational income of banking sector	Negative

The data was tabulated in to Microsoft excel and various variables generated. The excel file was then be exported to STATA version 14 for further analysis. The analysis was based on descriptive and inferential statistics. The descriptive statistics, which included skewness, minimum and maximum values, standard deviation and mean among others. Diagnostic tests were carried out to examine the conformity of the empirical model to classical ordinary least squares

assumptions. The study tested panel data classical least squares assumptions including normality, heteroscedasticity, multicollinearity, serial correlation, unit root diagnostic tests, cross-sectional correlation. Normality test was performed to evaluate whether a data set comes from normal distribution or not. Shapiro-Wilk test was adopted to test for normality of estimates' residuals. The residuals are said to be normal if their p-values are greater than 0.05 level of significance.

Heteroscedasticity Test: In statistical analysis, a sequence of random variables is said to be homoscedastic if all its variables have similar finite variance. In contrast, if the variance is not finite, the sequence is said to be heteroscedasticity. The research employed Breusch-Pagan / Cook-Weisberg test to evaluate for heteroscedasticity. If the calculated p-value is less than 0.05, then it would be concluded that there is heteroscedasticity.

Multicollinearity: This phenomenon occurs when predictor variables in multiple regression model correlate with each other. In such a case, the coefficient estimates for the model may change significantly to small changes in the data (Goldberger, 1991). The Variance Inflation Factor (VIF) was be adopted to evaluate the existence of multicollinearity problem. Multicollinearity does not exist (Gujarati, 2003) when the VIF value is less than 10.

Serial (Auto) Correlation: This is a cross-correlation of an indicator with itself at diverse points in time (Kmenta, 1986). The study adopted Wooldridge Drukker test to evaluate the presence of autocorrelation in the model where a Probability value greater than 0.05 would be taken to imply absence of autocorrelation. Unit Root Test: Econometric estimation requires that variables contained in a regression model to be stationary. When non-stationary variables are utilized in a model, this could result to spurious regression. The study utilized the Augmented Dickey Fuller (ADF) unit root test. A p-value greater than 0.05 was taken to imply for non-stationarity of the data; hence, the data was considered to have unit roots.

Finally, inferential statistics analysis were performed based on Feasible Generalised Least squares (FGLS) panel data regression models. The regression enabled the examination of the moderating effect of financial efficiency on the relationship between economic growth and poverty levels in the EAC Countries. The tests of hypotheses were examined at 95% confidence level. The data was analysed using the models presented in Table 2.

Table 2: Data Analysis Models

Hypothesis	Analysis Models
H_0: Financial Efficiency has no significant moderating effect on the relationship between economic growth and poverty levels in EAC Member countries.	**Stepwise Regression** $Y_{jt} = \beta_0 + \beta_1 X_{jt-1} + \varepsilon$ .....(1) $Y_{jt} = \beta_0 + \beta_1 X_{jt-1} + \beta_2 Z_{jt-1} + \varepsilon$ .....(2) $Y_{jt} = \beta_0 + \beta_1 X_{jt-1} + \beta_2 Z_{jt-1} + \beta_3 X_{jt-1}.Z_{jt-1} + \varepsilon$ .....(3) Where: Y_t = Poverty Level (Dependent Variable) for the current period X_{t-1} = Real GDP (Independent Variable) for lagged one period Z_{t-1}= Financial Efficiency (moderating variable) for lagged one period $X_{t-1}.Z_{t-1}$= Product of Real GDP and Financial Efficiency for lagged one period β_0= Constant β_1= coefficient of real GDP β_2 = coefficient of Financial Efficiency β_3 = coefficient of product of Real GDP and Financial Efficiency ε = error term $t-1$= lagged one period t= Current Period j= 1,2,3,4,5 (Country)

Results and Discussions

4.2 Descriptive Analysis

Descriptive statistics for all the variables were conducted to determine the statistical properties of the data before making an estimation. This involved the use of descriptive statistical tools including mean, standard deviation, minimum and maximum.

Table 3: Summary of Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Poverty	150	60.005	16.433	31.108	86
Economic Growth	150	1.62e+10	1.51e+10	1.23e+09	6.18e+10
Financial Efficiency	150	.496	.119	.117	.758

Table 3 presented the mean, standard deviation, minimum and maximum point. All the observations (Obs) were 150 with the exception of income distribution. The 150 observations were generated by getting the product of the time period and the number of the countries. Since the time was 30 years, from 1989 to 2018, and there were five countries, the observations were thus (30*5) = 150. However, data for income distribution (W) was only available for 29 years from 1989 to 2017 giving 145 observations (29*5) = 145. The mean for poverty measured by head count ratio for all the five countries considered in the study was 60%. The poverty average mean means that on average for the 30-year period of the study, poverty level has remained high in East African countries with more than 60% of the population earning less than 2 USD per day. The standard deviation was 16.43 meaning specific country poverty levels deviated away from the mean by about 16.4%. The minimum poverty level was 31.1% and the maximum poverty level was 86%.

The economic growth was measured by real GDP in USD. The average economic growth was USD 162 billion, the standard deviation was USD 151 billion implying the economic growth of the East African Community countries is spread around the mean by USD 151 billion. The highest economic growth was USD 618 billion and the minimum economic growth was USD 12.3 Billion. Financial efficiency was measured by the ratio of cost of the banking sector compared to income earned by the banking sector. This means the higher the ratio the higher the financially inefficient the banking sector. The mean financial efficiency was 49.62 implying the cost of financial intermediation was about 49.62 % as a proportion of the income earned by the banking sector. The standard deviation was about 11. 9% around the mean, the maximum financial efficiency ratio was 75.8 % and the minimum financial efficiency ratio was 11.6%. The higher the cost efficiency ratio, the worse of a country is doing in terms of financial efficiency.

4.3 Diagnostic Tests

These tests were carried out to examine the conformity of the empirical model to classical ordinary least squares assumptions. This ensured that the model is fit and robust for the purpose of forecasting. The study tested panel data classical least squares assumptions including normality, heteroscedasticity, multicollinearity, serial correlation, unit root diagnostic tests, cross-sectional correlation.

Table 4: Shapiro-wilk Test for Normality

Variable	Obs	W	V	z	Prob>z
Poverty	150	0.918	9.573	5.121	0.000
Economic Growth	145	0.939	6.874	4.362	0.000
Financial Efficiency	145	0.782	24.584	7.246	0.000

Table 4 showed that all the p-values were less than 0.05 meaning there of a problem of normality hence Least Squares Assumptions of normality of observed variables and residuals is violated hence the study adopted FGLS model for parameter estimation.

Table 5: Value Inflation Factor (VIF) test for Multicollinearity

Variable	VIF	1/VIF
Poverty	9.580	0.104
Economic Growth	5.180	0.193
Financial Efficiency	1.370	0.729
Mean VIF	5.376	

Table 5 shows that all the explanatory variables had a VIF value less than 10.The explanatory variables therefore showed a lower VIF value. With no explanatory variables showing signs of multicollinearity, the classical least squares panel data model may be appropriate for the analysis. However, for the study to classical least squares panel data model, there should be no violation of heteroscedasticity, unit roots and autocorrelation assumptions.

Table 6: Modified Wald Test for Heteroskedasticity

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model
H0: sigma(i)^2 = sigma^2 for all I
chi2 (5) = 4971.56
Prob>chi2 = 0.0000

Table 6 revealed that, the p-value (0.0000) is less than the significance level (0.05) hence the test concluded that there is no constant variance meaning the error terms are heteroskedastic and the OLS assumptions of homoscedasticity is violated. An attempt to remove heteroscedasticity by getting robust

standard errors and did not solve the problem. The study therefore ignored the ordinary Least Squares panel model regression model and adopted FGLS model.

Table 7: Wooldridge Test for autocorrelation

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
F(1, 4) = 149.845
Prob > F = 0.0003

The results in Table 7 showed that the p-value (0.0003) was less than the significance level (0.05) hence the test rejects the null hypothesis of no autocorrelation implying that the data has strong serial correlation. In addition utilising first order difference data transformation of the variables did not eliminate autocorrelation. Hence, the Ordinary least squares (OLS) assumption of no autocorrelation is violated. The study had to make a choice between Panel Correlated Standard errors (PCSE) model and Feasible Generalised Least Squares (FGLS) model. The study settled on FGLS given that it is used when T > n (T = 30 years and n= 5 countries).

Table 8: Unit- root Test

Variable	Adjusted t*	p-value	Conclusion
Poverty	1.5421	0.9385	Unit roots
Economic Growth	1.3855	0.9171	unit units
Financial Efficiency	-2.3774	0.0087	no unit roots

In Table 8, Since the P-value for poverty (0.9385) , economic growth (0.9171) were greater than the significance level (0.05), the test fails to reject the null hypothesis that panels contain unit roots hence poverty and economic growth have unit roots meaning the variables are significantly affected by time and may result in spurious regression. The p-value for income efficiency (0.0087) was less than 0.05 level of significance hence it did not have unit roots. However, given that the other two variables have unit units, The classical least squares panel model could not be adopted. The study therefore adopted FGLS model in parameter estimation.

4.4 Correlation Analysis

The study adopted correlation analysis to assist explain the association between economic growth, financial efficiency and poverty levels among east African community countries. The study also used pairwise Pearson Correlation to establish the relationship as shown in Table 9

Table 9: Pairwise Correlation Coefficients

Variables	(1)	(2)	(3)
(1) Poverty	1.000		
(2) Economic Growth	-0.748*	1.000	
	0.000		
(3) Financial Efficiency	-0.119	0.142	1.000
	0.154	0.089	

* shows significance at the .05 level

In Table 9, Pairwise Pearson correlation coefficient was generated at 0.05 level of significance. The association between Financial efficiency and poverty level was negative and statistically insignificant ($r = -0.119$, $p = .0.154 < \alpha = 0.05$). The relationship between economic growth and poverty level was negative and statistically significant ($r = 0.748$, $p = .000 < \alpha = 0.05$). All the explanatory variables were negatively correlated with poverty implying that the explanatory variables (economic growth and financial efficiency) were inversely related to poverty levels in east African countries (Kenya, Uganda, Tanzania, Burundi and Rwanda).

4.5 The Moderating Effect of Financial Efficiency on the relationship between economic growth and poverty levels

The study sought to test the null hypothesis (H_0) that financial efficiency has no significant moderating effect on the relationship between economic growth and poverty levels in EAC Member countries. The hypotheses test was based on p-values of FGLS regression analysis. The null hypothesis would be rejected if three conditions were satisfied. For the first condition, p-value associated with economic growth in the first step of regression, should be less than 0.05 level of significance (p-value < 0.05). The second condition is that the p-value associated with financial efficiency generated in the second step of regression should be less than 0.05. The third condition is that the p value associated with product of economic growth and financial efficiency (X_01**.** Z_01) generated in the third step of regression should be less than 0.05 level of significance. The findings are presented in Tables 10, 11 and 12.

Table 10: Effect Economic growth on poverty level, Hypothesis Test, Step One

Y	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
X_01	-0.135	0.019	-7.23	0.000	-0.171	-0.098	***
Constant	7.122	0.401	17.74	0.000	6.335	7.908	***
Mean dependent var		4.050	SD dependent var			0.299	
Number of obs		145.000	Chi-square			52.309	
			Prob < chi2			0.000	

**** p<0.01, ** p<0.05, * p<0.1 , x_01= lagged economic growth, y= poverty*

In table 10 presenting the first step of moderation, process for hypothesis one test, the overall p-value (0.000) is less than 0.05 meaning that economic growth had a significant effect on poverty levels in EAC member countries. Furthermore, the p-value associated with economic growth (0.000) is less than the level of significance (0.05) meaning economic growth has a significant effect on poverty levels among EAC countries. The model is thus estimated as shown in equation (1).

$$Y_{jt} = 7.122 - 0.135X_{jt-1} \quad \text{.....(1)}$$

Where:

Y_t = Poverty Levels (Dependent Variable) measured by Head Count Ratio.

X_{t-1} = Economic Growth (Independent Variable) measured by Natural logarithm of Real GDP

t-1= lagged one period

t= Current Period

j= 1, 2, 3, 4, 5 (Country)

In the fitted model, Intercept term for model equation 7.122 gives the levels of poverty when economic growth is held constant at zero. The coefficient of economic growth (β_1= - 0.135) is negative meaning a unitary growth in economy in terms of real GDP, ceteris paribus, is associated with falling poverty level by 0.135 units. The coefficient of economic growth gives direct effect of economic growth on poverty. The first condition for rejection of the null hypothesis 2 is satisfied since p-value associated with economic growth (LnX_01) was less than 0.05 level of significance.

Table 11: Effect of Economic Growth and Financial Efficiency on Poverty Level, Hypothesis Test, Step Two

Y	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
X_01	-0.135	0.019	-7.26	0.000	-0.171	-0.098	***
Z_01	0.011	0.011	0.96	0.336	-0.011	0.032	
Constant	7.132	0.400	17.84	0.000	6.349	7.916	***

Mean dependent var	4.050	SD dependent var	0.299
Number of obs	145.000	Chi-square	54.032
		Prob> chi2	0.000

**** p<0.01, ** p<0.05, * p<0.1 , z_01= lagged financial efficiency*

Table 11 presents the second step of moderation process for hypothesis one test. The overall p-value (0.000) is less than 0.05 implying that both economic growth and financial efficiency have a significant effect on poverty levels in EAC member countries. In addition, the p value associated with economic growth (0.000) is less than 0.05 implying that economic growth has a direct significant effect on poverty even in the presence of financial efficiency. However, the p-value associated with financial efficiency (0.336) is not statistically significant meaning that financial efficiency has a weaker effect on poverty levels in EAC countries. The model is thus estimated as shown in equation (2).

$$Y_{jt} = 7.132 - 0.135X_{jt-1} + 0.011\ Z_{Jt-1} \quad \text{.....(2)}$$

Where:

Y_t = Poverty Level (Dependent Variable) measured by Head Count Ratio.

X_{t-1} = Real GDP (Independent Variable) measured by Natural logarithm of Real GDP for lagged one period

Z_{t-1}= Financial Efficiency (moderating variable) measured by Ratio of operational cost to operational income of banking sector for lagged one period.

t-1= lagged one period

t= Current Period

j= 1,2, 3,4,5 (Country)

The intercept term for model equation (2) is **7.132** showing the levels of poverty when both economic growth and financial efficiency was held constant at zero. The coefficient of economic growth (β_1= **-0.135**) is negative meaning a unitary growth in economy in terms of real GDP, ceteris paribus, is associated with falling poverty level by -0.135 units. The coefficient of financial efficiency (β_2=

0.011) is positive meaning a unitary increase in financial inefficiency, ceteris paribus, is associated with increasing poverty level by **0.011** units. Given that the p-value associated with moderator variable, (financial efficiency) is greater than 0.05 hence not significant, the second condition for rejection of the null hypothesis two is not satisfied.

Table 12: Effect of Economic Growth, Financial Efficiency and Interaction term on Poverty Levels, Hypothesis test, Step Three

Y	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
X_01	-0.148	0.019	-7.66	0.000	-0.186	-0.110	***
Z_01	0.409	0.270	1.52	0.129	-0.120	0.939	
XZ_01	-0.018	0.012	-1.47	0.141	-0.042	0.006	
Constant	7.432	0.418	17.79	0.000	6.613	8.250	***

Mean dependent var	4.050	SD dependent var	0.299
Number of obs	145.000	Chi-square	64.226
		Prob>	0.000

**** p<0.01, ** p<0.05, * p<0.1 , xz_01= Interaction term*

The Table 12 presented the third step of moderation relationship for hypothesis one test. The overall p-value (0.000) is less than 0.05 hence economic growth, financial efficiency and interaction term have a significant effect on poverty levels in EAC countries. In addition, the p-values for economic growth (p=0.000) measuring direct effect of economic growth on poverty is less than 0.05 meaning than in the presence of financial efficiency, economic growth still has a significant effect on poverty levels among EAC member countries. However, the p values associated with financial efficiency (p=0.129) and the interaction term (product of economic growth and financial efficiency) (0.141) were greater than the level of significance (0.05). This implies that financial efficiency and the interaction term does not have a significant effect on poverty levels in EAC countries. The model was thus estimated as shown in equation (3).

$$\mathbf{Y_{jt} = 7.432 - 0.148\ X_{jt-1} + 0.409\ Z_{t-1} - 0.018\ (X_{jt-1})(Z_{jt-1})} \quad \text{.....(3)}$$

Where:

$\boldsymbol{Y_t}$ = Poverty Level (Dependent Variable) for the current period

$\boldsymbol{X_{t-1}}$ = Real GDP (Independent Variable) for lagged one period

$\boldsymbol{Z_{t-1}}$= Financial Efficiency (moderating variable) for lagged one period

$\mathbf{X_{t-1}.\ Z_{t-1}}$= Product of Real GDP and Financial Efficiency for lagged one period (Interaction term)

t-1= lagged one period

t= Current Period

j= 1,2, 3,4,5 (Country)

In equation (3), the intercept term was **7.432** showing the level of poverty when economic growth, financial efficiency and interaction term were held constant at zero. The coefficient of economic growth (β_1= **-0.148**) was negative meaning a unitary growth in economy in terms of real GDP, ceteris paribus, is associated with falling poverty levels by **0.148** units. The coefficient of financial efficiency (β_2= **0.409**) was positive meaning a unitary increase in financial inefficiency, ceteris paribus, is associated with increasing poverty levels by **0.409** units. The coefficient of product of economic growth and financial efficiency (β3**= -0.018**) gives the moderating effect of financial efficiency on the link between economic growth and poverty levels in East African member countries. The value of β3 = -0.018 means that financial inefficiency weakens the association between economic growth and poverty levels. Given that p-values of financial efficiency and the interaction term were less than 0.05 level of significance, the study concludes that the third condition for rejection of the null hypothesis two was not satisfied.

In conclusion, not all conditions for rejection of the null hypothesis were not satisfied hence the study therefore fails to reject the null hypothesis that financial efficiency has no significant effect on the link between economic growth and poverty levels in East African Community member countries. The study therefore concludes that financial efficiency has no significant effect on the link between economic growth and poverty levels in East African Community countries. Financial efficiency is therefore not a moderator for the relationship between economic growth and poverty reduction among EAC member countries.

4.6 Discussion of Results

The expected effect of financial efficiency on the relationship between economic growth and poverty levels is inverse, such that improved financial efficiency should lead to reduced poverty. The Information asymmetry theory proposed by Akerlof (1970) and Stiglitz & Weiss (1981) explains how credit information opaqueness reduces the efficiency of financial intermediation and access to finances. The differential in information concerning the risks involved in business

ventures may put the financial institutions on the disadvantaged side, as they do not possess enough information about the risks of different investments of their clients. The information asymmetry makes banks to input a risk on the cost of finances making the financial products to be costly and this discourages borrowing for investment. Increasing information asymmetry leads to high cost of capital hence reduced income inefficiency that further leads to increased poverty rates.

In the first step of moderation process for hypothesis test, the overall p-value (0.000) was less than 0.05, meaning that economic growth had a significant effect on poverty levels in EAC countries. In addition, the p-value associated with economic growth (0.000) was less than the level of significance (0.05) meaning economic growth has a significant effect on poverty levels among EAC countries. In the fitted model, Intercept term for model equation 7.122 gives the level of poverty when economic growth is held constant at zero. The coefficient of economic growth (β_1= -0.135) was negative meaning a unitary growth in economy in terms of real GDP, ceteris paribus, is associated with falling poverty level by 0.135 units. The coefficient of economic growth gives direct effect of economic growth on poverty. The first condition for rejection of the null hypothesis was satisfied since p-value associated with economic growth was less than 0.05 level of significance.

In the second step of moderation process for hypothesis test, the overall p= (0.000) was less than 0.05 level of significance meaning that both economic growth and financial efficiency had a statistically significant effect on poverty levels in EAC countries. In addition, the p-value associated with economic growth (0.000) was less than 0.05 implying that economic growth has a direct significant effect on poverty even in the presence of financial efficiency. However, the p-value (0.336) associated with financial efficiency was not statistically significant meaning that financial efficiency has a weaker effect on poverty levels in EAC countries. The intercept term for model equation (6) was **7.132** showing the level of poverty when both economic growth and financial efficiency were held constant at zero. The coefficient of economic growth (β_1= **-0.135**) was negative meaning a unitary growth in economy in terms of real GDP, ceteris paribus, is associated with falling poverty level by 0.135 units. The coefficient of financial efficiency (β_2= **0.011**) was positive meaning a unitary increase in financial inefficiency, ceteris paribus, is associated with increasing poverty levels by **0.011** units. Given that the p-value associated with moderator variable, (financial efficiency) was greater than 0.05 hence not significant, the second condition for rejection of the null hypothesis four was not satisfied.

In the third step of moderation process for hypothesis test, the overall p-value (0.0000) was less than 0.05 implying that economic growth, financial efficiency and the interaction term have a significant effect on poverty levels among EAC member countries. In addition, p-values (0.000) for economic growth measuring direct effect of economic growth on poverty was less than 0.05, meaning that in the presence of financial efficiency, economic growth still has a significant effect on poverty levels among EAC countries. However, the p value (0.129) associated with financial efficiency and p-value (0.141) associated the interaction term (product of economic growth and financial efficiency) were all greater than

the level of significance (0.05). This implies that financial efficiency and the interaction term does not have a significant effect on poverty levels in EAC member countries. The intercept term was **7.432** showing the level of poverty when economic growth, financial efficiency and interaction term were held constant at zero. The coefficient of economic growth (β_1= **-0.148**) was negative meaning a unitary growth in economy in terms of real GDP, ceteris paribus, is associated with falling poverty level by 0.148 units. The coefficient of financial efficiency (β_2= **0.409**) was positive, meaning a unitary increase in financial inefficiency, ceteris paribus, is associated with increasing poverty level by 0.409 units. The coefficient of product of economic growth and financial efficiency (β3= -0.018) gives the moderating effect of financial efficiency on the link between economic growth and poverty levels in east African countries. The value of β3 = -0.018 means that financial inefficiency weakens the association between economic growth and poverty levels. Given that p- values of financial efficiency and the interaction term were less than 0.05 level of significance, the study concludes that the third condition for rejection of the null hypothesis 4 was not satisfied.

In conclusion, not all conditions for rejection of the null hypothesis were satisfied hence the study therefore fails to reject the null hypothesis that financial efficiency has no significant effect on the link between economic growth and poverty levels in East African Community countries. The study therefore concludes that financial efficiency has no significant effect on the link between economic growth and poverty levels in East African Community countries. Financial efficiency is therefore not a moderator for the relationship between economic growth and poverty reduction among EAC countries.

The study is in congruence with empirical literature. A study by Hasan et al., (2009) evaluated the association between bank efficiency, financial depth and economic growth. The research ascertained that financial efficiency had statistically significant effect on economic growth. Ferreira (2012) analyzed the influence of efficiency of banking institutions on growth of the economy. The findings demonstrated a positive impact of bank cost effectiveness on development of economy as estimated by GDP. Ewah, et al., (2009) examined the association between capital market efficiency and economic growth in Nigeria for the period beginning 1961 and ending in 2004. The study ascertained that Nigerian economic growth had not been affected much by capital market efficiency. Ayadi, et al., (2015) analysed the link between growth in economy and financial sector development in selected nations found in the northern and southern part of the Mediterranean Sea for the period between 1985 and 2009. The study established that financial deepening is inversely related to growth of economy and credit to the private segment is adversely related with development. Belke, et al., (2016) sought to establish whether areas of the country with banks that have high quality financial intermediation were growing faster during economic booms and were more stable compared to regions with banks that have poor quality financial intermediation. The findings established that banks that are relatively more efficient in terms of intermediation quality stimulated growth in the economy of the regions of their existence.

Conclusion

Based on the findings on the relationship between economic growth, financial efficiency and poverty levels, the study makes a number of conclusions. First, the study concludes that economic growth has a significant effect on poverty levels in East African Community countries. The coefficient of economic growth was negative meaning a growing economy is also associated with falling poverty level as citizens income improves. The finding implies that improvement of economic growth was crucial in enhancing poverty reduction among countries in east Africa. The findings provide an insight into the significant role that economic growth play in reduction of poverty, especially among EAC member countries. The study also concludes that financial efficiency has no significant effect on the link between economic growth and poverty levels in East African Community countries. The positive coefficient of financial efficiency is associated with rising poverty levels. Financial efficiency was measured by cost to income ratio meaning increase in the ratio means falling financial efficiency hence the positive relationship means falling efficiency levels in the banking sector is associated with rising poverty levels. A banking sector that is inefficient cannot play the role of financial intermediation as expected hence rising poverty associated with reduced investment activities.

The study makes a number of recommendations for policy purposes. Given that economic growth has a significant effect on poverty levels in EAC countries, the finding implies that improvement of economic growth was crucial in enhancing poverty reduction among countries in east Africa. The study therefore recommends that the government in general and ministries of planning and economic affairs of EAC countries should put down concrete plans and concerted actions aimed at improving economic growth rates. Additionally, the EAC countries' central banks and the government ministries of finance and treasury should keep the rate of inflation at one digit level to ensure that economic growth is not eroded by increased general price level in the economy. Increased economic growth means improved income for the general population, especially the poor masses. Finally, concerning financial efficiency, the study recommends to EAC governments and regulatory authorities to put down plans and policies aimed at making the financial sector efficient. Efficient financial sector is associated with reduced cost of financial intermediation and a banking sector that is not efficient is linked with high cost of financial intermediation. The respective governments and regulatory authorities can increase financial sector efficiency within their respective countries through encouraging the banking sector to adopt and enhance technology further to lower transaction costs for the benefit of the poor masses.

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