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## **Determinants of Commercial Banks' Lending Behavior: Case Study for Selected Commercial Banks in Ethiopia**

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### **Abstract**

The main objective of the study was to examine the determinants of commercial banks' lending behavior for selected commercial banks' in Ethiopia. The study used a cross sectional explanatory research design. The study describes the determinants of commercial banks' lending behavior. Both qualitative and quantitative data were employed. The study used secondary data from the selected audited annual reports of the commercial banks as well as the yearly financial reports of National bank of Ethiopia from 2011 to 2017. The study utilized correlational and regression analysis to examine the relationship between the dependent (lending behavior) and independent variables (Interest Rate, Capital Adequacy Ratio, Liquidity Ratio, Asset Quality and Volume of Deposits) and power of explanation of the independent variables for the dependent variable respectively. The correlation results suggest that there was linear relationship between Volumes of Deposit, Interest/Credit Rate, Liquidity Ratio, Asset Quality (AQ) and Capital Adequacy ratio (CAR) with lending behavior of the selected commercial banks. Furthermore, the regression result revealed that the factors; Liquidity Ratio (LR), Credit Rate (CR) and Asset Quality have significant effect on lending behavior; whereas, two factors; Capital Adequacy Ratio and Volume of Deposits have insignificant effect on lending behavior of the selected commercial banks. Finally, the researcher recommended that there should be closer consultation and cooperation between commercial banks and the regulatory authorities so that the effect of regulatory measure on commercial banks is taken into account at the stage of policy formulation to include the most significant determinant factors of lending behavior. The study also recommends that effective policies should be developed to ensure commercial banks grow and advance more credit for their customers.

**Keywords:** Lending Behavior; Interest Rate; Capital Adequacy Ratio; Asset Quality; Volume of Deposits; Commercial Banks; Ethiopia.

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## **1. Introduction**

The primary role of a bank is intermediation by way of collecting savings from depositors and making these savings available as loans to borrowers [10]. In performing this function, banks are regulated often by the environment within which they operate. Banks cannot compensate an increased failure risk by charging higher interest rates [21]. This encourages any financial institution to request for collateral from the borrower to minimize losses that might occur from loan defaults [18]. To achieve this, banks follow certain policy criteria and determinant factors to provide their loans for their customers. The sound and practical functioning of commercial banks is adversely affected by the choice of certain policy instruments for the regulation of banking operations [8, 18]. This includes a rigidly administered interest rate structure, directed credit, unremunerated reserve requirements and stabilizing liquidity control measures; the volume of cash in the banks vault also determines its ability to grant advances [18]. The bank runs into difficulty in meeting its customer's cash drawings when it grants advances in excess of its chasing ability due to the existence of high competition, huge deposits and varied investment opportunities, some tend to disregard the fact that their administration require considerable skill and dexterity on the part of their management [13]. The same also applies to situation where loans and advances are given out by commercial bank without adequate or commensurable collateral and backups [16]. Furthermore, non-servicing of loans reduces the profitability and liquidity levels of the affected commercial banks [18]. Several studies have been conducted on the determinants of commercial banks' lending behavior [13, 18]. For this case, [18], on his study found that the commercial banks' lending has significantly played crucial roles in igniting industrialization in every economy, by facilitating the mobilization of capital which oils the wheels of economic production. The common determinants of commercial banks' lending behavior confirm the effectiveness of these factors/variables on their lending behavior due to commercial banks are the most important savings mobilization and financial resource allocation institutions [16, 17]. These roles make them an important phenomenon in economic growth and development. In performing this role, it must be realized that banks have the potential, scope and prospects for mobilizing financial resources and allocating them to productive investments [13]. Moreover, banks usually consider a number of factors in determining the lending decision which relates to the sector of economy to lend to the type of clients to take risks on the amount of loans and advances to be extended [13]. These determinants factors for the commercial bank lending behavior include: lending/interest rate, the Volume of deposits (Vd), asset quality, reserve ratio, volume of deposits, their Investment portfolio (Ip), the presiding interest (lending) rate (Ir), Cash reserve requirement ratio (Rr), annual average exchange rate of the local currency to dollar (Fx), liquidity ratio, portfolio theory and capital adequacy (Lr) [17, 18]. The low interest rates encourage borrowing, hence, high lending activities by commercial banks and vice versa [8]. The study by [8], recommended to improve regulation of credit as well as asset quality of commercial banks. Whereas the research by [13], recommended that banks should strive hard to manage their deposits efficiently so that their objective of profitability can be achieved and the multiplier effects maintained to the maximum. This implies that generation of more deposits is tangent to the survival of commercial banks as a whole. Several investigations have been carried out by previous researchers to determine the factors that influence commercial banks' lending decision in the world [10, 13, 18]. These studies advise to conduct more similar research by inclusion of more determinant factors of lending behavior in other areas like Ethiopia. Nevertheless, few research has been conducted on loan and advance related problems in Ethiopia for

commercial banks due to their focus on credit management and deposit mobilization. Moreover, few of these studies include all the determinant factors: the Volume of Deposits (VD), Asset Quality (AQ), Interest (credit) rate (CR), Capital Adequacy Ratio (CAR) and Liquidity Ratio (LR) to examine the lending behavior of commercial banks. Based on the relevance of this issue to policy, very limited studies of citable significance have also dealt on determinants of commercial banks' lending behavior in Ethiopia. This is due to proposition remained relatively not well studied while the country is battling out of economic crisis to support the industry and agriculture sectors. It is, therefore, important that an empirical study of this nature be carried out with the view of understanding the determinants of lending behavior of commercial banks in the wake of volatile and unstable macro environment in Ethiopia particularly in selected commercial banks. Therefore, the study was intended to examine the determinants of Commercial banks' lending behavior on selected commercial banks in Ethiopia.

### **1.1. Objectives of the Study**

The main objective of this study was to examine the effect of determinants (capital adequacy, interest rate, asset quality, liquidity ratio and volume of deposits) on lending behavior of selected commercial banks in Ethiopia.

### **1.2. Limitation of the Study**

The limitation of the study includes; firstly, the difference between concentrations on determinants lending behavior within 10 commercial banks might make the study biased. Secondly, in order to collect enough data to make generalization, the researcher have chosen the time horizon from 2011 to 2017 audited annual reports of the ten selected commercial banks as well as the NBE financial reports; it does not include other financial years as well as other reports. Thirdly, this study only used the secondary data to analyze the determinants of lending behavior based on the cross sectional explanatory research design: it does not include primary data as well as other research design. Fourthly, it only considers the lending behavior of commercial banks based the five determinant factors; interest rate, asset quality, volume to deposit, capital adequacy ratio and liquidity ratio; it does not include other risks, and determinant factors lending behavior of total loans and advances for the selected commercial banks. Finally, the study intends to focus only 10 commercial banks (Awash International Bank, Bank of Abyssinia, Oromia International Bank, Commercial Bank of Ethiopia, Cooperative Bank of Oromia, Dashen Bank, Lion International Bank, Nib International Bank, United Bank and Wegagen Bank) in Ethiopia.

## **2. Related Literature Review**

### **2.1. The concept and development of commercial banks' lending behavior**

Most of the previous studies agreed on the fact that banks have to have some basic lending principles or consideration to act as a check in their lending activities [17, 22]. Since there are many studies in respect of commercial bank's lending behavior, it is therefore vital to consider some factor that economist and professionals alike have suggested as virtually significant in explaining the determinants of commercial banks' lending behavior [13]. Accordingly, credit establishes the largest single income-earning asset in the portfolio of

most banks [12]. This explains why banks spend huge resources to estimate, monitor and manage credit quality and quantity that influence greatly on the lending behavior of banks as large resources are involved [17]. For the banks to balance their main objectives of liquidity, profitability and solvency, lending must be handled effectively and the banks must behave in a way that these potential customers are attracted and retained [13]. Most studies divide the determination of commercial banks' lending behaviors into two (2) categories that is: internal and external factors [17, 22]. The internal determinants include profitability which are within the control of the bank management could be broadly classify into two: financial statement variables and non-financial statement [17]. Accordingly, the financial statement variables refer to those items in the balance sheet and income statement and the non-financial variables have no direct relationship to the financial statement. Whereas, external factors are those factors that are not to be controlled by the bank management like Competition, regulation, market share, ownership, money supply, inflation. Banks use different strategies to assess their credit and it is vital for them to consider these guiding rules in carrying out their lending activities [1]. This is because commercial banks do not trust the information they acquire from opaque borrowers who might end up defaulting [22]. Some recent researchers found out that in addition to a political and environmental crisis, the banking crisis is also a major interfering to the economic growth of countries [16, 17]. One way to challenge this issue is to implement or set up strict rules and regulations to govern banks' lending activities. This policy does not only reduce the cost of the crisis in a society, but it as well enables banks to better maximize their profits and enhance economic growth [22].

## ***2.2. Empirical Evidence on Commercial Banks' lending Behavior***

There is significant positive correlation between the discretionary loan loss provisions and earnings before taxes and provisions (EBTP); whereas, significant negative correlation between the discretionary loan loss provisions and capital adequacy ratio (CAR) [4]. This paper recommended that the commercial banks should improve the information-disclosed to avoid the commercial banks' undertake profit manipulation and capital management by manipulating the provision for loan losses and faintly disclosing the information. The researcher [9], examined determinants of commercial banks' lending in the Ethiopian banking industry using panel data from eight banks for the 2005 -2011 period. The results of the study depict a significant relationship between banks' lending and banks size, credit risk, gross domestic product and liquidity ratios; while, volume of deposit, investments, cash reserve ratios and interest rates had no significant effect on Ethiopian banks' lending activities. The researcher [10], in his study found that the bank capitalization, volume of deposit, interest rate spread and rate of GDP growth were significant in determining lending behavior in Kenya's commercial banks; whereas, bank size has insignificant and positive effect on bank lending behavior. He recommended that there is need to have a comprehensive consideration by commercial banks given the significant relationship established between interest rate spread and real GDP growth rate on lending volumes. Finally, he advised that there is a need for consideration of more other factors in future studies like political environment as well as other socioeconomic environment. The study by [8], indicated a positive linear relationship between the lending behavior and capital adequacy and liquidity ratio, an inverse relationship between the lending behavior and interest rate; while, asset quality has a slightly less significant role in determining the lending behavior of commercial banks. The study recommended that commercial banks should look for more innovative ways to source for cheap deposits, the interest rate charged on loans should mirror/factor in the risk profile of the industry and the client unique

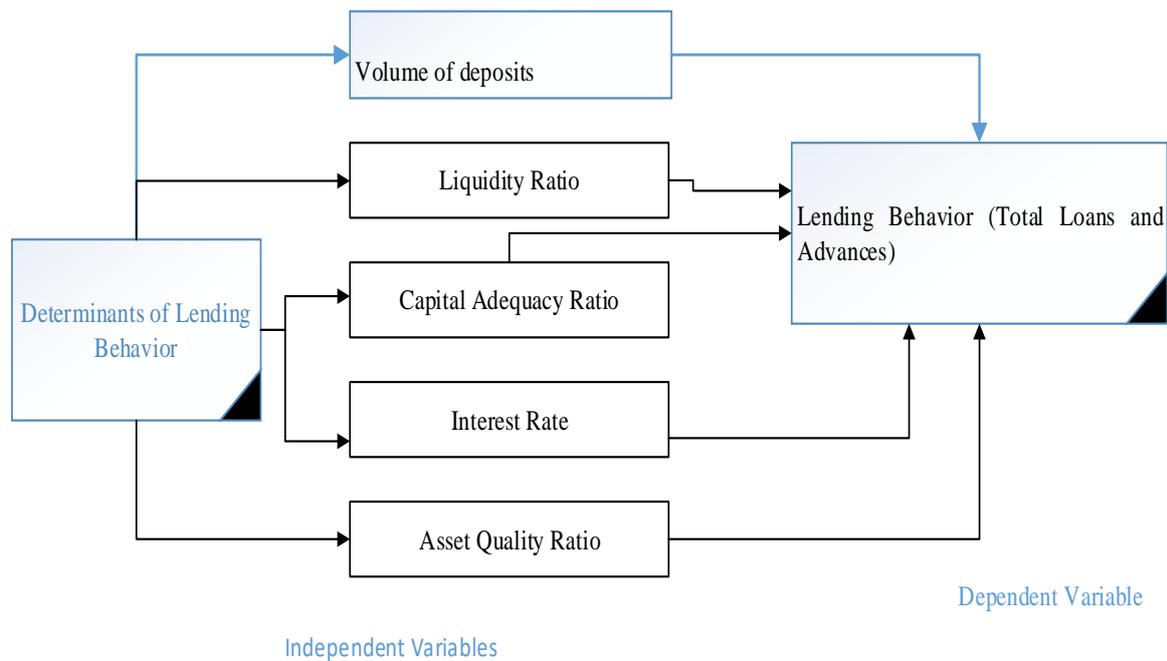
features and pay more attention to their asset quality. Finally, he advised to conduct a further research to be carried out on determinants of banks' lending behavior incorporating regulatory and macroeconomic factors as independent variables as well to conduct similar research in other areas by including more explanatory variables. The research by [18], indicated that lending interest rates are negatively related and significantly affect the total loans advanced. Further, volume of deposit in commercial banks has a significant and positive effect on the total loan advanced. The study recommended that commercial banks must innovate ways of increasing their profit through fee incomes and commissions since incomes from interest rate tend to decline with increase in the lending interest rate. This paper also recommends that another study should be done to augment the findings in this study; it therefore recommends a study be done on the effect of monetary policies on borrowing behavior of the commercial banks.

### ***2.3. Summary and Literature Gap***

The assessment of both theoretical and empirical literature indicates that most of the studies on the banks' lending behavior have been carried out in the developed financial markets. Studies used total loan advanced (lending behavior of commercial banks') as dependent variable, volume of deposits, bank's investment portfolio, lending rate, cash reserve ratio, liquidity ratio, credit risk, GDP, interest rate spread, investment portfolios, capital adequacy, asset quality, capital structure and exchange rate as independent variables depending on the perceptions of researchers [7, 9, 10, 17]. There are, however, a few studies [17, 18] that have been done in the less developed financial markets. Moreover, majority of studies conducted in the world focus on the determinants of lending behavior of commercial banks particularly interest rate spreads, cash reserve ratio, credit risk, bank's investment portfolio and credit risk [10, 15]. The description indicates as there is some research gap in investigating the factors that influence lending behavior by commercial banks. Majority of the mentioned studies present inadequate empirical results since the researchers focused on the impact of such decisions on the bank borrower rather than what the finding meant to the bank and banking system. Most researchers also recommended to conduct further research on other areas using more determinants of lending behavior. Furthermore, there is little insight on how emerging economies determine their lending decisions, application of appropriate lending determinants, the similarity or difference that it exhibits to the lending theory in first world economies and the contribution of relationship factors and risk in credit creation and their impact on the entire banking system. Now a days, there is scarcity of empirical studies on the determinants of lending behavior using the determinant factors; volume of deposits, interest rate, capital adequacy, liquidity and asset quality of commercial banks particularly in Ethiopia. Similarly, studies on the determinants of lending behavior of banks in the Ethiopian financial market are hardly available with the only existing addressing a few of these variables [9]. Moreover, the few studies have been done particularly in Ethiopia focusing on the inclusion of some of the determinant factors of lending behavior. This means that little attempts have been made to conduct studies on lending behavior of commercial banks based on these five determinant factors. Consequently, the study designed to address this knowledge gap. Therefore, the aim of the study was to examine the determinants of commercial banks' lending behavior for selected commercial banks in Ethiopia.

### ***2.4. Conceptual Framework***

Considering theories such as Loan pricing theory, credit market theory, hold-up theory, soft budget constraint, signaling, bankruptcy and risk return theories, market power (MP), efficiency structure (ES) hypotheses and others, lending behavior of commercial banks is attributed to bank specific characteristics and other external management factors [8, 14, 18, 22, 23; 24]. These theories and empirical results show that asset quality, volume of deposits, capital adequacy, liquidity ratio and interest/credit rate significantly influence lending behavior of the commercial banks. However, the empirical result shows that some of the factors have significant and positive influence; while, others have insignificant and negative effect, and others have different effects on the performance of lending behavior of commercial banks. Based these effects, the relationship between the dependent variable (Lending behavior of commercial banks) and the independent variables (the determinant factors; volume of deposits, interest rate, liquidity, capital adequacy and asset quality) are indicated in figure I below;



**Figure 1: Conceptual Frameworks**

Sources: Adapted from [10], with certain modification

The Dependent variable: Total Loans and Advances (Lending Behavior of Commercial Banks) This is the dependent variable of the model. It is defined as the total annual gross loans and advances the commercial banks advances to both the public and private sector. This was obtained from the assets side of the bank’s balance sheet [11, 18]. The trend of the total loans and advances therefore captured the behavior of banks’ lending over time thus indicating on whether banks are lending more in the current period compare to the previous periods. The Independent Variables: The determinants of Lending Behavior of Commercial Banks

These determinants consist of the following:

### 1) Volume of Deposit

Lending activity is made possible only if the banks can mobilize enough funds from their customers [23]. Since commercial banks depend on depositor's money as a source of funds, it means that there are some relationships between the ability of the banks to mobilize deposits and the amount of credit granted to the customers [17]. As total deposit increases the total advance and loan increases proportionally [13]. An increase in deposit of a bank is likely to improve its ability to lend more funds to its customers. Lending and deposits move together because faster deposit growth signals growing demand for loans [10]. The researchers [17], in their study found positive significant relationship between volume of deposit and lending behavior of commercial banks. Similarly, the volume of deposit has the highest influence on the lending of commercial banks and a change in it will yield the highest change in banks' loans and advances [13, 18]. Moreover, Volume of deposits has a positive and significant influence on lending volumes among commercial banks [10].

### 2) Interest/Credit Rate

Loan pricing or interest rate is one of the most important factors deliberated by both the borrower and the lending institution in the process of lending decision [10]. This interest rates vary according to the government's directives to the central bank to accomplish the government's goals, the currency of the principal sum lent or borrowed, the term to maturity of the investment, the perceived default probability of the borrower and supply and demand in the market as well as other factors [18]. The cost of borrowing is reduced by low interest rate, which in turn determines the investment activities and high consumer durables purchase. As a result, low interest rate may trigger investing into stocks, raising households' financial assets. The impact of this may be increased consumer spending, making firms' investment projects more attractive. A borrower of sound financial position is usually granted long term interest rates on loans for a longer period. Whereas, short-term interest rates are based on rates charged on treasury bills. The short-term rates have higher fluctuations but at the same time averages lower compared to the long-term rates [10]. Interest rate negatively affected the lending behavior of commercial banks [18]. Similarly, lending (or interest) rate and lending behavior of commercial banks are inversely related [8].

### 3) Capital Adequacy Ratio

Capital adequacy ratio (CAR) is a specialized ratio used by banks to determine the adequacy of their capital keeping in view their risk exposures. The ratio is intended to be a measurement of a bank's capital position in respect of its exposures to credit risk, market risk and operational risk. Since 1988 when Basel Capital Accord came into effect, a lot has been reviewed on impact of a banks' capital on its lending but empirical literature from the Western Countries have not been exhaustive in this area. It will measure as a ratio of equity capital to total assets. For this case, banks are expected to be adequately capitalized. This implies that they must have enough assets that can be readily transformed to cash to meet short-term and long-term obligations [10]. The researchers [3], assumed the relationship between a bank's activities and financial conditions is impacted largely by the bank's capital on its lending. Rababah (2015 cited in [8], found out that capital had no significant effect the banks' lending activities by commercial banks in Jordan using shared regression analysis. However, capital

adequacy has positive and significant influence on lending behavior of commercial banks [8].

#### **4) Liquidity Ratio**

Liquidity denotes a bank's ability to honor its financial obligations, mainly to depositors, whenever they are in need of their deposits [10]. Liquidity ratios of any business outfit demonstrate their financial sound position. It shows the capability of an enterprise to meet its maturing obligations. Lending recognizes as the main business activity for the majority of commercial banks. The largest asset in a bank's balance sheet is probably loan portfolio which contributes heavily to a bank's revenue. This makes it to be the largest source of commercial banks' risk to its safety and sound position [10]. The scholar [20], suggests that the liquidity level held by banks relies to a great extent on demand for loan which forms the foundation for growth in loans. Accordingly, a lower demand for credit facilities leads the commercial banks to keep more of short term assets, whereas a higher loan demand triggers holding of less liquid assets which is informed by the high profits associated with the long term loans [10]. Thus, loans and advances posit an inverse relationship with the banks liquidity. For this case, liquidity ratio will measure as a ratio of total loans advanced to total assets. Some researchers found that liquidity is positively related with the profitability of a bank [8, 9]. Liquidity is paid much more attention by banks than the other types of financial institutions e.g. insurance companies dealing in life policies [6]. It should be noted that banks meet their payment obligations largely from the current receipts of liabilities from its normal business course [10]. For this case, a strong liquidity position in economy is a demonstration of the sectors liking for liquid assets which are generally government related financial securities which are risk free in nature. Liquidity ratio has positive and significant influence on lending behavior of commercial banks [8, 9].

#### **5) Asset Quality**

Asset quality refers to the relationship between loan provisions and the total loans. It measured as a ratio of loan loss provision to total loans and advances. The loan provision is an expense to the profit and loss statements and therefore needs to be mitigated appropriately [8]. It measures the efficiency of a bank management in raising revenues by extending loans and advances. Lending carries with it risks in that the loan repayments is not guaranteed all the time and largely depend on other factors which are within the borrowers control [18]. Managing loans therefore in an appropriate way has positive effect on both the performance of the bank and also on the borrower and the economy of a country as a whole [10]. Poor loan management would definitely lead to soaring levels of non-performing loans [8]. This will have a multiplier effect on the performance of bank and economy at large. Asset quality has no significant influence on lending behavior of commercial banks [8].

### **3. Methodology of the Study**

#### ***3.1. Description of the methods used to conduct the study***

The research design adopted for this study was a cross sectional explanatory research design. The study describes the determinants of commercial banks' lending behavior. Both qualitative and quantitative data were employed. Qualitative data were designed to understand the interaction of the results and to create a chance for the researcher to analyze more on the determinants of commercial banks' lending behavior. In addition to this, it

was used for examining and analyzing the interaction of the data collected from the commercial banks' audited annual reports as well as the National Bank of Ethiopia annual reports on commercial banks' performance from 2011 to 2017. Whereas, Quantitative research approach denotes the application of systematic steps of scientific research, while utilizing quantitative properties in the study [5, p. 20]. Quantitative data were used in order to do more through statistical analyses (both descriptive and inferential) from the sample taken. The study used secondary data from the selected audited annual reports of the commercial banks as well as the yearly financial reports of National bank of Ethiopia from 2011 to 2017. Finally, the study utilized correlational and regression analysis to examine the relationship between the dependent and independent variables and power of explanation of the independent variables for the dependent variable respectively.

### 3.2. Model Specification

Based on the conceptual framework, bank lending behavior has been measured by aggregate of total loans advanced by the banks in each financial year. Liquidity was measured as a ratio of total loans advanced to total assets. This was done on each bank over the period under study and the same amalgamated to get the industry position. Capital adequacy measured as a ratio of equity capital to total assets. Total assets here refer to total loans and advances. Interest rates factor was determined by calculating the average interest rates as published by National Bank of Ethiopia, denominated as National Bank Rates (NBR). Asset quality was measure as a ratio of loan loss provision to total loans and advances. Finally, volume deposits refer to the amount of deposit within the commercial bank in the specified period. The regression equation used to establish the determinants of the lending behavior by commercial banks in the Ethiopian banking sector with a focus on lending behavior of selected commercial Banks in Ethiopia was as indicated below:-

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Where: Y is the dependent variable (Lending Behavior – Total Loans and Advances (TLA))

$\beta_0$  is the intercept of the regression equation;

$\beta_1, \beta_2, \beta_3, \beta_4$  and  $\beta_5$  are the coefficients of the regression equation;

$X_1$  = Liquidity ratio (Total loans to Total Assets)

$X_2$  = Capital Adequacy ratio (Total Capital to Total Assets)

$X_3$  = Interest/credit Rates (Central Bank Rates, Treasury bill Rates)

$X_4$  = Asset Quality (Loan loss provisions to Total Loans)

$X_5$  = the Volume of Deposits (total deposits to Total assets); and  $\varepsilon$  is an error term

### 3.3. Testing for Regression Model Assumptions

Classical assumptions for regression analysis include the sample is representative of the population for the inference prediction and the error is a random variable with a mean of zero conditional on the explanatory variables, the independent variables are measured with no error. The independent variables (predictors) are linearly independent, i.e. it is not possible to express any predictor as a linear combination of the others. It also includes the errors are uncorrelated, that is, the variance-covariance matrix of the errors is diagonal and each non-zero element is the variance of the error, the variance of the error is constant across observations (homoscedasticity). If not, weighted least squares or other methods might instead be used [2]. Out of the above listed tests, the research tested the following assumptions:

### 3.3.1. Test for Average Value of the Error Term is Zero

The first assumption required is the average value of the errors is zero; ( $\sum (U_i) = 0$ ). In fact, if a constant term is included in the regression equation, this assumption will never be violated. Therefore, since the constant term (i.e.  $\alpha$ ) is included in the regression equation, the average value of the error term in this study is expected to be zero.

### 3.3.2. Test for Heteroskedasticity

Ordinary least squares (OLS) assumes homoscedastic error terms. In OLS, the data are homoscedastic if the error term does not have constant variance. If there is non-constant variance of the error terms, the error terms are related to some variable (or set of variables), or to case. The data is then heteroskedastic. The tests for heteroskedasticity tend to incorporate the same basic idea of figuring out – through an auxiliary regression analysis – whether the independent variables (or case numbers, or some combination of independent variables) has a significant relationship to the goodness of fit of the model. To resolve this problem, one of the applicable tests for heteroscedasticity is Breusch-Pagan / Cook-Weisberg test for heteroscedasticity. Accordingly, if the p-value of Breusch-Pagan test is greater than .05, the homogeneity of variance of the residual has been met (Homoscedasticity) [25]. Based on this concept, the null and its alternative hypotheses are as indicated below;

Hypothesis, H<sub>0</sub>: there is constant variance

Variables: fitted values of total loans and advances

**Table 1:** Test for Heteroscedasticity

Breusch-Pagan / Cook-Weisberg test	chi <sup>2</sup> (1)	=	0.39
	Prob > chi <sup>2</sup>	=	0.5299
NR2 version of the score test	chi <sup>2</sup> (1)	=	0.42
	Prob > chi <sup>2</sup>	=	0.5182
F-Statistics	F(1 , 68)	=	0.41
	Prob > F	=	0.5251

As indicated in table 1, the significant level of the Breusch-Pagan /Cook-Weisberg test, NR<sup>2</sup> version of the score test and F-Statistics are above 0.05, indicating that the null hypothesis ‘ there is constant variance/homoscedasticity is accepted.’ Hence, the existence of a constant variance leads to no Heteroscedastic effect in the regression model.

**3.3.3. Test for Multicollinearity**

Multicollinearity refers to a situation in which two or more explanatory variables in a multiple regression model are highly linearly related. We have perfect Multicollinearity if, for example as in the equation above, the correlation between two independent variables is equal to 1 or -1. In practice, we rarely face perfect Multicollinearity in a data set. More commonly, the issue of Multicollinearity arises when there is an approximate linear relationship among two or more independent variables. To avoid this, it is important that the results from collinearity diagnostics should have tolerance value above 0.10 and variance inflation factor (VIF) value less than 10, which indicates less correlation of the variables [19].

**Table 2:** Test for Multicollinearity Effect

Variables	VIF	1/VIF = Tolerance
Asset Quality (AQ)	1.71	0.586
Volume of Deposits (VD)	1.68	0.594
Credit Rate(CR)	1.08	0.927
Liquidity Ratio(LR)	1.06	0.940
Capital Adequacy Ratio(CAR)	1.05	0.954
Mean VIF	1.32	

As indicated in table 2, there are no values for tolerance below 0.1 and VIF above 10, indicating that there is no Multicollinearity effect here.

**3.3.4. Testing for Omitted Variables**

Ramsey RESET test using powers of the fitted values of total loans and advances

Ho: Model has no omitted variables

**Table 3:** Test for Omitted Variables

F(3, 61)	0.14
Prob> F	0.933

The above result in table 3 has significant value of above 0.05, indicating that the null hypothesis of the model which has no omitted variables is accepted.

#### 4. Discussion for Major findings of the Study

##### 4.1. The Findings from Descriptive Results

**Table 4:** Descriptive Analysis for the determinants of lending behavior

Variable	Observation	Mean	Std. Dev.	Min	Max
Liquidity Ratio(LR)	70	.447	.065	.31	.58
Credit Rate(CR)	70	.140	.018	.12	.18
Capital Adequacy Ratio(CAR)	70	.125	.039	.04	.2
Asset Quality (AQ)	70	.018	.011	0	.06
Volume of Deposits (VD)	70	7.154	3.766	3.59	22.56

##### 1. Liquidity Ratio (LR)

Table 4 shows descriptive analysis of the five determinants of lending behavior for the selected commercial banks from the period of 2011 to 2017. For this case, liquidity ratio (LR) has an aggregate mean score of .447 with standard deviation of .065, depicting that on average, the loans and advances given to the selected commercial banks is about 44.7% of their Assets. This reveals that on average 44.7 percent of commercial banks assets is converted in to the loan and the remaining balance helps to maintain the liquidity position of the banks. Moreover, the selected commercial banks have a minimum and maximum LR of 0.31 and 0.58 respectively. This indicates that the selected commercial banks have a minimum and maximum of 31% and 58% of their assets converted in to loans for their customers respectively.

##### 2. Credit Rate (CR)

Similarly, table 4 depicts the aggregate mean score of 0.140 by credit rate (CR) with standard deviation of 0.018, indicating that selected commercial banks borrow to their customers with an average lending/credit rate of 14% from the periods 2011 to 2017. It also shows minimum credit rate of 12 % in 2012 and a maximum CR of 18% in 2017. This is an indication for the selected commercial banks borrow customers with minimum credit rate of 12% and maximum credit rate of 18% per year from 2011 to 2017 financial period respectively.

##### 3. Capital Adequacy Ratio (CAR)

Table 4 also depicts the descriptive analysis of the capital adequacy ratio of the selected commercial banks from 2011 to 2017. Accordingly, the selected commercial banks' CAR have aggregate mean score of .125 with standard deviation of .039, which indicates the selected ten commercial banks have capital adequacy ratio of 12.5% of their assets. This presents on average the capital of the selects commercial banks covers 12.5% their assets size. It also shows with minimum CAR of 0.04 and maximum of 0.2 with in the specified period, indicating that the capital of the selected commercial banks shows a minimum and maximum of 4% and 20% their asset size.

4. Asset Quality (AQR)

Table 4 also illustrates the descriptive analysis of the Asset Quality (AQ) of the selected commercial banks from 2011 to 2017. Accordingly, AQ for the selected commercial banks has an aggregate mean score of 0.018 with standard deviation of 0.011, which indicates the provision for loans and advances of selected ten commercial banks presents 1.8% of their total loans and advances given for their borrowers. It also shows with minimum AQ of 0 and maximum of 0.06 with in the specified period from 2011 to 2017. This indicates the selected commercial banks loss a minimum of 0% and a maximum of 6% provision for loans and advance to recover their doubtful loans and advances.

5. Volume of Deposits (VD)

Table 4 also represents the descriptive analysis of the volume of deposits (VD) of the selected commercial banks from 2011 to 2017. Accordingly, the volume of deposits (VD) for the selected commercial banks has an aggregate mean score of 7.154 with standard deviation of 3.766, which indicates on average the deposit for the selected ten commercial banks 7.154 times their capitals. It also shows with minimum VD of 3.59 and maximum of 22.56 with in the specified period from 2011 to 2017 respectively. The researcher [13], in his study recommended that both government and commercial banks need to do a lot in order to ensure good lending behavior to enforce the most easily realizable policies and good credit management in every situation even where a good measure of macroeconomic stability is achieved.

4.2. The Findings from Correlation Results

**Table 5:** Correlation Values of the Dependent and Independent Variables

	TLA	LR	CR	AQR	CAR	VD
Behavior in total loans and Advances (TLA)	1.000					
Liquidity Ratio(LR)	0.313*	1.000				
Credit Rate(CR)	-0.347*	-0.229	1.000			
Capital Adequacy Ratio(CAR)	-0.125	-0.027	0.032	1.000		
Asset Quality (AQ)	-0.206	0.066	-0.086	0.188	1.000	
Volume of Deposits (VD)	-0.003	-0.060	0.090	-0.626	-0.135	1.000

\*Correlation is significant at 0.05

Pearson correlations results in table 5 showed that liquidity ratio was most highly positively and significantly correlated to lending behavior ( $r = 0.313$ ). Thus, the liquidity ratio had 31.3% positive relationship with quantity of loan. Similarly, credit rate was also moderately associated with lending behavior ( $r = -0.347$ ) an indication that interest rate had 34.7% significant negative relationship with lending behavior. Capital Adequacy ratio (CAR) ( $r = -0.125$ ) has negatively weak association with lending behavior, depicting that CAR had 12.5% negatively and insignificant association with lending behavior of the selected commercial banks. Moreover,

Asset Quality (AQ) (-0.206) has negative, weak and insignificant association with lending behavior for total loans and advances given by the selected commercial banks. Finally, the Volume of Deposit (VD) ( $r = -0.003$ ) shows almost no relationship with lending behavior of the selected commercial banks. This correlation findings provided enough evidence to suggest that there was linear relationship between volumes of deposit, interest/credit rate, liquidity ratio, asset quality and capital adequacy ratio with lending behavior of the selected commercial banks.

**4.3. The Findings from Regression Results**

**Table 6:** Regression estimation of the determinants of lending behavior

Variables	Unstandardized Coefficients	Std. Err	t	P > t	Standardized coefficients (Beta)
Liquidity Ratio(LR)	79.493	35.058	2.27	0.027	.254
Credit Rate(CR)	-336.034	125.506	-2.68	0.009	-.302
Capital Adequacy Ratio(CAR)	-49.149	74.540	-0.66	0.512	-.094
Asset Quality (AQ)	-450.075	210.488	-2.14	0.036	-.238
Volume of Deposits (VD)	-.256	.762	-0.34	0.738	-.047
constant	62.927	28.892	2.18	0.033	

Source	SS	df	MS	Number of observations = 70	
				F(5, 64)	= 4.15
Model	7002.14842	5	1400.430	Prob > F	= 0.0025
Residual	21575.3516	64	337.115	R-squared	= 0.2450
Total	28577.5	69	414.167	Adj R-squared	= 0.1860
				Root MSE	= 18.361

As indicated in table 6 above, the coefficient of determination ( $R^2$ -value) is 0.2450, which means that 24.50% of the variations in the dependent variable (behavior of total loans and advances) are explained by the independent variables; Liquidity Ratio (LR), Credit Rate (CR), Asset Quality (AQ), Capital Adequacy Ratio (CAR) and Volume of Deposits (VD); whereas, the remaining 75.50% was explained by other extraneous variables. From the Analysis of Variance (ANOVA) model table 6, F ratio of 4.15 with p-value of  $0.0025 < 0.05$ . This level of significance indicated that the coefficient of determination ( $R^2$ -value) was significant. Thus, the model was fit to predict Lending behavior using liquidity, Capital adequacy, Interest Rate, Asset Quality and Volume of Deposits (VD).The F-stat result also show that the independent variables jointly explain the variations in the model and the model was statistically fitted. Based on the above results in table 6, lending behavior (total loans and advances) =  $\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \epsilon$ . This implies,  $TLA = \alpha + \beta_1 (LR) + \beta_2 (CR) + \beta_3 (CAR) + \beta_4 (AQ) + \beta_5 (VD) + \epsilon$ . Therefore,  $TLA = 91.819 + 79.493 (LR) - 336.034 (CR) - 49.149(CAR) - 450.075(AQ) - .256 (VD)$  using the unstandardized coefficients.

OR:  $TLA = .254 (LR) - .302 (CR) - .094 (CAR) - .238 (AQ) - .047 (VD)$  using the standardized coefficients of the regression estimation.

Based on the standardized coefficient estimations indicated above, a unit increase in the liquidity ratio (LR) will lead to a 25.4% increase in the total loans and advances, holding the remaining other four variables constant. Credit (lending) rate is also statistically significant at 5% level of significance, where a unit increase in credit rate leads a direct decrease in the total loans and advances by .302, holding others determinants constant. Similarly, a unit increase in capital adequacy ratio (CAR) will lead to 9.4% decrease in the behavior of lending. Asset quality (AQ) is also negatively related to the behavior of lending and statistically significant at 5% level of significance where, a unit increase in asset quality ratio leads to 23.8% in the behavior of lending. Finally, volume of deposit has a linear relationship with behavior of lending but it is not statistically significant at 5% level of significance. It also shows a unit increase in the asset quality ratio leads to 4.7% decrease in the behavior of lending. The constant is statistically significant at 5% level of significance. This indicates that all the factors, liquidity, capital adequacy, Interest/credit rates, volume of deposits and asset quality have impact on the credit extension by the selected commercial banks. Moreover, the significant value under  $P > t$  shows three factors; Liquidity Ratio(LR), Credit Rate(CR) and Asset Quality have significant effect on lending behavior; while, two factors; Capital Adequacy Ratio (CAR) and Volume Deposits (VD) have insignificant effect on lending behavior of the selected commercial banks in Ethiopia. In contrast to this finding, liquidity, interest/credit rate and capital adequacy demonstrated significant impact on lending behavior; whereas, asset quality appeared to have insignificant impact on the lending behavior of state owned commercial banks [8]. Similarly, the research finding by [18], indicated volume of deposit in commercial banks has a significant effect on the total loan advanced by commercial banks.

## **5. Conclusions and Recommendations**

### **5.1. Conclusions**

From the descriptive results, the loans and advances given to the selected commercial banks was about 44.7% of their Assets, average credit rate of 14%, the capital of the selected commercial banks covers 12.5% their assets size, the provision for loans and advances of selected ten commercial banks presents 1.8% of their total loans and advances given for their borrowers and the deposit for the selected ten commercial banks 7.154 times their capitals. From the correlation results, the study concludes that liquidity ratio has a significant positive relationship with commercial bank lending behavior for the selected commercial banks in Ethiopia. However, credit/interest rate is negatively and significantly related to lending behavior for the selected commercial banks. The study also concludes capital adequacy ratio, asset quality ratio and volume deposits had negative and insignificant relationship with lending behavior by commercial banks in Ethiopia. This result implies that the explanatory variables has an impact on the lending behavior of commercial banks and a change in them will yield the highest change in banks' total loans and advances. The regression result shows that the factors; liquidity ratio (LR), credit rate (CR) and asset quality ratio have significant effect on lending behavior; whereas, two factors; capital adequacy ratio and volume deposits have insignificant effect on lending behavior of the selected commercial banks. Accordingly, liquidity ratio had positive and significant effect on lending behavior

of the total loans and advances given by the selected commercial banks. The four factors; credit rate, capital adequacy ratio, asset quality and volume of deposits have negative effect on lending behavior of the total loans and advances. The study findings revealed that the banks' interest/credit rates, capital adequacy ratio, asset quality ratio and volume deposits have an inverse relationship with lending behavior of total loans advanced by commercial banks. For this case, high interest rates discourage borrowing and vice versa. This means that as the credit/interest rate, capital adequacy ratio, asset quality ratio and volume of deposits increases, the lending behavior on total loans and advances given to their customers' decreases.

## **5.2. Recommendations**

From the correlation and regression results discussed above, some recommendations and implications can be highlighted. Thus, the correlation and regression result revealed the existence of relationship between banks' lending behavior on total loans and advances and volume of deposit, credit rate, capital adequacy ratio, asset quality ratio and liquidity ratio of the selected commercial banks' in Ethiopia. For this reason, there should be closer consultation and cooperation between commercial banks and the regulatory authorities so that the effect of regulatory measure on commercial banks is taken into account at the stage of policy formulation to include the most significant factors. The study also recommends that effective policies should be developed to ensure commercial banks grow and therefore advance more credit for their customers. Commercial banks should also try as much as possible to raid a balance in their loan pricing decisions. This will help them to be able to cover cost associated with lending and at the same time, maintain good banking relationship with their borrowers. Commercial banks could also increase profit by holding a larger volume of loans than they have done previously in order to make up for the short fall of the interest income. When banks are unable to fund their loans or make payments on debt, they will be very unwilling to lend. Liquidity allows banks to meet any unexpected expenses without having to liquidate other assets. For this case, a low liquidity reduces commercial banks' lending. Hence, the selected commercial banks should have high liquidity ratio to increase their loans and advances for their borrowers. The study findings revealed that the volume of deposit in commercial banks has an effect on loans advanced by them. Therefore, commercial banks should exert more effort to manage their deposits efficiently so that their objective of profitability can be achieved. Finally, this study established the determinants of lending behavior in selected commercial banks in Ethiopia by taking five factors using secondary data. Therefore, it recommends that another study should be done to supplement the findings in this study by taking more determinant factors in other banks. Moreover, it also recommends a study should be done on the determinants of lending behavior in small and medium enterprise by taking similar or other factors.

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## Appendix

### Appendix-I: Summary for the Commercial Bank’s under the Study

**Table 7**

S. No.	Name of the Bank	Year of Establishment
1	Awash International Bank	1994
2	Bank of Abyssinia	1996
3	Oromia International Bank	2008
4	Commercial Bank of Ethiopia	1943
5	Cooperative Bank of Oromia (SC.)	2005
6	Dashen Bank	1996
7	Lion International Bank	2006
8	Nib International Bank	1999
9	United Bank	1998
10	Wegagen Bank	1997

Sources: <http://www.wikipedia.org/list of banks in Ethiopia>