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Causality between Financial Development and Economic Growth: Empirical Evidence from Ethiopia: (Johansen and VECM Approaches)

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Abstract
The nature of the relationship between financial development and economic growth has been one of the most debated issues in the recent past, yet with little consensus. Thus, the general objective of this study was to analyze the existence of long run co integration and direction of the causality between financial development and economic growth in Ethiopia from 1973-2008. The sources of the data were World Bank database and National Bank of Ethiopia. To analyze the data the researcher used Johansen and Vector Error Correction (VEC) modeling approaches with the help of E-views software version 9. The Johansen co-integration testing methodology proved existence of the long run con-integration among variables. The Outcome from vector error correction (VEC) model revealed that in the long run Private credit by deposit money bank and other financial institutions to the GDP ratio and real GDP growth rate have **bi-directional causality** and Deposit Money Bank assets to the GDP ratio and real GDP growth rate have **unidirectional causality** which runs from finance to Economic growth. However, in the short run there is no causality between financial Development and economic growth indicators. Therefore, it is recommendable for the government to create conducive condition for the development of finance to sustain its contribution for economic growth.
Keywords: Financial Development, Economic Growth, Johansen and VECM

Introduction

Background of the Study

Currently, the common question for all economists is why country growth at different rates? Some researchers try to list out the main reasons for differences in economic development such as the difference in factor production, institutional development, legal system effectiveness and international trade. Still different scholars found out different factors for the world economic differences. Recently, the roles of the financial sectors start to receive due attention (Mohsin and Abdelhak, 2000). More developed financial system facilitate the economic development of those country through (i) providing information before funding (ii) for monitoring and evaluation after funding, (iii) easing management of risks, (iv) encouraging saving and (v) facilitating trades (Juzhong et al, 2009).

However, regarding an important contribution of financial sector development to economic growth, a number of controversial empirical studies have been conducted. The issue has been extensively studied by many scholars whether the financial sector development has a positive impact on economic growth, vice versa or not related at all. some of the research conducted in support of financial development lead economic growth are Ugbaje & Edez, 2014, Montfort, et.al, 2013, Najia, 2013, Adusei, 2013, Levine & Zervos, 1996 and Pagano, 1993 are among others. According to these researchers financial development is one of the inputs for economic growth. Other scholars proved as economic growth is inputs for financial development. The supporter for these demand follow principles are Athenia and Alfred, 2014, Agnieszka, 2013, Ndlovu, 2013, Ali, 2012 and Nicholas, 2008 reveal that there is unidirectional causality from economic growth to financial development. Patrick, 1966 who first introduced the idea of the bi-directional relationship between financial development and economic growth, suggested two patterns in the relationship between financial development and economic growth. In this type of relationship financial development and economic growth are supplementary to each others. On the other hand, some researchers found out as there is no relationship between financial development and economic growth. Therefore, this study analyzed the existence of co integration, causality and direction of causality between financial sector development and economic growth in Ethiopia.

General Objective of the study

The general objective of the study is to analyze the existence of long run co integration, the causality and direction of causality between financial sector development and economic growth in Ethiopia.

Specific Objective of the study

- To identify the existence of the long run co integration between financial sector development and economic growth in Ethiopia.
- To pinpoint the existence of long run and short run causality between financial sector development and economic growth in Ethiopia.

- To know the direction of causality between financial sector development and economic growth in Ethiopia.

Statement of the Problem

The nature of the relationship between finance sector development and economic growth has been one of the most debated issues in the recent past, yet with little consensus. Central to this debate is the question of whether strong economic performance is finance-led or growth driven. The question is important because the determination of the causal pattern between finance and growth has important implications for policy-makers' decisions about the appropriate growth and development polices to adopt. Concerning this causality, there are two school of thought Gold Smith- Mckinnon - Shaw School of thought and Structuralist and neo structuralist school of thought. The first school of thought believe that financial sector development facilitate the economic growth of a nation. The ideology of this school of thought had been supported by Walter Bagehot, 1873, Josef Schumpeter, 1911, Goldsmith, 1969, Hicks, 1969, McKinnon, 1973 and Shaw, 1973, Levine, 1997, Jean and Varoudakis, 1996, Demetriades and Hussein, 1996, Rioja and Valev, 2002 and others. The theoretical foundation of this relationship can be traced back to the early discussions of Walter Bagehot, 1873 who argue that the financial system plays a critical role in facilitating the mobilization of capital and growth and subsequently extended by Josef Schumpeter, 1911 who contends that the services provided by financial institutions are essential drivers for innovation and growth. Schumpeter notes that a well-developed financial system channel financial resources to the most productive use; thereby suggesting that finance leads economic growth.

Goldsmith, 1969, Hicks, 1969, McKinnon, 1973 and Shaw, 1973 explained the link between financial development and economic growth showing the significant contribution of financial development in economic growth. Levine, 1997 claimed that financial development helps to identify better investment opportunities, reduces productive cost, mobilizes savings, boosts technological innovation and enhances the risk taking capacity of investors. Jean and Varoudakis, 1996 used a large sample of cross-country data to conclude that the developed financial sectors favor growth by mobilizing savings. Demetriades and Hussein, 1996 conducted causality tests between financial development and real GDP using time series data. The paper concluded that finance is a leading sector for economic development. Rioja and Valev, 2002 they found strong positive influences of finance on productivity growth mainly in the developed economies, while such growth occurs in less developed economies through capital accumulation.

Structuralist and neo-structuralist school of thought has been supported by many researchers like Robinson, 1952, Luca, 1988, Waqabaca, 2004. Robinson, 1952 proposed that financial development is followed by economic growth and financial development itself is not a leading factor to growth. Lucas, 1988 found that economists are 'badly over stressed on financial development for growth'. Waqabaca, 2004 examined the relationship between financial development and economic growth in the context of Fiji using time series data of 30 years and found a positive relationship between financial development and economic growth, with causation running predominantly from economic growth to financial development. Furthermore, some researchers like Deidda and Fattouh, 2002 and De Gregorio and Guidotti, 1995 found out as there is no causality between financial development and economic growth. Deidda and Fattouh, 2002 presented a simple model to establish a non-linear relationship between financial development and economic growth. They suggested that no significant relationship between financial development and economic growth is found in low-income countries. De Gregorio and Guidotti, 1995 have also found that financial development significantly reduces economic growth for some countries that experienced high inflation rates, in particular Latin American countries.

In Africa, the most recent studies about the subject include the following: Ghirmay, 2004, Agbetsiafe, 2004, Abu-Bader and Abu-Qarn, 2008, Baliamoune-Lutz, 2008, Atindehou et al, 2005 and Odhiambo, 2007. As it is elsewhere, there is no consensus on direction of causality between financial development and economic growth in Africa as well. Ghirmay, 2004 found that financial development played a causal role in the economic growth of eight out of the thirteen countries sub- Saharan African countries he investigated. Agbetsiafia, 2004 also found mostly unidirectional causality running from financial development to economic growth in seven African countries thus lending support for the supply leading phenomena of the finance-growth nexus. In the case of Egypt, Morocco and Tunisia, Abu-Bader and Abu-Qarn, 2008 using four different indicators of financial development, found a bi-directional causality running between financial development and economic growth. Baliamoune-Lutz, 2008 also found mixed results for North African countries. Similarly, Atindehouet al, 2005 using three indicators of financial development, found weak causal relationship in almost all the twelve West African countries they studied. Odhiambo, 2007 also found conflicting results for three sub Saharan African countries where the demand following was supported in Kenya and South Africa while in Tanzania the supply-leading response was supported. Having such inconclusive and open works, this research found out the existence of co integration and causality between financial sector development and economic growth specifically in Ethiopia.

Research question

- Is there the long run co integration between financial sector development and economic growth in Ethiopia?
- Are there long run and the short run causality between financial sector development and economic growth in Ethiopia?
- What is the direction of long run and short run causality between financial sector development and economic growth?

Significance of the study

As the direction of the causality between financial sector development and economic growth is difficult to generalize indentifying the country specific result is important for the leaders and decision makers of the country. Therefore, the finding and policy recommendation of this study will help the decision makers and leaders of this country in term of adopting the right policy for these sectors. Furthermore, this research will be used as one of important inputs for the future researchers.

Literature Review

Concepts and definition of Financial Development and Economic Growth

Financial sector development in developing countries and emerging markets is part of the private sector development strategy to stimulate economic growth and reduce poverty. The Financial sector is the set of institutions, instruments and markets. It also includes the legal and regulatory framework that permits transactions to be made through the extension of credit. Fundamentally, financial sector development concerns overcoming "costs" incurred in the financial system. This process of reducing costs of acquiring information, enforcing contracts and executing transactions results in the emergence of financial contracts, intermediaries and markets. Different types and combinations of information, transaction and enforcement costs in conjunction with different regulatory, legal and tax systems have motivated distinct forms of contracts, intermediaries and markets across countries in different times.

Economic growth is an increase in the capacity of an economy to produce goods and services, compared from one period of time to another. It can be measured in nominal or real terms, the latter of which is adjusted for inflation. Traditionally, aggregate economic growth is measured in terms of gross national product (GNP) or gross domestic product (GDP), although alternative metrics are sometimes used.

In Ethiopian history the period from 1974-1991 is known as the dictator regime in which every national plan is controlled by the central government of the country. Both financial and economic plan of the country were highly controlled by the central governments. So, the National Bank of Ethiopia was established by the proclamation 1976 to facilitate the central controlling of the financial system in the country. According to proclamation 1976 article 6 mentioned the role of the National Bank of Ethiopia which was fostering the balanced and accelerated economic development in the country. After the new government controlled power there were many financial and economic reforms that took places in Ethiopia. One of the major changes was in the banking industry. The 1994 financial proclamation allowed Ethiopian private sector to invest in the banking industry. This proclamation resulted in the dramatic changes in the banking sectors in Ethiopia. In 2016 the number of the private commercial bank was around 20 and three government owned banks. In 2010/11 there are 14 new insurances company in the country. The number of the branches is 221 in the same year. On the other hand, before 1991 there is no microfinance institution in Ethiopia. But after financial reform policy implemented there are around 31 microfinance institutions in Ethiopia. Their total capital increased by 24 percent to Birr 2.9 billion and their assets rose by 27.6 percent to Birr 10.2 billion mirroring their ever growing rose in the economy (Sime, 2015).

Empirical Literature

Paudel, 2009 study the causality of financial sector development and economic growth in Sri Lanka using a time series data found out that broad money causes economic growth and there is two-way causality between broad money and economic growth. Private sector credit has contributed positively to economic growth and in this case causality runs from private sector credit to economic growth as one-way causality. One-way causality runs from economic growth to narrow money, total credit, and private sector credit to total domestic credit.

Anthony and Tajudeen, 2010 study the causality between financial sector development and economic growth for ten sub-Saharan African countries using time series data they found out that financial development Granger causes economic growth in Central African Republic, Congo Republic, Gabon and Nigeria while economic growth Granger causes financial development in Zambia. However, bi directional relationship between financial development and economic growth was found in Kenya, Chad, South Africa, Sierra Leone and Swaziland.

Rudra, 2009 study the causality between financial sector development and economic growth in India

using time series data. The Granger causality test finds the existence of bi directional causality between money supply and economic growth, bank credit and economic growth, money supply and foreign trade and market capitalization and foreign trade. It also confirms the unidirectional causality from market capitalization to economic growth, foreign trade to economic growth, money supply to market capitalization, bank credit to market capitalization, and money supply to bank credit. The study, however, does not find any causality between bank credit and foreign trade.

Dimpho, Sukumaran and Rathedi, 2014 analyze the causality between financial sector development and economic growth in Botswana using time series data found out that the causal relationship among the variables depends to a large extent on the choice of the proxy for financial development. When money supply is used as a proxy, there is no causal relationship between financial development and economic growth. The introduction of inflation does not alter this scenario. When private credit is used as a proxy for financial development, economic growth is found to granger cause financial development. However, after the introduction of inflation bidirectional causality is found to exist between the two variables.

Guglielmo et.al, 2009 analyze the causality between financial sector development and economic growth for ten new EU members' counties using panel data found out that the stock and credit markets are still underdeveloped in these economies, and that their contribution to economic growth is limited owing to a lack of financial depth. By contrast, a more efficient banking sector is found to have accelerated growth. Furthermore, Granger causality test indicate that causality runs from financial development to economic growth, but not in the opposite direction.

Mercy et.al, 2015 study the causality between financial sector development and economic growth in Kenya using time series data found out that financial development exerts a positive and statistically significant effect on economic growth in Kenya hence confirming supply leading hypothesis. This was confirmed both in the short-run as well as in the long-run regression results.

Michael, 2013 study the causality between financial sector development and economic growth in Ghana using time series data found out that financial development undermines economic growth in Ghana. The researcher suggests cautions against financial liberalization in Ghana.

Phouphet, Gazi and Muhammad, 2014 study the causality between financial sector development and economic growth in Loas using time series data found out that the presence of feedback effect between both variables. Financial development promotes economic growth and in resulting, economic growth leads financial development.

Giuseppina, 2005 examine the causality between financial sector development and economic growth in USA and Japan found out that the Japanese case appeared to be a satisfactory representation of the relationship between finance and growth. In large part, real GDP seemed to be determined by the investment share in the long run. The selected model in the US case did not have a suitable economic interpretation, although it satisfied all statistical analysis.

Spinthiropoulos. et.al., examine the causality between financial sector development and economic growth in Greece found out that the results which came up from this study were expected .The stock market is an area which is effected by the simultaneous investing actions of millions of investors. Also the investors are influenced by the several economic events, domestic or universal, so that in long terms the powers of supply and demand to act in such a way that everything to be restored in a "hypothetical balance". So we claim that the financial development effects and at the same time is effected by the economic growth.

Deren, 2002 examine the causality between financial sector development and economic growth found out that except for one of the proxies, financial development significantly causes economic growth in the short-run, and in the long-run, there is a bidirectional relationship between financial development and economic growth. In other words, the Turkish case supports the supply-leading phenomena in the short-run and both the supply-leading and the demand-following cases (mutual causality) in the long-run.

Urgaia, 2015 study the contribution of financial sector development to east Africa economy using panel data found out that a one year lagged difference in domestic credit to GDP ratio and that of broad money annual growth rate to GDP ratio, both have positively significant effects on the real GDP or long-run economic growth. However, the broad money annual growth rate ratio to GDP has negatively significant impact on the economic growth of the region. These ratios are considered as proxies for financial sector development in this study.

Hailay, 2013 study the causality of financial sector development and economic growth in Ethiopia using a time series data found out that the long run model revealed interest rate margin, physical capital stock, and labor growth remained significant variables. Moreover, net interest rate margin is positively related to economic growth. This implies that economic growth becomes slow when transaction costs higher and a small share of savings is flow in to investment due to the inefficiency of the bank sector development. The short run, coefficient of error correction term is -0.2461 signifying about 24.61 percent annual adjustment towards long run equilibrium which is guaranteed the occurrence of a stable long run relationship among the variables. Moreover, the estimated short-run model confirmed that interest rate margin is significantly and negatively related to

economic growth. This finding is consistent with theory, which advocates that economic growth will get faster when transaction costs get lower and a large share of savings is flowed in to investment

Abriham, 2016 study the causality of financial sector development and economic growth in Ethiopia using time series data found out that the existence of long run association between financial sector development and economic growth in Ethiopia. Ganger-causality test result also revealed that there is bi directional causality between economic growth and financial developments in Ethiopia for the period of 1980/81-2014/15. The limited credit granting inhibits the banking sector and hence limiting the money supply needed to grow the local economy.

Research gap

As we can see from empirical literature many of these researches were conducted in other foreign countries. On the other hand it is very difficult to generalize the causality between financial sector development and economic growth for all countries. Furthermore, there are no many researchers conducted in this area in Ethiopia. Therefore, this research aimed to fill the gaps of identifying the co integration and causality between financial sector development and economic growth in Ethiopia.

Methods and Methodology

Data Source

The country selected for this study was Ethiopia. The period of the study was from 1973-2008. The study focused only on those years because of lack of data for financial sectors development indicators. The main sources of the data were World Bank data base and National Bank of Ethiopia.

Specification of data

The study used Real GDP growth rate (RGDPGR) as a measures for economic development indicators and private credit by deposit money bank and other financial institutions to the GDP ratio (PCDMBFIG) and Deposit money bank assets to the GDP ratio (DMBAG) as indicators for financial development. Private credit by deposit money bank and other financial institutions to the GDP ratio measure the probability for the private sector to get credit from bank and all other financial institution in the country. Whereas, deposit money bank assets to the GDP ratio measures the amount of deposit in the banking sector in comparison to the GDP level in the country.

Econometric specification

Unit root test

It is common to check the stationarity of the data before conducting a test for identifying the existence of long run co integration between financial sector development and economic growth. To test the stationarity of the data in a series the researcher used Augmented Dickey-Fuller tests (ADF). The different tests are achieved assuming the presence of a unit root (non-stationary variable) in the null hypothesis (H_o) and a stationary variable in the alternative hypothesis (H_1). If the calculated statistic is higher than McKinnon's critical value then we do not reject H_o and the considered variable is non stationary, if not, it is stationary. The model for unit root test is written in these ways:

$$\Delta Y_t = B_1 + \Delta Y_{t-1} + a_i + e_t \text{ (Intercept only)} \quad \text{----------(1)}$$

$$\Delta Y_t = B_1 + B_2 t + \Delta Y_{t-1} + a_i + e_t \text{ (Trend and Intercept)} \quad \text{----------(2)}$$

$$\Delta Y_t = \Delta Y_{t-1} + a_i + e_t \text{ (no trend and no intercepts)} \quad \text{----------(3)}$$

Null Hypothesis H_o = Variable is not stationary or got unit root

Alternative Hypothesis H_1 = stationary

Co integration Tests

Once the tests of integration (that is unit root tests) are achieved then it is possible to implement tests of co-integration to check the existence of a stable long run relationship between financial development and economic growth indicators. The tests of co integration between financial development and economic growth are based on a vector auto regression (VAR) approach initiated by Johansen (1988). According to Johansen (1988), a p-dimensional VAR of order k can be specified as follows:

$$Z_t = \alpha + \prod_1 Z_{t-1} + \prod_2 Z_{t-2} + \ldots\ldots\ldots\ldots + \prod_k Z_{t-k} + \varepsilon_t \quad \text{----------(4)}$$

This expression can be written:

$$\Delta Z_t = \alpha + \prod_k Z_{t-k} + \sum_{i=1}^{k-1} \theta_i \Delta Z_{t-i} + \varepsilon_t$$

----------(5)

Here, π and θ are p-by-p matrices of unknown parameters and ∑ is the white noise term. Johansen and Juselius (1990) developed two likelihood ratio tests: the Maximum Eigen Value test, which evaluates the null hypothesis of r co integrating vectors against the alternative of (r+1) co integrating vectors and the Trace test, which evaluates the null hypothesis of, at most, r co integrating vectors versus the general null of p co integrating vectors. The null hypothesis is that there is no co integration between the variables and the alternative one is the existence of at least one co integrating vector (Perera and Paudel, 2009).

Vector Error Correction Model

If the variables are co integrated we can use an error correction model to test causality between financial development and economic growth since co-integration implies the existence of an error correction model (ECM). The ECM corresponding to this situation is:

$$\begin{aligned}\Delta EG_t &= \delta_1 + \gamma_1 \Delta FD_{t-1} + \gamma_2 \Delta FD_{t-2} + \ldots\ldots\ldots + \gamma_{p-1} \Delta FD_{t-(p-1)} \\ &\quad + \beta_1 \Delta EG_{t-1} + \beta_2 \Delta EG_{t-2} + \ldots\ldots\ldots + \beta_{p-1} \Delta EG_{t-(p-1)} \\ &\quad + \alpha_1 EC_{t-1} + \varepsilon_{t1} \\ \Delta FD_t &= \delta_2 + \lambda_1 \Delta FD_{t-1} + \lambda_2 \Delta FD_{t-2} + \ldots\ldots\ldots + \lambda_{p-1} \Delta FD_{t-(p-1)} \\ &\quad + \theta_1 \Delta EG_{t-1} + \theta_2 \Delta EG_{t-2} + \ldots\ldots\ldots + \theta_{p-1} \Delta EG_{t-(p-1)} \\ &\quad + \alpha_2 EC_{t-1} + \varepsilon_{t2}\end{aligned}$$

--------(6)

Where, EG is economic growth indicators, FD is financial development indicators, EC is the error correction term, p is the order of the VAR, which translates into a lag of p-1 in the ECM. The coefficients α_1 and α_2 represent the speed of adjustment after the economic growth (or the financial development) deviates from the long run equilibrium in period t-1. In other words, it represents the long-run causal effect in relation to the long-run equilibrium relationship of the co integrated processes. The coefficients of the lagged values, γ_j s in the first of the two equations represent short-run effects of financial development on economic growth and θ_j s in the second equation represents short-run effects of economic growth on financial development. To test the causality of the model in the short run the researcher used the Walt test.

Empirical Result and Discussion

A necessary condition for the co integration and causality test is that each of the variables should be stationary and integrated of same order. Hence, the first step is to know the degree of integration (stationarity of the data) and existence of the long run co integration among the variables (Rudra, 2009).

Unit Root test using ADF test

Many economic and financial time series exhibit trending behavior or non-stationary in the mean. Leading examples are asset prices, exchange rates and the levels of macroeconomic aggregates like real GDP. An important econometric task is determining the most appropriate form of the trend in the data. To run Johansen co-integration testing procedure checking the stationarity of the data is a pre-condition. Unless the data are stationary we can't use Johansen modeling approach for testing the long run co integration between dependent and independent variables. Table one below show result for stationarity of both financial development and economic growth indicators.

Table one: ADF unit root test result

Unit root test					
No	*Variables*	*ADF tests statistics*		*Criteria*	*Conclusion*
		Level	*First Difference*		
1	*RGDPG*	*4.500535****	*9.643563****	*None*	*Stationary*
2	*PCDMBFIG*	*3.571508***	*-6.875011****	*Intercept and trend*	*Stationary*
3	*DMBAG*	*1.242585*	*5.316401****	*Intercept*	*Stationary*
Where, ***, ** and * indicates one, five and ten percent significance level Source: authors Estimation					

According to the above table, only private credit by deposit money bank and other financial institution to the GDP and Real GDP growth rate are stationary at level. But at first difference all data are stationary at one percent significance level. Since all variables are stationary at same order of integration, we can proceed to Johansen co integration testing procedure.

Co Integration Analysis

Thus, having established that all the variables are stationary and integrated of the same order, the next step is to proceed and test for the number of co integrating relationships by applying the Johansen Test for Co integration. Co integrated variables ensure that we eliminate spurious relations and as such share common stochastic trends. Furthermore, they enable us to formulate an error correction model as we determine the long-run relationship among the variables (Abriham, 2016). Johansen suggests two test statistics to determine the co integration rank. The first one is known as the trace statistic and the second one is known as maximum eigenvalue test.

Existence of Co integration between Private Credit by deposit money bank and other financial institution to the GDP (PCDMBFIG) and Real GDP growth rate (RGDPGR)

Table two below shows the co integration result from Johansen co integration testing methodology. The null hypothesis states that there is no long run co integration between private credit by deposit money bank and other financial institutions to the GDP and Real GDP growth rate.

Table two: *Co integration between Private credit by deposit money bank and other financial institutions to the GDP and real GDP growth rate:*

Test	Null **Hypothesis**	Variables	Trace value	Trace Statistics	5% Critical Value
Trace Test	**$H_o = 0$**	*PCDMBFIG* *RGDPG*	0.499143	**30.21027**	**15.49471****
Max Eigen test	**$H_o = 0$**	*DMBAG* *RGDPG*	0.499143	**23.50875**	**14.26460*****
Where, ***, ** and * indicates one, five and ten percent significance level Source: authors Estimation					

To reject this null hypothesis we have to get statistically significant t-statistics at 5% significance level. As showed on table two above, both Trace test and Max eigen test were statistically significant at five percent and one percent significance level, respectively. Therefore; we can reject the null hypothesis and we accept as there is co integration between these two variables.

Existence of co integration between Real GDP growth rates (RGDPGR) and deposit money bank assets to the GDP (*DMBAG*)

Table three below shows the co integration result from Johansen co integration testing methodology. The null hypothesis states that there is no long run co integration between deposit money bank assets to the GDP and Real GDP growth rate.

Table three: Co integration between deposit money bank assets to the GDP and Real GDP growth rate

Test	*Null Hypothesis*	*Variables*	*Trace value*	*Trace Statistics*	*5% Critical Value*
Trace Test	***$H_o = 0$***	*DMBAG* *RGDPG*	***0.506714***	***25.73285***	***15.49471****
Max Eigen test	***$H_o = 0$***	*DMBAG* *RGDPG*	***0.506714***	***24.02665***	***14.26460****
Where, ***, ** and * indicates one, five and ten percent significance level Source: authors Estimation					

According to the Johansen co integration testing result above, both trace and maximum eigen value testing approaches reject the null hypothesis and proved the existence of the long run co integration among these variables.

Therefore, from the Johansen co integration testing procedures the researcher proved that economic growth and financial development indicators mentioned above have long run co integration in Ethiopia. These results go in line with the result of (Abriham, 2016, Rudra, 2009, Deren, 2012, Dimpho, Sukumaran and Rathedi,

2014, Phouphet, Gazi and Muhammed, 2014, Anthony and Tajudeen, 2010) in which they concluded that financial development and economic growth have long run co integration in their specific country of studies.

The Causality between Financial Development and Economic Growth

To determine the the direction of causality between financial sector development and economic growth the researcher used restricited vector error correction model (VEC). The first criteria to employ vector error correction model (VEC) is all varaibles in the model must have long run co integration among each other. Since it is already proved the existance of long run co integration among variables in the model, it is possible to employ vector error correction model in the study.

Causality between private credit by deposit money bank and other financial institutions to GDP ratio and Real GDP growht rate

Table four below show the result from Vector error correction model about the existence of the long run causality between private credit by deposit money bank and other financial institutions to GDP ratio and real GDP growht rate. In the the first case researcher took private credit by deposit money bank and other financial institutions to the GDP as dependent varaibles and real GDP growth rate as independent variables. The reverse is true in the second case.

Table Four :Long run causality between private credit by deposit money bank and other financial institutions to the GDP ratio and the Real GDP growht rate

Indicators	***Dependent variables***	
	D(PCDMBFIG)	***D(RGDPG)***
	C(S.E)	*C(S.E)*
Constant	*0.025669* *(0.299986)*	*0.235876* *(1.008099)*
ECT(-1)	*-0.138216* *(0.047207)****	*-0.962943* *(0.226166)****
R- square	*0.401365*	*0.425450*
Adjusted R-square	*0.341501*	*0.367996*
Log likelihood	*-64.89159*	*-106.1025*
Where, ***, ** and * indicates one, five and ten percent significance level Source: authors Estimation		

As table four above showed private credit by deposit money bank and other financial institution to the GDP and real GDP growth rate have a long run causlity. When Private credit by deposit money bank and other financial institutions to the GDP was taken as dependent varaible, the value of error correction term was negative and statstically significant. This implies as real GDP growth rate is the cause for the development of private credit by deposit money bank and other financial institutions to the GDP. This value also implies as our model is convergent towards the long run equilibrium. In the model 13.82% of the short run devaition from equilibrim will converged towards the long run equlibrium. On the other hand, when Real GDP growht rate was taken as dependent varaible, the value of error correction term was negative and stastically significant. So, in the long run private credit by deposit money bank and other financial institution to the GDP is the cause for the growth of real GDP growth rate. In the model 22.61% of the short run deviation will be corrected towards the long run eqilibruim in the long run. Thus, this emprical result show that private credit by deposit money bank and other financial institution to the GDP and real GDP growth rate have a **bi-directional causality**. This finding support (Greenwood & Jovanovic, 1990 and Luintel & Khan, 1999) finding.

Greenwood & Jovanovic, 1990 found as financial development and economic growth have bi-directional relationship. Accordingly, as the probability for the private sectors to get credit from financial institution increase, real GDP growth rate will increase in the same direction. In the same reasoning, as real GDP growth rate increase it cause for the increment of the chance for the private sector to get credit from financial institutions. Luintel & Khan, 1999 empirically examine the long-run causality between financial development and economic growth in a multivariate time series framework using data from 10 sample countries. Their finding supports the bi-directional causality between financial development and economic growth in all countries analyzed.

The causality between deposit money bank assets to the GDP and Real GDP growth rate:

Table five below show the result from Vector error correction model about the existence of the long run causality between deposit money bank assets to the GDP and real GDP growht rate. In the first case researcher took deposit money bank assets to the GDP as dependent varaibles and real GDP growth rate as independent variables. The reverse is true in the second case.

Table five: Long run relationship between deposit money bank assets to the GDP and Real GDP growht rate

Indicators	***Dependent variables***	
	D(DMBAG)	***D(RGDPG)***
	C(S.E)	*C(S.E)*
Constant	*0.348564* *(0.324999)*	*0.658332* *(0.933633)*
ECT(-1)	*-0.037468* *(0.023077)*	*-1.241925* *(0.224025)****
R- square	*0.133308*	*0.557671*
Adjusted R- square	*0.046638*	*0.513438*
Log likelihood	*-65.77766*	*-101.6565*
Where, ***, ** and * indicates one, five and ten percent significance level, Source: authors Estimation		

As showed on table five above when deposit money bank assets to the GDP was taken as dependent variable the value of error correction term was negative but statistically insignificant. This implies as real GDP growth rate is not the cause for deposit money bank asset to the GDP in the long run. It also implies as the model is divergent model in the long run. On the other hand when we took real GDP growth rate as dependent variable the value of error correction term is negative and statistically significant. This implies in the long run deposit money bank assets to the GDP are the cause for the development of real GDP growth. In the model 22.4% of the short run deviation will be corrected towards the long run equilibrium in the long run. The value of error correction term implies as the second model is the convergent model.

The finding in this model goes in line with the ideology of supply leading alternatives. According to this alternative the direction of causality runs from the finance to economic growth. The philosophy in this alternative already supported by (Gupta K. L., 1984); (King & Levine, 1993); (Blommestein & Spencer, 1996); (Levine R., 1997); (Rajan & Zingales, 1998); (Levine R. , 1999); Beck, Levine et al. 2000; (Xu, 2000); (Carlin & Mayer, 2003); (Fase & Abma, 2003). These entire researchers proved that financial development is one of the inputs for the economic growth.

Short run causality between financial Sector development and Economic Growth:

To check the existence of causality between financial development and economic growth indicators in the short run, the researcher used wald- coefficient testing approach. In this procedure the null hypothesis state as there is no short run causality between two variables. To reject this null hypothesis the researcher need to get statistically significant Wald chi-square test value.

Table six: Short run causality between Financial Developmed and Economic Growth Indicators:

Model	*Dependent variable*	*Wald Chi-square test*	*Wald t-statistics*
Model one	*PCDMBFIG*	*0.014265*	*0.119434*
	RGDPG	*0.038171*	*-0.195375*
Model two	*DMBAG*	*0.001022*	*0.031966*
	RGDPG	*2.332984*	*-1.527411*
Where, ***, ** and * indicates one, five and ten percent significance level Source: authors Estimation			

As showed in table six above all wald t-statistics value were statistically insignificant and the researcher can't reject the null hypothesis. Thus, there is no causality between financial development and economic growth indicators in the short run. This implies as the financial variables are dynamic in the short run and difficulty to have causality with economic growth. This finding of the study goes in line with the finding from (Anthony and Tajudeen, 2010). But it is on the opposite of Karim and Emad, 2011, Deren, 2002. Karim and Emad, 2011found as financial development and economic growth have bi directional relationship both in the short and long run. Deren, 2002 found that in the short run financial development and economic growth have supply leading alternatives in his study.

Fitness of the Models

The fitness of the model in the study checked from three main criteria; normality of the model, absence of serial correlation and absence of heteroskedasticity. The following table checked the fitness of the model from these three perspectives.

Table seven: Fitness of the model

Model	*Dependent variable*	*Normality test_Jarque-Bera*	*Serial Correlation test- Breusch-Godfrey*	*Heteroskedasticity test-ARCH*
		Probability	*Chi-square prob*	*Chi-square prob*
Model One	*RGDPG*	*57.9752*	*99.53*	*78.3*
	PCDMBFIG	*62.1945*	*35.39*	*77.35*
Model Two	*RGDPG*	*35.5714*	*11.56*	*8.56*
	DMBAG	*39.7294*	*48.29*	*62.53*
Where, ***, ** and * indicates one, five and ten percent significance level Source: authors Estimation				

The result of the diagnostic test confirms the adequacy of the model for further analysis. In the model to test the normality of the model, the null hypothesis says that the residual in the model is normally distributed. As showed in the above table the null hypothesis couldn't be rejected at five percent significance level. To check the serial correlation in the model, the null hypothesis state that in the model there is no serial correlation. As showed in the table, the null hypothesis couldn't be rejected at five percent significance level in all case. To check heteroskedasticity in the model the null hypothesis state as there is no heteroskedasticity in all case. As showed in the model the null hypothesis couldn't be rejected at five percent significance level. Therefore researcher concluded that all tests haven't discovered any problem of non-normality, serial correlation and heteroskedasticity.

Conclusion and Policy Recommendation

Conclusion

The main objective of the study is to analyze the existence of co integration, causality and direction of causality in the short run and long run between financial sector development and economic growth in Ethiopia. To check the causality between the two variables, it is mandatory to prove the stationarity of all variables and existence of long run co integration among variables. As such in the study all variables are stationary at same order of integration and Johansen co integration testing approach also found out existence of the long run co integration among variables. In the model when Private credit by deposit money bank and other financial institutions to the GDP was taken as dependent varaible, the value of error correction term is negative and statstically significant. This implies as real GDP growht rate is the cause for the development of private credit by deposit money bank and other financial institutions to the GDP. This value also implies as our model was convergent towards the long run equilibrium. In the model 13.82% of the short run devaition from equilibrim will converged towards the long run equlibrium. Furthermore, when Real GDP growht rate was taken as dependent varaible, the value of error correction term is negative and stastically also significant. This implies in the long run private credit by deposit money bank and other financial institution to the GDP is the cause for the development of real GDP growth rate. In the model 22.61% of the short run deviation will be corrected towards the long run eqilibruim in the long run. Thus, this emprical result show that private credit by deposit money bank and other financial institution to the GDP and real GDP growth rate have a **bi-directional causality**. This finding support Greenwood & Jovanovic, 1990 and Luintel & Khan, 1999 finding.

In the second case when a deposit money bank asset to the GDP was taken as dependent variable, the value of error correction term is positive and statistically insignificant. This implies as real GDP growth rate is not the cause for deposit money bank asset to the GDP in the long run. It also implies as the model is divergent model in the long run. On the other hand, in the second model when real GDP growth rate is dependent variable the value of error correction term is negative and statistically significant. This implies in the long run deposit money bank assets to the GDP are the cause for the development of real GDP growth. In the model 22.4% of the short run deviation will be corrected towards the long run equilibrium in the long run. As well this value implies as the second model is the convergent model. The finding in this model goes in line with the ideology of supply leading alternatives. According to this alternative the direction of causality runs from the financial development to real economic growth.

In the study the researcher test the short run causality between financial development and economic growth indicators by using the wald- test. According to the result in short run financial development indicators hadn't have any causality with economic growth indicators. This implies the dynamicity of financial sectors in the short run.

Policy recommendation

- As the causality between private credit by deposit money bank and other financial institutions to the GDP ratio and real GDP growth rate have bi direction causality in which the both variables are

supplementary to each other; it is advisable for the decision makers of the country to exert an effort to enhance both variables for the benefit of the community at large.

- The causality between deposit money bank assets to the GDP and Real GDP growth rate support the view of supply leading alternatives. Accordingly, financial development is one of the enabler for economic growth. It is recommendable for Ethiopia's decision makers to make a decision that facilitate and encourage the development of the deposit money bank assets to the GDP to sustain this benefit for a long time.
- Generally the finding of the study claims the government to create conducive environment for the development of finance to sustain its contribution to economic growth.

Reference

- Abrahams Ewunetu. 2016. Relationship Between Financial Development and Economic Growth in Ethiopia: Evidence from Granger-Causality tests. International Journal of Management, Information Technology and Engineering.
- Abu-Bader, S. and Abu-Qarn, A. M. 2005. Financial Development and Economic Growth: Time Series Evidence from Egypt. Discussion Paper No. 05-14a.
- Adusei, Michael. 2013. Finance-Growth Nexus in Africa: A Panel Generalized Method of Moments (GMM) Analysis. Asian Economic and Financial Review, 3(10):1314-1324.
- Agbetsiafa, D. K. 2003. The Finance Growth Nexus: Evidence from Sub-Saharan Africa. International Advances in Economic Research 9, 172—189.
- Agnieszka Gehringer. 2013. Financial Liberalization, Financial Development and Productivity Growth: An Overview. Economics Discussion Papers, No 2013- 46, Kiel Institute for the World Economy.
- Ali Awdeh. 2012. Banking Sector Development and Economic Growth in Lebanon.International Research Journal of Finance and Economics ISSN 1450-2887 Issue 100, Euro Journals Publishing, Inc.
- Anthony Enisan Akinlo and Tajudeen Egbetunde. 2010. Financial Development and Economic Growth: the Experience of 10 sub-Saharan African countries revisited. The Review of Finance and Banking Volume 02, Issue 1.
- Athenia Bongani Sibindi and Alfred Bimha. 2014. Banking Sector Development and Economic Growth: Evidence from Zimbabwe, Banks and Bank Systems, Vol. 9, No.2.
- Atindehou, R. B., J. P. Guyeie and Amenounve, E. K. 2005. Financial Intermediation and Economic Growth: Evidence from Western Africa. Applied Financial Economics 15, 777—790.
- Baliamoune-Lutz. 2008. Financial Development and Income. International Advances in Economic Research 14, 422 — 432.
- Bagehot, W. (1873). *Lombard Street*, *Homewood*, IL: Richard D. Irwin, 1962 Edition
- Beck, T. and R. Levine. 2000a. External Dependence and Industry Growth - Does Financial structure matter? Mimeo, University of Minnesota, February 200.
- Blommestein, H. J., & Spencer, M. G. 1996. Sound Finance and the Wealth of Nations.North American Journal of Economics and Finance, 7(2), 15-124.
- Carlin, W. and C. Mayer. 1999b. Finance, Investment and Growth. CEPR Discussion Paper, No. 2233, September 1999.
- De Gregorio J, Guidotti P. 1995. Financial Development and Economic Growth. World Dev 23:433-448.
- Deidda L, Fattouh B. 2002. Non-Linearity between Finance and Growth. Econ Lett 74:339-3.
- Demetriades, P.O., Hussein, K.A. 1996. Does Financial Development Cause Economic Growth? Time-series evidence from 16 countries, Journal of Development Economics, 51, pp. 387-411.
- Dimpho Sebina, M. K. Sukumaran Nair and M. Rathedi. 2014. The Causal Relationship between Financial Development and Economic Growth: Does Inflation matter? Empirical Evidence from Botswana.

Fase, M. M., & Abma, R. C. 2003. Financial Environment and Economic Growth in Selected Asian Countries. Journal of Asian Economics, 14, 11-21.

- Ghirmay, T. 2004. Financial Development and Economic Growth in Sub-Saharan African countries: Evidence from time series analysis. African Development Review 16, 415 — 432.
- Giuseppina Testa. 2005. Economic Growth and Finance. A Co integration analysis in US and Japan. Birkbeck College, University of London.
- Goldsmith, Raymond. 1969. Financial Structure and Development, New Haven, CT: Yale University Press.
- Greenwood, J.and Jovanovic, B. 1990. Financial Development, Growth, and the Distribution of Income. Journal of Political Economy 98(5), 1076 - 1107.
- Guglielmo Maria Caporale, Christophe Rault, Robert Sova and Anamaria Sova. 2009. Financial Development and Economic Growth: Evidence from Ten New EU Members. DIW Berlin German Institute for Economic Research. Mohrenstr. 58.
- Gupta, K. L. 1984. Finance and Economic Growth in Developing Countries. Croom Helm.

- Hicks, J. 1969. A Theory of Economic History, Oxford: Clarendon Press.
- Jean Claude, Berthelemg and Aristomene Varoudakis. 1996. Financial Development Policy and Growth, OECD.
- Johansen, S. 1988. Statistical Analysis of Co integration Vectors. Journal of Economic Dynamics and Control, 12 (2-3): 231-54.
- Juzhong Zhuang, Herath Gunatilake, Yoko Niimi, Muhammad Ehsan Khan and Yi Jiang. 2009. Financial Sector Development, Economic Growth and Poverty Reduction: A Literature Review. Asian Development Bank Working Paper Series No. 173: 3-7.
- Karim Eslamloueyan and Emad Aldeen Sakhaei. 2011. The Short Run and Long RunCausality between Financial Development and Economic Growth in the Middle East. Iranian Journal of Economic Research Vol. 16, No. 46.
- King, R. G., & Levine, R. 1993. Finance, Entrepreneurship and Growth: Theory and Evidence. Journal of Monetary Economics, 32, 513-542.
- Kisu Simwaka, Thomas Munthali, Austin Chiumia and Grant Kabango. 2012. Financial Development and Economic Growth in Malawi: an Empirical Analysis. Banks and Bank Systems, Volume 7.
- Levine Ross. 1997. Financial Development and Economic Growth: Views and Agenda. Journal of Economic Literature Vol. XXXV (June 1997), pp. 688–726.
- Levine, R. & Zervos, S. 1996. Stock Market Development and Long-run Growth. The World Bank Economic Review 10: 2, 323–329.
- Levine, R. 1997. Financial Development and Economic Growth: Views and Agenda. Journal of Economic Literature, 35, 688-726.
- Levine, R. 1999. Law, Finance and Economic Growth. Journal of Financial Intermediation, 8, 8-35.
- Levine, Ross. 1997. Financial Development and Economic Growth: Views and Agenda, Journal of Economic Literature, 25 (June): 688-726.
- Lucas, R. 1988. On the Mechanics of Economic Development. Journal of Monetary Economics, 22, 3-42.
- Luintel, K. B., & Khan, M. 1999. A Quantitative Reassessment of the Finance-Growth Nexus: Evidence from a Multivariate VAR. Journal of Development Economics, 60, 381-405.
- McKinnon, Ronald I. 1988. Financial Liberalization in Retrospect: Interest Rate Policies in LDC's. In the State of Development Economics (Ed G. Ranis and T. P. Stulz). Oxford: Basil Blackwell. P: 386-415.
- Mercy J. Kiprop1, Aquilars Kalio2 , Lawrence kibet and Symon Kiprop. 2015. Effect of Financial Development on Economic Growth in Kenya: Evidence from Time Series Analysis. European Journal of Business and Social Sciences, Vol. 3, No. 11
- Michael Adusei. 2013. Financial Development and Economic Growth: Evidence from Ghana. The International Journal of Business and Finance Research, volume 7, number 5.
- Mohsin S. Khan and Abdelhak S. Senhadji. 2000. Financial Development and Economic Growth: An Overview. International Monetary Fund Working paper/00/209. 3-10.
- Montfort Mlachila, Nedbank Sabina Zajc, Paul-Harry Aithnard, Dennis Dykes, Thorsten Beck, Mthuli Ncube and Oskar Nelvin. 2013. Banking in Sub-Saharan Africa: Challenges and Opportunities, European Investment Bank.
- Najia Saqib. 2013. Impact of Development and Efficiency of Financial Sector on Economic Growth: Empirical Evidence from Developing Countries. Journal of Knowledge Management, Economics and Information Technology, Vol. III, Issue 3.
- Ndlovu, Godfrey. 2013. Financial Sector Development and Economic Growth: Evidence from Zimbabwe. International Journal of Economics and Financial Issues Vol. 3, No. 2, pp.435-46.
- Nicholas M Odhiambo. 2008. Financial Development in Kenya: A Dynamic Test of the Finance led Growth Hypothesis. Economic Issues, Vol. 13, Part 2.
- Odhiambo, N. M. 2007. Supply-Leading versus Demand-following hypothesis: Empirical Evidence from SSA countries. African Development Review 19, 257 — 280.
- Pagano, Marco. 1993. Financial Markets and the Macro economy: an Overview of Financial Markets and Growth. European Economic Review 37, 613-622. North Holland, Elsevier Science Publishers B.V.
- Patrick, H. 1966. Financial Development and Economic Growth in Underdeveloped Countries. Economic Development and Cultural Change, 174-189.
- PERERA, Nelson and PAUDEL, Ramesh Chandra.2009. Financial Development and Economic Growth in Sri Lanka. *Applied Econometrics and International Development.* Vol.9-1 (2009).
- Phouphet Kyophilavong, Gazi Salah Uddin and Muhammad Shahbaz. 2014. The Nexus between Financial Development and Economic Growth in Laos. IPAG working papers.
- Rajan, R. G., & Zingales, L. 1998. Financial Dependence and Growth. American Economic Review, 88(3), 559-586.

- Rajan, R.G. and L. Zingales. 2000.The Great Reversals: The Politics of Financial Development in the 20th Century. OECD Economics Department Working Paper No. 256, October 2000.
- Rioja, Felix and Neven Valev. 2002. Finance and the Sources of Growth at various Stages of Economic Development. Andrew Young School of Policy Studies, Georgia State University.
- Robinson, Joan. 1952. The Generalization of the General Theory and Other Essays, London. The McMillan Press Ltd
- Rudra prakash pradhan. 2009. The Nexus between Financial Development and Economic Growth in India: Evidence from Multivariate var Model. International Journal of Research and Reviews in Applied Sciences ISSN: 2076-734X, EISSN: 2076-7366 Volume 1
- Schumpeter, Joseph A. 1912. Theories der Wirtschaftlichen Entwicklung (The Theory of Economic Development). Leipzig: Dunker& Humblot, Translated by Redvers Opie, Cambridge, MA: Harvard University Press, 1934.
- Shaw, E. 1973. Financial Deepening in Economic Development. New York: Oxford University Press.
- Sime, Workenh Eshatuu. 2015. Analyzing the Impact of Financial Liberalization on Financial Development in Ethiopia (ARDL modeling approaches). Research Journal of Finance and Accounting. Vol.6, No.19.
- Spinthiropoulos Konstantinos, Garefalakis Alexandros,Stiakakis Emmanuel and Symela Chatzivasileiadou. Financial Development and Economic Growth: an Empirical Research about Greece -Cointegration test.
- The Central Bank of the Republic of Turkey. 2002. The Causality between Financial Development and Economic Growth: The case of Turkey. Research Department
- Urgaia Rissa. 2015. The Contribution of Financial Sector Development to the east African Economy. Addis Ababa University. Economics Department. PhD Candidate
- Waqabaca, Caroline. 2004. Financial Development and Economic Growth in Fiji,Economics Department, Reserve Bank of Fiji.
- Xu, Z. 2000. Financial Development, Investment, and Economic Growth. Economic Enquiry, 38(2), 331-344.