

**FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN
TANZANIA**

BY

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DECLARATION

This paper is my original work and to the best of my knowledge, has not been presented for the award of a degree in any other university.

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Despite all this able assistance, the views expressed in this paper are my own and do not represent the views of any of the named person(s) or institution(s). I solely bear the responsibility for any errors and/or omissions.

DEDICATION

This paper is dedicated to my parents Mr and Mrs Thomas Fille and my sisters Elizabeth and Josepha for their unremarkable and priceless gift of encouragement and support in ensuring that I accessed higher education. This is all that you wanted for me.

ABBREVIATIONS

ADF	Augmented Dickey-Fuller
ADI	African Development Indicators
ARDL	Autoregressive Distributed Lag Model
BD	Bank Deposits
BOT	Bank of Tanzania
DCP	Domestic Credit to Private Sector
DCs	Developed Countries
EG	Economic Growth
FD	Financial Development
GDP	Gross Domestic Product
GFD	Global Financial Development
GMM	Generalized Methods of Moments
LDCs	Less Developing countries
M3	Broad Money
OLS	Ordinary Least Squares
SSA	Sub-Saharan African
STATA	Data Analysis and Statistical Software Package
TSH	Tanzanian Shilling
VAR	Vector Autoregression
VECM	Vector Error Correction Model
WDI	World Development Indicators

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ABSTRACT

This study investigates empirically the causal relationship between financial development and economic growth in Tanzania. This study has three main objectives which include; to determine the relationship between financial development and economic growth in Tanzania; to determine the direction of causality between financial development and economic growth in the short-run and long-run; and to suggest policy recommendations based on the findings. The aim of this study is to provide the policy makers and the research community with knowledge of the relationship between financial development and economic growth.

Unlike many previous studies, the study uses three proxies of financial development against Real GDP per capita growth (a proxy for economic growth). The three proxies for financial development include Broad money (M3) as a percentage of GDP, Domestic credit to the private sector as a percentage of GDP and Bank deposits as a percentage of GDP. This study used time series data from the period 1988 to 2012. This study investigates the relationship and causal link between financial development and economic growth in Tanzania by employing the Engle and Granger Co-integration test and the Granger causality test under a Vector Autoregression (VAR) framework.

The results indicate the existence of a long-run relationship between all the indicators of financial development and economic growth. In addition, there is bi-directional causality relationship between financial development and economic growth in Tanzania in both the short-run and the long-run. The study therefore recommends that the current financial development in Tanzania be developed further in order to make the economy more monetized, ensure greater availability of monetary credit and holding of private bank deposits.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Financial development can be defined as the ability of a financial sector to acquire information, registration of contracts, enforce contracts, facilitate transactions and create incentives for the emergence of particular types of financial contracts, markets and intermediaries, and all this at a low cost (Rajan and Zingales, 2003; and Levine, 1999). Financial development occurs when financial instruments, markets and intermediaries improve though not necessarily eliminate the effects of information, enforcement and transaction costs, and therefore provide better financial services.

The relationship between financial development and economic growth has recently received emphasis from numerous theoretical and empirical studies in both developed and developing countries. Three groups exist in the literature regarding the causal relationship between financial development and economic growth (Patrick 1966). The first group argues that financial development leads to economic growth (supply-leading response). The second group maintains that it is economic growth which leads to the development of the financial sector (demand-following response). The third group contends that both financial development and economic growth Granger-cause one another (bi-directional causality relationship).

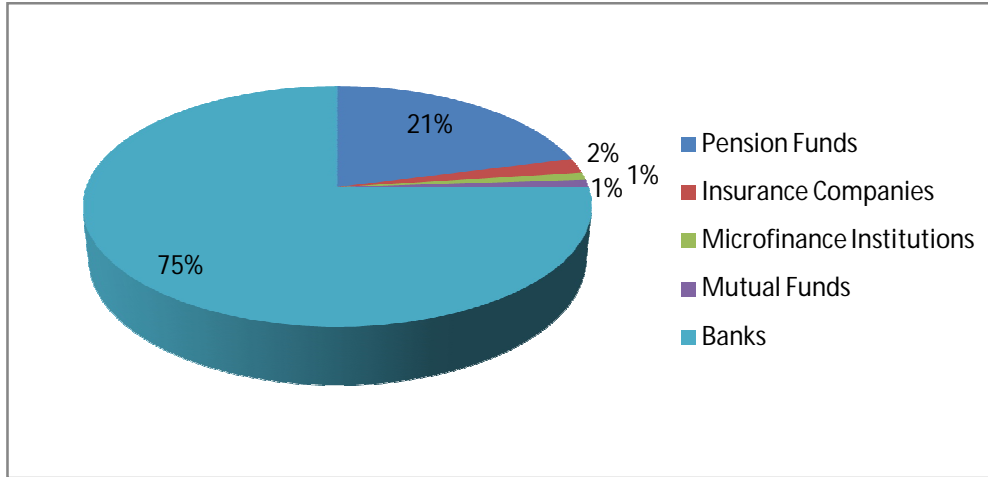
Majority of these studies have concentrated mainly on Asia and Latin America, affording sub-Saharan African (SSA) countries either very little coverage or none at all. In particular, studies in countries such as Tanzania are almost non-existent. Even where

such studies have been undertaken, the empirical findings on the direction of causality between financial development and economic growth and the mechanism through which this takes place have been largely inconclusive. In fact, the empirical evidence from previous studies on this subject suggests that the relationship between financial development and economic growth may be sensitive to the proxy variables used to represent financial development (Odhiambo 2011). In addition, the evidence suggests that the relationship between the two variables differs from country to country and over time (Calderon and Liu 2003 and Odedokun 1996).

1.1.1 Financial Sector in Tanzania

The financial sector in Tanzania has undergone substantial structural changes since the inception of measures towards liberalization of the sector in 1991. The financial sector in Tanzania is comprised of mainly banks, pension funds, insurance companies, and other financial intermediaries. However, the sector is dominated by banking institutions which account for about 75% of the total assets of the financial system, followed by pension funds whose assets account for about 21% and the insurance sector with 2% of the total assets, while the remaining financial intermediaries hold about 2% (Figure 1). The chart below shows the composition of the Tanzania's financial sector assets by type of financial institution in 2012.

Figure 1: Tanzania's Financial Sector Assets Composition (2012)



Source: Bank of Tanzania (BOT)

The financial sector in Tanzania is relatively small and less developed when compared to that of a number of emerging economies. In terms of size the sector is mainly bank dominated, and has underperformed in terms of financial development. A number of factors have contributed to the current underdevelopment of Tanzania's banking sector. The main constraint has been a long history of financial repression coupled with a weak and unclear institutional framework. Financial repression refers to the notion that a set of government regulations, laws, and other non-market restrictions prevent the financial intermediaries of an economy from functioning at their full capacity. The financial repression policies include interest rate ceilings, liquidity ratio requirements, high bank reserve requirements, capital controls, restrictions on market entry into the financial sector, credit ceilings or restrictions on directions of credit allocation, and government ownership or domination of banks. Economists have commonly argued that financial repression prevents the efficient allocation of capital and thereby impairs economic growth.

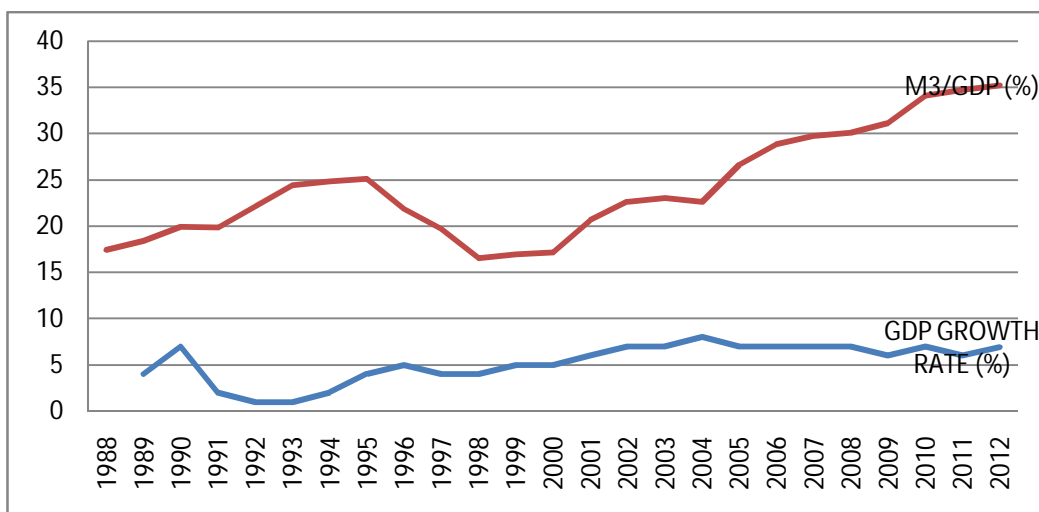
Unlike other sub-Saharan African countries, the financial system in Tanzania is still in its infancy. There is no significant development of leasing institutions, housing finance institutions, hire purchase and retail credit companies. The long-term lending remains underdeveloped with small and weak contractual saving institutions and a relatively small securities exchange (Dar-es-Salaam Stock Exchange), which was only established in 1996 and became operational in 1998. As a result, money and capital market intermediaries such as dealers, brokers, discount houses and merchant banks are arguably underdeveloped. Before financial reforms in the 1990s, state-owned banks dominated the Tanzania's banking sector.

Since the 1990s, the government has implemented a number of policy and institutional reforms in order to strengthen the development of financial institutions in Tanzania. The Banking and Financial Institutions Act of Tanzania was passed in 1991 in order to modernize the legal and regulatory framework in order to allow for competition in the delivery of financial services. The Tanzania banking sector embarked on a plan for financial liberalization in 1992 in order to sustain economic growth. This has been accomplished through the mobilization of financial resources as well as by increasing competition in the financial market and by enhancing the quality and efficiency of credit allocation. As a result of the liberalization, the banking sector in Tanzania has been booming, particularly over the last few years. New merchant banks, commercial banks, bureau de change, insurance companies, a stock exchange and related financial units have entered the market.

Fiscal and monetary policies were significantly transformed during 2011. After years of accommodating policies, the authorities adopted a policy of fiscal prudence. This policy was a response to growing inflation, an unstable exchange rate, and increasing fiscal pressures. These policies helped to achieve the stabilization of most financial variables, as shown by the fact that these have returned to a positive historical state from around the beginning of 2012. Also monetary policy instruments were used to ensure that liquidity level in the economy is within the target. These included: raising minimum reserve requirement on government deposits from 30% to 40% and reducing prudential limit on foreign currency net open position from 10% to 7.5% of core capital.

The government of Tanzania has implemented a number of reforms since early 1990 and the trend of Tanzania’s financial depth, as measured by M3/GDP, has grown rapidly than the real sector. This could mean that the Tanzania’s monetary sector has been growing faster than the real sector (Appendix 1). The trend of financial depth and economic growth in Tanzania is expressed in Figure 2 below.

Figure 2: Trend of Financial Depth and Economic Growth in Tanzania



Source: Computations based on World Development Indicators (WDI)

Figure 2 shows that financial depth as measured by M3 as a percentage of GDP and GDP growth rate of Tanzania recorded a mixed performance of high and low levels. The M3/GDP has increased more rapidly than GDP growth rate.

1.1.2 Economic Growth in Tanzania

Unlike the financial sector development, economic growth has remained either high or low throughout the post-reform period. The performance of the economy was satisfactory up to the mid 1970s, before a combination of global recession, sharp increases in the price of oil, adverse terms of trade and domestic policy failures plunged it into an unprecedented crisis. In the mid 1980s a major policy shift was made to liberalize the economy in favour of the greater role of market forces and integration in the global economy, including the introduction of political pluralism.

Between 1989 and 2012 Tanzania recorded an average annual percentage GDP growth rate of about 5.25%. From 1989 to 1990 the annual GDP growth rate increased from 4% to 7%. In 1991 and 1992 Tanzania recorded low annual GDP growth rates of about 2% and 1% respectively. However, in 1993 the rate remained constant. Following the liberalization in 1992 and 1993, the GDP growth rate increased phenomenally. The GDP growth rate increased from 1% in 1993 to 2% in 1994 and thereafter to 4% in 1995. By 1996, Tanzania's annual GDP growth rate reached 5%. Although the rate decreased to 4% in 1997 and 1998, it later increased to 5% in 1999 and 2000.

However, in 2001 the country's GDP growth rate increased significantly to about 6% and to 7% in 2002 and 2003. In 2004 the rate increased to 8%, the highest GDP growth rate recorded in Tanzania in more than a decade. The rate remained constant at 7% for four

years consecutively from 2005 to 2008. In 2009 the rate dropped to 6% and later increased to 7% in 2010. Also in 2011 the rate dropped again to 6% and later increased to 6.9% in 2012. Tanzania's economy is forecast to grow by 7% this year (2013) compared with 6.9% in 2012. The biggest contributors of economic growth in 2012 were information and communications, which expanded by 20.6% followed by financial services with 13.2% growth rate.

1.2 Statement of the Problem

This study aims to find out the direction of causality between financial development and economic growth for the case of Tanzania. Empirical studies on the direction of causality between the financial development and economic growth point to a mixture of findings.

In Tanzania, the studies which have been done on the direction of causality between financial development and economic growth show conflicting results. For example, Odhiambo (2007) found that financial development leads to economic growth (supply-leading response), Odhiambo (2011) found that economic growth leads to financial development (demand-pulling response) and Odhiambo (2005) found that there is a bidirectional causality relationship between financial development and economic growth therefore more research is needed in this area.

Also all studies done in Tanzania have used M2 as a percentage of GDP as a proxy for financial development but this study has used M3 as a percentage of GDP as a proxy for financial development since it is a better indicator of financial depth as it includes M2 and foreign currency deposits of the private sector, nonfinancial public enterprises, and nonbank financial institutions with commercial banks.

Importantly, there are a few empirical studies studying the direction of causality between financial development and economic growth in Tanzania. Therefore, this study aims at filling all these gaps by determining the causality relationship between financial development and economic growth in Tanzania.

1.3 Objectives of the Study

- a) To determine the relationship between financial development and economic growth in Tanzania.
- b) To determine the direction of causality between financial development and economic growth in the short-run and long-run.
- c) To suggest policy recommendations based on the findings.

1.4 Justification of the Study

The motivation of this study is that the financial development and economic growth nexus has rarely been investigated in Tanzania. This study will help in reducing the knowledge gap and in extending the literature by using an econometric technique that would allow the study to test the hypotheses (supply-leading and demand-pulling) proposed by Patrick (1966).

Therefore, the importance of this study is that, it will provide policy makers and the research community with knowledge of the theoretical and empirical relationship between financial development and economic growth. It is therefore important for the policy makers to determine how the financial sector and overall economy are related to each other, and the implications of such a relationship to other sectors in the economy. This will enable them to make decisions about the appropriate growth and development

policies to adopt in order to develop the financial sector and promote economic growth in Tanzania.

Also they will be able to initiate the attainment of the Tanzania's development vision 2025 of building a competitive economy capable of producing sustainable growth and shared benefits. Importantly, the study is an additional input to the existing literature.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature on the direction of causality between financial development and economic growth. The first part focuses on the theoretical literature review of financial development and economic growth; the second part presents the empirical literature review on the direction of causality between financial development and economic growth; and the third part presents the overview of the literature.

2.2 Theoretical Literature Review

The theory of finance and growth was introduced by Schumpeter (1911). In his theory, he argues that financial intermediation through the banking channel plays an important role in economic growth. The main argument of Schumpeter was that financial development affects economic growth through technological changes and that financial services to businesses are better provided by banking institutions than securities markets.

Financial development has a dual effect on economic growth. On the one hand, the development of financial markets may enhance the efficiency of capital accumulation hence increasing marginal productivity of capital. On the other hand, financial intermediation can contribute to raising the savings rate and, thus, the investment rate hence, increasing economic growth. The former effect is first emphasized by Goldsmith (1969), who also finds some positive correlation between financial development and the level of real per capital GNP. He attributes this correlation to the positive effect that financial development has in encouraging more efficient use of the capital stock. In

addition, Goldsmith (1969) also argues that the process of growth has feedback effects on financial markets by creating incentives for further financial development.

McKinnon (1973) and Shaw (1973) extend the earlier argument by noting that financial deepening implies not only higher productivity of capital but also a higher savings rate and, therefore, a higher volume of investment. Unlike Goldsmith (1969), where growth and financial intermediation are both thought of as endogenous, the focus of McKinnon (1973) and Shaw (1973) is on the effects of public policy regarding financial markets on savings and investment. In particular, McKinnon (1973) and Shaw (1973) argue that policies that lead to financial repression for example, controls which result in negative real interest rates reduce the incentives to save. Lower savings, in turn, result in lower investment and growth. Thus they conclude that higher interest rates resulting from financial liberalization induce households to increase savings. The empirical validity of the McKinnon-Shaw hypothesis has been challenged by various authors. Díaz-Alejandro (1985), for instance, argues that the Latin American experience shows that financial development is unlikely to increase savings; therefore, the main contribution of financial development to growth should be thought of as increasing the marginal productivity of capital, rather than the volume of savings and investment.

Recent theoretical work has incorporated the role of financial development in models of endogenous growth in an attempt to analyze formally the interactions between financial development and long-run economic growth. Greenwood and Jovanovic (1990) present a model in which both financial development and economic growth are endogenous. In their framework, the role of financial institutions is to collect and analyze information

and to channel investible funds to the investment activities that yield the highest return. Since the activity performed by financial intermediaries involves costs, Greenwood and Jovanovic (1990) show that there is a positive two-way causal relationship between economic growth and financial development. On the one hand, the process of growth stimulates higher participation in financial markets thereby facilitating the creation and expansion of financial institutions. On the other hand financial institutions, by collecting and analyzing information from many potential investors, allow investment projects to be undertaken more efficiently and, hence, stimulate investment and growth.

Bencivenga and Smith (1991) present a model in which individuals face uncertainty about their future liquidity needs. They can choose to invest in a liquid asset which is safe but has low productivity and/or an illiquid asset which is riskier but has high productivity. In this framework, the presence of financial intermediation increases economic growth by channeling savings into the activity with high productivity, while allowing individuals to reduce the risk associated with their liquidity needs. Although individuals face uncertain liquidity needs, banks, by the law of large numbers, face a predictable demand for liquidity and can, therefore, allocate investment funds more efficiently. In the absence of financial intermediaries, individuals may be forced to liquidate their investment (i.e. their savings held in illiquid assets) when liquidity needs arise. Thus, the presence of banks also provides the benefit of eliminating unnecessary liquidations. Interestingly, Bencivenga and Smith (1991) show in their model that growth increases even when aggregate savings are reduced as a result of financial development, the reason being the dominant effect that financial development has on the efficiency of investment.

2.3 Empirical Literature Review

The empirical literature review has been divided into three parts. The first part is the finance-led growth (supply-leading response), the second part is the growth-led finance (demand –pulling response) and third part is the bi-directional causality relationship.

2.3.1 Finance-Led Growth (Supply-Leading Response)

According to supply-leading argument, the effect runs from financial development to economic growth and this direction of causality is supported by King and Levine (1993), De Gregorio and Guidotti (1995), Odedokun (1996), Ahmed and Ansari (1998), Choe and Moosa (1999), Rioja and Valev (2004), Odhiambo (2007), Akinlo and Egbetunde (2010) and Al-Naif (2012), among others.

King and Levine (1993) presented cross-country evidence consistent with Schumpeter's view that the financial system can promote economic growth. They used data of 80 countries over the 1960 to 1989 period. Various measures of the level of financial development are strongly associated with real per capita GDP growth, the rate of physical capital accumulation and improvements in the efficiency with which economies employ physical capital. The study, therefore, concludes that Schumpeter might have been right about the importance of financial development for economic growth.

De Gregorio and Guidotti (1995), for example, examined the empirical relationship between long-run growth and financial development, proxied by the ratio between bank credit to the private sector and the GDP in 100 countries from 1960 to 1985 and in 12 Latin American countries from 1950 to 1985. They carried out estimations using ordinary least squares (OLS) and the standard errors were computed using White's robust

procedure. They found that this proxy is positively correlated with growth in a large cross-country sample, but its impact changes across countries, and is negative in a panel data for Latin America. They concluded that the main channel of transmission from financial development to growth is the effect on the efficiency of investment, rather than its level (De Gregorio and Guidotti, 1995).

Odedokun (1996), analyses the effects of financial intermediation on the growth of real GDP in the LDC's by employing annual data for 71 countries over varying periods from 1960 to 1980. Based on the modified version of the orthodox model framework and an entirely new model framework that recognizes the external effects of the financial sector on the real sector, as well as effects of the financial sector on the productivities of factor inputs engaged therein, they estimate regression equations for each country. The study findings are as follows: (a) financial intermediation promotes economic growth in about 85% of the countries; (b) financial intermediation is practically at par with export expansion and capital formation ratio, and superior to labour force growth, as determinants of economic growth; (c) the growth-promoting effects of financial intermediation are more predominant in low-income than in high-income LDCs; and (d) the growth-promoting effects of financial intermediation are practically invariant across the various regions of the world (Odedokun, 1996).

Ahmed and Ansari (1998), investigates the relationship between financial sector development and economic growth for three majors South-Asian economies, namely, India, Pakistan, and Sri Lanka. The standard Granger-causality tests are employed to determine the pattern of causal linkage between various measures of financial sector

development and economic growth. Also, several regression equations are estimated, using the Cobb-Douglas production function framework, in order to analyze the impact of financial sector development on economic growth. Results from causality analysis indicate that financial sector development causes economic growth in the Granger sense. This seems to validate the supply-leading hypothesis. The regression results, using pooled data based on time-series and cross-sectional observations, reinforce the findings of the causality analysis, suggesting that financial sector development has indeed made a significant contribution to economic growth in these countries (Ahmed and Ansari, 1998).

Choe and Moosa (1999), examines the relationship between the development of financial systems and economic growth in Korea during the period of 1970 to 1992. In particular, they focus on the relative development of financial intermediaries and capital markets, and their impact on the portfolio behavior of the household and business sectors. Causality and VAR model selection tests show that financial development in general leads to economic growth and that financial intermediaries are more important than capital markets in this relationship (Choe and Moosa, 1999).

Rioja and Valev (2004), while examining financial development as a source of growth, found that financial development may affect productivity growth and capital accumulation in different ways in industrial versus developing countries. This hypothesis is tested using panel data from 74 countries during the period of 1961 to 1995 using Generalized Method of Moments (GMM) dynamic panel techniques. The study therefore concludes that, finance has a strong positive influence on productivity growth in more

developed countries while in less developed countries the effect of finance on output growth occurs through capital accumulation (Rioja and Valev, 2004).

Odhiambo (2007), investigates empirically the direction of causality between financial development and economic growth in three sub-Saharan African countries such as Kenya, South Africa and Tanzania during the period of 1980 to 2005. He used a granger-causality test against three proxies for financial development against real GDP per capita growth. The study finds that the direction of causality between financial development and economic growth is sensitive to the choice of which variable is used as a proxy for financial development. In addition, the strength and clarity of the causality evidence is found to vary from country to country and over time. On balance, a supply-leading response is found to be stronger in Tanzania (Odhiambo, 2007).

Akinlo and Egbetunde (2010), examined the long run and causal relationship between financial development and economic growth for ten countries in sub-Saharan Africa using the vector error correction model (VECM) during the period of 1980 to 2005. They found that financial development is co-integrated with economic growth in the selected ten countries in sub-Saharan Africa. There is a long run relationship between financial development and economic growth in the selected sub-Saharan African countries which are Central African Republic, Congo Republic, Gabon, Nigeria, Zambia, Kenya, Chad, South Africa, Sierra Leone and Swaziland. The study, therefore, concluded that financial development Granger causes economic growth in Central African Republic, Congo Republic, Gabon, and Nigeria (Akinlo and Egbetunde, 2010).

Al-Naif (2012), examined the causal relationship between financial development and economic growth in Jordan using Granger's causality, co-integration, and vector error correction techniques. For 1977 to 2008 time series data, he found that there existed a long-run equilibrium between financial development and economic growth. In addition, there was evidence of a one-directional causality relationship from financial development to economic growth in both the long-run and short-run. He concluded that, in the future financial development in Jordan is expected to play an important role in determining the economic growth (Al-Naif, 2012).

2.3.2 Growth-Led Finance (Demand-Pulling Response)

In this view the causality runs from economic growth to financial development. Underpinning this view is that rapid growth of real national income causes a rise in the demand for financial services by enterprises looking for external funds, and leads to expansion of the financial sector. In this case, an expansion of the financial system is induced because of real economic growth. This view is supported by Waqabaca (2004) for Fiji, Odhiambo (2004) for South Africa, Odhiambo (2007) for Kenya and South Africa, Odhiambo (2008a) for Kenya and Odhiambo (2011) for Tanzania among others.

Waqabaca (2004), examines the relationship between financial development and growth in Fiji using time series data from 1970-2000. This study examines empirically the causal link between financial development and economic growth in Fiji using unit root and co-integration techniques within a bivariate vector auto-regressive (bVAR) framework. The author found a positive relationship between financial development and economic growth for Fiji with the direction of causation running

predominantly from economic growth to financial development. This outcome is consistent with results found for countries which have less sophisticated financial systems (Waqabaca, 2004).

Odhiambo (2004), investigates the direction of causality between financial development and economic growth in South Africa using time series data from 1968 to 2000. Three proxies of financial development are used against real GDP per capita growth, a proxy for economic growth. The study uses Johansen-Juselius cointegration technique and vector error correction mechanism. The study reveals that supply-leading hypothesis has been rejected in South Africa and instead there is an over whelming demand-following response between financial development and economic growth in South Africa. This applies irrespective of the type of measurement used for financial development. This implies that, for South Africa, it is the economic growth which drives the development of financial sector (Odhiambo, 2004).

Odhiambo (2007), investigates empirically the direction of causality between financial development and economic growth for three sub-Saharan African countries which are Kenya, South Africa and Tanzania. He used data for the period of 1980 to 2005. From granger-causality tests of three proxies of financial development against real GDP per capita growth (a proxy for economic growth), the study found that the direction of causality between financial development and economic growth is sensitive to the choice of proxy variable for financial development. In addition, the strength and clarity of the causality evidence is found to vary from country to country and over time. The author

concludes that a demand-pulling response is found to be stronger in Kenya and South Africa (Odhiambo, 2007).

Odhiambo (2008a), examines the direction of causality between financial development and economic growth in Kenya using a dynamic Granger causality model. He used annual time series data for the 1968 to 2000 period. The study was motivated by the debate on the causal relationship between financial development and economic growth in developing countries. The study uses three proxies of financial development against real GDP per capita. The empirical results of the study reveal that although the causality between financial development and economic growth in Kenya is sensitive to the choice of the measurement for financial development, by and large the demand-following response tends to predominate (Odhiambo, 2008a).

Odhiambo (2011), examines the dynamic causal relationship between financial deepening and economic growth in Tanzania from 1980 to 2005 using Granger-causality test. Unlike the majority of the previous studies, this study includes foreign capital inflows as an intermittent variable between financial deepening and economic growth, thereby creating a simple trivariate model. Using the newly introduced ARDL-bounds testing procedure, the study finds a distinct unidirectional causal flow from economic growth to financial depth in Tanzania. This applies irrespective of whether the causality is estimated in the short run or in the long run. Other results show that there is a bi-directional causality between financial development and foreign capital inflows, and a unidirectional causality from foreign capital inflows to economic growth. The study, therefore, concludes that financial development in Tanzania follows growth, irrespective

of whether the causality is estimated in a static or dynamic formulation (Odhiambo, 2011).

2.3.3 Bi-directional Causality Relationship

Bi-directional causality suggests a two-way causal relationship between financial development and economic growth. A country with a well developed financial system could promote high economic growth through technological change, as well as product and service innovations in the financial sector, which will in turn create a high demand for financial services. As the financial sector responds to these demands, it will stimulate increased economic performance. Thus, financial development can affect economic growth at a certain stage of development, and the reverse causality will be found later on. This is how the idea of a bi-directional relationship emerges. This view is supported by Demetriades and Hussein (1996), Luintel and Khan (1999), Calderón and Liu (2003), Odhiambo (2005), Akinlo and Egbetunde (2010) and Sanchez et al (2011) among others.

Demetriades and Hussein (1996), while investigating the causality relationship between financial development and economic growth in 16 developing countries found that there is little support to the view that finance is a leading sector in the process of economic development. The 16 developing countries were Costa Rica, El Salvador, Greece, Guatemala, Honduras, India, Korea, Mauritius, Pakistan, Portugal, South Africa, Spain, Sri Lanka, Thailand, Turkey and Venezuela. They used time series data for 27 years. Using co-integration and error correction model, the study found evidence of bi-directional causal relationship. Their findings also demonstrate that causality patterns vary a cross countries and, therefore, highlight the dangers of statistical inference based

on cross-section country studies which treat different economies as homogeneous entities (Demetriades and Hussein, 1996).

Luintel and Khan (1999), for example, examined the long run relationship between financial development and economic growth in 10 developing countries from 1936 to 1941 using a multivariate vector autoregressive (mVAR) framework. The countries include; Costa Rica, Columbia, Greece, India, Korea, Malaysia, Philippines, Sri Lanka, South Africa and Thailand. They identified the long run financial development and output relationships in a co-integrating framework through tests of over-identifying restrictions. The study concluded that there is a bi-directional causality between financial development and economic growth in all the 10 developing countries (Luintel and Khan, 1999).

Caldefon and Liu (2003), examines the direction of causality between financial development and economic growth using the Geweke decomposition test on pooled data of 109 developing and industrial countries from 1960 to 1994. The study, therefore, found that the bi-directional Granger causality between financial development and economic growth exists in 87 developing countries and 22 industrial countries. In addition, the causal relationship from financial development to total factor productivity growth is stronger in developing countries, while the causal relationship from total factor productivity to financial development is stronger in industrial economies (Caldefon and Liu, 2003).

Odhiambo (2005), investigates empirically the role of financial development on economic growth in Tanzania from 1960 to 2005. Unlike many previous studies, the study uses three proxies of financial development against real GDP per capita (a proxy for economic growth). Using the Johansen-Juselius cointegration method and vector error-correction mechanism, the empirical results of this study, taken together, reveal a bi-directional causality between financial development and economic growth in Tanzania, although a supply-leading response tends to predominate. When the ratio of broad money to GDP ($M2/GDP$) is used, a distinct supply-leading response is found to prevail. However, when the ratio of currency to narrow definition of money ($CC/M1$) and the ratio of bank claims on the private sector to GDP (DCP/GDP) are used, bi-directional causality evidence seems to prevail (Odhiambo, 2005).

Akinlo and Egbetunde (2010), while examining the long-run causal relationship between financial development and economic growth for ten countries in sub-Saharan Africa using the vector error correction model (VECM) during the period of 1980 to 2005, finds that financial development is co-integrated with economic growth in the selected ten countries in sub-Saharan Africa. There is a long run relationship between financial development and economic growth in the selected sub-Saharan African countries namely Central African Republic, Congo Republic, Gabon, Nigeria, Zambia, Kenya, Chad, South Africa, Sierra Leone and Swaziland. The study, therefore, concluded that there is bi-directional relationship between financial development and economic growth in Kenya, Chad, South Africa, Sierra Leone and Swaziland (Akinlo and Egbetunde, 2010).

Sanchez et al (2011), examines the role of financial development in accounting for economic growth in low and middle-income countries classified by geographic regions namely East Asia & Pacific, Europe & Central Asia, Latin America & Caribbean, Middle East & North Africa, South Asia, sub-Saharan Africa, High-income OECD countries and High-income non-OECD countries. To analyze the relationship between financial development and economic growth, they estimated both panel regressions and variance decompositions of annual GDP per capita growth rates to determine which proxy measures of financial development are most important in accounting for economic growth over time. They found a positive relationship between financial development and economic growth in developing countries. The study also found that short-term multivariate analysis provided mixed results: a two-way causality relationship between finance and growth for most regions and one-way causality from growth to finance in East Asia & Pacific and sub-Saharan Africa, the two poorest regions. Furthermore, other variables from the real sector such as trade and government expenditure play an important role in explaining economic growth. Therefore, it seems that a well-functioning financial system is a necessary but not sufficient condition to reach steady economic growth in developing countries (Sanchez et al, 2011).

The above empirical findings on the Finance-Growth nexus in developing countries are summarized in a table in Appendix 2.

2.4 Overview of the Literature

Overall, the studies done in Tanzania regarding the direction of causality between financial development and economic growth are few and they show conflicting results.

There are literatures in support of the finance-led growth (supply-leading response), others are in support of growth-led finance (demand-following response) and others show a bi-directional causality response. No consensus has been reached regarding the direction of causality between financial development and economic growth all over the world and in Tanzania because countries have different financial infrastructures; different levels of economic growth and different proxies are used to measure financial development. This study, therefore aims at extending the literature by determining the direction of causality between financial development and economic growth in Tanzania.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter presents the conceptual framework, empirical model specification, the estimation techniques to be used, the definition of variables and their measurement and the data source and analysis.

3.2 Conceptual Framework

The relationship between financial development and economic growth can be derived from the neoclassical aggregate production function in which financial development constitutes an input (Odedokun 1996). The relationship can be presented in the equation below.

$$Y_t = f(K_t, L_t, FD_t) \quad (1)$$

Where Y_t is the aggregate output or real GDP per capita growth, K_t is the physical capital stock, L_t is the labour force, FD_t is financial development and the subscript t denotes the time period.

From the above production function, aggregate output is not only a function of the factors of production, capital and labour but it is also a function of financial development. When growth rate is introduced, the equation becomes:

$$\Delta Y_t = \Delta K_t + \Delta L_t + \Delta FD_t \quad (2)$$

Where ΔK_t represents investment

Therefore, the level of financial development is assumed to have a dual effect on economic growth. On the one hand, the development of financial markets may enhance the efficiency of capital accumulation hence increasing marginal productivity of capital and on the other hand, financial intermediation can contribute to raising the savings rate and, thus, the investment rate hence, increasing economic growth (De Gregorio and Guidotti 1995).

3.3 Empirical Model Specification

In this regard, the Bivariate Vector Autoregressive model (bVAR) was used in order to explore the relationship between financial development and economic growth. This model has been proven in the literature to be the best when studying this type of relationships, especially the ones involving tests of causality between variables. The causality relationship between financial development and economic growth was put to the test by estimating these two equations:

$$\ln Y_t = \alpha_0 + \alpha_{1i} \sum_{i=1}^m \ln Y_{t-i} + \alpha_{2j} \sum_{j=1}^n \ln FD_{t-j} + \varepsilon_t \quad (3)$$

$$\ln FD_t = \beta_0 + \beta_{1i} \sum_{i=1}^m \ln FD_{t-i} + \beta_{2j} \sum_{j=1}^n \ln Y_{t-j} + \mu_t \quad (4)$$

Where

Y = Represents real GDP per capita growth as an indicator for economic growth.

FD = Represents three alternate proxies for Financial Development which include the ratio of Broad money to GDP (M3/GDP), the ratio of domestic credit to the private sector to GDP (DCP/GDP) and the ratio of bank deposits to GDP (BD/GDP).

ε_t and μ_t = Error terms.

m and n = Denote number of lagged variables.

ln = Represents Natural Logarithm

3.4 Estimation Techniques

3.4.1 Descriptive Data Analysis and Statistical Tests

Descriptive data analysis is essential in determining the statistical properties of the model in order to select the proper functional form of the estimated model. One of the tests conducted is the normality tests of the variables because non-normality of the variables could lead to non-normality of the residuals which is a problem. The Jarque-Bera (JB) test was used to test for the normality properties of the variables. It compares the skewness and kurtosis coefficients of the variables. For a variable to be normally distributed its skewness should be equal to zero, kurtosis should be equal to three and the JB statistics should be equal to zero. The spread of the data was determined by estimating the mean and the first movement away from the mean for all variables in the model. Also a graphical analysis of the variables used was conducted to capture their movement over time.

3.4.2 Stationarity Test

If the variables of financial development and economic growth are stationary at level then one can proceed with the regression because the variable has a long-run equilibrium. Many empirical studies have found that time series data for a number of variables are usually non-stationary, as proved by Stock and Watson (1988). Regression techniques based on non-stationary time series data would produce spurious regression (Granger and Newbold, 1974). The Augmented Dickey Fuller Test (ADF) was used for testing stationarity as proposed by Dickey and Fuller (1979 and 1981).

The hypotheses which were used to test the series:-

H_0 : Series is non-stationary

H_A : Series is stationary

The ADF is a regress test using each series' own lagged terms with significant differences. If the ADF test statistic is greater than McKinnon's critical values, then the series are stationary at that level. The H_0 is rejected and the data is considered to be stationary (Gujarati, 2004). A non stationary variable was transformed by way of differencing before it is used in Co-integration test and Granger-causality test. After differencing the variables, the variables become stationary and hence avoid spurious regression.

3.4.3 Co-integration Test

Having established the stationarity of the variables of financial development and economic growth after differencing, the variables loses the long-run equilibrium. The next step is to test for long-run equilibrium within the variables to find if the variables are co-integrated. When testing for co-integration Engle and Granger (1987) procedure, which is based on testing for a unit root in the residual series of the estimated equilibrium relationship by employing the Dickey-Fuller test was used. The following steps were followed.

- i. Estimate the co-integrating regression model by OLS
- ii. Obtain the residuals.
- iii. Test for non-stationarity of the residuals

The hypotheses were as follows:

H_0 : The residual series are not stationary (or Financial Development and Economic Growth series are not co-integrated).

H_A : The residual series are stationary (or Financial Development and Economic Growth series are co-integrated).

If the residual series has no unit root, the null hypothesis should be rejected, meaning that the residuals are stationary therefore, there is co-integration between the financial development and economic growth series implying that they are moving together in the long-run.

3.4.4 Error-Correction Model (ECM)

The variables of financial development and economic growth were co-integrated therefore the error-correction model was used to model the long-run and short-run relationship between the variables. To determine the direction of causality between financial development and economic growth a bVAR model based on the Error-Correction Model (ECM) was used, which relied on the following equation:

$$\Delta \ln Y_t = \alpha_0 + \alpha_{1i} \sum_{i=1}^{m_i} \Delta \ln Y_{t-i} + \alpha_{2j} \sum_{j=1}^{m_j} \Delta \ln FD_{t-j} + \alpha_3 ECM_{t-1} + \varepsilon_t \quad (5)$$

$$\Delta \ln FD_t = \beta_0 + \beta_{1i} \sum_{i=1}^{m_i} \Delta \ln FD_{t-i} + \beta_{2j} \sum_{j=1}^{m_j} \Delta \ln Y_{t-j} + \beta_3 ECM_{t-1} + \mu_t \quad (6)$$

Where

ΔY = Represents the differencing of real GDP per capita growth as an indicator for economic growth.

ΔFD = Represents the differencing of the three alternate proxies for Financial Development which include the ratio of Broad money to GDP (M3/GDP), the ratio of

domestic credit to the private sector to GDP (DCP/GDP) and the ratio of bank deposits to GDP (BD/GDP).

ε_t and μ_t = Error terms.

m and n = Denote number of lagged variables

ECM_{t-1} = Represents vector error correction, which measures short adjustment and estimate the speed of adjustment to the deviation from the long-run equilibrium between two variables.

Δ = Represents the first differencing process because the variables of financial development and economic growth are non-stationary.

ln = Represents Natural Logarithm.

3.4.5 Granger-Causality Test

If there is a lagged relationship between two variables, one of the tests, which is applied to determine the direction of the relationship in statistical terms, is the Granger Causality test. This test also gives information about the short-term relationship between the variables. If there is no co-integration between the variables, Granger-Causality Test without including error correction terms would be undertaken. If there is a co-integration between the variables, the Granger-Causality Test will fail and it will be necessary to difference the data and to include error correction terms into the models.

In the Granger Causality test, there are three possible situations; One directional causality from FD to EG or EG to FD; opposite direction between FD and EG or one affecting the other; and an independency of FD and EG from each other. To apply the Granger-Causality test under null hypothesis illustrates that coefficients of financial development

variables (FD_t) are meaningful (equal to zero) and that F-statistics can be calculated. If null hypothesis is not rejected then it is possible to say that the Granger-Causality test accepts that financial development causes economic growth. The direction can be either negative or positive (Engle and Granger, 1987). This test is used to determine causality direction between variables in the short-run using the F-statistic and in the long-run using the t-statistic.

3.4.6 Post-Estimation Diagnostics

After estimating the model it is essential to conduct post-estimation tests in order to ascertain the fit of the model and to examine the structure of the residuals in order to ascertain the validity of inferences made from the estimated results. These tests include Ramsey Regression Error Specification Test (RESET) for model stability, the residual normality test, the residual autocorrelation LM test and the residual heteroscedasticity test.

3.5 Definition of Variables and their Measurement

This study has employed three competing proxies for financial development against real GDP per capita growth which is an indicator for economic growth. The first proxy is the ratio of broad money (M3) to GDP (M3/GDP), which is a standard measure of financial development. The broad money (M3/GDP) is designed to show the real size of the financial sector of a growing economy. M3 comprises of M2 and foreign currency deposits of the private sector, nonfinancial public enterprises, and nonbank financial institutions with commercial banks. M3 is sometimes referred to as liquid liabilities. The ratio is therefore expected to increase over time if the financial sector develops faster than

the real sector on the one hand, and decrease if the financial sector develops slower than the real sector, on the other hand.

The second proxy selected is the ratio of domestic credit to the private sector to GDP (DCP/GDP). This is the most important measure of financial intermediary development. This ratio indicates the importance of the role played by the financial sector in financing the economy. It is assumed that credit provided to the private sector generates increases in investment and productivity to a much larger extent than do credits to the public sector.

The third proxy is the ratio of bank deposits to GDP (BD/GDP). This ratio is a measure which provides direct information on the extent of financial intermediation. It consists of channeling funds between surplus and deficit agents. It is a mechanism whereby surplus funds from ultimate savers are matched to deficits incurred by ultimate borrowers. This ratio is indicative of the stage of financial development at a particular point in time. The measurement of the variables is presented below.

- a) $M3/GDP$ is measured by the ratio of Broad money (M3) to GDP.
- b) DCP/GDP is measured by the ratio of Domestic credit to the private sector to GDP.
- c) BD/GDP is measured by the ratio of Bank deposits to GDP.
- d) Economic growth is measured by Real GDP per capita growth.

In summary, the study was investigating the empirical relationship between three alternate proxies for financial development which include the ratio of broad money (M3) to GDP ($M3/GDP$), the ratio of domestic credit to the private sector to GDP (DCP/GDP)

and the ratio of bank deposits to GDP (BD/GDP) against real GDP per capita growth which is an indicator for economic growth.

3.6 Data Source and Analysis

The annual time series data for the Tanzanian economy was collected from the World Development Indicators (WDI), the African Development Indicators (ADI) and the Global Financial Development (GFD) data base published by World Bank for the period 1988 to 2012. The study used STATA statistical software package for data analysis.

CHAPTER FOUR

4.0 EMPIRICAL ESTIMATION RESULTS

4.1 Introduction

This chapter presents results from the empirical estimation and also gives the economic interpretations of the results. It includes a presentation of the descriptive statistics of all the variables in the estimated model, the unit root test results, the autoregressive distributed lag model, the co-integration test results, the error-correction model, the granger causality test results, the post-estimation diagnostics and the discussion of the results.

4.2 Descriptive Data Analysis and Statistical Tests.

Descriptive data analysis is conducted in order to ascertain the statistical properties of the data so as to give the estimated model an appropriate functional and mathematical form. Table 1 reports the mean, standard deviation, skewness, kurtosis and Jarque-Bera statistics of all the variables in the model.

Table 1: Descriptive Data Analysis

Variables	Mean	Std. Dev	Skewness	Kurtosis	JB Statistics
lnRGDP/C	12.5399	0.1888661	-0.51589	2.5903	0.55403
lnM3/GDP	-1.448798	0.2342631	0.19388	2.8233	0.91667
lnDCP/GDP	-2.457221	0.6305358	0.07872	3.7179	0.77194
lnBD/GDP	-2.113583	0.6801568	-0.62374	3.8739	0.32904

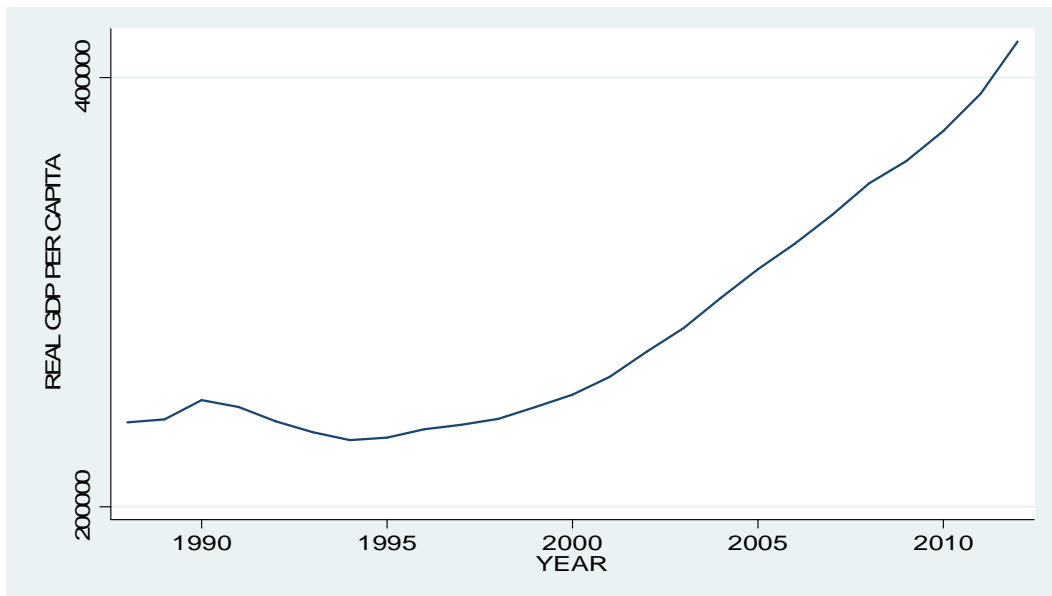
Source: Author's Computations

Table 1 shows that, the natural logarithms of all the variables are not dispersed significantly from their mean values as indicated by their small standard deviation values. The skewness for a normal distribution is zero, and any symmetric data should have skewness near zero, therefore this shows that the data is normally distributed. The skewness of $\ln\text{RGDP}/C$ and $\ln\text{BD}/\text{GDP}$ are negative indicating that the data is skewed to the left which means that the left tail is long relative to the right tail. The skewness of $\ln\text{M3}/\text{GDP}$ and $\ln\text{DCP}/\text{GDP}$ are positive indicating that the data is skewed to the right which means that the right tail is long relative to the left tail. The kurtosis of a standard normal distribution is three therefore the natural logarithms of all the variables are normally distributed. In addition, the kurtoses are positive indicating a peaked distribution. The Jarque-Bera test is a goodness of fit test of whether sample data have the skewness and kurtosis matching a normal distribution. The JB statistics show that the data is normally distributed because it has a chi-squared distribution with two degrees of freedom and its value is greater than the 0.05 level of significance

4.2.1 Graphical Data Analysis

A trend analysis was conducted in order to detect the movements in the value of the variable over time and to analyze the causes of such movements. Figure 3 shows the movements in real GDP per capita growth over time, figure 4 shows the movements in broad money (M3) to GDP ratio over time, figure 5 shows the movements in domestic credit to the private sector to GDP ratio over time and figure 6 shows the movements in bank deposit to GDP ratio over time.

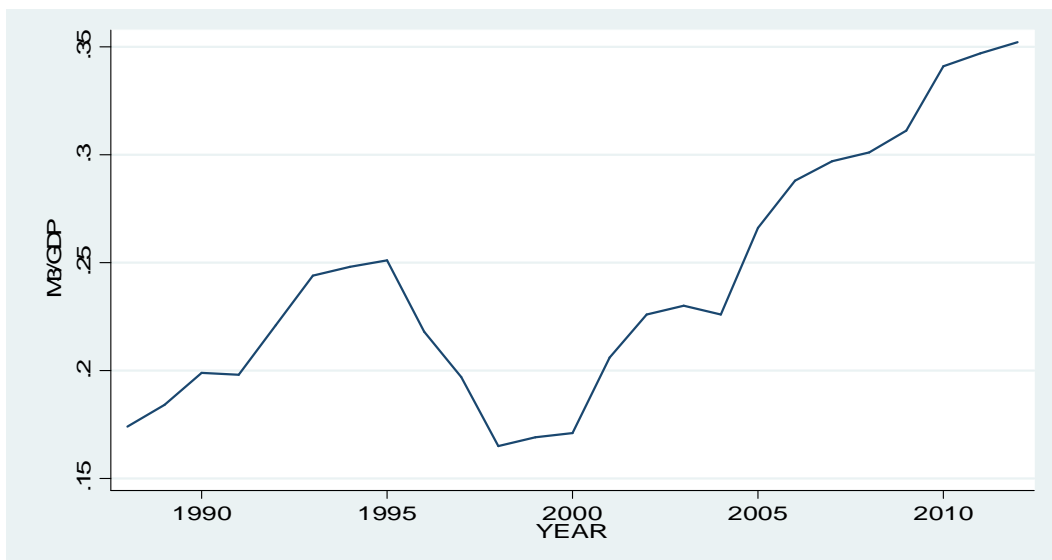
Figure 3: Trends in Real GDP per capita growth



Source: Author's Computations

Figure 3 shows that the value of the real GDP per capita growth has been increasing over time. It rose from 1988 to 1990 and then declined from 1991 to 1994. Due to liberalization it rose persistently from 1995 up to 2012.

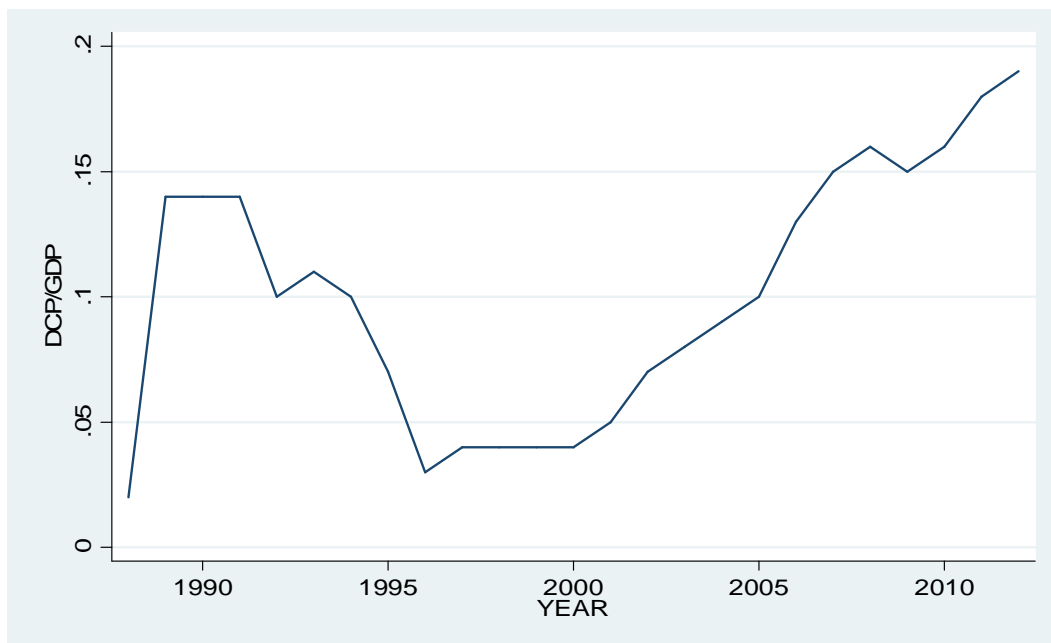
Figure 4: Trends in Broad money (M3) to GDP ratio



Source: Author's Computations

Figure 4 shows that the ratio of broad money (M3) to GDP had increased from 1988 to 1995 due to the transformation of the banking sector after 1992 which improved the quality of banking services. It then dropped sharply from 1996 to 1999. From the year 2000 its value has been increasing.

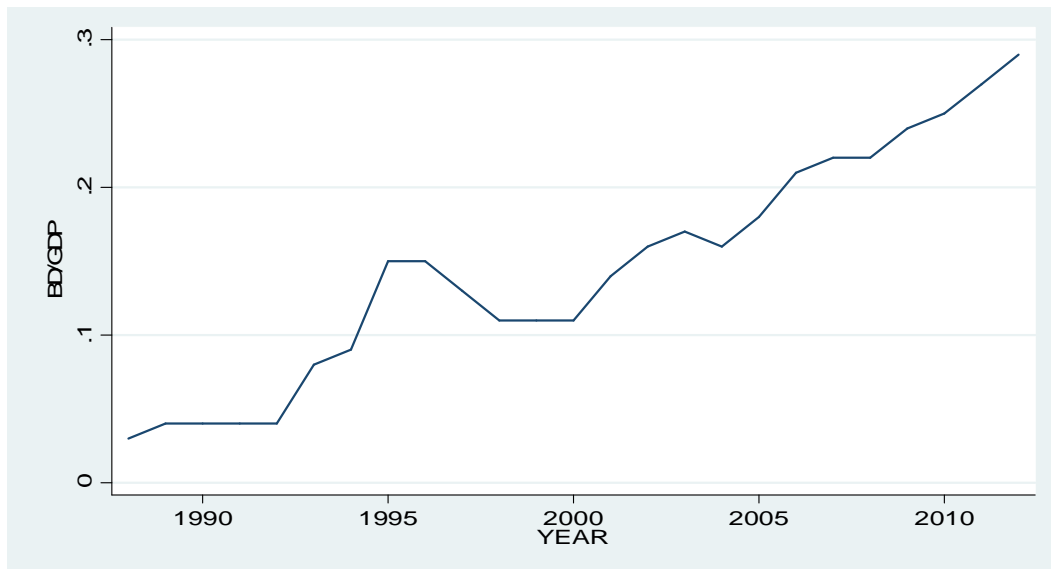
Figure 5: Trends in Domestic credit to the private sector to GDP ratio



Source: Author's Computations

Figure 5 shows that the ratio of domestic credit to the private sector to GDP increased sharply from 1988 to 1989 and then dropped sharply from 1994 to 1996. From the year 2001 its value has been increasing because financial resources provided to the private sector, such as through loans, purchases of nonequity securities, trade credits and other accounts receivable that establish a claim for repayment has been increasing.

Figure 6: Trends in Bank deposits to GDP ratio



Source: Author's Computations

Figure 6 shows that the ratio of bank deposits to GDP has been having a mixture of high and low trends from 1988 to 2012. The introduction of Treasury Bills in 1994 has offered a high yielding alternative to bank deposits.

4.3 Unit Root Test Results

A basic assumption of the Classical Linear Regression model is that variables should have a constant mean, variance and the covariance between the values of two time periods should be zero. Violation of this assumption leads to spurious regression. To avoid this short fall, the unit root test was conducted on the variables to ascertain their stationarity properties. Where non-stationarity was detected, stationarity was induced by taking the first difference of the variable involved. The Augmented Dickey-Fuller test was conducted with trend and without trend as guided by the graphical analysis. The ADF test results are shown in Table 2 below.

Table 2: ADF Unit Root Test Results

Variables	Levels		First Differences		Lags
	Trend	No Trend	Trend	No Trend	
lnRGDP/C	-1.236	1.109	-4.616 [*]	-0.868	1
lnM3/GDP	-0.913	0.054	-3.051	-3.027 ^{**}	0
lnDCP/GDP	-2.564	-2.636 ^{***}	-8.519 [*]	-8.286 [*]	0
lnBD/GDP	-2.102	-1.761	-4.419 [*]	-4.451 [*]	0

Source: Author's Computations

*, ** and *** means rejection of the null hypothesis at 1%, 5% and 10% respectively.

The reported results in Table 2 clearly demonstrate that the null hypothesis of each of the time series has a unit root that cannot be rejected for the levels since their ADF values are less than critical values at the 1%, 5% and 10% level of significance. Therefore, financial development variables and economic growth are non-stationary in their levels. However, the results indicate that the null hypothesis is rejected for the first differences; therefore financial development variables and economic growth are stationary in their first differences. This result indicates that all the variables under investigation are individually integrated in order one I(1).

4.4 Autoregressive Distributed Lag Model (ARDL)

This study estimated the relationship between financial development and economic growth in the context of the Autoregressive Distributed Lag Model. The variables used to capture financial development are Broad money (M3) as a percentage of GDP, Domestic credit to the private sector as a percentage of GDP and Bank deposits as a percentage of GDP. While the variable used to capture economic growth is Real GDP per capita growth. Before estimating the model the optimal lag length of each variable in the model was determined in order to ensure that the model was well specified. The Akaike Information Criterion (AIC) and the Schwartz Bayesian Information Criterion (SBIC) were used to determine the optimal lag length. Whenever there is conflict between the two the SBIC is usually preferred because it penalizes more. The AIC and SBIC are chosen when the p-value is less than the 0.05 level of significance. Table 3 reports the AIC and SBIC test results.

Table 3: AIC and SBIC Test Results

Variables	Lags	AIC	HQIC	SBIC	P-Value
lnRGDP/C	3	-6.54232	-6.49914	-6.34337	0.010
lnM3/GDP	2	-2.01002	-1.97763	-1.8608	0.028
lnDCP/GDP	1	-0.277303	0.298893	0.376782	0.000
lnBD/GDP	1	0.553385	-0.511851	-0.433962	0.0000

Source: Author's Computations

The test results from AIC and SBIC presented in table 3 show that the variable lnRGDP/C should be lagged three times, lnM3/GDP should be lagged twice, lnDCP/GDP

and lnBD/GDP each should be lagged once because their p-values are less than the 0.05 level of significance. Table 4 reports the long-run estimates from the model.

Table 4: Autoregressive Distributed Lag Model Results

Variables	Coefficient	Std. Error	t-Statistic	P-Value
lnM3/GDP	-0.0323024	0.0467537	-0.69	0.504
lnDCP/GDP	-0.0008659	0.0142632	-0.06	0.953
lnBD/GDP	0.037043	0.0178387	2.08	0.062
L1lnRGDP/C	1.183043	0.1139574	10.38	0.000
L1lnM3/GDP	-0.0151035	0.0485871	-0.31	0.762
L1lnDCP/GDP	0.0113396	0.0120181	0.94	0.366
L1lnBD/GDP	0.0106962	0.022474	0.48	0.643
L2lnRGDP/C	-0.0000922	0.0140721	-0.01	0.995
L2lnM3/GDP	-0.0315097	0.0337412	-0.93	0.370
L3lnRGDP/C	-0.1680104	0.1191568	-1.41	0.186
Constant	-0.1667324	0.661164	-0.25	0.806
Number of Observations = 22				
F(10, 11) = 1141.90				
Prob>F = 0.0000				
R-squared = 0.9990				
Adj R-squared = 0.9990				
Root MSE = 0.00831				

Source: Author's Computations

Table 4 shows that Broad money (M3) as a percentage of GDP has a negative impact on the Real GDP per capita growth in all time periods and all of its impact is statistically insignificant in all periods. Domestic credit to the private sector as a percentage of GDP has a negative impact on the Real GDP per capita growth in the current period and has a positive impact in lags of the first period. However its impact is statistically insignificant in all the periods. Bank deposits as a percentage of GDP has positive statistically insignificant impact on the Real GDP per capita growth. The first lag of Real GDP per capita growth has a positive statistically significant impact on Real GDP per capita growth but its second and third lag have a negative statistically insignificant impact on Real GDP per capita growth.

4.5 Co-integration Test Results

When testing for co-integration Engle and Granger (1987) procedure, which is based on testing for a unit root in the residuals of the estimated long-run relationship by employing the Dickey-Fuller test, was used. If the residuals are stationary then it means that the variables of financial development and economic growth are co-integrated.

Table 5: Co-integration Test Results

Variable	Trends	Test Statistics	1% Critical Value	5% Critical Value	10% Critical Value	P-Value
Residuals	Trend	-3.472	-3.750	-3.00	-2.630	0.0042
Residuals	No Trend	-3.226	-4.380	-3.600	-3.240	0.0368

Source: Author's Computations

The results presented in Table 5 show that the ordinary least square residuals with trend are stationary at 5% and 10% critical values and the p-value 0.0042 is less than the 0.05 level of significance. Therefore, the variables of financial development and economic growth are co-integrated, indicating that there is a long-run relationship between financial development and economic growth in Tanzania.

4.6 Error-Correction Model (ECM)

Estimating a model with non-stationary variables could lead to spurious regression. To solve for non-stationarity, the variables are first differenced and then the short-run relationship is estimated. But estimating a model with first differenced variables leads to a loss of long-run information. Therefore, an error-correction model is used to bridge both the long-run and short-run relationships within the context of a single equation. The optimal lag length of the variables was determined by the Akaike Information Criterion (AIC) and the Schwartz Bayesian Information Criterion (SBIC). Table 6 reports the AIC and SBIC test results.

Table 6: AIC and SBIC Test Results

Variables	Lags	AIC	HQIC	SBIC	P-Value
DlnRGDP/C	1	-6.72296	-6.70353	-6.62339	0.000
DlnM3/GDP	1	-2.0583	-2.03887	-1.95873	0.045
DlnDCP/GDP	0	0.16519	0.174908	0.214976	0.000
DlnBD/GDP	0	-0.344415	-0.334696	-0.294629	0.000

Source: Author's Computations

Table 6 shows that the first difference of the variables lnRGDP/C and lnM3/GDP each should be lagged once and the first difference of the variables lnDCP/GDP and lnBD/GDP should not be lagged because their p-values are less than the 0.05 level of significance. Table 7 presents the error correction models estimations.

Table 7: Error-Correction Model Estimates

Variables	Coefficient	Std. Error	t-Statistic	P-Value
DlnM3/GDP	-0.0417378	0.0285231	-1.46	0.165
DlnDCP/GDP	-0.0053326	0.0089108	-0.60	0.559
DlnBD/GDP	0.0298206	0.0151708	1.97	0.069
LDlnRGDP/C	1.10074	0.113464	9.70	0.000
LDlnM3/GDP	-0.0046036	0.0260036	-0.18	0.862
LECM	-0.7796361	0.3605964	-2.16	0.048
Constant	-0.0006847	0.0035537	-0.19	0.850
Number of observation = 21				
F(6, 14) = 24.41				
Prob>F = 0.0000				
R-squared = 0.9127				
Adj R-squared = 0.8753				
Root MSE = 0.00851				

Source: Author's Computations

Table 7 shows that Broad money (M3) as a percentage of GDP has a negative statistically insignificant impact on Real GDP per capita growth in the current period and in lag 1.

Domestic credit to the private sector as a percentage of GDP has a negative impact on Real GDP per capita growth and its impact is statistically insignificant. Bank deposits as a percentage of GDP has a positive impact on Real GDP per capita growth and its impact is statistically insignificant. The lag of Real GDP per capita growth has a positive statistically significant impact on Real GDP per capita growth. The error-correction term shows that 78% of the errors are corrected each period and its impact is statistically significant. Additionally, the adjusted R^2 shows that about 88% of the variations in Real GDP per capita growth are explained by the model after correcting for degrees of freedom. The F-statistics shows that the estimated parameters are jointly significantly different from zero.

4.7 Granger Causality Test Results

From the results of unit root test and co-integration test both financial development and economic growth are $I(1)$ and are co-integrated. Therefore they have a long-run relationship. They may nevertheless be related in the short-run. Their short-run fluctuation can be described by their first differences, which are stationary. The interactions in the short-run fluctuations may therefore be described by a VAR model in first differences. In general, the VAR model can be used to capture the evolution and the interdependencies between multiple time series. The VAR model is more suitable for the analysis as the direction of the causal relationship between financial development and economic growth is unknown and it is also expected that past values of both variables could have a significant impact on their current values.

The VAR model of one lag was used to estimate the variables of financial development and economic growth. The VAR (1) model was estimated in the following form with all variables in first difference form and tests various hypotheses:

H_0 = Financial Development does not cause Economic Growth or Economic growth does not cause Financial Development.

H_A = Financial Development causes Economic Growth or Economic Growth causes Financial Development.

Table 8: Results of Granger Causality Wald Test

Causality Direction	Probability Value	Results
dlnRGDP/C→dlnM3/GDP	0.311	Do not reject H_0
dlnRGDP/C→dlnDCP/GDP	0.041	Reject H_0
dlnRGDP/C→dlnBD/GDP	0.237	Do not reject H_0
dlnM3/GDP→dlnRGDP/C	0.515	Do not reject H_0
dlnM3/GDP→dlnDCP/GDP	0.337	Do not reject H_0
dlnM3/GDP→dlnBD/GDP	0.041	Reject H_0
dlnDCP/GDP→dlnRGDP/C	0.124	Do not reject H_0
dlnDCP/GDP→dlnM3/GDP	0.081	Do not reject H_0
dlnDCP/GDP→dlnBD/GDP	0.022	Reject H_0
dlnBD/GDP→dlnRGDP/C	0.000	Reject H_0
dlnBD/GDP→dlnM3/GDP	0.000	Reject H_0
dlnBD/GDP→dlnDCP/GDP	0.158	Do not reject H_0

Source: Author's Computations

Note: For F-statistics, probabilities that are less than 5% level null hypotheses are rejected at that level.

The Granger Causality Wald test found that there is independence between the following variables: Real GDP per capita growth and Broad money (M3) as percentage of GDP; and Domestic credit to the private sector as a percentage of GDP and M3 as percentage of GDP. One-way causal relationship was found between the following variables: Real GDP per capita growth and Domestic credit to the private sector as a percentage of GDP with causality running from Real GDP per capita growth to Domestic credit to the private sector as a percentage of GDP; Domestic credit to the private sector as a percentage of GDP and Bank deposits as a percentage of GDP with causality running from Domestic credit to the private sector as a percentage of GDP to Bank deposits as a percentage of GDP; and finally, Bank deposits as a percentage of GDP and Real GDP per capita growth with causality running from Bank deposits as a percentage of GDP to Real GDP per capita growth. A bi-directional causal relationship was found to prevail in the Broad money (M3) as a percentage of GDP and Bank deposits as a percentage of GDP.

4.8 Post-Estimation Diagnostics

A post-estimation diagnostic is carried out in order to ascertain if the estimated model is properly specified. The Ramsey RESET test which was based on the null hypothesis that a model has omitted variables against the alternative a model has no omitted variables was used. Table 9 reports the results from the Ramsey RESET Test.

Table 9: Ramsey RESET Test Results

F-statistics	Probability Value
1.28	0.3280

Source: Author's Computations

Table 9 indicates that the model has no omitted variables and it is well specified as indicated by the p-value 0.3280 which is greater than the 0.05 level of significance.

A normality test of the residuals was also carried out in order to ascertain the predictive accuracy of the model. The test was conducted on the null hypothesis of non-normality against the alternative of normality. Table 10 reports the results from the residual normality test.

Table 10: Residual Normality Test Results

Shapiro-Wilk W Test	Probability Value
0.89797	0.02708

Source: Author's Computations

Table 10 indicates that the residuals from the model are not normal as indicated by the probability value 0.02708 which is less than the 0.05 level of significance.

A test for autocorrelation of residuals was conducted using the Breusch-Godfrey Serial correlation LM test which is based on the null hypothesis of no serial correlation against the alternative of serial correlation. Table 11 reports the results from the test.

Table 11: Breusch-Godfrey Serial Correlation LM Test Results

F-statistic	Probability Value
1.298	0.2545

Source: Author's Computations

Table 11 shows that the residuals of the model are not serially correlated with the variables as indicated by the p-value 0.2545 which is greater than the 0.05 level of significance.

The test for heteroscedasticity of the residuals was also conducted using the Breusch-Pagan-Godfrey test which is based on the null hypothesis of heteroscedasticity against the alternative of no heteroscedasticity. Table 12 reports the results.

Table 12: Breusch-Pagan-Godfrey Test for Heteroscedasticity Results

F-statistic	Probability Value
0.54	0.4608

Source: Author's Computation

Table 12 shows that the residuals of the model have no heteroscedasticity as indicated by the p-value 0.4608 which is greater than the 0.05 level of significance.

4.9 Discussion of the Results

The autoregressive distributed lag error-correction model estimates show that Broad money (M3) as a percentage of GDP and Domestic credit to the private sector as a percentage of GDP have a negative insignificant impact on the level of Real GDP per capita growth prevailing within the economy. At lag one, the impact of Broad money (M3) is negative. This means that, an increase in Broad money (M3) today will decrease

real GDP per capita growth after one year. This is due to the fact that commercial banks invest heavily in Treasury bills and bonds, which are risk free securities instead of investing on productive sectors like agricultural sector which accounts for about 50% of GDP. Also commercial banks have high lending rates which discourage small entrepreneurs from borrowing hence decreasing the rate of economic growth.

Consequently, an increase in Domestic credit to the private will decrease the real GDP per capita growth after one year because the credit is not taken into productive sectors hence decreasing the rate of economic growth. Bank deposits as a percentage of GDP have a positive and insignificant impact in explaining the changes in Real GDP per capita growth. However, previous levels Real GDP per capita growth has positive and significant effects on the current level of Real GDP per capita growth.

The granger causality test results show that Broad money (M3) as a percentage of GDP and Domestic credit to the private sector as a percentage of GDP have no effect on the level of Real GDP per capita growth prevailing within the economy. However, Bank deposits as a percentage of GDP has an effect on the level of Real GDP per capita growth prevailing within the economy. On the other hand, the level of Real GDP per capita growth prevailing within the economy has an effect on the Domestic credit to the private sector as a percentage of GDP. Also Broad money (M3) as a percentage of GDP and Bank deposits as a percentage of GDP granger cause one another.

The adjusted R^2 shows that about 88% of the variations in Real GDP per capita growth are explained by the model after correcting for the degrees of freedom. Therefore, the model is good in explaining changes in Real GDP per capita growth

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter provides the summary of the study, conclusion, policy implications and recommendations, limitations of the study and area for further study.

5.2 Summary of the Study

This study examined the causal relationship between financial development and economic growth using data for the period 1988 to 2012. Three variables used to measure financial development included the ratio of Broad money (M3) to GDP, the ratio of Domestic credit to the private sector to GDP and the ratio of Bank deposits to GDP. Real GDP per capita growth was used as an indicator for economic growth.

The study employed pre-estimation tests such as statistical, descriptive and graphical analyses and also established time series properties of the variables using the ADF unit root test. The ADF test showed that all the variables with the exception of Domestic credit to the private sector as a percentage of GDP were non-stationary at levels but stationary at first differences at the 1% and 5% level of significance. Also the co-integration test showed that financial development and economic growth are co-integrated implying that they have a long-run relationship.

The model was estimated using autoregressive distributed lag error-correction model and the findings show that Broad money (M3) as a percentage of GDP and Domestic credit to the private sector as a percentage of GDP have a negative insignificant impact on the level of Real GDP per capita growth prevailing within the economy. However, previous

levels Real GDP per capita growth has positive and significant effects on the current level of Real GDP per capita growth. The granger causality test results show that Broad money (M3) as a percentage of GDP and Domestic credit to the private sector as a percentage of GDP have no effect on the level of Real GDP per capita growth prevailing within the economy. On the other hand, Bank deposits as a percentage of GDP has an effect on the level of Real GDP per capita growth prevailing within the economy and the level of Real GDP per capita growth prevailing within the economy has an effect on the Domestic credit to the private sector as a percentage of GDP.

Post estimation diagnostic tests revealed that the model is well specified as reported by the Ramsey RESET; the residuals from the model are normal and the model showed signs of outliers in the residuals as reported by Shapiro-Wilk W Test; the residuals from the model have serial correlation as reported from Breusch-Godfrey Serial correlation LM test; and the residuals from the model have no heterescedasticity as reported by Breusch-Pagan-Godfrey test.

5.3 Conclusions

The model estimates found that the two proxies for financial development which include Broad money (M3) as a percentage of GDP and Domestic credit to the Private sector as a percentage of GDP have a negative relationship to Real GDP per capita growth while Bank deposits as a percentage of GDP have a positive relationship to Real GDP per capita growth which is an indicator for economic growth. Also the co-integration test results found that the variables of financial development and economic growth have a long-run relationship.

Granger causality test results show that Real GDP per capita growth causes Domestic credit to the private sector as a percentage of GDP and Bank deposits as a percentage of GDP causes the Real GDP per capita growth. Therefore, these results provide evidence that the relationship between financial development and economic growth in Tanzania follows a bi-directional causal relationship. The results also confirm Greenwood and Jovanovic (1990) postulation that there is a two-way causal relationship between financial development and economic growth and are consistent with those obtained by Demetrades and Hussein (1996), Luintel and Khan (1999), Calderon and Liu (2003), Odhiambo (2005), Akinlo and Egbetunde (2010) and Sanchez, Hassan and Yu (2011) among others.

5.4 Policy Implications and Recommendations

Since the enactment of the Banking and Financial Institutions Act in 1991 liberalizing the financial sector, there has been a rapid growth of financial institutions in Tanzania. Despite this increase in number, concerns have been raised about their lending policies. Commercial banks have tended to prefer to hold government securities in the form of Treasury Bills and Bonds, which command high returns and are considered risk free. The second concern is the high cost of lending in the form of unrealistic interest rates. Therefore, the government of Tanzania should encourage commercial banks to lend to productive sectors such as the agricultural sector which accounts for about 50% of the GDP so as to promote economic growth. Also commercial banks should reduce their cost of lending so as to stimulate investment and hence promote economic growth.

The Capital Market and Security Act, 1997 led to the establishment of the Dar es Salaam Stock Exchange as another alternative for raising capital. Its scope is, however, limited given the lack of experience, the small number of listed companies, and low market capitalization. Therefore, the government of Tanzania should gear its policies toward strengthening and developing the capital market in Tanzania. Some measures such as improving market capitalization, providing incentives to companies which participate in the capital market and increasing the number of trained personnel could contribute towards strengthening the financial sector and could promote economic growth.

Since there is a bi-directional causal relationship between financial development and economic growth in Tanzania the government of Tanzania should promote the process of growth which will stimulate higher participation in financial markets thereby facilitating the creation and expansion of financial institutions. The government can also develop the financial sector by collecting and analyzing information from many potential investors which will allow investment projects to be undertaken more efficiently and hence stimulate investment and growth.

5.5 Limitations of the Study

A major limitation of the study is the quality of data used in this study and how the variables used in this study are captured and measured. There is non-reliability of data where different years' publications are not consistent with each other. Another limitation is the use of proxies to measure financial development. Various studies have used different proxies for financial development leading to results not being comparable and

hence no consensus has been reached regarding the causality relationship between financial development and economic growth.

5.6 Areas for Further Study

Since financial development is such an important element for economic growth, further research should be devoted towards the exact mechanism by which it influences economic growth. In this regard, further studies should include other indicators of financial development used in the literature such as the number of ATM, number of bank branches and usage of credit/debit card as proxies for financial development. This might provide better results about the causality relationship between financial development and economic growth.

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APPENDICES

Appendix 1: Trends of Financial Depth and Economic Growth in Tanzania

Years	M3 as a percentage of GDP	GDP Growth rate (%)
1988	17.4%	-
1989	18.4%	4%
1990	19.9%	7%
1991	19.8%	2%
1992	22.1%	1%
1993	24.4%	1%
1994	24.8%	2%
1995	25.1%	4%
1996	21.8%	5%
1997	19.7%	4%
1998	16.5%	4%
1999	16.9%	5%
2000	17.1%	5%
2001	20.6%	6%
2002	22.6%	7%
2003	23%	7%
2004	22.6%	8%
2005	26.6%	7%
2006	28.8%	7%
2007	29.7%	7%
2008	30.1%	7%
2009	31.1%	6%
2010	34.1%	7%
2011	34.7%	6%
2012	35.2%	6.9%

Source: Computations based on World Development Indicators (WDI)

**Appendix 2: Empirical Findings on the Finance-Growth Nexus in Developed
Developing Countries.**

Author(s)	Region/Country	Direction of Causality
A: Studies supporting Finance-Led Growth (Supply-Leading Response)		
King and Levine (1993)	80 countries	Finance → Growth
De Gregoria and Guidotti (1995)	100 countries	Finance → Growth (the impact changes a cross countries)
Odedokun (1996)	71 countries	Finance → Growth (evidence is found in 85% of the sample countries)
Ahmed and Ansari (1998)	India, Pakistan and Sri Lanka	Finance → Growth
Choe and Moosa (1999)	Korea	Finance → Growth (Financial intermediaries are more important than capital markets)
Rioja and Valev (2004)	74 countries	Finance → Growth
Odhiambo (2007)	South Africa, Kenya and Tanzania	Finance → Growth (in the case of Tanzania)

Akinlo and Egbetunde (2010)	Central African Republic, Congo Republic, Gabon, Nigeria, Zambia, Kenya, Chad, South Africa, Sierra Leone and Swaziland.	Finance → Growth (in case of Central African Republic, Congo Republic, Gabon and Nigeria)
Al-Naif (2012)	Jordan	Finance → Growth
B: Studies supporting Growth-Led Finance (Demand-Pulling Response)		
Waqabaca (2004)	Fiji	Growth → Finance
Odhiambo (2004)	South Africa	Growth → Finance
Odhiambo (2007)	South Africa, Kenya and Tanzania.	Growth → Finance (in case of South Africa and Kenya)
Odhiambo (2008a)	Kenya	Growth → Finance
Odhiambo (2008b)	Kenya	Growth → Finance (savings is included as an intermittent variable)
Akinlo and Egbetunde (2010)	Central African Republic, Congo Republic, Gabon, Nigeria, Zambia, Kenya, Chad, South Africa, Sierra Leone and Swaziland	Growth → Finance (in case of Zambia)
Odhiambo (2011)	Tanzania	Growth → Finance (foreign capital inflow is included as an intermittent variable)

C: Studies supporting the Bi-directional Causality Relationship		
Demetrades and Hussein (1996)	16 countries (Costa Rica, El Salvador, Greece, Guatemala, Honduras, India, Korea, Mauritius, Pakistan, Portugal, South Africa, Spain, Sri Lanka, Thailand, Turkey and Venezuela)	Finance ↔ Growth
Luintel and Khan (1999)	10 countries (Costa Rica, Columbia, Greece, India, Korea, Malaysia, Philippines, Sri Lanka, South Africa and Thailand).	Finance ↔ Growth
Caldeón and Liu (2003)	109 Countries (87 developing countries and 22 industrial countries)	Finance ↔ Growth
Odhiambo (2005)	Tanzania	Finance ↔ Growth
Akinlo and Egbetunde (2010)	Central African Republic, Congo Republic, Gabon, Nigeria, Zambia, Kenya, Chad, South Africa, Sierra Leone and Swaziland	Finance ↔ Growth (in case of Kenya, Chad, South Africa, Sierra Leone and Swaziland)

Sanchez, Hassan and Yu (2011)	East Asia & Pacific, Europe & Central Asia, Latin America & Caribbean, Middle East & North Africa, South Asia, sub-Saharan Africa, High-income OECD countries and High-income non-OECD countries.	Finance ↔ Growth (in most of the regions except in East Asia & Pacific and sub-Saharan Africa where demand-pulling is dominant)
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Source: Compilation from the Empirical Literature Review

Appendix 3: Data on Financial Development and Economic Growth

Years	Real GDP Per Capita	M3/GDP	DCP/GDP	BD/GDP
1988	239324.384	0.174	0.02	0.03
1989	240769.566	0.184	0.14	0.04
1990	249653.989	0.199	0.14	0.04
1991	246576.296	0.198	0.14	0.04
1992	239829.03	0.221	0.1	0.04
1993	234773.376	0.244	0.11	0.08
1994	230972.11	0.248	0.1	0.09
1995	232191.297	0.251	0.07	0.15
1996	236123.587	0.218	0.03	0.15
1997	238185.655	0.197	0.04	0.13
1998	240946.256	0.165	0.04	0.11
1999	246455.819	0.169	0.04	0.11
2000	252226.905	0.171	0.04	0.11
2001	260625.339	0.206	0.05	0.14
2002	272160.152	0.226	0.07	0.16
2003	283343.872	0.23	0.08	0.17
2004	297450.209	0.226	0.09	0.16
2005	310784.748	0.266	0.1	0.18
2006	322645.255	0.288	0.13	0.21
2007	336073.309	0.297	0.15	0.22
2008	350820.044	0.301	0.16	0.22
2009	361203.797	0.311	0.15	0.24
2010	375090.481	0.341	0.16	0.25
2011	392496.929	0.347	0.18	0.27
2012	416739.143	0.352	0.19	0.29

Source: Computations based on World Development Indicators (WDI)