Financial Development and Economic Growth in Tanzania

Frank Peter MANG'ATI[1], Bright ANTWI AGYEI[2], Raphael AMPEDU[3]

[1]Department of Finance: Zhongnan University of Economics and Law, Wuhan HU 430070, Hubei, China.

[2] Department of Business Administration: Zhongnan University of Economics and Law, Wuhan HU 430070, Hubei, China.

[3] Department of Accounting: Zhongnan University of Economics and Law, Wuhan HU 430070, Hubei, China.

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ABSTRACT

This research emphasizes the discovery of both short-term and long-term causal linkages between financial development and economic growth within Tanzania. It undertakes a thorough exploration of the dynamics at play between these two determinants, diverging from many previous investigations by using two indicators to measure domestic financial evolution: The allocation of credit to the private sector in relation to GDP, alongside the comparison of broad money supply (M2) and its correlation with GDP expansion. The study employs an assortment of statistical methodologies, including Granger causality analysis within a pairwise framework, Vector Error Correction Model, Johansen-Juselius cointegration test for Granger cointegration, along with Augmented Dickey-Fuller test for examining stationarity.

The objective of this research was to investigate the causality that exists between financial development and economic growth within Tanzania. Utilizing time series data spanning from 1980 to 2012, the findings of the investigation demonstrate a steady correlation across all indicators of financial development and economic growth. Moreover, the analysis elucidates a bidirectional linkage: it highlights a supply-leading mechanism prevailing over both short-term and long-term spans that links financial development with economic growth, accompanied by an analogous demand-following reaction relationship. The research implies that measures should be initiated to enhance the efficiency of financial sectors, which will expedite economic advancement in Tanzania. Furthermore, it is imperative for the government to intensify its initiatives in applying economic policy incentives to foster the growth of the financial sector within the economy.

Keywords - Financial Development, Economic Growth, Broad Money, Gross Domestic Product, Domestic Credit, Tanzania

INTRODUCTION

In both developed and developing nations, the advancement of financial systems plays a pivotal role in achieving economic prosperity. The financial system serves as a conduit for reallocating resources from entities with excess funds to those experiencing shortages. Entities with surplus capital engage in savings activities, whereas those on the deficit side utilize these borrowed funds to participate in various economic undertakings such as investment, production, and entrepreneurship. Moreover, governments may also access these resources

to finance projects like infrastructure development, which subsequently facilitates individuals' ability to perform diverse tasks more efficiently. Capital can be deployed by individuals, enterprises, or governmental bodies. In essence, the financial sector accumulates capital and leverages it to fulfill economic needs, which in turn can facilitate economic advancement. The degree of financial development within Tanzania corresponds with that of other least developed countries, proving inadequate for fostering economic growth. As articulated by the World Economic Forum, a nation's financial system or market exerts influence on its operational efficiency, long-term fiscal stability, and overall prosperity. They elaborated that the comprehensiveness, scope, accessibility, efficacy, and robustness of a country's financial systems., institutions, and regulatory frameworks are instrumental indicators of its financial progression.

The accessibility of financial services escalates in tandem with the advancement of the financial sector, facilitating a broader spectrum and ultimately enhancing welfare and prosperity for both producers and consumers who can avail themselves of these services. Regarding Tanzania, apprehensions persist concerning the breadth, depth, reachability, efficacy, and stability of its financial architecture, including systems, institutions, and regulatory frameworks. Thus, in the context of Tanzania, this investigation aimed to ascertain the causal relationship between financial development and economic growth. Nonetheless, empirical studies examining the nexus between financial development and economic growth have yielded varied outcomes.

THEORETICAL LITERATURE REVIEW

There are several theories that aim to elucidate the determinants underlying the favorable influence of FD[1] on EG[2]. There is hypothetical relationship between which dates back Schumpeter (1911) who posited that the innovation and development is vital due to service provided by financial intermediaries.Expanding on this relationship, Fry(1978, 1980) and Galbis (1977) looked at how government action affected the growth of the financial sector, they argued that intervention by the government, like credit limitation and high reserve requirement for banks, might negatively impact the expansion of the financial sector and, as a result, obstruct economic progress, in agreement with this, Greenwood and Smith (1997) as well as Levine (1997) have both argued for the existence of a positive association between FD and EG. They have proposed that the promotion of a strong financial sector plays a vital role in generating credit, thereby stimulating economic growth.

The imperative significance attributed to FD in facilitating EG has been significantly emphasized with the advent of endogenous growth theory. As a result, two primary perspectives regarding the correlation between finance and growth have emerged within scholarly literature, which has expanded to scrutinize this relationship. The initial perspective underscores the causative linkage between financial advancement and economic development, accentuating the positive impacts of financial progress on widespread economic enhancement. This phenomenon is ascribed to either an escalation in savings rates or improved efficiency in capital accumulation. Referred to as the supply-leading perspective, it was originally introduced by Schumpeter in 1911. Subsequently, researchers such as King and Levine(1993), along with Calderon and Liu(2003), among others, have lent their support to this theory.

The second viewpoint, known as the demand-leading approach, assert that changes in the real sector influence financial development. According to this viewpoint, financial development follows economic expansion in a causal relationship. The financial sector undergoes expansion and development as a result of the escalated demand for financial services, which is propelled by advancements in economic growth. Essentially, financial

[1]Financial Development
[2] Economic Growth

evolution reacts to the surge in economic activities. Proponents of this perspective include Ireland (1994) and Jug (1986)

Two further viewpoints arise in the context of supply-leading theories. The initial perspective suggests a bidirectional relationship, positing that financial development and economic growth exert mutual influences upon each other. Conversely, the subsequent viewpoint emphasizes the superiority of supply-leading over demand-following perspectives, signaling an ambiguous connection between financial advancement and economic expansion

The phase of economic development may impact the causal linkage between financial evolution and economic expansion, according to Patrick's (1966)Introduction to the hypothesis on developmental stages, where it is theorized that a supply-leading approach acts as an impetus for the formation of real capital during the initial phases of EG. According to the theory proposed by Patrick regarding developmental stages, there may exist a causative relationship between FD and EG contingent upon the stage of economic advancement. At the nascent phase of economic expansion, it is believed that a supply-leading paradigm supports real capital accumulation's potential enhancement. Certainly, the importance of FD in driving economic advancements, especially within developing countries like Tanzania, should not be underestimated. A considerable portion of individuals in these regions lack access to adequate capital for various entrepreneurial activities due to the ability of financial systems to redistribute funds from surplus to shortage areas. They play a crucial role in facilitating diverse economic activities; this mechanism enables investment, thereby augmenting economic efficiency. Therefore, it is clear that a positive association exists between the development of financial systems and economic expansion.

EMPIRICAL LITERATURE

A considerable volume of research has been conducted to explore the nexus between financial development and economic growth. Jug (1986) analyzed the connection between FD and economic expansion across 56 nations, encompassing 19 developed countries and 37 developing countries, through a thorough examination, the results showed that wealthy countries tended to follow demand-leading pattern, while developing countries showed a greater frequency of supply-leading causality. These results align with Patrick's (1966) stage of development theory.

The relationship between FD and EG growth was examined by Hoe and Moosa (1999). Their research revealed that financial development stimulates economic expansion. Expanding upon this, king, Levine, and Ghali (1999) discovered a causal relationship between FD and EG, Schumpeter's theory, according to these studies, that FD spurs EG is empirically supported. Furthermore, Odhiambo (2003) used a vector error correction model to investigate the casual relationship between FD and EG in South Africa, his findings supported the demand-leading view and refuted the supply-leading view.

Luintel and Khan (1999) used a multivariate vector autoregression approach to investigate the long-term relationship between FD and EG for ten different countries. All of the sampled countries' EG and FD were found to be causally related in both directions. Apergis et al. (2007), Odhiambo (2005), and Calderon and Liu (2003) all offered data in favor of the existence of bidirectional causality between FD and EGAkinlo and Egbetunde(2010) conducted an analysis of ten sun-Saharan African nations to explore the causal and long-term relationship between FD and EG, utilizing a VECM[3], their investigation spanned the years 1980 to 2005.

The ten Sub-Saharan African nations they chose—Congo, Gabon, Nigeria, Zambia, Central African Republic, Chad, Kenya, South Africa, Sierra Leone, and Swaziland—were found to have co-integrated FD and EG. In

[3]Vector Error Correction Model

these selected SSA[4] countries, a long-lasting correlation between financial development and economic growth was found. As a result, the study came to the conclusion that in Nigeria, Gabon, the Congo Republic, and the Central African Republic, FD Granger leads to EG (Akinlo and Egbetunde 2010).

Using the Granger-causality test, Odhiambo (2011) carried out a dynamic investigation into the causal relationship between financial deepening and EG in Tanzania spanning from 1980 to 2005. Using a straightforward trivariate model, this research distinguished itself from most previous studies by including foreign capital inflows as an intermittent variable between financial deepening and economic growth. The study's conclusions, which were derived using the ARDL bounds testing procedure, demonstrated a clear unidirectional causal flow in Tanzania from EG to financial depth. Al-Naif (2012) investigated the link between Jordan's EG and FD in a similar manner. Using time series data startingfrom 1977 to 2008, the Granger Causality, co-integration, and vector error correction techniques were employed in the study to reveal a long-run equilibrium between financial development and economic growth. The findings also indicated a unidirectional causal relationship from financial development to economic growth persisting in both the long and short terms.

Akinboade (1998) investigated the relationship between economic growth and financial development in Botswana between 1972 and 1995. The findings showed that there was evidence of a causal relationship that was bidirectional between financial development indicators and real GDP[5] per capita that is not related to mining. There are a few studies investigating the correlation between FD and EG in Tanzania, and the existing studies provide inconclusive findings A supply-led response is emphasized in some literature that supports the finance-led growth perspective, whereas a growth-led perspective emphasizes a demand-following response. There is still no universal agreement on which way FD and EG are causally related. The reason for this lack of agreement is that Tanzania has different financial infrastructures and differing rates of EG, which means that different proxies are used to gauge FD. This study aims to close these gaps by determining the causal relationship between Tanzania's FD and EG.

METHODOLOGY

The arguments whether financial development causes increased economic activities has been one of the most debated issues among economist and researchers. Therefore, the study among others employed Granger Causality test to provide empirical evidence of causal relationship between financial development and economic growth in Tanzania.

A. Granger Causality Test

Granger (1969) define causality in the statistical sense as the relationship between an economic time series and another if the inclusion of the previous results in a forecast that is precise than the exclusion of the latter. Feedback on causality can be bidirectional when it is both causing and causing, or unidirectional when Y cause X or X cause Y. the Granger Methods, which ‘see how much of the current Y can be explained by pat values of and then to see whether adding lagged values of X can improve the explanation’, are the most often used techniques for determining whether there is AC causal relation. If X aids in the prediction of Y, or if the coefficient on the lag value of X are statistically significant, then Y is said to be Granger caused by X. single equation techniques as suggested by Granger (1969), Sims (1972), Hsiao (1979, 1981), and others, can be used

[4]Sub Saharan Africa
[5] Gross Domestic Product

to estimate Granger causality. The following is the expression for a straightforward causality test with two variables; GDP and FIN.

$FIN_t=\sum_{j=1}^{k} \varphi j FIN_{t-j}+\sum_{j=1}^{k} \delta_j GDP_{t-j}+u_t$ …… (1)
$GDP_t=\sum_{j=1}^{k} \phi j FIN_{t-j}+\sum_{j=1}^{k} \gamma j GDP_{t-j}+v_t$ …… (2)

The null hypotheses to be tested are as follows:

H_1: φj=0, j=1……k, meaning that financial development does not cause GDP
H_2:δ=0, j=1……..k. Implies that GDP does not exhibit Granger causality over financial development

If the first hypothesis is true, then GDP is implied to be caused by financial development Granger. On the other hand, rejecting the second hypothesis implies that financial development and GDP are causally related. When neither hypothesis is rejected, it is clear that GDP is not caused by financial development and vice versa, indicating the independence of the two variables. Conversely, if one or both of the hypotheses are disproved, it suggests that there is bidirectional causality. Granger causality test should be done in the ECM and expressed as:

$\Delta FIN_{t-1}=\sum_{j=1}^{k} \varphi_j \Delta FIN_{t-j}+\sum_{j=1}^{k} \delta_j \Delta GDP_{t-j}+\beta_1 \varepsilon_{1t-1}+u_t$…….....(3)
$\Delta GDP_{t-1}=\sum_{j=1}^{k} \phi_j \Delta FIN_{t-j}+\sum_{j=1}^{k} \gamma_j \Delta GDP_{t-1}+\beta 2 \varepsilon_{2t-1}+v_t$..……...……(4)

Where $\varepsilon 1_t$-1 and $\varepsilon 2_t$-2 represent the lagged values of the error term derived from the subsequent cointegration:

$FIN_t=\alpha_0+\alpha_1 GDP_t+\varepsilon_{1t}$…….(5)
$GDP_t=b_0+b_1 FINA_t+\varepsilon_{2t}$…....……..(6)

B. Econometric Technique and Empirical Methodology

This study used co-integrated vector auto regression (VAR). The model was suitable for modeling time series simultaneously. Johannsen (1988:1995) pioneered a methodology addressing autocorrelation mechanism (VECM) specification, providing econometric corrections.The methodology avoids substantial bias that occurs in OLS estimates of the Cointegration relations when using Engle-Granger procedure. The Johansen approach is explained as follows: after defining a vector Yt n possibly endogenous variables, the data-generating process can be characterized, and Yt can be modeled as an unconstrained vector autoregression (VAR) involving p-lags of Y_t, which are specified as follows:

$Y_t=\mu+A_1 y_{t-1}+…..+A_p y_{t-p}+\varepsilon_t$…… (7)

In this case, t ε is a nxl vector of innovations, and Vt is a nxl vector of variables that are integrated of order one, or I(1). An (nxn) matrix of parameters makes up AI. According to Sims (1980), VAR modeling estimates dynamic relationships between endogenous variables without placing heavy restrictions on it beforehand. It is easy to reorganize equation 7 into a vector error correction format (VECM). The system is reduced form in this format, and all of the other variables in the system as well as each of the variables in Yt are regressed on their respective lagged values.

$\Delta Y_t=\mu+\Gamma_1 \Delta y_{t-1}+……+\Gamma_{p-1} \Delta y_{t-p+1}+\Pi y_{t-k}+\varepsilon_t$…….(8)

In this case, Δ is defined as -(1 - Ai -... - Ap), and Γi is defined as -(I - A1 -... - Ai), where i is any number between 1 and p-1. I stand for a unit matrix in these expressions, Ai (for i between 1 and p) for coefficient vectors, p for the number of lags in the system, and ε for the residuals vector, which indicates the unexplained

changes in the variables or the impact of exogenous shocks. Since all of the terms in equation (7) are I(1), equation (8) makes the assumption that there are only I(0) variables and a white noise process. The system was formulated by Jordan and Eita (2007) using estimates of Γi and μ, respectively, to offer insights into short- and long-run adjustments to changes in Vt. The matrix of long-run coefficients, represented by P, is an important component of VAR analysis. As a multiple of two (n x r) vectors, these long-run coefficients are represented by 'α.' P is therefore equal to ab', where 'b' is a matrix of long-run coefficients and 'a' is a vector of loading matrices that indicate the rate of adjustment from disequilibrium. The term '1t-by' in equation (8) denotes co-integrating relationships in the co-integration model up to (n-1). Evidence of the rank (r) for the P matrix corresponds to the presence of co-integration. If it maintains a full rank, denoted as r=n, it implies the existence of n co integrating relationships, and all variables are I(0).Assuming that t y is a vector of non-stationary variables I(1), it follows that all terms in equation (8) involving t i y – D are I(0), and t p y -P must also be stationary for t e ~ I(0) to be white noise. The co-integrating rank undergoes scrutiny through two statistics; the trace(1trace) and the maximum eigenvalue (1max). The presence of co-integration implies a long-run relationship between the variables, warranting a subsequent examination of the direction of causality as depicted in equation (1) to (4).Co-integrated variables share common stochastic and deterministic trends, moving together in a stationary manner over time, even if one variable is I(1) and the other I(0).in such cases, differentiating the I(1) variable is a suitable modeling approach, allowing the analysis to proceed with all variables being stationary. While Johansen's methodology is conventionally applied in systems where all variables are I(1), having stationary variables in the system poses no theoretical hindrance.Johansen(1995) notes that there is little need to pre-test variables for their order of integration.. if a single variable is I(0) instead of I(1), this distinction becomes evident through a co-integrating vector aligned with the only stationary variable in the model's space..

C. Sources of data and definition of variables.

This study employed annual time series data spanning from 1980 to 2012, sourced from the Quarterly Bulletins published by the Central Bank of Tanzania and the international Financial Statistic IFS[6] yearbook by the IMF[7]. To asses FD in relation to real GDP per capita growth, an indicator of economic growth, the study utilizes two proxies. The first proxy, the ratio of Broad money(M2) to GDP (M2/GDP), is designed to quantify financial development. This ratio reflects the actual size of financial sector in a growing economy. Over time, the ratio is expected to increase if the financial sector outpaces the real sector, and decrease if the financial sector lags behind the real sector. The second chosen proxy is the ratio of domestic credit to the private sector to GDP(DCP/GDP), a pivotal measure of financial intermediaries' development. The ratio signifies the significance of the financial sector in financial the economy.The assumption is that credit provided to the private sectors has a more pronounced impact on increasing investment.Fostering entrepreneurship, innovation and productivity compared to credits extended to the publicthe measurement of these variables is presented below.

a) M_2/GDP is a measure by the ratio of broad money(M_2) to GDP
b) DCP/GDP is a measure by the ratio of Domestic credit to the private sector to GDP
c) Economic growth is measured by the real GDP per capita growth.

The study explored the empirical relationship between two financial development proxies-namely, the ratio of broad money to Gross Domestic Product(Broad money/Gross Domestic Product) and the ratio of domestic credit to private sector to Domestic gross Product (Domestic Credit product/ Domestic gross Product). These proxies serve as indicators for economic growth.

[6] International Financial Statistics
[7] International Monetary Fund

EMPIRICAL RESULT AND INTERPRETATION

A. Unit Root Test

Time series datasets, like those utilized in this research, frequently demonstrate deterministic or stochastic time trends, thereby exhibiting non-stationarity; that is to say, the variables under examination possess means, variances, and covariances that do not remain constant over time. As pointed out by Engle and Granger (1987), the direct application of OLS or GLS to non-stationary data produces regression that are mis-specified or spurious in nature.Consequently, we tested variables for a unit root (non-stationary0 using an Augmented Dickey-Fuller test (ADF) (Dickey-Fuller, 1981). The results of the stationary tests at level show that all the variables are non-stationary at level 9. Having found that the variables are not stationary at level, the next step is to difference the variables once in order to perform stationarity tests on difference variables. The results of the stationarity tests on differenced variables confirmed stationary.

TABLE I AUGMENT DICKEY-FULLER TEST STATISTICS FOR GDP AND FINANCIAL INDICATORS, 1980-1981

Variables		
Model specification	Test statistics	
	Level	1st Difference
LNGDP		
Intercept and trend	-1.73	-4.19***
Intercept	-0.33	-4.31***
None	-0.81	-4.41***
LNM2GDP		
Intercept and trend	-2.51	-4.56***
Intercept	-2.51	-4.28***
None	-0.41	-4.35***
LNDCPRIV		
Intercept and trend	-1.34	-3.39***
Intercept	-0.62	-3.76***
None	-0.30	-3.47***

Note:i) All variables are in logs. The test uses different lags, not exceeding four lags.
ii) ***, ** and *Indicate the rejection of unit root at the significance levels of 1%, 5% and 10%, respectively

B. Cointegration Analysis

After establishing that all variable considered in the causality test are integrated of order one, the subsequent phase involves examining the presence of a co-integration relationship among the variable series. This examination is conducted through the application of the Johansen-Juselius approach, as detailed in the methodology. The cointegration test results are shown in Table 2.

TABLE II CONTEGRATION TEST RESULT BETWEEN LGDP, LM2 AND GDP

Null hypothesis	Alternative hypothesis	
Test statistics	0.05 critical value	probability**

Trace statistics		
r=0	r=1	
43.18*	29.79	0.0008
r=1	r=2	
11.32*	15.49	0.0226
Maximum Eigenvalue Statistics		
r=0	r>0	
31.86*	21.49	0.0011
r≤1	*r=2*	
0.56*	3.8	0.167 .

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values

The results in table 2 indicate the existence of long run relationship between the proxy of financial development and economic growth.Both trace statistics and maximum eigenvalue statistics reject the null hypothesis of no cointegration at 5% level 1. The trace statistics lead to the rejection of the null hypothesis suggesting no co-integration (r=0) among Gross Domestic Product, Broad money/Gross Domestic Product, and Domestic Credit/Gross Domestic Product. Instead, the general alternative hypothesis of r=1 is accepted. However, at the 5% significance level, the null hypotheses of r=1 and r=2 cannot be rejected.Also, the maximum eigenvalue statistics reject null hypothesis of no cointegration vector(r-0) at 5% level of significance and accept the specific alternative hypothesis that there is one cointegration (r=1). Likewise, the null hypothesis of r=1 and r-2 could not be rejected at 5% level of significance.Consequently, based on the results, the conclusion can be drawn that there exists a single cointegration vector between the EG variable GDP and the two proxies of FD. This implies the presence of a long-run relationship between FD and EG.

TABLE III ERROR-CORRECTION MODEL ESTIMATION

Variables	Coefficient	Std.Error	t-Statistics	P-value
D(LGDP)	0.468193	0.246881	1.896438	0.0787
D(LM2/GDP)	0.357070	0.260258	1.371984	0.1917
D(LDC/GDP)	0.236650	0.778027	0.304167	0.7655
LECM	-0.736232	0.284531	-2.587524	0.0215
Constant	0.002320	0.090448	0.025647	0.9799

The VECM findings presented in the table indicate a positive impact of all FD measures on real GDP. The results discern short-run and long-run Granger causality. Notably, the coefficient of lagged error correction term (ECM) in the table is both negative and statistically significant. This relevance suggests that there is a causal relationship between FD and EG over the long term. Additionally, it implies that EG and FD initiatives are adjusting to their long-run equilibrium relationships. The negative coefficient of ECM indicates the speed of adjustment to the long run equilibrium relationship, which is 74% speed of adjustment, meaning that it's adjusting slowly towards the long-run equilibrium. TheVECM results passed all diagnostics statistics. The results are multivariate which have no heteroscedasticity and no serial correlation.

C. Granger Causality Test Results

The unit root and co-integration tests reveal that both financial development and economic growth exhibit I(I) characteristics and are co-integrated. This implies the existence of a long-term relationship between the two variables. Their short-term dynamics might still be connected, though. These variables are stationary because their first differences capture the short-run fluctuations in them. VAR[8] model in first differences provides an effective description of the interactions during these short-run fluctuations. In a broader context, the VAR model proves effective in scrutinizing the dynamics and interaction among multiple time series. Given the unknown causal relationship between FD and EG and the anticipation that past values or both variables might significantly impact their current values, the VAR model stands as a suitable analytical choice. To estimate the variables of FD and EG, a one-lag VAR model was employed. Various hypotheses underwent testing, and the VAR (I) models were estimated using the specified form, with all variables expressed in their first difference

H_0 = Financial development does not cause economic growthor economic growth does not cause financial development.

H_1 = Financial development cause economic growth or economic growth causes financial development

TABLE IV CAUSALITY TEST

Direction of P-value	Decision Causality	Outcome
LGDP>M2 5.6%	Do not reject Ho	LGDP does not cause M2/GDP
LM2/GDP> 16.4%	Do not reject Ho	LM2/GDP does not cause GDP
LGDP>LDCP/GDP 42.9%	Do not reject Ho	LGDP does not cause LDCP/GDP
LDCP/GDP<LGDP4.2%	Reject Ho	LDCP/GDP does cause LGDP
LDCP/GDP>LM2/GDP64.3%	Do not reject Ho	LDCP does not cause LM2/GDP
LM2/GDP>LDCP/GDP 91.1%	Do not reject Ho	LM2 does not cause LDCP/GDP

[Note: P-value less than 5% at significance level indicates that the null hypothesis is rejected at that level]

The results shown in the above table depict that financial development and economic growth are causally related in both directions. In particular, the causal relationship is found to flow from economic growth to financial development when the ratio of broad money to GDP is used as a stand-in for financial development. This is not the same as the findings of Odhiambo (2011), who found evidence of a bi-directional causal relationship. It's important to note that while Odhiambo employed the log of real GDP per capita as a stand-in for EG, the current study uses the log of real GDP as a measure of EG. Furthermore, there may be differences in the results because this study's econometric methods are different from Odhiambo's. Similarly, the causal relationship between FD and EG is found when the private sector to GDP ratio is used as a stand-in for FD. Furthermore, findings from Kar and Pentecost (2000) emphasize that the choice of financial development proxies affects the direction of causality between financial development and economic growth.

This study findings strongly support the perspective that the interplay between FD and EG aligns with both supply-side and demand-side theories. The established causal relationship underscores the potential acceleration of Tanzania EG through prioritizing initiatives focused on improving the efficiency and advancement of financial system. Conversely, when the causality is from EG to FD, it implies a need for the government to

[8]Vector Auto Regressive

intensify efforts in formulating policies that foster growth. This, in turn, create a conducive environment for the development of the financial sector within the economy.

D. Post-Estimation Diagnostic

To evaluate the model's predictive accuracy, a standard test for residual normality was run. The test was designed to assess the alternative hypothesis, which asserts that the residuals deviate from normal distribution, against the null hypothesis, which suggests that the residuals are normally distributed.

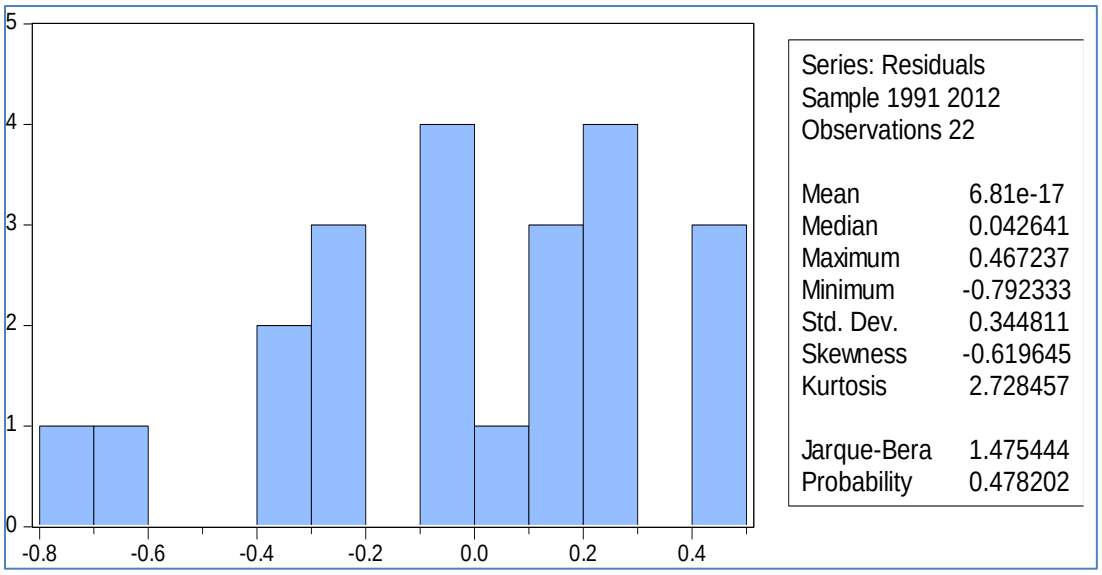

Figure 1: Residual Normality

The outcomes indicate that the residuals of the model exhibit a normal distribution, as indicated by the p-value of 0.478202, which is greater than the significance level of 0.05

A residual test of Heteroskedasticity was conducted by using the Breusch-Pangan-Godfrey test on the null hypothesis that there is no ARCH affect and alternative, there is ARCH affect.

TABLE V HETEROSKEDASTICITY TEST: ARCH

F-statistic	3.057744
Prob. F (2, 17)	0.0734
Obs*R-squared	5.291248
Prob. Chi-Square (2)	0.0710

The outcome reveal that the residual model exhibits no ARCH effect, evident from the p-value of 0.0710, surpassing the 0.05 significance level.

An autocorrelation residual test was performed utilizing the Breusch-Pagan-Godfrey serial correlation LM test. The null hypothesis posits the absence of serial effect, while the alternative hypothesis suggest the presence of serial effect.

TABLE VI BREUSCH-GODFREY SERIAL CORRELATION LM TEST

F-statistic	1.146985
Prob. F (4, 10)	0.3894
Obs*R-squared	6.919049
Prob. Chi-Square (4)	0.1402

The results from the table above, indicate that the residuals of the model are not serially correlated with the variables as indicated by the p-value 0.1402 which is greater than the 0.05 level of significance.

CONCLUSION

This study used cointegration and error-correction models to examine Tanzania's economic growth. In order to stimulate economic growth, the research compares two proxies for financial development with real GDP per capita. The ratios of domestic credit to the private sector to domestic gross product (Domestic Credit product/ Domestic gross product) and broad money to gross domestic product (Broad money/Gross Domestic Product) are the two financial development indicators taken into consideration. The empirical findings of this research demonstrate that the relationship between Tanzania's financial development and economic growth depends on the approach taken to measure financial development.

The research finds that when using the ratio of broad money to GDP (M2/GDP) as a stand-in for financial development, demand-following evidence is frequently present. Odhiambo (2004, South Africa), Waqabaca (2004, Fiji), Odhiambo (2007, South Africa; Kenya), and Odhiambo (2011, Tanzania), among others, have viewpoints that are in line with this. But when one looks at the ratio of domestic credit to the private sector (Domestic Credit product/ Domestic gross Product), one can clearly see a supply-leading response. In summary, the study finds that in Tanzania, a supply-led response is less common than a demand-following one. This suggests that the country's financial advancement is primarily driven by economic expansion, to use Granger's terminology. Stated differently, expansion in the real sector encourages active participation in the financial markets. Even though this study may not be like most other studies, it still agrees with the conclusions of Waqabaca (2004), Odhiambo (2004a), and Zang and Kim (2007).

In conclusion, the study establishes a causality between financial development and economic growth, underscoring the need to enhance the effectiveness and efficiency of Tanzania's financial systems. Additionally, it emphasizes the importance of government initiatives in formulating policies geared towards fostering economic growth. Such policies are crucial as they not only contribute to the development of the financial sector but also play a pivotal role in overall economic improvement.

AUTHORS CONTRIBUTION

Frank Peter MANG'ATI: Idea conceptualization, literature revision, methodology, original draft article writing and formal analysis.

Bright ANTWI AGYEI: Analysis, Review, Editing and Supervision

Raphael AMPEDU: Proofreading and Editing

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There is no conflict of interest in the entire work..

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The authors declare that they do not have competing interest related to the publication of this manuscript.

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