EFFECT OF LOAN PORTFOLIOS ON FINANCIAL PROFITABILITY OF COMMERCIAL BANKS IN ETHIOPIA PANEL ANALYSIS

MSC THESIS

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EFFECT OF LOAN PORTFOLIOS' ON FINANCIAL PROFITABILITY OF COMMERCIAL BANKS IN ETHIOPI PANEL ANALYSES

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STATEMENT OF DECLARATION

I hereby declare that this thesis entitled **"effect of loan portfolios' on financial profitability of commercial banks in Ethiopia panel analyses"** has been carried out by me under the guidance and supervision of **Kirubel Asegidewu (ass. Prof)** and submitted by me for the award of the degree of Master of Science in accounting and finance of Wolkite University.

The thesis is original and has not been submitted for the award of any Degree of diploma any University. It is offered for the partial fulfillment of the degree of Masters of in accounting and finance.

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LIST OF ACRONYMS and abbreviation

LIST abbreviation meaning of abbreviation

AIB……..Awash International Bank SC

AQ……Asset Quality

BBI……Birhan International Bank

BIB……Bunna International Bank

BOA……..Bank of Abyssinia S.C

BS……..Bank Size

CA…….Capital Adequacy

CAR……..…Cash reserve

CBE……..….Commercial Bank of Ethiopia

CBO……..COOPERATIVE Bank of Oromia

CLRM……. Classical Linear Regression Model

DB……Dashen Bank SC

FEM…….Fixed Effect Model

ID…….Income diversification

LER…….Legal reserve

LIB……..Lion International Bank SC

LQ……...Liquidity

NBE……National Bank of Ethiopia

NIB…….Nib International Bank

NPL……Non-performing loans

OE…….Operational efficiency

OIB……Oromia International Bank

OLS……..Ordinary Least Square

REM…….Random Effect Model

ROA…….Return on Asset

ROE…….Return on Equity

UB……United Bank SC

VOD…….Volume of deposit

ZB…….Zemen Bank

ABSTRACT

Banks play very significant role in the economies of the nation. The well-being of the economy is highly related to the soundness of its banking system. Loans comprise the single largest asset for commercial banks. The purpose of this study is to investigate the effect of loan portfolio on the financial profitability of commercial banks in Ethiopia. To achieve this objective explanatory research design with a quantitative approach was used. The study fully employed strongly balanced panel data from the period 2011-2020. Collocated data from 12 commercial banks audited financial statement purposively and by using Eviews-9 software packages analyzed through panel data regression analysis methods. The study employed a random-effect model as confirmed by the Hausman test. The study found that loan portfolio growth (LPG) and loan portfolio profitability (LPP) have statistically significant and a positive effect on commercial banks' financial profitability measured by ROA, ROE and NIM. Whereas, loan portfolio operational efficiency (LPOE) and loan portfolio asset quality (LPAQ) has a positive and statistically insignificant effect on Commercial banks' financial performance. That is LPAQ, LPG, LPOE and LPP are jointly explaining 58.35%, 65.46% and 53.4% of the change in ROA ROE and NIM respectively The researcher recommended that to increase loan portfolio asset quality (LPAQ) the bank has to revise and the fill gap of Credit Policy & Procedures within a short period of time and also to establish strong follow up mechanism to insure strict adherence to the Policy and Procedure.

Key words: loan portfolio/aggregate loan, financial profitability, Commercial banks

CHAPTER ONE

1. INTRODUCTION

1.1 Overview of Ethiopian banks

It was in 1905 that the first bank, "Bank of Abyssinia", was established based on the agreement signed between Emperor Minilik II and the National Bank of Egypt, which was owned by the British with a capital Pound Sterling 500,000. The Bank was given full rights to issue bank notes and monitor coins which were to be legal tender. The Ethiopian Government, under Emperor Haile Selassie, closed the Bank of Abyssinia, paid compensation to its shareholders and established the Bank of Ethiopia which was fully owned by Ethiopians, with a capital of pound Sterling 750,000 which was started its operation in 1932. During the Italian occupation (1936- 1941), the operation of the Bank of Ethiopia came to a halt, but a number of Italian financial institutions were working in the country. These were Bunco Di Roma, Bunco Di Napoli and Banka National Del Lavora. It should also be mentioned that Barclays Bank had opened a branch and operated in Ethiopia during 1942-43. With the departure of the Italians and the restoration of Emperor Haile Selassie's government, the State Bank of Ethiopia was established in 1943 with a capital of 1 million Maria Theresa Dollars. In 1945 the Agricultural Bank was established but was replaced by the Development Bank of Ethiopia in 1951, which changed in to the Agricultural and Industrial Development Bank in 1970. In 1946 Banquo Del Indochina was opened and functioned until 1963. In 1963, the Imperial Savings and Home Ownership Public Association (ISHOPA) and the Investment Bank of Ethiopia were founded. In 1965, the later was renamed Ethiopian Development Corporation S.C. In the same year, the Savings and Mortgage Company of Ethiopia S.C. was also founded. In 1963, the State Bank of Ethiopia split into the National Bank of Ethiopia and the Commercial Bank of Ethiopia S.C. with the purpose of segregating the functions of central banking from those of commercial banking. The first privately owned company in banking business was the Addis Ababa Bank S.C., established in 1964. Thus, until the end of 1974, there were state owned, foreign owned and Ethiopian owned banks in Ethiopia. Following the 1974 Revolution, on January 1, 1975 all private banks and 13 insurance companies were nationalized and along with state owned banks, placed under the coordination, supervision and control of the National Bank of Ethiopia. In 1976, the Ethiopian Investment and Savings S.C. was merged with the Ethiopian government saving 2 and Mortgage Company to form the Housing and Savings Bank. The Agricultural and Industrial Development Bank continued under the same name until 1994 when it was

renamed as the Development Bank of Ethiopia. Thus, from 1975 to 1994 there were four state owned banks and one state owned insurance company, i.e., the National Bank of Ethiopia (The Central Bank), the Commercial Bank of Ethiopia, the Housing and Savings Bank, the Development Bank of Ethiopia and the Ethiopian Insurance Corporation. After the overthrow of the Dergue regime by the EPRDF, new economic policy replaced centrally planned economic system with a market-oriented system and ushered in the private sector. In line with this, Monetary and Banking proclamation of 1994 established the national bank of Ethiopia as a judicial entity, separated from the government and outlined its main function. Monetary and Banking proclamation No.83/1994 and the Licensing and Supervision of Banking Business No.84/1994 laid down the legal basis for investment in the banking sector. Consequently shortly after the proclamation the first private bank, Awash International Bank was established in 1994 by 486 shareholders. (www.nbe.gov.et)

The banking sector is comprised of 18 banks including the two state-owned Commercial Bank of Ethiopia (CBE) and Development Bank of Ethiopia (DBE). Together with Microfinance Institutions (n. 38 MFIs) banks hold 98.6 percent of all sector assets. The banking sector has been closed to foreign investors, who are prohibited from acquiring shares of Ethiopian banks (Art. 9 of Banking Business Proclamation n. 592/2008). However, through amendments to the Banking Proclamation13 ratified by Parliament on July 31, 2019 the government of Ethiopia (GOE) took recent steps towards opening the sector which now allows 'foreigners of Ethiopian origin' (Diaspora) to purchase shares in Ethiopian banks. The new proclamation also allowed interest-free lending to support development of Islamic financing.

1.1.1 Background of the Study

The purpose this study Banks play very significant role in the economies of the nation. The well-being of the economy is highly related to the soundness of its banking system. Loans comprise the single largest asset for commercial banks. To grow the banks' assets bank managers, focus on growing the amount of loans granted by the bank. Banks have always played an important position in the country's economy. They play a decisive role in the development of the industry and trade. They are acting not only as the custodian of the wealth of the nation but also as resources of the public, which are necessary for the economic development of a nation. The general role of commercial banks is to provide financial services to general public and business, ensuring economic and social stability and sustainable growth of the economy. The difficulties in creating borrowers' ability and

willingness to repay, and lack of legal support for creditor rights limit banks' lending schemes, which contributes to shallow financial development.

Today's banks seek to earn income by lending money out at a higher interest rate than they pay depositors for use of their money. Banks usually make loans up to the point where they can no longer do so because of the reserve requirement restriction. The banks required amount of reserves is equal to the required reserve ratio times the total deposits in the bank (Case and Fair, 2007). The banking industry considers lending as their most important function for utilization of funds. Since the major portion of gross profit of the industry is earned from loans; the administration of loan portfolios seriously affects the profitability of banks (Wei-shong and Kuo-chung, 2006). Loan is equally important for borrowers (the private sector in particular) as it remains to be the most important external financing source. Hence the availability or constraint as well as restriction on free access to loan affect both banks and borrowers.

Ethiopia's Banking Sector cepheus research (2019) Revenue sources: Split by two broad categories, the revenue sources of Ethiopian banks are comprised of: (1) interest income received from loans/bonds; and (2) non-interest income derived from items such as opening import Letter of Credits, guarantee services, trading plus revaluation gains, and fees for services such as cheek books, ATM cards, and money transfers. As of FY 2017-18, net interest income provided Birr 15.5bn of revenue (62 percent) while non-interest income amount to Birr 9.3bn (38 percent). Seen over time, private banks' revenue base has in recent years shifted towards interest income rather than other non-interest sources; only 46 percent of revenue was derived from net interest income five years ago, but this is now 62 percent.

Interest income: Interest income has risen nearly five-fold from Birr 3.2bn five years ago to Birr 15.5bn last year. The rapid growth in (net) interest income reflects banks' rising loan balances, which are up from Birr 44 billion to 178 billion over the past five years. The growth in the volume of loans has offset the moderate decline in effective lending spreads on loans, which are down from about 12 percent to 7.4 percent at private banks. The fall in spreads reflects the decline in effective lending rates which, in turn, reflects the rising share of NBE bills in total interest-earning assets

Anteneh T. (2018) According to his study Financial Performance analysis of Commercial Banks in Ethiopia: Asset quality, management efficiency, size of the bank and net interest margin were the major significant variables to affect performance of commercial banks by return on asset measure at 1% significant level. Liquidity also has significant effect on return on asset at 5% significant level, whereas earning quality does not have significant

impact on profitability measurement of return on asset and return on equity. Asset quality and management efficiency looks to have an inverse relationship with return on asset and return on equity in connection with their negative sign, but they have direct relationship with them. Size of the bank, liquidity and net interest margin also have direct relationship with ROA. Capital adequacy, asset quality, management efficiency, liquidity and net interest margin were the most significant variables to affect return on equity at 1% significant level as compared to insignificant variable size of the bank and earning quality despite their inverse relationship. Capital adequacy, asset quality, management efficiency have an inverse relationship with return on equity, while liquidity and net interest margin have direct relationship with it.

Interest income is the amount paid to an entity for lending its money or letting another entity use its funds. On a larger scale, interest income is the amount earned by an investor's money that he places in an investment or project. A very simple and basic way of computing it is by multiplying the principal amount by the interest rate applied, considering the number of months or years the money is lent. Interest income is usually taxable income and is presented in the income statement for the simple reason that it is an income account. Usually, the two categories in the income statement, namely "Income from Operations" and "Other Income" are listed separately. In such an instance, the presentation of interest income will largely depend on the nature of the business' primary operations. If, for example, the income from interest is a major source of funds for the company, then it falls under "Income from Operations." A very simple example of interest income that happens every day is when an individual deposits money into a savings account and decides to leave it untouched for several months or years. The money won't just sit idly in his account, because the bank will use it to lend money to borrowers. The bank will earn interest by lending money out, but will also pay interest to holders of deposit accounts. At the end of every month, the account statement will react the interest that the bank pays for borrowing the account holder's money. It is important to note that banks use what is called "fractional banking," which means that only a part of customer deposit accounts can be used by the bank as lending funds. The bank must retain a certain level – known as the reserve – of deposit account funds. It cannot legally loan out all the funds that customers have deposited with it. The main deference between interest income and interest expense is outlined below: In some cases, businesses report the interest expense and interest income separately, while others combine them and label them as Example of interest income

International Monetary Fund (2020) the financial system continues to be sound, underpinned by a well-capitalized, profitable and liquid commercial banking system. Commercial banks reported a risk-weighted capital ratio (RWCR) of 19.2 percent in June 2019, well above the statutory minimum of 8 percent. The Commercial Bank of Ethiopia (CBE) in particular, had an RWCR of 34.7 percent, and private banks reported capital levels well in excess of the regulatory minimum. Asset quality also remains good: non-performing loans (NPLs) to total loans were below 3 percent – under the statutory 5-percent ceiling – and have been largely stable throughout the year. The CBE's NPL ratio, in particular, was 1.78 percent in June 2019. Private Banks remained liquid: the liquid assets-to deposits ratio remained high at 18.7 percent, above the statutory minimum of 15 percent. The CBE, however, experienced tighter liquidity conditions due to its support for critical national projects that have not yet started generating revenues during the year. In response, the government has adjusted the pace of implementation of projects to reduce pressures

Finally In Ethiopia the commercial banks dominate the financial sector. In a country where the financial sector is dominated by commercial banks, any failure in the sector has a huge implication on the economic growth of the country. This is due to the fact that any bankruptcy that could happen in the sector has a domino effect loan that can lead to bank runs, crises and bring overall financial crisis and economic problems. However, substantial number of studies has not conducted to investigate the status of banks loan portfolio financial performance as well as the determinants of financial performance of the Ethiopian banking system according to the researcher's knowledge. This research examined the internal factors that determine the financial performance of Ethiopian commercial banks industry from the period 2011-2020. Moreover, the current banking failures in the developed countries and the bailouts thereof motivated this study to evaluate the effect of loan portfolio financial performance of Commercial banks in Ethiopia. Thus, to take protective and qualifying measures, there is dire need to understand the performance of banks and its effect

1.2 Statement of Problem

What is not clear is whether loan portfolio interest income and non-interest income are related as well as the significant contribution of banks' profitability. Moreover, the growth rate of loan portfolio interest income in banks in the last ten years seems unclear hence the need for this study. This is because, when these factors are investigated, loan portfolio

interest income generation may become the core income source for banks. The profitability of commercial banks is partly dependent on the interest spread–the difference in interest rates charged on loans and what is paid to suppliers of funds (Pyle, 1971). On the other hand, examining the trend of loan portfolio interest income over ten years in the selected banks may reveal growth or reduction that calls for new strategies in product development and service delivery.

Irrespective of the aforementioned predicaments of the sector, the number of banks in Ethiopia is increasing from time to time. This is resulted with the increasing in competitions among banks. This in turn leads to dramatic effect on the performance of banks, particularly in financial and technological innovations Financial performance and its sustainability in commercial banks and its relationship with loan portfolio has remained a subject of interest to most researcher, Though nonperforming loans in relation to financial performance of commercial banks has been evaluated by a number of scholars, a long lasting solution has not been identified yet. This study evaluates on how aggregate‘s loan portfolios affects financial performance of commercial banks in Ethiopia. Commercial banks do lend to different sectors of the economy and are well known for spurring the economic growth, in the process the intention is to generate enough funds for their growth and for the benefit of the stakeholders. The problem for most of these commercial banks is to determine of how much affect these loans have towards their financial performance, can a strong or weak financial performance be attributed to a loan portfolio?. For a strong and sustainable financial performance, banks depends so much on loan portfolio they hold at one particular time. Researches made in Ethiopia had their own limitation. Most researches focused on evaluation of bank performance, Yigremachew (2008) in his study concluded that interest and non-interest incomes and interest expense are the main determining factor for the profitability of private banks in Ethiopia both in static and dynamic conditions. instead of ``emphasizing on cause and effect relationships i.e. what caused good or bad bank performance. The analyses were also made using comparison of banks ‘performance one another. Therefore, this researcher tried to fill-in the gap by examining the effect of loan portfolio in Ethiopia.

Banks are playing an important role in intermediating finance and wheeling the economy to function, studying the financial performance of banks in the country is timely and necessary. Measuring the performance of banks generally in the world and particularly in Ethiopia has attracted augmented attention over the past years. Researchers devoted to analyzing the performance of banks in general and of private ones in particular are scarce. Researches like Addisu (2015), Berhanu (2016), Melaku (2016) and Rani and Lemma

(2017), were, devoted to analyzing the determinants of bank performance using only return on asset as their only measure of financial performance. . However, the current study uses key variables which were not included in some of the previously mentioned researches such as loan growth, loan portfolio profitability, return on equity, and net interest margin. Hence, this study mainly concentrated on determining key variables that could affect the financial performance of private commercial banks in Ethiopia by providing due emphasis to the bank specific variables as it could be difficult to bank managers to control the external factors Meanwhile, little has been done. This is more prevalent when it comes to commercial Banks. Thus, this study aimed at evaluating the effect of loan portfolio on the financial performance of the banking sectors in Ethiopia, particularly commercial banks at a focus Objectives of the Study

1.3Objectives of the Study

1.3.1 General objectives

The general objective of the study is to investigate the effect of loan portfolio on financial profitability of commercial banks in Ethiopia.

1.3.2.Specific Objectives

- ✓ To identify the effect of loan portfolio profitability on the financial performance of Commercial banks.
- ✓ To investigate the loan portfolio growths on the financial performance of commercial banks.
- ✓ To determine examine the loan portfolio operational efficiency on the financial performance of Commercial Banks.
- ✓ To examine the effect of loan portfolio Asset quality on financial performance of Commercial banks.

1.4. Hypothesis

The study tested by the following hypothesis to get answers of the research questions:

- ✓ **H_1**: There is a positive relationship between loan Portfolio growth and Banks Profitability in Commercial Bank of Ethiopia.
- ✓ **H_2**: There is a positive relationship between asset quality and Banks Profitability in Commercial Bank of Ethiopia.

- ✓ **H_3**: There is a positive relationship between loan portfolio profitability and Banks Profitability in Commercial Bank of Ethiopia.
- ✓ **H_4**: There is a positive relationship between loan operational management and Banks Profitability in Commercial Bank of Ethiopia.

1.5. Significance of the Study

Like any other third world nation, the banking industry in Ethiopia is become important source of financing different business segments that operating in the nation. Due to this fact, this study which deals with the effect of loan portfolio on financial performance of commercial banks in Ethiopia is beneficial for different stakeholders such as: Commercial banks management/Administration to know the effect of loan portfolio on financial performance indicators of success and failure to take the necessary actions to improve the performance of the banks and choose the right decisions in addition to that this research was give sound information that might enable banks to acquire and maintain a sustainable competitive advantage and also increase its market share through sound loan portfolio management.

Investment managers make investment decisions for their firms. They seek to increase the penetration ratio in the market. Firm performance is therefore affected by the decisions made by these managers. This study will be help to them to execute their role efficiently and have the right investment portfolio for their firm.

Government interested in knowing which banks operate of knowledge on the factors affecting loan portfolio on financial performance of commercial banks in Ethiopia. Industry Regulators Regulatory authorities namely national bank of Ethiopia play a crucial role in ensuring that there is fair play in the market by all relevant market players in the industry. This study may, therefore, assist the regulatory authorities in assessing the suitability of the current investment regulations for commercial banks in Ethiopia. Shareholders Since most commercial banks pay annual bonuses to the shareholders based on the performance recorded in the preceding financial year, with attempts to vary the payments based on an individual's contribution to the bottom-line. The earnings shortfalls recorded in the last financial year resulted from a mix of factors among them deteriorating portfolio optimization challenges that are unique to some of the commercial banks. The study recommendations will be might strengthen the performance.

Academicians and Researchers the research provided a background for future research on effect of loan portfolio and its impact on performance in the commercial banks in Ethiopia.

It might also be used as a point of reference for future researchers on portfolio management.

1.6. Scope of the Study

The scope of the study limited to assess the effect of loan portfolio in commercial banks financial performance in Ethiopia by ten years (2010-2020) audited financial statements of each commercial bank. The study comprised all commercial banks which have at least ten years data. The study used three dependent and four independent variables i.e. the dependent variables were return on asset (ROA), return on equity (ROE) and net interest margin (NIM) and four independent variables were capital adequacy (CA), asset quality (AQ), loan operational efficiency (LOE), portfolio profitability's (LPP), and loan growth (LG).

1.7. Limitation of the Study

The study is limited to investigate the effect of loan portfolios on the financial performance of commercial banks in Ethiopia. For a period from 2011 to 2020 and the annual panel data of 12 commercial banks are used. This is because of insufficient data on studied variables. The number of independent variables could be more than four since there are other factors effect of loan portfolios with the same prediction level. Finally, the study used quantitative approach and focused on the description of the outputs from the eviews hence ignoring qualitative aspects of credit management.

1.8. Organization of the Study

The research paper was structured in five chapters as follows. Following introduction in the first chapter, chapter two contains a review of related literature including sound Loan portfolios management, asset quality, loan growth, operational efficiency, loan portfolio profitability and Profitability of banks Performance. The research design and methodology are presented in chapter three. Specifically, this chapter shows the research design, research approach, and population, research sampling method followed by methods used in collecting and analyzing data. Furthermore, statistical methods used to analyze the data are also discussed.

CHAPTER TWO

2. REVIEW LITERATURE

2.1. Theoretical Framework of the Study

2.1.1. The Portfolio Theory

The portfolio theory approach is the most relevant and plays an important role in bank performance studies (Nzongang and Atemnkeng, 2006). According to the Portfolio balance model of asset diversification, the optimum holding of each asset in a wealth holder's portfolio is a function of policy decisions determined by a number of factors such as the vector of rates of return on all assets held in the portfolio, a vector of risks associated with the ownership of each financial assets and the size of the portfolio. It implies portfolio diversification and the desired portfolio composition of commercial banks are results of decisions taken by the bank management.

2.1.2. Credit Risk Modeling Theory

Credit risk modeling also known as structural approach entails a theoretical framework that describes the causality between the attributes of the borrowing entity and its potential bankruptcy. It was proposed largely as a logical extension of the Black-Scholes (1973) option pricing framework. It is conceived as a model for assessing the credit risk of a firm by characterizing the firm's equity as a call option on its assets. Alternatively, the debt holders of the firm could be viewed as holding a short put position on the firm's assets. The approach is referred to as the 'structural approach' because it relies entirely upon the capital structure of the firm (debt and equity) for modeling credit risk. It builds a setup within which credit events are triggered by movements of the firm's value relative to some pre-defined threshold or barrier (Merton, 1974). Structural approach, reduced form appraisal and incomplete information approach. The structural approach (structural credit risk model) also known as Asset Value Model is a model for assessing credit risk, typically of a corporations debt. The model assumes that, the modeler like company's managers have complete knowledge of its assets and liabilities, leading to a predictable default time. The reduced - form models, on the other hand is for pricing credit risk. It utilizes multifactor and dynamic analysis of interest rates to calculate the probability of default. The reduced-form models assume that, the modeler like the market has incomplete knowledge about the company's condition, leading to an inaccessible default time. The

incomplete information approach combines the two (structural and reduced-form approaches). It is concluded that for pricing and hedging, reduced – form models are the preferred methodology (Crosbie and Bohn, 2003).

2.1.3.Capital Market Efficiency Theory

THOMAS E. (1946) the purpose of capital markets is to transfer funds between lenders (savers) and borrowers (producers) efficiently. Individuals or firms may have an excess of productive investment opportunities with anticipated rates of return that exceed the market-determined borrowing rate but not enough funds to take advantage of all these opportunities. However, if capital markets exist, they can borrow the needed funds. Lenders, who have excess funds after exhausting all their productive opportunities with expected returns greater than the borrowing rate, will be willing to lend their excess funds because the borrowing/lending rate is higher than what they might otherwise earn. Therefore both borrowers and lenders are better off if efficient capital markets are used to facilitate fund transfers. The borrowing/lending rate is used as an important piece of information by each producer, who will accept projects until the rate of return on the least profitable project just equals the opportunity cost of external funds (the borrowing/lending rate). Thus a market is said to be allocation ally efficient when prices are determined in a way that equates the marginal rates of return (adjusted for risk) for all producers and savers. In an allocation ally efficient market, scarce savings are optimally allocated to productive investments in a way that benefits everyone**.**

2.1.4.Bank Performance Indicators

Profit is the ultimate goal of commercial banks. All the strategies designed and activities performed thereof are meant to realize this grand objective. However, this does not mean that commercial banks have no other goals. Commercial banks could also have additional social and economic goals. However, the intention of this study is related to the first objective, profitability. To measure the profitability of commercial banks there are variety of ratios used of which Return on Asset, Return on Equity and Net Interest Margin are the major ones (Murthy and Sree, 2003; Alexandru et al., 2008).

Profitability Performance measures are similar to those applied in other industries, with return on assets (ROA), return on equity (ROE) or cost-to-income ratio being the most widely used. In addition, given the importance of the intermediation function for banks, net interest margin is typically monitored. Return on Assets (ROA) (net profit/total assets) shows the ability of management to acquire deposits at a reasonable cost and invest them

in profitable investments (Ahmed, 2009). The return on assets (ROA) is the net income for the year divided by total assets, usually the average value over the year. This ratio indicates how much net income is generated per dollar of assets. The higher the ROA, the more profitable the bank is. Return on Equity (ROE) (net profit/ total equity) ROE is an internal performance measure of shareholder value, and it is by far the most popular measure of performance, since: it proposes a direct assessment of the financial return of a shareholder's investment; It is easily available for analysts, only relying upon public information; and It allows for comparison between different companies or different sectors of the economy. ROE is sometimes decomposed into separate drivers: this is called the "DuPont analysis", where ROE = (result/turnover)*(turnover/total assets)*(total assets/equity). The first element is the net profit margin and the last corresponds to the financial leverage multiplier. Cost to Income Ratio (C/I) (total cost /total income) measures the income generated per cost. The cost-to-income ratios shows the ability of the institution to generate profits from a given revenue stream.

2.1.4.1. Return on Asset (ROA)

ROA is also another major ratio that indicates the profitability of a bank. It is a ratio of Income to its total asset (Khrawish, 2011). It measures the ability of the bank management to generate income by utilizing company assets at their disposal. In other words, it shows how efficiently the resources of the company are used to generate the income. It further indicates the efficiency of the management of a company in generating net income from all the resources of the institution (Khrawish, 2011). Wen (2010), state that a higher ROA shows that the company is more efficient in using its resources.

2.1.4.2. Return on Equity (ROE)

ROE is a financial ratio that refers to how much profit a company earned compared to the total amount of shareholder equity invested or found on the balance sheet. ROE is what the shareholders look in return for their investment. A business that has a high return on equity is more likely to be one that is capable of generating cash internally. Thus, the higher the ROE the better the company is in terms of profit generation. It is further explained by Khrawish (2011) that ROE is the ratio of Net Income after Taxes divided by Total Equity Capital. It represents the rate of return earned on the funds invested in the bank by its stockholders. ROE reflects how effectively a bank management is using shareholders' funds. Thus, it can be deduced from the above statement that the better the ROE the more effective the management in utilizing the shareholders capital

2.1.4.3. Net Interest Margin and the Earnings Base

Other commonly referenced ratios indicate specific factors that contribute to bank profitability. Net interest margin (NIM) equals net interest income divided by earning assets and thus represents the net interest return on income producing assets. A bank's earnings base (EB) measures the fraction of assets that produce income, while noninterest expense minus noninterest income divided by total assets reveals the bank's burden, and thus its comparative ability to control net noninterest expense.

2.1.4.4. Asset quality

Tigist T. (2019) Asset quality is a good indicator of financial and operational performance of Commercial Bank of Ethiopia. Allowance for doubtful account to total assets ratio indicates that the performance is better in its lending is the lower the ratio in 2015 the performance was good but in 2014 and 2016 was low as compared to 2015. In allowance for doubtful account to net advance ratio was good in 2016 which is 1.77 that means the lower ratio denotes better quality of the asset i.e. loan.

RONALD K. (2016) this research has comprehensively reviewed Kenyan commercial banks profitability and asset quality. This research‘s findings conclude there is a positive relationship between Kenyan commercial banks profitability and asset quality. When non-performing asset to net assets ratio is lower, asset quality of Commercial Banks in Kenya is high and this implies a positive trade-off between assets quality and profitability.

2.1.4.5. Effect of loan portfolio growth

ERIC N.(2015) The results from the analysis indicate that loan portfolio quality, measured by loan loss provision to gross loan advances (LLP/GLA) and loan portfolio profitability (LPP), has a significant effect on the financial performance of the selected universal banks. For instance, the result shows that an increase in loan portfolio profitability leads to an increase in the financial performance of the selected banks. The results also show that LLP/GLA has a negative but statistically insignificant effect on the financial performance of banks in Ghana. The results imply that the higher the provision for loan loss to total advances, the higher the credit risk and hence the higher the accumulation of unpaid loans and interest. Unpaid loan and associated interest reduces the profit of the bank thereby making it less profitable.

Loan growth International Journal, V. 7, No 11, (2017) the conclusions can be drawn through the analysis of data and information gained from this study are as follows: Economic Growth, Funding Growth and NPL are having positive influence to Bank

Lending Growth Banks while BI Rate and CAR are not having significant influence to Bank Lending Growth. Economic Growth is the most significant variable in influencing Bank Lending Growth.

PAUL K. (2017) the study found that growth in a banks' loan portfolio affects financial performance of commercial banks adversely in the subsequent years. It also found that growth in loan portfolio increases nonperforming loans in the subsequent years. The study found that commercial banks lower their lending rates in order to grow their loan book and that commercial banks lend more cautiously following periods of heavy losses occasioned by bad loans. The result of regression indicated that loan portfolio growth had a negative effect of return assets but the effect was not significant.

MURIRA M. (2010) The study recommends that for commercial banks to remain profitable they should have loan portfolio management which will help them in making prudent decisions about loan investment mix and policy, matching investments to objectives. Level of loan asset allocation for banking institutions should be balanced against risk and financial performance. Portfolio management techniques employed by banks should focus more on strategic issues for a 48 portfolio of projects and the ability to achieve strategic objectives. The study further recommends that commercial banks should not ignore other non-loans factors for they have fair constant contribution to the overall profitability of the banks. Since business loans and mortgage loans were found to strongly influence profitability of banks, Commercial banks in Kenya should concentrate on advancing more of these loans to enhance their general performance.

Belainesh y. (2017) the negative impact of loan growth on banks liquidity was in line with the hypothesis which is based on the argument of taking loans as illiquid assets of banks. According to this argument when the amount of loans provided by banks increase, the amount of illiquid assets in the total assets portfolio of banks increase and lead to the reduction in the level of liquid assets held by banks. This finding reveals that larger amount of loans was provided from periodic deposits with affecting the amount of liquid assets held by the commercial banks in Ethiopia

2.1.4.6. Capital adequacy ratio (CAR)

Jose M. and Rochelle M. (2010) this paper has applied a number of different methods to examine how bank capital influences the extension of bank credit. An analysis based on panel data finds modest effects of BHC capital to-asset ratios on BHC lending; using

macroeconomic time series and aggregate commercial bank balance-sheet data, we find larger—but still modest—effects of capital ratio shocks on loan growth.

CAR is the ratio of bank's capital to its risk and is calculated as total capital divided by bank's total risk-weighted assets. CAR protects depositors and promotes the stability and efficiency of financial systems around the world by lowering the risk of banks becoming insolvent. When a bank's winding-up process, depositors' funds are given a higher priority than capital so that the depositors can only lose their savings if a bank's loss outsize the capital. The higher CAR ratio means that depositors' assets are better protected by the bank. There are two kinds of capital needed to be measured when calculating CAR. Tier one capital can absorb which can absorb losses without a bank being required to cease trading. Tier two capital can absorb losses in the event of a winding-up and provides lower level of protection to depositors. It is used to absorb losses when a bank loses all its tier one capital. Actually, in practice, because there is very limited data in terms total capital and risk-weighted assets, we use the ratio of total equity capital divided by total assets to substitute the original calculation formula. Concerning the first objective of the study which was to determine the effect of capital adequacy ratio on performance by commercial banks in Kenya, the study concluded that, at 5% significance level, capital adequacy ratio has statistically no significant effect on bank stock performance in Kenya. (ONANG'O O.2017)

Bahiru W. (2014) the study found that the minimum of capital adequacy ratio of Ethiopian banks is 10.4%. Thus, all Ethiopian banks are committed by a minimum 8% capital adequacy ratio that set by NBE and Basel committee. There is a negative significant relationship between CAR and LLR as expected. Therefore, the result supports the hypotheses. This result realizes that Ethiopian banks have increased their loan loss reserves accounts to reduce their risks and maintain a higher capital adequacy ratio. Besides, deposits and CAR has been a positive significant relationship as expected and it means that the imposition of minimum capital standards was the response of the moral hazard problem created by deposit insurances. 60 Leverage factor peroxide by total equity to total liabilities, shows a positive significant relationship with CAR because the risk premium for high leverages bank is higher than the low leveraged banks. So in general low leverage bank (high EQTL) may have a higher capital since they can issue new shares easier compare to high leverage bank. The liquidity of the banks also shows positive significant relationship which is consistent with the literature. Size (the natural logarithm of total assets) and profitability which peroxided by net income after taxation to total assets have

positive relationship with CAR but NIM has negative relationship with CAR, however, SIZE, ROA and NIM has been statistically insignificant. In conclusion, the finding of the study suggests that deposits, liquidity, leverage, and LLR were important variables that influence banks‟ capital adequacy ratio. However, there were no support of banks‟ size, profitability and management quality influencing the level of capital adequacy ratio of banks in Ethiopia.

Yared B. (2020) capital adequacy ratio, equity investment and liquidity have negative insignificant impact on bank lending activity. When we see the cash reserve requirement has positive and insignificant impact on bank lending. Generally, except Capital adequacy ratio, cash reserve ratio, equity investment and liquidity all independent variables were in agreement with the research hypothesis. The explanatory variables included in this study jointly explain about 64.8% of the determinant of bank lending on Ethiopian commercial banks. Effects of capital adequacy ratio on credit risk in Ethiopian Commercial banks. The finding indicates that capital adequacy ratio was negative and statistically significant in explaining the credit risk of Ethiopian Commercial Banks (Tamrat D., 2016)

2.2. Liquidity Risk Management Guidelines

Bank Supervision Directorate (2010) Determining what is adequate liquidity for banking organizations has always been a rather subjective and difficult task, because banks rarely have liquidity problems as long as they are viewed as sound and deposit inflows are positive. Failure to properly manage liquidity can quickly result in significant unanticipated losses. The purpose of liquidity management is to ensure that every bank is able to meet fully its contractual commitments. The ability to fund increases in assets and meet obligations as they come due is critical to the ongoing viability of any bank. Therefore, managing liquidity is among the most important activities conducted by banks. Sound liquidity management can reduce the probability of serious problems. Indeed, the importance of liquidity transcends the individual bank, since a liquidity shortfall at a single bank can have system-wide repercussions. For this reason, the analysis of liquidity requires the management of the bank not only to measure the liquidity position of the bank on an ongoing basis, but also to examine how funding requirements are likely to evolve under various scenarios, including adverse conditions. Banks should review frequently the assumptions utilized in managing liquidity to determine that they continue to be valid. Since a bank’s future liquidity position will be affected by factors that cannot always be forecasted with precision, assumptions need to be reviewed frequently to determine their

continuing validity. These assumptions should be made under the different categories of assets, liabilities and off-balance sheet activities.

2.2.1.Operational efficiency

The Cost to Income ratio is an efficiency measure similar to operating margin. Cost to income ratio measures a bank's ability to earn a profit from the revenue it generates. This is purely a measure of a bank's cost control. No matter how much revenue it generates, a bank cannot be profitable unless it is able to control its costs. A lower cost to income ratio is better as it indicates a lower cost relative to revenue.

Tesfaye B. and Abdurezak M. (2016) this part of the study has explored the efficiency level of banks using cost models. It has used the Data Envelopment Analysis score to examine the efficiency level of banks under both constant and return of scale. In addition, it has explored the scale efficiency of all the models. The study finds that banks efficiency level has witnessed a wide variation across various bank groupings. The study has also found that the state banks efficiency has been consistently on the efficiency frontier reflecting the high dominance of the banks in the Ethiopian banking system. In addition, the study finds that the small private banks efficiency is growing overtime while the middle size private banks are facing difficult to improve their level of efficiency. The parametric and non- parametric tests also witness that state and private banks possess different management and technology capabilities. This shows that despite the scale. Advantage the state banks have, the difference in their management and technology capabilities has contributed for better efficiency performances.

Tesfaye K.(2013)The negative relationship of cost income ratio and profitability, and its significance on earning on asset shows that more operationally efficient commercial banks reported higher profits than those commercial banks that have poor expense management over the study period. Therefore, one of the factors that negatively affect the banks' profitability is the failure of management to control cost.

2.2.2.Loan portfolios management

Anania s. (2015) Banks have to be vigilant in their lending decisions so as to avoid loan losses and the accumulation of non-performing loans. Banks need to concentrate on sectors that are performing well and avoid lending to those sectors which have already recorded a significant amount of non-performing loans. One thing to note is that, this result can be

generalized to the whole banking sector in Ethiopia as almost all the banks have been affected by non-performing loans. Therefore, the recommendations generated are a prescription for all commercial banks in Ethiopia.

According to Ambrose N. (2017) determined the effect of credit risk management on the financial performance of commercial banks in Tanzania using panel data for the period of 2005 to 2015 by adopting Panel data regression analysis. The researcher found that non-performing loans ratio (NPLR) had statistically significant negative effect on financial performance. Profitability of banks may be affected by loan portfolio management. Money lending exposes banks to credit risks; this has adverse effects on bank profitability. Loan portfolio activities are risky to the lenders and borrowers. The risk that a borrower may fail to fulfill their obligation at the required time have a great effect of smooth operations of banks. When the bank is exposed to high credit risks then it indicates awaited bankruptcy; this is also a great risk to depositor's money. Loan is very vital for banks; this is because it affects the bank's book value. The increase in number of loan defaulters in banking industry lowers the bank's profitability. Client appraisal and review of collection policy and terms of credit would help banks to recover most of their money.

Poor Risk management lead to the accumulation of Nonperforming loan under which the generated profit are not only eroded through loan provision but also soundness, safety and stability of bank While effective Credit risk management improve Credit performance through establishing appropriate Credit risk environment, maintaining Credit limit at acceptable level, undertaking sound Credit granting process, proper monitoring and controlling credit risk. Therefore it is important to examine level of Credit risk management system and practice of Ethiopian Commercial banks to initiate top level management and regulatory bodies to take policy measure toward maintaining adverse effect of their Credit function.

Poverty-oriented Banking Working paper (No. 9) the quality of the loan portfolio is determined by the amount of risk that is involved in lending the available funds to clients. An SFI cannot always be sure that their loans will be repaid. As a result, the quality and size of a portfolio changes continually as loans are disbursed, payments are made and loans and payments become past due. The loan portfolio represents the largest asset of the institution. At the same time, the loan portfolio is important for the SFI's survival because it generates the SFI's income through interest payments. Therefore, an SFI need to monitor the quality of its loan portfolio carefully in order to be able to deliver financial services to

small entrepreneurs on a continual basis. The portfolio, or amount outstanding, is commonly referred to as current, active, actual, or outstanding portfolio, and is the total loan principal owed by borrowers that the SFI expects to receive. Interest owed by clients is not usually considered part of the portfolio. Principal and interest should always be considered separately because principal is part of the SFI's asset whereas interest contributes to the SFI's income and cash flow. An important tool for monitoring the portfolio is trend analysis. Changes over time are the first indication of a problem or of the effectiveness of an attempted solution. The monitoring system should provide the SFI with enough information to detect trends and determine the likely causes of those trends. Managers should be able to analyses and compare over time, the amount, number, and percentage of payments past due and the extent of portfolio at risk by variables such as:

1. Age (number of months) of delinquency: Are the payments past due by 30 days moving into the 30-60 days category, or being paid off from one month to the next?
2. Loan officer and geographic location of entrepreneur: Has the portfolio grown too large to permit adequate follow-up with existing staff?
3. Size of loan and repayment terms: As loan size grows, is delinquency increasing?
4. Single or group loan: Does the interchange of information and ideas, and peer pressure in groups result in better repayments than with individual loans?
5. Activity of entrepreneur: Is delinquency concentrated in particular economic sectors, or is it related to the size of the businesses financed?
6. Type of enterprise: For example, are starters a higher or lower risk for the institution than the established businesses?
7. Purpose of loan: For example, are loans used for buying machinery causing more problems than working capital loans?
8. Gender of entrepreneur: Do men show higher or lower delinquency rates than women? Are opening hours in harmony with women's business and domestic obligations?
9. Number of repeat loan: Are new clients more or less inclined to fall behind their payments than those who have been with the institution for a while? Should screening or selection procedures be changed?
10. External factors: Are political or macroeconomic factors affecting many of the client group?
11. Is there demand or climatologically constraints affecting the business

2.3. Empirical Literature

Abdu M. (2018) the study was intended to investigate the bank specific factors of the financial performance of commercial banks in Ethiopia by using secondary data of 2011-2017. The multiple regression analysis was made using three dependent variables (ROA, ROE and NIM) and five independent variables (asset quality, capital adequacy, and management efficiency bank size and liquidity management efficiency). The regression result clearly showed that size of banks is statistically significant determining factor that positively boost the financial soundness of the selected commercial banks in Ethiopia as it can help banks to realize economic scale. It was also indicated that capital adequacy is statistical and positively affect the financial performance of the banks. That means, the higher equity capital the banks have, the more the banks become financially sound. Further, the study showed that liquidity management of banks has statistically negative impact on the financial soundness of private commercial banks of Ethiopia, i.e. the higher liquid the banks are the lesser their ability they generate profit. Management efficiency of banks has positive and statistically significant impact on the financial efficiency of the privet commercial banks. That means operational expenses inefficiency shrinks the return on asset and interest margin of the banks in Ethiopia. The result also depicts as quality of assets of banks is statistically insignificant factor for the dependent variable.

NBE (2020) Quarterly Bulletin At the same time, the total capital of the banking system reached Birr 110.9 billion, of which, private banks accounted for 48 percent, while that of state owned banks, namely Commercial Bank of Ethiopia and Development Bank of Ethiopia, constituted 45.1 percent and 6.9 percent, respectively. The banking sector disbursed Birr 50.7 billion in new loans during the review quarter indicating a 36.8 percent annual growth. Of the total new loans, state owned banks took a 54.3 percent share while that of private banks was 45.7 percent. Of the total fresh loans, industry sector was the largest beneficiary, accounting for 39 percent followed by international trade (16.3 percent), domestic trade (12.3 percent), agriculture (11.9 percent), personal credit (8.7 percent), and housing & construction (6.3 percent). The remaining balance was taken up by other economic sectors. During the same period, the banking sector collected loans to the tune of Birr 44.6 billion which was about 61.1 percent higher than a year earlier. Of the total loan, 50.5 percent was collected by private banks and 49.5 percent by state owned banks. Meanwhile, total outstanding credit of the banking system (excluding credit to government) increased to Birr 605.4 billion, showing a 28.2 percent year-on year growth.

About 99.7 percent of private banks' and 49.7 percent of state owned banks' loans went to finance the private sector.

Studies Journal Volume 24, Issue 3, (2020) based on the findings from the empirical analysis, both monetary authorities and management of individual banks hold as way in the overall financial performance of banks. Existing studies recommend that banks need to administer and concentrate more on effective credit risk management strategies. Banks' rigorous credit evaluation in the lending process contributes towards the elucidation of an effective strategy that wills not only limit banks' exposure to credit risk but will improve banks performance and competitiveness. Nonperforming loans not only have a negative impact on the profitability of banks, but also affect the economy. As such, the South African regulatory authorities need to craft regulations that will lead to improved credit risk management and arrest the tide of increasing non-performing loans in banks. This will help secure the banking sector and the economy at large.

Mohammed A. (2014) there is some evidence to support the fact that banking system structure explains bank lending behavior only when the financial sector is reformed and the banks are allowed to operate freely. The parameter of the concentration is negative, and statistically significant, indicating that there is a relationship between bank lending and concentration in Sub-Saharan Africa.

Zelalem B. (2020) Then the researcher found that the model has passed the diagnostic test and the explanatory variables are jointly significant to explain the dependent variable which is liquidity risk. In addition the empirical result of 2SLS estimate illustrates that, bank liquidity has positive effect on bank profitability even if it is insignificant but total non-interest income and expectation have a positive significant effect on bank profitability. Here also the explanatory variables are jointly significant to determine the bank profitability.

(Paul K, 2016) the study concluded that growth in a bank's loan portfolio had a positive effect in the current year but the effect in the subsequent years was adverse. Further the study concluded the following; growth in loan portfolio increases the amount of nonperforming loans in the subsequent years, commercial banks tend to lower their lending rates in order to grow their loan book and that commercial banks exercise caution in lending following periods of heavy losses occasioned by bad loans.

Alem G. (2019) in this paper, the effect of bank specific factors on bank's profitability was analyzed using CAMEL model: considering Capital Adequacy, Asset quality, Management efficiency, Earnings ability, & Liquidity status were considered as independent variables while earning per share as the dependent variable. Also this paper used nine commercial

banks as a sample size for ten years (2007 to 2016). The financial data were collected from the annual financial reports posted on the sample banks official website. Moreover, data was analyzed and results were interpreted using numerous statistical tools like regression analysis, descriptive statistics, and correlation analysis. As a result, therefore, the findings showed that, Total capital to total asset and total loan to total deposit had a positive correlation with the dependent variable. Total capital to total asset had a significant effect on the profitability of the banks whereas total loan to total deposit had an insignificant effect on the profitability of the banks. On the other hand, interest income to total asset, non-performing loan to total loan, and liquid asset to total assets all had a negative correlation with the dependent variable. Whereas liquid asset to total asset had a significant effect on the profitability of the banks, the influence of interest income to total asset and non-performing loan to total loan on banks profitability is insignificant.

Engdawork T.(2014)the study therefore finds that the selected variables : the provision to total loans, loan to total asset, cost to total loans and natural logarithm of total asset have significant effect on the performance of Banks. However, a certain variation in the magnitude and direction of their effect on the selected profitability measure, Return on Asset.(SHMENDI A.,2019)The study concluded that NPLR, Capital Adequacy, Loan to Deposit, Bank Size, GDP and INF had a statistically significant effect on the level of ROE. However, the results of this random effect regression model revealed the insignificant effect of Interest spread rate, on the level of ROE of commercial banks in Ethiopia for the period under consideration. In order to get more comprehensive results of loan portfolio evaluation, loans that form a loan portfolio should be distributed into sub-portfolios according to activity segments of a bank: large-scale projects, corporate and private clients. Such approach to loan portfolio enables banks not just properly distribute resources with a purpose to get a maximum profit, but also designate appropriate consideration while evaluating risk of individual loans or sub-portfolios.

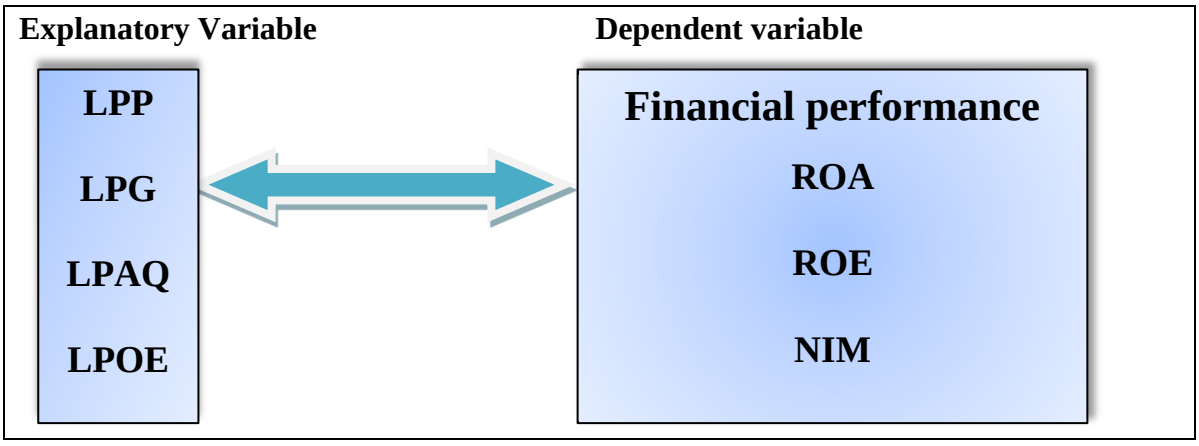
Alemayehu F.(2016)The result showed a negative relationship between loan growth and liquidity with strong statistical significance in case of L1 which is as expected, indicating that the increase in loans provided by banks lead to the reduction of the level of liquid assets held by banks. In accordance with expectation of study, capital adequacy and profitability showed positive and significant relationship with banks liquidity measured by L1. The positive influence of the share of capital on total assets is consistent with the assumption that bank with sufficient capital adequacy should be liquid, too. The positive and statistically significant impact of inflation was based on which a bank needs to sacrifice liquidity to achieve a higher profitability which in turn increases the liquidity risk

and liquidity ratio. Liquidity need is actually a constraint for a bank from investing all its cash as profit comes from either bank lending activities or by investing it.

2.4. Conceptual frame work

After the carful study of literature review the following conceptual model is adapted with some modification to illustrate the Effect of loan portfolios' on financial profitability of commercial banks in Ethiopia.

Figure 2-1Conceptual framework of the Study



Source: Researcher, 2021 based on different literature

2.5 The theory of Structure Conduct Performance (SCP) Hypothesis is

In formulation of theoretical framework for studying the effect of credit risk management on performance of commercial banks in Ethiopia (industry –specific factors), market structure conduct performance hypothesis provided use full model. Market structure conduct and performance (SCP) framework derived from the neo classical analysis of markets. It first formalized by Mason in 1939 as a method of analyzing markets and firms (Worthington et al., 2001). The SCP was the central opinion of the Harvard school of thought and popularized during 1940-60 with its empirical work involving the identification of correlations between industry structure and profitability. Most early research explanation for the relationship between the market concentration 12 and profitability based on the structure-conduct performance (SCP) hypothesis, and focused on the interpretation of a positive empirical relationship between concentration and profitability Goddard et al. (2004). The SCP paradigm asserts that there is a relationship between the degree of market concentration and the degree of competition among firms. This hypothesis assumes that firms behave or rivalry in the market determined by market

structure conditions, especially the number and size distribution of firms in the industry and the conditions of entry. This rivalry leads to unique levels of prices, profits and other aspects of market performance (Berger et al., 1989). The Structure-Conduct-Performance (SCP) hypothesis, which also sometimes referred to as the MP hypothesis, asserts that increased market power yields monopoly profits. A special case of the SCP hypothesis is the Relative Market-Power (RMP) hypothesis, which suggests that only firms with large market shares and well-differentiated products are able to exercise market power and earn noncompetitive profits (Berger, 1995). The assumptions of SCP hypotheses have been applied in different research by various researcher and supported positive relationship between market concentration (measured by concentration ratio) and performance (measured by profits) exists. Furthermore, SCP recognized the competitiveness of small market share banks with large market share is weak as a result the positive relationship between market concentration and performance (profitability) of high market share banks exist (Berger and Hannan, 1989). As explained in the SCP, the market concentration encourages collusion among large firms in the industry, which subsequently leads to higher profits. Hence, SCP pointed out those changes in market concentration may have a direct influence on a firm's financial performance. Firms in more concentrated industries can earn higher profit than firms operating in less concentrated industries earn, irrespective of their efficiency (Goldberg et al., 1996). The relative market power hypothesis (RMPH) which is a special case of SCP posited that only banks with large market shares and well differentiated service lines are able to exercise market power to gain superior profit on non-competitive price setting behavior (13 in this case service charge) Berger (1995). Studies, such as those by Smirlock (1985) and Berger and Hannan (1989), investigated the profit-structure relationship in banking, providing tests of the RMP hypotheses. To some extent, the RMP hypothesis verified that superior management and increased market share (especially in the case of small-to medium-sized banks) raise profits. SCP, in general, provides two main benefits to studies, which investigate the banks profit behavior.

H_1: There is a positive relationship between Loan Portfolio profitability and financial performance

Helina G. (2017) Profitability which is peroxide by return on average assets (ROA) is computed as net income divided by average total assets. This is generally considered as a good indicator to evaluate the profitability of the assets of a bank in comparison to other banks in the same industry. The coefficient of the return on average assets (ROA) has been

positive and has a statistical insignificance at 5 % which means one unit increase in ROA, results in 11.05 percent increase in banks' loan and advance facility.

William A. (2018) In terms of loan portfolio risk management, the correlation analysis found a significant positive correlation between portfolio risk management and bank performance. This depicts that an increase in the use of portfolio risk management leads to an increase in bank performance. The regression analysis further indicated that there was a positive significant relationship between portfolio risk management and performance of commercial banks in Kenya.

Ethiopia's Banking Sector cepheus research (2019) Revenue sources: Split by two broad categories, the revenue sources of Ethiopian banks are comprised of: (1) interest income received from loans/bonds; and (2) non-interest income derived from items such as opening import Letter of Credits, guarantee services, trading plus revaluation gains, and fees for services such as cheque books, ATM cards, and money transfers. As of FY 2017-18, net interest income provided Birr 15.5bn of revenue (62 percent) while non-interest income amount to Birr 9.3bn (38 percent). Seen over time, private banks' revenue base has in recent years shifted towards interest income rather than other non-interest sources; only 46 percent of revenue was derived from net interest income five years ago, but this is now 62 percent.

Interest income: Interest income has risen nearly five-fold from Birr 3.2bn five years ago to Birr 15.5bn last year. The rapid growth in (net) interest income reflects banks' rising loan balances, which are up from Birr 44bn to 178 bn over the past five years. The growth in the volume of loans has offset the moderate decline in effective lending spreads on loans, which are down from about 12 percent to 7.4 percent at private banks. The fall in spreads reflects the decline in effective lending rates which, in turn, reflects the rising share of NBE bills in total interest-earning assets (NBE Bills now make up 20 percent of total assets at private banks and are earning an interest rate of only 5 percent).

Anteneh T., (2018) According to his study Financial Performance analysis of Commercial Banks in Ethiopia: Asset quality, management efficiency, size of the bank and net interest margin were the major significant variables to affect performance of commercial banks by return on asset measure at 1% significant level. Liquidity also has significant effect on return on asset at 5% significant level, whereas earning quality does not have significant impact on profitability measurement of return on asset and return on equity.

H_2: There is a positive relationship between loan Portfolio growth and Banks Profitability in Commercial Bank of Ethiopia.

PAUL K. (2017) this study sought to examine the effect of growth in bank's loan portfolio on financial performance of commercial banks in Kenya. The study concluded that growth in a bank's loan portfolio had a negative effect on financial performance of commercial banks. Further the study concluded the following; growth in loan portfolio increases the amount of nonperforming loans in the subsequent years, commercial banks tend to lower their lending rates in order to grow their loan book and that commercial banks exercise caution in lending following periods of heavy losses occasioned by bad loans. Conclusion was reached on whether loan portfolio diversification helps in reducing the problem of bad loans. (TAMRAT D., 2016) Effects of annual loan growth of a bank on credit risk in Ethiopian Commercial banks. The finding indicates that loan growth of a bank was negative and statistically significant in explaining the credit risk of Ethiopian Commercial banks, Loan growth is the most natural part of every bank's activities, while remaining the most pronounced vulnerability area. This is especially the case on developed markets, where the degree of market saturation is high and relatively few (if any) good quality customers are absent from the banking system. The situation on developing markets may differ, where bank expansion onto a new client may boost credit quality, if bank saturation had been weak beforehand. The restriction had significant impact on the overall performances of the banks. Lending is the most important function of commercial banks. Its contribution to asset and income portfolio is very high in the banking industry. Therefore, any problem in lending like restricting or reducing loan is likely to have great impact on the performance of banks

H_3: There is a positive relationship between asset quality and Banks Profitability in Commercial Bank of Ethiopia.

Serwadda I. (2018) there is a significant and positive effect of loan loss provision to total loans on banks' performance. From a theoretical perspective, loan loss provision should affect the bank's profitability negatively; unfortunately, the study realized a positive correlation coefficient which signifies performance of banks positively.

Girma M. (2011)the regression result shows that loan provision to non-performing loan and loan provision to total asset of the financial institution is significantly positively related to return on asset. The parameter value shows that 1 percent increase in loan provision to non-performing loans increases return on asset by 0.003986 percent. In addition that a 1 percent increase in loan provision increases return on asset by 0.017190 percent.

Vincent O. (2013) Asset quality is also significantly related to the financial performance of banks expressed by ROA and ROE. This indicates that poor asset quality or high non-performing loans to total asset related to poor bank performance. In this study, the negative correlation coefficient between poor asset quality and return on equity is very strong. Thus, asset quality strongly determines the performance of commercial banks in (Paul Kiama T., 2014) the effect of asset quality on financial performance of commercial banks in Kenya. This study found that the quality of banks loan portfolio positively affect the financial performance of commercial banks. It found that loan portfolio diversification determines the quality of assets held by banks. Further the study found that the quality of banks loan portfolio deteriorates following periods of rapid lending. It also found that increase in nonperforming loans adversely affect the financial performance of commercial banks. In addition the study found that in periods of economic expansion banks do not pay much attention to borrowers' credit history.

The study therefore finds that the selected variables : the provision to total loans, loan to total asset, cost to total loans and natural logarithm of total asset have significant effect on the performance of Banks. However, a certain variation in the magnitude and direction of their effect on the selected profitability measure, Return on Asset (Engdawork T., 2014)

H_4: There is a positive relationship between operational management and Banks Profitability in Commercial Bank of Ethiopia

Belen Z. (2016) Appositive relationship between expense management and profitability of commercial banks. The regression result ascertains the hypothesis as there is a positive relationship between the dependent variable and explanatory variable, expense management. Even if it has a positive relationship and significant at 5%, tells us its impact on profitability is greater.

Engdawork T. (2014) the credit administration cost (cost to loan ratio), which reveals the intermediation efficiency in terms of cost, appears most important determinant variable on the profit of Ethiopian commercial banks. The variable is incorporated in the model to compare the impact of provisions vs. non-provision costs on the profitability of banks. The surprising result is that this variable appears significant to affect bank's performance.

In this study, inefficiency is measured by the ratio of operating expenses to total income. Inefficient banks tend to face high operating expense that flamed by nonperforming loan related costs. Inefficient bank's Credit risk management system and practice characterized with poor credit analysis and credit monitoring system lead to poor credit quality. Efficient banks have sound and effective Credit strategy, policy and procedure with a strong credit culture that enable to undertake Credit risk management function properly and reduce

operating expense while improving operating income. As a result, positive coefficient will be expected on this explanatory variable. (Hiwot Z., 2019) According to findings Management Efficiency (Overhead Expense) and profitability of Commercial Bank of Ethiopia has a negative and significant effect which means the increasing of Management Efficiency decreasing profitability of banks. Credit risk management in terms of liquidity ratio has positive but insignificant effect on the performance of commercial bank of Ethiopia.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1.Introduction

This study attempts to reveal the effect of loan portfolio on financial performance of commercial banks in Ethiopia. The researcher decides that explanatory study is the most suitable for the topic. The study used three dependent variables on the financial performance parameters like Return on Equity (ROE), Return on Asset (ROA), Net Interest Margin (NIM), four independent variables that are loan portfolio profitability, loan portfolio growth, asset quality and operational efficiency. Descriptive statistics and regression analysis specifically used to analyze the effect of the depended variable with independent variables. This chapter captures the research design, target population and research instruments used in carrying out the study. Furthermore, it explains how the data obtained will analyze and presents.

3.2. Research Design

Based on the purpose of the research, the researcher decides that explanatory study is the most suitable for the topic. Even though the research starts with the description about loan portfolio quality and performance of banks, the ultimate goal is to test if a relationship exists and how the Loan portfolio could effect on performance of banks. That is to say, the aim is to find causes and effects of the problem under study. The main task is to separate such causes and to say to what extent they lead to such effects. Therefore the study seeks to explain the causal relationship between the variables. Hence, the researcher considers explanatory study as the research design.

3.3. Target Population

According to Sekaran (2003), Population refers to the entire group of people, events or things of interest that the researcher wishes to investigate. The study population or participants of this research are all private commercial banks in Ethiopia. As per NBE report, currently there are seventeen private commercial banks in Ethiopia (NBE, 2018). These includes: commercial bank of Ethiopia (CBE),Abay Bank S.C (AB), Addis International Bank S.C (AdIB), Awash International Bank S.C (AIB), Bank of Abyssinia S.C (BOA), Berehan International Bank S.C (BBI), Buna International Bank S.C (BIB), Cooperative Bank of Oromia S.C (CBO), Dashen Bank S.C (DB), Debub Global Bank S.C

(DGB), Enat Bank S.C (EB), Lion International Bank S.C (LIB), Nib International Bank S.C (NIB), Oromia International Bank S.C (OIB), United Bank S.C (UB), Wogagen Bank S.C (WB) and Zemen Bank S.C (ZB)

3.4. Sample Size

Sample size can be defined as the number of units in a population to be studied. The study includes all commercial banks that have at least ten and more year's data i.e., 2010-2020. Thus, the sample size is twelve commercial banks in Ethiopia which includes, Awash International Bank (AIB), Bank of Abyssinia (BOA), Commercial Bank of Ethiopia(CBE), Dashen Bank SC (DB), Nib International Bank SC (NIB), United Bank SC (UB), Wegagen Bank SC (WB),Cooperative Bank of Oromia (CBO), Lion International Bank (LIB), Oromia International Bank (OIB), Zemen Bank (ZB), and Bunna International Bank (BIB). Therefore, the matrix for the frame is 12*10 that includes 120 observations. A justification for this choice sample period is to capture significant economic downturns and upturns and meets two times their five years strategically plans. Moreover, since the sources as well as the types of loans and ways of loan supply are homogenous across private commercial banks in Ethiopia, the selected samples are sufficiently representing the population.

3.5. Data Collection Methods and Procedure

The study used secondary data obtained from published statements of accounts of the commercial Banks in Ethiopia. The published accounts mainly of the balance sheet and income statements of Commercial Banks. In addition, the various annual and quarterly publications of the NBE, publications (including the annual report) of the Central Statistical Authority of Ethiopia (CSA), Ministry of Finance and Economic Development (MOFED), Ethiopian Economic Association (EEA-Ethiopia) was consult. Also, references with regard to the existing commercial code of the country, Banking proclamations, various directives of the NBE were made.

3.6.Model Specification

According to Allen (1999), Model specification is the first and most critical stage of regression analysis; followed by estimation of parameters and interpretation of those parameters. Our estimates of the parameters of a model and our interpretation of them depend on the correct specification of the model.

*3.6.1.*Fixed effect model specification

A fixed effects model is a statistical model in which the model parameters are fixed or non-random quantities. This is in contrast to random effects model in which all or some of the model parameters are considered as random variables. In many applications including econometrics and biostatics a fixed effects model refers to a regression model in which the group means are fixed (non-random) as opposed to a random effects model in which the group means are a random sample from a population. Generally, data can be grouped according to several observed factors. The group means could be modeled as fixed or random effects for each grouping. In a fixed effects model each group mean is a group-specific fixed quantity.

The equation of fixed effect model is given by:

$$\boldsymbol{Y_{it} = X_{it}\beta + \alpha_i + \mu_{it}}$$

Where: Y_{it} is the dependent variable observed for individual i at time t, X_{it} is the time-variant (the number of independent variables) regress or vector, β is the matrix of parameters α_i is the unobserved time-invariant individual effect and μ is the error term

*3.6.2.*Random Effect Model Specifications

In the random effects model, the individual-specific effect is a random variable that is uncorrelated with the explanatory variables. When the individual-specific effect is a random variable, which is uncorrelated with the explanatory variables of all past, current and future time periods of the same individual. However, the observations are independent across individuals but not necessarily across time. We use random effect model when we assume variation across entities to be random and uncorrelated with explanatory variables included in the model. In other words, if we find reasons that influence difference across entities affect the dependent variable. The equation of random effect model is given by:

$$\boldsymbol{Y_{it} = Y_i X_{it} + \alpha_i + U_{it} + \in_{it}}$$

Where; $\boldsymbol{Y_{it}}$ is the dependent variable as usual; $\boldsymbol{x_{it}}$ represent the potential explanatory variables; $\boldsymbol{Y_i}$the corresponding coefficients of independent variables.$\boldsymbol{\alpha_i}$ Represent the group specific constant term; $\boldsymbol{U_{it}}$ is the error term which unobserved or due to specification problem individual entity specific is the error or idiosyncratic error or varies over time entities $\boldsymbol{U_{it}}$ is assumed uncorrelated with the explanatory variables of all past, current and future time periods of the same individual. This is a strong assumption which example rules out lagged dependent variables and uncorrelated with the individual specific effect and while $\in_{it}$ is the usual error component which is assumed to be independent and

identically distributed over individual country and time with mean zero variance (Woodrage et al, 2005).

The random effects model can be consistently estimated by both the RE estimator or the FE estimator. We would prefer the RE estimator, if we can be sure that the individual-specific effect really is an unrelated effect. This is usually tested by a (Durbin-Wu-) Hausmann test. However, the Hausman test is only valid under homoscedasticity and cannot include time fixed effects. The assumption of FE is better tested by running an auxiliary regression. Not rejecting RE does not mean accepting it. Interest in the effect of a time-invariant variable is no sufficient reason to use the RE estimator (Wooldridge, 2010).

Regression Model Specification In order to evaluate the financial soundness of private commercial banks in Ethiopia, three models have been developed and each of them has three dependent variable and four alike independent variables as illustrated below. As presented below, multiple regression analysis was adopted to show the bank's specific factors affecting the profitability of banks;

Model: $\mathbf{Y = \beta 0_{it} + \beta_1 X1_{it} + \beta 2X2_{it} + \beta 3X3_{it} + \beta_4 X4_{it} + \varepsilon_{it}}$

The following final log linear model was as follow

$$\boldsymbol{ROA_{it} = \beta 0_{it} + \beta_1 LPP_{it} + \beta 2\mathrm{LPAQ}_{it} + \beta 3\mathrm{LPG}_{it} + \beta_4 \mathrm{LPOE}_{it} + \varepsilon_{it}}$$

$$\boldsymbol{ROE_{it} = \beta 0_{it} + \beta_1 LPP_{it} + \beta 2\mathrm{LPAQ}_{it} + \beta 3\mathrm{LPG}_{it} + \beta_4 \mathrm{LPOE}_{it} + \varepsilon_{it}}$$

$$\boldsymbol{NIM_{it} = \beta 0_{it} + \beta_1 LPP_{it} + \beta 2\mathrm{LPAQ}_{it} + \beta 3\mathrm{LPG}_{it} + \beta_4 \mathrm{LPOE}_{it} + \varepsilon_{it}}$$

Where:-

- ✓ ROA it= Return on Asset of the bank i at time t,
- ✓ ROE it = Return on Equity of Bank i at time t and
- ✓ NIM it = Net interest margin of Bank i at time t
- ✓ β0= Constant, Y intercept
- ✓ Єit =Error term where is cross sectional at "t" time period
- ✓ β1, β2, β3 and β4 Coefficient indicating rate of change of financial performance as of the independent variables.
- ✓ Lpp = loan portfolio profitability
- ✓ LPGit= loan Portfolio growth for bank i in year t.
- ✓ LPAQ it = loan Portfolio Asset quality for bank i in year t
- ✓ LPOEit = loan Portfolio operational efficiency for bank i in year
- ✓ Where t= 2010-2020

3.7. Description of Variables

3.7.1. Dependent variable

3.7.1.1. Return on Asset (ROA)

Return on Asset (ROA) is a financial ratio that shows the financial performance of a bank. The return on assets (ROA) is the net income for the year divided by total assets, usually the average value over the year. This ratio measures the ability of the bank management to generate income by utilizing company assets at their disposal. In other words, it shows how efficiently the resources of the company are used to generate the income.

ROA= denotes the dependent variable (profitability) measured by

$$\textbf{ROA} = \frac{\textbf{Profit before Tax}}{\textbf{Total Asset}}$$

3.7.1.2. Return on Equity (ROE)

This ratio measures the management efficiency in utilizing the bank funds in achieving a profit, and is calculated by dividing net income (net profit after tax) on the owed capital. Thus, It is expressed as a percentage of what the financial institution earns on loans in a time period and other assets minus the interest paid on borrowed funds divided by the average amount of the assets on which it earned income in that time period. Thus,

Return on equity (ROE) = (Profit after tax/ Shareholders Fund) × 100. Shareholders

3.7.1.3. Net interest income (NIM)

This variable has been used as a proxy for financial performance and is used as one of the dependent variables.

$$\text{NIM} = \frac{\text{Interest income – interest expense}}{\text{Average earning assets.}}$$

3.7.2. Independent variable

3.7.2.1. Loan Portfolio Profitability (LLP)

This is expressed as interest income attributable to advances minus provision for bad and doubtful loans divided by gross loans and advances. Thus,

Loan portfolio profitability = (interest income attributable to advances - provision for bad and doubtful loans) / gross loans and advances.

3.7.2.2. Loan portfolio Operational efficiency

Cost to income ratio shows the overheads or costs of running the bank, including staff salaries and benefits, occupancy expenses and other expenses such as office supplies, It is used as an indicator of management's ability to control costs and is expected to have a negative relation with profits, since improved management of these expenses will increase efficiency and therefore raise profits. It is also one of the key drivers of profitability that is examined.

Operational efficiency (OE) = (operating cost /operating income)

3.7.2.3. Loan portfolio Asset Quality

There appears to be an agreement that bank profitability is directly related to the quality of the assets on its balance sheet, poor credit quality has a negative effect on bank profitability and vice versa. This relationship exists because an increase in the doubtful assets, which do not accrue income, requires a bank to allocate a significant portion of its gross margin to provisions to cover expected credit losses; thus, profitability will be lower

AQ=Asset Quality (loan loss provision /total loan)

3.7.2.4. Loan portfolio growth

Loan Portfolio Growth: A measure of unexpected change in loans, Δ Loans, t is defined as the change in the size of the (net) loan portfolio from quarter t to quarter t-4. Using the loan portfolio 4 quarters lagged controls for any seasonality in the size of the loan portfolio. This variable is normalized by lagged total assets.

Δ Loans, t = Loans, t1 − Loans, t−2/ Total Assets, t2.

3.8. Data Presentation and Analysis

The data collected through secondary date use to tabulate and analyze using the eview9 software because we use panel data analyses. Descriptive statistics such as frequencies and percentages were used to analyze data. Furthermore, descriptions were made based on the results of the tables. The data was coded to enable the responses to be grouped into various categories. The findings will present using tables, bar graphs, and pie charts. Correlation and regression analysis were used to test the effect of independent variables on the dependent variable. Correlation analysis was used to test the effect of each of the independent variables on the dependent variable. Regression analysis was used to test the effect of all the independent variables on the dependent variable.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

This chapter presents descriptive statics, regression result and analyzes the Effect of loan portfolios' on financial profitability of commercial banks in Ethiopia 12 commercial banks' data and strongly balanced panel data analysis from 2011 to 2020.

The analysis has three sections. The first section is descriptive statics of the study presented and the second section of the chapter present the diagnostic test result and the final section of the chapter includes panel regression results report and estimation output of the regression model.

4.1. Descriptive statics

Tables 4-1 showed the summary data for the variables used in the analysis. The data are average values across years and reported showing the trend of the key variables over the period 2011 to 2020. The data showed that during 2011 to 2020 the average profit level; NIM, ROA and ROE Ethiopian banks are 732, 731 and 712.49 percent respectively. However, there is much difference in profitability among the banks as witnessed by the values of the standard deviations which is 237.11, 203.7 and 249 as indicated in table 4-1 respectively.

Table 4-1: Descriptive statistics NIM, ROA and ROE

	ROA	NIM	ROE	LPAQ	LPG	LPOE	LPP
Mean	731.6292	732.5305	712.4906	2.470148	44.83287	64.16411	13.63402
Median	754.2363	759.6945	750.6306	0.543576	45.96201	55.51736	12.56577
Maximum	1196.637	1350.983	1350.983	78.69293	82.44839	652.9001	64.91806
Minimum	166.1359	102.3352	117.3752	0.017419	3.856968	0.093320	1.135206
Std. Dev.	203.7223	237.1063	249.5700	8.652198	12.10104	72.70679	7.938978
Skewness	-0.394462	-0.345317	-0.376742	6.757081	-0.810742	7.027250	4.691864
Kurtosis	2.974840	2.973178	2.705336	54.85884	5.080738	53.83698	28.67283
Jarque-Bera	3.115169	2.388474	3.272832	14359.86	34.79342	13909.64	3735.743
Probability	0.210644	0.302935	0.194676	0.000000	0.000000	0.000000	0.000000
Sum	87795.50	87903.66	85498.88	296.4178	5379.944	7699.693	1636.083
Sum Sq. Dev.	4938829.	6690109.	7411937.	8908.404	17425.78	629067.0	7500.258
Observations	120	120	120	120	120	120	120

Source: Eviews-9 test result summary

4.2. Diagnostics Tests Results

In this section presented panel data parameters and diagnostic tests. The most critical regression diagnostic tests consisting of normality test, multicollinearity test, heteroskedasticity test, test of autocorrelation, and the model selection test is used to determine whether fixed or random effect model is appropriate.

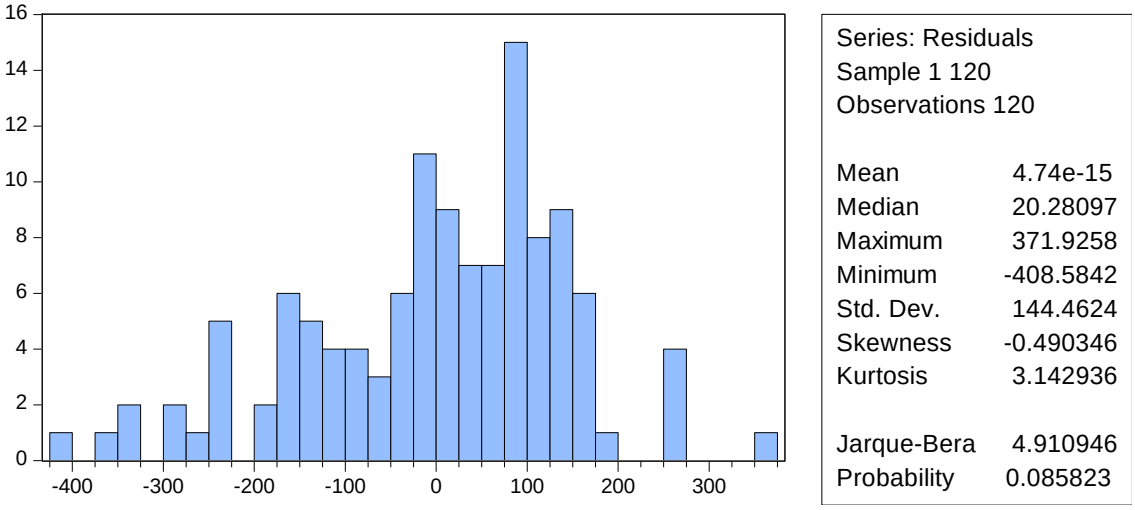
4.2.1.Test for Normality

This test is performed to confirm the assumption of CLRM which states that the disturbances terms are normally distributed. One of the most commonly applied tests for normality is the Bera-Jarque (BJ) test. BJ uses the property of a normally distributed random variable that the entire distribution is characterized by the first two moments, the mean and the variance, (Brooks 2008). According to the same author, if the residuals are normally distributed, the histogram should be bell-shaped and the Bera-Jarque statistic would not be significant. This means if the p-value is bigger than 0.05 the null hypothesis of normality should not be rejected at a 5% level of significance.

H0: Residuals are normally distributed

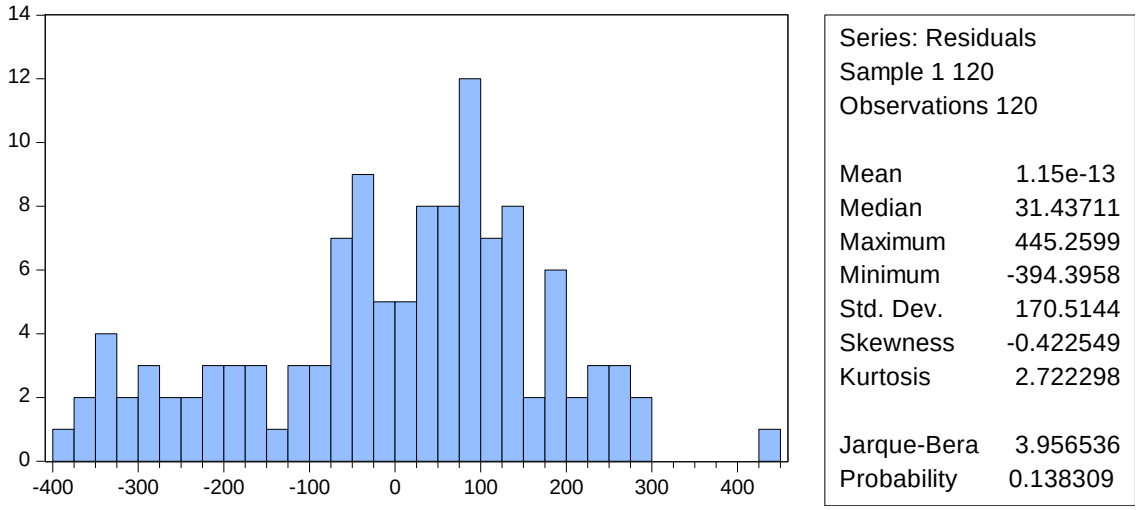
H1: Residuals are not normally distribute

Figure 4-1 Normality test using ROA



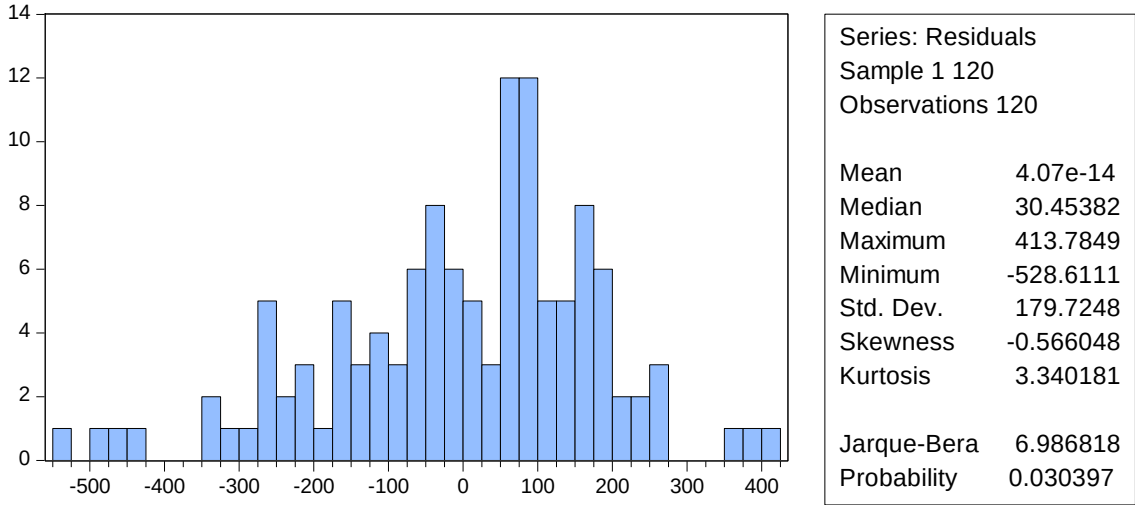
Source: Eviews-9 test result summary

Figure 4-2 Normality test using ROE



Source: Eviews-9 test result summary

Figure 4-3 Normality test using ROE



Source: Eviews-9 test result summary

The above figure 4-1, 4-2 and 4-3 shows that the p-value of the BJ test is 0.085823, 0.13 and 0.030397 using dependent variable like ROA, ROE and NIM respectively as a result we fail to reject the null hypothesis for residual normality. It indicates the residual value is normally distributed. Moreover, kurtosis is 3.142936, 2.7229 and 3.340181 respectively which is near to 3. Therefore, there is no normality problem in the data used for this study.

4.1.1 Test of Multicollinearity

In addition to the above diagnostic tests, the data set was checked for the problem of multicollinearity. The presence of multicollinearity among explanatory and control variables can be easily detected by looking the correlation coefficient in the correlation matrix. If correlation between two variables exceeds 0.8, we have to reject the null hypothesis (Gujarati, 2004).

Table 4-2: Correlation among Explanatory Variables using ROA

	ROA	LPAQ	LPG	LPOE	LPP
ROA	1				
LPAQ	-0.2069047	1			
LPG	0.558636	-0.586142	1		
LPOE	0.192289	-0.066684	0.191554	1	-
LPP	0.1041951	0.518810	-0.480800	-0.0488752	1

Table 4-3: Correlation among Explanatory Variables using ROE

	ROE	LPAQ	LPG	LPOE	LPP
ROE	1				
LPAQ	-0.3108075	1			
LPG	0.696539	-0.586142	1		
LPOE	0.197550	-0.06668	0.1915540	1	
LPP	-0.154711	0.5188102	-0.480800	-0.0488752	1

Table 4-4: Correlation among Explanatory Variables using NIM

	NIM	LPAQ	LPG	LPOE	LPP
NIM	1				
LPAQ	-0.1768875	1			
LPG	0.52254321	-0.5861422	1		
LPOE	0.197468	-0.066684	0.1915540	1	
LPP	0.0826367	0.518810	-0.4808004	-0.0488752	1

Source: researcher's computation using Eviews-9

As indicated on the correlation matrix in table 4-2, 4-3 and 4-4 in the above, almost all correlations that have occurred among explanatory variables are weak correlations; this indicates there is no existence of a multicollinearity problem in the study.

4.1.2 Test for homoscedasticity

The test of heteroscedasticity is conducted in this study to know the weather the variance of the error term is constant or varying. This theoretically assumed that the variance of the error term is assumed to be constant or var (∈_t) =δ^2, also known as homoscedasticity assumption. Heteroscedasticity arises as a result of the presence of outliers. The inclusion or exclusion of such observations, especially when the sample size is small, can substantially alter the results of regression analysis. The standard errors and t statistics are justified only as the sample size becomes large, even if the CLRM assumptions are true. With small sample sizes, the t statistics can have distributions that are not very close to the t distribution, and that could throw off our inference.

The distribution of one or more repressors' included in the model is another source of heteroscedasticity. Even sometimes incorrect data transformation, incorrect functional

form (linear or log-linear model) is also the source of heteroscedasticity. There are many ways of testing heteroscedasticity tests of problem, like the White (1980), and Breash Pagan.

This assumption requires that the variance of the errors be constant. If the errors do not have a constant variance, we say that they are heteroscedastic. To check this assumption Breusch-Pagan-Godfrey was conducted for the model.

H_0: The variance of the error is Homoscedastic

H1: The variance of the error is Heteroscedastic

Table 4-5: Heteroscedasticity test ROA

Heteroskedasticity Test: Breusch-Pagan-Godfrey using			
F-statistic	4.311714	Prob. F(4,115)	0.0028
Obs*R-squared	15.64969	Prob. Chi-Square(4)	0.0035
Scaled explained SS	15.39992	Prob. Chi-Square(4)	0.0039

Table 4-6: Heteroscedasticity test ROE

Heteroskedasticity Test: Breusch-Pagan-Godfrey using ROE			
F-statistic	2.284997	Prob. F(4,115)	0.0644
Obs*R-squared	8.835176	Prob. Chi-Square(4)	0.0654
Scaled explained SS	6.987579	Prob. Chi-Square(4)	0.1365

Table 4-7: Heteroscedasticity test NIM

Heteroskedasticity Test: Breusch-Pagan-Godfrey using NIM			
F-statistic	1.768113	Prob. F(4,115)	0.1400
Obs*R-squared	6.952380	Prob. Chi-Square(4)	0.1384
Scaled explained SS	7.471128	Prob. Chi-Square(4)	0.1130

Source: researcher's computation using Eviews-9

The above table 4-5, 4-6 and tables 4-7, stated that in the model there is no problem of heteroscedasticity or the error variance is constant since the p-value is not significant, meaning that the p-value is **0.0644 and 0.1400 in the case of ROE and NIM** which is greater than 5%. This means the null hypothesis was not rejected which says that the error variance is constant or homoscedastic.

4.1.3 Test for Autocorrelation

The CLRM assumes that the disturbance term relating to any observation is not influenced by the disturbance term relating to any other observation. In other words, it is assumed that the errors are uncorrelated with one another, it would be stated that they are 'auto correlated'.

The first test was Durbin-Watson which is shown in the regression output of the model. In this test for the first-order autocorrelation- i.e. it tests only for a relationship between an error and it's immediately previous value. Therefore, in addition to the DW test, it is

desirable to conduct the Breusch Godfrey Serial Correlation LM test to examine a joint test for autocorrelation that allows us to examine the relationship between the error term and several of its lagged values at the same time.

Table 4-8: Test of autocorrelation

Breusch-Godfrey Serial Correlation LM Test: ROE

F-statistic	32.91627	Prob. F(2,113)	0.0000
Obs*R-squared	44.17487	Prob. Chi-Square(2)	0.0000

Source: researcher's computation using Eviews-9

Breusch-Godfrey Serial Correlation LM Test: using ROA

F-statistic	17.72205	Prob. F(2,113)	0.0000
Obs*R-squared	28.65248	Prob. Chi-Square(2)	0.0000

Source: researcher's computation using Eviews-9

Breusch-Godfrey Serial Correlation LM Test: using NIM

F-statistic	15.01523	Prob. F(2,113)	0.0000
Obs*R-squared	25.19502	Prob. Chi-Square(2)	0.0000

Source: researcher's computation using Eviews-9

To check the Breusch-Godfrey test we can lag 2 years specification and in the case of ROE, ROA and NIM result indicate in above table 4-8, the prob.chi-square (2) value is 0.0000. The Breusch-Godfrey Serial Correlation LM Test: confirm that the prob. chi-square value less than 5%, the result shows we can reject the null hypothesis and cannot reject the alternative. So, the model found the problem of autocorrelation. (Guideline: If P-value>5%, we can't reject the null hypothesis).

Therefore from the above test, we can conclude that by using the Durbin-Watson (DW) testing model (1.83, 1.969 and 1.966 near to 2) the null hypotheses were not rejected for the model so there is no problem of autocorrelation in the model (see appendix).

4.1.4 Model Selection Test: Random Verses Fixed effect Model

The Effect of loan portfolios' on financial profitability is specified and the model is formulated based on theory as stated in chapter three. The organized data were estimated based on the panel model, which includes cross-sectional and time-series dimensions for 12 commercial banks over the period 2011-2020. Fixed effects and random effects models are commonly used models for the panel data.

According to Brooks (2008), the simplest types of fixed effects models allow the intercept in the regression model to differ cross-sectional but not overtime, while all of the slope estimates are fixed both cross-sectional and over time. The random-effects approach proposes different intercept terms for each entity and again these intercepts are constant

over time, with the relationships between the dependent and independent variables assumed to be the same both cross-sectional and temporally.

To choose fixed or random-effect model a formal test so-called Hausman test was used based on the null hypothesis in favor of random effect model estimator or the hypothesis states as:

- ✓ Ho: Random effect model is appropriate and
- ✓ H1: The random effect model is not appropriate or the FE model is appropriate.

The decision rule is when the prob>chi2 or the P-value is greater than the given level of significance (usually 5%), then we fail to reject the null hypothesis (Ho), thus random effect model is appropriate. On the other hand, if the P-value is less than a given level of significance or 5% we reject the null or the fixed effect model is appropriate (Woodridge, 2006).

Test for model one:

Ho: RE model is appropriate.

H1: FE model is appropriate.

Table 4-9: Haussmann Test Result using ROA

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.966113	4	0.4106

Table 4-10: Haussmann Test Result using ROE

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.060773	4	0.2811

Table 4-11: Haussmann Test Result using NIM

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.101778	4	0.5409

Source: Own Computations, by using Eviwe-9

Table 4-9, table 4-10 and table 4-15 in the above shows that the Hausman specification test, the P-value of a model using the dependent variables ROA, ROE and NIM is 0.4106, 0.2811 and 0.5409 which is greater than a 5% level of significance. Hence, the null hypothesis of the fixed effect model is appropriate is too rejected at 5 percent of a significant level for all model. This implies that the random effect model is more appropriate than the fixed effect model and gives more comfort than fixed effects model results are invalid.

4.2Random-effect Regression Results and Discussion

After analyzing the assorted econometric issues that were presented and discussed, and based on this estimation technique which results in consistence and unbiased estimator is used. Thus the random effect estimation technique is more appropriate to analyze and discuss in the analysis effect of loan portfolios' on financial profitability of commercial banks in Ethiopia as the estimation technique yields efficient and consistent result.

4.2.1 Operational model

The operational panel regression model used to find the significant factors of financial profitability of commercial banks in Ethiopia measured by Return on Asset (ROA), return on equity (ROE) and net interest margin (NIM) was:

$$\boldsymbol{ROA_{it} = \beta 0_{it} + \beta_1 LPP_{it} + \beta 2\mathrm{LPAQ}_{it} + \beta 3\mathrm{LPG}_{it} + \beta_4 \mathrm{LPOE}_{it} + \varepsilon_{it}}$$

$$\boldsymbol{ROE_{it} = \beta 0_{it} + \beta_1 LPP_{it} + \beta 2\mathrm{LPAQ}_{it} + \beta 3\mathrm{LPG}_{it} + \beta_4 \mathrm{LPOE}_{it} + \varepsilon_{it}}$$

$$\boldsymbol{NIM_{it} = \beta 0_{it} + \beta_1 LPP_{it} + \beta 2\mathrm{LPAQ}_{it} + \beta 3\mathrm{LPG}_{it} + \beta_4 \mathrm{LPOE}_{it} + \varepsilon_{it}}$$

Table 4-12: Random effect model regression result ROA

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 07/02/21 Time: 04:59
Sample: 2011 2020
Periods included: 10
Cross-sections included: 12
Total panel (balanced) observations: 120
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-91.15250	72.76266	-1.252737	0.2128
LPAQ	2.575487	1.727349	1.491006	0.1387
LPG	14.81183	1.264658	11.71212	0.0000
LPOE	0.085437	0.154742	0.552128	0.5819
LPP	10.77313	1.704673	6.319765	0.0000

Effects Specification	S.D.	Rho
Cross-section random	97.09314	0.4166
Idiosyncratic random	114.8904	0.5834

Weighted Statistics

R-squared	0.597525	Mean dependent var	256.4070
Adjusted R-squared	0.583525	S.D. dependent var	178.0022
S.E. of regression	114.8735	Sum squared resid	1517530.
F-statistic	42.68293	Durbin-Watson stat	1.296609
Prob(F-statistic)	0.000000		

Table 4-13: Random effect model regression result using ROE

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 07/02/21 Time: 05:07
Sample: 2011 2020
Periods included: 10
Cross-sections included: 12
Total panel (balanced) observations: 120
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-296.4885	82.94701	-3.574433	0.0005
LPAQ	6.111453	1.947238	3.138525	0.0022
LPG	20.01142	1.426541	14.02793	0.0000
LPOE	0.154728	0.174323	0.887595	0.3766
LPP	636.5369	192.0945	3.313666	0.0012

Effects Specification	S.D.	Rho
Cross-section random	117.3556	0.4516
Idiosyncratic random	129.3269	0.5484

Weighted Statistics

R-squared	0.666261	Mean dependent var	234.4637
Adjusted R-squared	0.654653	S.D. dependent var	221.0828
S.E. of regression	129.9220	Sum squared resid	1941168.
F-statistic	57.39526	Durbin-Watson stat	1.082282
Prob(F-statistic)	0.000000		

Table 4-14: Random effect model regression result using NIM

Dependent Variable: NIM
Method: Panel EGLS (Cross-section random effects)
Date: 07/02/21 Time: 05:12
Sample: 2011 2020
Periods included: 10
Cross-sections included: 12
Total panel (balanced) observations: 120
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-202.0849	91.44860	-2.209819	0.0291
LPAQ	0.039115	0.021583	1.812295	0.0725
LPG	0.169228	0.015807	10.70569	0.0000
LPOE	0.141141	0.193278	0.730247	0.4667
LPP	11.52994	2.129538	5.414293	0.0000

Effects Specification	S.D.	Rho
Cross-section random	125.9371	0.4353
Idiosyncratic random	143.4400	0.5647

Weighted Statistics			
R-squared	0.549785	Mean dependent var	248.2306
Adjusted R-squared	0.534126	S.D. dependent var	209.3309
S.E. of regression	142.8788	Sum squared resid	2347649.
F-statistic	35.10841	Durbin-Watson stat	1.455368
Prob(F-statistic)	0.000000		

Source: researcher's computation using Eviews-9

4.2.2 The adjusted R^2 determination and coefficient R^2

As shown from the above table 4-10, table 4-11 and table 4-12 Adjusted R^2 values of the model (using ROA, ROE and NIM) was of 0.583525, 0.654653 and 0.534126 respectively the result indicates that about 58.35%, 65.46% and 53.4% of the variability in the dependent variable ROA, ROE and NIM is explained by the independent variables used in the model. That is LPAQ, LPG, LPOE and LPP are jointly explaining 58.35%, 65.46% and 53.4% of the change in ROA ROE and NIM respectively.

The remaining 41.65%, 34.56% and 46.6% of the variability in the dependent variable is left unexplained by the independent variables used in the study. This means that the remaining % of the changes was explained by other variables that are not included in the model.

By using random-effect regression model the value of F-statistic is 42.68293, 57.39526 and 35.20841the probability of not rejecting the null hypothesis that there is statistically significant relationship existing between the dependent variable (ROA, ROE and NIM) and the independent variables, Prob (F-statistic) is 0.000000 indicates that the overall

model is significant at 5% and that all the independent variables which are LPAQ, LPG, LPOE and LPP are significantly influenced the dependent variable.

4.2.3 Summary of Result Interpretation

The established regression equation is:-

4.2.3.1. Result of ROA

$$\mathbf{ROA = -91.15 + 2.57LPAQ + 14.81LPG + 0.85LPOE + 10.773LPP}$$

The panel random effect estimation regression result in the above table 4-10 shows that; coefficient intercept (β_0) is -91.15. This means, when all explanatory variables took a value of zero, the average value of ROA, would be take -91.15 unit and statistically insignificant at 5% level of significance which probability value is 0.2128.

Other things being constant, a unit increase in loan portfolio asset quality leads to an increase in financial profitability of commercial banks in Ethiopia by **2.57 units** (birr) on average.

Other things being constant, a unit increase in loan portfolio growth leads to an increase financial profitability of commercial banks in Ethiopia by a factor of **14.81 units** (birr) on average.

Other things being constant, a unit increases in loan portfolio operational efficiency leads to an increase financial performance of commercial banks in Ethiopia by a factor of **0.85 units** (birr) on average.

Other things being constant, a unit increase in loan portfolio profitability leads to increase in financial performance of commercial banks in Ethiopia by a factor of **10.773 units** (birr) on average. Therefore from the above table concluded that there is a positive relationship between the financial performance of commercial banks in Ethiopia (ROA) and LPAQ, LPG, LPOE and LPP.

4.2.3.2. Result of ROE

$$\boldsymbol{ROE_{it} = -296.49 + 6.11LPAQ + 20.01LPG + 0.15LPOE + 636.54LPP}$$

The panel random effect estimation regression result in the above table 4-10 shows that; coefficient intercept (β_0) is -296.49. This means, when all explanatory variables took a

value of zero, the average value of ROE, would be take -296.49 unit and statistically significant at 5% level of significance which probability value is 0.0005.

Other things being constant, a unit increase in loan portfolio asset quality leads to an increase in financial profitability of commercial banks in Ethiopia by 6.11 **units** (birr) on average.

Other things being constant, a unit increase in loan portfolio growth leads to an increase financial profitability of commercial banks in Ethiopia by a factor of 20.01 **units** (birr) on average.

Other things being constant, a unit increases in loan portfolio operational efficiency leads to an increase financial performance of commercial banks in Ethiopia by a factor of **0.15 units** (birr) on average.

Other things being constant, a unit increase in loan portfolio profitability leads to increase in financial performance of commercial banks in Ethiopia by a factor of **636.54 units** (birr) on average. Therefore from the above table concluded that there is a positive relationship between the financial performance of commercial banks in Ethiopia (ROE) and LPAQ, LPG, LPOE and LPP.

4.2.3.3. Result of NIM

$$NIM_{it} = -202.09 + 0.039\text{PAQ} + 0.1692\text{LPG} + 0.1411\text{LPOE} + 11.53\text{LPP}$$

The panel random effect estimation regression result in the above table 4-10 shows that; coefficient intercept (β_0) is -202.09. This means, when all explanatory variables took a value of zero, the average value of NIM, would be take -202.09 unit and statistically significant at 5% level of significance which probability value is 0.0291.

Other things being constant, a unit increase in loan portfolio asset quality leads to an increase in financial profitability of commercial banks in Ethiopia by **0.039 units** (birr) on average.

Other things being constant, a unit increase in loan portfolio growth leads to an increase financial profitability of commercial banks in Ethiopia by a factor of **0.1692 units** (birr) on average.

Other things being constant, a unit increases in loan portfolio operational efficiency leads to an increase financial performance of commercial banks in Ethiopia by a factor of **0.1411 units** (birr) on average.

Other things being constant, a unit increase in loan portfolio profitability leads to increase in financial performance of commercial banks in Ethiopia by a factor of **11.53 units** (birr) on average. Therefore from the above table concluded that there is a positive relationship between the financial profitability of commercial banks in Ethiopia (NIM), and LPAQ, LPG, LPOE and LPP.

Loan portfolio asset quality (LPAQ):- The result of regression showed that Loan portfolio asset quality (LPAQ) has positive but insignificant relationship on ROA, ROE and NIM in the models .Thus, the result was not in accordance with the expected sign of the study.

Loan portfolio growth (LPG) – loan portfolio growth has positive and significant effect on the financial profitability of commercial banks in Ethiopia that measured interims of ROA, ROE and NIM.

Loan portfolio operational efficiency (LPOE) - The result indicates that in the model loan portfolio operational efficiency has positive but insignificant relation with dependent variable ROA, ROE and NIM at 5% level of confidence in the model. This result largely supported by Shibiru & Mebiratu (2017), Mekasha (2011), they observed that the negative effect of NPLs on the performance of banks is the symptom of ineffective credit risk management.

Loan portfolio profitability (LPP) - The regression result indicates that loan portfolio profitability has positive and significant relationship on banks performance in the case of ROA, ROE and NIM.

CHAPTER FIVE

5. CONCLUSION AND RECOMANDTION

5.1. CONCLUSION

Profitability is the primary goal of all businesses and is vital for the existence and growth of any business. The profitability of banks is crucial for the economy since banks are stable when they are profitable and in turn maintains the stability of the whole economy. Because of this it is necessary for bank managers and policy makers to identify the underlying factors that influence the bank's profitability. Studies on the effect of loan portfolio on the profitability of banks consider. The objective of this study is to assess the effect of loan portfolio on the profitability of Commercial Bank of Ethiopia measured by ROA, ROE and NIM. Using a non-random sampling method (purposive sampling) selected 12 commercial Banks in Ethiopia for the period covering 2011 to 2020; the study was carried out by constructing a balanced panel regression model based on random-effects estimates of the secondary data obtained from the financial statements, mainly annual audited report of the commercial Banks in Ethiopia under the study. To maintain the data validity and robustness of the regressed result of the research, the most critical regression diagnostic tests consisting of Normality, Multicollinearity, Heteroscedasticity, and Autocorrelation are tested.

Adjusted R^2 values of the model (using ROA, ROE and NIM) was of 0.583525, 0.654653 and 0.534126 respectively the result indicates that about 58.35%, 65.46% and 53.4% of the variability in the dependent variable ROA, ROE and NIM is explained by the independent variables used in the model. That is LPAQ, LPG, LPOE and LPP are jointly explaining 58.35%, 65.46% and 53.4% of the change in ROA ROE and NIM respectively.

By using random-effect regression model the value of F-statistic is 42.68293, 57.39526 and 35.20841the probability of not rejecting the null hypothesis that there is statistically significant relationship existing between the dependent variable (ROA, ROE and NIM) and the independent variables, Prob (F-statistic) is 0.000000 indicates that the overall model is significant at 5% and that all the independent variables which are LPAQ, LPG, LPOE and LPP are significantly influenced the dependent variable. This conclusion is like Kenyan researcher Molson S. (2019), the analysis results showing that all this loans had a telling influence on financial performance at 5% level of significance, with Required of 39.3% on ROA, 62.83% on ROE and 61.8% CR, the study concludes that there could be

other factors outside the scope of this study, that could be having a significant influence on financial performance of banks

Accordingly, the effect of loan portfolio such as LPAQ, LPG, LPOE and LPP use as independent variable on profitability measured by ROA, ROE and NIM as dependent variable on commercial banks in Ethiopia were carefully analyzed.

The panel regression result showed that the LPG and LPP have positive and significant effect on the financial profitability of commercial banks of Ethiopia measured by ROA, ROE and NIM. On the other hand LPAQ and LPOE positive and statically insignificant effect on ROA, ROE and NIM.

5.2. Recommendation

Based on Regression results, Loan portfolio asset quality and loan portfolio operational efficiency have positive and insignificant effect on the loan portfolio management and profitability Commercial Bank of Ethiopia.

Therefore it is recommended that to increase loan portfolio asset quality (LPAQ) the bank has to revise and the fill gap of Credit Policy & Procedures within a short period of time and also to establish strong follow up mechanism to insure strict adherence to the Policy and Procedure. Improving assets quality by reducing the rate of credit risk by reducing operational costs, improving diversifying income source and by increasing amount of liquid assets. And also by expanding the size of the bank Thus it can be concluded that Profitability in Ethiopian banking sector is largely driven by asset quality.

The result also indicates that loan portfolio operational efficiency has positive and insignificant effect on the banks profitability. In terms of operational efficiency, it is obvious that a lot needs to be done to expenses in the banking sector to improve financial performance. Because efficiency is mainly concerned with cost relative to output imparts the ingredients to long term commercial success To increase loan portfolio operational efficiency the banks taking decreasing controllable expense as one target by management by involve all staff members to decrease controllable expenses which are: Telephone, Stationery, per diem, Petroleum, Transport, over time Clerical & non-Clerical Applying efficient and tight management to decrease wastage of resources.

5.3. Recommendations for Research

The researcher proposes that further study should be carried out on the Effects of loan portfolio management on the Profitability of Commercial Bank of Ethiopia focusing on other External factors because this study only use 4 independent variable(LPAS, LPOE, LPG and LPP).

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APPENDEXI-A Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey Using ROA

F-statistic	4.311714	Prob. F(4,115)	0.0028
Obs*R-squared	15.64969	Prob. Chi-Square(4)	0.0035
Scaled explained SS	15.39992	Prob. Chi-Square(4)	0.0039

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 07/02/21 Time: 04:00
Sample: 1 120
Included observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	36310.98	15404.59	2.357153	0.0201
LPAQ	1345.126	400.6862	3.357056	0.0011
LPG	-27.66830	284.2760	-0.097329	0.9226
LPOE	-44.10413	37.15346	-1.187080	0.2376
LPP	-1090.494	403.3489	-2.703600	0.0079

R-squared	0.130414	Mean dependent var	20695.47
Adjusted R-squared	0.100168	S.D. dependent var	30422.65
S.E. of regression	28858.78	Akaike info criterion	23.41899
Sum squared resid	9.58E+10	Schwarz criterion	23.53514
Log likelihood	-1400.139	Hannan-Quinn criter.	23.46616
F-statistic	4.311714	Durbin-Watson stat	1.620920
Prob(F-statistic)	0.002753		

Breusch-Godfrey Serial Correlation LM Test: using ROA

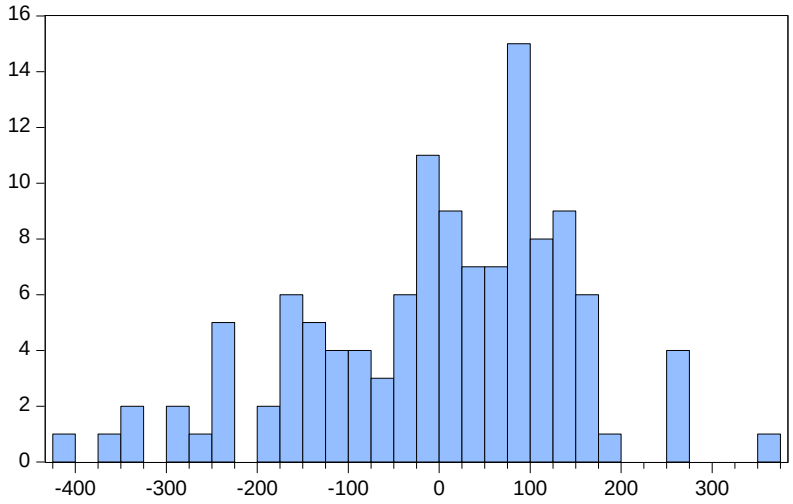
F-statistic	17.72205	Prob. F(2,113)	0.0000
Obs*R-squared	28.65248	Prob. Chi-Square(2)	0.0000

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 07/02/21 Time: 03:58
Sample: 1 120
Included observations: 120
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	28.19891	69.21135	0.407432	0.6845
LPAQ	2.103501	1.844815	1.140224	0.2566
LPG	-0.138904	1.274459	-0.108991	0.9134
LPOE	-0.163552	0.168774	-0.969059	0.3346
LPP	-1.264592	1.821185	-0.694379	0.4889
RESID(-1)	0.492614	0.094709	5.201330	0.0000
RESID(-2)	0.037021	0.094866	0.390242	0.6971

R-squared	0.238771	Mean dependent var	-1.14E-13
Adjusted R-squared	0.198351	S.D. dependent var	144.4624
S.E. of regression	129.3442	Akaike info criterion	12.61939
Sum squared resid	1890480.	Schwarz criterion	12.78200
Log likelihood	-750.1636	Hannan-Quinn criter.	12.68543
F-statistic	5.907348	Durbin-Watson stat	1.966409
Prob(F-statistic)	0.000022		

Appendix-B Normality test using



Series: Residuals	
Sample 1 120	
Observations 120	
Mean	-1.14e-13
Median	20.28097
Maximum	371.9258
Minimum	-408.5842
Std. Dev.	144.4624
Skewness	-0.490346
Kurtosis	3.142936
Jarque-Bera	4.910946
Probability	0.085823

Heteroskedasticity Test: Breusch-Pagan-Godfrey using ROE

F-statistic	2.284997	Prob. F(4,115)	0.0644
Obs*R-squared	8.835176	Prob. Chi-Square(4)	0.0654
Scaled explained SS	6.987579	Prob. Chi-Square(4)	0.1365

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 07/02/21 Time: 04:05
Sample: 1 120
Included observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	65905.20	19858.62	3.318720	0.0012
LPAQ	-889.5261	516.5392	-1.722088	0.0877
LPG	-817.1230	366.4706	-2.229710	0.0277
LPOE	-51.39432	47.89588	-1.073043	0.2855
LPP	37087.86	51997.18	0.713267	0.4771

R-squared	0.073626	Mean dependent var	28832.86
Adjusted R-squared	0.041405	S.D. dependent var	37997.86
S.E. of regression	37202.90	Akaike info criterion	23.92693
Sum squared resid	1.59E+11	Schwarz criterion	24.04308
Log likelihood	-1430.616	Hannan-Quinn criter.	23.97410
F-statistic	2.284997	Durbin-Watson stat	1.020988
Prob(F-statistic)	0.064416		

Breusch-Godfrey Serial Correlation LM Test: using ROE

F-statistic	32.91627	Prob. F(2,113)	0.0000
Obs*R-squared	44.17487	Prob. Chi-Square(2)	0.0000

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 07/02/21 Time: 04:09
Sample: 1 120
Included observations: 120
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.974705	74.46685	-0.053375	0.9575

LPAQ	3.690585	2.010243	1.835890	0.0690
LPG	0.612418	1.372762	0.446121	0.6564
LPOE	-0.235783	0.181731	-1.297432	0.1971
LPP	-134.2272	198.7481	-0.675363	0.5008
RESID(-1)	0.613350	0.098263	6.241927	0.0000
RESID(-2)	0.035641	0.102091	0.349112	0.7277

R-squared	0.368124	Mean dependent var	1.15E-13
Adjusted R-squared	0.334573	S.D. dependent var	170.5144
S.E. of regression	139.0949	Akaike info criterion	12.76475
Sum squared resid	2186256.	Schwarz criterion	12.92736
Log likelihood	-758.8852	Hannan-Quinn criter.	12.83079
F-statistic	10.97209	Durbin-Watson stat	1.830435
Prob(F-statistic)	0.000000		

Heteroskedasticity Test: Breusch-Pagan-Godfrey using NIM

F-statistic	1.768113	Prob. F(4,115)	0.1400
Obs*R-squared	6.952380	Prob. Chi-Square(4)	0.1384
Scaled explained SS	7.471128	Prob. Chi-Square(4)	0.1130

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 07/02/21 Time: 04:15
Sample: 1 120
Included observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	71935.96	25933.46	2.773867	0.0065
LPAQ	8.895836	6.745508	1.318779	0.1899
LPG	-4.489712	4.785755	-0.938141	0.3501
LPOE	-64.57242	62.54744	-1.032375	0.3041
LPP	-1307.733	679.0334	-1.925874	0.0566

R-squared	0.057936	Mean dependent var	32031.82
Adjusted R-squared	0.025169	S.D. dependent var	49206.61
S.E. of regression	48583.42	Akaike info criterion	24.46073
Sum squared resid	2.71E+11	Schwarz criterion	24.57687
Log likelihood	-1462.644	Hannan-Quinn criter.	24.50789
F-statistic	1.768113	Durbin-Watson stat	1.175760
Prob(F-statistic)	0.140034		

Correlated Random Effects - Hausman Test using ROA
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.966113	4	0.4106

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LPAQ	2.994443	2.575487	0.075566	0.1275
LPG	15.129410	14.811829	0.058443	0.1890
LPOE	0.069003	0.085437	0.000325	0.3618
LPP	10.522908	10.773131	0.054146	0.2822

Cross-section random effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 07/02/21 Time: 04:55
Sample: 2011 2020
Periods included: 10
Cross-sections included: 12
Total panel (balanced) observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-101.9594	68.13299	-1.496477	0.1376
LPAQ	2.994443	1.749085	1.712005	0.0899
LPG	15.12941	1.287557	11.75048	0.0000
LPOE	0.069003	0.155787	0.442930	0.6587
LPP	10.52291	1.720481	6.116259	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.722044	Mean dependent var	731.6292
Adjusted R-squared	0.681954	S.D. dependent var	203.7223
S.E. of regression	114.8904	Akaike info criterion	12.44940
Sum squared resid	1372779.	Schwarz criterion	12.82107
Log likelihood	-730.9640	Hannan-Quinn criter.	12.60033
F-statistic	18.01063	Durbin-Watson stat	1.427307
Prob(F-statistic)	0.000000		

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.060773	4	0.2811

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LPAQ	6.733865	6.111453	0.084699	0.0325
LPG	20.479437	20.011419	0.065578	0.0676
LPOE	0.149036	0.154728	0.000363	0.7653
LPP	633.397638	636.536907	606.528301	0.8986

Cross-section random effects test equation:
Dependent Variable: ROE
Method: Panel Least Squares
Date: 07/02/21 Time: 05:05
Sample: 2011 2020
Periods included: 10
Cross-sections included: 12
Total panel (balanced) observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-318.2152	76.69422	-4.149142	0.0001
LPAQ	6.733865	1.968866	3.420174	0.0009
LPG	20.47944	1.449344	14.13014	0.0000
LPOE	0.149036	0.175363	0.849872	0.3973
LPP	633.3976	193.6668	3.270554	0.0015

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.765318	Mean dependent var	712.4906
Adjusted R-squared	0.731470	S.D. dependent var	249.5700
S.E. of regression	129.3269	Akaike info criterion	12.68613
Sum squared resid	1739446.	Schwarz criterion	13.05780
Log likelihood	-745.1678	Hannan-Quinn criter.	12.83706
F-statistic	22.61022	Durbin-Watson stat	1.225203
Prob(F-statistic)	0.000000		

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.101778	4	0.5409

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LPAQ	0.043663	0.039115	0.000011	0.1709
LPG	0.173671	0.169228	0.000009	0.1284
LPOE	0.122842	0.141141	0.000474	0.4005
LPP	11.382137	11.529941	0.079024	0.5990

Cross-section random effects test equation:
Dependent Variable: NIM
Method: Panel Least Squares
Date: 07/02/21 Time: 05:10
Sample: 2011 2020
Periods included: 10
Cross-sections included: 12
Total panel (balanced) observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-219.9363	85.06369	-2.585549	0.0111
LPAQ	0.043663	0.021837	1.999479	0.0482
LPG	0.173671	0.016075	10.80372	0.0000
LPOE	0.122842	0.194500	0.631579	0.5290
LPP	11.38214	2.148012	5.298918	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.680154	Mean dependent var	732.5305
Adjusted R-squared	0.634022	S.D. dependent var	237.1063
S.E. of regression	143.4400	Akaike info criterion	12.89328
Sum squared resid	2139805.	Schwarz criterion	13.26494
Log likelihood	-757.5966	Hannan-Quinn criter.	13.04421
F-statistic	14.74377	Durbin-Watson stat	1.611410
Prob(F-statistic)	0.000000		

Breusch-Godfrey Serial Correlation LM Test: using ROE

F-statistic	32.91627	Prob. F(2,113)	0.0000
Obs*R-squared	44.17487	Prob. Chi-Square(2)	0.0000

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 08/17/21 Time: 02:44
Sample: 1 120
Included observations: 120
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPAQ	3.690585	2.010243	1.835890	0.0690
LPG	0.612418	1.372762	0.446121	0.6564
LPP	-134.2272	198.7481	-0.675363	0.5008
LPOE	-0.235783	0.181731	-1.297432	0.1971
C	-3.974705	74.46685	-0.053375	0.9575
RESID(-1)	0.613350	0.098263	6.241927	0.0000
RESID(-2)	0.035641	0.102091	0.349112	0.7277

R-squared	0.368124	Mean dependent var	3.10E-14
Adjusted R-squared	0.334573	S.D. dependent var	170.5144
S.E. of regression	139.0949	Akaike info criterion	12.76475
Sum squared resid	2186256.	Schwarz criterion	12.92736
Log likelihood	-758.8852	Hannan-Quinn criter.	12.83079
F-statistic	10.97209	Durbin-Watson stat	1.830435
Prob(F-statistic)	0.000000		

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	17.72205	Prob. F(2,113)	0.0000
Obs*R-squared	28.65248	Prob. Chi-Square(2)	0.0000

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 08/17/21 Time: 02:47
Sample: 1 120
Included observations: 120
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPAQ	2.103501	1.844815	1.140224	0.2566
LPG	-0.138904	1.274459	-0.108991	0.9134
LPOE	-0.163552	0.168774	-0.969059	0.3346
LPP	-1.264592	1.821185	-0.694379	0.4889
C	28.19891	69.21135	0.407432	0.6845
RESID(-1)	0.492614	0.094709	5.201330	0.0000
RESID(-2)	0.037021	0.094866	0.390242	0.6971

R-squared	0.238771	Mean dependent var	-1.43E-14
Adjusted R-squared	0.198351	S.D. dependent var	144.4624
S.E. of regression	129.3442	Akaike info criterion	12.61939
Sum squared resid	1890480.	Schwarz criterion	12.78200
Log likelihood	-750.1636	Hannan-Quinn criter.	12.68543
F-statistic	5.907348	Durbin-Watson stat	1.966409
Prob(F-statistic)	0.000022		

Breusch-Godfrey Serial Correlation LM Test: using NIM

F-statistic	15.01523	Prob. F(2,113)	0.0000
Obs*R-squared	25.19502	Prob. Chi-Square(2)	0.0000

Test Equation:
Dependent Variable: RESID
Method: Least Squares

Date: 08/17/21 Time: 02:51
Sample: 1 120
Included observations: 120
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPG	-0.006496	0.016217	-0.400583	0.6895
LPAQ	0.014865	0.023021	0.645740	0.5198
LPOE	-0.050721	0.212471	-0.238721	0.8118
LPP	-0.988669	2.299185	-0.430009	0.6680
C	41.92008	87.91690	0.476815	0.6344
RESID(-1)	0.420754	0.095807	4.391692	0.0000
RESID(-2)	0.089624	0.098665	0.908364	0.3656

R-squared	0.209959	Mean dependent var	2.33E-13
Adjusted R-squared	0.168009	S.D. dependent var	179.7248
S.E. of regression	163.9333	Akaike info criterion	13.09336
Sum squared resid	3036776.	Schwarz criterion	13.25596
Log likelihood	-778.6015	Hannan-Quinn criter.	13.15939
F-statistic	5.005078	Durbin-Watson stat	1.969898
Prob(F-statistic)	0.000139		

12 commercial banks in Ethiopia decade data

Year	total asset	total equity	total loan	default loan
2011	169,493,373,905.05	13,997,652,503.86	54,965,774,777.16	736,235,019.39
2012	234,001,203,029.00	17,707,944,550.05	85,798,045,424.10	690,280,311.21
2013	290,385,514,545.00	21,564,046,066.00	104,181,737,357.00	1,299,912,622.70
2014	357,260,700,575.05	26,964,473,268.27	132,029,236,023.60	1,038,565,860.00
2015	443,550,122,977.00	31,624,853,028.00	174,482,551,579.00	1,359,685,663.00
2016	552,884,129,466.67	38,380,730,606.00	215,241,201,107.12	1,534,618,418.90
2017	718,242,777,098.00	72,290,992,979.00	266,746,592,980.00	2,193,600,788.00
2018	876,148,422,397.00	84,424,967,446.00	330,113,789,856.00	2,284,124,864.00
2019	1,100,082,082,184.00	98,630,102,276.00	417,049,617,056.00	4,048,059,350.00
2020	1,337,375,582,021.80	125,192,573,731.20	528,091,412,000.00	5,299,915,927.00

Year	NET INCOME	NET Interest income	interest income	interest expense
2011	4,917,496,723.29	4,434,979,116.07	6,838,866,041.38	2,400,889,921.71
2012	5,393,960,381.13	7,369,583,441.15	10,688,824,829.75	3,319,241,388.60
2013	8,556,028,232.70	10,173,868,993.00	14,570,240,201.00	4,396,353,208.00
2014	10,165,890,710.73	12,354,642,452.49	18,313,756,023.00	5,959,110,570.51
2015	12,351,089,074.00	17,069,587,134.00	24,437,818,328.00	8,167,431,185.00
2016	13,080,920,176.19	21,575,727,310.44	32,228,748,528.57	10,626,021,228.13
2017	14,421,581,997.00	25,817,417,920.00	40,513,576,189.00	14,705,158,209.00
2018	12,386,955,720.00	36,272,769,586.00	59,921,970,816.00	23,725,860,280.00
2019	20,636,946,611.00	44,313,271,092.00	77,143,521,455.00	32,833,008,363.00
2020	24,771,565,124.00	55,549,279,510.40	95,760,105,546.00	40,045,680,035.00

Year	operating income	operating expense	income before tax
2011	11,104,676,688.00	5,669,904,376.00	5,434,772,312.00
2012	14,323,311,085.00	7,855,788,895.00	6,467,522,190.00
2013	17,424,559,994.00	11,878,183,169.00	5,546,376,825.00
2014	30,565,091,069.00	15,499,084,341.00	15,066,006,728.00
2015	37,454,893,767.00	21,049,112,017.00	16,405,781,750.00
2016	45,667,457,785.00	28,305,014,294.00	17,362,443,491.00
2017	60,200,138,244.00	43,203,483,350.00	16,996,654,894.00
2018	78,268,619,313.00	52,935,793,105.00	25,332,826,208.00
2019	83,412,287,313.00	57,880,183,105.00	25,532,104,208.00
2020	90,472,438,610.00	60,038,606,009.00	30,433,832,601.00