ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Determinants of Commercial Banks' lending: Evidence from Ethiopia

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A Thesis Submitted to the School of Graduate Studies of Addis Ababa University Department of Management in Partial Fulfillment of the Requirements for Masters of Business Administration in finance (MBA-Finance)

Addis Ababa

STATEMENT OF DECLARATION

I, Zelalem Getachew declare that, this thesis entitled: “Determinants of commercial banks’ lending evidence from Ethiopia is my original work produced under the guidance of my advisor Dr. Abebaw Kassie, and has never been published and/or submitted for any award of Degree in any other University. Any source used is duly acknowledged in this study.

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CERTIFICATION

This is to certify that the thesis prepared by Zelalem Getachew, entitled *"Determinants of commercial banks' lending evidence from Ethiopia* submitted in partial fulfillment for Masters of Business Administration in Finance complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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Abstract

The study was aimed to investigate the effect of Bank specific,regulatory and Macro economic factors on Ethiopian commercial banks' lending or loan and advances. In order to achieve research objective the researcher used quantitative research approach. The analyses were performed using panel data derived from the financial statements of sampled Ethiopian commercial banks and macro-economic data from National bank of Ethiopia. Ordinary least square (OLS) technique was applied to determine the impact of those predictor variables on commercial bank lending. In the study bank size, volume of deposit, cash reserve requirement, credit risk, liquidity ratio, lending interest rate, GDP and inflation of the country were considered as independent variables whereas commercial banks' lending or loan and advances was considered as dependent variable. The result of the regression analysis reveals that Ethiopian commercial banks' lending is determined by bank size (asset), volume of deposit and GDP growth, positively and by cash reserves requirement and liquidity ratio negatively. On the other hand credit risk, lending interest rate and inflation has insignificant impact on Ethiopian commercial banks' lending or loan and advances. The study suggests that Ethiopian commercial banks should enhance their strategies in mobilizing deposits from the public and have to strive to strength their asset size. In addition commercial banks' should manage their liquidity and administer their lending activity by considering internal factors, existing economic situation, competitive environment, regulatory measures and their target customers.

***Key words**: lending, cash reserve requirement, volume of deposit, liquidity ratio, bank size*

ACKNOWLEDGEMENTS

First, I want to thank almighty of God and his virgin mother saints marry. In God's will and with the help of his mother this study finalized and become fruitful.

I am grateful for my advisor, Dr.Abebaw Kassie, for his important and valuable advice throughout the study.

Next, I want to thank my parents who are very much supportive and they are the reason why I am here.

I also gratefully acknowledge and would like to thank the National Bank of Ethiopia for giving me the opportunity to the study with financial support and study leave. In addition I want to thank the bank specially bank supervision directorate and monetary and economic research directorate for their willingness to provide data for the study.

Finally, I want to thank my colleagues and my friends who assist me in the process of accomplishment of this study.

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CLRM=Classical linear regression model

CR=Credit risk

CRR = Cash reserve requirement ratio

FEM=fixed effect model

LQR =Liquidity ratio

LIR = Lending interest Rate

LD = Natural logarithm of loan and advances

SIZE = Natural logarithm of bank size

VD = Volume of deposit

INF=Annual inflation rate

NPLR - Nonperforming loan ratio

OLS: Ordinary Least Square

REM: Random Effect Model

CHAPTER ONE

1.1. INTRODUCTION

Financial institution especially banks are play very important role in the economic life of the nation. The health of the economy is closely related to the soundness of its banking system. Although banks create no new wealth but their depositing, lending and related activities facilitate the process of production, distribution, exchange and consumption of wealth. In this way they become very effective partners in the process of economic development. Today modern banks are very useful for the utilization of the resources of the country. The banks are the most important saving mobilization loan granting and financial resources allocation institution. If there would be no banks then a great portion of a capital of the country would remain idle.(Mistruli 2003)

Commercial banks are an important phenomenon in economic growth and development. In order for them to perform these roles, it must be realized that banks have the potential, scope and prospects of financial intermediation. As a result commercial bank plays a great role for the growth of the economy by maintaining three main operating guiding principles, which are profitability, liquidity and solvency. (Osei,2013)

Banking is a rapidly growing industry in Ethiopia. During the study period there are 2 state owned and 16 private commercial banks; Commercial Bank of Ethiopia is the largest, controlling the majority assets of the industry.

Bank loan is typically the largest asset and the predominant source of income for banks. In view of the significant contribution of loans to the financial health of banks through interest income earnings, these assets are considered the most valuable assets of banks.

Lending could be on short, medium or long term basis is a major service rendered by the commercial banks to their customers which includes: individual, firms and government to aid their economic activities for the development and growth of the national economy. Thus, banks' lending activities generate economic growth through resources provision for real investment (Mckinnon, 2005).

Banking operations involve lending which is an integral function of the commercial banks. In all economies around the world, the operations of commercial banks are regulated more by banking supervisory authorities by National Bank of Ethiopia (NBE) in Ethiopian case Therefore; lending aspect of banking operations is determined by both bank specific, external regulatory and macroeconomic factors.

This study aimed to determine the effect of common determinants of commercial banks' lending behavior or loans and advances; and thereby, to provide empirical evidence about the effects bank size, volume of deposit, cash reserve requirement ratio, credit risk, liquidity ratio, lending interest rate, gross domestic product and inflation on Ethiopian commercial banks' lending or loan and advances.

1.2. Statement of the problem

Banks perform the role of financial intermediation by mobilizing savings from the public in the form of deposits and then lend this to borrowers. Therefore, banks act as an intermediary to

channel credits on behalf of the depositors. Banks are supposed to do this job better than the public as they specialize in the lending business. (Okoye,2014)

Lending is the principal business activity for most commercial banks, makes the loan portfolio is typically the largest asset and the predominate source of revenue for commercial banks. Thus, the major portion of gross profit of the banking industry is earned from loans in the form of interest income and contributes the lion share of commercial banks earnings (Vong et al., 2009). But, on the other hand, it is also one of the greatest sources of risk to a financial institutions safety and soundness. Whether due to lax credit standards, poor portfolio risk management, or weakness in the economy, historically loan portfolio problems have been the major cause of losses and failures for commercial banks (Vong et al., 2009).

Commercial banking specially lending by its nature is highly prone to unpredictability, arising from different internal bank specific and external regulator and macro economic factors.

In Ethiopia as far as the researchers knowledge the only studies conducted with regard to determinants of commercial bank lending behavior are Mitku(2014),Amano(2014)and Berhanu(2016). When these studies are analyzed even if it is grateful to make inquiries in this untouched but foremost area the authors in their study fail to include the impacts of inflation, credit risk and bank sizes on Ethiopian commercial banks' lending respectively. In addition Berhanu (2016) in his study about commercial banks lending decision includes only private banks but he neglect the impact of the dominant state-owned bank, commercial bank of Ethiopia. Hence, leave out of most important variables, exclusions of main sample from the study initiate the researcher for further study and detail investigation in the area. Therefore, the researcher will

try to fill this knowledge gap and assess the impacts of those and other factors on lending of Ethiopian commercial banks by using panel data.

1.3. Objective of the study

The main objective of the study is to investigate the factors that affect lending behavior of commercial banks' in Ethiopia. More specifically, the study has the following specific objectives.

1.3.1 Specific Objectives

The specific objectives are;

- To examine the effect of bank size on commercial banks' lending or loan and advances
- To examine the effect of volume of deposit on commercial banks' lending or loan and advances
- To examine the effect of cash reserve requirement on commercial banks' lending or loan and advances
- To examine the effect of credit risk on commercial banks' lending or loan and advances
- To examine the effect of liquidity ratio on commercial banks' lending or loan and advances
- To examine the effect of lending interest rate on commercial banks' lending or loan and advances
- To examine the effect of GDP on commercial banks' lending or loan and advances
- To examine the effect of inflation on commercial banks' lending or loan and advances

1.4. Hypotheses of the study

In line with the broad purpose statement the following hypotheses were also formulated for investigation. Hypotheses of the study stands on the theories related to loan and advances ,has been developed over the years by different researchers' and past empirical studies related to commercial banks' lending behavior. The results from the literature review were used to establish expectations for the relationship of the different determinants. Hence, based on the objective, the present study seeks to test the following eight hypotheses.

- **Hypothesis1:-**Bank size has positive and significant impact on Ethiopian commercial banks' lending or loan and advances.
- **Hypothesis2:-**Volume of deposit has positive and significant impact on Ethiopian commercial banks' lending or loan and advances.
- **Hypothesis3:-**Cash reserve requirement has negative and significant impact on Ethiopian commercial banks' lending or loan and advances.
- **Hypothesis4:-**Credit risk has negative and significant impact on Ethiopian commercial banks' lending or loan and advances.
- **Hypothesis 5:-** Liquidity ratio has positive and significant impact on Ethiopian commercial banks' lending or loan and advances.
- **Hypothesis6:-**Lending interest rate has negative and significant impact on Ethiopian commercial banks' lending or loan and advances**.**
- **Hypothesis7:-**GDP growth of the country has positive and significant impact on Ethiopian commercial banks' lending or loan and advances.

- **Hypothesis8:-.**Inflation of the country has negative and significant impact on Ethiopian commercial banks' lending or loan and advances.

1.5. Significances of the study

First and foremost, the findings of the study will be tremendously beneficial to the academicians, as well as the commercial banks to understand the factors which affect commercial banks' lending behavior.

The result of the study will be of a benefit to future researchers who will make use of the findings to conduct further research work in the area of lending behavior of commercial banks in the country.

The findings of the study will expose the relevant factors affecting the lending activities of the commercial banks. By implication, this will aid the relevant regulatory authorities and policy makers in formulating appropriate policies that will enhance effective administration and management of loans, credits and other forms of lending by commercial banks in the economy.

Furthermore, the findings of the study will be of immense benefit to commercial banks in terms of using them as inputs in formulating guidelines with which to effectively manage their lending activities in the economy.

1.6. Scope and limitation of the study

The scope of the study is restricted to the assessment of factors affecting commercial banks lending or loan and advances which are found in Ethiopia. The study's period is designed to have coverage on relevant data of thirteen years between the years 2002-2014. This period is chosen due to the availability of relevant data and yet considered reasonably long enough to provide adequate analysis and investigation in this study.

In researcher viewpoint the limitation of study is, in Ethiopia huge amount of loan is processed through government's policy bank, Development Bank of Ethiopia (DBE) however, the study doesn't include this bank in examining determinants of lending behavior of Ethiopian banks.

1.7. Organization of the study

The paper is organized in five chapters. Chapter one provides introductory information and gives a general picture about objective of the study, statement of the problem, hypothesis of the study, significance of the study, scope and limitation of the study. Chapter two presents review of related literature and the study area description. Chapter three is methodology part. It addresses the approach intended to use, data collection methods research design, and models that are employed for the purpose of the study. In the fourth chapter of the study analysis, discussion and interpretation of the result would take place.The last chapter will summarize the findings of the study and provides recommendation in line with the finding.

CHAPTER TWO

2. LITERATURE REVIEW

The intention of this chapter is to discuss about different literature regarding determinants of lending or loan and advances around the world and in our country as well.

The chapter has five sections. The first section discussed about overview of Ethiopian commercial banks lending or loan and advances history, the second section discussed about Theoretical framework on lending or loan and advances, the third section discussed determinants of commercial bank lending or loan and advances, the fourth section discussed about empirical studies around the globe and in Ethiopia The fifth section will deal about summary and knowledge gaps and the last section present conceptual framework.

2.1. Overview of Ethiopian banks' lending or loan and advances history

According to Itana (1994) in pre 1974 period the Development Bank and Investment Corporation merged in 1970 and formed the Agricultural and Industrial Development Bank share company to deal mainly with medium and long term loans in the agricultural and industrial loans. While other banks during the time concentrated on short term commercial and industrial loan. The National Bank of Ethiopia as central Bank of the country had the responsibility of licensing and supervising of commercial Bank operation in Ethiopia .lending rates and size of the loans are granted by commercial Banks were unregulated except for the 12% maximum of general application. Lending rates ranged between 6 and 9.5% for both export and other loans .although the growth of saving rapid there was shortage of short term

funds to meet the demand for credit from commercial banks. The Overall credit systems during the pre-revolution period in Ethiopia were also characterized by the concentration of bank operation in few urban areas; the collateral requirements were up to 200% for loans by financial intermediaries in addition the minimum loan requirements were high which favored big business men over small ones.

In post revolution period the financial sector institution were fully nationalized and consolidated into specialized banks, the institutions are National bank of Ethiopia (NBE) which is the central bank and financial arm of the Government, Commercial Bank of Ethiopia(CBE) which is responsible for mobilization of savings and extensions of loans for commercial activities, Agricultural and Industrial development Bank(AIDB) extends short and long term loans to agricultural and industrial and other sectors. The Housing and Saving Bank (HISB) concentrates on activities related to mortgage loan. Lending policies in the formal financial sector are set by NBE ,and were geared towards supporting the planned economy and hence all major aspects of borrowing and lending are fully regulated .Interest rates charged to borrowers and commitment fees and other charges on the loans are dictated by NBE .Within context of the planned economy ,the state and public enterprise had been major customers of banking system as depositors borrowers and users of the service .in many instances ,banks have been directed by National bank to lend the public enterprises particularly state farms ,.

Currently the lending rate is fully liberalized, and hence there is no lower/upper lending limit rate in the country. Each bank determines the lending rates by itself. And Ethiopian Banks grant different types of loan for their customer such as short term loan, medium and long term loans,

Overdraft, pre shipment export credit facility, revolving credit facility ,merchandise facility and Agricultural investment loan .

2.2. Theoretical framework on lending or loan and advances

There are many theories which seek to explain the behavior of commercial banks in their lending activities in various economies around the world. For the purpose of this study, the theories that are considered relevant are included.

Loan pricing theory

The theory posits that banks cannot always set high interest rates by trying to earn maximum interest income. Banks should consider the problems of adverse selection and moral hazard since it is very difficult to forecast the borrower type at the start of the banking relationship (Stiglitz and Weiss, 1981). If banks set interest rates too high, they may induce adverse selection problems because high risk borrowers are willing to accept these high rates. Once these borrowers receive the loans, they may develop moral hazard behavior or so-called borrower moral hazard since they are likely to take on highly risky projects or investments (Chodecai, 2004). From the reasoning of Stiglitz and Weiss (1981), it is usual that in some cases we may not find that the interest rate set by banks is commensurate with the risk of the borrowers.

Theory of multiple lending

It is found in literature that banks should be less inclined to share lending (loan syndicate in the presence of well-developed equity markets and after a process consolidation. Both outside

equity; and mergers and acquisition increases banks' lending capacity, thus reducing that need of greater diversification and monitoring through share lending. (Carletti et al 2006; Ongene & Smith, 2000; Karet et al, (2004); Dgreyse et al, (2004).

Hold-up and soft budget constraint theories

Banks' choice of multiple-bank lending is in terms of two inefficiencies affecting exclusive bank firm relationships, namely the hold-up and the soft-budget-constraint problems. According to the hold-up literature, sharing lending avoids the expropriation of informational rents. This improves firms' incentives to make proper investment choices and in turn it increases banks' profits (Von Thadden, 2004; Padilla and Pagano, 1997). As for the soft-budget constraint problem, multiple-bank lending enables banks not to extend further inefficient credit, thus reducing firms' strategic defaults.

Both of these theories consider multiple-bank lending as a way for banks to commit towards entrepreneurs and improve their incentives. None of them, however, addresses how multiple-bank lending affects banks' incentives to monitor, and thus can explain the apparent discrepancy between the widespread use of multiple-bank lending and the importance of bank monitoring.

Nevertheless, "when one considers explicitly banks' incentives to monitor (Carletti et al, 2006), multiple-bank lending may become an optimal way for banks with limited lending capacities to commit to higher monitoring levels. Despite involving free-riding and duplication of efforts, sharing lending allows banks to expand the number of loans and achieve greater diversification. This mitigates the agency problem between banks and depositors, and it improves banks' monitoring incentives.(Carletti et al, 2006)

The signaling arguments theory

The signaling argument states that good companies should provide more collateral so that they can signal to the banks that they are less-risky type of borrowers and then they are charged lower interest rates. Meanwhile, the reverse signaling argument states that banks only require collateral and or covenants for relatively risky firms that also pay higher interest rates (Chodechai, 2004; Ewert and Schenk, 1998).

Portfolio theory and bank lending

Financial portfolio theory provides practical insights into how a bank should structure a loan portfolio in light of its goals. At the risk of oversimplification, a bank's goals can be seen as threefold:

Earn strong profits. A bank's profitability is ultimately derived from its ability to add economic value for its customers.

Avoid large losses. A bank's economic value as an ongoing franchise is at stake if poor lending threatens the organization with failure. Careful loan underwriting and effective risk diversification help keep the likelihood of failure.

Maintain high shareholder value. Here, portfolio theory makes an interesting contribution. The theory emphasizes that the market value of an asset cannot be determined in isolation based on its risk-and-return features. Rather, the real issue faced by bank owners is how their shares in the bank will affect risk and return in their own portfolios.

The third goal puts a different twist on risk and return. A classic example from portfolio theory is a stock that is "risky" in the specific sense that its price fluctuates widely. However, if these

movements have low correlation with the overall stock market, then within a larger portfolio they should tend to wash out due to a law-of-large-numbers effect.

In contrast, another stock might appear less volatile, but if it is highly correlated with the overall market, then adding it to the investor's portfolio would raise its volatility disproportionately.

Portfolio theory predicts that investors seeking stable portfolio values will bid up the prices of low-beta stocks (stocks that are less correlated with the market) relative to high-beta stocks.

It is important for lenders to know how portfolio theory, introduced in the third goal, helps reconcile the apparent tension between the first two goals – that is, the trade-off between profitability through specialization and the need to spread risk through diversification. (Smith, 2005)

Loadable funds theory

According to the Loanable Funds Theory of Interest, the rate of interest is calculated on the basis of demand and supply of loanable funds present in the capital market. The concept formulated by Knut Wicksell, the well-known Swedish economist, is among the most important economic theories.

The loanable Funds Theory of Interest advocates that both savings and investments are responsible for the determination of the rates of interest in the long run. On the other hand, short-term interest rates are calculated on the basis of the financial conditions of a particular economy. The determination of the interest rates in case of the Loanable Funds Theory of the Rate of Interest depends essentially on the availability of loan amounts. The availability of such loan amounts is based on certain factors like the net increase in currency deposits, the amount of

savings made, willingness to enhance cash balances and opportunities for the formation of fresh capitals.

According to the loanable funds theory of interest the nominal rate of interest is determined by the interaction between the demand and supply of loanable funds. Keeping the same level of supply, an increase in the demand for loanable funds would lead to an increase in the interest rate and the vice versa is true. Conversely an increase in the supply of loanable funds would result in fall in the rate of interest. If both the demand and supply of the loanable funds change, the resultant interest rate would depend much on the magnitude and direction of movement of the demand and supply of the loanable funds.

Now, the demand for loanable funds is basically derived from the demand from the final goods and services. These final goods and services are again generated from the use of capital that is financed by the loanable funds. The demand for loanable funds is also generated from the government.

The Loanable Funds Theory of the Rate of Interest has similarity with the Liquidity-Preference Theory of Interest in the sense that both of them identify the significance of the cash balance preferences and the role played by the banking sector to ensure security of the investment funds. Robert(1999)

Credit market theory

A model of the neoclassical credit market postulates that, the storms of credits clear the market. If collateral and other restrictions remain constant, the interest rate is the only price mechanism with an increasing demand for credit and a given customer supply, the interest rate rise and vice

versa. It is thus believed that the higher the failure risk of borrower, the higher the interest premium (Ewert et al, 2000).

The bank lending channel theory

The bank lending channel theory posits that during monetary contractions banks restrict some firms' loans, thus reducing their desired investment independently of interest rates. (Henderson,2003)

Transactions theory

Credit money created by commercial banks as primary rather than derived from central bank money credit money drives the monetary system, it does not claim that all money is credit money, though money is a commodity. A monetary transaction is not bilateral transaction between buyer and seller but rather tripartite transaction between buyer, seller and bank. Rather than buyer handling over a physical good in exchange for their purchase, instead, there is a debit to their account at a bank, and a corresponding credit to the sellers account. That is precisely what happened in credit card or debit card transactions. (Alfred, 2004)

Money creation theory

Under this theory credit money is created by a loan extension such loan needs to be backed by central bank Money but it is created from the promise embodied in the loan, not from the lending or relending of central bank money. When the loan is repaid, with interest the credit money of the loan is destroyed but reserves (equal to the interest) are created the profit from the loan. In practice, commercial banks extend time of credit to Companies a promise to make a loan. This promise is not considered money for regulatory purposes, and banks need not hold reserves against it, but when the line is tapped (and a loan extended). Then bona-fide credit money is

created, and reserves must be found to match it, in this case, credit money precedes reserves. In other words, making loans pulls reserves in instead of reserves being pushed out as loans which are assumed by the mainstream model.(Stephen ,2007)

New theory of commercial banking and bank lending

Ahtiala (2008) have developed a model of bank lending behavior in the presence of customer specific capital and the critical nature of the loan decision, which are mainly due to joint production in information and transactions. Therefore, if the profits are independent across customers, the bank maximizes the expected present value of its profits by maximizing the product of the probability of the customer staying with the bank (which is a function of the loan extended each time one is applied for) and the face value of the specific capital of each customer. Thus the bank is concerned with the entire specific capital but makes decisions on individual loan applications.

The bank's loan decision was shown to be asymmetrical. On the one hand there is the marginal gain in the probability of the customer staying times all of specific capital (i.e. a function of the increment), and on the other the expected net marginal interest cost of the average loan stock, which does not include non-interest profits and is zero if the loan is not expected to increase the long-run stock. It improves the customer's loan terms, reallocating resources to profitable customers' projects. Customer profitability for the bank thus becomes a factor in the allocation of resources. Adjusted for customer size, it is often negatively correlated with the profitability of the customer's investments or depends on the customer's production function. Its relative significance increases, the smaller the loan and the shorter its maturity. The conventional

optimum results in the special case where the non interest profits on each customer are zero and the bank is sure of keeping their business

It can be optimal to extend loans to a valuable customer at an interest rate loss. Cutting the loan rate is not always possible, however, partly because of the non-negativity of the interest rate and the prime rate convention, which accentuates the role of specific capital.

The intermediate-to-large firm's mobility affects its loan terms, unambiguously improving them if the bank cannot adjust the loan rate. However, the really large firm can extract a greater share of the rents at the source, which worsens the terms. Loyalty increases a customer's value to the bank but improves the customer's loan terms only to the extent that the customer makes it conditional on the loan extended.

There is no mechanism bringing about equilibrium where the bank is indifferent, at the margin, between lending to different customers. The bank is in a corner solution with respect to its good customers, and other customers often have an incentive to try to get to a corner.

Therefore corner solutions may be the rule rather than the exception in bank-customer relations. The best customers are immune to monetary policy if they are in a corner solution and the interest rate floor is binding. They can thus get all the loans on preferential terms in all conceivable situations, as is well known to practical bankers.

Another implication of specific capital is that there are efficiency gains to be made by allowing banks to further expand the scope of their operations.

Finally, the harsh judgment on banks' lending to present problem debtors does not appear to be entirely justified when viewed in the light of the present approach. In offering loans to

prospective customers on concessionary terms banks invest in specific capital. If non-interest earnings on the loans are taken into account in addition to net interest earnings and credit losses, the picture changes substantially Moreover, a potential or actual problem debtor can take advantage of the decision asymmetry when asking for a loan: it can force the bank to choose between making one more risky loan even with an expected loss in the hope of saving the entire specific capital, whereas by refusing the request the bank takes a high probability of losing much of the loan capital and all of the rest of specific capital.

On the whole, these theories suggest that the contribution of the banking system to the efficiency of resource allocation is likely to be smaller than has commonly been perceived. The allocative effect of information capital through the interest earnings on loans can be justified on efficiency grounds to the extent that it contributes to the appropriate pricing and rationing of loans. The same applies to banking services priced on the basis of risk. However, the allocative effects of non-interest earnings on loan terms are likely to be a source of serious inefficiency, which can be expected to persist into the future. The economies of joint production are substantial, and recent product innovations in banking services have enhanced the significance of specific capital on resource allocation, whereas the switch to cost-based pricing has weakened it. (Ahtiala 2008)

2.3. Determinants of commercial bank lending or loan and advances

Theoretically factors affecting commercial banks lending or loan and advances are divided in to two broad categories, internal and external factors .Internal factors are lending determinants of banking industry, which are; Bank size, volume of deposit, credit risk, liquidity ratio and lending

interest rate. External factors are macroeconomic and regulator variables this are GDP, inflation and cash reserve requirement.

2.4. Empirical review on commercial banks' lending or loan and advances

A lot of studies have been carried out in attempts to determine the significant influencing factors on lending or loan and advances of commercial banks around the world. Since there are varied studies on lending or loan and advances of banks, it is only pertinent that some inquiry on such studies is considered in terms of highlighting the influencing factors on bank lending.

2.4.1. Empirical studies around the world

Usman (1999) on his study hypothesized that the factors that affect commercial banks' lending behavior depend on the choice of certain policy instruments in Nigerian banking operations. Such policy instruments include a rigidly administered interest rate structure, directed credit, unremunerated reserve requirements and stabilizing liquidity control measures like the stabilization securities. Furthermore, Usman (1999) observes that "a major regulation affecting commercial banks' lending in Nigeria is the restriction on the amount of interest banks are allowed to pay on deposits which in turn affects their efforts to attract reasonable volume of deposits and the interests they charge on their loans and advances. However, the study does not consider the factors that influence the behavior of bank lending generally except a few factors such as interest rate structure, directed credit, reserve requirements and liquidity control measures

Kazuo and Kitasaka(2000),on their study Bank lending in Japan, Its determinants and Macroeconomic Implications, found that the lending behavior is quite different by types of banks and of borrowers. For regional banks the bank loans are sensitive to deposits, indicating that they face imperfections in capital market. For major banks such as city banks, real estate plays a vital role as collateral in loan contracts. The authors also found that loans to small and non-manufacturing firms are more dependent on real estate as collateral and sensitive to the deposit growth. It is inferred that real estate functions as a device to reduce the agency cost stemming from the asymmetric information between borrowers and banks. The authors also find that expenditure on fixed investment is much more sensitive to bank loans for small firms than for large firms.

Gambacorta and Mistrulli(2003), on their study on Italian banks Bank capital and lending behavior with the aim of investigating the existence of cross-sectional differences in the response of lending to monetary policy and GDP shocks due to a different degree of bank capitalization indicated that those well capitalized banks can better shield their lending from monetary policy shocks as they have, consistently with the "bank lending channel" hypothesis, an easier access to non-deposit fund raising. A "bank capital channel" is also detected, with higher effects for cooperative banks that suffer a higher maturity mismatching. Capitalization also influences the way banks react to GDP shocks. Again, the credit supply of well-capitalized banks is less pro-cyclical. The introduction of a specific solvency ratio for highly risky banks determines an overall reduction in lending. it use a unique dataset of quarterly data for Italian banks; the full coverage of banks and the long sample period should overcome some distributional bias detected for other public available dataset.

Fan and hagiwara(2003) have assessed that ,Changing Bank lending behavior and corporate financing in Asia, This paper seeks to outline a number of issues relating to banking lending and corporate finance .Numerous demand and supply side factors affect bank lending. On the supply side, reduced bank lending may come about because banks have insufficient capital for lending due to tight monetary policy and more stringent regulations such as stricter requirements on capital adequacy ratios. The accumulation of NPLs in Asia may be a particularly important influence hindering the banking system from performing its intermediary functions. An important demand side factor is the weakened status of borrowers' balance sheets. In a number of countries, the corporate sector has been struggling to deal with high debt burdens and overcapacity. Falling asset prices have adversely affected their net worth. Economic downturn itself can also cause demand for loans to decline, reflecting declines in new investment and increased excess capacity

In a study on determinants of bank lending in Thailand, Chodechai (2004) investigates factors that affect interest rates, degree of lending volume and collateral setting in the loan decision of banks. The emphasis of the study is on mainly on the influence of interest rates on lending behavior of banks to the neglect of other significant factors that affect the behhaviour of commercial banks in lending generally. Furthermore, the study is based on a distinct economic clime with peculiar regulatory framework

Chizea (2004) on his study titled Commercial Banks and Recent Challenges investigate the factors that determine bank lending behavior in agricultural financing. In a guide to the lending banker on finance for farming investigated that there are certain aspects of fiscal and monetary policies which affect the lending behavior of commercial banks with emphasis on the interest

rate regime. Furthermore, he observes that the low interest rates being required by commercial banks to be charged on agricultural loans serve as disincentive because of the effect of inflation. The shortcoming inherent in this study is the emphasis on interest rate as the only factor affecting bank lending behavior in agricultural financing.

Imran(2010),on his study aimed to empirically identifies the factors which explain the bank credit to the businesses in varying financial environments and emerging global challenges According to the study the growth in bank credit to the private sector is used as dependent variable whereas growth of liabilities from abroad, growth in domestic deposits, money market rate, M2 as percentage of GDP, real economic growth, inflation and the exchange rate are identified as major explanatory variable to explain the behavior of bank credit. The empirical results revealed that the foreign liabilities, domestic deposits, economic growth, exchange rate, and the monetary conditions have significant impact on banks credit to the private sector in Pakistan, particularly in long run. Whereas the inflation and money market rate do not affect the private credit. Moreover, in short run the domestic deposit does not influence private credit. The results also infer that the financial health and liquidity of the banks play a significant and vital role in the determination of loan. A strong economic condition measured by GDP, as motivating factor to banks has statistically significant impact on issuance of more private credit to businesses. Results also indicates that the long run relationship is stable and any disequilibrium formed in the short run will be temporary and get corrected over a period of time.

Djiogap (2012) on his study Determinants of Bank Long-term Lending Behavior in the Central African Economic and Monetary Community (CEMAC) found that smaller banks less

capitalized banks, banks with low levels of long term funding sources, banks with higher nonperforming loans and operate in recession environment are more averse to lend long term. From the broader perspective, these results confirm that in addition to the well-known country-level obstacles to long-term financing in emerging markets, such as weak creditor rights protection and enforcement and low creditworthiness of risky borrowers, there are significant bank-level constraints in providing long-term loans to firms, including insufficient bank size, low capitalization, and lack of long-term liabilities. From the practical view, these results identify specific bank-level macroeconomics constraints that systematically affect bank willingness and ability to extend long-term credit to firms. To examine the relationship between bank characteristics and bank propensity to issue long-term loans to firms, a large sample of Central Africa Countries banks and a broad set of explanatory variables are applied to a panel data model.

Samuel, oluwatosin, andchukwuemeka (2012) have assessed determinants of commercial bank lending behavior in Nigeria case and they found that, foreign exchange rate, investment portfolio, deposits and liquidity ration have positive impacts on commercial bank lending volumes, while the coefficients of lending interest rate and minimum cash reserve ratio were negative.

Osei(2013) on his study titled Determinants of Bank Lending Behavior in Ghana found that bank size and capital structure have a statistically significant and positive relationship with bank lending behavior and also found evidence of negative and significant impact of some macroeconomic indicators (central bank lending rate and exchange rate) on bank lending

behavior. Again, competition in the industry was found to have a positive and significant impact on bank lending behavior. Finally, relationship banking was found to have a positive correlation with bank lending behavior in Ghana. Thus the authors argued that, policies aimed at maintaining stable macroeconomic fundamentals would greatly accelerate bank lending decision.

Glemza (2013), Banks 'Lending and Investment Behavior During and Post Financial Crisis: This study aimed to investigate banks' investment behavior mainly focusing on the amount of loan issuance and investments in securities. The results of this paper suggest the following. Firstly, a decreasing interest in loan granting and an increasing attraction towards investments in government bonds. Secondly, government bond holdings are mainly influenced by risk taking and loans. Thirdly, crisis has had a negative impact on liquid asset holdings. Crisis effect is clearly visible in banks' lending behavior, the amount of loans granted reduced during the distress period for both retail and corporate clients. The effect is stronger for smaller banks with lower accessibility to deposit financing and lower liquidity position

Marinc(2014) reveals that the high quality of the bank funding strategy and prevalent government backing were crucial to continuous bank lending during the crisis period. This effect was especially pronounced in non-OECD and BRIC countries. The Author concludes by suggesting that in crisis periods high-quality bank capital is a bank's competitive strength

On the effects of macroeconomic factor on lending Richard (2014) contends that monetary policy affects bank assets which do arise because of their lending (loans) as well as banks' liabilities (deposits). The implication of operations of monetary policy is that besides shifting the

supply of deposits it also shifts the supply of bank loans. For instance, an expansionary monetary policy that increases bank reserves and bank deposits increase the quantity of bank loans available; the crucial response of banks to monetary policy is their lending response.

2.4.2. Empirical Studies in Ethiopia

In Ethiopia as far as the researchers' knowledge only few studies were conducted with regard to determinants of commercial banks lending behavior, these researches were Mitku (2014), Amano (2014) and Berhanu (2016). Thus, this particular section provides a detailed review of the related studies conducted in the context of Ethiopia.

Mitku (2014) examined the main determinants of commercial banks lending in Ethiopia by using panel data of eight commercial banks in the period from 2005 to 2011. He tested the relationship between commercial banks lending and its some determinants (bank size, credit risk, gross domestic product, investment portfolio, volume of deposit, interest rate, and liquidity ratio and cash reserve required). Seven years financial data of eight purposively chosen commercial banks were used for analysis purpose. Ordinary least square (OLS) technique was applied to determine the impact of those predictor variables on commercial banks lending. The result suggests that, there is positive and statistically significant relationship between commercial bank lending and its size, liquidity ratio, credit risk, and gross domestic product. But, there is a positive but insignificant relationship between commercial bank lending and deposit, investment portfolio, cash reserve required and interest rate for the study period.

The next author is Amano (2014) in his study examined the determinants of commercial banks' lending behavior in Ethiopia. The study applied the balanced fixed effect panel data of eight commercial banks in Ethiopian that covers the period 2001- 2013. The study used Ordinary

Least Square (OLS) technique to investigate some internal as well as external variables that determine the lending decision of commercial banks' in Ethiopia and use loans and advances as dependent variable. The estimation results showed that volume of deposit, bank size, cash reserve requirement, and inflation rate had positive and significant impact on loan and advance while liquidity ratio and interest rate had negative and significant impact on loan and advance. Nevertheless, real GDP growth rate had statistically insignificant impact on bank's loan and advance.

Lastly Berhanu (2016) investigate the determinants of lending decision of private commercial banks in Ethiopia and the impact of those factors on the financial performance of the banks. The study applied random effect panel regression and data of six private commercial banks in Ethiopia for the sample covered the period from 2001 to 2015 was taken. Eight variables that may affect banks' lending decision were selected and analyzed. The results of panel data regression analysis showed that Liquidity ratio, Capital adequacy ratio, Inflation rate and gross domestic product had positive and statistically significant effect on banks' lending. Nonperforming loans, Cash reserve requirement, and lending interest rate had negative and statistically significant effect on banks' lending. Volume of deposit had positive but insignificant effect nonbanks' lending.

2.5. Summary and Knowledge Gap

In Ethiopia as far as the researchers knowledge the only studies conducted with regard to determinants of commercial bank lending behavior are Mitku(2014),Amano(2014)and Berhanu(2016). When these studies are analyzed even if it is grateful to make inquiries in this

untouched but foremost area the authors in their study fail to include the impacts of inflation, credit risk and bank sizes on Ethiopian commercial banks' lending respectively. In addition Berhanu (2016) in his study about commercial banks lending decision includes only private banks but he neglect the impact of the dominant state-owned bank, commercial bank of Ethiopia. Hence, leave out of most important variables, exclusions of main sample from the study initiate the researcher for further study and detail investigation in the area. Therefore, the researcher will try to fill this knowledge gap and assess the impacts of those and other factors on lending of Ethiopian commercial banks by using panel data.

2.6. Conceptual framework

Based on the theoretical propositions discussed above the conceptual relation and interaction of commercial banks' lending or loan and advances can be diagrammatically framed as depicted in figure 2.1

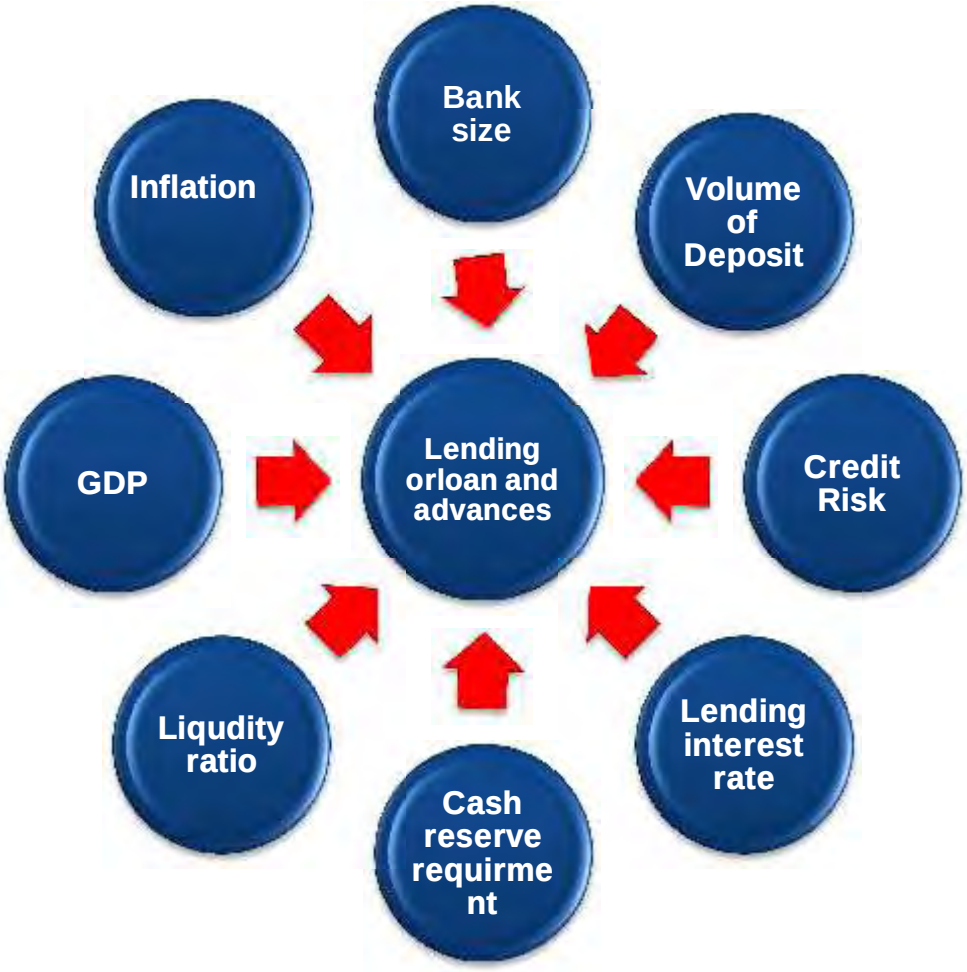


Fig 2.1 Conceptual frame work of lending or loan and advances model

Source: *Own by examining different literatures*

CHAPTER –THREE

3. RESEARCH DESIGN AND METHODOLOGY

The previous chapter dealt with review of theoretical and empirical related literature on the determinants of commercial banks' lending or loan and advances. This chapter outlines and explains the methodology employed to achieve the research objective and to test the research hypotheses formulated in the study. This chapter provides a brief overview of research design adopted in the study, which in turn includes population, sampling design and actual data collection tools in this section, discusses about data presentation and analysis techniques used in the study. Moreover deals with model selection issues in a considerable detail including various tests conducted to select the appropriate model for the study

3.1. Research design

This section presents the methodologies that have been employed to achieve study objectives as well as to test the hypothesis by large, the study employed explanatory research design.

The major objective of this study is to investigate the determinants of commercial banks' lending or loan and advances .The research problem tend to be explanatory which seeks to explain the relationship between lending or loan and advances and bank level, macroeconomic as well as regulatory factors. Therefore, quantitative research approach was employed to establish how independent variable affects dependent variable. Explanatory research design is centered on the quantification of relationship between variables. Quantitative data-gathering instruments establish relationship between measured variables. Measurement, numerical data and statistics

are the main substance of quantitative instruments. With these instruments, an explicit description of data collection and analysis of procedures are necessary .The quantitative approach is more on the detailed description of a phenomenon. It basically gives a generalization of the gathered data with tentative synthesized interpretations (Creswell, 2003).

The study used a panel regression technique to analyze the impact of bank specific, industry specific as well as regulatory and macroeconomic determinants on Ethiopian commercial banks' lending behavior. The purpose of using panel data is the data has the advantage of giving more informative data as it consists of both the cross sectional information, which captures individual variability, and the time series information, which captures dynamic adjustment. Panel modeling could help to identify a common group of characteristics while, at the same time, taking in to account the heterogeneity that is present among individual units. This technique allows studying the impact of industry specific, macroeconomic and regulatory determinants on banks' lending.

3.2. Population

All Ethiopian commercial banks that are operating in the country are taken as a population for this study. Among those banks two of them are state owned whereas the rest are privately owned.

3.3. Sample and sampling design

A sample is a portion of the population that inferences are to be made about the population. The population for this study consists of all commercial banks operating in Ethiopia. The sample frame for the study was determined based on long year banking operation experience and the availability of each bank data from the year 2002 -2014.The selection of the sample period is based on the intention to increase the degree of freedom and to meet the requirements of the

estimation procedure. During the whole sample periods the total number of commercial banks that are operational is 8.Inclusion of banks that do not have data for the whole sample period specified above would lead to unbalanced panel data which may fail to satisfy the assumptions of model which is based on balanced data. Thus, banks that are established after the year 2002 are excluded from the sample to satisfy the balanced data requirement of the model.

The data for the estimation of the model are sourced from both the NBE and the individual banks' published financial statements. The data obtained from both sources was checked for consistency and reconciled based on the published annual reports of banks.

3.4. Data collection

The data used for this particular study is secondary data. Data collection instruments conducting appropriate data gathering instruments help researchers to combine the strengths and amend some of the inadequacies of any source of data to minimize risk of irrelevant conclusion. Consistent and reliable research indicates that research conducted by using appropriate data collection instruments increase the credibility and value of the research findings (Koul 2006).Accordingly, document review has been used for this research to collect required information, which was relevant for addressing the objectives of the study, the bank specific variables of the study will drive from balance sheet of eight Ethiopian commercial banks'. The selected banks are included in the study have been operating for the last 13 years, from the year 2002 up to 2014. For this regard, 13 years (2002-2014) financial statement of the selected banks used in the analysis and all the financial statements are consolidated each year. Regarding the industry and macroeconomic variables, the data has collected from National Bank of Ethiopia

(NBE), which regulates the financial sector of the country. Besides, related books, journals articles and various literatures also were used as sources of data.

3.5. Data analysis technique

In this study various statistical analysis were employed to analyze the data and test the research hypothesis. First, descriptive statistics is used to highlight the nature of the data and describe the variables used in the study in terms of trends and variation among the cross-section. Second, correlation analysis is also conducted to see the relationship among the dependent and independent variables. This would help to get an initial picture as to the nature of the relationship among the variables before proceeding to regression analysis. Finally the panel least square regression analysis is used to determine the significant relationships between commercial banks' lending behavior and its various determinants and to test the hypothesis there on. Various tests were also conducted to determine the appropriate regression model and to test the validity of its assumptions. The analysis technique used for this study is multiple regression analysis technique.

3.6. Explanation of study variables

This section presents explanation and measurements of the study variables. For this study, Commercial bank lending behavior (loan and advance) was used as a dependent variable which is determined by bank size, volume of deposit, credit risk, liquidity ratio, and cash reserve requirement, lending interest rate, gross domestic product and inflation of the country. The explanatory variables were chosen by taking in to account the availability of data and its influence on bank lending as mentioned in literature.

Table3.1 Definition of study variables and Expected Signs

Variables	Operational definition/ Measurements/	Notation	Expected sign
Dependent variables			
Lending behavior (Loan and Advances)	Natural logarithm of Net loans and advances	LD	NA
Independent Variables			
Bank Size	Natural logarithm of total assets	SIZE	Positive
Volume of deposit	Deposit/Total Asset	VD	Positive
Cash reserve requirement ratio	Annual reserve requirement ratio	CRR	Negative
Credit risk	Nonperforming loan / Total loans and advances	CR	Negative
Liquidity ratio	Liquid asset / Total Asset	LQR	Positive
Lending Interest rate	Annual average bank lending rate	LIR	Negative
Gross Domestic Product	Real GDP growth (in %)	GDP	Positive
Inflation rate	The annual inflation rate	INF	Negative

Source: *Own by examining different literatures*

3.6.1. Study Variables

In this section both dependent and independent variables will be explained by examining different literatures.

3.6.1.1 Dependent variable

Lending or loan and advances

Lending which may be on short term, medium or long term basis is one of the services that commercial banks usually render to their customers. In other words, banks do grant loans; overdrafts and advances to individuals, business organizations as well as government in order to enable them embark on developmental activities as a means of aiding their growth in particular or contributing towards the economic development of a country in general. The customer may be in need of the fund for the various purposes which may spread through new capital venture bridging loan, farming, contract jobs, and business expansion among others. (Iwedi & Onuegbu, 2014)

Loans and advances are defined in the respective laws of different countries. In Ethiopia, under Article 4(6) of Directive № SBB/043/2008 loans and advances are defined as:

"Any financial asset of a bank arising from direct or indirect advances (i.e. unplanned overdrafts, participations in loan syndication, the purchase of loans from another lender, etc.) or commitment to advance funds by a bank to a person that are conditioned on the obligation of the person to repay the funds, either on a specified date or dates or on demand, usually with interest."

Lending is the heart of banking business. Banking mostly transforms liquid assets like deposits into illiquid assets like loans (Diamond and Rajan (1998)). This is transformational process of bank's activity is at best influenced by a host of factors namely macroeconomic levels (Peek and

Rosengren (1995)) and industry level characteristics (Boot and Thakor (2000)). Lending is the most important services that commercial bank's do render their customers, in other words banks grant advances and loan to individuals, government and business organization (Cheboi (2012)).

Loans and advances from banks are found to be economical for traders and businessmen, because banks charge a reasonable rate of interest on such loans/advances. Loans and advances are utilized for making payment of current liabilities, wage and salaries of employees, and also the tax liability of business. Loans and advances can be arranged from banks in keeping with the flexibility in business operations. Traders may borrow money for day to day financial needs availing of the facility of cash credit, bank overdraft and discounting of bills. The amount raised as loan may be repaid within a short period to suit the convenience of the borrower. Thus business may be run efficiently with borrowed funds from banks for financing its working capital requirements. (Murray, 2014).

Loans and advances granted by commercial banks are highly beneficial to individuals, firms, companies and industrial concerns. The growth and diversification of business activities are effected to a large extent through bank financing. Loans and advances granted by banks help in meeting short-term and long term financial needs of business enterprises.

To proxy lending or loan and advance, logarithm of total loan and advance was used.

3.6.1.2 Independent Variables

Bank Size

Bank size is considered as an important determinant of bank lending decision (Berger and Udell, 2006, Uchida etal. 2007). Berger and Udell (2006) provide that large and complex banks tend to

lend few loans to small scale firms. Stein (2000) explains that small banks have comparative advantages in producing soft information whereas large banks also have comparative advantages in lending based on hard information. On the other hand, when large and complex banks are able, through technical expertise, to process soft information about small scale firms, then there would be positive relationship between bank size and lending.

According to Bashir, (2003) large-sized banks have the advantage of providing a larger menu of financial services to their customers and there by mobilize more funds. Cole et al. (2004) also suggest that, smaller banks adopt small business loan underwriting practices that are riskier than those of larger banks. More over Salas and Saurina (2002) assert that, a big balance sheet allows managers to invest in different geographical or business segments to deal with asymmetric shocks.

To proxy bank size natural logarithm of total assets of the bank was used.

Volume of deposit

Banks, all over the world, thrive on their ability to generate income through their lending activities. The lending activity is made possible only if the banks can mobilize enough funds from their customers. 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. Thus, the main function of financial institutions of mobilizing funds from the surplus economic agents to the deficit economic agents is put to test in order to generate economic growth.

Olokoya (2011) suggested that commercial banks should focus on mobilizing more deposits, as it will enhance their lending performance through the formulation of critical, realistic and comprehensive strategies and financial plans.

Akinyomi(2014) in his study examined that the effect of deposit volume on bank lending behavior in the Nigerian Post-consolidation banking era. The result of the regression analysis revealed that the Volume of Deposit has a significant and positive relationship with the loan and advances on the Nigerian deposits money banks. In other words, the higher the deposit volume, the greater the probability of granting loans and advanced to prospective borrowers.

To proxy volume of deposit, volume of deposit to total asset ratio was used.

Cash reserve requirement ratio

Koray and Mahir(2014) stated that reserve requirement ratios have been one of the most popular tools among unconventional monetary policy instruments utilized by the central banks in emerging economies. They have been extensively used by emerging market economies as a supplementary monetary policy tool to ease the trade-off between financial stability and price stability.

Montoro and Moreno (2011) stated that, central bank raise reserve requirements to contain credit growth in the boom part of the business cycle in order to counteract financial imbalances in the economy or in an economic downturn, they can lower reserve requirements to utilize reserve buffers accumulated during the boom part, having the banking sector extend more credit to non-financial businesses.

Tovar et al (2012) analyzed the effectiveness of reserve requirement system in selected Latin countries. Their conclusion is that reserve requirement ratio influences real private bank credit growth and that it is a useful policy tool to 'lean against the wind' and avoids the buildup of imbalances.

In Ethiopian case with the objective of controlling the recurring inflationary episodes in the country, National Bank of Ethiopia increase the reserve requirement on commercial banks from 5% (Directive No.SBB/37/2004) to 10% effective from July 2007 (Directive No. SBB/42/2007) and further to 15% effective from April 2008 (Directive No. SBB/45/2008). Following the success in getting down the inflation in the country, the NBE revised the reserve requirement downwards to 10% effective from Jan 2012 (Directive No. SBB/46/2012) and further to 5% effective March 2013 (Directive No. SBB/55/2013).

In this study annual reserve requirement rate was used as proxy.

Credit risk

Credit risk is defined as the potential that a borrower or counterparty will fail to meet its obligations in accordance with agreed terms. According to Chijoriga (1997) credit risk is the most expensive risk in financial institutions and its effect is more significant as compared to other risks as it directly threatens the solvency of financial institutions. While financial institutions have faced difficulties over the years for a multitude of reasons, the major cause of banking problems continue to be directly related to lax credit standards for borrowers and counterparties, poor portfolio risk management, or lack of attention to changes in economic or

other circumstances that lead to deterioration in the credit standing of financial institution's counterparties (Basel, 1999).

The Basel Committee on Banking Supervision (BCBS) (1999) published document entitled "Credit risk management principles" It encompasses four major activities of managing Credit risk: 1)Establishing an appropriate Credit risk environment 2) Operating under sound Credit granting process 3) maintain appropriate Credit administration, measurement and monitoring process and 4) adequate Control overall Credit risk.

To proxy credit risk a ratio of nonperforming loan to Total loan and advances was used.

Liquidity ratio

Amano (2014) states that the loan portfolio is typically the largest asset and the predominate source of revenue. As such, it is one of the greatest sources of risk to a bank's safety and soundness. Since loans are illiquid assets, increase in the amount of loans means increase in illiquid assets in the asset portfolio of a bank. If demand for loans is weak, then the bank tends to hold more liquid assets ,whereas if demand for loans is high they tend to hold less liquid assets since long term loans are generally more profitable.

To proxy liquidity ratio Liquid asset/total asset was used.

Lending Interest rate

Interest rate can be defined as the premium received by the lender after stated period of time .From the borrowers' point of view; it is a cost of capital at the time of obtaining the loan.

The debate on whether high interest rates affect for the demand for loan is inconclusive and may go on indefinitely .There are two main schools of thought ,The first schools advocates that high interest rate negatively affect the demand for loan because only limited borrowers with high risk projects may have their demand satisfied .Prominent among the schools are Sliglitiz and Weiss (1981),Sliglitiz (1989) and Basely (1994) who argue that high interest rates encourage adverse selection of loan seekers these high risky enterprises may not approved are those with high default rates. The second school of thought's assertion is that high interest rates do not affect the demand for credit The study by Aryeesty et al (1994) indicated that the high interest rate were not a major concern for demand to credit .

In this study annual average bank lending rate was used as proxy

Gross domestic product

The real gross domestic product is the measure of total economic activity within the economy and it is commonly used economic indicator. In this study we employ the gross domestic product growth as a measure of macroeconomic conditions.

According to kashif and mohammed (2008) A strong economic condition measured by GDP, as motivating factor to banks has statistically significant impact on issuance of more private credit to businesses. A strong economic condition creates more demand for goods and services which lead to more investment in different sectors hence increase the per capita income as well as the savings, collectively these factors convince to banks to issue more private credit.

Annual real Gross Domestic Product (GDP) growth rate was used in this study.

Inflation

Inflation is generally the persistent increase of price level of goods and services in an economy over a period of time. When price level rises, each unit of currency buys fewer goods and services. Consequently, inflation results into a reduction in the purchasing power per unit of money, a loss of real value in the medium of exchange and unit of account within the economy (Boyd and Champ, 2004)

Inflation is a key determinant of commercial banks' lending rates globally. According to Santoni (1986), inflation depreciates the value of money such that a percentage increase in inflation results into a similar percentage fall in value of the country's currency. Broadly, inflation theorists attribute inflation to monetary causes and mal adjustments in economic system (Chand, 2008).

Taner (2000) study on the effects of inflation uncertainty on credit markets reveals that unpredictable inflation raises interest rates, decreases loan supply and affect loan demand. This therefore suggests that an increase in inflation may raise the bank lending rates.

To proxy inflation; the annual gross inflation rate was used in this study.

3.7. Model specification and variable setting

3.7.1 Model selection

In terms of data type's employed, empirical researchers usually used three type's data: time series, cross-sectional and pooled data that combines both time series and cross-sectional observations. A typical panel or pooled data are repeated observations on the same cross section,

typically of individuals or firms observed for several time periods and have attracted attention for its potential to improve precession in estimation (Kaplan and Henderson 2000).

To conduct regression analysis with panel data three main approaches are available: pooled regression, the fixed effects model, and the random effects model. The pooled model is the most restrictive case that has a single common intercept (α) and constant coefficients estimates based on variation between firms and over time. The Fixed-effects model allows each cross-sectional unit to have a different intercept term (αi) though all slopes are the same. The αi, are random variables that capture unobserved heterogeneity (cross-sectional specific effects). The Random effect model assumes the unobserved heterogeneity (αi) are random that are distributed independently of the regressors. In the latter two approaches, the unobserved differences are always regarded as random variables. The difference lies on the structure of the correlations between the observed variables and the unobserved variables. In fixed effects model, the unobserved variables are allowed to have any correlations whatever with the observed variables (which turns out to be equivalent to treating the unobserved variables as fixed parameters). In a random effects model, the unobserved variables are assumed to be uncorrelated with all the observed variables.

The improvements in estimation attained with the use of panel data are several. In general terms, the availability of repeated measures on a single sample unit allows construction of models that are more sophisticated than similar time-series, cross-sectional, and pooled models. Furthermore, where a dynamic setting is anticipated, it is more informative to understand how a particular firm responds to changed circumstances rather than how one firm‘s response differs from that of other firms.

As to specific improvements, panel data analysis can address two persistent econometric problems: omitted variables bias and heterogeneity bias. First, if an excluded explanatory variable is correlated with an explanatory variable included in the model, application of least squares regression methods to cross-sectional or pooled data provides estimates that are biased and inconsistent. The resulting estimate reflects the effects of both the included variable and the excluded correlated variable. With panel data analysis (specifically, fixed effects), because estimation focuses on within-firm variation, omitted variables bias is avoided, provided it is reasonable to assume that the omitted variable is constant over the time frame of study. Consider the following panel data model in which z represents the correlated omitted variable.

$Yit= \alpha i+ \beta' xit+ \gamma' zit+ \varepsilon it$

Estimation approach:

$Yit-\bar{Y}i= (\alpha i-\bar{\alpha} i).+ \beta'(xit-xi)+ \Phi'(zit-zi)$

Where Zit=Zi:

$Yit-\bar{Y}i= \beta' (xit-xi)+ (\varepsilon it -\varepsilon i)$

Where: Yit is the dependent variable at time t for each i, xit is a vector of explanatory variables, i= individual cross-section (1..N) and t=time (1..T), Zi, represent a vector of covariates that vary across units but not over time; εit= the error term that varies over time; Yi, xi, zi,αi and εi with over bar represent time average values for each i.

In estimating such fixed effect models, note that the Zis(time invariant factors) drop out of the equation because they do not vary over time. Importantly, not only do all the Zis observed drop

out, but in fact any Zi that we could ever imagine, whether observable or unobservable, drops out too.

An econometric problem that panel data can address is heterogeneity bias. By including only a single intercept term (a), cross-sectional and pooled models implicitly assume that behavior is similar across sample firms. Where this assumption does not hold, cross-sectional and pooled regressions yield parameter estimates that are unreliable because they are adversely affected by heterogeneity bias. Because it allows the intercept to vary across firms (includes αi for each firm), panel data analysis is can be used to capture heterogeneity. For example, in panel fixed effect models fixed effects formulation implies that differences across groups can be captured in differences in the constant term. Each αi is treated as an unknown parameter to be estimated

In this study the commercial banks' lending or loan and advances model constructed as follows

LD = f (SIZE, VD, CRR, CR, LQR, LIR, GDP, INF, Z) ……. equ (i) Where z contains other variables not explicitly includes in the model. The explicit form of equ (i) above is shown as follows:

LD = Natural logarithm of total loan and advances

SIZE = Natural logarithm of bank size(total asset)

VD = Volume of deposit

CRR = Cash reserve requirement ratio

CR=Credit risk

LQR =Liquidity ratio

LIR = Lending interest rate

GDP=Real GDP growth (in %)

INF=The annual inflation rate

U = error term controlling for unit specific residual in the model

α = intercept of the regression line

$\beta 1$, $\beta 2$, $\beta 3$ $\beta 4$, $\beta 5$, $\beta 6$, $\beta 7$, $\beta 8$: are parameters or coefficients of the independent variables estimated. Where z contains other variables not explicitly includes in the model. The explicit form of equation (i) above is shown as follows:

$$LD = \alpha + \beta 1SIZE + \beta 2VD + \beta 3CRR + \beta 4CRR + \beta 5LQR + \beta 6LIR + \beta 7GDP + \beta 8INF + U \quad \text{Eq (ii)}$$

Due to the panel nature of the data employed in this study, it is necessary to test whether the data can be pulled together and cross-sectional/ pooled regression could be applied. In other words, one needs to make sure that the cross-sectional units are homogeneous. Ignoring heterogeneity and applying a simple cross sectional model like above would result in biased and inconsistent estimate.

Pooled OLS cannot be a viable option for this study for the fact that the underling heterogeneity among the cross sections may result in biased estimators in the form of omitted variable biases. Greene (2010) suggested ignoring the heterogeneity when the fixed effects model is appropriate

renders the least squares estimator inconsistent and biased. The application of OLS with the presence of unobserved heterogeneity is likely to result in highly misleading estimates because the explanatory variables may be correlated with the error term and by this the central assumption of regression is circumvented(Brüderl 2005).The model applied for this study is;

$$LD = \alpha + \beta 1SIZE_{it} + \beta 2VD_{it} + \beta 3CRR_{it} + \beta 4CR_{it} + \beta 5LQR_{it} + \beta 6LIR_{it} + \beta 7GDP_{it} + \beta 8INF_{it} + U_{it} \ldots\ldots\ldots\ldots\ldots\ldots \text{Eq (iii)}$$

3.8. Diagnostic test methods

The econometric estimation technique that is used by this study is ordinary least square (OLS). There are five assumptions made in relation to the classical linear regression model (CLRM). The researcher has tested if there exists the violation of these assumptions. The method used to test these assumptions by the researcher is described as follows:-

Assumption one: the errors have zero mean

This assumption is not violated as the regression line did not force to pass through the origin. This assumption is violated if the models do not have constant term since the line will be forced to pass through the origin.

Assumption two: homoscedasticity (variance of the errors is constant)

The variance of the errors should be constant. This assumption is called homoscedasticity assumption. If the errors do not have a constant variance, they are said to be heteroscedastic. The researcher is used white test to testheteroskedasticity. In this test the null hypothesis is that there

is no evidence for the presence of heteroskedasticity(homoscedasticity does exist) and the alternate hypothesis is that there is evidence for the existence of heteroskedasticity. Therefore, if this hypothesis is rejected it is said to be the variance of the errors are no longer constant or the assumption of homoscedasticity is violated, on the other hand there is evidence for the existence of heteroskedasticity(Brooks, 2008).Therefore the researcher tested this assumption violated or not with regard to determinants of lending behavior.

Assumption three: the assumption of autocorrelation

Covariance between the errors terms overtime is zero. It is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are auto correlated or that they are serially correlated (Brooks, 2008). The study was used both Durbin-Watson test (DW test) and Breusch-Godfrey Serial Correlation LM test to test autocorrelation. The null hypothesis for this test is there is no autocorrelation and the alternative hypothesis is that there is evidence for the presence of autocorrelation. Therefore if the null hypothesis is rejected then it is said that there is an evidence for the presence of autocorrelation.

Assumption four: The assumption of disturbances are normally distributed

The study uses BeraJarque(BJ) normality test for non-normality. From the result the study uses the value of kurtosis and p-value to identify whether normality exists or not. The null hypothesis is that the distribution is normal and the alternate hypothesis is that the distribution is not normally distributed. Therefore if the null hypothesis is rejected then the distribution is not normally distributed. The researcher had also used kurtosis value to test for non-normality and

from the literature the normal distribution had a kurtosis value of 3. A normal distribution is not skewed and is defined to have a coefficient of kurtosis of 3(Brooks, 2008). For the residuals to be normal jarquebera value should not be significant.

Assumption five:-Test of Multicollinearity

Multicollinearity in the regression model suggests substantial correlations among independent variables. This phenomenon introduces a problem because the estimates of the sample parameters become inefficient and entail large standard errors, which makes the coefficient values and signs unreliable. In addition, multiple independent variables with high correlation add no additional information to the model. It also conceals the real impact of each variable on the dependent variable (Anderson et al., 2008).

CHAPTER FOUR
4. RESULTS AND DISCUSSION

In the preceding chapters, the review of relevant literature helped this study to understand the problem and design an appropriate research approach to deal with. The previous chapter also discussed the research design employed to achieve the objectives of the study and to test the research hypothesis there on. In this chapter, the study analyzes the collected data using various statistical tools and presents the results and discussion accordingly. This chapter is organized in two sections. The first sub section presents the result which in turn includes descriptive statistics, correlation analysis, diagnostic tests and the regression results. The second section is dedicated to the discussion of results.

4.1. Results

As mentioned in chapter three, this study covers all commercial banks operating during the whole study period (2002-2014) in Ethiopia. The cut off year was by considering that it offers combining recent and sufficient observations. In this study banks' size, volume of deposit cash reserve requirement, credit risk, liquidity ratio, lending Interest rate, gross domestic product and inflation of the country were considered as independent variables. Commercial banks' lending behavior or loan and advances was considered as dependent variables

In order to achieve the study objective, the researcher adopted various statistical tools to analyze the collected data. The first section presents descriptive statistics which focuses on the distribution the data, mean, max and standard deviation, the second section discusses correlation

analysis. The third section tests the Classical Linear Regression Model assumptions and the final section presents the regression results for the model.

4.1.1. Descriptive Data Analysis

This section discussed the summery descriptive statistics of each variables of the study. The variables include the dependent and independent variables. The dependent variables used in this study is sampled commercial banks' lending behavior which measured by natural logarithm of loan and advance, whereas the explanatory or independent variables Bank size, volume of deposit, cash reserve requirement ,credit risk, liquidity ratio, lending interest rate, GDP and inflation of the country.

The researcher conducted descriptive statistic using Eviews.7 software in order to give more understanding about the study variables that are being analyzed. Descriptive Statistics is the foundation stone for any type of analysis which enables the researcher to describe the relevant aspects to all the study variables that will entail detailed information about each relevant variable (SaswataChatterjee, 2012).

Descriptive studies produced the mean, minimum, maximum and standard deviations for each variable. Accordingly, the descriptive statistics for all variables are presented in table 4.1.

Table 4.1 summery of descriptive statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
LD	21.6125	21.5795	25.1922	18.8969	1.1329	104
SIZE	22.3701	22.3261	26.2156	19.5649	1.3317	104
VD	0.7535	0.7688	0.8715	0.5415	0.0702	104
CRR	0.0808	0.0500	0.1500	0.0500	0.0420	104
CR	0.0928	0.0672	0.4155	0.0153	0.0843	104
LQR	0.3612	0.3595	0.5941	0.1283	0.1071	104
LIR	0.1101	0.1150	0.1225	0.0925	0.0112	104
GDP	0.0918	0.1060	0.1260	-0.0210	0.0419	104
INF	0.1388	0.1090	0.3640	-0.1060	0.1209	104

Source*:* *Financial statement of sampled commercial banks and own computation through Eviews 7*

Table 4.1 shows the descriptive statistics of each variable, computed based on 104 observations recorded. It can be noticed that loan and advance fluctuates between 18.8969and25.1922, average loan and advance value is 21.6125, loan and advance value is deviates from the average value with about1.1329, which implies the presence of high variations among the values of loan and advance across commercial banks' included for this study. The implication of this descriptive result is there is noticeable increment of loan advance from period to period.

As depicted in the descriptive statistics table the first independent variable, sizes of sampled commercial banks which measured by natural logarithm of total asset, ranges from a minimum of 19.5649 to a maximum of 26.2156 and the average size of the commercial banks is 22.3701 with highest deviation from other explanatory variables of 1.3317.The result implies that there is a huge increment in banks' asset which enables banks' to increase loan and advance.

The mean value of volume of deposit was 75 % which shows that ¾ of the asset is financed by deposit from customers with the maximum and minimum values of 87 % and 54 % respectively. The standard deviation for volume of deposit was 7%.

The average cash reserve requirement ratio is 8% and the maximum and minimum reserve requirement ratio during the study period was 5% and 15% respectively. This variation occurs by the measure taken by the regulatory body, NBE to check monetary growth, to control risk of high inflation and ensure a stable macroeconomic environment for a healthy economic growth.

The average credit risk ratio encountered by banks is 5% which is abovefrom NBE‘s regulation which order banks’ to lower their NPLR below 5%.the minimum and maximum ratios varies between 1.5 % and 41.5% with 5% dispersion.

Moreover, the outputs of the descriptive statistics indicate that, the ratio of liquid assets was 36% on average, with a minimum of 12.8 % and a maximum of 59.4 %. The liquidity measure indicates that the Ethiopian commercial banks have, on average, a higher liquidity position which was higher than the statutory requirement of 15% NBE Directive № SBB/57/2014.In addition liquidity ratio has moderate dispersion from the mean which was 10.7%.

The average lending interest rate is 11% and the minimum and maximum ratio is ranges from 9.25% to 12.25% with standard deviation of 1%.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’ determines the lending rates by considering the loan type and their target customer.

When we see the country's growth ,in the study period average GDP growth rate was 9.2 % The maximum growth of the economy was recorded in the year 2005 (i.e. 12.6%) and the minimum was in the year 2003 (i.e. -2.1%). Since the year 2004 the country has been recording double digit growth rate with little dispersion towards the average over the period under study with the standard deviation of 4.2%.

Lastly, the general inflation rate (i.e. 13.9%) of the country on average over the past thirteen years was more than the average GDP. The maximum inflation was recorded in the year 2009 (i.e. 36.4%) and the minimum was in the year 2002 (i.e. -10.6%). The rate of inflation was highly dispersed over the periods under study towards its mean with standard deviation of 12.1%.

4.1.2. Correlation analysis

Correlation is a way to index the degree to which two or more variables are associated with correlated to each other. The most widely used bi-variant correlation statistics is the Pearson product-movement coefficient, commonly called the Pearson correlation which was used in this study. Correlation coefficient between two variables ranges from +1 (i.e. perfect positive relationship) to -1 (i.e. perfect negative relationship). The sample size is the key element to determine whether or not the correlation coefficient is different from zero/statistically significant. As a sample size approaches to 100, the correlation coefficient of about or above 0.20 is significant at 5% level of significance (Meyers et al. 2006). The sample size of the study was 8*13 matrixes of 104 observations which was even more than 100 hence, the study used the above justification for significance of the correlation coefficient.

According to Brooks (2008), if it is stated that y and x are correlated, it means that y and x are being treated in a completely symmetrical way. Thus, it is not implied that changes in x cause changes in y, or indeed that changes in y cause changes in x rather, it is simply stated that there is evidence for a linear relationship between the two variables, and that movements in the two are on average related to an extent given by the correlation coefficient.

Table 4.2. Correlation Matrix of Dependent and Independent Variables

correlation probability	LD	SIZE	VD	CRR	CR	LQR	LIR	GDP	INF
LD	1								
SIZE	0.98	1							
VD	0.29	0.25	1						
CRR	(0.62)	(0.59)	(0.01)	1					
CR	(0.16)	(0.08)	0.22	0.61	1				
LQR	(0.21)	(0.10)	0.04	0.02	0.30	1			
LIR	0.58	0.57	0.01	(0.90)	(0.59)	0.05	1		
GDP	0.35	0.32	0.08	(0.59)	(0.45)	0.05	0.48	1	
INF	0.32	0.31	(0.03)	(0.57)	(0.36)	0.10	0.54	0.27	1

SOURCE*: Financial statement of sampled commercial banks and own computation through Eviews 7*

As depicted in the table 4.2 above Bank size, volume of deposit, lending interest rate, GDP and inflation had statistically significant and positive relationship with loans and advances. Similarly, cash reserve requirement ratio and liquidity ratio had statistically significant but negative linear relationship with total loans and advances .However, credit risk has negative but statistically insignificant relation with loan and advances.

Loan and advance has highly positive correlation with bank size with the coefficient of correlation 0.98 and statistically different from zero/statistically significant. During the study period the size of all banks (natural log of total asset) which was included in this study shows progress. Volume of deposit has statistically positive correlation (i.e. 0.29) with loan and advances which indicates that as volume of deposit increases commercial banks' will have capacity to give a loan. Furthermore loan and advances had statistically significant positive correlation with country's GDP growth. On the other hand contrary to researchers expectation inflation (0.32) and lending interest rate (0.58) had statistically significant positive correlation with loan and advances.

Moreover, cash reserve requirement ratio (-0.62) and liquidity ratio (-0.21) had statistically significant but negative linear relationship with total loans and advances even if liquidity ratio relates with loan and advance with opposite direction. Lastly credit risk has negative relation with loan advances as expected but it is not significant.

Even though the correlation analysis shows the direction and degree of associations between variables, it does not allow the researcher to make cause and effects inferences regarding the relationship between the identified variables. Thus, in examining the effects of selected independent variables on lending behavior, the econometric regression analysis which is

discussed in the subsequent section of the paper gives assurance to overcome the shortcomings of correlation analysis.

4.1.3. Testing assumptions of classical linear regression model (CLRM)

For valid hypothesis testing and to make data available for reliable results, the test of assumption of regression model is required. Accordingly, the study has gone through the most critical regression diagnostic tests consisting of errors have equal zero mean test, heteroskedasticity, normality, autocorrelation, and multicolinearity.

Test for the errors have zero mean*(E(ut) = 0)*

According to Brooks (2008), if a constant term is included in the regression equation, this assumption will never be violated. Thus, in this study since the regression model included a constant term, the average value of the error term is expected to be zero. Therefore this assumption was not violated.

Tests for the assumption of homoscedasticity (variance of the errors is constant var(ut) = σ2 <∞)

It has been assumed that the variance of the errors is constant. This is known as the assumption of homoscedasticity. If the errors do not have a constant variance, they are said to be heteroskedastic. To test this assumption the whites test was used having the null hypothesis of heteroskedasticity. Both F-statistic and chi-square $(\chi)^2$ tests statistic were used.

In this study as shown in table 4.3, both the F-statistic and Chi-Square versions of the test statistic gave the same conclusion that there is no evidence for the presence of heteroskedasticity,

since the p-values were in excess of 0.05. The third version of the test statistic, "Scaled explained SS", which as the name suggests is based on a normalized version of the explained sum of squares from the auxiliary regression, also gave the same conclusion that there is no evidence for the presence of Heteroskedasticity problem, since the p-value was considerably in excess of 0.05.

Table 4.3. Heteroskedasticity Test: White

F-statistic	1.521159	Prob. F(8,95)	0.1601
Obs*R-squared	11.80940	Prob. Chi-Square(8)	0.1599
Scaled explained SS	12.02639	Prob. Chi-Square(8)	0.1500

Source*: Financial statement of sampled commercial banks and own computation through Eviews 7*

Test for absence of autocorrelation (covariance between the error terms over time is zero (cov (ui,uj) = 0)

The test for autocorrelation was made by using both Durbin -Watson (DW) and Breusch-Godfrey Serial Correlation LM Test. Durbin-Watson (DW) is a test for first order autocorrelation i.e. it tests only for a relationship between an error and its immediately previous value whereas Breusch-Godfrey Serial Correlation LM Test is more general than the DW test, and can be applied in a wider variety of circumstances since it does not impose the DW restrictions on the format of the first stage regression (Brook,2008). The null hypothesis for the DW test is no autocorrelation between the error term and its lag. The Durbin-Watson Statistics (D-W stat.)

onthe regression result table the DW test shows that it is 1.81 which is approaching to 2 and hence no evidence for the presence of autocorrelation.

In addition, Breusch-Godfrey Serial Correlation LM test provided that both the F- and $\chi 2$ -test statistic give the same conclusion that there is no evidence for the presence of autocorrelation since the p-values in all of the cases were greater than 0.05.

Table 4.4.Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.439284	Prob. F(10,85)	0.1773
Obs*R-squared	15.05999	Prob. Chi-Square(10)	0.1299

Source*: Financial statement of sampled commercial banks and own computation through Eviews 7*

Test for the assumptions of normality (*ut*~N(0, *σ*2))

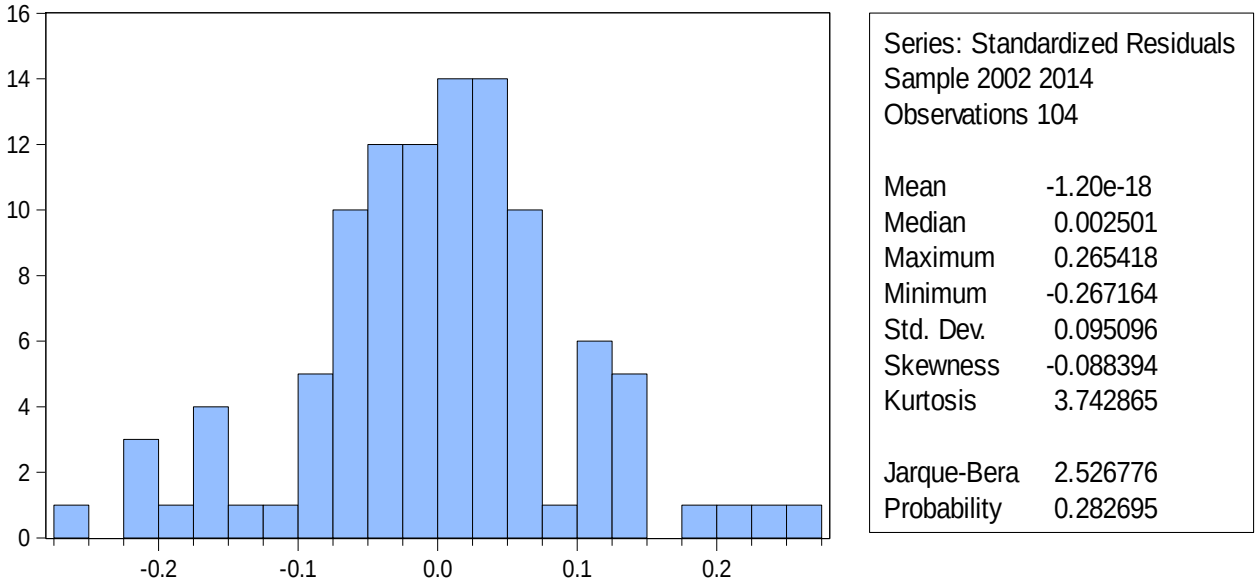
According to Brooks (2008), if the residuals are normally distributed, the histogram should be bell-shaped and the Jarque-Bera statistic would not be significant. This means that the p-value given at the bottom of the normality test screen should be greater than 0.05 to support the null hypothesis of presence of normal distribution.

Theoretically, if the test is not significant, then the data are normal, so any value above 0.05 indicates normality. Jarque-Bera formalizes this by testing the residuals for normality and testing whether the coefficient of skeweness and kurtosis close are zero and three respectively. Skewness refers to how symmetric the residuals are around zero. Perfectly symmetric residuals

will have a skewness of zero. Skewness measures the extent to which a distribution is not symmetric about its mean value. Kurtosis refers to the peakednes of the distribution. For a normal distribution the kurtosis value is 3.

The Bera-Jarque probability statistics/P-value is expected not to be significant even at 10% significant level (Brooks 2008). According to Gujarati (2004), the JB is a large sample test and our sample of 104 was equal to the frame was large; we considered the JB test also. As shown in the histogram below kurtosis closes to 3 (i.e. 3.74, and the Jarque-Bera statistics was not significant even at 10% level of significance as per the P-values (i.e. 0.28) shown in the histogram. Hence, the null hypothesis that is the error term is normally distributed should not be rejected and it seems that the error term in all of the cases follows the normal distribution.

Fig 4.1 Normality test



Source*: Financial statement of sampled commercial banks and own computation through Eviews 7*

Tests of multicollinearity

This assumption is concerned with the relationship exist between explanatory variables. If an independent variable is an exact linear combination of the other independent variables, then we say the model suffers from perfect collinearity. Broos(2008). According to Churchill and Iacobucci (2005), when there is multicollinearity, the amount of information about the effect of explanatory variables on dependent variables decreases.

How much correlation causes multicollinearity is not clearly defined. Hair et al(2006) argue that correlation coefficient below 0.9 may not cause serious multicollinearity problem.

In this study correlation matrix for eight of the independent variables shown below in the table had been estimated. The results in the following correlation matrix show that the lowest (i.e. -0.0056) and the highest (i.e.-0.89) correlation was between CRR and VD and CRR and LIR respectively. Hence according to Hair et al (2006) we can notice that there is no problem of multicollinearity in this study.

Table 4.5: Correlation Matrix between independent variables

	SIZE	VD	CRR	CR	LQR	LIR	GDP	INF
SIZE	1							
VD	0.2474	1						
CRR	(0.5866)	(0.0056)	1					
CR	(0.0831)	0.2187	0.6118	1				
LQR	(0.0963)	0.0364	0.0210	0.3004	1			
LIR	0.5673	0.0095	(0.8988)	(0.5887)	0.0466	1		
GDP	0.3174	0.0769	(0.5852)	(0.4501)	0.0516	0.4790	1	
INF	0.3118	(0.0264)	(0.5749)	(0.3567)	0.0982	0.5380	0.2688	1

Source*: Financial statement of sampled commercial banks and own computation through Eviews 7*

In general, all tests illustrated above were testimonials as to the employed model was not sensitive to the problems of violation of the CLRM assumptions.

Test for Choosing fixed effect (FE) versus Random effect (RE) models

According to Gujarati (2004), if T (the number of time series data) is large and N (the number of cross-sectional units) is small, there is likely to be little difference in the values of the parameters estimated by fixed effect model/FEM and random effect model/REM. Hence the choice here is based on computational convenience. On this score, FEM may be preferable. Since the number of time series (i.e. 13 year) is greater than the number of cross-sectional units (i.e. 8 commercial banks), FEM is preferable in this case. According to Brooks (2008); Verbeek (2004) and Wooldridge (2004), it is often said that the REM is more appropriate when the entities in the sample can be thought of as having been randomly selected from the population, but a FEM is more plausible when the entities in the sample effectively constitute the entire population/sample frame. Hence, the sample for this study was not selected randomly and equals to the sample frame FEM is appropriate.

4.1.4. Results of regression analysis

In the commercial banks' lending behavior model regression output the beta coefficient may be negative or positive; beta indicates that each variables level of influence on the dependent variable. P-value indicates at what percentage or precession level of each variable is significant. R^2 values indicate the explanatory power of the model and in this study adjusted R^2 value which takes into account the loss of degrees of freedom associated with adding extra variables were inferred to see the explanatory powers of the models.

Operational model

In this section the hypothesis articulated in the prior chapter are tested and the results are estimated through Panel least square is presented. In commercial banks' lending behavior model the researcher specified panel fixed effect model by which loan and advance are regressed by various banking industry, regulatory and macroeconomic factors. The operational panel regression model used to examine the significant factors that affect the lending behavior of commercial banks in Ethiopia which represented by Loan and Advances (LD) was:

$$\mathbf{LD = \alpha + \beta 1 SIZE_{it} + \beta 2 VD_{it} + \beta 3 CRR_{it} + \beta 4 CR_{it} + \beta 5 LQR_{it} + \beta 6 LIR_{it} + \beta 7 GDP_{it} + \beta 8 INF_{it} + U_{it}}$$

The estimation result of the operational panel regression model used in this study is presented in table 4.5. From regression result table the R-squared statistics and the adjusted-R squared statistics of the model was 99.2% and 99.1% respectively. The result indicates that the changes in the independent variables explain 99 % of the changes in the dependent variable. i.e. bank size, volume of deposit, cash reserve requirement ratio, credit risk, liquidity ratio, lending interest rate, gross domestic product and inflation rate of the nation are collectively explain 99% of the changes in commercial banks' lending behavior or loan and advances. The remaining 1% of changes was explained by other factors which are not included in the model. From this it can be understood that these variables are the major factors which affect Ethiopian commercial banks' lending behavior. The null hypothesis of F-statistic i.e. the overall test of significance that the $R^2$is equal to zero was rejected at 1% as the p-value was sufficiently low. F value of 0.000 indicates strong statistical significance, which enhanced the reliability and validity of the model.

The panel fixed effect estimation regression result in the table 4.5 shows that; coefficient intercept (C) is 5. This means, when all explanatory variables took a value of zero, the average value of loan and advances will take 5 unit and statistically significant at 1% level of significance.

Table 4.6: FEM regression result

Dependent Variable: LD
Method: Panel Least Squares
Date: 07/05/15 Time: 08:29
Sample: 2002 2014
Periods included: 13
Cross-sections included: 8
Total panel (balanced) observations: 104

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.001095	0.598794	8.351943	0.0000
SIZE	0.751317	0.026314	28.55180	0.0000***
VD	0.975911	0.268472	3.635058	0.0005***
CRR	-2.587256	0.709984	-3.644104	0.0005***
CR	-0.075414	0.253971	-0.296940	0.7672
LQR	-1.352470	0.123624	-10.94021	0.0000***
LIR	-2.758929	2.382398	-1.158047	0.2500
GDP	0.657300	0.329476	1.994984	0.0491**
INF	0.121276	0.105170	1.153139	0.2520

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.992953	Durbin-Watson stat	1.810603
Adjusted R-squared	0.991752		
F-statistic	826.6782		
Prob(F-statistic)	0.000000		

Source: *own computation from sampled banks through Eviews 7*

***, and ** denote significance at 1%, 5%, levels respectively.

4.2. Discussion of results

This section of the chapter discusses the main implications of the results and the research hypotheses will also tested. The analysis is based on the results of the regression between the dependent variable and the independent variables presented in table 4.6 above.

As it can be shown in regression results table, among the explanatory variables bank size, volume of deposit and GDP had statistically positive significance at 1%, 1%and 5% significance level respectively. While cash reserve requirement ratio and liquidity ratio had statistically negative significance at 1%significance level. Conversely credit risk, lending interest rate and inflation had statistically insignificant impact although the coefficient signs of inflation rate were opposite to the expectation. Next to this detail discussion of each explanatory variable regression result will be presented.

4.2.1. Bank size

In line with prior studies, the size of the bank is highly significant at 1% level (p-value 0.000) with (coefficient 0.75). The significant size coefficient can be interpreted as a 1 unit rise/decline in the bank‘s total asset leads to 0.75 unit rise/decline in loan and advances. This result is consistent with various prior empirical studies recurring finding of appositive relationship between the bank size and lending which is consistent to the finding of Cole et al. (2004) ,Andreas & Gabrielle (2009),(Amano, 2014), Mitku (2014).The larger the bank size, the more commercial banks' ability to hold lonable funds to lend for their customers .It could also mean that bank size is associated with diversification which may impact favorably on risk and loan portfolio. The data of this study shows that the size of all Ethiopian commercial banks which is

measured by natural log of total asset is increased for the last 13 years. Consequently, this improvement raises the capacity of banks to provide more loans. Thus those banks which are big in size can grant more loan than which are small in**.** based on this finding the researcher rejects the null hypothesis which is bank size doesn't have impact on commercial bank loan determination. The result implies that commercial banks 'need to increase their asset size in order to boost their ability of giving loan and advances.

4.2.2. Volume of deposit

The FEM regression result indicates that volume of deposit has positive relationship with Ethiopian commercial banks' lending behavior at one percent significance level with a p-value of 0.0005, coefficients of 0.975.

As regression coefficient reveals, a 1unitrise/decline in volumes of deposit leads to a 0.975 unit growth in commercial banks loan. This indicates that deposit is a major source of loan for commercial banks'. The finding is consistent with prior studies (i.e.Olokoyo(2011), Olumuyiwa (2012)Amano (2014),Berhanu(2016) .The finding implies that commercial banks' depend on depositor's money as a source of funds, it means that as the as the ability of the banks to mobilize deposits enhanced, the amount of loan granted to the customers will improved. Hence in order to increase the ability of Ethiopian commercial banks' lending capability commercial banks' need to give emphasis in increase volume of deposit by encouraging saving.

4.2.3. Cash reserve requirement ratio

The result of the model reveals that, cash reserve requirement ratio has highly statistically negative significant relationship with Ethiopian commercial bank lending behavior with p- value of 0.0005, and coefficient of -2.58.

The result found in this study is in line with prior studies, Christian& Pascal (2012), Cargill and Mayer (2006), and Montoro and Moreno (2011) contended that, an increase in reserve requirement case to decrease bank credit. .

With the objective of controlling the recurring inflationary episodes in the country, National Bank of Ethiopia increase and decreases the reserve requirement on commercial banks from time to time

The regression output implies that cash reserve requirement set by the regulatory body, NBE highly affects commercial banks' loan and advances negatively i.e. high reserve requirements decrease loanable funds available for investment.

4.2.4. Credit risk

The result of the study reveals that credit risk has statistically insignificant negative relationship with commercial banks' lending behavior with p value of 0.76 and coefficient of –0.075..

Many finance literature suggests that if the commercial banks' are within the environment of high credit risk the principal plus interest may not repaid. Nevertheless, as the regression result probability value indicate that Ethiopian commercial banks' lending is not as such affected by credit risk, this impact is may be due to the borrowers in the nations are creditworthy and the

moral hazard and adverse selection problems is not much serious problem the other possible reason is commercial banks' in Ethiopia request a sufficient guarantee or collateral during the time of giving loan. As a result, the probability the borrowers make a default is much less.In addition, the National Bank's regulation which orders banks' to lower their NPLR enables banks to focus on credit risk minimization. Furthermore an additional tool banks to minimize their credit risk is , NBE's proclamation no. 97/1998 provide for property mortgaged or pledged with by banks gave banks a right to sell properties which they hold as a collateral and the borrower fails to pay the loan.

4.2.5. Liquidity ratio

The regression result on the table 4.6 indicated that a significantly negative relationship between liquidity and commercial banks' lending behavior at one percent significance level with a p-value 0.0000 and coefficients of -1.35.The result is consistent with some prior studies (i.eOlokoyo, F 2011 and Olumuyiwa 2012and Amano 2014).

According to Pilbeam (2005, p. 42), in practice the amount of liquidity held by banks is heavily influenced by loan demand that is the base for loan growth. If demand for loans is weak, then the bank tends to hold more liquid assets, whereas if demand for loans is high they tend to hold less liquid assets since long term loans are generally more profitable (Amano 2014).As the regression result implies since loans are illiquid assets, increase in the amount of loans means increase in illiquid assets in the asset portfolio of a banks, it indicates that according to the researcher's angle of view and the regression result reveals liquidity ratio and loans and advance has negative relationship.

4.2.6. Lending interest rate

The result of the study reveals that lending interest rate has statistically insignificant negative relationship with commercial banks' lending behavior with p-value of -2.75 and coefficients of -0.25.The result is in line with the findings of (Bernanke and Blinder, 1988), (Amano, 2014) and (Berhanu ,2016).

.According to Berhanu (2016), the trend of borrowers depending on banks' loan as a source of fund is less when compared to developed countries. Hence, the borrowers are more sensitive to the lending interest changes. This has a possibility to reduce the demand for loan.

Even if it is proved that lending interest has inverse relationship with loan and advances the result is not significant, this is may be due to in current Ethiopian case fully liberalization of lending interest rate the variable was not significant during the study period,as there is no lower/upper lending limit rate in the country, commercial banks can freely determine their lending interest rate.

4.2.7. Gross domestic product

The regression result shows that the coefficient of GDP is 0.65 and p-value is 0.04, which indicates that 1 unit change in country's GDP contributes 0.65 unit changes in commercial banks loan and advances with 5% significance level. From this analysis can understand that the country's growth is positively related with the banks' lending behavior as well as their performance.

The finding of this study reveals that GDP has a significant positive impact on commercial banks' lending behavior which agrees with Mansor H. I. (2006) note that, gross domestic product affect bank loans positively since an increase in GDP causes a raises in both supply and demand for loans. An increase in GDP means more funds are available for banks to make loans since deposits are more likely to increase. Pruteanu-Podpiera (2007) investigated the impact of, gross domestic product growth rate on loans of Czech banks from 1996 to 2001 and gets the same result. On the other way, the result is not consistent with Amano (2014), which concludes that there is no relationship between gross domestic product and lending behavior of Ethiopian commercial banks.

The implication of this result is if the country's GDP increase the standard of living of the society will improve, if the society's living standard is improve they can deposit money at bank then banks' give this deposit as loan to the society again.

4.2.8. Inflation

The FEM regression result indicates that inflation has positive insignificant relationship with Ethiopian commercial banks' lending behavior with a p-value of 0.25, coefficients of 0.12.

According to Amano (2014), market frictions lead to the rationing of credit, credit rationing becomes more severe as inflation rises. As a result, the financial sector makes fewer loans, resource allocation is less efficient, and intermediary activity diminishes with adverse implications for capital/long term investment. According to different theories and the null hypothesis there is inverse relationship between inflation rate and loan and advances. Conversely the result of this study shows positive relationship between the two variables but it is not

significant. Hence inflation rate has not significant impact on Ethiopian commercial banks' lending behavior; the possible reason for this result is different regulatory measures taken by NBE helps to control the impact of inflation on Ethiopian commercial Banks lending activity.

To sum up results and discussions of determinants of Ethiopian commercial banks' lending or loan and advances, Ethiopian commercial banks' lending behavior is determined by bank size (asset), volume of deposit and GDP growth positively, and by cash reserves requirement and liquidity ratio negatively. On the other hand the findings suggest that credit risk, lending interest rate and inflation have not significant impact on Ethiopian commercial banks' lending behavior.

Table 4.7 Comparison of the hypothesis test result with the expectation

Hypothesis no	**Independent Variables**	**Expected relationship with dependent variable (LD)**	**Actual Result**	**Status**
Hypothesis 1	Bank size	Positive and sig	Positive and sig	Not rejected
Hypothesis 2	Volume of deposit	Positive and sig	Positive and sig	Not rejected
Hypothesis 3	Cash reserve requirement	Negative and sig	Negative and sig	Not rejected

Hypothesis 4	Credit risk	Negative and sig	Negative and insig	Not rejected
Hypothesis 5	Liquidity ratio	Positive and sig	Negative and sig	Rejected
Hypothesis 6	Lending interest rate	Negative and sig	Negative and insig	Not rejected
Hypothesis 7	GDP	Positive and sig	Positive and sig	Not rejected
Hypothesis 8	Inflation	Negative and sig	Positive and insig	Rejected

Source; Own

Note: Sig- statistically significant

Ins- statistically insignificant

CHAPTER FIVE

5. CONCLUSIONS AND RECOMMENDATIONS

The preceding chapter presented the results and discussion, while this chapter deals with conclusions and recommendations based on the findings of the study. Accordingly this chapter is organized into two subsections. Section 5.1 presents the conclusions and section 5.2 presents the recommendations.

5.1. Conclusions

Bank loan is typically the largest asset and the predominant source of income for banks. In view of the significant contribution of loans to the financial health of banks through interest income earnings, these assets are considered the most valuable assets of banks. To this end, this study aimed at examining possible factors that could determine the lending behavior of Ethiopian commercial banks.

In order to achieve this objective, eight hypotheses have been developed. To test hypotheses and achieve the broad research objective, the study used quantitative research approach. The analyses were performed using panel data derived from the financial statements of sampled Ethiopian commercial banks and macro-economic data from National bank of Ethiopia for thirteen years period from 2002-2014. The sample for this study consists of eight commercial banks operating in Ethiopia for the whole 13 years study period. Fixed effect model was used to estimate the regression equation. Many diagnostic tests, descriptive and correlation analysis were applied. In the study bank size, volume of deposit, cash reserve requirement, credit risk, liquidity ratio,

lending interest rate,GDP growth and inflation were considered as independent variables while commercial banks' lending behavior or loan and advances was considered as dependent variable. These explanatory variables were included in loan and advance multiple regression model to estimate its impact on commercial banks' lending behavior. Parameters were estimated using the Ordinary Least Square (OLS) method.

The results of the regression analysis reveals that, Ethiopian commercial banks' lending or loan and advances is determined by bank size, volume of deposit and GDP growth positively ,and by cash reserve requirement and liquidity ratio negatively. On the other hand the findings suggest that credit risk, lending interest rate and inflation have not significant impact on Ethiopian commercial banks' lending loan and advances.

The study implies that lending is affected by bank specific macroeconomic and regulatory factors. Hence, commercial banks' have to manage their loan and advances by considering the general economic dynamic, regulators rule and regulation i.e.by taking into account both internal and external environment.

5.2. Recommendations

Based on the findings of the research to improve commercial bank lending behavior the following recommendations are provided:

- Ethiopian commercial banks' should enhance their strategies in mobilizing deposits from the public by creating awareness in the society to increase saving and they have to improve their service excellences, branch expansion, promotional effort, and using new banking technology. Because the studies indicate that deposit plays a great role as a source of funds for giving loan and advances.
- Since large banks have a comparative advantage in lending to large customers as they can exploit economies of scale in evaluating the hard information Ethiopian commercial banks' should have to strive on strengthen their asset size.
- Since liquidity management plays a significant role in enhancement of lending commercial Banks' should have build system to control their liquidity.
- Even if the regularly measures taken by the central bank to control the economy as a whole and to maintain soundness and stability of financial sector some regulations like cash reserve requirement ratio should have managed carefully as it has adverse impact on commercial banks' lending ability.

Finally this study focuses on commercial banks' lending behavior from the supplier (Banks) side not from client (borrowers) side so the researcher recommends to future researcher to emphasizing both banks and client side determinants of lending or loan and advances.

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Appendices

Appendix 1 ;-Heteroskedasticity Test: White

F-statistic	1.521159	Prob. F(8,95)	0.1601
Obs*R-squared	11.80940	Prob. Chi-Square(8)	0.1599
Scaled explained SS	12.02639	Prob. Chi-Square(8)	0.1500

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 07/05/15 Time: 09:45
Sample: 1 104
Included observations: 104

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.019199	0.028847	-0.665539	0.5073
SIZE^2	0.000109	3.76E-05	2.902141	0.0046
VD^2	-0.025143	0.016708	-1.504876	0.1357
CRR^2	0.019541	0.516586	0.037827	0.9699
CR^2	-0.045692	0.076759	-0.595268	0.5531
LQR^2	0.011404	0.023089	0.493912	0.6225
LIR^2	-0.860964	1.642532	-0.524168	0.6014
GDP^2	-0.129111	0.484044	-0.266734	0.7903
INF^2	0.000206	0.044592	0.004613	0.9963

R-squared	0.113552	Mean dependent var	0.010345
Adjusted R-squared	0.038904	S.D. dependent var	0.016241
S.E. of regression	0.015922	Akaike info criterion	-5.359669
Sum squared resid	0.024083	Schwarz criterion	-5.130828
Log likelihood	287.7028	Hannan-Quinn criter.	-5.266959
F-statistic	1.521159	Durbin-Watson stat	1.420990
Prob(F-statistic)	0.160095		

Appendix;- 2 Breusch-Godfrey Serial Correlation LM Test:

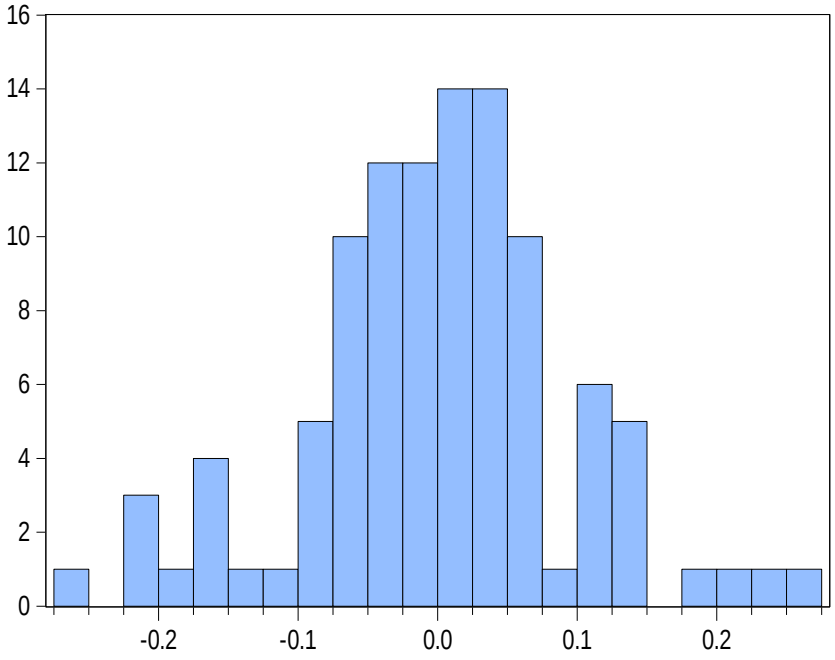
F-statistic	1.439284	Prob. F(10,85)	0.1773
Obs*R-squared	15.05999	Prob. Chi-Square(10)	0.1299

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 07/05/15 Time: 09:48
Sample: 1 104
Included observations: 104
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.134026	0.371441	-0.360826	0.7191
SIZE	0.003776	0.012702	0.297273	0.7670
VD	-0.039087	0.167106	-0.233905	0.8156
CRR	0.305394	0.712970	0.428340	0.6695
CR	0.039885	0.229600	0.173715	0.8625
LQR	-0.063846	0.126321	-0.505424	0.6146
LIR	0.675819	2.408057	0.280649	0.7797
GDP	0.006536	0.362352	0.018037	0.9857
INF	-0.009817	0.113662	-0.086366	0.9314
RESID(-1)	0.221822	0.110421	2.008863	0.0477
RESID(-2)	0.233440	0.113934	2.048910	0.0436
RESID(-3)	-0.052630	0.122394	-0.430007	0.6683
RESID(-4)	-0.095538	0.124462	-0.767607	0.4448
RESID(-5)	0.190478	0.124426	1.530849	0.1295
RESID(-6)	-0.038053	0.124777	-0.304971	0.7611
RESID(-7)	-0.118692	0.121551	-0.976474	0.3316
RESID(-8)	0.005875	0.119029	0.049358	0.9607
RESID(-9)	-0.049756	0.118045	-0.421499	0.6745
RESID(-10)	0.083667	0.116163	0.720256	0.4733

R-squared	0.144808	Mean dependent var	-1.29E-14
Adjusted R-squared	-0.036292	S.D. dependent var	0.102204
S.E. of regression	0.104042	Akaike info criterion	-1.524404
Sum squared resid	0.920098	Schwarz criterion	-1.041294
Log likelihood	98.26901	Hannan-Quinn criter.	-1.328682
F-statistic	0.799602	Durbin-Watson stat	2.015329
Prob(F-statistic)	0.695352		

Appendix 3;-Normality test



Series: Standardized Residuals	
Sample 2002 2014	
Observations 104	
Mean	-1.20e-18
Median	0.002501
Maximum	0.265418
Minimum	-0.267164
Std. Dev.	0.095096
Skewness	-0.088394
Kurtosis	3.742865
Jarque-Bera	2.526776
Probability	0.282695

Appendix 4;-FEM regression result

Dependent Variable: LD
Method: Panel Least Squares
Date: 07/05/15 Time: 08:29
Sample: 2002 2014
Periods included: 13
Cross-sections included: 8
Total panel (balanced) observations: 104

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.001095	0.598794	8.351943	0.0000
SIZE	0.751317	0.026314	28.55180	0.0000***
VD	0.975911	0.268472	3.635058	0.0005***
CRR	-2.587256	0.709984	-3.644104	0.0005***
CR	-0.075414	0.253971	-0.296940	0.7672
LQR	-1.352470	0.123624	-10.94021	0.0000***
LIR	-2.758929	2.382398	-1.158047	0.2500
GDP	0.657300	0.329476	1.994984	0.0491**
INF	0.121276	0.105170	1.153139	0.2520

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.992953	Durbin-Watson stat	1.810603
Adjusted R-squared	0.991752		
F-statistic	826.6782		
Prob(F-statistic)	0.000000		