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Article

Determinants of financial development in Ethiopia: ARDL approach

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Determinants of financial development in Ethiopia: ARDL approach

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Abstract: Sustainable economic growth requires financial sector development. However, financial development is low in Ethiopia. Hence, the main objective of the study was to examine determinants of financial development in Ethiopia. Annual data from 1980 to 2019 was used and examined by ARDL estimation technique. Private sector credit and money supply as percentage of GDP were used as dependent variables. Independent variables include external debt, reserve requirement, real exchange rate, lending interest rate, inflation, political freedom index, trade openness and economic growth. Broad money supply model is positively affected by political freedom index, economic growth and trade openness both in the short run and long run. While it is negatively affected by interest rate and reserve requirement. However, real exchange rate has negative effect in the long run and insignificant effect in the short run. On the other hand, credit to private sector model is positively affected by inflation, and political freedom, economic growth and trade openness. While it is negatively affected by external debt, reserve requirement and lending interest rate. Error correction estimation result of credit to private sector model shows the adjustment coefficient is -0.263 and statistically significant at 5% level of significance, which means short run deviation from long run equilibrium is adjusted at a rate of 26.3%. The adjustment coefficient for broad money supply model is -0.254 . The study recommends that the government needs to improve trade and the quality of factors of production, reduce reserve requirement, reducing interest rate on lending, political.

Subjects: Development Studies; Economics and Development; Economics; Finance

Keywords: finance; financial development; ARDL; Ethiopia

1. Introduction

Financial development has important ramifications for economic growth, because it channels funds from surplus to deficient units to finance investment projects. However, in Ethiopia creation of

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PUBLIC INTEREST STATEMENT

Financial development is essential for sustainable development of the economy. However, financial development is low and at its infant age. Moreover, the majority of credit from financial institutions, particularly from bank goes to public sectors, which lowers the amount of credit provided to the private sector. Thus answering the question "why financial development indicators (money supply and credit to the private sector) is low?" may have many benefits to Ethiopian economy.

appropriate regulatory framework and sound financial system is difficult particularly during the Derg regime (1974 to 1991) were state enterprise received bank finance. After the overthrow of the socialist regime in 1991, Ethiopia started market economy. Following this, new financial institutions have emerged and private sector becomes active players in the financial system (Addison & Fole, 2001).

Banking in Ethiopia is dominated by government owned entity with two-third market shares. In 2019, there are 17 commercial banks (16 private and 1 public). The sector shows notable changes from single state owned in 1990 to 7 banks in 2000. The total number of public and private bank branches reaches 4,757 as of June 2018, which improves population to bank branch ratio from 1 branch to 126,000 in June 2008 to 20,000 in 2018. Also depositor numbers are increased from 4 million in 2010 to 33 million in 2018. For instance, commercial bank of Ethiopia served 18.8 million customers through 1,708 ATM Machines, 11,796 POS-machines and 1,375 branches. On the other hand, private banks has a maximum of 380 branches and customers not more than 2 million per bank, and only around 300 ATM machines (CEPHEUS, 2019).

On the credit side, the majority of funds by banks (two thirds) have gone to the public sector. In 2011–2012, private credit to private sector was 36% of total credit, but in June 2018, it declines to 32%. Currently, private credit to private sector is only 11%, half lower than the average among the 20 largest African countries and in need of much improvement if a more private sector driven economy is to take hold in the coming years. In addition to the limited credit provided to private sectors in Ethiopia, the particular forms and lending features are not matched with the demand of private business firms. Moreover, loans by bank provided to small and micro enterprises requires stringent collateral or it is short-term maturities, which in turn holds back the potential user base among Ethiopia's large pool of small- and medium-sized enterprises (CEPHEUS, 2019).

Following change in government in 1991, Ethiopia made a reform on financial sector. However, Ethiopia can't improve the performance of financial sector as much as expected. Almost all financial sectors are at their infant stage and the majority of the peoples, particularly living in rural areas of the country, cannot easily access the financial sector either for formal credit or for saving purpose. Particularly in the rural areas of the country, to get financial sectors households cross much many kilometers with foot. Financial sectors have no modernized, automated and networked their services (Yimer, 2011). Though both private banks and microfinance institutions are allowed to emerge, the coverage and size of financial sectors are very low. In 2014, only 10% of households were accessed to formal credit. Financial sector in Ethiopia heavily depends on banking sector, and insurance companies and microfinance institutions are the next best alternatives of getting money (NBE, 2015).

Since the economy is dominated by subsistent agriculture the degree of monetization and financial sector development in Ethiopia are very low. Broad money supply (M2) as a proportion of GDP, which is one measure of financial development was only 24% to 28% from the period 2008/09 to 2013/14. Another measure of financial development, credit to private and public enterprise sectors to GDP ratio stands at about 22% in 2013/14 (Gashayie & Singh, 2016). However, this is the lowest as compared to other east African countries particularly south Africa and Kenya, which are countries having most and second most developed financial sectors in east African countries (Ogola, 2016). Improving the availability of financial facilities is one of the incentives that should be proposed for stimulating its growth and the realization of its potential contribution to the Ethiopian economy. However, the need for finance became higher and complicated when they grow and involve in high dynamic activities. Despite this the level of financial development as compared to demand is very low. Therefore identifying the determining factors of financial development has paramount importance. Hence, this study tries to investigate the factors which hamper the development of financial sector in Ethiopia using an auto-regressive distributed lag model.

The reminder of the paper is presented as follows. Section 2 provides an overview of previous theoretical and empirical literatures. Section 3 presents methodologies and data. The remaining section 4 and 5 presents result and discussion and conclusion and recommendations, respectively.

2. Literature review

Researchers grouped all endogenous and exogenous factors affecting financial development in to five groups. These are the interference of the government, legal tradition, institutions, openness policy and political economy factors (Voghouei et al., 2011). By comparing the level of price and quantities, particularly the interest rate spread and stock-flow, one can determine the performance of financial sector of a country. Many researchers used different indicators of financial development. For instance, Arcand et.al. (2015), Scartascini (2012) and Huang (2005) used credit to private as a percentage of gross domestic products. On the other hand, King and Levine (1993), Demetriades and Leuintel, (1996) and Saci and Holden (2008) used liquid liability (M2) as a percentage of gross domestic products.

Empirical study by Mbulawa (2015) show that strong evidence suggesting that financial development (credit to the private sector % GDP) is explained by economic growth, trade openness and institutional factors play a complementary role. Using 16 industrial countries Hofmann (2001) analyzed the determinants of credit to the private non-bank sector. The author found that financial development is negatively affected by real interest rate. According to Akinlo and Oni (2015), the prime lending rate and reserve ratio cause a drop in private sector credit. Inflation raises private credit to the private sector, but it tends to reduce real bank lending to the private sector. Using principal component approach Badeb and Lean (2017) examined the main determinants of financial development in the Republic of Yemen. They found economic growth and trade openness have a positive impact on the pace of financial development. The natural resource dependence has a negative impact.

Takyi and Obeng (2013) also found the influencing variables of Ghana's financial development using an auto-regressive distributed lag model. The model estimation found that income per capita and trade openness had a positive significant effect on a country's financial progress. While inflation and interest rates have a positive statistically significant influence in the short and long run, reserve requirements for commercial banks have a negative statistically significant influence in both the short and long run. Borrowing by the government, on the other hand, has no effect. Benya (2010) discovered that financial development and trade openness have a considerable beneficial link. According to Huang (2005), political liberalization has a positive impact on financial development, especially in the short run. From 1978/79 to 2010/11, Assefa (2014) evaluated the short and long-run influence of bank-specific, monetary policy, and macroeconomic variables on bank loan to the private sector in Ethiopia using a supply-side methodology. The author discovered that the requirement has no effect on commercial banks' loan to the private sector in the long or short run.

Bist and Read (2018a) investigated the long-run relationship between financial development and economic growth using panel co-integration analysis in 16 selected low-income countries by employing annual time series data from 1995 to 2014. Dynamic OLS estimation result shows that financial development has positive significant effect of economic growth. Ellahi (Ellahi et al., 2021) examined institutional factors affecting financial industry of South Asian Association of Regional Cooperation (SAARC) region. The author employed generalized method of moment and found that trade openness; institutional factors, legal origin, and real gross domestic product have statistically positive significant effect on financial depth. On the other hand, inflation has negative significant effect. Recent studies discussed various factors, which positively or negatively affect the finance-growth relation. Ehigiamusoe et al. (2019) explored the impact of inflation on the relationship between finance and economic growth in the West African region. They found a negative interaction term of the inflation rate and financial development. A novel outcome is finding the threshold level of inflation, which was 5.6% above, which could harm the relationship. Significant findings suggested that instead of increasing both financial development and inflation, it is worth to improve financial development and reduce the inflation rate. A similar analysis by Ehigiamusoe et al. (2019) discussed that macroeconomic stability is an essential determinant of financial development. The West African region study found that macroeconomic stability is an important factor, particularly for financial sector development.

3. Methodology and data

This study is used secondary data mainly drawn from World Development Indicators (WDI), freedom house survey (FHS), national bank of Ethiopia (NBE) and International monetary fund (IMF). In Ethiopia for the dependent variables (credit to private sector as a percentage of GDP and broad money supply as a percentage of GDP) there is no compiled data from 1980 backwards. Due to this this study covers covers a period of 40 years from the period (1980–2019). The dependent variables used in this are broad money supply as % of gross domestic product and credit to private sector as % gross domestic product. The independent variables are external debt, reserve requirement, real exchange rate, lending interest rate, inflation rate, political freedom index, trade openness, and GDP = gross domestic product. Summary statistics of both dependent and independent variables is reported in [Table 1](#), and the trend of dependents variables were discussed below in [Figure 1](#).

For the study sample broad money supply as a percentage of GDP has a mean value of 31.194% with minimum and maximum values of 16.081 and 45.353% respectively. since the stanard error is higher it represents higher variation from its mean, which indicates in Ethiopia there is no stable growth of money supply proportional to growth of real gross domestic product. Growth of liquid liability as % of GDP has no constant trend. This financial development indicator remained low for most of the Derg period. Between 1981/82 and 1985/86, the ratio of M2/GDP increased from 15% to 20% and further to 22% by 1989/90. During the last two years of the Derg regime, M2 further expanded due to the growth in the net claims of banks on the central government. After the economic reform, efforts have been made to make growth of broad money supply in line with nominal GDP growth. A relatively faster growth in broad money has been witnessed from 1994/95 to 2005 since the beginning of the reform averaging 23% in 1994/1995 and 45% in 2005.

On the other hand, credit to private sector as percentage of real gross domestic product is lower, which is on average 16.188% with maximum and minimum values of 35.45 and 6.11 respectively. Domestic credit issued to the private sector refers to the financial resources provided to the private sector, such as through loans, purchase of non-equity securities and trade credit and other account receivables, that establish a claim for repayment. For some countries, these claims include credit to public enterprises. Bank credit to the private sector grew slowly because of the restriction imposed on the economic activities of the private sector. After the economic reform however, bank claims on government grew on average by 3.2% while non-government borrowers increased by 20% per annum due to the increasing participation of the private sector. Credit disbursed to non-government borrowers accounted for 51% of the total domestic credit up from 30% in 1991/92. Unlike the Derg period, bank credit to the private sector became a major determinant for the expansion of the monetary base. For example, the ratio of private credit as percent of GDP in 2004 was 19.1 the second highest in East Africa (Kiyota et al., 2007). However, this does not necessarily mean that intermediation is stronger because Ethiopia's GDP is relatively low. After 2010 domestic credit to private sector as % of GDP increase.

The average value of lending interest rate in Ethiopia from the period 1980 to 2019 is 10.964%. The minimum and the maximum value of this variable is 6.8% and 15.5% respectively with lower variations of 2.556%. The mean value of the inflation rate in the country is 9.798% for the period 1980 to 2019. The minimum and the maximum value of this variable are -7.764% and 39.27%, respectively. The variation from the mean for inflation rate is 10.336%. This highest variation from the mean is an indication of macro-economic instability in the region through overall price increasing, which affects economic activities. during the study period Ethiopia's real exchange rate growth ranges from 2.987 to 20.356% with mean values and standard deviation of 10.793 and 5.191, respectively. In standard theory, depreciation will raise exports in the foreign market this will improve investment and in the contrary depreciation will decrease import this will discourage investment through increasing investment inputs imported from the rest of the world. In Ethiopia case the later one is mostly happen because, Ethiopian investors they import more capital goods than they export.

Table 1. Summary statistics of variables

Variables	Observation	Mean	Std. Dev.	MIN	MAX
M2%GDP	40	31.194	8.762	16.081	45.353
CPS%GDP	40	16.188	5.56	6.107	35.451
Interest rate	40	10.964	2.556	6.8	15.5
Freedom index(FI)	40	5.688	.889	4	7
Trade openness	40	0.365	0.248	0.011	.412
Inflation(CPI)	40	9.798	10.336	-7.764	39.265
External debt growth	40	12.29	26.36	-64.04	88.31
Real exchange rate	40	10.793	5.191	2.987	20.356
Reserve requirement	40	24.19	11.22	9.76	48.56
Real gross domestic product growth	40	5.978	6.425	-11.144	13.859

The measurement of political freedom incorporates two broad sub-groups: political right (PR) and civil liberties ratings (CL). Political right includes sub groups such as process of election, level of participation and political pluralism and government functioning. While civil liberties includes level of freedom of expression and belief, rights associated with freedom to join and leave existing groups of organization, rule of law, protection of individual right and personal freedom. Both evaluated in the range of 1 to 7. If the index ranges between 1 and 2.5 a country is considered as free, 3 to 5 partially free and 5.5 to 7 is considered as not free. The average values of 5.688 with standard deviation of 0.889. The minimum and maximum values are 4 and 7, respectively. The mean value shows that in Ethiopia there is political freedom. From 1980 to 2019 the average growth of external debt stock in the country remains high averaging 12.29% with standard deviation of 26.26. The minimum level of growth of external debt stock is negative 64.04% whilst the maximum value recorded at 88.31%. This is an indication that countries in the region heavily dependent on the external financial source to fill their financial gaps.

For the study sample the mean growth of reserve requirement is 24.19% and the minimum and maximum growth are 9.76 and 48.56%, respectively. The other variable is trade openness (export + import/RGDP) with a mean value of 0.365 or 36.5% with minimum and maximum of 1.1 and 41.2%, respectively. Finally, the mean growth of real gross domestic product is 5.978 with minimum and maximum growth of negative 11.144 and 13.859%, respectively.

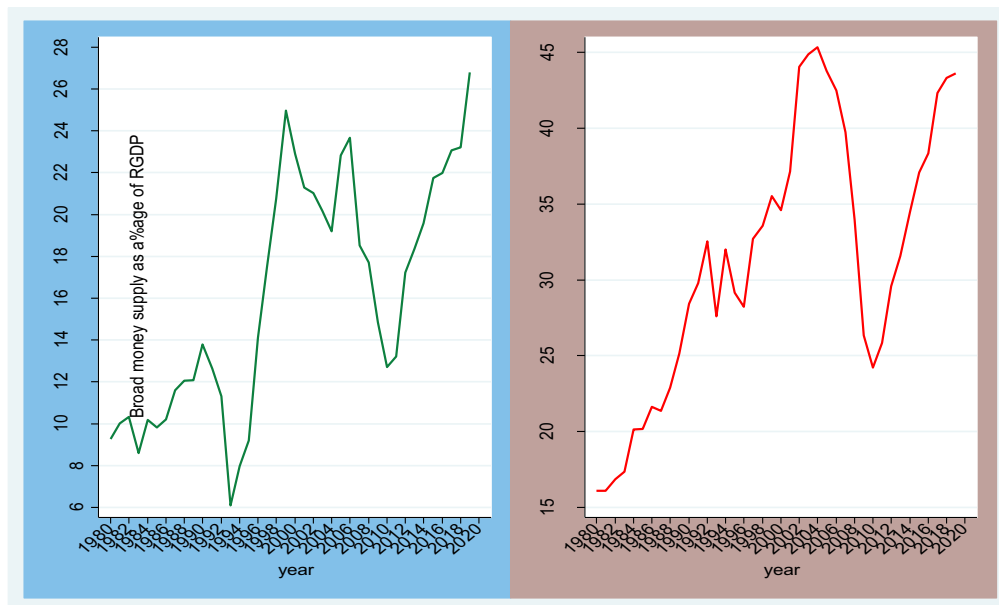
3.1. Empirical model specification

The linkage between financial development and independent variables were tested by ARDL estimation technique. Estimation method to test the long run relationship between dependent variable and independent variable, the study applies Autoregressive Distributed Lag (ARDL) Model, which is first developed by (Pesaran et al., 1997; 1999). ARDL approach is preferred over Johansen maximum Likelihood because the former avoids the problem of order of integration, suitable for small sample size, provides consistent results.

According to Johansen and Juselius (1990), Pesaran and Shin (1995), and Pesaran et al. (1996) the general ARDL model is specified as follows.

The ARDL (p, q1, q2, q3qk) model specification is given as follows.

Figure 1. Trend of money supply and credit to private sector as a percentage of gross domestic product.



$$\Phi(L, p)y_t = \sum_{i=1}^k B_i(L, q_i)x_{it} + \delta w_t + u_t \tag{3.1}$$

Where, $\Phi(L, p) = 1 - \Phi_1L - \Phi_2L^2 - \dots - \Phi_pL^p$

$B(L, q) = 1 - \beta_1L - \beta_2L^2 - \dots - \beta_qL^q$, for $i = 1, 2, \text{ and } 3 \dots k$, $u_t \sim iid(0, \delta^2)$ and L is the lag operator. Based on the above equation 3.1 The ARDL model specifications:

$$\Phi(L)y_t = \varphi + \theta(L)x_t + u_t \tag{3.2}$$

With $\Phi(L) = 1 - \Phi_1L - \dots - \Phi_pL^p$,

$$\theta(L) = \beta_0 - \beta_1L - \dots - \beta_qL^q$$

Hence, the general ARDL ($p, q_1, q_2, q_3 \dots q_k$) model;

$$\Phi(L)y_t = \varphi + \theta_1(L)x_{1t} + \theta_2(L)x_{2t} + \theta_k(L)x_{kt} + u_t \tag{3.3}$$

Using the lag operators L applied to each component of vector, $Lk y = y_{t-k}$, is convenient to define the lag polynomial Δ and the vector polynomial $B(L, q)$. As long as the error term U_t assumed to be, white noise process, or more generally, independent with $x_t, x_{t-1} \dots$ and $y_t, y_{t-1} \dots$, the ARDL model consistently estimated using ordinary least squares. To explain the determinants of financial development this study adopted the empirical model specification by Chinn and Ito (2002). However, I utilize more updated data and incorporate new and additional variables. This include freedom house survey index.

Generally, the mathematical form of the study is formed as:

$$M2/GDP = f(\text{debt, RR, RER, R, INF, FI, RGDP and TOP})$$

$$\text{CPSGDP} = f(\text{debt, RR, RER, R, INF, FI, RGDP and TOP})$$

Where M2/GDP = broad money supply as % of gross domestic product, CPSGDP = credit to private sector as % gross domestic product, debt = external debt, RR = reserve requirement, RER = real exchange rate, R = lending interest rate, INF = inflation rate, FI = political freedom index, TOP = trade openness, and GDP = gross domestic product. Based on the above equation of determinants factor of financial development, ARDL model in mathematical form is formed as follows

$$\begin{aligned} \text{CPSGDP}_t = & C_0 + \sum_{i=1}^Q \alpha_i \text{CPSGDP}_{t-i} + \sum_{j=0}^J \beta_j \text{DEBT}_{t-j} + \sum_{l=0}^L \gamma_l \text{RR}_{t-l} + \sum_{m=0}^M \delta_m \text{RER}_{t-m} + \\ & \sum_{s=0}^S \pi_s \text{R}_{t-s} + \sum_{p=0}^P \eta_p \text{INF}_{t-p} + \sum_{n=0}^N \zeta_n \text{FI}_{t-n} + \sum_{r=0}^R \gamma_r \text{TOP}_{t-r} + \sum_{z=0}^Z \rho_z \text{RGDP}_{t-z} + \\ & \varepsilon_t (\text{Model1}) \end{aligned}$$

$$\begin{aligned} \frac{\text{M2}}{\text{GDP}}_t = & C_0 + \sum_{i=1}^Q \alpha_i \frac{\text{M2}}{\text{GDP}}_{t-i} + \sum_{j=0}^J \beta_j \text{DEBT}_{t-j} + \sum_{l=0}^L \gamma_l \text{RR}_{t-l} + \sum_{m=0}^M \delta_m \text{RER}_{t-m} + \sum_{s=0}^S \pi_s \text{R}_{t-s} \\ & + \sum_{p=0}^P \eta_p \text{INF}_{t-p} + \sum_{n=0}^N \zeta_n \text{FI}_{t-n} + \sum_{r=0}^R \gamma_r \text{TOP}_{t-r} + \sum_{z=0}^Z \rho_z \text{RGDP}_{t-z} \\ & + \varepsilon_t (\text{Model2}) \end{aligned}$$

Where cpsgdp and m2/gdp refers to credit to private sector and liquid liabilities to the share of GDP respectively. C_0 is the drift parameter, Q, J, L, M, S, P, N, R, Y and Z denotes the lag lengths. $\alpha, \beta, \gamma, \delta, \eta, \theta, \zeta, \rho$ and π Are the coefficients to be estimated, i, j, l, m, s, p, n, r, y and z denotes the time trend, and ε_t is the error term. Since it is necessary to understand the long run and short run dynamics of the determinants of financial development, specification of the long run and short run ARDL models is specified after checking the co integration of variables. Therefore, the short run model is specified as the error correction model as shown in the following Equation.

$$\begin{aligned} \Delta \text{CPSGDP}_t = & C_0 + \sum_{i=1}^q \beta_1 \Delta \text{CPSGDP}_{t-i} + \sum_{i=1}^q \beta_2 \Delta \text{DEBT}_{t-i} + \sum_{i=1}^q \beta_3 \Delta \text{RR}_{t-i} + \sum_{i=1}^q \beta_4 \Delta \text{RER}_{t-i} \\ & + \sum_{i=1}^q \beta_5 \Delta \text{R}_{t-i} + \sum_{i=1}^q \beta_6 \Delta \text{INF}_{t-i} + \sum_{i=1}^q \beta_7 \Delta \text{FI}_{t-i} + \sum_{i=1}^q \beta_8 \Delta \text{TOP}_{t-i} \\ & + \sum_{i=1}^q \beta_9 \Delta \text{GRGDP}_{t-i} + \theta \text{ECM}_{t-i} + \varepsilon_t (\text{Model3}) \end{aligned}$$

$$\begin{aligned} \Delta \frac{\text{M2}}{\text{GDP}}_t = & C_0 + \sum_{i=1}^q \beta_1 \Delta \text{CPSGDP}_{t-i} + \sum_{i=1}^q \beta_2 \Delta \text{DEBT}_{t-i} + \sum_{i=1}^q \beta_3 \Delta \text{RR}_{t-i} + \sum_{i=1}^q \beta_4 \Delta \text{RER}_{t-i} + \sum_{i=1}^q \beta_5 \Delta \text{R}_{t-i} \\ & + \sum_{i=1}^q \beta_6 \Delta \text{INF}_{t-i} + \sum_{i=1}^q \beta_7 \Delta \text{FI}_{t-i} + \sum_{i=1}^q \beta_8 \Delta \text{TOP}_{t-i} + \sum_{i=1}^q \beta_9 \Delta \text{GRGDP}_{t-i} + \theta \text{ECM}_{t-i} \\ & + \varepsilon_t (\text{Model4}) \end{aligned}$$

To test long run co-integration between variables ARDL bound test is used based on Null hypothesis (H_0): no long run relationship and alternative hypothesis (H_1): there exists long run relationship. The decision is accept if $F < \text{critical value for } I(0)$ independent variables or reject if $F > \text{critical value for } I(1)$.

Table 2. Stationary test of variables

Variables	t-statistics at level	t-statistics at 1 st difference	stationary
M2%GDP	-1.425	-4.666	I(1)***
CPS%GDP	-1.136	-4.777	I(1)***
IR	-5.568	-10.518	I(0)***
FI	-6.165	-9.706	I(0)***
TOP	-6.418	-11.941	I(0)***
INF	-2.965	-8.415	I(0)**
Debt	-1.385	-7.229	I(1)***
RER	-0.958	-4.435	I(1)***
RR	-1.629	-7.63	I(1)***
Real gross domestic product	-4.363	-7.793	I(0)***

4. Empirical findings

4.1. Results of unit root test

In this study, Augmented Dickey–Fuller (ADF) unit-root test developed by Dickey and Fuller (1979) was used. Hamilton (1994) describes the four possible ways (with trend and drift; without trend and drift; with drift but without trend; with trend but without drift) of conducting ADF test. Deciding to choose among these four options involves many theories and the nature of the data. For instance, if the data has non-zero mean ADF test including trend but avoiding drift is the best way. As a result the author in this study used this test statistics and the result for both level and first difference reported in Table 2 confirms that M2/GDP, CPS/GDP, external debt, real exchange rate and reserve requirement are stationary at first difference. While lending interest rate, political freedom index, trade openness, inflation and economic growth are stationary at level.

4.2. Results of bounds test of co-integration

In this study, the presence of co-integration in the long run is tested by bound test. The value of F-statistics is used as identifying the existence of long-run relationship between dependent and independent variables. ARDL-bound test is based on Null hypothesis (H_0): no long-run relationship and alternative hypothesis (H_1): there exists long run relationship. The computed F-statistic can be compared with the critical values provided by Pesaran et al. (2001) or Narayan (2005). However, the critical value computed by Pesaran et al. (2001) is not suitable for small sample, which necessitates the use of Narayan’s (2005) critical values. The decision is accept H_0 if $F <$ critical value for I (0) independent variables or reject if $F >$ critical value for I (1). The results of bound test for long run co-integration of model 1 reported in Table 3 show that F- statistics value of the test is 8.099, which is greater than critical value (4.10) of upper bounds at 1% level of significance. While for model 2 reported in Table 4 below, the F- statistics value are 7.508, which is also greater than critical value (4.10) at 1% level of significance. Hence, in both models null hypothesis of no co- integration is rejected.

Table 3. Bound test for model 1

	Critical value 90%		Critical value 95%		Critical value 97.5%		Critical value 99%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
K								
8	1.95	3.06	2.22	3.39	2.48	3.70	2.79	4.10

F- statistics for model 1 = 8.099

Table 4. Bound test for model 2

K	Critical value 90%		Critical value 95%		Critical value 97.5%		Critical value 99%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
8	1.95	3.06	2.22	3.39	2.48	3.70	2.79	4.10

F- statistics for model 2 = 7.508

4.3. Results of long- and short run relationship

4.3.1. Long- and short run estimation of model 1 (credit to private sector as % of GDP) as dependent variable

ARDL estimation of long and short run regression result is reported in Table 5. In both long- and short-run external debt has statistically significant negative effect on financial development, measured as credit to private sector as a percentage of GDP. When debt and debt-servicing of a country increase, private investment falls as investors are discouraged because of the expectation that future corporate taxes would increase to pay off the outstanding debt. Also, when government resorts to domestic borrowing, interest rate rises and investment falls. Estimation result of ARDL model revealed that national bank's reserve requirement has negative significant effect on financial development at 5 and 10% significance level in long and short run, respectively. Giorgio (1999) found similar results, and it is in line with the proposition by McKinnon-Shaw, which believes that an increase in reserve requirement retards the performance of financial sector. The empirical study conducted by Ang (2008) is similar with this result. When reserve requirement increases the amount of excess reserve (Vault cash) declines, which in turn may reduce the availability of credit to the private sector.

Over the study period, interest rate has an adverse significant effect on financial development of Ethiopia. This is because the prime rate of interest that financial institutions charged widens interest rate spread of banks, which implies low saving interest rate discourages potential savers and in turn the availability of resources in the financial institution, and the amount of credit to the private sector. The use of prime rate by the financial institution as a monetary policy signal reduces the response of lending rates to changes in market rates, which reduces the flexibility of banks performing their financial activities. The coefficient of inflation has positive significant

**Table 5. Long run ARDL estimation result for model 1
 ARDL(1, 0, 1,1,2,1,0,2,2) Dependent variable: CPS%GDP**

Independent variable	coefficient	Standard error	T-ratio	P- value
CPSGDP(-1)	0.738	0.121	6.11	0.000 ***
Gdebt	-0.075	0.018	-4.07	0.001***
RR(-1)	-0.014	0.0053	-2.14	0.048**
RER(-1)	0.102	0.345	0.29	0.772
R(-2)	-0.687	0.237	-2.9	0.010**
INF(-1)	0.145	0.052	2.8	0.013**
Freedom	-1.39	0.658	-2.12	0.050**
GTOP(-2)	0.328	0.044	2.31	0.035**
GDP growth (-2)	0.193	0.066	2.94	0.010**
Constant	-8.38	5.576	-1.50	0.152

effect. It has positive effect in the short run and is statistically significant at 5% significance level for both long run and short run. When the general price level increases to increase profit through an increase in price investors or firms may be highly willing to invest, which increases demand for investment. Thus, other things constant the values of credit to private sector increase. Moreover, according to classical school of macroeconomics inflationary environment may improve financial development by increasing the money supply money and increasing financial resources for investment projects.

The regression indicates the Freedom Index to be significant at 5% significance level in both long run and short run regression coefficients. The negative sign of the coefficient comes from the Freedom Index specification. Since 1 is highest evaluation of freedom and democracy and 7 for the lowest scale, negative sign is in line with our suggestion that more freedom and democracy enhances financial development. The result is in line with predicted sign. However, the study is contrary to the research work conducted by Yang (2011) who pointed out that the level of democracy affects financial development depth if and only if cross sectional data is employed. The other variable examined is trade openness and the result shows there is a positive relationship between financial development and trade openness in both short and long run estimation result at 5% level of precision. This means that increases in trade openness has the potential of stimulating financial development in Ethiopia at the aggregate level over the study period. This positive relationship is supported by the study of Rajan and Zingales (2003) which claim that greater openness is linked with adjustment is the structure of the sector which will in turn boost demand for external finance. Finally, in both short and long run trade openness and economic growth have positive significant effect on financial development. As income increases the demand for goods increases and to fulfill the increased demand higher investment and production is required; higher investment can be financed by borrowing, which in turn increases credit to private sector (financial development).

After estimating long run co-integrating model, estimating the short run dynamic relationship between variables with in ARDL model is the next step. To do so, a linear combination denoted by error-correction term, $ECMt-1$ is retained in the ARDL model. On below Table 6 estimation of the model selected based on AIC selection criteria is reported. From the above table the coefficient of the error correction model (ECM) of the selected ARDL (1, 0, 1, 1, 2, 1, 0, 2 and 2) is negative and highly significant at 5% level. The ECM stands for the rate of adjustment to restore equilibrium in the dynamic model following a disturbance. The coefficient of the ECM is around -0.263 and this signifies that a deviation from the long-run equilibrium subsequent to a short-run shock is corrected by about 26.3% at the end of each year.

4.3.2. Long- and short-run estimation of Model 2 (Money supply as percentage of GDP) as dependent variable

Long-run ARDL estimation result for model 2 (money supply as a percentage of GDP) is reported in Table 7. In both long- and short-run external debt has insignificant effect. In both long- and short-run reserve requirement has statistically negative significant effect on financial development. This is because when central bank (national bank of Ethiopia) increases reserve requirement, the amount of money (deposit) at commercial banks (micro finances) decreases, which in turn results decrease in the amount of loans to investors. In addition to reserve requirement in the long run, real exchange rate has negative significant effect on financial development, but in the short run it has insignificant effect. Moreover, in the long run, inflation has positive significant impact. This confirms quantity theory of money, which states money supply and inflation have positive relationship. While in the short run it has insignificant effect. Political freedom index freedom has also positive significant effect on financial development of Ethiopia in both long and short run. It is concerned about whether the institutional development of one's country depends on democracy and rules of law i.e. the involvement of the population in the decision making process). In estimating the level of freedom, freedom house survey control for cultural difference and provides generalized estimation built on worldwide standards of political and civil rights such as universal declaration of human rights. The coefficient of

Table 6. Short run (ECM_1) ARDL estimation result for model 1
ARDL(1,0, 1,1,2,1,0,2,2) Dependent variable: Δ CPS%GDP

Independent variable	coefficient	Standard error	T-ratio	P- value
Δ debt	-0.075	0.018	-4.07	0.001***
Δ RR(-1)	-0.387	0.089	-4.35	0.007***
Δ RER(-1)	0.091	0.331	0.28	0.786
Δ R(-1)	-0.879	0.248	-3.54	0.003***
Δ INF(-1)	.096	0.0501	1.93	0.072*
Δ Freedom	-1.395	0.658	-2.12	0.050**
Δ TOP(-2)	0.087	0.043	2.00	0.060*
Δ GDP Growth (-1)	0.193	0.066	2.94	0.010***
Constant	-8.38	5.576	-1.50	0.152
ECM(-1)	-0.263	0.121	-2.17	0.045**

freedom index on Table 7 is negative, which means as the values of freedom index increases political and civic liberties are violated i.e. the country is not free, which in turn deters financial development. Coefficient of trade openness is statistically significant at 5% significance level in both long and short run. This means that increases in trade openness has the potential of stimulating financial development in Ethiopia at the aggregate level over the study period. Finally, economic growth has positive significant effect on financial development for long and short run period confirming the quality for standard of living are deemed imperative in determining financial development. The result is similar to the findings of Jaffee and Levonian (2001).

Like long run effect in the short run also reserve requirement and real exchange rate have negative significant effect on financial development performance of Ethiopia. On the other hand, inflation, political freedom index, and trade openness have positive significant effect. From Table 8 below the coefficient of the error correction model (ECM) of the selected ARDL (1, 1, 0, 1, 1, 4, 1, 0, and 2) is negative and highly significant at 5% level. The ECM stands for the rate of adjustment to restore equilibrium in the dynamic model following a disturbance. The coefficient of the ECM is around -0.254 and this signifies that a deviation from the long-run equilibrium subsequent to a short-run shock is corrected by about 25.4% at the end of each year.

5. Conclusion and recommendation

To make the growth of the economy sustainable and maximize social welfare improving the performance of financial sector is essential. However, in Ethiopia financial development is very low and unevenly distributed. So identifying determinant factors of financial development has paramount importance. Therefore, the main objective of this study was to examine determinant factors of Ethiopia’s financial sector development. To achieve this objective annual time series data from the period 1980 to 2019 was used. Auto-regressive distributed lag estimation technique is applied in this study. Error correction estimation results of credit to private sector as % GDP model shows the adjustment coefficient is negative (-0.263) and statistically significant at 5% level of significance, which means short run deviation from long run equilibrium is adjusted at a rate of 26.3%. The adjustment coefficient for liquid liability as % GDP is -0.254.

Both in the long and short run the two financial development indicators (credit to private sector as % GDP and broad money supply M2 as % GDP) are positively affected by political freedom index, trade openness, and economic growth. While the long and short run estimation result of ARDL model revealed that reserve requirement and lending interest rate have negative significant effect

**Table 7. Long run estimation result of ARDL for model 2
 ARDL(1, 1, 0,1,1,4,1,0,2) Dependent variable: m2gdp**

Independent variable	coefficient	Standard error	T-ratio	P- value
m2gdp(-1)	0.746	0.073	10.23	0.000***
debt(-1)	-0.023	0.015	-1.49	0.149
RR	-0.174	0.0772	-2.25	0.033**
RER(-1)	-0.68	0.293	-2.32	0.028**
R(-1)	-0.692	0.239	-2.90	0.008***
INF(-4)	0.132	0.039	3.35	0.002***
Freedom(-1)	-1.47	0.677	-2.17	0.039**
TOP	1.158	0.354	3.27	0.003***
GDP growth (-2)	0.153	0.064	2.38	0.025**
Constant	9.069	6.603	1.37	0.181

on both financial development indicators. On the other hand, in the long run real exchange rate has negative effect on financial development measured by money supply as a percentage of GDP, but it has insignificant effect in the short run. Contrary to these both in the long run, real exchange rate has insignificant effect on credit to private sector. In addition to this, in both long and short run external debt has negative significant effect on credit to private sector, but in both long and short run it has insignificant effect on broad money supply M2 as % GDP. Inflation rate has positive significant effect on credit to private sector as % GDP, but it has positive significant effect in the long run and insignificant effect in short run on broad money supply M2 as % GDP. Based on the results revealed the author of this article recommends the following policy directions:

- The government and national bank of Ethiopia can adjust both saving and lending interest rate policies. Increasing interest rate on saving will increase deposit in the financial institution, which will make financial institutions to have enough deposit to lend in the form of loan. To equilibrate demand and supply of loanable fund the concerning authority would reduce lending interest rate.

**Table 8. Short run (ECM_1) estimation result of ARDL for model 2
 ARDL(1, 1, 0,1,1,4,1,0,2) Dependent variable: Δm2gdp**

Independent variable	coefficient	Standard error	T-ratio	P- value
Δdebt(-1)	0.023	0.0153	1.49	0.149
ΔRR	-0.174	0.0772	-2.25	0.033**
ΔRER(-1)	-0.468	0.329	-1.42	0.167
ΔIR(-1)	-0.692	0.239	-2.90	0.008***
ΔINF(-3)	0.027	0.0396	0.68	0.505
ΔFI(-1)	1.47	0.677	2.17	0.039**
ΔTOP	1.158	0.354	3.27	0.003***
ΔGDP Growth (-1)	0.153	0.0644	-2.38	0.025**
Constant	9.069	6.603	1.37	0.181
ECM(-1)	-0.254	0.335	-1.80	0.083*

- To allow high and sustainable development of the financial sector performance in Ethiopia efforts should be made to allow more trade openness through reducing trade barriers and simplify procedures and controls. But for least developing countries like Ethiopia highly dependent on foreign trade may have detrimental for the growth of the economy, because according to the law of the Prebisch–Singer terms of trade declines. Thus, trade openness measured as the sum of export and import divided by GDP can be boosted by providing sufficient loan to export industries that diversifies and facilitates the shift towards the export of semi-finished and manufactured goods and in turn financial development.
- There is internal conflicts and violation of democratic and human rights are violated. The government should respect political rights and civil liberties; an increase in reserve requirement reduces deposits of financial institutions available for loan, which in turn negatively affects financial development. Hence, reducing reserve requirement will boost financial development in the country. National bank of Ethiopia may.
- Finally, real exchange rate has negative effect on financial development. Thus one way of reducing real exchange rate to increase financial development is not to devalue domestic currency. The government and other concerning bodies in the country should implement policies which brings economic growth. These are improving the quality of both physical and human capital, reducing the bureaucracy for getting license for investment, stabilizing price.

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