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THE DIRECTION OF CAUSALITY BETWEEN FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN TANZANIA: AN EMPIRICAL ANALYSIS

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ABSTRACT

This paper examines causality relationship between financial development and economic growth in Tanzania over the period 1980 to 2012. In time series context, recently econometric techniques were used; namely Augmented Dickey and Fuller test (ADF) for unit roots test, Johansen test for Co-intergration test, Vector error correction model (VECM) tested for short run and long run causality, a pairwise Granger causality test used to establish the direction of causality and Variance decomposition (VD) under VAR framework applied for validating strengths of findings outside the estimated sampling period. In overall empirical findings can be summarized as follows. Firstly, there is long-run relationship between financial development and economic growth. Secondly, granger causality test suggests economic growth causes financial development in a short-run when broad money to nominal GDP and liquidity liability to nominal GDP used, however when credit to private sector to nominal GDP was used findings confirmed evidence of bidirectional causality between financial development and economic growth, and in a long-run causality run only from Economic growth to financial development even in outside the estimated sampling period. Thirdly, financial sector has been effective in promoting economic growth in a short run only and economic growth variable was the most exogenous leading variable than others suggesting, financial sector has played little role in promoting economic growth in Tanzania. Lastly, capital accumulation channel via gross domestic investments to nominal GDP links financial development and economic growth in a short run only, suggesting long-term financial infrastructures that are necessary for successful promoting investments for spurring economic growth still remain weak in Tanzania. These findings are contrary to the convectional results favored only supply view. Although study has confirmed

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mixed results on the direction of causality between financial development and economic growth in Tanzania ,in view of feedback effect results, study recommend more efforts should be devoted to the deepening of financial sector by enhancing competition, improving business environment, investing on human resources and legal environment.

Keywords: Financial development, Economic growth, Cointergration, Granger Causality and Tanzania.

1. INTRODUCTION AND BACKGROUND

The link between financial development and economic growth has been examined by numerous empirical and theoretical studies and it is generally well recognized that, financial sector is crucial for economic development (Levine, 1997, and Eita et al, 2007, Hussain 2012).It improves productivity and economic growth through functions which are part of financial system such as, mobilizing savings, allocating capital, evaluation and monitoring borrowers through either effects of capital accumulation (rate of investment) and technological innovation.

Theoretical relationship between financial development and economic growth has been well established and date back to the work of Bagehot (1873) who claims that, large well organized capital markets in England enhanced resource allocation towards to more productive investments. Other early work along with this view is Schumpeter (1911) who emphasized the role of financial sector and especially the banking sector as paramount in promoting economic development by mobilizing savings, and encouraging productive investments.

However, until 1960s the impacts of financial sectors' development on the process of economic growth of a nation did not gain sufficient weight in literature .It is latter works of Economists like MacKinnon (1973) and Shaw (1973) among others who threw light on aspects of economic growth and have succeeded to attract attention and interest of economists of modern times. Although Mackinnon-Shaw hypothesis was very influential and was used in affecting policies of many developing countries , it was the findings study of King and Levine (1993) which attempted to generate renewed interest on the effects of finance on economic growth (Hussein et, al. 2012).

Consequently, numerous studies have been undertaken attempting to answer two related questions, correlation and the direction of causality between financial development and economic growth. There is general agreement among economists about correlation but, the direction of causality between financial development and economic growth has remained a controversial matter and central question being whether financial development causes economic growth or economic growth causes financial sector development. (Sindano, 2009 and Aknilo et al, 2010). It is surprising to notice that, in most of the time studies undertaken largely

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concentrated in Latin America, Asia and in advanced economies with insufficient coverage or none at all about Sub-Sahara Africa and mostly were cross country studies. However, despite their bias about Sub- Sahara Africa studies have failed to address country specific issues (Odhiambo, 2011).

By standards of developing countries, Tanzania is regarded as least of developing country in Sub Sahara Africa and has relatively less developed financial system when compared with some African countries. The World Economic Forum Finance report (2012), which measure development financial sector covering the best world financial systems including Tanzanian financial system, Tanzania was ranked the 60th out 62 countries covered whereas Kenya was ranked 54th , Ghana 56th , and South Africa 28th. Its financial sector deepening as measured by financial depth indicators has not reached to the expected levels; is even below that recorded in 1980 though has undergone through series of reforms. In 1980 the ratio of M2/GDP and liquidity liability/GDP, were 41, and 41.4 in percentages respectively but, as at 2013 the ratios recorded 26, and 32 in percentages respectively. Financial sector in Tanzania comprises banks, pension funds, insurance and other financial intermediaries (Christina Falle, 2013). Banking sector is the most dominant, suggesting that reforms far embarked in Tanzania have largely impacted banking sector. Banking sector in Tanzania account for about 74% of total assets in the financial system while pension and insurance sector accounts only for 24% and 2% respectively (BoT, 2013).

Economic growth rate as expressed in real GDP since independence to the present time has exhibited different patterns with periods of high and moderate growth rates .Between 1967-1973; real GDP growth rate was satisfactory on average by 4.4 percent. However, in 1974- 1985 growth rate of GDP went down on average was 2.4 percent, with a decline of 2 percent from the previous phase and within the same phase headed down and recorded negative historic GDP growth rate in 1981 as –0.5 percent and in 1983 deepen down to -2.4 percent . Major driving forces for the downturn were economic crisis that hit the economy, oil crisis, draught, war with Uganda, prolonged deficit budgets and repression policies which undermined macroeconomic stability needed for the long-term growth. From 1986-1989 the growth rate of real GDP was by 3.9, percent on average, 1990-1994, 4.2 percent and, 1995- 2012 was 6.6 percent on average. The upward growth trends recorded from 1986-1969 to the present time is trying to suggest maturity of the reforms embarked from the 1986.

For the purpose of drawing proper inferences and provide policy makers with necessary information about impacts of financial sector through financial reforms implemented on economic growth in Tanzania , it cannot be only done by observing up and down trend of variables, rather need to be tested empirically by using advanced econometric techniques to provide evidences based on findings that, financial reforms have impacted financial sector and

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ultimately economic growth rate for further policy development and setting strategies of stimulating economic development in both short term and long term. Studies on finance- growth nexus in Tanzania are almost limited (Odhiambo, 2005, 2011, and Christine Falle 2013) and those examined causality mostly have attempted to use financial development indicators and economic growth variables to conduct their analysis; they have not well explained specific mechanisms or channels in which Tanzanian financial sector development impact economic growth and vice versa. In addition to that, result on the direction of causality has remained ambiguous as it has been elsewhere. Besides that, majority limited their studies in biviriate analysis and in the surveyed literature causality has been examined within the estimated sampling period.

This paper, therefore attempts to fulfill the voids by examining causality relationship between financial development and economic growth in Tanzania using recently time series data set. Specifically study was aimed to establish the direction of causality of between financial development and economic growth, to examine effectiveness of financial sector in promoting economic growth, and lastly establish channels linking financial development and economic growth. The rest part of this study is organized as follows; section 2 gives theoretical reviews, and section 3 empirical reviews, whereas methodology and empirical results are in section 4 and 5 respectively. Section 6, provides conclusion and policy recommendations.

2. THEORETICAL REVIEWS

When considering economic growth theories, the most well known economic theory (model) to investigate outputs dynamics is the Solow model. This model was developed in the late of 1950s. The model states that "once an economy attains its equilibrium level of output, growth rate of population and technology are the sole determinants of output growth" (Valickova, 2012). With time other economists emerged and criticized the theory in that, countries are heterogeneous in more than the two determinants of output growth presented and it was noted that the Robert Solow theory managed to explain only small part of economic growth of a specific country. Also, with the passage of time other models involving more than two determinants' such as, human capital accumulation, technology, propensity to save, and growth rate etc were developed. However, these theoretical models omitted one important determinant, that is the level of country's financial development due to its' nature of complexity (Sindano, 2009 and Valickova, 2012). It is similarly with other determinants of economic growth, that once true causality and directional effects of financial development in economic growth has been determined and being understood, economic policy can be shaped to approach the desired level of economic growth more efficiently. In this case poor countries can ketch up faster; the

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developed countries and developed one will continue to enjoy stable economic growth (Valickova, 2012).

The hopes of having equation type or model that could explain financial development as an input factor in economic growth materialize following to the emergence of endogenous growth theory. The modern growth theory developed over the last twenty years recognizes financial development as important determinant of economic growth. It is contrary to Solow model, that in the new theorists, sources of growth are determined endogenously and among others, it include, Pagano (1993), Greenwood and Smith (1997) both have presented models in which both capital accumulation and growth are endogenously determined. Let us consider a simple endogenous growth model presented by Pagano (1993) – the AK model, that aggregate output is the linear function of capital stock.

$$\mathrm{Y_t = AK_t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots . (1)$$

For simplicity Pagano assumed, population is stationary and that the economy produce single good and can be consumed or invested. If invested it could depreciate at the rate of δ per period, then gross investments equals

$$I_t = K_t + (1-\delta)K_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots . (2)$$

In a closed economy with no government, capita market equilibrium requires gross saving St equals to gross investments It. For reasons that will be made clear below it is convenient to assume that a proportion (1-ø) of the flow of saving lost in the process through financial intermediation. In this case only parts of saving that will be allocated to investments is øSt, thus

$$S_t = I_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots . (3)$$

$$\emptyset S_t = I_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$

At time (t+1) growth rate is given by; δ

$$g_{t+1} = \frac{Y_{t+1}}{Y_t} - 1 = \frac{K_{t+1}}{K_t} - 1 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (5)$$

$$K_{t+1} = I_t - (1-\delta)K_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (6)$$

Replacing Kt+1 with its value, is given as

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$$g_{t+1} = I_t - (1-\delta)K_t/K_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

$$g = \frac{AI_t}{Y_t} - \delta \leftrightarrow g = A\emptyset S - \delta \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

Therefore, growth rate (g) equals to marginal productivity of capital (A), rate of savings and the proportion of savings channeled to investments ø minus δ. From this model one can conclude that, it is unlike the Solow model that in Pagano model both savings and productivity of capital affect long-term economic growth positively. Also, the remaining fraction (1- ø) can be considered as tax imposed by government in form of reserve requirement, transaction taxes etcetera, as proposed by Roubin and Sala -i- Martini (1992), sometime may also reflect X-inefficiency of intermediaries and their market power. Therefore, if one can reduce the linkages of resources that raises saving rate ø and it also increases growth rate (g) in equation 8.

Theory suggest that ,when financial arrangements, markets, financial institutions arises to ameliorate information and transaction costs financial systems serve one primary function of allocation of resources across space and time in a certain environment (Merton, Bodie 1996 pg 12) as cited in Levine (1997). The primary function further is categorized into five basic functions which includes, mobilizing savings, facilitating exchange of goods and services, facilitate trading hedging, diversification and pooling risk, evaluate managers and exert corporate control, acquiring information and resource allocation. Financial system affects economic growth through these five functions. There are two recognized ways or channels used to demonstrate how financial system can affect economic growth, ie through technological innovation and capital accumulation. In capital accumulation growth based models, functions performed by financial system can affect economic growth by influencing rate of capital accumulation through either altering saving rates or reallocating savings among different producing technologies while, in technological innovation growth models, focus on inventions of new production process and goods, in these models functions performed by financial system can affect economic growth through technological innovation. Apart from these two widely recognized channels as Levine (1977) demonstrated, extension has been made by some recent studies to incorporate shock absorber as another channel used to explain how financial systems can affects economic development and among other supporters includes Coricelli (2008), Cerra and Sexena (2008).

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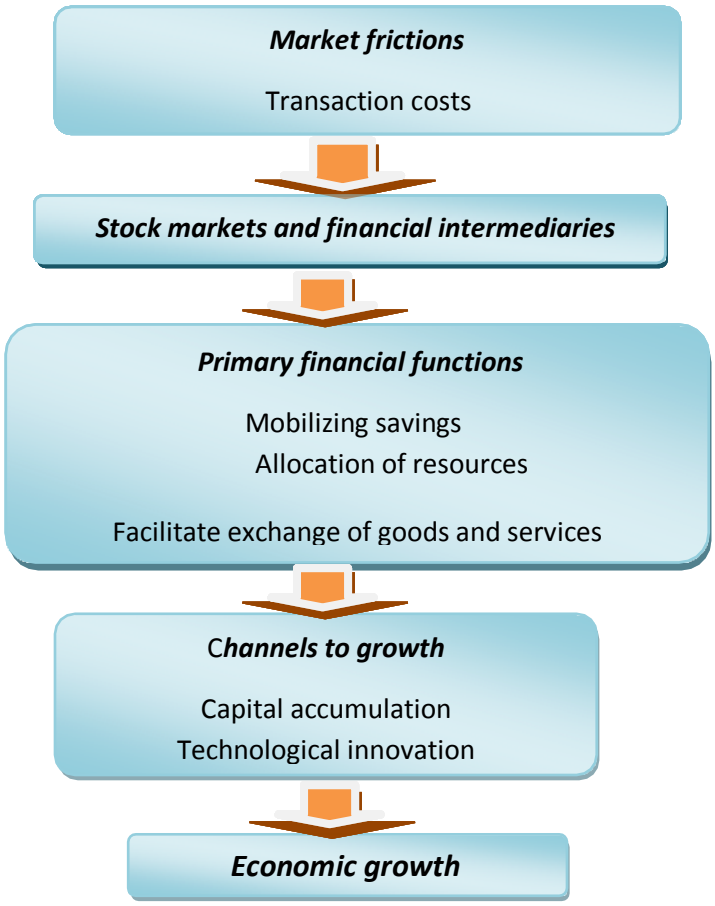
Figure.2. Theoretical approach to finance and economic growth source; Levine (1997), Coricelli (2008), and Valickova (2012)



3. EMPIRICAL REVIEWS

In general empirical literature has been characterized by four streams of thoughts related to the direction of causality between financial development and economic growth. The first, is supply streams of thoughts which simply states that, financial development causes economic growth and among other supporters, includes the early works by Gurley, Shaw (1955), Gold smith (1969) and Hicks (1969), as cited by Ang, (2007, p 3), Patrick (1963), and Latter on by Mackinnon and Shaw (1973) to more recently by Hussein, and Chakrabarty ,(2012).In general they have argued that development of a financial system is crucially important for stimulating economic growth and underdeveloped financial system retards economic growth. This view had policy

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implications that focused on formulating policies aimed at expanding financial services for fostering economic growth.

The second line of views, growth lead finance (Demand following views), mostly contents that economic growth causes financial development. This view was advanced by Robison (1952), it simply states that finance follows economic growth or where enterprise leads finance follows economic growth. Other empirical studies in line with this views are Fredman and Schwarz (1963) and Demetrides and Hussein (1996).This view had policy implications focused on formulating policies that are aimed at promoting growth of real sectors of economy for fostering financial development, that when economy expands, demand for certain financial instruments and arrangements and then financial markets increases hence leading to the growth of these services (financial services) and finally financial development.

The third one is hybrid view or feedback causality or the bidirectional causality views between financial development and economic growth. In this view researchers believe existence of compliment causality between financial development and economic growth. Environment that has been considered is that, under well developed financial system in a country economic growth could be promoted through technical changes, innovations and products and service innovations (Schumpeter ,1912). This in turn will lead to high demand for financial arrangements and services (Levine ,1997). In the course of response from banking institutions to meet the increasing demand, this will stimulate further economic development hence provide feedback causality or two way causality. Among other empirical works, supporting these arguments includes Greenwood and smith (1997).

Fourth view worth discussing follows Robert Lucus view (1988, p.6), he argued that financial development and economic growth are independently causally related. In other words, it is based on the idea that, financial development does not cause economic growth and vice versa. (the two variables are independent each other). Lucus further stated that economists badly overstress the role of financial variables in economic growth. This view does not attribute that; finance has any role on promoting economic growth and vice versa (Valicuva, 2012). Also some development economists' pioneers have expressed their skepticism about the role of financial systems in economic growth by just ignoring it (Anand chandayarkar 1992). For example Nicholas Stern's (1989) review of development economics does not discuss financial system, even in a section that lists omitted topics as cited by Levine (1997).

African empirical literature study surveyed falls within the four streams of thoughts as mentioned above, starting with those undertaken in other parts of Africa than Tanzania, they includes, Eita el al (2007), conducted empirical study on causality analysis between financial development and economic growth in Botswana for the period between 1977 to 2006 using

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Granger causality test through cointegrated Vector Auto regression methods, findings confirmed causality runs from financial development to economic growth implying financial intermediations and institutional reforms should be further enhanced to promote Botswana's economic growth. In Tanzania studies of this nature are almost limited (Odhiambo, 2011, Christine Falle 2013). Specific notable studies includes, Akinboade (2000), who investigated the relationship between financial development and economic growth in Tanzania using ratio of bank deposits liability and real GDP percapita income through static ordinary least square (SOL) and dynamic ordinary least square (DOLS) estimation techniques. He conducted his analysis into two periods, before liberalization 1966-1981 and after liberalization 1982-1996 and provided two conclusions: First, financial development was negatively related with economic growth and significant (in the 1966-1981) and second conclusion, was that ,the two variables are independent in the period between 1982-1996 as cited by (Gin and Ndiege , 2013). In reality financial development has different dimensions, there is no single variable that can measure and capture all aspects of financial development as used by Akinboade (2000), and besides bank industry measures are not appropriate measure since financial system is not only about banks (Global financial development report, 2013,) . Also the use of SOL and DOLS are subjected to asymptotic bias because does not fully correct for the second-order asymptotic bias effects of cointegration since a "truncation bias" always remains (Panopoulous et al, 2004)

Although present study uses granger causality test through cointergrated VAR methods as used by some previous studies in Tanzania but this depart from the existing in the following ways; it uses longer time series data from 1980-2012 , explore channels in which Tanzanian financial sectors causes economic growth and vice versa because most of studies examined causality based on financial measures that may not capture mechanisms such as through enhancing efficiency ,also present study adopt multivariate framework by involving four variables (financial variable is captured by three indicators M2/GDP, Liquidity liability/GDP and domestic credit to private sector/GDP, other variables are savings to GDP, domestic investments to GDP and real GDP per capita). Further, study uses variance decomposition (VD) to evaluate strengths of the findings from granger causality test outside the estimated sample period which has not been the case for the observed studies in Tanzania.

4. METHODOLOGY

4.1 Model specification

$$GDP = f(FD, Z) \quad (1)$$

Where FD is financial development and GDP is real GDP percapita. To avoid specification bias as it has been reported in bivariate analysis, conditional variables (savings/GDP and

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investments/GDP) are included in model Z for estimation purpose. The function can also be presented in log linear econometric format as :

Log GDPt = α0 + α1 log FDt +α2log savings/GDPt +α3logI/GDPt + εt ……... (2)

Where financial development (FD) is captured by (M2/GDP, Liquidity Liability/GDP and credit to private sect/GDP), savings /GDP is ratio of savings to nominal GDP, and I/GDP is ratio of domestic investments to nominal GDP, α is constant term, t is time trend and εt is error term. The coefficients α1 ,α2 and α3 are expected to be significantly positive.

4.2 Econometrics procedures for data analysis

4.2.1 Stationarity test

To avoid spurious regression results on non stationary variables, all series of variables were differenced. There are different ways used to test stationarity but, the most widely used way is unit root test. This study uses standard Augmented Dickey-Fuller (ADF) test that takes into account any autocorrelation presented by adding the lagged values of the dependent variable

ΔX_t

$$\Delta X_t = \propto_1 + \propto_2 t + \delta X_{t-1} + \sum_{t=1}^{m} \beta_t \Delta X_{t-1} + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

Analysis involved first intercept, then intercept and trend. Where Xt is the variable, whose time series properties is being investigated, Δ is the Difference operator, m is the number of lagged variables, and εt is the random error term. Null hypothesis tested for each series of a variable (H0; δ= 0, has unit root and is non stationary) and alternative hypothesis (H1: δ< 0, has no unit and trend stationary)

4.2.2 Cointergration

There are two widely used approaches to investigate cointergration between variables, Engle Granger and Johansen tests. Engle-Granger approach investigates the possibility of cointergration in a bi-variate models and one of its major weakness or limitation is that, it assumes uniqueness of cointergration vector and when there is more than two variables does not provide sufficient framework. This study applies Johansen procedure which is based on Vector Auto-regression (VAR) framework. This econometric technique corrects for autocorrelation and endogeneity parametrically using vector error correction (VECM) mechanism specification (Edita and Jordaan 2007). The Johansen procedure in form of Vector Autoregressive Error correction mechanism for k vector and variable Xi is described as follows.

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$$\Delta\chi_t = \sum_{i=1}^{p-1} \prod_i \Delta\chi_{t-i} + \alpha\beta\chi_{t-p} + \epsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4$$

Where vector (β1, 2, 3.. n) Contain r co integrating vectors and speed of adjustments parameter (α1, 2… n) when rank α = r < k, k is number of endogenous variables (Amiruddin et al, 2007).

4.2.3 Granger Causality test

In order to test whether financial development causes economic growth and vice versa study uses granger causality test developed by granger (1969), according to him a variable (in case Financial development) is said to granger causes the other variable (Economic growth) if the past and present financial development predict Economic growth/real GDP percapita (Edita, and Jordan 2007). This approach is preferred because of it is response for both small and larger samples (Odhiambo 2011). Thus; for estimation purpose a simple causality test is presented by the following regressions equations assuming three variables case.

$$FD_t = \sum_{j=1}^{p} \propto_j FD_{t-j} + \sum_{j=1}^{p} \beta_j GDP_{t-j} + \sum_{j=1}^{p} \gamma_j Z_{t-j} + \mu_{1t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

$$GDP_t = \sum_{j=1}^{p} \lambda_j FD_{t-j} + \sum_{j=1}^{p} \delta_j GDP_{t-j} + \sum_{j=1}^{p} \phi_j Z_{t-j} + \mu_{2t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

$$Z_t = \sum_{j=1}^{p} \theta_j FD_{t-j} + \sum_{j=1}^{p} \eta_j GDP_{t-j} + \sum_{j=1}^{p} \omega_j Z_{t-j} + \mu_{3t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Where ere μ_{1t}, μ_{2t}, and μ_{3t} is white noisy error term for the three functions, GDP_t = Economic growth variable (in real GDP percapita) and FD_t = Financial development Zt= Savings /GDP & domestic investment/GDP. Similar approach has also been followed in (Chimobi , 2010, Ang 2005)

However, the traditional granger causality test as presented above uses F-statistics. The use of F-statistics have some statistical problems and has been identified as not sufficient if variables are integrated at order I(1) and cointegrated, that it fails provides standard distribution (Edita et al, 2007). It is therefore advised to obtain the causal inference through error correction model because it reintroduces information again that lost during differencing process and hence maintaining long run information. Error correction model is presented by equations (8, 9 and 10)

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$$\Delta FD_t = \sum_{j=1}^{p} \propto_j \Delta FD_{t-j} + \sum_{j=1}^{p} \beta_j \Delta GDP_{t-j} + \sum_{j=1}^{p} \gamma_j \Delta Z_{t-j} + \rho_1 EC_{1t-1} + \mu_{1t} \dots\dots\dots\dots\dots\dots\dots (8)$$

$$\Delta GDP_t = \sum_{j=1}^{p} \lambda_j \Delta FD_{t-j} + \sum_{j=1}^{p} \delta_j \Delta GDP_{t-j} + \sum_{j=1}^{p} \phi_j \Delta Z_{t-j} + \rho_2 EC_{1t-2} + \mu_{2t} \dots\dots\dots\dots\dots\dots\dots (9)$$

$$\Delta Z_t = \sum_{j=1}^{p} \theta_j \Delta FD_{t-j} + \sum_{j=1}^{p} \eta_j \Delta GDP_{t-j} + \sum_{j=1}^{p} \omega_j \Delta Z_{t-j} + \rho_3 EC_{1t-3} + \mu_{3t} \dots\dots\dots\dots\dots\dots\dots (10)$$

Where Δdifference operator, and causal inference is captured by ρ_1, $\rho_2$and $\rho_3$coefficients of the error correction terms (EC) derived from cointergration below

$$FD_t = \delta + \varphi Y_t + \pi Z_t + EC_{1t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (11)$$

$$GDP_t = \alpha + \psi FD_t + \nu Z_t + EC_{2t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (12)$$

$$Z_t = \chi + \varrho FD_t + \varpi Z_t + EC_{3t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (13)$$

4.4. Variance Decomposition (VD).

The F and t – test in Vector error correction can describe causality within the sample period only. They can only determine degree of exogenoeity or endogeneity of dependent variables within the estimated period. Variance decomposition can describe a causality test outside the estimated period. Variance decomposition (VD) shows the percentage of forecast error variance of each variable that may be attributed to its own shocks and to the fluctuations in other variables in the system and is based on moving average model (MA) obtained from the original VAR model. In Eviews 8 software the choleski's clarification method is utilized to orthogoralize all innovations. The method is very sensitive to and depends on order of variables. In the present study order is identified according to importance of variable (GDP, FD, I, S). (Abu-bader et al, 2005 and 2006) are among of recent studies used variance decomposition to validate strength of granger causality outside the estimated period.

5.0 The Empirical Results

5.1 Descriptive statistics

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Table 5.1. Summary of the Descriptive Statistics of the Variables

	LN Real GDP percapita	LNM2/GDP	LN LIQUIDITY L/GDP	LNCREDIT PVT SECT/GDP	LN INVESTIMENT/ GDP	LN SAVINGS/GDP
Mean	241632.3	0.220859	0.272256	0.081227	0.229577	0.157988
Median	406052.2	0.194775	0.247837	0.068347	0.216000	0.16014
Maximum	215234.6	0.424319	0.425081	0.178581	0.394012	0.24143
Minimum	55565.6	0.110317	0.178268	0.015835	0.148997	0.04462
Std.Dev	55565.6	0.092505	0.077438	0.055403	0.061022	0.058101
Skewness	1.206903	1.133168	0.588936	0.359077	0.866964	0.321433
Kurtosis	3.078481	2.968758	2.086385	1.652188	3.216745	2.07443
Jarque-Bera	8.019853	7.063721	3.055356	3.206971	4.198537	1.746189
Probability	0.018135	0.02925	0.217039	0.201194	0.122546	0.417657
Sum	8833820	7.288334	8.98445	2.680477	7.576029	5.2136
Sum sq.Dev	01109.88	0.273828	0.191891	0.098224	0.119159	0.108023
Obsevations	33	33	33	33	33	33

Source: Author, LN is log

Most of the study variables were normally distributed after being transformed into logarithm since, Jarque-Bera probability was not significant in most of the variables which implied series of the respective variables follow normal distribution. Also; skewness was close to zero in most of the variables implying that the distribution was symmetrical around mean. With respect to peakeness, most of the variables were flat than a normal distribution. Furthermore, standard deviation indicates that there is degree of variability in most of the variables.

5.2 Stationary Test results

Time series initially tested for non-stationary using ADF test at their levels before causality test. The test involved first with constant and trend (deterministic trend) and it followed with constant. Null hypothesis tested (Ho: series of variable has unit root and is non stationary) versus (H1: series of a variable has no unit root and trend stationary)

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Table 5.2: Stationary test results

		At level			After first and second difference		
Variable	Model spefication	t -statistics	5% Critical value	stationary status	t -statistics	5% Critical value	stationary status
LN Real GDP percapita	Constant and trend	0.339605	-3.562882	I(2)	-6.305895	-3.568379	I(0)
	Constant	1.202157	-2.960411	I(2)	-6.42364	-2.963972	I(0)
LNM2/GDP	constant and trend	-1.751225	-3.562882	I(1)	-5.165839	-3.562882	I(0)
	Constant	-2.176398	-2.960411	I(1)	-4.585633	-2.960411	I(0)
LN LIQUIDITY LIABILITY/GDP	Constant and trend	1.753779	-3.562882	I(1)	-5.230623	-3.562882	I(0)
	Constant	-2.205158	- 2.960411	I(1)	-4.598399	-2.960411	I(0)
LN CREDITPVT SECT/GDP	Constant and trend	1.96857	-3.557759	I(1)	-4.99955	-3.562882	I(0)
	Constant	-0.87569	-2.960411	I(1)	-5.04393	-2.960411	I(0)
LN SAVINGS/GDP	Constant and trend	2.399366	-3.557759	I(1)	-5.757662	-3.562882	I(0)
	Constant	-2.172645	-2.957110	I(1)	-5.808629	-2.960411	I(0)
LN INVESTIMENT/GDP	Constant and trend	-1.136509	-3.557759	I(1)	-5.136477	-3.562882	I(0)
	Constant	-0.319325	-2.957110	I(1)	-4.888565	-2.960411	I(0)

LN=Log, Significance level 5% , **Source ; Author**

Results in The table 5.2 demonstrate that, all series of variables real GDP percapita, M2/GDP, Liquidity liability to GDP, Private credit/GDP Savings /GDP and domestic investments /GD are non stationary, since critical values are higher than the computed t-statistics. Null hypothesis fail to reject in each case and conclusion is that all series of variables under study have unit roots and are non stationary.

After testing variables at their levels, the next step was differencing once all variables to turn data into stationary. Null hypothesis tested all the time series of variable has unit root and is non stationary) versus alternative hypothesis series of a variable has no unit root and trend stationary). Rejection of null hypothesis means that, the series of variable has no unit root and is

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stationary. It appeared that after taking first difference the null hypothesis rejected for M2/GDP, liquidity liability to GDP and private credit/GDP, savings /GDP and domestic investments/GDP which implied stationary series that were integrated at order zero I (0) since, computed t-statistics values were higher than critical values. However, for real GDP percapita the null hypothesis fail to reject the null hypothesis at first difference which means the series of real GDP percapita were integrated at order I (2) and become stationary at their second difference.

5.3 Cointegration Test Results

Having verified that all series of variables were stationary and integrated at order zero I(0), the next step was to perform cointegration test using Johansen procedures based on multivariate to determine whether there is stable long run relationships between financial development and economic growth. The optimal lag length selection was based on Akaike and Hannan –Quinn information selection criterion. When computed Johansen test provided trace statistics and maximum eigen value statistics, critical values and p-value results.

Trace test confirmed existence of two cointergration relationships between the two variables. That, the null hypothesis(HO:) rejected r = 0 , r ≤1 for trace statistics, since computed trace test value was higher than critical value and p-value was less than 5 percent in other words I accepted alternative hypothesis(H1:) at r = 1 , and r = 2 which implied existence of two long run cointegration relationships .The second part of the test provided maximum eigenvalue test, this indicated existence of two co integration relationships between the two variables. The null hypothesis r = 0, r ≤1 rejected on maximum eigenvalue statistics at level of 5 percent and we accepted alternative hypothesis r ≥1 and r ≥ 2 which means two co integrating equations found between economic growth and financial development as indicated on the table 5.2.The results in general indicates that over long-run financial development and economic growth tend to move together towards to the equilibrium or steady state and any deviations from the equilibrium because of shock the system will have tendency to restored back the equilibrium.

Table 5.3 Johansen Cointergration Test Results

		Trace test					Maximum eigenvalue test			
H0:	**H1:**	**Eigen value**	**trace statics**	**critical value(0.05)**	**p – value (**)**	**H1:**	**Eigen value**	**maximum eigen statistics**	**critical value**	**p – value (**)**
r*=0	r=1	**0.823545**	**130.5979**	**95.75366**	**0.0000**	r≥1	**0.823545**	**53.7753**	**40.07757**	**0.0008**
r*≤1	r=2	**0.673971**	**76.82259**	**69.81889**	**0.0124**	r≥2	**0.673971**	**34.7439**	**33.87687**	**0.0393**
r≤2	r=3	**0.474075**	**42.07874**	**47.85613**	**0.1565**	r≥3	**0.474075**	**19.9205**	**27.58434**	**0.3467**
r≤3	r=4	**0.30237**	**22.15825**	**29.79707**	**0.2898**	r≥4	**0.30237**	**11.1621**	**21.13162**	**0.6311**
r≤4	r=5	**0.218899**	**10.99621**	**15.49471**	**0.2117**	r≥5	**0.218899**	**7.65856**	**14.2646**	**0.4145**

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r≤5	r=6	**0.102072**	**3.337641**	**3.841466**	**0.0677**	r≥6	**0.102072**	**3.33764**	**3.841466**	**0.0677**

Both Trace test and maximum eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

5.4 Vector Error Correction Model (VECM).

Based on cointergration results that there is long run relationship between financial development and economic growth, running VECM was valid to distinguish both short run and long run causality results. The results are presented on table 5.4. In general the VECM shows that there is evidence of both short run and long run causality.

Table 5.4 Summary Results of Vector Error Correction Models with Diagnostic Tests

	ΔLNReal GDP percapita	**ΔLNM2/GDP**	**ΔLNLQL/GDP**	**ΔLNCREDITPV/GDP**	**ΔLNI/GDP**	**ΔLNS/GDP**
Constant	1592.40 (1.48)	0.017 (-1.62)	-0.012 (-1.12)	-3.84 (0.00)	-0.004 (0.79)	-0.013 (-1.13)
ECT	-0.0046 (-0.54) {0.58}	8.22 (0.97) {0.33}	5.15 (0.60) { 0.54}	-1.18* (-3.58) {0.00}	1.67* (4.47) {0.00}	5.5 (0.56) {0.57}
R-Square	0.85	0.27	0.27	0.83	0.86	0.52
DWS	2.10	2.10	2.28	2.10	1.88	2.02
x^2- normality (Prob-Jarque Bera)	0.61	0.00	0.00	0.72	0.91	0.40
x^2- Het test (Prob F-statitics)	0.81	0.10	0.12	0.12	0.99	0.08
x^2- Arch test (Prob F-statitics)	0.73	0.69	0.82	0.43	0.18	0.85

t-statistics( ), p-value { }, * Significance level of 1% rejected null hypothesis. LN is Log, Durbin Watson statistics (DWS), ECT is error correction term, Source: Author.

After estimating VECMs we conducted diagnostic test which involved first testing whether models estimated were spurious or not. This detected by using the rule of thumb as proposed by Granger and Newbold (1974), that if R- square is greater than Durbin Watson statistics (DWS), or R-square ≈ 1 then, model estimated was spurious and conversely, if R-square, was less than DWS then, estimated model was not spurious (Asteriou and Stephen, 2007). It is worth noting that in each error correction equation DWS was greater than R-square and conclusion is that models estimated were not spurious. Since Durbin Watson statistics is larger than R-square in each model, according to Marno Verbeeck, (2004), there is no serial correlation on the residuals. Normality test suggest that most of the estimated models residual follow normal distribution

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except in model with LQL/GDP and M2/GDP where, null hypothesis that the residual follow normal distribution was rejected at significance level of 5%, meaning that the residual does not follow normal distribution for the two respective models. Also, there is no problem of heteroskedasticity (Het) and autoregressive conditional heteroskedasticity (ARC) in all models since null hypothesis was not rejected at significance level of 5% in all cases. Although, there is weakness on error correction equation with LQL/GDP and M2/GDP, that the residual does not follow normal distribution, still we went on with further estimations and analysis because in other residual tests the null hypothesis in each case was not rejected at significance level of 5% (see Asteriou and Stephen, 2007).

The VECMs summary results in table 5.4 suggest that there is only one long run causality running from independent variables (real GDP percapita) to credit to private sector/GDP. That, the coefficient of error correction term ECT with vector error correction equation credit to private sector/GDP was (-1.18) negative as expected and statistically significant at 5%. Further, the coefficient of error correction term ECT in model with gross domestic investment to GDP (I/GDP) was statistically significant at 5% but the sign was not negative. This suggests there is short run causality running from independent variables (financial development and economic growth) to gross domestic investments/GDP. In other words, gross domestic investment/GDP link financial development and economic growth in a short run only. In the rest error correction equations, the sign for the coefficient of error correction term ECT was neither negative nor statistically significant. Furthermore, short run causality was also detected by looking significances of each individual independent variable in each error correction equation.

Also, we imposed restrictions using Wald test (coefficient restrictions) in model with real GDP percapita to examine whether there is joint short run influences from financial sector to economic growth, after notice that financial variables individually were not significant and yet the model was fitted well. The VECM results confirms that financial sector in a long run has not promoted economic growth. Our results suggest that financial sector has been effective in promoting economic growth in a short run. Justification is found from the error correction equation with real GDP percapita; where the coefficient of error correction term ECT was negative as expected but not statistically significant. Also, joint short run influences/causality examined through Wald test confirms causality is running from financial development to economic growth only when credit to private sector/GDP is used. That, the null hypothesis c(8)=0, c(9)=0 ,there is no joint short run causality from credit to private sector/GDP to economic growth was rejected by both F-statistics and chi square and were statistically significant at 10% (see Table 5.5).

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Table 5.5 Joint short run causality results in VECM, real GDP percapita dependent variable

Wald test			
LN real GDP percapita; Null hypothesis tested c(2)=0,c(3)=0			
Test statistics	Value	df	Probability
F –statistics	25.29337	(2,16)	0.0000
Chi square	50.58674	2	0.0000
LN M2/GDP; Null hypothesis tested c(4)=0, c(5)=0			
Test statistics	Value	df	Probability
F –statistics	0.075505	(2,16)	0.9276
Chi square	0.151010	2	0.9273
LN LQL/GDP; Null hypothesis c(6)=0, c(7)=0			
Test statistics	Value	df	Probability
F –statistics	0.317476	(2,16)	0.7325
F –statistics	0.634953	2	O.7280
LNCREDIT PVSCT/GDP; Null hypothesis c(8)=0, c(9)=0			
Test statistics	Value	df	Probability
F –statistics	2.762880	(2,16)	0.09832
Chi square	5.525760	2	0.0631
LNI/ /GDP: Null hypothesis, c(10)=0, c(11)=0			
Test statistics	Value	df	Probability
F –statistics	1.766967	(2,16)	0.2026
Chi square	3.533934	2	0.1709
S /GDP: Null hypothesis c(12)=0, c(13)=0			
Test statistics	Value	df	Probability
F –statistics	0.410246	(2,16)	0.6703
F –statistics	0.820492	2	0.6635

Restrictions are linear in coefficients; significance levels 1%, 5% and 10%. LN=Log C ( ) represents coefficients of independent variables. Source; Author

5.5 Granger Causality Test Results.

Granger causality test through VAR framework was employed to establish the direction of causality after being satisfied with the results from the VECM, that there is evidence supporting existence of both short run and long run causality. The details of the results from a pairwise granger causality test are presented on the table 5.6

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Table. 5.6. Pairwise granger causality test results.

Null Hypothesis:	Obs	F-Statistic	Prob.	Decision
LNM2_GDP does not Granger Cause LNREAL_GDP_PERCAPITA	31	0.57988	0.567	Fail to reject
LNREAL_GDP_PERCAPITA does not Granger CauseLN M2_GDP		3.90165	0.033	Reject
LN LIQUIDITY_LIABILITY_GDP does not Granger Cause LNREAL_GDP_PERCAPITA	31	0.21291	0.8096	Fail to reject
LN REAL_GDP_PERCAPITA does not Granger Cause LNLIQUIDITY_LIABILITY_GDP		4.12977	0.0277	Reject
LNCREDIT_PVT_SECT_GDP does not Granger Cause LNREAL_GDP_PERCAPITA	31	3.44457	0.0471	Reject
LNREAL_GDP_PERCAPITA does not Granger Cause LNCREDIT_PVT_SECT_GDP		3.95318	0.0317	Reject
LN GROSS_DOMESTIC_INVESTIME does not Granger Cause LNREAL_GDP_PERCAPITA	31	3.02083	0.0661	Reject
LNREAL_GDP_PERCAPITA does not Granger Cause LNGROSS_DOMESTIC_INVESTIME		6.94938	0.0038	Reject
LNSAVINGS_GDP does not Granger Cause LNREAL_GDP_PERCAPITA	31	2.39948	0.1106	Fail to reject
LNREAL_GDP_PERCAPITA does not Granger CauseLN SAVINGS_GDP		2.2893	0.1214	Fail to reject
LNGROSS_DOMESTIC_INVESTIME does not Granger Cause LNM2_GDP	31	1.01503	0.3763	Fail to reject
LNM2_GDP does not Granger Cause LNGROSS_DOMESTIC_INVESTIME		4.32305	0.0239	Reject

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LNSAVINGS_GDP does not Granger Cause LNM2_GDP	31	2.87322	0.0746	Reject
LNM2_GDP does not Granger Cause LNSAVINGS_GDP		2.26293	0.1242	Fail to reject
LN GROSS_DOMESTIC_INVESTIME does	31	0.97438	0.3908	Fail to reject
LNLIQUIDITY_LIABILITY_GDP does not Granger Cause LNGROSS_DOMESTIC_INVESTIME		2.65932	0.089	Reject
LNSAVINGS_GDP does not Granger Cause LNLIQUIDITY_LIABILITY_GDP	31	1.77997	0.1886	Fail to reject
LNLIQUIDITY_LIABILITY_GDP does not Granger Cause LNSAVINGS_GDP		1.29821	0.2901	Fail to reject
LNGROSS_DOMESTIC_INVESTIME does not Granger Cause LNCREDIT_PVT_SECT_GDP	31	0.04914	0.9521	Fail to reject
LNCREDIT_PVT_SECT_GDP does not Granger Cause LNGROSS_DOMESTIC_INVESTIME		9.12248	0.001	Reject
LNSAVINGS_GDP does not Granger Cause LNCREDIT_PVT_SECT_GDP	31	1.65812	0.21	Fail to reject
LNCREDIT_PVT_SECT_GDP does not Granger Cause LNSAVINGS_GDP		1.42114	0.2596	Fail to reject

Significance level 1%, 5%, 10% Source; Author, LN= log.

In overall empirical findings from Granger causality test suggest that there is evidence of unidirectional short run causality running from economic growth to financial development when ratio of M2/GDP, and liquidity liabilities to GDP used. However, when credit pvt sect/GDP was used bidirectional causality result was detected between financial development and economic growth with long run causality running only from economic growth to financial development. Capital accumulation channel via gross domestic investment/GDP link financial development and economic growth in Tanzania in a short run. These findings are contrary to Mbellenge and Aikaeli (2010) who only confirmed supply view in Tanzania .The difference on the results is

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explained by difference on indicators used as stated by Odhiambo (2005) and sample size used in the study. Findings from the present study justify that results on the direction of causality in Tanzania is still mixed, and not only demand following hypothesis as confirmed by Odhiambo (2011) ,where using his findings for policy advice, the government/policy makers would have been obliged to pursue only policies limited to enhancing growth and expecting output growth promote financial sector development. In the present study, results shows that there is policy freedom to decide whether to deal with supply side or demand side policies or adopt balanced policies to stimulate further economic development in Tanzania.

5.6 Variance Decomposition (VD) Results.

A ten period of horizon was employed to convey sense of the system dynamic granger causal chain, which tend to suggest that real GDP percapita time series is the leading variable being the most exogenous of all, it followed with financial variables, domestic investments and savings. In general, even after examining causality outside the estimated sampling period causality findings obtained are consistent with those obtained from granger causality test.

Furthermore, variance decomposition results suggest that, financial sector in Tanzania has not played strong significant role in promoting economic growth because if it was, would have been a leading exogenous variable. Therefore, this implies that, reforms far embarked and especially financial sector reforms the gains still have long way to go to the expected level , to a point where financial sector will play a leading role of enhancing economic growth in a long run. Factors that might have been impeded includes, the institutional environment, quality of the institutions including judicial system, bureaucracy, law and order and property rights are of poor quality because hinders commercial activities and investments. Secondly, findings suggest that proper infrastructures such as long-term financing that are necessary for successful promoting investments for spurring economic growth are still remain weak in Tanzania. Lastly, though it's clear that, there have been clear improvement in the financial sector for the past two decades in Tanzania, but the degree which financial sector has promoted economic growth our results suggest is still below the threshold needed to play a leading role. (See table 5.7, appendix 1)

6. Conclusion and Policy Recommendations

6.1 Conclusion

This study aimed at examinining causality relationship between financial development and economic growth in Tanzania using Johansen cointergration test, Vector error correction model (VECM), granger causality and variance decomposition under VAR framework. Granger causality test results confirmed evidence of unidirectional short- run causality running from economic growth to financial development (demand following hypothesis) when ratio of

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M2/GDP and Liquidity Liability/GDP used. However, evidence of bidirectional causality detected when ratio credit pvt sect/GDP used with long run causality running only from Economic growth to financial development. Also, despite clear improvement in the financial sector for past, our results shows that financial sector has been effective in promoting economic growth in a short run. In terms of channels, findings support capital accumulation channel via gross domestic investments/GDP links financial development and economic growth in a short run. We did not find evidence supporting existence of technological innovation channel. In overall, findings justify that result on the direction of causality between financial development and economic growth in Tanzania is still mixed in contrast with convectional studies favored only supply hypothesis.

6.2 Policy Recommendations

In view of feedback effect results on the direction of causality, in determination of policy, government or policy makers in Tanzania should utilize financial sector to influence economic growth. However, for financial sector to promote economic growth in a long run study recommends more efforts should be devoted to the deepening of financial sector by enhancing competition, improving business environment, investing on human resources and legal environment.

In particular, financial institutions should widen outreach of their services in rural areas where majority of the population have not been served, rather than being biased towards urban areas only. In terms of promoting competition, foreign financial institutions should be encouraged or allowed to participate on the domestic financial market because, will bring new technologies and new financial products which ultimately will create incentives for local institutions to compete and hence deepen financial sector.

Serious decisive steps from the government is required to make business environment more friendlier for the operation of financial sector, and among other things, which need immediate action is abandon bureaucratic procedures on providing business permits and licenses. Further, government should invest on human resources and especially by supporting students taking science subjects in schools and Universities, because to develop competitive financial sector innovation is essential and is possible under well trained personnel.

Furthermore, creditor's rights should be protected because high degree of creditor's rights creates incentives for the entry of private financial institutions which will enhance competition and deepen financial sector.

However, the challenge we see is for the government to continue with its efforts of fighting against corruption, because to build strong and competitive financial sector fair playing

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field/ground for all players is highly needed. Unfair playing field is more likely to discourage entry of new financial institutions and thus results to less competition in the financial sector, and hence remain with weak financial sector.

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Appendix 1

Table. 5.7 Variance Decomposition Results.

Variance Decomposition of REAL_GDP_PERCAPITA:

Period	S.E.	REAL_GDP_PERCAPITA	M2_GDP	LIQUIDITY_LIABILITY_GDP	CREDIT_PVT_SECT_GDP	GROSS_DOMESTIC_INVESTIME	SAVINGS_GDP
1	3625.618	100	0	0	0	0	0
2	6494.843	95.59453	1.474045	0.064019	2.256075	0.539284	0.072048
3	9093.357	93.53713	2.221421	1.885482	1.200406	0.548938	0.606618
4	11786.73	85.65716	5.666081	5.989331	1.186629	0.964005	0.536797
5	14812.55	73.13746	7.232018	14.99669	2.673511	1.490818	0.469509
6	18295.16	57.35208	8.893814	26.78212	4.153981	2.173603	0.644395
7	22407.42	41.99905	9.835673	39.46146	5.354747	2.498806	0.850257
8	27220.71	29.71426	10.58137	50.11498	6.143591	2.565559	0.880235
9	32503.7	21.1738	10.94962	57.97766	6.585013	2.521272	0.792638
10	37922.86	15.59682	11.25771	63.24149	6.714616	2.482363	0.707004

Variance Decomposition of M2_GDP:

Period	S.E.	REAL_GDP_PERCAPITA	M2_GDP	LIQUIDITY_LIABILITY_GDP	CREDIT_PVT_SECT_GDP	GROSS_DOMESTIC_INVESTIME	SAVINGS_GDP
1	0.028124	15.24292	84.75708	0	0	0	0
2	0.036331	30.65242	61.3545	1.462364	2.205962	3.35778	0.966972
3	0.043375	30.04498	51.64764	1.769555	2.538332	10.96876	3.030737
4	0.046723	27.05407	49.55094	1.558261	2.720963	13.82839	5.28738
5	0.049257	24.43817	49.9657	2.19417	3.825099	14.1958	5.381057
							4.922442
7	0.05348	21.20815	47.24865	6.601526	6.197348	14.14639	4.59793
8	0.055344	21.8062	45.2885	8.34757	6.258999	13.81682	4.481914
9	0.057002	23.74029	43.50027	9.07885	6.122509	13.25067	4.307409
10	0.058207	26.03405	42.13089	8.954621	5.955178	12.79387	4.131391

Variance Decomposition of LIQUIDITY_LIABILITY_GDP:

Period	S.E.	REAL_GDP_PERCAPITA	M2_GDP	LIQUIDITY_LIABILITY_GDP	CREDIT_PVT_SECT_GDP	GROSS_DOMESTIC_INVESTIME	SAVINGS_GDP
1	0.028563	9.027801	59.32137	31.65083	0	0	0
2	0.039877	20.50211	35.58757	40.88033	0.597389	2.377312	0.05528

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3	0.048482	20.08152	27.36691	41.22151	0.444571	8.016982	2.868498
4	0.051899	18.44039	25.0562	41.63393	0.403476	9.73339	4.732614
5	0.052968	17.81744	25.43983	41.19975	0.708489	10.0715	4.762985
6	0.053401	17.5304	25.51149	40.64745	1.334899	10.21207	4.763698
7	0.053668	17.69945	25.34509	40.24445	1.632188	10.36231	4.716517
8	0.054217	19.10848	24.84675	39.43343	1.642074	10.24648	4.722788
9	0.055028	21.41409	24.12056	38.30219	1.597753	9.948423	4.616985
10	0.055915	23.55481	23.39963	37.35102	1.550763	9.64955	4.494226

Variance Decomposition of CREDIT_PVT_SECT_GDP:

Period	S.E.	REAL_GDP_PERCAPITA	M2_GDP	LIQUIDITY_LIABILITY_GDP	CREDIT_PVT_SECT_GDP	GROSS_DOMESTIC_INVESTIME	SAVINGS_GDP
1	0.018531	0.403898	1.358515	0.000878	98.23671	0	0
2	0.022035	6.994307	1.720577	0.120507	86.45936	4.425506	0.279741
3	0.030865	22.6371	4.0521	16.81203	46.43984	3.129262	6.929661
4	0.039892	38.50724	2.461441	23.13452	27.87269	1.879763	6.14434
5	0.04682	42.18616	1.977519	28.37437	20.62561	2.043533	4.792815
6	0.050392	43.95346	1.820513	28.86163	17.82653	2.173767	5.364095
7	0.052237	45.78369	2.429753	27.16288	16.87862	2.381665	5.363383
8	0.053989	46.01427	2.71595	26.70886	16.94708	2.570274	5.043563
9	0.056664	42.83195	3.008284	30.13651	16.6431	2.717468	4.662691
10	0.060779	37.29268	3.320794	36.91817	15.62856	2.60513	4.234673

Variance Decomposition of GROSS_DOMESTIC_INVESTIME:

Period	S.E.	REAL_GDP_PERCAPITA	M2_GDP	LIQUIDITY_LIABILITY_GDP	CREDIT_PVT_SECT_GDP	GROSS_DOMESTIC_INVESTIME	SAVINGS_GDP
1	0.021546	12.76789	1.448857	3.875859	3.785741	78.12166	0
2	0.026579	10.31699	18.21151	5.635428	12.94306	52.33673	0.556279
3	0.031481	12.46177	13.22591	9.499617	19.28924	44.25667	1.266793
4	0.039248	24.28136	8.559972	18.12275	13.77297	31.23671	4.026234
5	0.046657	35.84019	6.059352	23.0813	9.835556	22.11492	3.068682
6	0.051409	40.63195	4.990878	24.20169	8.166294	18.78675	3.222438
7	0.053578	43.42071	4.716083	22.74082	7.54735	17.62176	3.953277
8	0.055437	44.55504	4.888212	22.37362	7.726085	16.62359	3.833453
9	0.058803	42.00091	4.903406	26.39422	8.30716	14.97901	3.415298
10	0.063968	36.2384	4.88211	34.54253	8.449994	12.92176	2.96521

Variance Decomposition of SAVINGS_GDP:

Period	S.E.	REAL_GDP_PERCAPITA	M2_GDP	LIQUIDITY_LIABILITY_GDP	CREDIT_PVT_SECT_GDP	GROSS_DOMESTIC_INVESTIME	SAVINGS_GDP
1	0.040383	16.98101	0.005852	0.309023	4.914518	2.433279	75.35632
2	0.052326	27.97253	7.348227	0.275193	4.610267	4.468025	55.32575
3	0.060984	27.29757	5.45359	14.86578	8.06608	3.555062	40.76192
4	0.068337	27.36198	4.364364	25.23518	7.026722	2.948945	33.06281
5	0.074003	28.9566	4.038963	29.96399	5.992104	2.712476	28.33586

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6	0.076623	31.37984	3.79184	29.73902	5.770791	2.844271	26.47424
7	0.077567	32.4317	3.707098	29.02111	5.79713	3.024539	26.01842
8	0.078622	32.03562	3.632166	29.92574	5.990047	2.982203	25.43422
9	0.081013	30.25131	3.617476	33.05944	6.269714	2.825864	23.97619
10	0.084807	27.60495	3.553752	37.87069	6.477291	2.609277	21.88404

Cholesky Ordering: real GDP percapita, financial variables, domestic investment /GDP and savings/GDP

