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Determinants of Commercial Bank Loan and Advance Disbursement: The Case of Private Ethiopian Commercial Banks

Abstract

This paper aimed to investigate the determinants of loans and advances from commercial banks in the case of Ethiopian private commercial banks. The study randomly selected seven commercial banks to represent the population stratified on their asset, deposit, and paid-up capital amounts. The study utilized an unbalanced panel data model as each bank started operation at a different period of time and considered the period 1995-2016 for secondary details. The findings showed that the deposit size, credit risk, portfolio investment, average lending rate, real GDP, and inflation rate had significant and optimistic effects on the lending and advancement of private commercial banks. On the contrary, liquidity ratio had significant and negative effects on private commercial bank loans and advances. Finally, the study forwarded a feasible recommendation for concerned organs to focus on deposit size, credit risk, portfolio investment, average lending rate, real GDP, inflation rate, and liquidity ratio. The results of this study will help banking industry policymakers and planners understand how to minimize inflation and unemployment by improving development and sustainable economic growth. The findings of this study can also affect the general attitudes of a society by increasing knowledge and improve the quality of life for the general public.

Keywords: Internal factors and external factors; Fixed effect model; Unbalanced panel data; Inflation rate; Liquidity ratio.

1. Introduction

The reasons why customers prefer banks (including price, reputation, and service) seem to be universal in transitional economies. The balance sheets of economic entities are closely interrelated through a lender–borrower relationship (Tsujimura and Tsujimura, 2011). The latest financial crisis (revolution of the economy of Ethiopia in 1974) demonstrated the importance of a clearer understanding of the relationship between financial and macroeconomic environments (Megersa and Cassimon, 2015). Thus, financial

intermediation, which mobilizes financial capital from the surplus sector and lends to deficit outlets to promote market transactions and economic growth depending on the country's monetary and fiscal policy, is the primary objective of each financial system (Jonathan *et al*., 2013). Commercial banks have a great role in saving, fund mobilization, and financial resource allocation among households, firms, and governments. Banks accept customers' deposits and lend to other customers or invest in other fields that yield higher returns (McCarthy *et al*., 2010; McCauley *et al*., 2012; Sokic, 2015; Nurboja, 2017). Furthermore, Nwankwo (2000) documented that loans and advances generate income through interest rates charged to borrowers. Funds that receive net money inflows do not earn risk-adjusted returns, according to Bu and Lacey (2013), whereas funds that receive net outflows earn negative and statistically significant abnormal returns. Their results also showed that neither net inflow funds nor net outflow funds can forecast market returns, though there is some proof that net inflow funds can forecast market volatility. Studies on bank lending frequently look at either the demand side or the supply side, because analyzing the demand side necessitates looking at the factors that influence individual and corporate demand for bank loans (Boadi, 2016; Ekpu, 2016; Kapounek et al., 2017; Smoluk, 2020). Studying the demand side relies on analyzing the variables impacting the demand for bank loans from individuals and enterprises. However, the supply side focuses on variables that influence the lending potential of commercial banks, such as the size of their reserves, the liquidity and size of their deposits, the size of their borrowers' risks, interest rates, and other factors relevant to the overall economic climate, such as growth in the economy, inflation, and currency exchange (Deleidi, 2017; Kapounek et al., 2017; Schmidt and Zwick, 2018). Olokoyo (2011) stated that supply of loans and advances can be affected by factors like deposit size, investment portfolio, liquidity ratio, and macro level factors, such as gross domestic product, required reserve ratio, lending interest rate, and annual foreign exchange rate. There are certain aspects of monetary and fiscal policies of a country that determine lending behavior of a given commercial bank. Monetary policy is mainly concerned with both the regulation of interest rates and the aggregate supply of money and is usually carried out by financial institutions (Chiang, 2020). Fiscal policy is a general term for policymakers' taxation and

expenditure behavior that is determined by the executive and legislative branches of the government (Segal, 2020).

In Ethiopian commercial banks, loan portfolios include long/short-term loans, overdraft, merchandise loans, import and export loans, staff loans, agricultural loans, etc. (Eaton, 2017). In Ethiopia, private banks collectively accounted for 39.9% of the overall assets, with Commercial Bank of Ethiopia (CBE) controlling the remaining 51.1% and Development Bank of Ethiopia (DBE) holding 9% of the assets. In 2017/18, the share of private banks in the overall branch network was 68.8% (NBE, 2018). The total number of bank branches operating nationally is 4757. Addis Ababa was home to 35.3% of the total number of bank branches. The bank branch to population ratio in 2017/18 was 1: 20286 people (NBE, 2018). The amount of loans and advances banks grant to customers is a function of internal and external factors. Though many studies are currently focusing on commercial banks sector (e.g., Girma, 2017; Teshome et al., 208), only very limited studies such as those by Gezahegn (2017), Kaba (2019), and Malede (2014) investigated factors affecting loan and advances supply of Ethiopian private commercial banks.

Commercial banks are most sensitive to loans as their earning asset because the primary objective of the bank management is to make income from the loan and loan is the dominant asset of the bank (MacDonald and Koch, 2006; Widiarto and Emrouznejad, 2015). Banks play an important role in the economy as financial intermediaries including mobilizing savings, lowering the cost of financial transactions, and managing risks (Salehi, 2008). The financial crisis highlights the need for banks to carefully measure and manage their collateral risks and ensure that loan portfolio credit risk is low (Basel Committee on Banking Supervision, 2014). Banks should diversify their loan portfolios across various economic sectors to reduce idiosyncratic risks (Beck & De Jonghe, 2013). Both options have implications for bank credit risk and viability. As briefly explained by Boeve et al. (2010), a bank can specialize its lending in a few sectors to strengthen its screening and monitoring capability and reducing credit risks, but this increases the bank's vulnerability to drawbacks within these industries. Credit portfolio diversification across various economic sectors will also undermine the incentives for banks to track and monitor their effectiveness. Loan and advances shared by Ethiopian private commercial banks showed up and down

3

trends, demonstrating the variations of 15.86%, 59.4%, 51.8%, 35.10%, 44.50%, and 43.60% in 2000, 2007, 2010, 2014, 2015 and 2016 respectively as per NBE annual reports (NBE, 2020).

In Ethiopia, most of the studies about commercial banks' lending decisions focus only on private banks. Therefore, by neglecting the impact of the dominant state-owned bank, the most important variables will be ignored. To fill this gap, the current study attempts to assess the impacts of undiscovered factors on lending process (activity) of private Ethiopian commercial banks using panel data. Accordingly, the main contributions of the study are as follows:

- First and foremost, the study results would be of great value to scholars, as well as commercial banks, considering the factors impacting the lending practices of commercial banks.

- The results of this study can help future researchers who will use the results to carry out more researches on the lending activity of commercial banks in the region.

- The findings of the current study will expose the relevant factors affecting the lending activities of the commercial banks.

-The results of this study will affect the activities of commercial banks and will help relevant regulators and policymakers in formulating effective policies and efficient management of loans and credits.

2. Theoretical framework

2.1. Literature Review

Although loan and advances are dominant assets of commercial banks, only few studies were undertaken regarding determinants of loan disbursement by commercial banks in Ethiopia. For example, Mitiku (2014) studied common determinants of lending behavior like bank size, credit risk, deposit ratio, liquidity, interest rate, investment portfolio, real gross domestic product rate and reserve requirement rate in case of Ethiopian commercial banks. The study included eight commercial banks of Ethiopia representing all banks that have data from 2005 to 2011 years. According to Assfaw (2019), bank-specific factors such as bank size, loan growth, and deposit are major factors of banks' liquidity. Furthermore, macroeconomic

4

determinants such as interest rate margin, purchase of national bank bills, GDP, and annual inflation have a significant impact on the liquidity of Ethiopian private commercial banks. According to Assfaw (2018), capital adequacy, management efficiency, and bank size all have a statistically significant positive impact on the financial performance of Ethiopian private commercial banks. Liquidity management, on the other hand, has a negative impact on banks' financial performance. The significant factors affecting nonperforming loans in the banking sector of lower middle-income countries, according to Olarewaju (2020), were lagged nonperforming loans, lending rate, capital adequacy, credit growth, cost income ratio, and real interest rate. In addition, Amano (2014) studied the determinants of Ethiopian commercial bank lending behavior such as bank size, deposit ratio, liquidity ratio, interest rate, and reserve requirement, real gross domestic product rate and inflation rate. The study sampled all Ethiopian commercial banks and used eight commercial banks from 2001 to 2013. Since income generated through granting a loan is a backbone for all commercial banks especially where the secondary market is not available like Ethiopia, factors that affect the bank loan and advance supply are issues that have to be addressed.

A number of researches (e.g., Dong et al., 2016; Zhang et al., 2019; Kamya et al., 2020) attempted to determine important credit factors and the progress of commercial banks around the world. Richard (2014) explored the impact of the macroeconomic factor on lending activity. His findings showed that monetary policy affects bank assets, which emerged due to their lending (loans) as well as the liabilities of banks (deposits). As a product of monetary policy activities, the supply of bank loans changes along with a change in the supply of deposits. For example, an expansionary fiscal policy, which raises bank reserves and bank deposits, increases the volume of available bank loans. Their lending response is the crucial response of banks to monetary policy. Marinc (2014) stated that, during the crisis period, the high quality of the banking financing strategy and the prevalent government support were crucial for continuous bank lending. He concluded that bank capital and the provision of high-quality services are in fact the competitive strength of a bank in times of crisis. The results of a study by Glemza (2013) firstly show a declining interest in awarding loans and a rising attraction to government bond investments. Secondly, his finding showed that the portfolios of government bonds are largely affected; thirdly, the crisis had a negative effect on sources

of liquid assets by risk-taking and lending. The consequence of the crisis is clearly evident in the lending conduct of banks, and the amount of loans issued was reduced for both the retail and corporate clients during the time of recession. In smaller banks with less exposure to deposit funding and lower liquidity status, the impact is greater.

The results by Teshome et al. (2018) showed that the financial results have a favorable and statistically important impact on the capital adequacy ratio, loan interest income, and the size of the bank. Non-performing loans, allowance of credit losses, debt ratio, and cost productivity of operations had a negative and statistically important impact on the financial performance of banks. Teshome et al. (2018) suggested that to increase their profitability, Ethiopian commercial banks were advised to control their loan defaults, be cost-effective, and set their leverage ratio to the highest level. The findings of a study by Ashfaq (2018) showed that the adequacy of funding, management efficacy, and scale of the banks had a favorable and statistically important impact on the financial performance of Ethiopia's private commercial banks. Liquidity management, however, had a dramatically negative effect on the banks' financial results. The study also showed that the efficiency of the reserves was not a statistically important determinant of the sound financial output of Ethiopia's private commercial banks. Therefore, focus should be paid to ensure that commercial banks have sufficient resources, optimal liquidity, effective cost control mechanism, and adequate asset size for improved efficiency and profitability in their own market areas. Lastly, Berhanu (2016) investigated the determinants of the lending decision of private Ethiopian commercial banks and the influence of such impacts on the banks' financial results. The study used a random impact panel regression approach and data was taken in Ethiopia from seven private commercial banks as a sample spanning the period from 2001 to 2015. Eight variables that could influence the decision of the banks on lending have been selected and analyzed. The findings of the regression analysis of the panel data showed that the liquidity ratio, the leverage ratio, the inflation rate, and the gross domestic product had a positive and statistically important impact on the lending of banks. Non-performing loans, cash balance requirements, and interest rates on credit had a negative and statistically important effect on lending by banks. Deposit amounts had a favorable yet marginal effect on lending by banks.

2.2. Conceptual Framework

Based on the theoretical propositions discussed above and the interactions between commercial banks' lending and loan and advances, the theoretical framework of the research has been developed as shown in Fig. 1. The suggested hypotheses by this study and its advances are based on the results of various researches and experimental studies conducted in the past by other researchers (e.g., Richard, 2014; Marinc, 2014; Teshome et al., 2018; Berhanu, 2016; Panda and Reddy, 2016). The hypotheses of this study are focused on the theories of loans and advances, established over the years by numerous researchers and past empirical studies related to commercial banks' lending behavior. The results from the literature review and the preferences for the relationship of various determinants were used to create expectations. Therefore, the present study aims to evaluate the following eight theories, centered on the objectives (Fig.1):

H_1: Deposit size has a positive and important effect on the credit or lending and advances of Ethiopian commercial banks.

H_2: The liquidity ratio has a meaningful and positive effect on the loans or loans and advances of Ethiopian commercial banks.

H_3: The need for cash reserves has a positive and important effect on the lending or credit and advances of Ethiopian commercial banks.

H_4: Credit risk has a positive and major effect on the deposits or loans and advances of Ethiopian commercial banks.

H_5: Portfolio investment has a meaningful or substantial effect on the loans or loans and advances of Ethiopian commercial banks.

H_6: The average lending rate has a meaningful and important effect on the loans or loans and advances of Ethiopian commercial banks.

H_7: The country's GDP growth has a positive and important effect on the credit or lending and success of Ethiopian commercial banks.

H_8: The annual inflation rate has a meaningful and substantial effect on the loans or loans and advances of Ethiopian commercial banks.

[Insert Fig.1]

3. Methodology

3.1 Data Source and Collection Method

This study used secondary data sources to attain the objective of the study and to investigate how much historical data has been determining loan and advance disbursement of private commercial banks. To study the relationship between the loan and advance size and its factors, the data was collected from each of the sampled banks' audited financial statements and the National Bank of Ethiopia (from 1995 to 2016). The secondary data collected from each bank were analyzed by descriptive statistics describing the facts of the loan and advances with its variables identified. Besides descriptive statistical instruments such as mean, standard deviation, minimum, and limit, the study used Multiple Linear Regression Model to show the relationship between loan and advances and its factors. Furthermore, the study utilized inferential statistics to estimate the impact of these variables on commercial bank credit measured by loan and advances. The study applied descriptive statistics, correlation, and inferential statistics with help of STATA13 Software.

3.2 Sample Design and Sample Size

Currently, there are sixteen private commercial banks in Ethiopia (NBE, 2018; Tekatel and Nurebo, 2019). These Banks are AIB (Awash International Bank) (1994), DB (Dashen Bank) (1996), BOA (Bank of Abyssinia) (1996), WB (Wegagen Bank) (1997), UB (United Bank) (1998), NIB (Nib International Bank) (1999), CBO (Cooperative Bank of Oromia) (2005), LIB (Lion International Bank) (2006), OIB (Oromia International Bank) (2008), ZB (Zemen Bank) (2008), BrIB (Birhan International Bank) (2009), BIB (Buna International Bank) (2009), AB (Abay Bank) (2010), AdIB (Addis International Bank) (2011), DGB (Debub Global Bank) (2012) and EB (Enat Bank) (2013). Kimutai (2013) used commercial banks' asset size to stratify banks according to their homogeneity to study factors rationing commercial banks of Kenya. Therefore, the researcher randomly selected banks that registered more than populations' average asset size as sample size. Following the study of Kimutai (2013), the current study has used private commercial banks based on their loan and advances, asset size, and their paid-up capital to select sample size. Accordingly, of sixteen private commercial banks, seven banks that registered equal to or greater than

industry average (6.25%) at least in one measurement criteria (asset size, loan, and paid-up capital) are randomly included in the sample size. As indicated by Econometrics Books like Gujarati (2004), regressing similar firms together on the same level helps to detect outliers. Therefore, these banks (AIB, DB, BOA, WB, UB, NIB, and CBO) have similar loan and advances sizes, asset size, and paid-up capital. In addition, though these selected banks represent 43.75% of the total number of private commercial banks, these banks shared 71.13%, 71.17%, and 64.10% of the total private commercial banks in loan, asset, and paid-up capital, respectively (NBE, 2016). Research methodology by Mugenda and Mugenda (2003) recommends that a sample percentage of 30% of the entire population is an appropriate population representative. Therefore, 43.75% of the sample size is taken as a sufficient representative of private commercial banks that are active in Ethiopia.

3.3 Empirical Model Formulation

A review of classical econometrics indicates that when there is a linear relationship between controlling variable and controlled variable, linear regression model helps to estimate their relationships.

According to Brook (2008), multiple regression is a regression equation used when more than one independent variable linearly affects the dependent variable, and hence, the study uses this model.

$$Y_{it} = \alpha + \beta X1 + \beta x2t + \text{-------} + \beta kXk + E \qquad \text{Equation (1)}$$

Multiple linear regressions model is formulated following previous studies of Djiogap and Ngmosi (2012) and Mitiku (2014) as follows. Loan disbursement is the function of bank specific factors and macro-economic factors.

$$LOA_{jt} = f(BS_{jt} + MS_t) \qquad \text{Equation (2)}$$

where LOA= Loan and advance payments for bank j at time t, BSjt represents bank-specific factors for bank j at time t, and MSt represents a macroeconomic trend impacting the availability of credit at time t.

$$LOA_{jt} = f(DS_j + LR_{jt} + CR_{jt} + PI_{jt} + CRR_{jt} + ALR_{jt} + GDP_t + INF_t) + u_{jt} \qquad \text{Equation (3)}$$

where DS= Deposit Size, LR= Liquidity Ratio, CR= Credit Risk, PI= Portfolio Investment, CRR= Cash Reserve Requirement, ALR= Average Loan Rate, GDP= actual GDP Growth Rate, and INF= Inflation

Rate and period of disruption. Therefore, the log of level data was taken to overcome data structure differences.

$$LogLOAjt=\beta0+LogDSjt+LRjt+CRjt+PIjt+LogCRRjt+LRjt+RealGDPt+INFt+ujt \qquad \text{Equation (4)}$$

where β represents coefficients of parameters and μ represents the error term.

It is worth mentioning that Eq. (2) provides the general form of the model (and proposition) and Eq. (3) is the model that was used for the empirical estimation (to test the validity of the hypotheses).

4. Result

4.1 Descriptive Statistics Interpretation

Descriptive statistics of each variable was indicated in Table 1. The dependent variable was loan and advances (LOA) whereas deposit size (DS), liquidity ratio (LR), credit risk (CR), portfolio investment (PI), lending rate (ALR) and macroeconomic factors like real GDP growth rate (Real GDP) and annual inflation rate (INF) were independent variables. On average, each bank maintained a log (in monetary terms: amount in local currency) of 9.14 loan and advances with a minimum of 7.52 and maximum of 10.18 for the period 1995 to 2016 fiscal years. On average, each banks' loan and advances have been deviating by 0.58 from the mean. The deviation was from the fact that banks were not in operation at the same time as AIB started operation in 1995 while CBO started operation in the 2005 fiscal year.

As depicted in the descriptive statistics table, on average, each bank had maintained 70.95% of deposit size, and banks with small deposits held 37.33%, whereas banks with large deposits held 86.59% for the given periods. During the period, each bank's deposit size was deviated only by 9.41% from the mean which was not significant as data was unbalanced.

The liquidity ratio's mean value was 35% and the liquidity ratio's maximum and minimum values were 0.001% and 1.25%, respectively. Given that the National Bank of Ethiopia sets the regulation that banks should not hold a liquidity ratio of less than 15% at any time, the results showed that banks held 35% of liquidity ratio which was two times greater than the minimum regulatory requirements. There had been two edges between banks that had less liquidity and banks that had the highest liquidity as the minimum and maximum were respectively registered as 0.01% and 125.67% from 1995 to 2016.

Based on the results, the average credit risk ratio encountered by banks was 3.2%, and the minimum and maximum ratios varied from 0.2% to 10% with 0.019% dispersion. In other words, during the mentioned period, banks had been holding 3.2% of loan provision rate with a minimum of 0.2% and a maximum of 10% on average. In banking sectors, when the non-performing loan signals an increment rate, the bank adjusts it to hold more provisions following a nonperforming loan. The National Bank of Ethiopia imposes regulations on each bank, limiting their non-performing loan ratio to no more than 5% at any time. During the period, the deviation of each bank provision from the mean was 0.19% which was minimal (Table 1).

[Insert Table 1]. The level of cash reserve maintained by each commercial bank has a relationship with the amount that each bank lends. Cash reserve requirement (CRR) is measured as cash reserve maintained at NBE to the total asset of the bank. Accordingly, on average, private commercial bank of Ethiopia had maintained 3.6% with the minimum and maximum of 1.87% and 10.72%, respectively.

This means that the bank that has mobilized few deposits maintained 1.87% of the asset as cash reserve whereas the bank that has mobilized more funds maintained 10.72% of its asset as cash reserve.

As the results of Table 1 show, on average, portfolio investment of the banks had been 6.9% with a minimum and maximum of 0% and 29.11% during the period of 1995 to 2016. The deviation of each bank from portfolio investment mean was 7.95% during these periods. The minimum portfolio investment was zero because banks did not invest in equity and government bond in the year and started the banking operation. The 29.11% maximum portfolio investment indicated that banks like AIB have a large share in Premier Switch Solution Share Company, Awash Insurance Share Company, and others. Based on the results, private commercial banks of Ethiopia were lending at a 10.08% rate with a minimum of 4.28% and a maximum of 16.21% with a 2.48% deviation. The minimum lending rate was 4.28% at the beginning of the 2000 fiscal year when the saving rate was less than 5% and when the private commercial banks were so infant. Currently, some banks lend loans at more than a 16% rate based on risk return reward. In the current Ethiopian case, the lending rate is fully liberalized, and hence, there is no lower/upper lending limit

rate in the country; thus, banks determine the lending rates by considering the loan type and their target customer.

On average, real GDP growth rate of the country has been 8.6% with a minimum of -5.4% and a maximum of 13.3% for the period of 1995 to 2016. The minimum -5.4% and maximum 13.3% were registered during the 1998 and 2000 fiscal years, respectively. Another macroeconomic factor is annual inflation rate and on average, it was 11.22% for the past twenty-two years. The country has registered minimum -10.6% and maximum 36.45% inflation rates during 2002 and 2009 fiscal years. Comparing the macroeconomic factors deviations, real GDP growth rate deviation was 4.4%, which showed the stability of Ethiopian economy during the specified periods. However, during these periods (1995-2016), the inflation rate has been deviating by 11.4%.

4.2. Classical Linear Regression Model (CLRM) Assumption Tests

For valid hypothesis testing and making data available for reliable results, the regression model assumption test is required. Accordingly, the study went through the most critical regression diagnostic tests consisting of errors, heteroscedasticity, normality, autocorrelation, and multi-collinearity, all had the same zero mean test.

4.2.1 Normality Test

The test for normality means testing for whether the data are well modeled by normal distribution or not (Table 2). The tests of normal distribution may consider either graphical Histogram (non-graphical) or Skewness (kurtosis tests) for normality. Therefore, Skewness is an indicator of asymmetry, which indicates the way the objects are grouped around the average. In the right line, if the curve is skewed, we have positive skewness, but we have negative scenes where the curve is distorted towards the left. To calculate the peak of the frequency distribution curve, kurtosis is also used. The judgment rule behind the normality skewness/kurtosis tests says that if the p-value of the error term is greater at the significance level chosen, i.e., 1 percent, 5 percent, and 10 percent, it showed that the error terms are typically distributed (Gujarati, 2004). It was checked by the p-value of residual statistics (p=0.005) which confirmed that it is less than 5% significant level of tests and hence, disturbance term was not normally distributed and also indicted by the

histogram. Then, two consecutive years of CBO data (2005 and 2006) were excluded, and the number of observations was decreased from 128 to 126, which is not serious. After that, the data were checked for normality using statistical tests, which showed that normality was distributed.

[Insert Table 2]

As the results of Table 2 show, the value of Pr (Skewness) is 0.4432, the value of Pr (Kurtosis) is 0.0309, and Prob > chi2 is 0.0747. Therefore, the null hypothesis claimed that the residuals were generally allocated, and as long as the statistical experiments were carried out, the investigator refused to refute the null hypotheses which were insignificant at 5% significance level (Fig 2). Thus, the residual was normally distributed.

[Insert Fig. 2]

4.2.2 Multi-collinearity Tests

This statement involves the interaction that occurs between the explanatory variables. If an independent variable is the same linear combination of the other independent variables, we conclude that the formula has perfect collinearity (Broos, 2008). According to Churchill and Iacobucci (2005), the sum of knowledge on the influence of explanatory variables on dependent variables reduces when there is multi-collinearity. The magnitude of the multi-collinearity-causing association is not well established. Hair et al. (2006) argued that the coefficient of association below 0.9 does not cause significant issues with multi-collinearity. Multi-collinearity is the indication of a linear relationship between independent variables. Anderson et al. (1999) used 0.70 correlations as the standard point for the indication of Multi-collinearity, and then, there is no multi-collinearity as the mean of VIF being registered for less than 10 and further is indicated in Table 3 as correlation matrixes.

The correlation matrix for eight independent variables, shown in Table 3, was calculated in this analysis. The findings indicate that the lowest correlation (i.e., 0.41) and the highest correlation (i.e., 0.85) are between PI and Actual GDP in the following correlation matrix. Therefore, we can note that there is no multi-collinearity problem in this research, according to Hair et al. (2006).

[Insert Table 3]

4.2.3. The Heteroskedasticity Breusch-Pagan/Cook-Weisberg Test

For general heteroscedasticity tests, the Breusch-Pagan test was used. It tested to check if the variance of the error term is homogeneous (there is no heteroscedasticity problem) (Table 4). Therefore, the result is insignificant (P=0.17) which indicates the absence of heteroskedasticity, and it is concluded that the variance is constant (homoscedasticity).

[Insert Table 4]

4.2.4 Breusch-Godfrey LM Test for Autocorrelation

An issue with autocorrelation arises when the error terms occurred in each cycle are influenced by each other and correlated to each other over time. The autocorrelation term can be defined as the correlation between members of time-ordered observation series [as in time-series data] or space-ordered observation series [as in cross-sectional data]. It was tested to check whether the errors of last years' variables were correlated with current errors of variables. Accordingly, the study used Breusch Godfrey LM tests for autocorrelation Chi2 (2.217) with a probability greater than significance level (P=0.13) which proved the evidence for no serial autocorrelation. In addition, if data is normally distributed, the probability of data exposure to autocorrelation is low, and accordingly, the tests fail to reject null hypothesis which dictates no serial autocorrelation.

4.2.5 Tests for Model Specification

Testing the model is very important to check out whether the model omits one or more important variables, or one or more irrelevant variables are used in the model. There are various approaches to detecting model specification defects. The Ramsey RESET test is widely used for omitted variables (Mitiku, 2014). Ramsey RESET Test (ovtest) for omitted variables was tested as depicted in Table 5. It tested the null hypothesis which dictates that the model has no variables that are omitted. A model definition is suitable for regression analysis as a judgment rule according to Ramsey RESET test if the p-value specified is greater than the significance of the selected stage, i.e., 1 percent, 5 percent, and 10 percent. In classical linear regression model, the tests are only significant when important variables are exhaustively

included and R-square is very high confirming no omitted variables or the model does not contain irrelevant variables. Therefore, the test failed to reject null hypothesis which indicates that there are no omitted variables because R-square cannot be 100% and there is/are omitted variable(s).

[Insert Table 5]

4.4 Unbalanced Panel Data Regression Result

The model applied unbalanced panel data that was collected from seven banks from 1995 to 2016. When the true model is pooled ordinary least square, which dictates that the variables hold constant coefficients, and the intercepts and regressors are not correlated with errors, ordinary least square estimators are efficient. If the true model has a fixed effect, in which variables dictated to hold constant coefficients across individuals and time periods, assuming error terms are correlated with regressors. In fixed effect model, error term is treated as part of intercept and fixed effect (within estimators), or the first difference might be the efficient estimator. Furthermore, the random effect model specifies constant coefficients across individuals and time periods, implying that error terms are not correlated with regressors. Random Effect Model considers the effects that are not included in the model as part of error terms and if the true model is random effect, the Generalized Least Square (GLS) is the efficient estimator.

Theoretically, fixed effect is preferable when T>N (Brook,2008), unless random effect is better. In this study as data is unbalanced panel data, minimum time is equal to 10 (T=10), whereas maximum time is 22 and the number of firms is 7 (N=7), which supports the fixed effect model. Moreover, set effects are superior to random effects when all independent variables are assumed to be correlated to error terms and this is in fact when some variables are not included in the model. Furthermore, Hausman test was conducted statistically for fixed and random effect to select the efficient model as indicated in Table 6.

[Insert Table 6]

Accordingly, Hausman test result is in favor of fixed effect as Chi2 (8) has a probability of 0.0268 with a chi2 value of 17.33. Based on Hausman test, fixed effect model is preferred over random effect. Furthermore, ordinary least square was compared to random effect model and with the help of

Breusch and Pagan Lagrangian multiplier test (LM Test), ordinary least square is preferred to random effect. Consequently, there is no indication of substantial discrepancies between the private commercial banks of Ethiopia during the periods in question.

[Insert Table 7]

The R-square under Ordinary Least Square (OLS) is 0.68 whereas R-square under fixed effect is 0.76 which is better (Table 8). The R^2 (0.7644) implies that the 76.44% variation in the model variables used in the model is clarified by the predictor factors. During the specified period, the 76.44% variance in loan and advance (LOA) has been explained by deposit size (DS), liquidity ratio (LR), credit risk (CR), cash reserve requirement (CRR), portfolio investment (PI), real GDP (real GDP), and annual inflation (INF) growth rates as macroeconomic influences. Furthermore, the entire regression statistics measured by F-statistics were significant at less than 1% (P= 0.000) indicating that variables included in the model are jointly impacted.

Loans and advances from commercial banks were specified over the period. The platform used for this research was therefore sufficiently well equipped. According to the results (Table 8), the average lending rate (Coef=8.03), portfolio investment (Coef=1.84), deposit size (Coef=1.26), real GDP (Coef=2.64), inflation rate (Coef=1.01), credit risk (Coef=0.01), and annual inflation rate (Coef= 1.01) of the loans and advances of private commercial banks have had a major and positive effect on the specified periods. This implied that with the increment of 1% unit in predictor variable, loans and advances have been impacted positively with coefficients mentioned for each explanatory variable. On the other hand, liquidity ratio (Coef. 0.81) was significantly and negatively determining the amounts that banks disburse to customers. This means that as the amount of liquidity ratio increases, the rate of loans and advances will decrease.

5. Discussion

The deposit size was measured by the customers' net deposit to the total asset ratio. The study found that DS was positively correlated with LOA for the 1995-2016 period. The statistics found that DS was

significant at less than 1% (P= 0.008) and it impacted the LOA positively and matched with the expected sign. As a result, the statistics results evidently supported the dismissal of the hypothesis that there has been no essential link between the deposit volume and loan and that the bank would like to disburse to the borrowers. In addition, DS was correlated with LOA with 0.48 for the periods. As the deposit volume increased, the bank tends to lend more because income from the income interest was the major income for the commercial bank. Therefore, during the given period, on average, DS was impacting LOA of the bank by 1.26 coefficients. This result was consistent with various prior empirical studies recurring the finding of a positive relationship between the bank size and lending, which was consistent with the finding of Cole et al. (2004), Andreas & Gabrielle (2009), Amano (2014), Mitku (2014), Olokoyo (2011), Olumuyiwa et al. (2012), and Ajayi (2007). The data of these studies showed that over the last 13 years, the deposit size of all Ethiopian commercial banks was determined by the natural log of the total assets they has been raised. Consequently, this improvement improved banks' willingness to supply further loans. Thus, those banks, which were big in deposit size could grant more loan than those which were small in terms of deposits. The result implies that commercial banks need to increase their asset size in order to boost their ability to give loans and advances. Therefore, the amount of customer deposits that banks had access to, significantly affects their capacity to repay loans and prepay. These results were also in line with the findings of Panda and Reddy (2016), showing that a higher deposit size would lead to an increase in the provision of loans by commercial banks in India.

Liquidity ratio has been measured as the current asset of the bank excluding cash reserve to the net customers' deposit (current liability). Liquidity ratio has been negatively correlated to LOA by 0.32 for the given periods. In addition, the regression statistics found that the liquidity ratio was significant at less than 1% (P=0.000) and it had negative impacts with a 0.81 beta coefficient during the specified period. Accordingly, the statistics evidently rejected the null hypothesis stating that liquidity ratio had no significant relationship with loan and advances. However, the expected sign failed to match with the empirical sign. Indeed, the National Bank of Ethiopia set a directive on commercial banks dictating that the liquidity ratio of each bank shall not plunge to below 15% at any time. Therefore, commercial banks have held the portion

of the cash to comply with the regulatory requirement which decreased the amount to be lent, and as a result, the inverse relationships occurred. The result is consistent with some prior studies in Ethiopia (e.g., Olokoyo, 2011; Olumuyiwa, 2012; Amano 2014). According to Pilbeam (2005), in reality, loan demand, which is the basis for loan expansion, has significantly affected the amount of liquidity kept by banks. If loan demand is low, the bank continues to hold more liquid assets, and if loan demand is strong, they prefer to hold less liquid assets because loans are normally more lucrative in the long run (Amano, 2014). Because loans are illiquid assets, as the regression result implies, an increase in the amount of loans implies an increase in the illiquid assets of the bank's asset portfolio, implying that an increase in the amount of loans implies an increase in the illiquid assets of the bank's asset portfolio. The researcher's viewpoint and the regression result, liquidity ratio, and loans and advances had a negative relationship together. The finding was also consistent with the study by Mitiku (2014), which was conducted on the determinants of lending activity in Ethiopian commercial banks. Furthermore, the finding was consistent with the study by Ajayi (2007) in Nigeria, the study by Onyango (2015) in Kenya, the study by Anik et al. (2019) in Bangladesh, and other studies which were conducted on factors influencing commercial bank lending showing that the liquidity ratio has been negatively related to LOA. Therefore, the size of liquidity ratio that was determined by the regulatory organization had unfavorable impacts on the size of loans and advances disbursed to the borrowers.

Provision is a proxy to measure credit risk and is measured as a provision held for loans and advances. The empirical finding indicated that CR was positive and had a significant impact on loans and advances in each bank during the specified period (1995-2016). As a result, the credit risk has been impacting the amount of loans and advances by 4.4 beta coefficients for the fiscal year period of 1995-2016. The result was consistent with the study by Mitku (2014), which was conducted on determinants of commercial banks' lending behavior. Furthermore, the result was in line with the study by Djiogap and Nigomsi (2012) which was conducted on determinants of commercial banks' lending in the case of central Africa. Therefore, the credit risk was significantly determining the loan and advances of Ethiopian commercial banks for the 1995-2016 period. This research was consistent with the study performed by Gizaw et al. (2015) and

Getachew (2016) on the effect of credit risk on commercial bank profitability in Ethiopia and studies by Serwadda (2018) in Uganda and Rizvi et al. (2018) in India.

Portfolio investment is measured as banks' investment in other equity and government bond to total assets. The correlation matrix indicated that PI and LOA were positively correlated. The regression result indicated that PI was significant at less than 1% (p=0.001) and has a positive relationship with LOA. As a result, the p-value statistics evidently rejected the null hypothesis which claimed that LOA and portfolio investment have no substantial relationship. However, the expected sign differed from empirical results. The reason for this sign difference was that portfolio investment included investment in government bonds. As commercial banks disburse loan, NBE has imposed an obligation to buy bonds by 27% of loans and advances disbursed. Thus, portfolio investment increases with loan and advance increment proportionally. In addition to this, risk minimization requires investment diversity, and therefore, banks' investment in each portfolio increases as long as the returns from each portfolio are satisfactory. As a result, PI was positively correlated to Loan and Advance (LOA) during the periods. The result was not consistent with some prior studies in Ethiopia such as the study by Mitiku (2014) showing that the investment does not affect Ethiopian commercial banks' lending. In addition, it was consistent with the study by Olokoyo (2011), Amano (2014), and Serwadda (2018) being conducted on the determinants of the lending activity of commercial banks in Nigeria, Ethiopia, and Uganda. Therefore, portfolio investment had been affecting Ethiopian commercial banks from 1995 to 2016.

Lending rate and LOA have been positively correlated for the period of 1995-2016 fiscal years. The regression result indicated that ALR was significant at less than 1% (p=0.001) and has a positive relationship with LOA. The regression statistical results have evidently rejected hypothesis h0, according to which no meaningful association exists between the lending rate and credit. High lending rate favorably affects loan demand in the short run as long as the demand for loan is elastic. On the other hand, whenever the rate of interest for loans is strong, the demand for loan increases which results in lending volume increment (Everaert et al., 2015). This consequently motivates the banks to increase the lending rate that covers the lending transaction costs with a margin of profit. Hence, the lending rate and loan advances were

directly correlated for the past twenty-two years (1995-2016) in private commercial banks of Ethiopia. The result was consistent with the studies by Mitiku (2014), Atlaw (2017), Kidane (2019), and Gezahegn (2017), being conducted in Ethiopian commercial banks showing that the average lending rate had a positive and significant effect on the amount of loan and advances. Furthermore, the study showed consistent results with the findings of the study by Richard and Okoye (2014), which was performed in Nigerian commercial banks on determinants of lending activity.

In addition, the lending rate was not only an important variable but also a variable that had the highest beta coefficient (8.03) during the period. For this reason, it had been the most driving factor to determine whether the bank had to lend more or less jointly with other identified factors. Therefore, the lending rate had been impacting the lending behavior of Ethiopian commercial banks for the 1995-2016 fiscal years period. The real GDP growth rate was positively correlated to LOA and statistically significant at less than 1% (p-value=0.000). The sign of GDP was positive as expected. As a result, the null presumption that there was no substantial correlation between the rate of economic growth (Real GDP) and the LOA was evidently rejected. The p-statistical value of Real GDP was significant indicating the variation of LOA across individual banks. In addition, the growth rate of the real GDP coefficient was 2.6 following the credit risk (beta coefficient of 4.4) implying that the growth rate by Real GDP was determining the private commercial banks' LOA for the past twenty-two years (1995-2016). The finding of this study reveals that GDP had a significant positive impact on commercial banks' lending, agreeing with the study by Mansor (2006) noting that the increase in GDP triggers an increase in both the supply and demand for credit, and the gross domestic product has had a positive effect on bank loans. If savings are more likely to grow, an increase in GDP means more funds are available for banks to make loans. Pruteanu-Podpiera (2007) studied the effect of the growth rate of gross domestic products on Czech bank loans from 1996 to 2001 and obtained the same findings. However, the result was not consistent with the study by Amano (2014), who concluded that there was no association between the Ethiopian commercial banks' gross domestic product and lending activity. The implication of this result was that if the country's GDP increased, the standard of living of the

society would improve; if the society's living standard was improved, they could deposit money in the banks, and then, the banks could give the deposit as loans to the society again.

Inflation rate was positively correlated with LOA showing that private commercial banks of Ethiopia have been disbursing loans. The evidence from regression result rejected the null hypothesis that there was no substantial correlation between LOA and the annual inflation rate as the p-value was significant at less than 1% (P=0.000). In addition, when the inflation rate increased, banks were forced to lend more of the fund to the customers to absorb the decline of purchasing power of money and to minimize loan impairment. Another reason was that when inflation was anticipated, the amount of loan borrowers' need increases and they need to borrow more. Consequently, the bank compensates for the reduction in the buying power of capital among borrowers by granting large loans and advances, and hence, the inflation rate and LOA were positively correlated. According to Amano (2014), price pressure has resulted in credit rationing, which has become more extreme as inflation has risen. As a consequence, fewer loans were made by the financial sector, resource utilization was less effective, and intermediary operation declined with detrimental capital/long-term investment consequences. According to different theories and the null hypotheses, there was an opposite relationship between the rate of inflation, credit and growth. Conversely, the result of this study showed a positive correlation between the two factors. Hence, the inflation rate had a significant impact on Ethiopian commercial banks' lending. The possible reason for this result was the different regulatory measures taken by NBE which helped to control the impact of inflation on Ethiopian commercial banks' lending activity.

According to the research findings, banks can encourage more people to get more loans by changing attitudes among people in the community by modifying the methods of increasing liquidity and reducing the profits received. This, in turn, can be more profitable for banks and create a competitive field among private banks. In this situation, due to the facilitation of loan conditions, people's quality of life would increase due to receiving loans to create or develop economic activities, which will contribute to improving the quality of life and the market of supply and demand. This requires banks to pay special attention to providing equal access to cheap loans, economic activities, services and facilities, and social justice. In

general, ALR, CR, real GDP, PI, DS, INF, and LR had been investigated as determinants of Ethiopian private commercial banks loan advance (LOA) disbursement (factors make banks lend much or little) during the specified periods.

6. Conclusion

The study used multiple regressions applying unbalanced panel data using fixed effects to investigate the determinants of loans and advances. The study included seven private commercial banks as a sample size with the data of the 1955-2016 period with 126 total observations. Accordingly, the finding indicated that lending rate had a positive and significant impact on LOA. In addition, the lending rate has the highest beta coefficient (Beta coef. = 8.03) and hence, it has been the most driving factor to determine whether the bank has to lend more or less jointly with other identified factors. Credit risk (CR) had a positive and meaningful influence on loans and advances during the specified period (1995-2016). The credit risk has been impacting the amount of loans and advances by 4.4 beta coefficients for the 1995-2016 period. Real GDP had a positive and significant impact on LOA and on average, it has been impacting private commercial banks of Ethiopia by a 2.64 beta coefficient. In addition, portfolio investment, deposit size, and annual inflation rate had positively and significantly determined the amount that private commercial banks of Ethiopia disbursed to borrowers during the 1995-2016 period. However, liquidity ratio had a negative and significant impact on the amounts that private commercial banks are willing to lend during the specified period. The National Bank of Ethiopia has issued a directive on commercial banks dictating that liquidity ratio of each bank shall not be lower than 15% at any time. Therefore, banks are inclined to decrease the amount to be disbursed to meet the requirement and this resulted in an inverse relationship between liquidity and loan and advance disbursements.

The results of this study showed different positive and substantial implications for loans granted, taking into account the aspect of improving bank profitability. Then, there will be banks contest at that stage, and this competition between commercial banks provides good conditions for investors by reducing bank profits and increasing the amount of loans. Given the role of banks, general analytical studies suggest that

commercial banks' profitability is affected by banks' particular factors. These factors may be directly related to bank management and macroeconomic factors but are not a direct result of the bank management decision. In general, there are emerging problems that this paper has not yet overcome and are left in the field for potential researchers. Access to loans for private business operations in the country is very limited, as the government mainly funds some industries and does not pay heed to other sectors. Commercial banks were reluctant to establish branches in some remote areas with respect to infrastructure impediments. There is a lot of informal credit market (usury) in rural areas, and as usual, the interest rate for the informal sector is higher than that of the formal markets, and this has so many impacts on the economies of rural citizens and the income of commercial banks. In cases of borrowers' inability to meet commitments, the problems of graft, regulator policy gaps, weak legal institutions, and loan write off (CBs report) are the key current obstacles. This means that it is important to educate and develop expertise within commercial banks and regulatory personnel. Policies will need to be extended in the following fields: 1) proactive credit risk and technology tracking, 2) clear organizational policy for handling capital, and 3) strong internal resource management strategy.

There is no process that gives harmony between lending to different customers at the margin when the bank is indifferent. With regards to its successful clients, the bank is in a corner solution, and other clients also have an opportunity to try to get to a corner. Therefore, in bank-customer partnerships, corner strategies can be the norm rather than the exception.

Realistic bankers are well aware that they will receive all loans on preferential terms in all circumstances. Another consequence of unique resources is that by enabling banks to further broaden the reach of their activities, there are productivity improvements to be made. Finally, in the light of the new strategy, the harsh judgment on banks' lending to current issue debtors does not seem to be completely warranted. Banks invest in unique capital by selling loans on concessionary terms to prospective customers.

When non-interest earnings on loans are considered in addition to net interest earnings and collateral risks, the picture changes dramatically. In addition, when applying for a loan, a probable or real issue debtor may take advantage of the judgment asymmetry. Furthermore, an anticipated loss in the hope of

saving the entire specific capital will cause the bank to choose between making one more costly loan, whilst the bank takes a high chance of losing all of the loan capital and much of the remainder of the specific capital by denying the offer. The current study looked into the factors that influence commercial banks' lending activities in Ethiopia. The findings of this study's main implication are that they will assist relevant regulatory authorities and policymakers in formulating appropriate policies. These policies will help Ethiopian commercial banks administer and manage loans, credits, and other forms of lending more effectively. Also, the results of this study will help banking industry policymakers and planners understand how to minimize inflation and unemployment by improving development and sustainable economic growth. Another implication of this study is that by increasing information on the factors affecting lending, the commercial banks can achieve productivity improvements by expanding the scope of their activities. The result of this study will benefit to the researchers who will make use of the findings to conduct further research in the area of lending behavior of commercial banks in their country.

The present study has focused only on some selective determinants of bank profitability factors. Therefore, it is imperative to undertake further empirical studies in the same field to explore what other internal and external factors could affect the profitability of commercial banks. For example, in future studies, it may be interesting to explore how cost efficiency may affect the profitability of banks. Moreover, it is also important to investigate the impact of exogenous factors on banks' managerial decisions to determine the overall banks' profitability. Also, it will be interesting to study the behavior of commercial bank customers. Finally, future researchers could include other bank-specific and macroeconomic variables in regression models, such as inflation and exchange rates. **References**

Ajayi, M.A. (2007), "Determinants of loan and advances in the financial system: Empirical evidence from Nigerian commercial banks", J. of Business and Social science, Vol. 12 No. 1, pp. 10-20.

Amano, G. (2014), "Determinants of lending behavior of banks: A case study on commercial banks of Ethiopia", unpublished thesis submitted, University of Addis Ababa.

Anderson, D.R. Sweeny, D.J. and William, T. (1990), "Introduction to Management Science: A Quantitative Approach to Decision Making", Published by South-Western, 10/06/1999, 1999.

Assfaw, A.M. (2019), "Firm-specific and macroeconomic determinants of banks liquidity: empirical investigation from Ethiopian private commercial banks", J. of Account Finance and Auditing Stud, Vol 5. No. 2, pp. 123-145.

Assfaw, A.M. (2018), "Determinants of the Financial Performance of Private Commercial Banks in Ethiopia: Bank Specific Factors Analysis", Global J of Manage and Bus, 18(3-C).

Anik, T.H., Das, N.K., Alam, M.J. (2019). "Non-Performing Loans and Its Impact on Profitability: An Empirical Study on State Owned Commercial Banks in Bangladesh". Journal of Advances in Economics and Finance, 4(4). https://dx.doi.org/10.22606/jaef.2019.44001.

Berhanu, A. (2016). "Determinates of lending decision and their impact in financial performance: A Case study on Commercial Banks of Ethiopia". MSc Project Paper. Unpublished, Addis Ababa University

Boadi, I. (2016), "Determinants of Ghanaian banks' credit to the "missing middle": a supply side approach", International Journal of Bank Marketing, Vol. 34 No. 6, pp. 924-939.

Cesaroni, G. (2017), "Industry cost efficiency in data envelopment analysis", Socio Econ Plan Sciences.

Chéron, E., McTavish, R. and Perrien, J. (1989), "Segmentation of Bank Commercial Markets", I. J. of Bank Marketing, Vol. 7 No. 6, pp. 25-30. https ://doi.org/10.1108/EUM 0000000001458.

Chiang, T.C. (2020), "Global Stock Market Prices Response to Uncertainty Changes in US Monetary and Fiscal Policies", Jeon, B.N. and Wu, J. (Ed.) Emerging Market Finance: New Challenges and Opportunities (International Finance Review, Vol. 21), Emerald Publishing Limited, pp. 131-147.

Deleidi, M. (2017), "Post Keynesian endogenous money theory: A theoretical and empirical investigation of the credit demand schedule". Journal of Post Keynesian Economics, 41(2).

Djiogap, F. and Ngomsi, A. (2012), "Review of Economics & Finance Determinants of Bank Long-term Lending Behavior in the Central African Economic and Monetary Community", CEMAC, pp. 107–114.

Dong, Y., Firth, M., Hou, W., Yang, W. (2016), "Evaluating the performance of Chinese commercial banks: A comparative analysis of different types of banks". European Journal of Operational Research, 252(1), 280-295.

Ekpu V.U. (2016), "Supply-Side Factors Affecting Bank Lending to SMEs. In: Determinants of Bank Involvement with SMEs". SpringerBriefs in Finance. Springer, Cham. https://doi.org/10.1007/978-3-319-25837-9_5

Eaton, A. (2017), "Loan Conditions of Commercial Banks and Micro Finance". https://silo.tips/queue/loan-conditions-of-commercial-banks-and-micro-finance?&queue_id=1&v=1604649971&u=MTg4 LjI0NS45Ny4xMzQ=

Everaert, G. De-Laender, F. and Goethals, P.L.M. (2015), "Multidecadal field data support intimate links between phytoplankton dynamics and PCB concentrations in marine sediments and biota", Environ. Sci.Technol, VOL. 49, PP. 8704-8711.

Feldmann, H. (2015), "Banking system concentration and unemployment in developing countries", J. of Econ and Business, Vol. 77, pp. 60-78.

Girma, B. (2019), "Intellectual Capital Efficiency and Its Impact on Financial Performances of Ethiopian Commercial Banks". Research Journal of Finance and Accountin, 8(8).

Gezahegn, Helina. (2017), "FACTOR AFFECTING PRIVATE COMMERCIAL BANKS LOAN AND ADVANCE IN ETHIOPIA". http://hdl.handle.net/123456789/3169

Gujarati, D.N. (2004), Basic Econometrics, (Ed.), McGraw Hill, Boston.

Gizaw, M., Kebede, M., Selvaraj, S. (2015), "The impact of credit risk on profitability performance of commercial banks in Ethiopia". African Journal of Business Management. 9(2), 59-66.

Hill, T.D., Davis, A.P., Roos, J.M. (2020), "Limitations of Fixed-Effects Models for Panel Data." Sociological Perspectives 63(3):357–369.

Jonathan, E.O. Victor, A.M. and Ifeoma, C.M. (2013), "A panel data analysis of the impact of informality on the liquidity of deposit money banks in Nigeria, Published By European Centre for Research Training and Development UK", Global J of Human Resource Manag, Vol. 1 No. 3, pp. 12-28.

Kaba, A.T. (2019). "Factors affecting deposit growth of commercial banks in Ethiopia". A thesis submitted to st.mary's university, school of graduate studies in partial fulfillment of the requirements for mba in accounting and finance.

Kamyab, P., Mozaffari, M.R., Gerami, J. and Wankei, P.F. (2020), "Two-stage incentives system for commercial banks based on centralized resource allocation model in DEA-R", International Journal of Productivity and Performance Management, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/IJPPM-11-2018-0396

Kapounek, S., Kučerová, Z., Fidrmuc, J. (2017). "Lending conditions in EU: The role of credit demand and supply". Economic Modelling, 67, 285-293.

Kimutai J.C. (2013), "Factors Influencing Credit Rationing by Commercial Banks in Kenya", I Jof Human and Social Science, Vol. 3 No. 20.

Mac Donald, S.S. and Koch, T.W. (2006), Management of Banking, (Ed.), Thomson- South Western, U.S.A.

Malede, M. (2014). "Determinants of Commercial Banks Lending: Evidence from Ethiopian Commercial Banks". European Journal of Business and Management, 6(20).

McCarthy, M.G. Schneider, D.K. and Tibb, S.L. (2010), "Investments and loans reported by the 10 largest U.S banks", J. of Bank accounting and Finance, pp. 19-24.

McCauley, R. McGuire, P. and Von Peter, G. (2012), "After the global financial crisis: From international to multinational banking?", J. of Econ and Business, Vol. 64 No. 1, pp. 7-23.

Mugenda, O.M. and Mugenda, A.G. (2003), "Research methods: Quantitative and qualitative Approaches", Nairobi: African Centre for Technology Studies.

Mitku, M. (2014), "Determinants of Commercial Banks Lending: Evidence from Ethiopian Commercial Banks", Euro. J. of Business and Manag, Vol. 6 No. 2.

NBE. (2016), "NBE Annual report", National Bank of Ethiopia, Addis Ababa, Ethiopia.

Nurboja, B. and Košak, M. (2017), "Banking efficiency in South East Europe: Evidence for financial crises and the gap between new EU members and candidate countries", Econo Sys, Vol. 41 No. 1, pp. 122–138.

Nwankwo, G.O. (2000), "Organizing for Financial Risk Management", The Credit Administrator, Vol. 2 No. 2, pp. 32-39.

Olarewaju, O.M. (2020), "Investigating the factors affecting nonperforming loans in commercial banks: The case of African lower middle-income countries", African Dev Review, Vol. 32 No. 4, pp. 744-757.

Olokoyo, F.O. (2011), "Determinants of Commercial Banks' Lending Behavior in Nigeria", I. J. of Finan. Research, Vol. 2 No. 2, pp. 61–72.

Olumuyiwa, S., Oluwatosin, O.A. and Chukwuemeka, E. (2012), "Determinants of Lending Behaviour of Commercial Banks: Evidence from Nigeria", A Co-Integration Analysis, Vol. 5 No. 5, pp. 71–80.

Omowunmi, F.O. (2006), "Determinants of Banks' Lending Behavior a Case Study Of Commercial Banks In Nigeria", thesis submitted, University of Covenant.

Onyango, J.O. (2015), "Debating love, human rights and identity politics in East Africa: The case of Uganda and Kenya", African Human Rights Law Journal, pp. 28-57.

Panda, D. and Reddy, S. (2016), "Resource based view of internationalization: evidence from Indian commercial banks", Journal of Asia Business Studies, Vol. 10 No. 1, pp. 41-60. https://doi.org/10.1108/JABS-10-2014-0082.

Qureshi, F., Kutan, A.M., Ismail, E., SokGee, G. (2017). "Mutual funds and stock market volatility: An empirical analysis of Asian emerging markets." Emerging Markets Review, 31, 176-192.

Rizvi, N.U., Kashiramka, S., Singh, S. (2018). "Basel I to Basel III: Impact of Credit Risk and Interest Rate Risk of Banks in India." Journal of Emerging Market Finance, 17(1), S83-S111.

Schmidt, T., Zwick, L. (2018). "Loan supply and demand in Germany's three-pillar banking system during the financial crisis." Int finance, https://doi.org/10.1111/infi.12125

Segal, T. (2020). "Monetary Policy vs. Fiscal Policy: What's the Difference?" https://www.investopedia.com/ask/answers/100314/

Serwadda I. (2018). "Impact of Credit Risk Management Systems on the Financial Performance of Commercial Banks in Uganda." Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, 66(6): 1627 – 1635.

Smoluk, B. (2020). "Money Demand, Bank Lending and State Output." Quarterly Journal of Finance & Accounting. 58(1-2), 67-100.

Sokic, A. (2015), "Cost efficiency of the banking industry and unilateral euroisation: A stochastic frontier approach in Serbia and Montenegro", Economic Systems, Vol. 39 No. 3, pp. 541-551.

Kennington, C. Jeanne, H. and Rakowska, A. (1996),"Consumer selection criteria for banks in Poland", I. J. of Bank Marketing, Vol. 14 No. 4, pp. 12- 21.

Richard, E.Z.E.O. and Okoye, V. (2014), "Appraisal of Determinants of Lending Behaviour of Deposit Money Banks in Nigeria", I. J. of Scholarly, Vol. 2 No. 3, pp. 142-156.

Tan, Z., Frimpong, S., Ding, G. (2019). "Impact of Financial Risk Indicators on Banks' Financial Performance in Ghana." Business and Economic Research, 9(4).

Tekatel, W.L., Nurebo, B.W. (2019). "Comparing Financial Performance of StateOwned Commercial Bank with Privately Owned Commercial Banks in Ethiopia." European Journal of BusinessScience and Technology,5 (2): 200–217. ISSN 2694-7161, DOI http://dx.doi.org/10.11118/ejobsat.v5i2.174.

Teshome, E., Debela, K., Sultan, M. (2018). "Determinant of financial performance of commercial banks in Ethiopia: Special emphasis on private commercial banks." African Journal of Business Management, 12(1), 1-10.

Tsujimura, M. and Tsujimura, K. (2011), "Balance Sheet Economics of the Subprime Mortgage Crisis", Econ Sys Research, Vol. 23 No. 1.

Widiarto, I. and Emrouznejad, A. (2015), "Social and financial efficiency of Islamic microfinance institutions: A Data Envelopment Analysis application", Socio-Econ Planning Sciences, Vol. 50, pp: 1-1.

Megersa, K., Cassimon, D. (2015). "Assessing Indicators of Currency Crisis in Ethiopia: Signals Approach." African Development Review 27(3), 315-330.

Fig 1. Conceptual framework of lending or loan and advances model
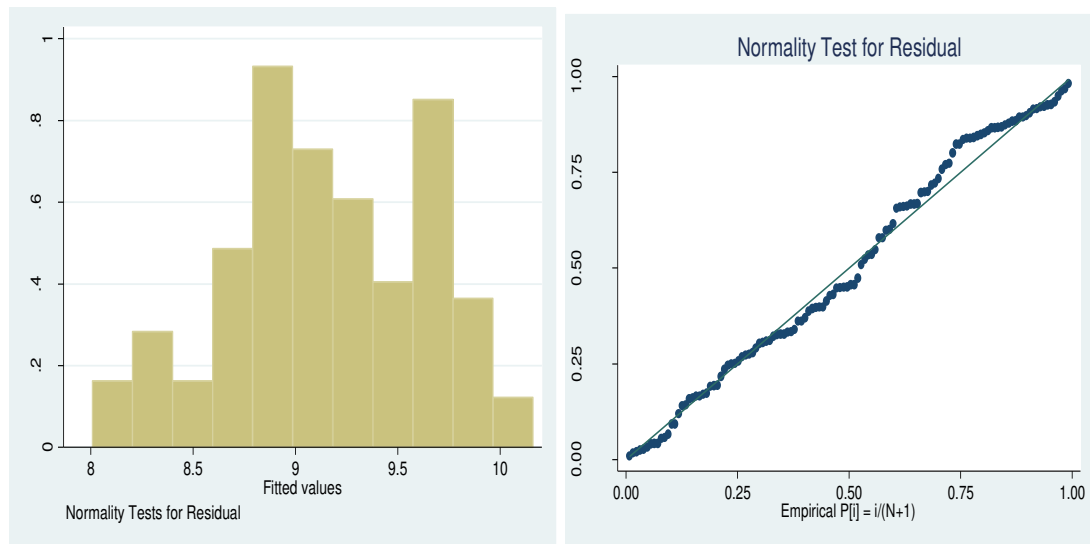**Source:** Study findings

Fig. 2. Normality Test by Histogram Graph b) Normality Test by Quantile plot

Table 1. Summaries of Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ID	126	3.650794	1.915484	1	7
TT	126	13.14286	5.686073	1	22
LOA	126	9.149861	.5881043	7.521073	10.18227
DS	126	.7095134	.0941206	.373361	.865939
LR	126	.3508483	.2106924	.0001375	1.256791
CR	126	.0318289	.0199501	.0019636	.1
CRR	126	.036081	.0086227	.018668	.1072747
PI	126	.0694598	.0795102	0	.2911219
ALR	126	.100847	.0247859	.0428559	.1621639
Real GDP	126	.0863929	.0446148	-.054	.133
INF	126	.1122143	.1140075	-.106	.364

LOA: Loan and Advances, DS: Deposit Size, LR: Liquidity Ratio, CR: Credit Risk, CRR: Cash Reserve Requirement, PI: Portfolio Investment, ALR: Average Lending Rate, Real GDP: Real GDP Growth Rate, INF: Annual Inflation Rate.

Table 2. Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
RES	126	0.4432	0.0309	5.19	0.0747

Table 3. Multicollinearity Tests by VIF

Variable	VIF	1/VIF
PI	2.38	0.419504
ALR	2.25	0.443767
DS	1.69	0.592027
CRR	1.47	0.680171
INF	1.20	0.831535
CR	1.20	0.832490
LR	1.19	0.837617
RealGDP	1.17	0.855508
Mean VIF	1.57	

PI: Portfolio Investment, ALR: Average Lending Rate, DS: Deposit Size, CRR: Cash Reserve Requirement, INF: Annual Inflation Rate, CR: Credit Risk, LR: Liquidity Ratio, RealGDP: Real GDP Growth Rate.

Table 4. Breusch-Pagan / Cook-Weisberg test for Heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for Heteroskedasticity	
Ho: Constant variance	
Variables: fitted values of loa	
Chi2(1)	1.83
Prob > chi2	0.1761

Table 5. Test for Model Specification

Ramsey RESET test using powers of the fitted values of loa	
Ho: model has no omitted variables	
F(3, 114)	4.90
Prob > F	0.0031

Table 6. Hausman Test

	(b) fixed	(B) random	(b-B) Difference	Coefficients sqrt(diag(V_b-V_B)) S.E.
DS	1.262679	.9691851	.2934935	.2061054
LR	-.8101749	-.3746513	-.4355235	.1100667
CR	4.402936	2.851491	1.551445	.
CRR	-.3883582	1.67933	-2.067688	.
PI	1.849494	1.720177	.1293169	.
ALR	8.03097	8.743069	-.7120991	.
RealGDP	2.646509	2.729687	-.0831779	.
INF	1.012875	.9478201	.065055	.

DS: Deposit Size, LR: Liquidity Ratio, CR: Credit Risk, CRR: Cash Reserve Requirement, PI: Portfolio Investment, ALR: Average Lending Rate, RealGDP: Real GDP Growth Rate, INF: Annual Inflation Rate.

Table 7. Fixed-Effects (within) Regression

loa	Coef.	Std. Err.	t	P>|t|	95% Conf.	Interval
DS	1.262679	.4712137	2.68	0.008***	.3289372	2.19642
LR	-.8101749	.1934986	-4.19	0.000***	-1.193605	-.4267444
CR	4.402936	1.652702	2.66	0.009***	1.127997	7.677875
CRR	-.3883582	3.963367	-0.10	0.922	-8.242035	7.465319
PI	1.849494	.5637898	3.28	0.001***	.7323066	2.966681
ALR	8.03097	1.668325	4.81	0.000***	4.725072	11.33687
REAL GDP	2.646509	.6553126	4.04	0.000***	1.347963	3.945055
INF	1.012875	.2589399	3.91	0.000***	.4997685	1.525982
CONS	7.13143	.3177443	22.44	0.000***	6.501798	7.761062

DS: Deposit Size, LR: Liquidity Ratio, CR: Credit Risk, CRR: Cash Reserve Requirement, PI: Portfolio Investment, ALR: Average Lending Rate, Real GDP: Real GDP Growth Rate, INF: Annual Inflation Rate.

**** Significant level at less than 1%