International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2013): 4.438

Financial Development and Economic Growth Nexus: Evidence from Ethiopia (Johnson Approach to Co-Integration)

Hailay Tsigab Kahsay

Adigrat University Department of Economics

Abstract: ***The main objective of the study was to examine empirically the nexus between banking sector development proxy by interest rate margin and economic growth in Ethiopia over the period 1975-2011.The Johnson approach to Co-integration and Error Correction Model are employed to investigate the long run and short run impact of financial development on economic growth. The test for Co-integration showed a linear long run relationship between real GDP per capita, interest rate margin, education (human capital), physical capital stock, and labor force. The estimated long run model revealed interest rate margin, physical capital stock, and labor growth remained significant variables. Moreover, net interstate 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. The above results have an important policy implication since most of the earlier studies measured the financial sector development using financial depth (size) which is not necessarily represent the development of financial sector due to its correlation with economic growth. The measurement of bank sector development by interest rate margin exposed Ethiopian bank sector needs further improvements to convey efficiency and competition among commercial banks. Hence, policy makers require reviewing the legal and institutional frameworks which creates financial repression and hinder financial sector efficiency.***

Keywords: Ethiopia, Interest rate margin, Economic growth, Financial development, Johnson method, and VECM

1. Introduction

There has been immense interest between the link between financial sector development and economic growth during the past decades. The basic AK (The first version of endogenous growth theory which did not make an explicit distinction between capital accumulation and technological progress produced by Frankel (1962) - model finds three ways through which the development of financial sector can affect economic growth. First it increase the productivity of investments second reduces transaction costs and widens the share of the savings channeled to productive investments lastly, it affect saving rates (Koivu, 2002).

The financial institutions and financial markets exert a powerful influence on economic development; poverty alleviation, ease external financing, and economic stability (Levine 2005; Shabri, 2008).Greenwood and Jovanovic (1990) also advocate financial intermediation endorses growth since it allows a higher rate of return to be earned on capital, and a means to implement costly financial structures. Moreover, financial development has a significant influence on economic development, poverty alleviation, and economic stability (DFID, 2004; Sab *et al.*,2004; Feyen, 2012). Smith (1776) added financial systems lower transactions costs, facilitates trade and specialization fundamental inputs to technological innovation. A well-functioning financial sector helps to fill the gap between the rich and the poor and the degree to which that gap persists across generations (Demirguc-Kunt andLevine, 2009).

If financial systems perform differently, it retards economic growth, restrains economic opportunities, and destabilizes macro economy. Such as, financial systems collect funds and pass them along to partners; the wealthy and the politically connected; which slow economic growth and blocks potential entrepreneurs from make an effort to realize their economic growth (World Bank, 2013).

Developing countries financial system is characterized by commercial banks which have over 80 per cent of the financial systems' total assets. It is also known by very high degree of bank concentration, lack of competition, and relatively small by world standards. Ajakaiye(2005) revealed that the financial sector of Sub Sahara Africa (SSA) is at elementary stage such as; the ratio of M2to GDP was 32 percent in 1990, increased slightly to 37 percent in 2003. Contrary to East Asia countries, 63.1 and 158.8 percent respectively which are more worthy. The interest rates increased from 8.2 percent in 1990 to 12.4 percent by 2003 was the highest in the world.

The relationship between financial development and economic growth is a long debated issue. Such as, the endogenous growth literature focused on the impact of financial markets on economic growth, such as Miller (1998) advocated financial markets promote economic growth. Levine (2005) concluded well-functioning financial systems play an independent role in promoting long run economic growth. Further, Beck *et al.* (2000) find that financial development has a positive impact on total factor productivity.

As cited in Arshad*et al*.(2005), others were enthusiastic to totally dismiss the impact of financial development on economic growth. Among those Lucas (1988), Economists ‘‘*badly overstress’’* the role of finance in economic growth and Robinson (1952) states that ‘‘*where enterprise leads finance follows.”*According to this sight, economic development creates demands for particular types of financial arrangements, and the financial system. Nicholas Stern’s (1989) survey of development economics does not even mention finance, not even in a section that lists ‘*omitted topics’*. From this perspective, finance responds to demands from the nonfinancial sector: it does not cause economic growth.

Even if the above two unlike views concluded diffidently most of the theoretical literatures and empirical evidences are in favor of a positive, first-order relationship between financial development and economic growth (Levine, 1997).

Most of the earlier studies measure the financial development using a variable that measures depth of the financial sector. However, depth does not necessarily represent the effectiveness of the financial development. Since it correlated with economic growth due to output increases the demand for financial service increases too, which in turn has a positive effect on financial development (Christopoulos and Tsionas,2001;Koivu,2002).

As a result, the long run relationship and the measurement become ambiguous and mixed results. Hence, this study is important because recent empirical studies that examine financial development and economic growth in Ethiopia remain scanty. Moreover, the measurement of banking sector development by net interest rate margin has not been used earlier as a proxy for banking sector efficiency in Ethiopia.

1.1. Objective of the Study

The main objective of the study is to examine empirically the nexus between development in the banking sector and economic growth over the period of 1975-2011 in Ethiopia. Moreover, the study tries to address the following specific objectives:

1. To analyze empirically the impact of banking sector development on economic growth;
2. To assess the performance of financial development indicators in pre and post reforms periods in Ethiopia.

1.2. Organization of the Study

The rest of the study is organized as follows: Chapter two reviews the theoretical and empirical literature regarding financial development and economic growth. Followed by chapter three the model specifications and methodology of the study. Chapter four looks with model estimation and interpretation of results. Chapter five presents conclusion and policy implication of the study.

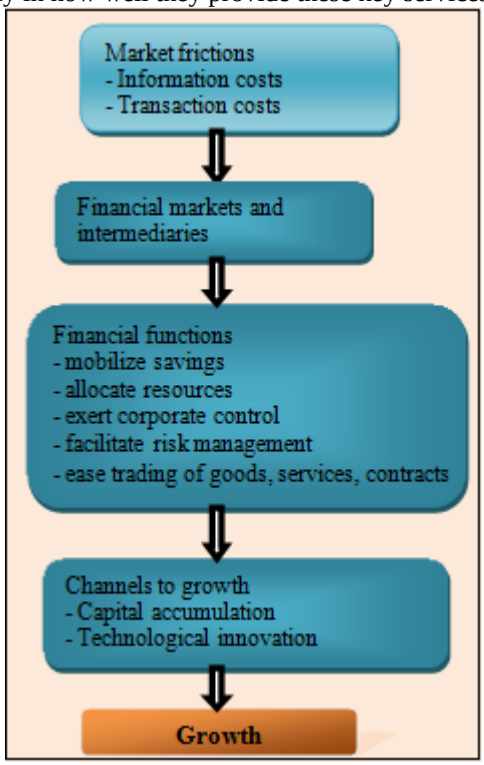
2. Literature Review

Financial growth nexus theoretical underpinning

The existence of imperfect market makes the relation between investors and savers to under agency problems caused by conflicting interests. Agency problems appear due to hidden action and hidden information of the borrower, who knows more information than the lender and shall be influence the return of an investment (Thiel, 2001).

The economic function of finance in the microeconomic explains financial intermediaries serve as a bridge the difference in interests between borrowers and lenders concerning the size of investment, its maturity and risk. Moreover, it connects financial services with asymmetric information and agency costs given the financial system a more prominent role in accomplishing an efficient allocation of capital (Thiel, 2001).Financial development occurs when financial instruments, markets, and intermediaries’ alleviate the effects of imperfect information, limited enforcement, and transaction costs(Levine, 2005; World Bank, 2012).

Levine (2005) has developed a broader definition that focus on what the financial system improves in the (1) production of ex ante information about possible investments, (2) monitoring of investments and implementation of corporate governance, (3) trading, versification, and management of risk, (4) mobilization and pooling of savings, and (5) exchange of goods and services. But, financial sectors differ evidently in how well they provide these key services.



Source: Adapted from (Levine, 1997)

Figure 1: A theoretical Approach to Finance and Growth

The nexus between financial development and economic growth has remained issue of economic debate. There are two types of concerns regarding economic growth and financial arrangements which improve resource allocation and reduce risks. First, higher returns ambiguously affect

saving rates due to income and substitutions effects. Second, lower risk also ambiguously affects savings rates (Levein, 2005). Financial arrangements that improve resource allocation and lower risk may discourage saving rates. Therefore, financial development could retard economic growth and lower welfare if the drop in savings and the externality combine to produce a sufficiently large effect (Levein, 2005).

Economists have quite different opinions regarding the significance of the financial system for economic growth for instance for Robinson (1952)finance does not cause growth; indeed finance responds to changing demands from the real sector i.e., where enterprise leads finance follows. For Kuznets (1955) financial market starts to grow as the economy reaches intermediate stage of the growth process and develop once the economy becomes mature. Chandavarkar (1992)"none of the pioneers of development economics . . . even list finance as a factor of development.''

The endogenous growth literature stresses the influence of financial markets on economic growth. Levine (2005) concludes that positive, first-order relationship between financial development and economic growth. i.e., well-functioning financial systems have an independent role in promoting long-run economic growth. Bagehot (1873) refuses the idea that the finance growth nexus can be excludes without substantially limiting understanding of economic growth (World Bank, 2013).The problem associated to the previous studies a positive relationship between financial development and output growth can exist due to an increase in output the demand for financial services increases too, this in turn has a positive effect on financial development (Khan, 2005).

Financial sector perform in the wrong way if any inappropriate government regulations in the banking system such as, interest rate ceiling, high reserve requirements and directed credit programs which hinder financial development and brings financial repression.

3. Empirical Evidence

There are numerous empirical studies on the relationship between financial development and economic growth (Patrick1974, Greenwood and Jovanovic 1990, Levine 1997, Thiel 2001, Christopoulos and Tsionas, 2003), among others.

Khan and Senhadji (2000)in their work covers the period between 1960-1999 for 159 countries comprising industrial and developing countries measured financial development by domestic credit to the private sector as a share of GDP. The study confirms strong statistically significant positive relationship between financial depth and economicgrowth in the cross-section analysis.

Koiuv(2002)measured the relation between banking sector development and economic growth in transition economies using fixed effect panel model for 25 transition countries during 1993 to 2000. The result of the model described interest rate margin and the amount of non-performing loans are negatively and significantly correlated with economic growth but bank credit to private sector has negative sign which is contrary to the theoretical literatures.

Christopoulos and Tsionas (2003) used panel data to examine the relationship between financial development and growth in ten developing countries. The time series evidence showed that there exists a unique co integrating vector between economic growth and financial development. Rahman (2004)also investigates the finance-growth nexus in Bangladesh during 1976-2005 based on a long-run structural vector auto regressions (SVARs) mode. The result indicates that financial development has a long-run positive impact both on investment-GDP ratio and income per capita.

Khan *et al* (2005), examine the relationship between financial development and economic growth in Pakistan for the period 1971-2004, using Autoregressive Distributed Lag (ARDL) approach. The result acknowledged that financial depth accelerated economic growth through the channel of increased investment but the coefficient on investment is insignificant. To sum up, the empirical evidence indicates a strong and statistically significant relationship between financial development and economic growth.

4. Operational Definition Financial System

Lack of harmony on how to conceptualize and operationalize financial development is the main reason different researcher use unlike variables proxy for financial development which is largely fragmented and often contradictory. Moreover, it is the reason behind the conflicting findings in empirical research on economic growth and financial development nexus. Empirical proxy variable often do not accurately measure the concepts emerging from theory (Levine, 2005).

Table 14x2 Matrix of Financial System Characteristics

	Financial Institutions	**Financial Markets**
Depth	**Private sector credit to GDP** Financial institutions' assets to GDP Money (M2 aggregate) to GDP Deposits to GDP Value-added of the financial sector to GDP	**Stock market capitalization plus outstanding domestic private debt securities to GDP** Private debt securities to GDP Public debt securities to GDP International debt securities to GDP Stock market capitalization to GDP Stocks traded to GDP

Access	**Accounts per thousand adults** (commercial banks) Branches per 100,000 adults (commercial banks) Percent of people with a bank account (from user survey) Percent of firms with line of credit (all firms) Percent of firms with line of credit (small firms)	**Percent of market capitalization outside of top 10 largest companies** Percent of value traded outside of top 10 traded companies Government bond yields (3 month and 10 year) Ratio of domestic to total debt securities Ratio of private to total debt securities (domestic) Ratio of new corporate bond issues to GDP
Efficiency	**Net interest margin** Lending-deposits spread Noninterest income to total income Overhead costs (percent of total assets) Profitability (return on assets, return on equity) Boone indicator(H-statistic)	**Turnover ratio** (turnover/capitalization) for stock market Price synchronicity (co-movement) Price impact Liquidity/transaction costs Quoted bid-ask spread for government bonds Turnover of bonds (private, public) on securities exchange Settlement efficiency
Stability	**z-score** (or distance to default) Capital adequacy ratios Asset quality ratios Liquidity ratios Other (net foreign exchange position to capital)	**Volatility** (standard deviation/average) of stock price index, sovereign bond index Skewness of the index (stock price, sovereign bond) Price/earnings (P/E) ratio Duration Ratio of short-term to total bonds (domestic, international) Correlation with major bond returns

Source: Adopted from C˘ihak, Demirguc-Kunt, Feyen, and Levine 2012.

Among the alternative measurements the focus of this study is to measure financial institution development specifically banks development efficiency proxy by lending-deposits spread (net interest rate margin). The usual way to characterize financial systems is measuring the size of financial institutions relative to the size of the economy. Private credit (Excludes credit issued to governments, government agencies, public enterprises, and credit issued by central banks), expressed as deposit money bank credit to the private sector as a percentage of GDP has a strong statistical link to long-term economic growth and to poverty reduction (Demirgüç-Kunt and Levine, 2008. However, size does not necessarily represent the effectiveness of the financial development. It may be correlated with economic growth due to output increases the demand for financial service increases too, which in turn has a positive effect on financial development (Christopoulos and Tsionas, 2001; Koivu, 2002). Implies credit does not necessarily represent the effectiveness of financial sector.

Financial access promoted economic growth, strengthens competition, and increases the demand for labor and brings return to the poor classes (World Bank, 2013).However, access is not referring to any form of finance; rather it considers the quality of financial services available to people at competitive interest rate and reliable payment services. A common proxy is the number of bank accounts per 1,000 adults and the number of commercial banks branches per 100,000 adults. Limitations associated to these proxies the numbers of bank branches is ambiguous with branchless banking besides to the number of bank accounts does not correct for clients who have many accounts.

Financial sector functions should provide at least cost as possible unless the higher costs may discourage to households, firms, and governments. Efficiency is primarily designed to measure the cost of intermediating credit. Proxy variable of efficiency for financial institutions include overhead costs to total assets, net interest margin, lending-deposits spread, non-interest income to total income, and cost to income ratio(Levine *et al.*, 2012).When the net interest margin reduces as a result of decline in transaction costs, the amount of savings reallocated to investment grow up. Since economic growth directly correlated to the size of investment low transaction costs accelerates economic growth (Koivu, 2002).

The ordinary variable used to measure financial stability is the *z*-score, defined as the sum of capital to assets and return on assets, divided by the standard deviation of return on assets. This variable explicitly compares buffers (capitalization and returns) with the potential for risk (volatility of returns). The z-score has a direct link with the probability of default, and for this reason the variable. One of the major limitations of the z-scores is based on accounting data. (Levine *et al*, 2012).

5. Performance of Financial Development Indicators in Ethiopia

Developing countries financial sectors are characterized by commercial banks, which have a lion share for over 80 per cent of the financial systems' total assets. The sector is also characterized by lack of competition, and relatively small by world standards. Moreover, Ajakaiye(2005) revealed that the financial sector of Sub Saharan Africa (SSA) is at their elementary stage comparing to the rest of the world. For instance, the ratio of M2to GDP was 32 percent in 1990, increased slightly to 37 percent by 2003. In the same way for East Asia countries, the above figures are 63.1 and 158.8 percent respectively which are more worthy in the same year.

The SSA performance is less than 50 percent of the world average. In terms of efficiency, the interest rates increased from 8.2 percent in 1990 to 12.4 percent by 2003. In the two periods, the interest rates increase for SSA was the highest in the world entails the SSA banking sector remains the least efficient in the world (Ajakaiye, 2005).

Abebaw (2012) after assessing the Ethiopian financial performance between 2001-2008 he finds the banking sector of Ethiopia constitute 95 percent of asset, 96.53 percent of deposits, 94 percent of loans and deposits and 76.78 percent of equity of the financial sector on average. Kiyota *et al* (2007), Ethiopian bank concentration measured by the asset of the three largest banks found 88 percent compare to 59 percent for Kenya, 67 percent for Tanzania, 63 percent for Uganda, and 81percent for SSA as a whole. Moreover, in 2008 the Ethiopian bank concentration drop to 67 percent out of it Commercial Bank of Ethiopia report 58percent which is the highest in East Africa standard. It implies that bank competition in Ethiopia had remained at its lowest degree. Consequently, there is high profitability and high lending-deposit spreads that discourages investment performances.

According Heritage Foundation Index (Available at http://www.heritage.org/research/features/index) Ethiopia acquires 134 world rank with an economic freedom score 52 in contrast Hong Kong's economic freedom score 89.9 making its economy the freest in the 2012 Index. Three alternative indicators of financial development, namely domestic credit to the private sector by banks to GDP ratio, M2 to GDP ratio, and total deposits to GDP ratio for Ethiopian economy discussed below.

Figure 2: Private sector credits to GDP ratio 1975-2010 (Million Birr)

Even though this ratio has been increasing gradually over the years, there is ample room for further growth given the post 1991participation of private commercial banks. Pre 1991 banks ordered to lend to prioritize sector mainly state farming and relevant projects besides to bank credit ceiling and predetermined interest rate to patronize the private sector. For instance, in l988, out of the Commercial Bank credit finance agriculture and industry received only 6 and l3 percent respectively which marginalize private credit. Private credit in total loans was only 22.6 percent between 1989 and 1991 besides, private sector's investment limited to ETB 500, 0000.

Following the domestic financial liberalization since 1992 new privately owned financial institutions increased the performance of private credit to GDP grown-up from 9.31 to 15.27 percent during 1975 to 2010 with a slight decline recently.

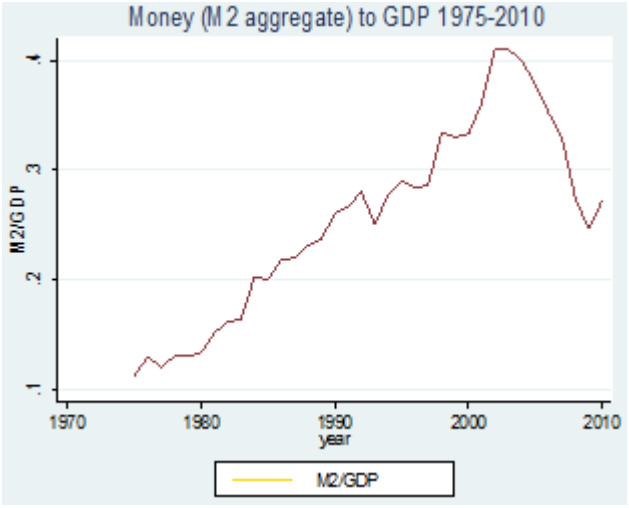


Figure 3: M2 to GDP ratio 1975-2010 (in Million Birr)

Figure 3indicated financial depth (i.e., M2/GDP) increased progressively represents efficient financial sector. Between 1974 to1991 the average M2/GDP ratio was approximately 18.1 percent, even though it was grow to 32.09percent during 1992 to 2010. During the entire period it was grow by 25.47 percent that is below SSA standard.

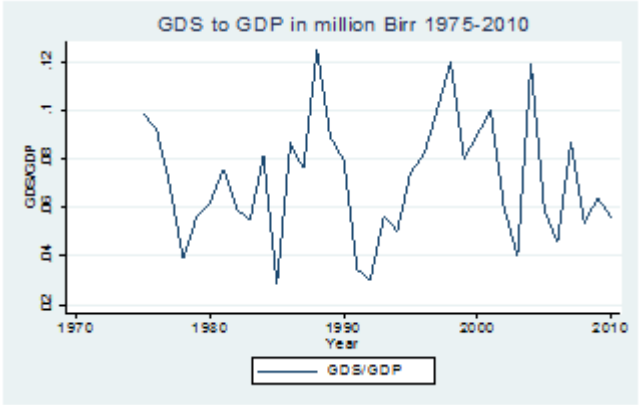


Figure 4: Gross domestic saving to GDP ratio 1975-2010(in million birr)

An alternative measure of financial depth, which is frequently used, is the ratio of bank deposit to GDP. Pre1991/2 both the deposit and lending interest rate structure were discriminated among private, public institutions, cooperatives, and associations. Hence, the private sector was incurred the highest rate in all kind of loans for instance, agricultural loan was 7 percent for private, 6 percent for state enterprises and 5 percent for cooperatives. The deposit interest rate paid for private was 5.5 percent for time deposit whereas it was 7.5 percent for others. The performance was not smooth pattern in the entire sample periods.

Table 2: Financial development indicators performance 1975-2010 (in million Birr)

Period	Credit/GDP	GDS/GDP	M2/GDP
1974/75-1900/91	9.31	7.09	18.1
1991/92-2009/10	15.27	*7.19*	32.09
1975-2010	***12.46***	*7.14*	**25.47**

Source: Author's calculation using data from NBE

6. Model Specification And Methodology

Theoretical Framework and Model Specification

Francesco Caselli (2005) in his study of development accounting, growth accounting inquires "how much of the variation in income growth can be attributed to differences in physical and human capital accumulation, and how much due to changes in the efficiency with which capital is used."Hence, growth accounting presents how various factors, such as government policies, institutions, natural resources, and financial intermediation affect economic growth (Barro and Barro and Salai Martin (1995) cited in Papaioannou, 2007).

Papaioannou (2007) studied the relationship between finance and growth of macroeconomic assessment evidence from European angle has used the growth accounting production function. Growth accounting starts with specifying the neo classical aggregate production function (Mankiw, Romer, and Weil, 1992):

$$Y_{it} = AK^{\alpha}(Lh)^{1-\alpha} \quad \ldots\ldots\ldots\ldots\ldots\ldots [1]$$

$0 < \alpha < 1$

α and $1-\alpha$measure the share of capital and quality adjusted labor in the aggregate economyrespectively.

The above function relates aggregate country (i) output Yin period (year) $t$to the aggregate capital stock K, the labor-force$L$, is adjusted for the average human capital of workers (h), and the level of technology A. Express the production function in per worker terms (intensive form):

$$y = Ak^{\alpha}h^{1-\alpha} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [2]$$

Differentiating equation[2]over time leads to:

$$y^{\cdot}/y = {}^{\alpha k^{\cdot}}/_{k} + (1-\alpha)\,{}^{h^{\cdot}}/_{h} + A^{\cdot}/A \quad \ldots\ldots\ldots [3]$$

Equation [3]decomposes output growth per worker into three parts: The first term in the right handside captures capital deepening (investment), the second term human capital accumulation (education) and the third term total factor productivity, which measures how efficient capital and labor are employed in the production.

Appling on [3] and [1] empirical cross country growth analyses of the effect of financial development on growth estimate alternatively the following regression equation.

$$\Delta lny_{i,t} = \beta lny_{i,t-1} + \gamma \Delta lnh_{i,t} + X'\phi + \lambda FD + \varepsilon_{i,t} \ldots\ldots\ldots\ldots [4]$$

$lny_{i,t-1}$(Alternatively substitute in the estimation equation the convergence term with physical capital accumulation $\Delta lnK_{i,t}$).

Where,

y = the dependent variable i.e., GDP

h = A proxy variable of human capital accumulation, such as changes in schooling or education enrolment rates.

$X^{'}$ = The set of explanatory variables ($X^{'}$) includes other control variables

FD =Proxy measure of financial development and ε_t= an error term

Hence, the researchers adopted the above theoretical model since it is consistent with the theoretical framework developed by Mankiw, Romer and Weil (1992) the following empirically estimable ***log-linear*** type of model is specified.

$$lnRGDPP_t = f(lnLDt, lnEHCAt, lnGCF_t, lnLABt) \ldots\ldots\ldots\ldots\ldots\ldots [5]$$

Where:

$lnRGDPPt$ = Natural logarithm of Real GDP per capita at time *t*.

$lnLDt$ = Natural logarithm of the margin between lending and deposits interest rates

$lnEHCA_t$ = Natural logarithm of education human capital accumulation at time *t.*

$lnGCFt$ = Natural logarithm of gross capital formation at time *t.*

$lnLAB_t$ = Natural logarithm of labor force growth rate at time *t.*

Natural logarithm transformations have been applied on all variables prior to analysis; hence coefficients on the level variables reflect elasticities.

Table 3: Summary Variables Measurement and Anticipated Signs

Variables	*Measure/proxy*	*Expected Sign*
Economic growth	Real Gross Domestic product per capita	Dependent variable
Bank efficiency The margin between lending and deposits interest rates (-)		
Education Human capital	Secondary school enrollment	(+)
Physical Capital stock	Real Gross Capital Formation to RGDP ratio	(+)
Labor force	Labor force growth rate	(+)

7. Data Sources

The study used 37 years annual data from 1975-2011. Most of the data is obtained from Ministry of Finance and Economic Development (MOFED), Ethiopian Economic Association (EEA) and National Bank of Ethiopia (NBE). Labor data also obtained from UNCTAD (CD–ROM).

8. Methodology of the Study

Stationarity and non-stationarity of time series data

Empirical studies based on time series data suppose that the underlying time series is stationary (Gujarati, 2004). A variable is said to be stationary if the mean and the variances of the variable are constant over time and the covariance between two periods depends only on the gap between the periods, and not the actual time at which this covariance is considered (Green, 2003, Gujarati 2004).

Regressing a non stationary variable $Y_t$upon a non stationary variable $X_t$leads to a spurious regression (Green 2003, Verbeek, 2004).Problem of spurious includes high R^2small standard error and inflated t- ratio thus, the usual t and Ftests on the regression parameters may be very misleading (Verbeek, 2004). A common solution to these problems is to

analyze the data in differenced form. Thus, non-stationary variables need to remove first before getting into any econometric work.

Tests of stationarity

The most common and popular one in econometric work is the Augmented Dickey Fuller (ADF) test (Gujarati 2004, Verbeek 2004). The ADF test here consists of estimating the following regression: The starting point of the unit root process is:

$$Yt = \rho Y_{t-1} + ut \quad -1 \leq \rho \leq 1 \ldots\ldots\ldots\ldots\ldots [6]$$

Subtract Y_{t-1} from both sides of equation [6]to obtain

$$Y_t - Y_{t-1} = (\rho - 1)Y_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots [7]$$

Which is equivalent to

$$\Delta Y_t = \alpha Y_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [8]$$

Where, $\alpha = (\rho - 1)$, $\varepsilon_t \sim (0, \delta^2)$,and Δ as usual, is the first-difference operator.

Estimating equation [8]and test the null hypothesis that α= 0then ρ = 1, that is a unit root, meaning the time series under consideration is non stationary. The hypothesis is formulated as follows:

$$Ho: \alpha = 0 \text{ or } (\rho = 1)$$
$$H1: \alpha < 0 \text{ or } (\rho < 1)$$

Co integration Analysis and Vector Error Correction Model

Testing for co-integration implies testing for the existence of long-run relationship between economic variables. The long run test used *Johansen's co-integration procedure*. The procedure suggests two likelihood ratio test statistics namely, the trace test (λ_{trace}) and the maximum eigenvalue test (λ_{max}). The trace test tests the null hypothesis that there is at most $r$cointegrating vectors against the general alternative. The maximum eigenvalue test tests the null hypothesis that there is $r$cointegrating vectors against the alternative that there are $r+1$ of them. The $r$vectors corresponding to the nonzero eigenvalues are chosen as cointegrating vectors (Enders, 1996).

The starting point of the Johansen procedure is formulation of the vector auto regressive (VAR) representation of Y_t:

$$\Delta Y_t = \delta + \Gamma_1 1 + \Delta Y_{t-1} + \cdots + \Gamma_{p-1}\Delta Y_{t-p+1} + \Pi Y_{t-1} + \varepsilon_t \cdots\cdots [9]$$

Where $\varepsilon_t$is *NID (0,δ^2), Δ is* difference operator the use of maximum likelihood requires to impose a particular distribution for the white noise terms. $Y_t$is a vector of $I(1)$ variables, Γ_1(i=1,…k) is $n \times n$ matrix of parameters, while $r$linear combinations of $Y_t$are stationary, it can be written as:

$$\Pi = \alpha\beta' \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [10]$$

Where, $\alpha$and $\beta'$are of dimension$k \times r$ matrices of rank. α the speed of adjustment to disequilibrium and β' is a matrix of long run coefficients of the co integrating model. In general, to identify the number of cointegrating vectors in the system, the (λ_{max}) and(λ_{trace}) statistics are used from the following formulas. The LR test of the null hypothesis at most $r$cointegrating vectors is given by:

$$\lambda_{trace}(r_0) = -T\sum_{j=r_{0+1}}^{k} \log(1 - \hat{\lambda}_j) \ldots\ldots\ldots\ldots\ldots\ldots [11]$$

T represents total number of sample observations, k the number of endogenous variables, λ_i is the largest eigenvalue obtained from the coefficient matrix and $\lambda_{trace}(r_0)$ is a chi-square distribution with k– $\lambda_t$degrees of freedom. Large values of $\lambda_{trace}(r_0)$ gives fewer cointegration vectors or it checks whether the smallest eigenvalues are significantly different from zero.

Furthermore, to test the null hypothesis of cointegrating vectors against the alternative hypothesis of r + 1 cointegrating vectors, for r = 0,1,2,…, k-1:

$$\lambda_{max}(r_0) = -T\log(1 - \hat{\lambda}_{r0+1}) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [12]$$

After testing the existence of a long run relationship between the variables, a Vector Error Correction Model (VECM) will be formed. After certain mathematical derivations and adjustments the general ECM model specified as follows including an intercept and time trend.

$$\Delta Y_t = c + \delta t + \Delta X_t \beta_0 + \delta ECT_{t-1} + \lambda D_{1+} u_t \ldots\ldots [13]$$

Where,

$c, \delta t, \delta, \beta_0$ and λ Intercept, time trend, error correction parameter, and slope respectively

u_t Error term stationary with a mean of zero and variance δ^2

$D_1, \Delta X_t$ Dummy variable and a vector of the first difference of the explanatory variables

ECT_{t-1} error correction term lagged by one period

The basic structure of ECM used to estimate the short run function can be written in the following way:

$$\Delta lnRGDPP_t = \sum_{i=1}^{k} \alpha_1 DRGDPP_{t-i} + \sum_{i=0}^{k} \alpha_2 DlnLD_{t-i} + \sum_{i=0}^{k} \alpha_3 DlnEHCA_{t-i} + \sum_{i=0}^{k} \alpha_4 Dln\,GCF_{t-i} + \sum_{i=0}^{k} \alpha_5 D\ln LAB_{t-i} + \beta_t + \gamma ECT_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [14]$$

Where, $D$is first difference and ε_t denotes error term. ECT_{t-1} and k, denotes the error correction terms lagged by one period for economic growth equations and the lag length respectively. The coefficient γ measures the long run equilibrium relationship, whereas $\alpha_1 \ldots, \alpha_5$ measure the short run relationship. The estimation results conducted using **Eviews*6*** software based on its merits in the pre and post estimation techniques.

9. Estimation Result

Tests for Stationarity

Table 4: Augmented Dickey- Fuller tests for unit root

Variables	t-statistics (with intercept and trend)	t-statistics (with intercept but not trend)
A. Variables in level		
lnRGDGPP	0.4880	0.3705
lnLD	2.6784	0.6057
lnEHCA	2.4382	0.7228
lnGCF	3.6240**	1.2647
lnLAB	3.6237**	.5314
B. Variables at first difference		
ΔlnRGDPP	5.4873***	4.603 ***
ΔlnLD	8.0344***	8.1683***
ΔlnEHCA	4.0002***	4.1224**
ΔlnGCF	8.6211***	8.7620***
ΔlnLAB	7.4944***	7.5925***

Source: Author's calculations, Δ denotes first difference***, **, * indicates the rejection of the null hypothesis of non-stationary at 1, 5 and 10 percent significant level respectively. From the above ADF test result the variables are non-stationary at levels but all are stationary at first difference hence the variables are considered as $I(1)$ processes **(Table 4).** Thus, all are chosen to be included in a long run.

Estimation of the Long Run Models

The next step is to test for cointegration test i.e., although macroeconomic series may not stationary independently its liner combination is stationary. If two or more non stationary time series follow a common long run path or equilibrium, test for cointegration is permitted. A test or cointegration used to test if a linear combination of the series is stationary or not.

Table 5 The λ_trace and λ_max tests

Null hypothesis	*Alternative hypothesis*	*Statistical value*	*5% critical value*	*Prob.*	*Eigen value*
λ_{trace} *tests*					
r = 0	r > 0	73.4321**	69.8189	0.0250	0.6411
λ_{max} *tests*					
r = 0	r = 1	35.8684**	33.8769	0.0286	0.6411

(Null ypothesis: See Enders(2002) Pp 396 for presentation of test results. Only the first cointegrating rank is presented)

Source: Author's calculations,* denotes rejection of the hypothesis at the 0.05 level.

Table 5 showed the existence of a single cointegration vector leads to long run estimation and variables have the same stochastic trends and cannot drift too far apart. The existence of one cointegrating vector advocates the first row of β and first column of α matrices are important for further analysis.

Table 6: Standardized beta (β') eigenvectors

	lnLD	*lnEHCA*	*lnGCF*	*lnLAB*
β-coefficients	0.4735	0.8911	2.2682	0.0494
LR-test	3.5573	1.5768	4.0900	3.4642
P-values	**(0.0592)***	**(0.2092)**	**(0.0431)****	**(0.0627)***

Jarque-Bera 2.722192 Prob 0.256380

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic 1.523487 Prob. F(4,32) 0.2188

RamseyREST Test

F-statistic 2.843823 Prob F (1, 31) 0.1018

Breusch-Godfrey Serial Correlation LM Test:

F-statistic 31.80940 Prob F (0.0000)

Source: Author's calculations, **, * donates significance at 5and 10 percent respectively.

The result of the diagnostic test confirms the adequacy of the model for further analysis. All tests have not discovered any problem of non-normality, serial correlation, hetroscedasticity, and model misspecification. The P-value indicated net interest rate margin, gross capital formation, and labor are statistically significantly at 10, 5 and 10percent respectively.

The coefficient of the net interest rate margin is 0.4735 implies that, in the long run, holding other things constant, a one percent increase in interest rate margin deteriorated real GDP per capita by 0.4735percent. The result implies that economic growth will become slow when transaction costs get higher and a small share of savings is flow in to investment due to the inefficiency of the banking sector measured by the margin between lending and deposit interest rates.

Even though the rationale for Ethiopian banking sector inefficiency requires further study the cause may arise due to the following: Financial repression which is a set of government regulations and other non-market restrictions distort the financial intermediaries from functioning at their full capacity. For instance, pre 1991 there was discriminatory interstate between private and government enterprise, absence of domestic and international financial liberalization which limited competition. High bank concentration for instance in 2008 the 58 percent asset share of Commercial Bank of Ethiopia the highest in East Africa in which prevents efficient allocation of resources and low bank competition. Moreover, the nominal lending and saving interest rates were 12 and 6.5 percent respectively during 1992-2011 which were among the highest in the world.

Exogeneity Tests

To identify the variables included in the growth model weak exogeneity of each variable tested by imposing zero restrictions on the first column of α-coefficients using the loglikely ratio (LR-ratio). The result revealed that the null hypothesis of weak exogeneity not rejected for all

explanatory variables i.e., the variables are found statistically to be weakly exogenous.

Table 7: Test for exogeneity of Variables

	lnLD	*lnEHCA*	*lnGCF*	*lnLAB*
α-coefficient	0.0965	-0.0650	-0.0060	-0.0188
LR-test	0.0081	1.3804	1.175	3.6614
P-values	0.9282	0.2400	0.7107	0.0557

Source: Author's calculations.

From Table 7 results of exogeneity test the null hypothesis of weak exogeneity is not rejected for all explanatory variables i.e., all the independent variables found to be weakly exogenous at the convectional significance level.

Estimation of Error Correction Models (ECM)

Table 8: Parsimonious error correction model

Regressors	Coefficient	SE	t	P
$\Delta lnRGDPP(-1)$	0.40151	0.1607	2.4985	0.0184**
$\Delta\, lnLD(-1)$	-0.1854	0.0873	-2.1233	0.0424**
$\Delta\, lnEHCA$	0.0410	0.1345	0.3050	0.7626
$\Delta lnGCF(-1)$	0.2458	0.0692	3.5501	0.0013***
ECT(-1)	-0.2461	0.07243	-3.3978	0.0244**
Constant	0.0050	0.0174	0.2886	0.07749

R-squared	0.413495	Mean dependent var	0.013486
Adjusted R-squared	0.312374	S.D. dependent var	0.087074
S.E. of regression	0.072205	Akaike info criterion	-2.263811
Sum squared resid	0.151193	Schwarz criterion	-1.997180
Log likelihood	45.61669	Hannan-Quinn criter.	-2.171770
F-statistic	4.089092	Durbin-Watson stat	1.838766
Prob(F-statistic)	0.006235		

Source: Author's calculations.

The coefficient of the error correction term is significant with expected sign -0.2461 indicates that deviation from the long run equilibrium is adjusted about 24.61 percent of the disequilibrium is removed or corrected within one year. The estimated short-run model reveals that real GDP per capita, lending deposit spread, and gross capital formation (all one period lagged value)were significant at 5% significance level. Un like long run positive relation coefficient, the lending deposit spread, (proxy for bank efficiency) results a negative coefficient implies a one percent decrease in lending deposit interest rate increase real GDP per capita by 0.1854 percent.

10. Conclusions and Policy Implications

The study examined the nexus between financial development specifically banking sector development and economic growth in Ethiopia using Johnson method for contegration approach between 1975-2011.To overcome the problem of financial depth (size) which is not a valid measurement of financial sector development this study used net interest rate margin. Economic growth accelerates when transaction costs get lower and larger share of saving is flowed in to investment in the economy. However, Ethiopian banking sector development remains in efficient with high interest rate margin hinder economic growth. The inefficiency of banking sector even though it requires further researches it may be due to high bank concentration for instance in 2007 the asset of the three largest banks found 88 percent compare to 59 percent for Kenya, 67 percent for Tanzania, 63 percent for Uganda, and 81percent for SSA as a whole that hamper competition among commercial banks. In terms of efficiency, the nominal lending and saving interest rates are 12 and 6.5 percent respectively during 1992-2011 which were among the highest in the world.

Moreover, financial repression through direct control over the financial system pre 1994 the government channel funds to itself at lower lending rate than it could resort to market finance. Specifically, during 1975-1991 the nominal lending and saving interest rates were 8.21 and 5.41 percent respectively which was relatively faire with a small profit margin an incentive to private sector investment.

The gradual increase in high required reserve ratio widens the interest rate spread to incorporate the amount of no-interest reserves, which can reduce the amount of funds available in the financial market. The requirement reserve ratio remained 15 percent from April 2008 the decline to 10percentfrom July 2007 to March 2008 but decrease to 5percentsince 2013(NBE, 2013).

Contrary, to long run estimation result the short run estimation indicated the net 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.

The empirical results obtained from the model analyses have important policy implications to promote financial sector development. Bank sector efficiency needs further improvements to establish competition among commercial banks thereby reduce bank concentration. Moreover, it is necessary to reformulate the legal as well as institutional arrangements of financial institutions leads to financial repression which hinder financial intermediation efficiency.

References

[1] Ajakaiye, O. (2005). Role of the State in Financial Sector Development in Sub-Saharan Africa. Africa in the World Economy.
[2] EEA(2011). Report on the Ethiopian Economy. Addis Ababa, Ethiopia.
[3] Enders, W. (1996). Applied Econometrics Time Series. Lowa state University: John Wiley & sons, Ltd.
[4] DFID. (2004). The Importance of Financial Sector Development for Growth and Poverty reduction. UK.
[5] Demese, C., Getinet, G., Goshu, M., & Yaddesa, D. (2009). Comprehensive Africa Agriculture Development program:Ethiopia study. Addis Ababa Ethiopia.
[6] Feyen, E.,Čihák, M., Demirgüç-Kunt, A., & Levine, R. (2012). Benchmarking Financial Systems around the World. Washington, D.C.: The World Bank.

[7] Green, H.M.(2003). Econometrics Analysis. New York University: New Jersey
[8] Gujarati.(2004). Basic Econometrics. The McGraw−Hill Company. 4th edition
[9] Goldsmith, R. W. (1969) Financial Structure and Development. New Haven, C.T.: Yale University Press
[10] Mckinnon, R. I. (1973) Money and Capital in Economic Development. Washington, D. C.: Brooking Institution.
[11] Mulatu, D., Fantu, G., and Tadele, F. (2004). Agricultural Development In Ethiopia: Are There Alternatives To Food Aid? Addis Ababa: Addis Ababa University.
[12] NBE (2011). 3rd quarter 2009/10 Fiscal year series V-25, Number -3. Addis Ababa Ethiopia.
[13] Sab, R.Creane, S., Goyal, R., Mobarak, A. M. (2004). Financial Sector Development in the Middle East and North Africa. IMF.
[14] senhadji, M. S. (2000). Financial development and economic growth: an overview. IMF working paper.
[15] Shabri. (2008). does financial development matter for economic growth in Malaysia ? an ARDL bound testing approach . Journal of economic ooperation , pp61-82.
[16] Thiel, M. (2001). Finance and economic growth a review of theory and the available evidence.
[17] Shaw, E. S. (1973) Financial Deepening in Economic Development. Cambridge, M.A.: Havard University Press.
[18] Smith, A. (1776). An Inquiry into the Nature and Causes of The Wealth Of Nations. UK: 20 Cambridge Drive, London SE12 8AJ.
[19] Sahn and, A. D.-K. (2009). Financial Structure and Economic Growth:Perspectives and Lessons.
[20] Demiriguc, A., & Levine, R. (2009). Financial Structure and Economic growth: perspective and lessons.
[21] Greenwood, J., & Jovanovic, B. (1990). Financial Development, Growth, and the Distribution of Income. The Journal of Political Economy; Vol. 98, No. 5, Part 1. , 1076-1107.
[22] Koivu, T. (2002). Does financial sector development affect economic growth in transition countries?
[23] LEVINE, R. (2005). Finance And Growth: Theory And Evidence.
[24] Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda. Journal of Economic Literature, Vol. 35, No. 2. , pp. 688-726.
[25] Muhammad Arshad Khan, A. Q. (2005). IslamabadFinancial Development and Economic Growth: The Case of Pakistan [with Comments]. Development Economists Islamabad , pp. 819-837.
[26] Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A Contribution to the Empirics of Economic Growth. The Quarterly Journal of Economics, Vol. 107, No. 2. , 407-437.
[27] papaioannou, E. (2007). Finance and growth A macroeconomic assessment of the evidence from a european angle. European central bank: E.
[28] Pesaran, M. H., & Smith, Y. S. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. Journal of Applied Econometrics Vol. 16, No. 3, Special Issue in Memory of JohnDenis Sargan, 1924-1996: , 289-326.
[29] Robert E. LUCAS, J. (1988). On The Mechanics Of Economic Development. Journal of Monetary Economics , 3-42.
[30] Rahman, M. H. (2004). Financial Development — Economic Growth Nexus: A Case Study of Bangladesh. The Bangladesh Development Studies, Vol. 30, No. 3/4 , pp.113-128.
[31] Tsionasb, D. K. (2001). Financial development and economic growth: evidence from panel unit root and cointegration. Journal of Development Economics 73 (2004) , 55– 74.
[32] Verbeek.M.(2002) A Guide to Modern Econometrics. Erasmus University Rotterdam: John Wiley & sons, Ltd.
[33] world, B. (2013). rethinking the role of state in finance . Washington D.c.: World Bank