Original Paper

Determinants of Financial Development in Ethiopia

Evidence From ARDL Bound Testing Approach: A Time Series Analysis

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Abstract

This paper aims at investigating the possible determinants of financial development in Ethiopia using the methodology of Autoregressive Distributive Lag model (ARDL) with bound testing approach with annual data from the national bank of Ethiopia. The study found a unique cointegration relationship between financial development, gross fixed capital formation, interest rate, inflation, reserve requirement ratio, financial sector reform (policy change), and external borrowing(debt). Up on the presence of long run relationship among these variables, the regression result shows that inflation, reserve requirement ratio, financial sector reform, and external (borrowing) debt are important determinants of financial development in Ethiopia in the long run. While reserve requirement ratio has adverse effect in the short run, external borrowing has positive and insignificant effect on financial development in the short run. Further, interest rate exerted negative and statistically significant effects on financial development both in the short run and long run suggesting that this variable adversely influence financial development. However, gross fixed capital formation has positive but statistically insignificant effect on financial development both in the short run and the long. It is therefore, recommended that the government of Ethiopia should ensure an accommodative (moderate) financial sector reform (policy change), reserve requirement ratio and inflation at threshold levels in order to stimulate financial development. Moreover, it should consider adjusting the interest rate downwards on lending by financial institutions.

Keywords: Financial Development, ARDL Model, Bound Testing, Ethiopia, Time serie

1. Introduction

Among the profound evolutions in development economics in recent decades, there has been renewed interest in, and growing contributions on, the role of financial systems in economic development. While it is clear that a positive effect exists between financial depth and economic growth, the questions of what determines financial development and how to develop financial markets remain imperfectly understood. Given the broad consensus on the substantial role of financial development in economic growth, it is of great importance to understand the origins of financial development. Economists still have an insufficient understanding of what brings about the emergence and development of financial markets, what are the reasons why different financial structures, bank-based or market-based, exist in countries where similar levels of economic development have been reached and what accounts for the differences in the level of financial development in countries like the OECD member countries which have similar income levels and geographic conditions (Yongfu, 2010).

A well-developed global financial sector improves the efficiency and effectiveness of financial institutions and also promotes financial innovations within the sector. The financial sector is said to be developed when: financial inclusion increases, the sector's stability increases, the amount of money that is intermediated by the financial institutions within the country increases, the number of financial institutions increase, the number of services or products offered increase and improve, the sector becomes more competitive and more efficient (DFID, 2004). This means there is no single measure that can include all dimensions of financial development. One way which can enable a country to achieve

high economic growth is by building a capacity to mobilize financial resources and by ensuring their efficient allocation to the projects with highest returns. The financial sector does this role by mobilizing savings and allocating these resources to the most productive projects. Other roles of the financial sector that promote economic growth include risk management, obtaining information on investment opportunities, facilitating the exchange of goods and services, facilitating and encouraging inflows of foreign direct investment, amelioration of information asymmetries, among others (Levine, 1997).

Policy measures related to financial and trade liberalization has been officially pronounced as determinants of financial development. Freeing the financial system from government intervention allows a more efficient allocation of resources by various economic agents while liberalizing trade reduces the power of interest groups who capture politicians to shape policies in their favor which impedes financial development. As such, the liberalization process reduces inefficiency, improves transparency and fosters a competitive environment which is conducive for the economy as a whole (Seetanah, 2010).

Financial liberalization could be considered as the midwife of trade openness in that the latter is expected to have an impact on financial development because a raise in the volume of trade increases opportunities for financial sector development. Both these elements are bound to mobilize domestic savings and raise inflows, increasing liquid liabilities in favor of development of financial system. Therefore, capital inflows are also expected to have an impact on financial development because more capital inflows are expected to increase liquid liabilities and support further financial development in the economy (Taghipour, 2009).

In most sub-Saharan African countries, the level of financial development is significantly lower than that in other developing regions. Where financial development has been fast, it typically occurred through both financial institutions and financial markets which provide a good momentum for macroeconomic fundamentals such as, capital account openness, trade openness, inflation, and the like are acting as the main drivers of financial development in these countries (IMF, 2016).

The evolution of financial sector development in Ethiopia is dated back to the early twentieth century during the raise of the imperial regime in the history of the country. Starting from this era, the economy experienced three politically distinct regimes since 1930. These are: The Imperial Government (1930-1974), The Dergue Regime (1974-1991) and the Post-Reform period (1991-present). The Ethiopian economy has been controlled by the state through a series of industrial development plans since the Imperial Government of Haile Selassie. From 1974-1991, the socialist government controlled the economy. The post-1991 government transformed the economy to a market-based system. During the Imperial regime, the government adopted a centrally administered development plans which is believed to have failed due to the government's administrative and technical capabilities. But the efforts made by Emperor Haile Selassie to bring Ethiopia into the 20th century enjoyed some success in limited areas (MoFED, 2012).

After the reform period (beyond 1991), the market-oriented economic policy wishes to establish a modern competitive financial system. The present government adopted a policy undertaking on the basis of gradualism and sequence of financial liberalization. The monetary and credit policies were made to ensure the growth of monetary aggregates consistent with the growth of GDP and inflation. Discriminatory interest rate policy to channel credit to privileged sector was eliminated. The private sector was allowed to participate in the financial sector whereas the specialized government banks were restructured. Since January 1995, auction market for Treasury Bills was introduced to avoid the crowding out effect of government borrowing from the banking system while laying the foundation for the development of capital market. Micro-financing institutions, which are specialized in providing credit to the emerging small enterprises and farmers, were established. The monetary and banking proclamations gave the National Bank of Ethiopia (NBE) increased autonomy to supervise the banking system (kydaki, 2014).

2. Review of Related Literature

There are a few prior studies which investigate the determinants of financial development. The main differences among these studies arise from the way that these studies are conducted. Some studies

reflect the impact of a set of variables whereas others investigate the impact of a particular variable on financial development. Another issue that causes the difference among these studies is the methodology, through which these studies are carried out. In this part we will review the major studies which have been done in the area of financial development.

Levine (2001) using a dynamic analysis from 1980-2006 established that the legal origins of countries tend to explain the cross-country differences. Chinn and Ito (2002) stressed on the links between financial liberalization, the legal and institutional environment, and financial development using a panel data analysis for 108 countries using data from 1980-2000.

Empirical results seemed to suggest that in developing economies a higher level of bureaucratic quality, law and order, lower levels of corruption enhances financial liberalization thereby promoting financial development. Luca and Spatafora (2012) by applying cross-sectional and panel techniques in developing countries between 2001 and 2007 found that reductions in the global price of risk and in domestic borrowing costs were the main contributors to the increase over time in net capital inflows and domestic credit. They said that cross-country differences in international and domestic finance are very large, and are best explained by fundamental factors such as institutional quality, access to international export markets, and an appropriate macroeconomic policy. Further, both net capital inflows and domestic credit exert a positive effect on investment this investment in turn contributes a lot for the underlying financial sector development this indicates that financial sector development and investment in capital are inextricably linked each other. Any effect of the global price of risk and domestic borrowing costs arisesmainly through their impact on net capital inflows and domestic credit.

Loayza and Ranciere (2005) using a pooled (cross-country, time-series) data set consisting of 82 countries evidenced that over the long run financial development supports and promotes economic growth. The process of financial development entails a deepening of markets and services that channel savings to productive investment and allow risk diversification; these positive aspects of financial development lead to higher economic growth in the long run. However, the path to development is far from smooth; and along the way, economic growth can suffer from the financial fragility that characterizes maturing systems. As economies mature, financial development can entail weaknesses evidenced by systemic banking crises, cycles of booms and busts, and overall financial volatility.

Mohsi S. Khan et al. (2001) using 168 countries (both industrialized and developing), investigated that in the presence of frictions arising from adverse selection, moral hazard or costly state verification, inflation impedes financial development by affecting the severity of these frictions. In particular, higher inflation leads to increased credit rationing and less extension of bank credit and therefore, leads to lower investment and slower growth. This predicts the linear and nonlinear relationship between inflation and financial development with threshold effects and beyond which inflation hinders significantly financial development and hence, economic growth.

The findings of Boyd et al (1996) employing time averaged data for 119 countries conclude that the empirical relationship between inflation and financial market development is highly nonlinear, and in particular that the relationship becomes less pronounced at higher rates of inflation. They also provided some evidence in favor of threshold effects. For countries with inflation rates below some "critical level," inflation and financial market performance exhibit a strongly negative correlation.

Once inflation exceeds some threshold, there is on average a discrete decline in the amount of banking and equity market activity. Moreover, for inflation rates above the threshold, inflation and financial market development seem essentially uncorrelated. Zingales and Rajan (2003) using cross country analysis showed four concluding remarks about financial development: The first is to show the reversal in financial markets, a finding inconsistent with pure structural theories of financial market development. The second is to add a new fact, which is that trade openness is correlated with financial market development, especially when cross-border capital flows are free. The third is to argue that these findings are consistent with interest group politics being an important factor in financial development across countries.

King and Levine (2008) using cross-country regressions of 80 countries studied the empirical link between a range of indicators of financial development and economic growth. They conclude that (1)

indicators of the level of financial development-the size of the formal financial intermediary sector relative to GDP, the importance of banks relative to the central bank, the percentage of credit allocate to private firms, and the ratio of credit issued to private firms to GDP-are strongly and robustly correlated with growth, the rate of physical capital accumulation, and improvements in the efficiency of capital allocation; and (2) the predetermined components of these financial development indicators significantly predict subsequent values of the growth indicators.

Huang (2005) studies the basic determinants of cross-country differences in financial development. He addresses two important tools for modeling uncertainty; he applied jointly Bayesian Model Averaging and General-to Specific approaches to examine the financial growth effects of an extensive range of variables taken from different sources. The analysis suggests that the level of financial development in a country is measured by its institutional quality, geographic characteristics and macroeconomic policies, as well as the level of cultural and earning characteristics.

S. Mbulawa (2015) used unbalanced annual panel data for the years 1996 to 2010 for 11 South African Development Community (SADC) member states and evidenced that financial development was positively influenced by credit to the public sector. This shows that as more funds are extended to the public sector there is more effective use of funds as more is channeled for the development of financial markets. The public sector appears to be better placed than the private sector in channeling funds towards financial development. Thus more private public sector partnerships are preferable for financial development to take place in SADC. The growth of per capita GDP had a positive and significant effect which supports the proposition that growth in the economy provides a larger scope for the growth of the financial market.

Using cross-country regression from 1980 to 2013 for sub-Saharan African countries, IMF (2016) concluded that financial development in the region is generally below the benchmark level. Relatively fast financial development over the past decade has led to a catch-up or even surpassing of the benchmark only in middle-income countries that expanded financial institutions beyond the banking sector. But it there is still considerable scope for further development, especially compared with other regions.

Indeed, until a decade or so ago, the level of financial development in a large number of sub Saharan African countries had actually regressed relative to the early 1980s. With the exception of the region's middle-income countries, both financial market depth and institutional development are lower than in other developing regions. In his study using a novel Panel Smooth Transition Regression, Sulemana Mahawiya (2015) provided a comparative study on the threshold effects of inflation on financial development between the Economic Community of West African States (ECOWAS) and the Southern Africa Development Community (SADC) for the period 1980-2011. His results suggest evidence of the existence of a robust single threshold of inflation in both regions. Particularly, it indicates 17.9% and 14.5% of inflation for ECOWAS and SADC respectively, suggesting that inflation above these thresholds presents statistically significant detrimental effects for financial development in both regions.

Time Series Evidence

Takyi (2013) using time series analysis with ARDL and cointegration approach evidenced that inflation, is statistically important determinants of financial development but have a negative impact, both in the long-run and in the short-run in Ghana. However, this finding is in opposition to the work of Nejad (2010) which concludes that inflation has a positive impact on financial development in the case of Iran. This is an interesting result as theoretically inflation is expected to inhibit financial development process. It is normally expected that inflation increases inflationary expectations and encourages capital outflow and discourages decisions for private activity. Almalki et al. (2015) also evidenced that inflation has significant negative effect on the financial development in Saudi Arabia.

Seetanah et al. (2010) using questionnaires and a time-series data set over the period 1970-2008 find that trade liberalization and investment rate played a significant role in stimulating financial development in Mauritius. Further, he observed that each time there was a progression made by the government in financial liberalization it boosted financial development. Other factors such as FDI to

GDP ratio and improvements in human capital also acted as a precursor for financial development. On the other hand it was found that inflation had a negative consequence on financial development. In his time series analysis using OLS with data ranging from 1980 to 2014, Abraha Gezae (2015) found that Trade Openness, Real Interest rate, population growth, and Government consumption expenditure have statistically significant impact on the development of the banking sector in Ethiopia by influencing the volume of credit provided by banks to the private sector. The banking sector development according to this finding has a long term and far-reaching and progressive effect on the overall development of the financial sector which is not globalized and opened to international financial investments.

3. Methodology and Model Specification

This section presents a simple econometric model that attempts to capture some of the possible macroeconomic factors affecting financial development. These factors include, financial policies, foreign aid, trade openness, institutional framework, foreign direct investment, interest rate, inflation rate, gross domestic saving, reserve requirement ratio, external debt, government, expenditure, political factors, socio-cultural factors, geography, demography and many others (Huang, 2010). Understanding characteristics and determinants of financial development requires an empirical framework that can be applied to a relatively long time frame. In order to examine the empirical evidence of the macroeconomic determinants of financial sector development in Ethiopia, the study considers some of these factors.

We can specify the financial development for Ethiopia expressing FD as a linear function of the variables which independently affect or determine development in the Ethiopian financial sector throughout the years which are included under consideration in undertaking the targeted research findings throughout the paper as follows.

Following the standard literatures of Oyakhilomen et al. (2014), Takyi et al. (2013) and Seetanah et al. (2010), economic model for financial development could bespecified implicitly as:

$$FD=f\ (GCF,\ INR,\ INF,\ RER,\ EXD,\ FR)…………................................\ (1)$$

Using the above economic function all the variables listed above is transformed into Log form to avoid hetroscedasticity (Gujarati, 2004) and to show elasticity of the variables; the log form is also used to express the growth function of equation and simple to interpret easily. The economic model in Equation (1) above can be written as an econometric model specified as:

Where, FD_t represents financial development, GCF_t represent for physical capital (formally gross investment) at a time t; INR_t represents interest rate, INF_t implies general inflation rate, RER_t implies reserve requirement ratio of commercial banks, and EXD_t implies external debt at time t, FR, implies dummy for financial sector reform. The error term (assumed to be normally and independently distributed with zero mean and constant variance, which captures all other explanatory variables which influences financial sector development in a country which are not captured in the model. Where the coefficients β_1, β_2, β_3, β_4, β_5, and β_6 are the parameters of the respective variables, β_0 is the constant term (drift parameter); t denotes time and ε is the error term.

3.1 Estimation Procedure

To test the long run relationship between dependent variable (Financial development) and independent variable (Gross capital formation, gross domestic saving, Interest rate, External debt, Reserve requirement and Inflation), the study applies Autoregressive Distributed Lag (ARDL) Model. The study will first investigate the time series properties of the data by using Augmented Dickey-Fuller (ADF) which is most importantly applicable in many papers. The unit root tests will be used to check the

stationarity of the variables and to check none of the variables are not order two (I.e. I (2)), which is precondition to apple ARDL model (Pesaran et al., 2001).

3.2 The Autoregressive Distributed Lag Model (ARDL)

A series of studies such as Pesaran et al. (2001); Narayan (2004) have introduced an alternative cointegration technique known as the 'Autoregressive Distributed Lag (ARDL)' bound test. There are numbers of advantages of using ARDL model also called 'Bound Testing Approach'. The ARDL model is more statistically significant approach to determine the cointegration relation in small samples as the case in this study (Pesaran et al., 2001 and Narayan, 2004). A second advantage of the ARDL approach is that while other cointegration techniques require all of the regressors to be integrated of the same order; the ARDL approach can be applied whether the regressors are purely order zero [I(0)], purely order one [I(1)], or mixture of both. This means that the ARDL approach avoids the pre-testing problems associated with standard co integration, which requires that the variables be already classified into I(1) or I(0) or mixture of both (Pessaran et al., 2001). Third, with the ARDL approach it is possible that different variables have different optimal numbers of lags. Following Pesaran et al. (2001), the ARDL model specification of equation (3) is expressed as un restricted error correction model (ECM) to test the co-integration among the variables under consideration in the study:

$$\Delta lnFDt = \alpha + \sum_{t=1}^{m} \beta_0 \, \Delta lnFD_{t-i} + \sum_{t=0}^{n} \beta_1 \Delta lnGCF_{t-i} + \sum_{t=0}^{p} \beta_2 \Delta ln \, INR_{t-}$$

$$_i + \sum_{t=0}^{q} \beta_3 \Delta lnINF_{t-i} + \sum_{t=0}^{r} \beta_4 \Delta ln \, RER_{t-i} + \sum_{i=0}^{s} \beta_5 \Delta lnEXD_{t-i} + \beta_6 FR_{t-i} +$$

$$\pi_0 lnFD_{t-i} + \pi_1 lnGCF_{t-i} + \pi_2 lnINR_{t-i} + \pi_3 lnINF_{t-i} + \pi_4 lnRER_{t-i} + \pi_5 lnEXD_{t-i} + \pi_6 FR +$$

$$u_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..(3)$$

Where,

FD_t = Financial development,

GCF_t = Physical capital (formally gross investment) at a time t;

FR = *Dummy for financial reform D=1 from 1990 0nwards*, **D=0** *otherwise*

, INR_t = Interest rate,

INF_t = General inflation rate,

RER_t = Reserve requirement ratio of commercial banks,

EXD_t = External debt at time t.

π_1 ------π_6 = Long run elasticites (coefficients of the explanatory variables)

β1-β6 = Short run elasticities (coefficients of the first-differenced explanatory variables) and Δ is the difference operator.

The error term (assumed to be normally and independently distributed with zero mean and constant variance, which captures all other explanatory variables which influences financial development in a country which is not captured in the model. u is the residual term, which is assumed to be white noise, **p** is the optimal lag length and **ln** is natural logarithm. Except inflation all the variables entered in the model is measured in millions of Birr.

If there is an evidence of long run relationship (cointegratio) among the explanatory variables under consideration, the following long-run ARDL (m, n, p, q, r, s, v) mode will be estimated from the equation (3) specified above.

$$\ln FD_t = \alpha + \sum_{i=1}^{m} \pi_0 lnFD_{t-i} + \sum_{t=0}^{n} \pi_1 lnGCF_{t-i} + \sum_{t=0}^{p} \pi_2 lnINR_{t-i} + \sum_{t=0}^{q} \pi_3 lnINF_{t-i}$$

$$+ \sum_{t=0}^{r} \pi_4 ln\ RER_{t-i} + \sum_{i=0}^{s} \pi_5 lnEXD_{t-i} + \pi_6\ FR + u_t \dots\dots\dots\dots\dots\dots (4)$$

3.3 Cointgration Test

The null hypothesis for no co-integration in the long-run among the variables in equation (3) could be specified as:

H0: $\pi_0 = \pi_1 = \pi_2 = \pi_3 = \pi_4 = \pi_5 = \pi_6 = 0$ (implies that no long run association ship between the explanatory variables opposed to the other alternative.

H1: $\pi_0 \neq \pi_1 \neq \pi_2 \neq \pi_3 \neq \pi_4 \neq \pi_5 \neq \pi_6 \neq 0$ (meaning there is an evidence of long run relationship between the independent variables under consideration. The cointegration test is based on the F-statistics or Wald statistics. The F-test has a nonstandard distribution. Thus, Pesaran et al. (2001) have provided two sets of critical values for the cointegration test. The lower critical bound assumes that all the variables are I(0), meaning that there is no cointegration among the variables, while the upper boundassumes that all the variables are I(1). If the computed Fstatistic is greater than the upper critical bound, then the null hypothesis will be rejected suggesting that there exists a cointegrating relationship among the variables. If the F-statistic falls below the lower critical bounds value, it implies that there is no cointegration relationship.

Finally, if it falls between the lower and upper bound, then the result would be inconclusive. The optimal lag length for the specified ARDL model will be determined based on the Schwann Information Criterion (SIC), meaning that the model that contains the smallest number of this criterion fits the lag selection well.

The *BIC* criterion can be preferred because it has the property that it will almost surely select the true model, if $T \rightarrow \infty$, provided that the true model is in the class of *ARMA* (*p,q*) models for relatively small values of *p* and *q* (Verbeek, 2004).

Then up on the presence of cointegration, the short run dynamic relationship could be estimated using an error correction model specified as follows:

$$\Delta lnFDt = \alpha + \sum_{i=1}^{m} \beta_0 \Delta lnFD_{t-i} + \sum_{t=0}^{n} \beta_1 \Delta ln\ GCF_{t-i} + \sum_{t=0}^{p} \beta_2 \Delta lnINR_{t-i}$$

$$+ \sum_{t=0}^{q} \beta_3 \Delta lnINF_{t-i} + \sum_{t=0}^{r} \beta_4 \Delta ln\ RER_{t-i} + \sum_{i=0}^{s} \beta_5 \Delta lnEXD_{t-i} + \beta_6\ FR + \lambda ECT_{t-1} + u_t$$

$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

Where, *ECTt-1* is error correction term lagged for one period and λ is the speed of adjustment to equilibrium and it should be negative and less that on in absolute terms, unless otherwise, there is no an indication of short run dynamic relationship between the explanatory variables under study.

4. Empirical Results and Discussion

4.1 Unit Root Test

The Augmented Dicky-Fuller (ADF) test is considered superior because of its popularity and wide application. The ADF test adjusts the DF test to take care of possible autocorrelation in the error terms by adding the lagged difference term of the dependent variable. In case of PP test, it also takes cares of the autocorrelation in the error term and its asymptotic distribution is the same as the ADF test statistic. However, ADF is applied here because of its easy applicability.

As shown in the Table 1 below, there are variables of which some are integrated of order zero (I [0]) and some of them are integrated of order one (I [0]). Particularly, financial development proxy (FD), gross capital formation (GCF), reserve requirement (RER) and external debt (EXD) are stationary at level without any differencing while interest rate (INR) inflation (INF) and the proxy for financial Development (FD) are stationary after differencing the variables under consideration. From this table, we can confidentially say that none of the variables under consideration are integrated of order two (I [2]). Therefore there is a reasonable objectivity to apply the Autoregressive Distributive Lag (ARDL) bound testing approach using the appropriate preliminary tests and the integrated variables (in mixture) taken in to consideration because none of the explanatory variables is integrated of order two.

Table 1. Unit root test (Augmented Dicky-Full test)

Variable	ADF	5%test cr. Value	Decision
@Level			
FD	-2.996992	-2.948404	Stationary
GCF	-4.846829	-2.9951125	Stationary
INF	-1.878973	-2.951125	Non Stationary
INR	-1.888439	-2.951125	Non Stationary
RER	-3.661248	-2.951125	Stationary
EXD	-3.018647	-2.951125	Stationary
DUMMY	-1.641741	-2.951125	Non Stationary
@1ST Difference			
FD	-0.476085	-2.948404	Non stationary
GCF	-0.627784	-2.954021	Non Stationary
INF	-4.348861	-2.954021	Stationary
INR	-3.301092	-2.954021	Stationary
RER	-0.475065	-2.954021	Non Stationary
EXD	-1.222091	-2.954021	Non Stationary
DUMMY	-3.316625	-2.954021	Stationary

Source: Author's computation using Eviews

Model Stability and Diagnostic Test

Just to check the verifiability of the estimated long run model under consideration, some preliminary diagnostic tests shall be undertaken. Priority in doing any analysis, it is of mandatory to check the standard property of the model. This study carries out a number of model stability and diagnostic checking, which includes Serial correlation test (Brush & Godfray LM test), Normality (Jaque-Bera test), and Hetroscedasticity test. In addition to the above diagnostic tests, the stability of long run estimates has been tested by applying the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) test. Such tests are recommended by Pesaran et al. (2001). In order to reject or accept the null hypothesis, Therefore, it is logical to test the null hypothesis of no serial correlation against the alternative hypothesis of first-order serial correlation.

B) We could not reject the null hypothesis test for Ramsey's RESET test, which tests whether the model suffers from omitted variable bias or not. As the test result indicates that we can't reject the Ramsey's test, which means that the model is correctly specified with a high probability value of 0.9124 as shown in the table above.

C) Reports the multivariate extensions of the Jarque-Bera residual normality test. In this test the histogram becomes "bell shaped" unless otherwise the residuals are not normal in their distribution. As shown in the table above, we cannot reject the null hypothesis of normality because the associated p-value is higher than the standard 5% significance level(0.624038 >0.05) under consideration.

D) As we have seen from the above table, we can reject at 5% significant level due to its p-value associated with the test statistics are greater than the standard significance level(i.e. 0.8472 > 0.05).

In addition to the above tests, the stability of the model should be checked using the commonly used CUSUM test (Brown, Durbin, & Evans, 1975) is based on the cumulative sum of the recursive residuals. This option plots the cumulative sum together with the 5% critical lines. The test finds parameter instability if the cumulative sum goes outside the area between the two critical lines. The CUSUM of squares test provides a plot of sum of squares against and the pair of 5 percent critical lines. As with the CUSUM test, movement outside the critical lines is suggestive of parameter or variance instability.
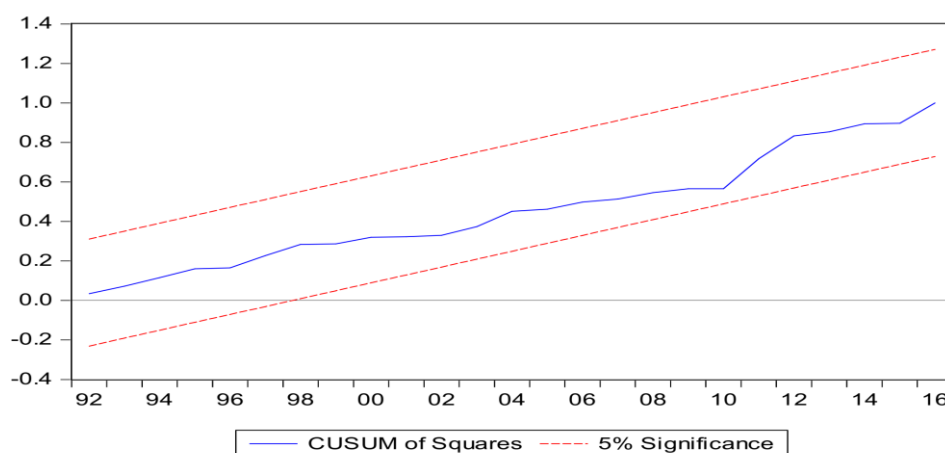

Figure 1. Test result for model stability (CUSUM Squares Test)

4.2 Long Run ARDL Bounds Testing Results for Cointegration

Irrespective of whether the underlying variables are I[0], I[1] or a combination of both, the application of ARDL approach to co integration will give realistic and efficient estimates. It helps in identifying variables stands as a single long run relationship equation. If one cointegration vector (i.e., the underlying equation is identified), the ARDL vector of cointegrating model is reparametrized in to ECM. The reparameterized ECM gives the short run dynamics.

Table 2. Result of bounds tests for the existence of cointegration (intercept only)

F - Statistics	Level of Significance	Lower Bound	Upper Bound	Decision
	10%	2.12	3.23	
3.811835	5%	2.45	3.61	Evidence of
	2.5%	2.75	3.99	Cointegration
K= 6	1%	3.15	4.43	

Source: Eviews Results; K is the No of explanatory variables

As we can see from the above table, the existence of long run cointegration among the underlying variables is verified by comparing the F statistics with the lower and upper bound critical values of the standard 5% significance level. Since the F-statistics is greater than this value at the 5% level (3.811835 >3.61), we can conclude that there is long run cointegration relationship between the underlying variables in this study and therefore, the null hypothesis of no cointegration between the variables is rejected and the alternative hypothesis is accepted.

4.3 Results of the Long Run Relationship

Table 3. Estimated Long Run Coefficients using the ARDL Approach (1, 0, 0, 0, 2, 1, 0) selected based on Bayezian Information Criterion (SIC). Dependent Variable: LOG (FD)

Variable	Coefficient	S. Error	t. Statistic	Probability
LOG(GCF)	0.181469	0.143455	1.264988	0.2180
LOG(INR)	-0.321352	0.172030	1.868005	0.0740*
INF	0.012670	0.004655	2.721542	0.0119**
LOG(RER)	0.196959	0.056746	3.470868	0.0020***
LOG(EXD)	0.133694	0.071493	1.870039	0.0737*
DUMMY(FR)	0.676226	0.112456	6.013246	0.0000***
C	-6.156244	1.122810	-5.482890	0.0000***

Source: author's computation using Eviews Note: ***, ** and * represent 1%, 5% and 10% levels of significance respectively

All the estimated long run coefficients of the variables under consideration have been given in the table 4.3 provided above and since the model is specified in a log-linear form, the coefficients can be interpreted as elasticity with respect to financial development (FD).

Consistent with expectation, the coefficient of interest rate is negative in sign and found to be statistically significant at 10% level of significance. Specifically, a 1% rise in interest rate leads to approximately 0.32% decrease in financial development. Thus, interest rate has had an adverse effect on financial development over the study period in Ethiopia. It is argued here that high interest rate charged by the central bank has the potential of widening the interest rate spread (the difference between lending rate and deposit rate) of banks. This means that larger banking sector's interest rate spread discourages potential savers due to low returns on deposits and thus limiting financing for potential borrowers. This finding is in line with Takyi et al. (2013) which claim that high prime rate restricts the supply of bank lending because the banks are unable to borrow large sums of money to lend to the private sector so as to enhance the services of financial intermediaries. Lower interest rate is beneficial for enhancing the activities of financial intermediaries to promote development in the financial sector.

The coefficient of inflation however, contradicts the expectation with reference to its sign implying that it is positive and statistically significant at 5% level of significance. Specifically, a 1% rise in inflation rate leads to approximately 1.26% increase in financial development. Thus, it demonstrates that inflation has a progressive effect on financial development in the Ethiopia under the study period. The study agrees with the conclusion by Mahawiya (2015) which claims that there is a critical inflation rate (17.9% and 14.5% of inflation for Economic Community of West African States (ECOWAS) and the Southern Africa Development Community (SADC) respectively), below which, a modest rise in inflation can encourage real activity and promote financial development rather than obstructing it. Further, the study is still in line with Nejad (2010) which founds that inflation has the potential of improving financial sector development in Iran and seems to have supported financial development rather than hindering it by encouraging real activity.

This finding is again in line with the empirical conclusion provided by Mbulawa (2015) which claims that inflation rate positively and significantly influenced the financial sector development of Southern Africa Development Community (SADC) countries. This supports the view that a moderate increase

the level of inflation below a threshold level has somewhat a positive influence for financial sector development especially for countries whose financial system is less developed. This is an interesting result as theoretically inflation is expected to inhibit financial sector development process.

Surprisingly, the coefficient of reserve requirement as shown above has the expected sign and has positive and statistically significant at 1% level of significance. Particularly, a 1% raise in reserve requirement results in 0.19% increase in sector development. Thus reserve requirement promotes financial development rather than retarding it in the Ethiopian case.

This study is confirmable with the findings of Hemedis et al. (2005) which conclude that a raise in RR is useful as a monetary policy handle in the Philippines. Their finding stresses that RRs are useful in countries where the financial system is relatively small, less developed (in terms of capital markets), and dominated by banks. Particularly during times when significant monetary tightening is required, as in cases of prolonged pressure in the foreign exchange markets where banks constitute the main market players. The reserve coefficient should be higher when the domestic financial system is less developed (i.e., when financial intermediation is dominated by banks), and that only after a sufficient degree of financial development has been reached should RR be lowered.

But theoretically, Joshua et al. (1993) argues that the higher the level of reserve requirements, the greater the costs imposed on the private sector; at the same time, however, higher reserve requirements may smooth the implementation of monetary policy and damp volatility in the reserves market.

This result is again in line with the empirical evidence given by Song et al. (2012) which showed that increases in reserve requirement ratio by the central bank has played a substantial role for China's banking system just to curb the problems of excess liquidity, increasing inflation pressure, a soaring bank loan scale, and the like, by acting as one of the most important monetary policies of its central bank.

To the extent of my knowledge, since the financial sector of Ethiopia is unmonetized and less developed with very low capital markets, the increment in RR by the central bank seems logical to some extent to stabilize the gap between the credit and deposit rates of financial intermediaries and liquidity management just to control the money supply and to tackle the frequently rising problems of inflation rates. Because frequent rises in inflation beyond the critical level may have a deleterious effect on financial development and demolishes the values of money in the hands of the peoples.

Another exciting result is that the coefficient of external (borrowing) debt has negative and statistically significant impact on financial development at 10% level of significance. This implies that external debt has played a progressive role for the development of financial in Ethiopia in the years under study. Particularly, other thing being unchanged, a 1% rise in the external debt (borrowing) leads to approximately 0.13% increase in financial development in the Ethiopian case. Even theoretically, there are literatures which favor the role played by external debt with in a moderate level. Ramakrishna (2002) asserted that as the development efforts in most of the poor countries involve investments that are greater than their domestic savings; foreign finance in the form of external debt becomes absolutely necessary. Chenery and Strout (1966) feel that this finance in the form of aid contributes to development by relieving some of the potential bottlenecks of savings and foreign exchange.

Hwang (2010) asserted that the level of external debt may contribute to the development of financial by simplifying the shortage of domestic financial distress as long as the level of indebtedness is below the critical level of debt overhang but above this certain limit, external debt may distress investment in the financial sector. Overall, external borrowing can lead to development if there is effective control of external debts by the government of Ethiopia. Plus to this if the government properly manages its external debt and pumped to investment and productive projects than consumption purposes within the sector, it makes the financial sector progressive than the other way round.

Finally, the coefficient of financial reform for Ethiopia has the expected sign and it is statistically significant even at the 1% level of significance. This positive significance may be associated with the fact that up on the coming of the present government in power particularly beyond 1990s, financial liberalization occurred, the private sector had got large attention to play its role in the sector itself in the areas of banking and insurance companies, in particular further liberalization of the foreign exchange

system and trade liberalization may be the reason among other things. This result is consistent with the work of M. Adussei (2013) in his paper; he concluded that financial reform (policy change) had played an important and significant role for the development of financial sector in Ghana from 1988 onwards.

Theoretically, this paper is in line with the early hypotheses of McKinnon (1973) and Shaw (1973) which claimed that although financial liberalization has been criticized as increasing the likelihood of financial crises and financial fragility, it is widely regarded as promoting the flow of financial resources, thereby reducing capital costs, stimulating investment and fostering financial development. Financial liberalization associated with policy reforms within the sector itself would go hand in hand with higher real interest rates and, so, it would stimulate savings and the higher saving rate would finance a higher level of investments and hence financial development may be achieved. Hence, according to this view, we should expect higher economic growth, investment and saving rates, as well as financial development following financial liberalization process in developing countries.

4.4 Results of the Short Run Relationship and Error Correction Model

Once the long-run cointegrating model has been estimated, the next step is to model the short-run dynamic relationship among the variables within the ARDL framework. Thus, the lagged value of all level variables (a linear combination is denoted by the error-correction term, ECM (-1) is retained in the ARDL model. Table 4 presents the results of the estimated error-correction model of financial development for Ethiopia using the ARDL technique. The model is selected based on the SBC. The error correction term (ECM), as we discussed in chapter three, indicates the speed of adjustment to restore equilibrium in the dynamic model. It is a one lagged period residual obtained from the estimated dynamic long run model.

The coefficient of the error correction term indicates how quickly variables converge to equilibrium. It should be negative and less than unity in absolute terms, since one cannot expect a 100% or instantaneous adjustment. The estimated value of equilibrium error correction term (ECT), -0.293405, has the correct sign, and is statistically significant at 1% significance level, implying that there is an adjustment to equilibrium level after a shock. Approximately, 29% of disequilibrium from the previous year's shock converges back to the long-run equilibrium in the current year. Since the coefficient is negative, there is an evidence of convergence instead of divergence to long run equilibrium.

The coefficient of determination (R-squared) is high explaining that about 99% of variation in the real FSD is attributed to variations in the explanatory variables in the model. In addition, the DW statistic does not suggest autocorrelation and the F-statistic is quite robust implying that all the explanatory variables under consideration can jointly and significantly influence the dependent variable (FD) at 1% level of significance as shown in the Table 4 below.

Table 4. Estimated short-run error correction model using the ARDL approach (1,0,0,0,2,1,0) selected based on Bayezian information criterion (SIC). Dependent variable: LOG (FSD)

Variable	Coifficient	S.Error	t-Statistic	Probability
DLOG(GCF)	0.053244	0.051709	1.029690	0.3134
DLOG(INR)	-0.094286	0.051876	-1.817520	0.0816*
D(INF)	0.003717	0.000983	3.780238	0.0009***
DLOG(RER)	-0.015447	0.006505	-2.374689	0.0259**
DLOG(RER(-1))	-0.070438	0.017651	-3.990636	0.0005***
DLOG(EXD)	0.007987	0.017443	0.457858	0.6512
D(FR)	0.198408	0.068466	2.897923	0.0079***
ECT(-1)	-0.293405	0.077410	-3.790264	0.0009***
R-Squared	0.998001		R-Bar-Squared	0.997161
DW Statistics	2.105978		F- Stat. (7, 35)	1197.923 [0.0000]

Source: Eviews results   Note: ***, ** and * represent 1%, 5% and 10% levels of significance respectively

As we can observe from the table above, all the coefficients of the variables except the reserve requirement ratio are consistent with that of the long run results in sign under consideration.

The sign of interest rate is consistent with the long run and negatively affects the financial development at 10% level of significance. This implies that holding other things unchanged, a 1% rise in interest rate leads to approximately 9.4% reduction in the level of financial development under consideration.

Inflation has also the same sign with that of the long run and but the level of significance is higher in the short run implying that a 1% change in inflation would result in approximately 0.37% increase in financial development keeping the effect of other variables unchanged.

In contradiction to the long run however, the coefficient of reserve requirement ratio negative in sign and statistically significantly affect FSD in Ethiopia in the short run at the 5% level of significance under consideration. Particularly, other things remain unchanged, a 1% raise in RR could result in an approximately 1.54% reduction in financial development in the short run. This result confirms the theoretical views of Hemedis et al. (2005) which claims that frequent increase in RR beyond certain limits may impose severe impact on the activities of banking and other financial and deposit institutions in which RR serve as tax on bank intermediation, leading to higher lending and lower deposit rates, and hence, may severely affect the level of FSD in the short term.

Lastly, the coefficient of the dummy for financial reform is positive in sign and has a positive and significant impact on the development of financial sector of Ethiopia under consideration both in the short run and in the long run at the 1% level of significance by implying that freeing the financial system and correspondingly undertaking the appropriate policy changes observed beyond 1990s has a tremendous effect on the financial development in Ethiopia under the study period.

5. Conclusion and Policy Implications

The regression result evidenced that inflation; reserve requirement ratio, financial sector reform, and external (borrowing) debt are important determinants of financial development in Ethiopia in the long run. While reserve requirement ratio has adverse effect in the short run, external borrowing has positive and insignificant effect and did not have any significant impact on financial development in the short run. Further, interest rate exerted negative and statistically significant effects on financial development both in the short run and long run suggesting that this variable adversely influence financial sector development.

Although inflation has positive inflation in the financial development in the study under consideration, this is not without problems by itself. This study supported the view that inflation and FSD has nonlinear relationship with reference to the threshold effects and above this level, frequent increases in inflation may have adverse and deleterious effect on financial development, encourages capital outflow and discourages decisions for private activity and even in the economy. Therefore, the responsible organ shall take the adverse effects of inflation apart from the positive side just to enhance the financial sector stabilization.

The other surprising result is that reserve requirement had positive and significant relationship with FSD in the case of Ethiopia in the long term. The central bank has to set the minimum requirement (progressively incremental at moderate level) on financial institutions to control the money supply during inflationary season and in prolonged pressure in foreign exchange markets which is used to speed up the process of financial development. But higher increases in Reserve requirements beyond certain limit may impose costs on the private sector and hence, banks may offset is by increasing interest rate on lending, leading to financial sector distress.

The other outstanding result is that external debt played positive role to the FSD in Ethiopia this may be the result of debt sustainability and proper management of external debt burden. On account of this however, the government of Ethiopia should design and properly implement coherence debt management policies to make it sustainable and the borrowed money should be pumped out in to progressive investments with future returns.

The last but not the least, since financial reform has substantial role for FSD in Ethiopia, the government of Ethiopia should deliver a wide range of opportunities for the private sector and

liberalizing the sector from unnecessary constraints can bring progress within the sector.

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