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ECONOMIC GROWTH, FINANCIAL DEEPENING, INCOME DISTRIBUTION, FINANCIAL EFFICIENCY AND POVERTY LEVEL NEXUS: A COINTEGRATION AND CAUSALITY ANALYSIS IN KENYA

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Abstract

The growth -finance - poverty nexus has been an area of interest to scholars and practitioners who seek policy measures to counteract poverty. The study sought to establish the relationship between economic growth, financial deepening, income distribution, financial efficiency and poverty level in Kenya. The key objectives were to determine the co-integration between economic growth, financial deepening, income distribution, financial efficiency and poverty level in Kenya and to establish whether economic growth, financial deepening, income distribution and financial efficiency granger causes poverty level in Kenya. The study was underpinned by the Liberal theory, financial intermediation theory and public choice theory of distribution. The study was based on descriptive research design with annual 30-year period data sourced from the World Bank, Central Bank of Kenya websites. The study adopted Vector Error Correction (VEC) Model given the cointegration among study variables. Based on Johansen cointegration test, the study revealed that there were at least two cointegrating equations implying long-term relationship between economic growth, financial deepening, income distribution, financial efficiency and poverty level in Kenya. The study also established that the long-term effect of economic growth, financial deepening, income distribution and financial efficiency on poverty level in Kenya was statistically significant. Additionally, the study revealed that economic growth and income distribution granger causes poverty in Kenya with causation running from economic growth to poverty. However, financial deepening and financial efficiency did not granger cause poverty in Kenya. The study therefore recommended that the government of Kenya should stabilize economic growth rate as a mechanism to eradicate poverty. Additionally, the state should come up with policies of equitable income distribution such as progressive taxation and direct transfers to poor sections of the society.

Key Words: Economic growth, financial deepening, income distribution, financial efficiency and poverty level.

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INTRODUCTION

Globally, the economic problem of poverty has been an area of concern for decades as world economies pool their resources to fight poverty. Various policies have been developed to fight poverty based on theoretical studies on the determinants of poverty (Bitler & Hoynes, 2015). Kenya for instance introduced the National Poverty Eradication Plan (1999-2005). Under this program, the government hoped to eradicate poverty by 2015 (Aduda, Chogii, & Murayi, 2014). One of the key policy areas has been on the role of economic growth, financial deepening, income distribution and financial efficiency on poverty level. The association between economic growth, financial deepening, income distribution, financial efficiency and poverty level has been an area of concern for scholars in the developed nations as well as their developing counterparts (Sinha, Pearson, Kadekodi & Gregory, 2017; Obuya & Olweny, 2017, Nyamweya & Obuya, 2020).

Economic growth has been key in poverty eradication. Todaro and Smith (2015) argued that economic growth occurs when productive potential in an economy increases, and that it is best measured by evaluating increase in national real output value over a given period of time. Pérez-Moreno and Weinhold (2012) established that economic development causes unidirectional decrease in poverty level. Waiyaki (2013) revealed that economic growth was critical in poverty reduction in Kenya. The association between financial deepening and poverty has also been evaluated in the finance-poverty literature. Financial deepening refers to a situation of wider option of financial services and improved access to financial services among different socioeconomic groups in an economy (Cole, Sampson & Zia, 2011, Obuya, 2016). Deep financial system tends to increase the breath and access to financial products while on the other hand; a financial system that is shallow limits the access to funds by the poor people (Otieno, 2013). The report by Financial Sector Development Program, established that enhanced financial deepening in East Africa countries, has reduced poverty levels through funding financial markets that are inclusive, efficient and robust (Aduda, Chogii & Murayi, 2014). The association between income distribution and poverty has also attracted the interest of policy makers and researchers. Todaro and Smith (2015) explained that income distribution is the manner in which total GDP of a country is distributed among the members of the public. Fosu (2010) found out that poverty income elasticity was less than income inequality's responsiveness. Gakuru and Mathenge (2012) demonstrated that because of high-income imbalance in Kenya, stimulation of development in rural and manufacturing parts of the country essentially was more advantageous to the urban family unit since they own most of the factors of production. Singh and Huang (2015) showed that poverty and income inequality were significantly related in Sub-Saharan Africa countries. Finally, the association between financial efficiency and poverty has been interrogated in the literature. Financial efficiency is the capability of financial markets to provide high quality financial products at minimal cost. 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. Ewah, Esang and Bassey (2009) ascertained that Nigerian economic growth had not been affected much by capital market efficiency.

Poverty eradication has been conceptualised around four variables that is economic growth, financial deepening, income distribution and financial efficiency. The first variable adopted is financial deepening.

Growth- finance- poverty studies have shown that financial deepening can affect poverty directly by offering the poor masses access to financial products like loans, which they can invest in micro business opportunities to improve their livelihood (Pérez-Moreno & Weinhold, 2016; Naceur & Zhang, 2016). The second variable adopted is the economic growth. Studies have shown that financial deepening can also influence poverty indirectly through economic growth where financial deepening in the economy enhances the Gross Domestic Product (GDP) of the country that further trickles down to the population including the poor in the society inform of income for their efforts used in growing the economy (Dutta, et al., 2012; Mellor, 2009). The next variable adopted is the income distribution. The process by which GDP is distributed to the general population inform of national income is affected by the income distribution such that if the income distribution is not equitable, poverty situation becomes worse while if the income is equitably distributed, poverty situation better (Naceur and Zhang, 2016; Keho, 2017). Finally, the study introduces financial efficiency as an explanatory variable. Financial deepening which is a quantity measure of financial development is influenced by financial efficiency. Financial efficiency is the cost effectiveness by which financial products are delivered to those who need them including the poor people (Ferreira, 2012; Waiyaki, 2013). The four variables therefore forms the conceptualization of the study.

Even though Kenya has experienced economic growth since 2003, the country still has high levels of poverty because almost half of the population earns below $1.25 per day (World Bank, 2019). Over the last three decades, worldwide poverty levels have fallen greatly from 40% to under 20 %, but the poverty levels in African countries in general and Kenya in particular has almost remained the same in the same period under review. Over 40% of the people who live in Kenya live in abject poverty (Kenya Bureau of Statistics, KBS, 2019). Statistics from the World Bank show that most of the population in Kenya are living in poverty with poverty headcount for Kenya ($1.90 per day) standing at about 33.6 %. It is therefore evident that the majority of the population is surviving on less than United States Dollar (USD) 2 per day.

1.1 Research Objectives

The general objective was to identify the relationship between economic growth, financial deepening, income distribution, financial efficiency and poverty level in Kenya. Specific research objectives were:

1) To determine the co-integration between economic growth, financial deepening, income distribution, financial efficiency and poverty level in Kenya.
2) To establish whether economic growth, financial deepening, income distribution and financial efficiency granger causes poverty level in Kenya.

LITERATURE REVIEW

2.1 Theoretical Review

The major theoretical underpinnings of the relationship between economic growth, financial deepening, income distribution, financial efficiency and poverty levels includes liberal theory, financial intermediation theory, information asymmetry theory and the public choice theory of distribution. Liberal Theory formulated by Keynes (1936) holds that poverty in an economy is caused by both market distortions and underdevelopment in various areas. The theory postulated that market forces were capable of promoting economic growth and in turn was able to eradicate poverty. 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). Liberal theory is critical in the analysis of the association between economic growth and poverty eradication. Liberal theory holds 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 micro and macroeconomic level.

The financial intermediation theory advanced by Akerlof (1970) postulates that the financial intermediation process includes economic units with surplus funds deposited with financial institutions which in turn lend the same funds to economic units with deficit funds. Generally, financial intermediaries exist in the financial markets because of the very nature of market imperfections concerning surplus units and deficit units. Financial markets are characterized by information asymmetry hence there exist differences in access to market information between buyers and sellers of financial products. It is therefore crucial that intermediaries should exist to bridge the gap in information and make flow of finances within an economic system practicable (Leland & Pyle, 1977; Obuya & Olweny, 2017). The theory underpins the current study by examining the contributions of financial intermediation to financial deepening and efficiency. Financial intermediation ensures that those with excess funds are connected with those who need finances to start business ventures. The purpose of financial intermediation is to reduce the intermediation cost hence efficiency in the financial system.

The Final theory considered was the public choice theory of distribution proposed by Buchanan and Tullock (1975). The theory claims that income distribution is critical in redistributing resources in countries that have high levels of income disparity and poverty (Fiszbein & Schady, 2009). The theory presupposes that competitive market economies are able to provide effective means that can be utilized to allocate resources to Pareto's optimal point (Blaug, 2007). Such an allocation would not make certain people better than others meaning that all people would be equal. Arrow and Debreu (1954) claim that perfect markets are effective in allocating resources meaning that once they allocate resources, there would be no way of re-allocating them. Nonetheless, this type of efficiency does not mean that desirable outcomes are achieved in a society. For this reason, even if it would be desirable to believe that market forces allocate resources effectively, it would be imperative to acknowledge the fact that they do not allocate resources in the right way (Blaug, 2007). The Public choice theory of distribution is relevant on the relationship between income distribution and poverty. The theory identifies the role of income distribution in redistributing resources in countries that have high levels of income disparity and poverty. Additionally, the theory explains that income redistribution can be utilized to reallocate resources in the society hence leading to poverty reduction.

2.2 Empirical Review

2.2.1 Economic Growth and Poverty

Pérez-Moreno and Weinhold (2012) analyzed the causal connection between poverty and economic growth in less developed nations between the period 1970 and 1998. The investigation applied Granger

causality tests and panel data specification. The examination revealed that economic development causes unidirectional decrease in poverty level. Waiyaki (2013) evaluated the connection between economic growth, poverty and development of financial sector in Kenya for the period between 1997 and 2012. The examination utilized Ordinary Least Squares (OLS) technique under the Power Auto-Regressive Condition Heteroskedastic (PARCH) model. The study established that economic growth significantly contributed to poverty eradication. Williams, Adegoke and Dare (2017) examined the association between growth of economy, reduction of poverty and financial inclusion in less developed countries using panel data running from 2006 to 2015. The analysis showed that, bank branches, number of Automated teller machines (ATM) and expenditure of the government of three Africa nations were the most significant proxies of financial inclusion on reduction of poverty.

2.2.2 Financial Deepening and Poverty Level

Odhiambo (2010) analyzed the link between poverty and financial development in Kenya. The study established that financial development granger contributed significantly to domestic savings thereby reducing poverty levels within the country. Fowowe and Abidoye (2013) examined the causal link between inequality, financial development and poverty in African nations. The study established that poverty was affected significantly by financial deepening. Okereke (2015) examined how the financial deepening has influenced the welfare of Nigerians, using data running between 1975 and 2010. Regression analysis was employed specific to each county by introducing a dummy variable. The findings demonstrated that aggregate welfare is not directly affected by financial deepening. Chinweze (2017) investigated the direction of causation between poverty reduction and Financial Deepening in Nigeria. Data used from 1981 to 2015 with the study establishing unidirectional causation from financial deepening to Poverty Reduction. The difference in findings between Okereke (2015) and Chinweze (2017) is based on the dependent variable adopted. Okereke (2015) used welfare as dependent, which is a measure of general living standards of population and may not superficially measure poverty level.

2.2.3 Income Distribution and Poverty Levels

Fosu (2010) while analyzing data spanning from 1980 to 2004 showed that income elasticity of poverty kept on declining. In addition, he found out that poverty income elasticity was less than income inequality's responsiveness. The study ignored economic growth as a variable in the model contrary to growth-finance-poverty nexus literature. Gakuru and Mathenge (2012) examined the level of income inequality and the role that policies developed toward income inequality played in reducing poverty. The outcomes demonstrated that because of high-income imbalance in Kenya, stimulation of development in rural and manufacturing parts of the country essentially was more advantageous to the urban family unit since they own most of the factors of production. Singh and Huang (2015) analyzed the association between Poverty, property rights and Financial Deepening Sub-Saharan Africa countries. The Data was from 37 countries in Africa from 1992 to 2006. The study used panel data regression model. Study showed that poverty, financial deepening and income inequality were significantly related.

2.2.4 Financial Efficiency and Poverty Levels

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 adopted OLS. 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. 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. 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.

METHODOLOGY

3.1 Research Design and Data sources

The study adopted a descriptive research design. The design enabled the investigation of the link between economic growth, financial deepening, income distribution, financial efficiency and poverty level in Kenya. Annual Secondary data was utilized in the study. The study collected annual data for 30 years from 1989 to 2018. The study variables were operationalised as shown in table 1.

Table 1: Definition and Measurement of Variables

Variables	Notation	Proxy	Expected Sign
Dependent Variable			
Poverty	Y	Head Count Ratio	
Explanatory Variable			
Economic growth	X	Real GDP	Negative
Financial Deepening	U	Credit to Private Sector	Negative
Income Distribution	W	Gini coefficient	Positive
Financial efficiency	Z	Operational cost efficiency	Negative

The data relating to financial deepening (credit to the private sector) economic growth (real GDP) were gathered from World Bank's website. Data on financial efficiency (operational cost efficiency) was gathered from the website of Central Banks of Kenya. Data on poverty (headcount ratio) and income distribution (Gini coefficient) was also acquired from the World Bank and African Development Bank websites. All the proxies used in the study were normalised using natural logarithm. The study carried out normality, heteroscedasticity, multicollinearity, serial correlation, optimal lag test, unit root diagnostic tests and cointegration test.

3.3 Data Analysis

The process of analyzing the data started start by sorting, classifying, collating and

checking for the data completeness. The data were then tabulated in Microsoft excel and various variables generated. The excel file was then exported to STATA version 14 for further analysis. The descriptive statistics, which included skewness, minimum and maximum values, standard deviation and mean among others, were calculated and tabulated. Diagnostic tests were then carried out to establish the robustness of the model for parameter estimation. Finally, inferential statistics analysis was performed based on Vector Error Correction Model (VECM) to ascertain the causal effect link between economic growth, financial deepening, income distribution, financial efficiency and poverty levels in Kenya. Due to presence of unit roots and cointegration in long-term time series data, the VEC model was adopted. The regression equation is shown in equation (1).

$$Y_t = \beta_0 + \beta_1 X_t + \beta_2 U_t + \beta_3 W_t + \beta_4 Z_t + \varepsilon \quad \ldots\ldots (1)$$

Where Y_t = Poverty Level, X_t = Economic Growth, U_t = Financial Deepening, W_t = Income Distribution and Z_t = Financial Efficiency, β_0= Constant, $\beta_1, \beta_2, \beta_3$ and β_4 = coefficients of explanatory variables, ε = error term t= current period.

RESULTS AND DISCUSSIONS

4.1 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. The purpose of descriptive analysis was to describe the basic features of the data in the study because they provide simple summaries about the sample and the measures.

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Income distribution	30	.499	.049	.451	.59
Financial Efficiency	30	.525	.12	.331	.748
Financial Deepening	30	8.29e+09	7.79e+09	1.10e+09	2.50e+10
Economic Growth	30	3.39e+10	1.21e+10	2.10e+10	6.20e+10
Poverty Level	30	37.54	4.811	31.108	43.792

Table 2 presented the mean, standard deviation, minimum and maximum point. All the observations (Obs) were 150 with the exception of income distribution. The mean for poverty, measured by head count ratio, was 37.54 %. The average poverty for the 30-year period of the study was high in Kenya with more than 37.54% of the population earning less than 2 USD per day. The standard deviation was 4.811 meaning yearly poverty level deviated away from the mean by about 4.8 %. The minimum poverty level was 31.1% and the maximum poverty level was 43.79%. The mean economic growth was USD. 33.9 billion; the standard deviation was USD. 12.1 billion implying the economic growth of Kenya was spread around the mean by USD. 12.1 billion. The highest economic growth was USD. 62 billion and the minimum economic growth was USD 12.3 Billion. The mean income distribution was

0.499. A Gini coefficient above 0.4 signifies unequal income distribution. The standard deviation was 0.049, the maximum income distribution was 0.59 meaning most of the income earned within the country is in the hands of a few people. The mean financial efficiency was 0.525 implying the cost of financial intermediation was about 52.5 % as a proportion of the income earned by the banking sector. The higher the cost efficiency ratio, the worse of a country is doing in terms of financial efficiency.

4.2 Diagnostic Tests

The study carried out normality, heteroscedasticity, multicollinearity, serial correlation, optimal lag test, unit root diagnostic tests and cointegration test.

Table 3: Shapiro Wilk Test for Normality

Variable	Obs	W	V	z	Prob>z
Poverty Level	30	0.872	4.054	2.894	0.002
Economic Growth	30	0.916	2.654	2.018	0.022
Financial Deepening	30	0.932	2.166	1.599	0.055
Income Distribution	29	0.840	4.952	3.301	0.000
Financial Efficiency	30	0.966	1.067	0.135	0.446

The Shapiro-Wilk test was adopted to test for normality of estimates' residuals. The residuals were said to be normal if their p-values are greater than 0.05 level of significance. If the residuals are not normally distributed, the study would transform the data using natural logarithm to obtain log linear relationship. From table 3, financial efficiency (p-value= 0.446) and financial deepening (P-value = 0.055) were normally distributed while the income distribution (p-value=0.000), economic growth (p-value= 0.022) and poverty level (p-value= 0.002) were not normally distributed. However, based on the 'W' statistics, the values of 'W' should have a value of one for perfectly normal distribution. All the variables used in the study had W statistics value near one (1) to one hence; the deviation of the data from normality is not extreme. The OLS assumption of normality of regression residuals was violated hence data analysis used VEC model to estimate parameters.

Table 4: VIF test for Multicolliniarity

Variable	VIF	1/VIF
Economic Growth	7.09	0.1409
Financial Deepening	7.27	0.1375
Income Distribution	1.75	0.5714
Financial Efficiency	1.00	0.9988
Mean VIF	4.49	

The study adopted Variance Inflation Factor (VIF) to test for existence of Multicollinearity. Gujarati (2003) noted that multicollinearity does not exist when the VIF value is less than 10. Table 4 shows that all the variables had VIF value less than 10. With all variables showing no signs of multicollinearity, the OLS model assumptions were not violated.

Table 4: Breusch-Pagan test for Heteroscedasticity

Ho: Constant variance
Variables: fitted values of lny
chi2(1) = 0.11
Prob > chi2 = 0.7452

The research employed Breusch-Pagan / Cook-Weisberg test to evaluate for heteroscedasticity. The study would conclude the presence of heteroscedasticity if the p-value is less than 0.05. Table 4 established that the p-value (0.7452) was higher than the level of significance (0.05), hence it is concluded that the data for Kenya does not exhibit presence of heteroscedasticity. Given the constant variance, OLS assumption of homoscedasticity was not violated. The findings are presented in Table 4.

Table 5: Durbin's Alternative Test

Durbin's alternative test for autocorrelation chi2	df	Prob>Chi2
58.073	1	0.000

H0: no serial correlation

The study adopted Durbin's alternative test to evaluate the presence of autocorrelation. The study would conclude that there is serial correlation if the p-value is less than 0.05. The p-value in the Durbin's Alternative Test (0.000) 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. Hence, the OLS model assumption of no autocorrelation is violated. Vector autoregression (VAR) and VEC model was preferred since getting the first order difference of the variables did not eliminate autocorrelation. The study adopted VEC model due to cointegrating equations observed with Johansen test.

Table 6: Optimal Lag Test

Sample: 1993 - 2017 Number of obs = 25

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	20.212				0.017	-1.217	-1.149	-0.973
1	57.042	73.66*	1	0.000	.000996*	-4.0833*	-4.0022*	-3.7908*
2	57.043	0.003	1	0.956	0.001	-4.003	-3.909	-3.662

3	0.247	1	0.619	0.001	-3.933	-3.825	-3.543
57.167							
4	0.893	1	0.345	0.001	-3.889	-3.767	-3.450
57.613							

Endogenous: lny

Exogenous: Economic growth, Financial Deepening, Income distribution and Financial Efficiency _cons

Table 6 shows that the optimal lag length for the model was lag length one. The value of p (0.000) was significant as shown by stared values of Fixed Prediction Error (FPE), Akaike Information Criteria (AIC), Hannan and Quinn Information Criteria (HQIC) and Schwarz' Bayesian Information Criteria (SBIC). The optimal Lag length was used in ADF unit root test.

Table 7: Augmented Dickey Fuller (ADF) unit root test

Variable	MacKinnon approximate p-value	Conclusion
Poverty Level	0.2958	Presence of unit roots
Economic growth	0.9991	Presence of unit roots
Financial deepening	0.9524	Presence of unit roots
Income distribution	0.9275	Presence of unit roots
Financial Efficiency	0.2944	Presence of unit roots

The study utilized the Augmented Dickey Fuller (ADF) unit root test to examine the presence of unit roots. Variables are said to exhibit unit roots when the MacKinnon approximate p-value is greater than 0.05 level of significance. Table 7 presents the findings on unit roots test. Since all the MacKinnon P-values (Poverty =0.2958, Economic growth = 0. 9755, financial deepening = 0.9524, income distribution =0.9275 and Financial efficiency = 0.2944) are greater than 0.05 level of significance, the test fails to reject the null hypothesis hence the variables used in the study have unit units meaning the variable is significantly affected by time variant unobserved variable. The study therefore adopted VEC model for further analysis.

Table 8: Johansen Test for Cointegration

Trend: constant Number of obs = 28
Sample: 1990 - 2017 Lags = 1

rank	parms	LL	maximum eigenvalue	trace statistic	5% critical value
0	5	235.71443	.	116.0747	68.52
1	14	266.11661	0.88600	55.2704	

47.21				
2	21	280.25753	0.63580	26.9885*
29.68				
3	26	289.15002	0.47016	9.2035
15.41				
4	29	292.51051	0.21340	2.4826
3.76				
5	30	293.75179	0.08485	

Trace test indicated at least two cointegrating equations. As indicated in Tables 8, the Johansen test indicated at least two cointegrating equations for trace statistic. In this case, the test fails to reject the null hypothesis of at least two cointegrating equations. The presence of cointegration was found and VEC model was chosen instead of VAR model. The study thus concluded that there was co-integration between economic growth, financial deepening, income distribution, financial efficiency and poverty level in Kenya.

4.3 Vector Error Correction Model

The study, having established cointegration, adopted the VEC model. The R-square value of the variables were good enough to justify their causality and p-values less than 0.05 also indicates significance. Generally, the Table 9 reports that the other explanatory variables explains 61.13% of the variation in poverty, however, that does not evidence causality.

Table 9: Long Term and Short-term Effects

		Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
D_Y	L._ce1	-0.068	0.033	-2.06	0.039	-0.132	-0.003	**
	L._ce2	0.436	0.082	5.29	0.000	0.275	0.597	***
	Constant	-0.019	0.012	-1.58	0.114	-0.042	0.005	
	Mean dependent var		24.146	SD dependent var			0.300	
	Number of obs		28.000	Akaike crit. (AIC)			.	

**** p<0.01, ** p<0.05, * p<0.1*

Table 9 shows that cointegrating equations one ‘ce1’ has a negative and significant coefficient (β= -0.068, t= -206, p=0.039<0.05). Cointegrating equation two ‘cel2’ has a positive coefficient which is also significant (β= 0.436, t= 5.29, p=0.000<0.05). The VECM shows long-term negative causality among poverty, economic growth, financial deepening, income distribution and financial efficiency in the first cointegrating equation. The study also established long-term positive causality among poverty, economic growth, financial deepening, income distribution and financial

efficiency in the second counteracting equation. The study thus concluded that economic growth, financial deepening, income distribution and financial efficiency do have a long-term effect on poverty levels in Kenya. Concerning short-term effect (causality), none of the explanatory variables including economic growth, financial deepening, income distribution and financial efficiency had short-term causality (short-term effect) with poverty level. The study therefore noted that that in Kenyan case, there are many other unobserved variables that may explain the short-term causality in poverty level apart from the variables considered.

4.4 Granger Causality Tests

The results of the granger causality using Wald test to show the direction of causality between economic growth, financial deepening, income distribution, financial efficiency and poverty as indicated in Table 10. The variables were in first difference and natural logarithm.

Table 10: Granger Causality Tests

Dependent variables	**Wald statistics and P values**				
	Poverty	Economic growth	Financial deepening	Income distribution	Financial efficiency
Poverty Level	_	4.940** [0.026]	0.057 [0.812]	35.467*** [0.00]	0.233 [0.629]
Economic growth	2.267 [0.132]	_	0.129 [0.719]	1.288 [0.256]	1.192 [0.275]
Financial deepening	0.579 [0.447]	8.706*** [0.003]	_	0.349 [0.555]	1.678 [0.195]
Income distribution	60.456*** [0.000]	13.328*** [0.000]	4.750** [0.029]	_	16.053*** [0.000]
Financial efficiency	0.796 [0.372]	8.889*** [0.003]	9.746*** [0.002]	5.400** [0.020]	_

Note: *, ** and *** denotes significance at 10%, 5% and 1% significance level, respectively. The figures in the squared brackets […] indicate the p-values

The Table 10 shows the granger causality test with finding showing that economic growth, income distribution did granger cause poverty reduction. However financial deepening and financial efficiency did not granger cause poverty. In addition, Poverty does granger cause income distribution while the other variables were not caused by poverty. Thus, there was bidirectional causality between poverty and income distribution and unidirectional causality between economic growth and poverty with causation running from economic growth to poverty.

4.5 Discussion of Results

Regarding the first objective, the study specifically examined the co-integration between economic growth, financial deepening, income distribution, financial efficiency and poverty level in Kenya. Johansen test indicated three cointegrating equations for trace statistic. In this case, the test fails to reject the null hypothesis of at least two cointegrating equations. From these results, the presence of cointegration was found and VEC model was chosen over the VAR model. The study thus concluded that there was co-integration between

economic growth, financial deepening, income distribution, financial efficiency and poverty level in Kenya. The cointegration implies that economic growth, financial deepening, income distribution, financial efficiency and poverty level have long-term association and that they move together over time. The finding is in agreement with Sin – Yu and Odhiambo (2011) who found that there is a long run relationship among financial deepening, financial efficiency and poverty when domestic credit to private sector was used as a proxy for financial development. Inaddtion, Waiyaki (2013) also established a long run link among economic growth, financial deepening, financial efficiency and poverty given that both the trace and the max-eigen statistics indicated the presence of one cointegrating equation.

Finally, the research analyzed the causal effect relationship between economic growth, financial deepening, income distribution, financial efficiency and poverty level in Kenya. The VECM showed long-term causality among poverty, economic growth, financial deepening, income distribution and financial efficiency. The study thus concluded that economic growth, financial deepening, income distribution and financial efficiency do have a long-term effect on poverty levels in Kenya. Concerning short-term effect (causality), none of the explanatory variables including economic growth, financial deepening, income distribution and financial efficiency had short-term causality (short-term effect) with poverty level. The study, therefore, concludes that none of the explanatory variables had a short-term effect (causality) on poverty in Kenya. The study also noted that that in Kenyan case, there are many other unobserved variables that may explain poverty level in the short-term apart from the variables considered. Further, there was bidirectional causality between poverty and income distribution and unidirectional causality between economic growth and poverty with causation running from economic growth to poverty. Odhiambo (2010) while using domestic credit to the private sector and bank assets as indicators of financial deepening showed that economic growth, financial deepening and financial efficiency causes poverty reduction and concluded that economic growth, financial deepening and financial efficiency does cause poverty reduction.

CONCLUSION

The Johansen test indicated at least two cointegrating equations based on trace statistic. Thus, the presence of cointegration was established and VEC model was adopted instead for parameter estimation. Hence, it was concluded that economic growth, financial deepening, income distribution, financial efficiency and poverty levels in Kenya are highly cointegrated implying long-term co-movements of the variables under study. The granger causality test showed bidirectional causality between poverty and income distribution and unidirectional causality from economic growth to poverty level. However, financial deepening and financial efficiency did not granger cause poverty. The study thus concluded that economic growth and income distribution are critical for poverty eradication and that financial deepening and financial efficiency does not directly affect poverty in a significant way. The study therefore recommends to the government of Kenya to stabilize economic growth rate and ensure double digit real GDP as a mechanism to eradicate poverty. Additionally, the study recommends that the state should come up with policies of equitable income distribution such as progressive taxation and direct transfers to poor sections of the society as an effort to eradicate poverty.

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