RESEARCH ARTICLE

FINANCIAL SECTOR DEVELOPMENT AND ECONOMIC GROWTH IN THE SELECTED EAST AFRICAN COMMUNITY COUNTRIES: EVIDENCE FROM PANEL UNIT ROOT AND COINTEGRATION TEST.

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Manuscript Info	*Abstract*

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This paper seeks to establish the relationship between financial sector development and economic growth in the selected East African Community Countries which include Uganda, Kenya and Rwanda using evidence from panel unit root and cointegration test basing on annual data from 2005-2015.The results from panel unit root indicate evidence of stationary variables after first difference while panel cointegration results indicate a unidirectional causality from financial sector development to economic growth in the long run which implies that financial sector development leads to economic growth in the selected East African Community Countries therefore policies aiming at developing the financial sector should be supported in order to achieve economic growth.

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Introduction:-

Economic growth has been impressive in all three countries however much faster and sustainable growth is required in the region to absorb the rapidly rising labor force and materially improved living conditions. There is a need to raise GDP growth rates to above 7 percent a year on a sustainable basis in order to achieve the Millennium Development Goals. Other things being equal, attaining such high growth rates over long periods of time would imply investment-to-GDP ratios in excess of 25 percent, similar to those achieved in the periods of sustained high growth in Asian countries. It will also require substantial improvements in capital productivity.

The ratio of investment to GDP in the region is currently highest in Kenya (34.42 percent) and comparatively lower in Uganda (15.6 percent) and Rwanda (15.1 percent). The gross domestic savings in the region is also very low, standing on average at 12, 8.1 and 15.55 percent of GDP in Kenya, Uganda and Rwanda respectively and independently, putting into question the region's ability to maintain high growth rates on sustainable basis (E.A.C Secretariat report, 2012). Given the declining international assistance for financing investment, the region needs to achieve substantially higher rates of domestic savings in order to finance the required increases in investment thereby accelerating its growth and development. Attaining high rates of domestic savings will in turn require well developed and efficient financial sectors.

Previous studies suggest three types of causal direction between financial sector development and economic growth, namely; supply flowing phenomenon where financial sector development affects economic growth (Odhiambo and

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2009,Kigabo, Okello & Mutuyimana, 2015, demand flowing phenomenon where financial sector development is said to simply follow economic growth(Waqabaca 2004,Abdelhafidh 2013) and bi-directional causality, where financial sector development leads to growth and growth as well leads to financial sector development(Kar and Pentecost 2000,Chuah and Thai 2004).

Various scholars using different methods either on developed or developing countries or both, have found conflicting results, therefore it is important to establish the exact relationship that exists between financial sector development and economic growth.

The main objective of this study is to establish the relationship between financial sector development and economic growth using the evidence from panel unit root and cointegration test in the selected East African Community(E.A.C) countries which are Uganda, Kenya and Rwanda basing on data from 2005-2015.Policies of the selected countries are based on the assumption that efficient utilization of resources through a highly organized, developed and liberal financial system enhances economic growth (McKinnon, 1973; Shaw, 1973).

At individual level, each of these selected countries have made policy efforts to develop efficient financial sector to achieve the Millennium Development goals, however Rousseau and Wachtel (1998) believe that theories of existing studies which were conducted on this topic towards resolving this issue are on developed economies such as U.S, U.K, Japan, Netherlands, Italy and Canada, among others. Lee and Wong (2005) reiterate that, the considered developing economies are majorly from Asia and Latin America, affording Africa in general and specifically East African Community very little coverage.

Even still, the few empirical research done on Africa has not clearly resolved the issue, as some support the view that financial development has a positive effect on economic growth in African countries (Allen and Ndikumana, 2000; Kigabo, 2015), while the studies carried out on Nigeria and Kenya for example have not clearly resolved the issue as most of them concluded that financial sector development did not promote economic growth while some of them (Agbetsiafa, 2003; Odhiambo, 2009) among others found evidence to support demand-flowing hypotheses. On the other hand (Akinlo and Egbetunde, 2010; Wolde-Rufael, 2009) performing the same study in Kenya, arrived at the same conclusion that there exists a bidirectional relationship between finance and growth. The researcher believes that the variation in the results produced by various researchers may have been due to different choice in econometric models and control variables.

Recent studies by Mugeme (2011), Okello et, al., (2015), Kigabo, et, al., (2015) used the model developed by Christopoulos & Tsionas, (2003) for Panel data and not for time series data (Kay and Coe, 2016). Therefore this study was informed by the gap in the previous models used. Hence this study introduced Panel based Unit Root and cointegration test and Human capital and technology as control variables in line with Lucas, (1988). Levin, Lin and Chu (2002), Breitung (2000), Hadri (1999), and Im, Pesaran and Shin (2003) developed panel-based unit root tests that are similar to tests carried out on a single series. Interestingly, these investigators have shown that panel unit root tests are more powerful (less likely to commit a Type II error) than unit root tests applied to individual series because the information in the time series is enhanced by that contained in the cross-section data. In contrast to individual unit root tests which have complicated limiting distributions, panel unit root tests lead to statistics with a normal distribution in the limit and that is what most researchers have used in the past, especially in the EAC (Baltagi, 2001).

Thus this study contributed to the existing literature by examining the relationship between financial development and economic growth in East African Community. Financial sector development was proxied by the credit to private sector to GDP per capita $(cpsy_t)$, the ratio of bank deposit GDP per capita (bdy_t), the ratio of M_3 GDP per capita (my_t) and economic growth proxied by GDP per capita (y_t), while control variables introduced were human capital (hc_t) and technology as $(Tech_t)$ all these were considered in order to clearly address the countrys' specific dimension to finance-growth debate.

Literature review:-

The financial sector provides intermediation services that bring savers and investors together, theoretically channeling investment funds to the uses that yield the highest rate of return, thus increasing specialization and the division of labor (Todaro, 2003). Risk is pooled, transferred, and reduced by commercial banks while liquidity and information increase through the use of progressively more sophisticated financial products and technology.

Neoclassicals support the view that an increase in the efficient investment of savings in new and innovative projects is one of the main engines of economic growth. Neoclassical theory assumes that growth is a function of labor and capital which are supported by the level of technological advancement. i.e. $Y = AF (K, L)$ Where Y is Gross Domestic Product (GDP), K is the stock of capital, L is the amount of unskilled labor and A is exogenously determined level of technology. Note that change in this exogenous variable, technology, will cause a shift in the production function.

While according to the Harrod-Domar theory, for economies to grow they must save and invest a certain proportion of their income. Failure to develop is caused by the failure to save, and accumulate capital. For growth to happen, savings must be accumulated. i.e. Rate of growth (Y) = Savings(s) / Capital output ratio (k)

Different empirical studies such as the ones by Fernandez and Galetovic (1994) and Arestis and Demetriades (1996) show that the direction of causality depends on the variables used and that different countries exhibit different results. However causality cannot be purely ruled out as empirical studies suggest three types of causal direction between financial sector development and economic growth which include;

Supply flowing phenomenon where financial sector development leads to economic growth: This is supported by some researchers who have explored causality with time series analysis such as Granger-type causality tests and vector autoregressive equations. Though some of these studies have mixed results over causality, nevertheless, majority of the works indicate that financial sector development leads to stronger growth. Xu (2000), using a Vector auto Regressive (VAR) analysis, rejects the hypothesis that financial sector development simply follows growth. Similarly, Chritopoulous and Tsionas (2004), using a panel data, show that causality runs from financial sector to economic growth. In support of the supply flowing phenomenon, King and Levine (1993a) use IMF data and various financial indicators to conclude that there is a positive relationship between financial sector indicators and growth, and that financial sector development is robustly correlated with subsequent rates of growth, capital accumulation, and economic efficiency. Odhiambo (2009c) set out to determine whether financial sector development which follows interest rate reforms causes economic growth in Kenya. He used a financial deepening model, Cointegration as well as the dynamic granger causality model and found that financial sector development caused by interest rate reforms influences economic growth both in the short and long run.

Demand flowing phenomenon where financial sector development is a result of economic growth is supported by researchers like Waqabaca (2004), while examining the relationship between financial sector development and economic growth in Fiji, finds a positive relationship between financial sector development and economic growth, but with the causation running from economic growth to financial sector development. Agbetsiafa (2003), while examining the causal relationship between financial sector development and economic growth in a sample of eight (8) emerging economies in sub-Saharan Africa (SSA), finds a unidirectional causality from growth to the finance dominate in Ivory Coast and Kenya. Abdelhafidh (2013) investigates the direction of causality between financial sector development and growth in North African countries over the period 1970-2008. Abdelhafidh (2013) distinguished between domestic saving and foreign inflows but also disaggregated the former into grants, FDI, portfolio investment and loans. Trivariate VAR models have been used to disentangle the direct and indirect impact of financial sector development on economic growth. The result indicates that economic growth Granger-causes domestic saving.

Bi-directional causality, where financial sector development leads to economic growth and at the same time economic growth leads to financial sector development. This is supported by some researchers like Kar and Pentecost (2000) who examined the causal relationship between financial sector development and economic growth in Turkey. The authors find that the direction of causality between financial sector development and economic growth is sensitive to the choice of measurement for financial sector development in Turkey. Calderon and Liu (2004), while using the Geweke decomposition test on pooled data for 109 countries, find some evidence of bi-directional Granger causality. Likewise, Chuah and Thai (2004), while investigating the causal relationship between

financial sector development and economic growth in six Gulf cooperation Council (GCC) countries, using Error Correction Model (ECM) and Vector Auto Regressive (VAR) models, find that there is evidence of bidirectional causality in five of the six study countries. Calderon and Liu (2003) also find evidence of bi-directional causality between financial sector development and economic growth using the VAR and granger causality test based on the ECM model.

Methodology:-

The data used in the study was mainly secondary data. Panel data on GDP, Human Capital (Hc_t) , and Technology $(Tech_t)$ was collected from National Institute of Statistics, and World Bank Indicators of the selected countries while data on financial sector development which include broad money, credit to private sector and bank deposits liability was collected from National Banks of Rwanda, Bank of Uganda and Commercial Bank of Kenya and IMF. All data is Panel data on annual basis from the 2005 up to 2015.

To measure economic performance, the quantity output expressed as index number (2006=100) was used (Christopoulos & Tsionas, 2003). However to measure the financial sector development, the study employed three proxies. The essence of using three banking sector indicators was to allow for robustness test; so as to confirm whether consistent results could be obtained using different proxies. The first proxy is Broad money or M_3 to GDP per capita (my_t) which is a monetization measure, it is the broadest measure of money and thus of financial depth as it includes all financial institutions. It includes foreign reserves and other large deposits in addition to (m_2) (Apergis et al., 2007). This proxy has been used for example by the World Bank (1989), Levine and King (1993a and 1993b) and Calderon and Liu (2003). The second is Credit to private sector as a ratio of to GDP per capita $(cpsy_t)$ used as a measure of financial depth. According to Beck et al. (2000) credit to private sector is superior to other measures of financial sector development because it excludes credit to the public sector and better reflects the extent of efficient resources allocation. It is based on the assumption that the private sector is more productive than the public sector when it comes to the utilization of funds. It is thus the most important measure of financial intermediary development, (Levine and Zervos (1998) and Yartey (2007). The third is Bank deposit liability to GDP per capita (bdy_t) is as well important as it shows the liquidity of the banking sector (Levine and Zervos, 1998).

The control variables; Human Capital (Hc_t) which should be considered per its effect on the economic performance (Odhiambo, 2009b). Technology $(Tech_t)$, which according to Barro and Sala-i-Martin (1995), Sala-i-Martin (1997), McMahon (1998), Temple (1999), Bils and Klenow (2000), Self et al. (2004) find the same to be positively correlated with the growth rate of per capita Gross Domestic Product across countries.

To test for the normality properties of the variables, the study made use of the Jarque-Bera Test which compares the skewness and kurtosis coefficients of the variables. For a variable to be normally distributed, its skewness should be equal to zero, kurtosis should be equal to three and the JB statistics should be equal to zero.
Additionally, the study sought to determine the spread of the data estimating the mean and the first movement away from the mean for all the variables contained in the research models bellow. The researcher also conducted a graphical analysis of the variables to capture their movement over time.
To investigate the relationship between financial sector development and economic growth, the researcher used the following model developed by Christopoulos and Tsionas (2003) when they conducted a study of financial sector development and economic growth in 10 developing countries and in Rwandan case was improved by (Kigabo, Okello &Mutuyimana, 2015; Okello, Kigabo &Kitambala, 2015) .

$$y = f(F,V) \hspace{4cm} 3.1$$

Where y stands for GDP per capita, F is the measure of financial development, while V stands for control variables which are the human capital and technology, as variables which are determinants of economic output.

1. $Y_t = \beta_0 + \beta_1 my_t + \beta_2 cpsy + \beta_3 bdy + \beta_4 hc_t + \beta_5 Tech_t + \varepsilon_t$ \hspace{2cm} 3.2

Where Y_t is the real output in year t; $cpsy_t$ is the credit to private as a ratio of GDP; hc_t is human capital, $Tech_t$ is the technology; bdy_t in equation (3.2) is the ratio of banks deposits to GDP; my_t in equation (3.2) is the ratio of M_3 to GDP and ε_t is an error term. The error term is guided by the following assumptions; No serial or auto-correlation, no Heteroscedasticity, and that there exist normality in the residuals.

In order to estimate elasticities in the long run relationships, the researcher introduced logarithms in the equation as follows:

$$lY_t = \beta_0 + \beta_1 lmy_t + \beta_2 lcpsy + \beta_3 lbdy + \beta_4 lhc_t + \beta_5 lTech_t + \varepsilon_t$$

Results:-
Panel Regression Model Analysis:-
In order to distinguish between variables per country the researcher developed the panel regression model for the selected three countries using the fixed effect in table 4.1 bellow. This method allows for the heterogeneity that exists within each and every country (Granger, 1998).

Table 4.1:- Panel Regression Model.

Dependent Variable: LY				
Method: Panel Least Squares				
Date: 04/21/16 Time: 14:59				
Sample: 2005 2015				
Periods included: 11				
Cross-sections included: 3				
Total panel (balanced) observations: 33				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMY	-1.271088	0.497050	-2.557266	**0.0165**
LHC	0.314239	0.097467	3.224068	**0.0033**
LCPSY	1.337901	0.365863	3.656830	**0.0011**
LBDY	0.100679	0.476340	0.211360	**0.8342**
LTECH	0.137553	0.072043	-1.909331	**0.0469**
C	5.839970	0.207073	28.20249	0.0000
R-squared	0.758653	Mean dependent var		6.039924
Adjusted R-squared	0.713959	S.D. dependent var		0.343771
S.E. of regression	0.183858	Akaike info criterion		-0.386338
Sum squared resid	0.912703	Schwarz criterion		-0.114246
Log likelihood	12.37458	Hannan-Quinn criter.		-0.294788
F-statistic	16.97441	Durbin-Watson stat		1.039348
Prob(F-statistic)	**0.000000**			

Panel regression model can be written as;

$$ly = 5.83 - 1.27lmy + 0.31lhc + 1.33lcpsy + 0.1lbdy + 0.13ltech + \mu \qquad 4.1$$

This indicates that $lcpsy$, $lbdy$, $ltech$ and lhc have positive impacts on the ly, with lmy having negative impact on the ly. This means that Credit to the private sector, bank deposits, Technological innovation and Human Capital are very important in regard to economic growth in the region this is in line with (Mugume, 2012). However ,direct Money Supply as expected has a negative influence on economic growth, this is means that the governments in the selected three countries should resort to other measures of increasing supply of money in the economy like encouraging commercial banks to increase their credit to private sector as a multiplier effect to growth (Verbeek, 2004).

Individual Significance:-
From the table 4.1 above, it's important to check individual significance of the variables using the probability of test statistics for every variable as bellow;

    i.   **Significance of Money Supply** (lmy) **on GDP per capita** (ly)

$H_0 : \alpha_1 = 0$ if the probability of $t - statistics$ is $> 5\%$

$H_1 : \alpha_1 \neq 0$ if the probability of $t - statistics$ is $< 5\%$

From the above table 4.1, the probability of the $t - statistics$ is equal to 1.6% which is less than 5%, therefore the researcher rejected the null hypothesis and accepted the alternative hypothesis which means that the Independent Variable (lmy) significantly influences the Dependent Variable (ly). However, the direction of the influence can't be identified at this point, because the alternative hypothesis only shows the evidence of a relationship between the Dependent Variable and the Independent Variable.

    ii.   **Significance of Human Capital** (lhc) **on GDP per Capita** (ly)

$H_0 : \alpha_2 = 0$ if the probability of $t - statistics$ is $> 5\%$

$H_1 : \alpha_2 \neq 0$ if the probability of $t - statistics$ is $< 5\%$

From the above table 4.1, the probability of the $t - statistics$ is equal to 0.33% which is less than 5%, therefore the researcher rejected the null hypothesis and accepted the alternative hypothesis which means that the Independent Variable (lhc) significantly influences the Dependent Variable (ly). However, the direction of the influence can't be identified at this point, because the alternative hypothesis only shows the evidence of a relationship between the Dependent Variable and the Independent Variable.

    iii.   **Significance of Credit to Private Sector** $(lcpsy)$ **on GDP per capita** (ly)

$H_0 : \alpha_3 = 0$ if the probability of $t - statistics$ is $> 5\%$

$H_1 : \alpha_3 \neq 0$ if the probability of $t - statistics$ is $< 5\%$

From the above table 4.1, the probability of the $t - statistics$ is equal to 0.011% which is less than 5%, therefore the researcher rejected the null hypothesis and accepted the alternative hypothesis which means that the Independent Variable $(lcpsy)$ significantly influences the Dependent Variable (y). However, the direction of the influence can't be identified at this point, because the alternative hypothesis only shows the evidence of a relationship between the Dependent Variable and the Independent Variable.

    iv.   **Significance of Bank deposits** $(lbdy)$ **on GDP per capita** (ly)

$H_0 : \alpha_3 = 0$ if the probability of $t - statistics$ is $> 5\%$

$H_1 : \alpha_3 \neq 0$ if the probability of $t - statistics$ is $< 5\%$

From the above table 4.1, the probability of the $t - statistics$ is equal to 83% which is more than 5%, therefore the researcher failed to reject the null hypothesis which means that the Independent Variable $(lbdy)$ does not significantly influence the Dependent Variable (y). However, the direction of the influence can't be identified at this point, because the alternative hypothesis only shows the evidence of a relationship between the Dependent Variable and the Independent Variable.

    v.   **Significance of Technological Innovation** $(ltech)$ **on GDP per capita** (ly)

$H_0 : \alpha_3 = 0$ if the probability of $t - statistics$ is $> 5\%$

$H_1 : \alpha_3 \neq 0$ if the probability of $t - statistics$ is $< 5\%$

From the above table 4.1, the probability of the $t-statistics$ is equal to 4.6 % which is less that than 5%, therefore the researcher rejected the null hypothesis and failed to reject the alternative hypothesis which means that the Independent Variable $(ltech)$ does significantly influence the Dependent Variable (ly). However, the direction of the influence can't be identified at this point, because the alternative hypothesis only shows the evidence of a relationship between the Dependent Variable and the Independent Variable.

Joint Significance:-

To measure the joint significance between the Independent Variables $(lmy, lcpsy, ltech, lhc, lbdy)$ and the dependent variable (ly), the researcher considered the value of probability $F-statistics\,(ANOVA)$ from table 4.1 above. This lead to the formation of the hypothesis bellow:

$$H_0 : \alpha_1 = \alpha_2 = \alpha_3 = 0 \text{ if the probability of } F-statistics \text{ is } > 5\%$$
$$H_1 : \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq 0 \text{ if the probability of } F-statistics \text{ is } < 5\%$$

Since the probability of the $F-statistics$ from table 4.1 above is equal to 0.0000%, which is less than 5%, the researcher rejected the null hypothesis and failed to reject the alternative hypothesis meaning that all the Independent Variables $lmy, lcpsy, lbdy, lhc, ltech$ have significant joint effect on the Dependent Variable (ly).

Checking for Normality of the Residuals in panel regression model4.1:-

The standard assumption in linear regression is that the theoretical residuals are independent and normally distributed. The observed residuals are an estimate of the theoretical residuals, but are not independent (there are transformed on the residuals that remove some of the dependence, but still give only an approximation of the true residuals) Indiana, (2011). To test for normality in the population residuals, the study used Jarque-Bera test whose results are shown in figure 4.1 on the next page.
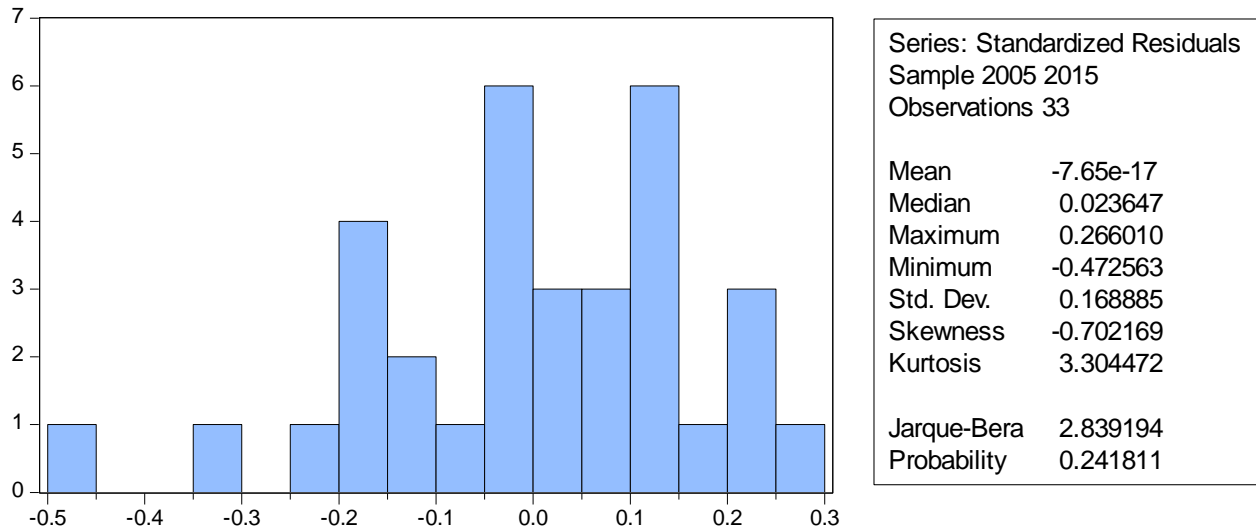
Figure:- Histogram-Normality Test for Normality of the Residuals in Panel regression model 4.1

To analyze the results of Jarque-Bera test in figure 4.1 above, the researcher set the following hypothesis;

H_0 : Residuals are normally distributed if probability of Jarque-Bera statistics $> 5\%$

H_1 : Residuals are not normally distributed if probability of Jarque-Bera statistics $< 5\%$

The probability of Jarque-Bera statistics from the figure 4.1 above is 24.1% which is greater than 5%, hence the researcher failed to reject the null hypothesis implying that the residuals are normally distributed.

Panel Unit Root Test:-

Pooled time series data, much like uni-variate time series data, tend to exhibit a time trend and are therefore non-stationary; i.e., the variables in question have means, variances, and covariances that are not time invariant. Engle and Granger (1987) argue that the direct application of OLS or GLS to non-stationary data produces regressions that are spurious in nature. These regressions tend to produce performance statistics that are inflated in nature, such as high R's and t-statistics, which often lead investigators to commit a high frequency of Type I errors (Granger and Newbold, 1974). Using the summary of Im, Pesaran and Shin t-test (2002) with null hypothesis stating that the panel data has unit root and alternative hypothesis stating that the panel does not have unit root, and Hadri (1999) with null hypothesis stating that the panel data is stationary or has no unit root and alternative hypothesis stating that panel data is not stationary, the result is displayed in table 4.2 bellow. Panel unit roots tests (both IPS and Hadri), reported in Table 4.2, support the hypothesis of a unit root in all variables across countries, as well as the hypothesis of zero order integration in first differences I(I). This finding is however in agreement with earlier research on the same by (Christopoulos & Tsionas, 2004) and Okello, Kigabo & Kitambala, 2015).

Table 4.2:- Panel Unit Root test.

Variables	Im, Pesaran and Shin test		Hadri Z-stat		Remarks
	Probability - Level	Probability - 1st difference	Probability - Level	Probability - 1st difference	
ly	0.0050**	0.4595	0.0002	0.0095**	I(0)
lmy	0.3458	0.0000**	0.0090	0.3095**	I(1)
lcpsy	0.6884	0.0000**	0.0020	0.0977**	I(1)
lbdy	0.3422	0.0140**	0.0118	0.3334**	I(1)
ltech	0.0900	0.0001**	0.0130	0.4521**	I(1)
lhc	0.0542	0.0001**	0.0073	0.2300**	I(1)

Panel Cointegration:-

After finding that all the variables are stationary at I(1) the researcher ran the Panel Cointegration model as shown Tables 4.3 and 4.4 bellow. The researcher used two tests namely Pedroni (1999a) in table 4.3 and Kao (Engle-Granger based) in table 4.4 and their results are conclusive: Pedroni (Engle-Granger based) test supports the presence of cointegrating vector. The Kao (Engle-Granger based) test also supports the hypothesis of a cointegrating relation. Therefore, all in all both panel-based tests concludes in support of a single cointegrating vector, and long run causality is unidirectional from financial sector development to growth which is in line with the findings of Christopoulos and Tsionas (2004)

Table 4.3:- Pedroni's Panel Cointegration result.

Pedroni Residual Cointegration Test					
Series: LY LMY LBDY LCPSY LTECH LHC					
Date: 04/22/16 Time: 03:48					
Sample: 2005 2015					
Included observations: 33					
Cross-sections included: 3					
Null Hypothesis: No cointegration					
Trend assumption: No deterministic trend					
Automatic lag length selection based on SIC with a max lag of 0					
Newey-West automatic bandwidth selection and Bartlett kernel					
Alternative hypothesis: common AR coefs. (within-dimension)					
				Weighted	
		Statistic	Prob.	Statistic	Prob.
Panel v-Statistic		-0.494422	**0.0195**	-0.709576	0.0610
Panel rho-Statistic		1.995642	**0.0470**	1.723048	0.9576
Panel PP-Statistic		-1.893288	**0.0292**	-0.748484	**0.0271**
Panel ADF-Statistic		-0.678524	0.2487	-0.565125	**0.0460**
Alternative hypothesis: individual AR coefs. (between-dimension)					
		Statistic	Prob.		
Group rho-Statistic		2.585342	0.9951		
Group PP-Statistic		-1.753153	**0.0398**		
Group ADF-Statistic		-0.384770	0.3502		

Table 4.4:- Kao's Panel Cointegration result.

Kao Residual Cointegration Test				
Series: LY LMY LBDY LCPSY LTECH LHC				
Date: 04/22/16 Time: 03:42				
Sample: 2005 2015				
Included observations: 33				
Null Hypothesis: No cointegration				
Trend assumption: No deterministic trend				
Automatic lag length selection based on SIC with a max lag of 2				
Newey-West automatic bandwidth selection and Bartlett kernel				
			t-Statistic	Prob.
ADF			-2.542036	**0.0055**
Residual variance			0.005007	
HAC variance			0.004608	

Conclusion and policy recommendations:-

This study used annual data from 2005 to 2015 to establish the relationship between financial sector development and economic growth using evidence from panel unit root and panel cointegration tests of the selected East African Community countries. To achieve this general objective, the research re-examined the common hypothesis in the finance-growth literature: the supply-leading, demand-following and bidirectional hypothesis. It applied the Panel cointegration tests by Pedroni (1999a) and Kao (1995b) to examine the long-run causal relationship between financial sector development and economic growth of the selected East African Community countries. The study utilized three financial sector indicators: a money supply (my), credit to private sector ($cpsy$) and bank deposits (bdy) while the control variables are Human capital (hc) and Technology ($tech$).

The Panel based regression model concludes that the use of credit to the private sector as percentage of GDP per capita is relevant since it is more related to the ability of the financial system to channel funds from savers to borrowers (financial intermediation). The results indicated positive and significant impact of Credit to the Private

Sector on economic growth of the selected EAC countries. In other words, the study established that coefficient of financial proxy variable (credit to private sector as a percentage of to GDP per capita is positive and statistically significant, supporting supply led hypothesis (Banking sector development leads to economic growth) this is in accordance with the predictions by McKinnon, (1973) and Shaw, (1973). This finding is consisted with the original study by King and Levine (1993) and later studies by Andrés, et., al. (1999) and Leahy, et., al. (2001), as they found significant links between bank credit to GDP ratios and subsequent economic growth rates in OECD countries.

The use of Bank Deposits to GDP per capita also indicated the consistency in supply lead hypothesis of the selected EAC countries as its coefficient is also positive and above all a statistically significant in the long run. As Levin, (1991) details that many projects or enterprises require a medium to long-term commitment of capital, whereas most savers prefer to have the option to draw on their savings, or move them into another investment opportunity, should the need arise i.e. they like their savings to be 'liquid'. Because banks and other financial intermediaries combine many households' savings, and because savers usually will not all want to withdraw their money at the same time, this allows financial intermediaries to simultaneously provide medium to long-term capital for investment, and liquidity for savers.

On the other hand, the Panel regression model indicated that M_3 herein denoted as money supply (my) is statistically significant but negative in the case of the selected EAC countries. This is in line with the findings of Mohamed, (2008) for the case of Sudan, but contrary to Kigabo, et., al, (2015) for the case of Rwanda, however the contradiction in findings is down to the inclusion of monetary policy variable in study done by Kigabo, et., al, (2015) which indicated that money supply without clear monetary policy is harmful to the Rwandan, Kenyan and Ugandan economy in the long run. Technology represented is shown to be statistically significant with a positive relationship. This means that the use of technology in Rwanda, Kenya and Uganda should be encouraged majorly through mobile banking.

On the same note, when the study used Panel cointegration tests by Pedroni (1999a) and Kao (1995b) test procedures, the overall results reveal evidence of unidirectional finance-led-growth of the selected East African Community countries in the long-run. This finding is in line with the findings of among others (Odhiambo, 2002; Zang and Kim (2007); Okello and Kigabo 2015).

The general conclusion is that there exists a supply flowing hypothesis from the financial sector development to economic growth of the selected EAC. In this paper we have combined cross-sectional and time series data to examine the relationship between financial development and growth in three developing countries.

The study has made use of panel unit root tests, and panel cointegration analysis to conclude that there is strong evidence in favor of the hypothesis that long run causality runs from financial sector development to economic growth, that the relationship is significant, and that there is no evidence of bidirectional causality but unidirectional causality. The empirical evidence also points to the direction that there is no short run causality between financial sector development and economic growth, so the effect is necessarily long run in nature.

The important policy implication is that policies aiming at improving financial sector of the selected EAC countries are important considering the variables used in this study. However money supply variable is herein significant but negative meaning that without clear monetary policy, money supply is harmful to the Rwandan, Kenyan and Ugandan economy in the long run. The use of technology especially through mobile banking should be encouraged. On the same points policy makers in these selected EAC countries should encourage savings through wide financial inclusion policies. This study achieved its general and specific objectives and the null hypothesis have been rejected meaning that all variables namely; $my, cpsy, bdy, hc, tech$ have a unidirectional cause to economic growth of the selected East African Countries. Such conclusions are in line with (Odhiambo, 2008).

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