

**MEKELLE UNIVERSITY**  
**COLLEGE OF BUSINESS AND ECONOMICS**  
**DEPARTMENT OF ACCOUNTING AND FINANCE**



**MSC IN ACCOUNTING AND AUDITING**

**DETERMINANTS OF EFFECTIVNESS OF RISK MANAGEMENT in  
PRIVATE COMMERCIAL BANKS IN ETHIOPIA.**

**FOR**

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## DECLARATION

I, Kiros Weldu, hereby declare that the thesis entitled **Determinants of Risk Management Effectiveness of Private Commercial banks in Ethiopia** is my original work and has not been provided for any award of any other degree or diploma of any other university or institution. This thesis is done for the award of Master of Arts in **Accounting and Auditing** from Mekelle University and all sources of materials used for this thesis have been fully acknowledged.

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## CERTIFICATION

This is to certify that the thesis entitle with **Determinants of Risk Management Effectiveness of Private Commercial banks in Ethiopia** is the genuine work of **Mr. Kiros Weldu** who have carried out the research under my follow up and guidance. Thus, I further certified that, to the best of my knowledge, the work reported in the paper is not from part of any other thesis report on the bases of which a degree or award was given on an early occasion on this or any other candidate.

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## **ABSTRACT**

*Banks and other financial institutions usually play a significant intermediary role between borrowers and lenders for the progress of a stable and healthy economy of a nation. In Ethiopian banking industry Commercial banks are the most dominant banks categorized as public and private banks. This study was designed to examine the relationship between risk management effectiveness and its determinants in private commercial banks. Capital adequacy was used as a proxy for risk management effectiveness in commercial banks. Ten explanatory variables namely bank specific factors (credit risk, liquidity risk, profitability, bank size, operating effectiveness, market risk) and Macroeconomic factors (GDP growth, inflation, lending interest rate and exchange rate) were used as independent variables. From the total population of 16 private commercial banks purposive sampling technique was used to select eight private commercial banks in Ethiopia. Secondary data were used to estimate the relationship between independent variables and capital adequacy ratio of banks. Balanced panel data set of ten fiscal years was collected from the audited financial statements of selected private banks in Ethiopia for the period of 2012 – 2022. Both descriptive statistics and econometric model was employed where descriptive statistics were used to describe the variables. In a panel regression analysis random effect model was used to determine the effect of bank specific and macroeconomic variables on risk management effectiveness of banks. The regression result shows that credit risk has negative impact where Bank size and profitability has positive effect on risk management effectiveness in private commercial banks. The macroeconomic factors have positive effect on risk management effectiveness of private banks where exchange rate has a significant effect. The study concludes that risk management effectiveness of banks is highly determined by bank specific and macroeconomic factors and private commercial banks are recommended to introduce risk based control systems in overall banking system operations and Businesses.*

**Key Words:** Risk management effectiveness, Capital adequacy, private commercial banks,

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## ABBREVIATIONS

AB	Awash Bank
BoA	Bank of Abyssinia
BLUE	Best Linear Unbiased Estimators
BS	Bank Size
CAR	Capital adequacy
CLRM	Classic Linear Regression Methods
CBO	Cooperative bank of Oromia
CR	Credit risk
DB	Dashen bank
EXR	Foreign Exchange Rate
FEM	Fixed Effect Model
GDP	Gross Domestic Product
INF	Inflation
LQR	Liquidity Risk
LIB	Lion international Bank
LIR	Lending Interest Rate
MR	Market Risk
MoFED	Ministry of Finance and Economic Development
NBE	National Bank of Ethiopia
NIB	Nib International Bank
OE	Operation Efficiency
OLS	Ordinary Least Square
REM	Random Effect Model
ROA	Return on Asset
RQ	Research Question
UB	United Bank
WB	Wegagen Bank

# CHAPTER ONE: INTRODUCTION

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*This part introduces the research process about determinants of risk management effectiveness of private banks in Ethiopia by briefly discussing the back ground and statement of the problem. The objectives, scope and significance of the study are also discussed in this chapter.*

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## **1.1. Back ground of the study**

The Financial industry usually plays a significant intermediary role between borrowers and lenders for the progress of a stable and healthy economy, transforming deposits in to financial assets and it helps in measuring the safety of the national economy of a country. Therefore, a tough banking system is crucial as it contributes towards maintaining confidence in the financial system and any failure may have the potential to impact on activities of all other financial and non-financial entities. When there is developed and appropriate resource utilization in the banking system a positive contribution will be made to the national economic development of a country. However, for this to happen, a bank must ensure that hazards and risk are accurately and efficiently assessed and risk effects are controlled to the accepted level (Mohammed, 2002), Raiz(2015).

According to Sergeant (2001), banks are the corner stone of an economy of a given nation that contributes to investments, employment creation and the process of economic growth and development. The economies of nations depend on the efficient operation of a complex and delicately balance system of money and credit. Banks give the bulk money supply and are the primary means of facilitating the flow of credit (Omankhanlen, 2012). In order for banks to be able to function efficiently in contributing to overall economic growth and play their role effectively, they should be efficient in transforming their expensive inputs into various financial products and services and need to develop efficient risk management mechanisms (Rozzani and Rahman, 2013).

Risk management can be defined as the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the impact of unfortunate events or maximize the realization of positive opportunities

(Edward, 2006). Risk-taking is an intrinsic element of banking and, that; profits are in part the reward for successful risk taking. Opposing this, excessive, poorly managed risk can lead to distresses and failures of banks. Risks are, therefore, warranted when they are understandable, measurable, controllable and within a bank's capacity to withstand adverse results. Redja (1998) also defines risk management as a methodical process for the identification and assessment of pure loss exposure faced by a company or an individual, and for the selection and implementation of the most appropriate techniques for treating such exposure.

Hussein and Tamini (2007), described risk management as it is the foundation of the banking process and practices. Since banking business is working in a hot-tempered environment it may face a huge amount of risks related with credit, market, operations, reputation, foreign exchange and liquidity. So adopting effective measures by banks to face such risks successfully is a vital thing to stay competitive.

In Ethiopia the banking system has witnessed a significant expansion following the banking reform program which is undertaken in the year 1994 that encourages private banks to enter and expand their operation in the industry. Over thirty commercial banks are operating in the Ethiopian banking industry with a one state owned commercial bank. Despite such growth has taken place, the banking system in Ethiopia is underdeveloped and characterized by operational inefficiency, little and insufficient competition and perhaps can be distinguished by its market concentration towards the big government owned commercial bank (Tesfaye, 2007).

In 1988, Basel I capital accord was proposed by the Basel committee on banking supervision and following that Basel II (2004) were proposed. The focus of the accords was to introduce an international standard that could be utilized by the regulators, when formulating regulations regarding a bank's requirement of capital. One of the main focuses on the Basel guide was related to capital adequacy which banks must use as a cushioning mechanism when a bank's assets are exposed to risk. When a financial institution receives higher exposure to operation and credit risk, there will be a need for its capital to augment itself in order to make sure that future operations are safeguarded in case that the risk leads to losses (Awojobi, O., Amel, R., & Norouzi, S. (2011).

In today's competitive business environment, having an effective risk management mechanism is very crucial for banking business. With no doubt, in today's unpredictable and explosive atmosphere commercial banks are surrounded by a number of risks like credit risk, liquidity risk, operational risk, market risk, foreign exchange risk and interest rate risk, besides with other risks, which may possibly affect the survival and successes of banks. Thus it is of paramount importance to manage these risks efficiently (Al-Tamimi and Al-Mazrooei, 2007).

## **1.2. Statement of the problem**

The most important challenge faced by the banking sector today is the challenge of understanding and managing the risk in the banking business where a threat of risk is imbibed in it. A well-functioning financial system facilitates efficient intermediation of financial assets to the economy. The more efficient the financial system in resource generation and allocation is the greater in its contribution to economic growth and sustainability (Mohan, 2005). Financial intermediary plays a key role in economic growth and development because they supply money for individuals, business sectors, lend government organizations etc. Moreover, financial institutions help the government in assessing and bearing out the monetary and economic policies, and provide a wide variety of economic services, (Scott & Timothy, 2006).

To investigate the status of risk management practice in Ethiopian commercial banks a survey was conducted on November 2009 by National Bank of Ethiopia. Questionnaires were distributed for a sample of 15 Ethiopian banks. The report revealed that credit, liquidity and operational risks were key bank risks over the last two years and would continue to be so over the next five years. But, the study did not identify the factors that affect risk management effectiveness of Ethiopian banks. An observation on risk effectiveness of private banks in Ethiopia shows that banks are facing with various forms of risk in their operations.

In Ethiopia, private commercial banking system has been witnessing a significant expansion over the past ten years than before even though the Ethiopian banking industry was still underdeveloped. A survey made by National Bank of Ethiopia (NBE) (2010), considers that such growth should be matched with strong risk management practices. This is because with the fastest economic growth of the country, societal demand of various banking service also

increase and this situation may increase level of risks on the banks unless and otherwise banks have introduced effective risk management program.

Risk management in banks has been the topic of various studies in the world. A study by Piyananda, S.D.P., Chandrasena, S.M. and Fernando, J.M.R (2015), were made considering capital adequacy as a dependent variable and aims to identify the significant bank specific determinants of risk management efficiency of the listed commercial banks in Sri Lanka. The study revealed that the credit risk, liquidity risk, ROA, operational efficiency and banks' size are the important factors of determining the degree of (CAR) capital adequacy ratio of commercial banks in Sri Lanka. Capital adequacy ratio (CAR) generally represents the safety moderate which can understand any unexpected loss that banks might face when operating in a highly uncertain environment. It represents the solidarity and stability of financial institutions.

The issue of risk management was concern of researchers such as Emira(2013) researched on Comparative Analysis of Risk Management in Conventional and Islamic Banks (The Case of Bosnia and Herzegovina). This research paper tries to determine the dependence of banks' financial performance on the risk management. The research reveals that still practices of risk management are developing worldwide. Anas & Fauziah (2014) also studied the impact of financial risk on Islamic banks' profitability. However, their findings found to be different across country, bank nature and ownership structure.

Determinants of the risk management efficiency can be two fold; mainly internal and external. Internal factors are the bank specific factors whereas the external determinants are macroeconomic factors, which can be the growth rate of Gross Domestic Product (GDP), changes in interest rates and inflation rates (Bohachova, 2008).

In Ethiopia a number of risk management related studies were undertaken in commercial banks ignoring the issue of determinants of risk management effectiveness and trying to study points like the association between risk management and profitability; credit risk issues and risk management practices. In this regard a study by Eneyew(2013) examines the impact of financial risk on profitability of commercial banks in Ethiopia. Fasika(2012) has investigated selected Ethiopian commercial banks operational risk management and Tibebe (2011) has studied on the impact level of credit risk management

towards the profitability of commercial banks in Ethiopia. Emawayih (2017) assesses the determinants of financial risks in private commercial banks using credit risk and liquidity risk indicators. Endawek (2015) deals with the impact of risk management on performance of banks. Yalemzewd (2013), Girma (2010), conducted on credit risk and performance of banks and Fikremariam (2018) conducts a research on factors affecting credit risk management practices in private commercial banks. In all the available research works there is no specific study on risk management effectiveness of commercial banks in Ethiopia which shows as there is a knowledge gap to show clear cut determinants of risk management effectiveness in Ethiopian commercial banks. This initiates the researcher to investigate on the problem.

In this regard a study by Tilahun A.& Dugasa A. (2014) on the bank specific determinants of credit risk in Ethiopian commercial banks, only bank specific determinant variables such as bank size, profitability, capital adequacy, liquidity, credit growth, operating efficiency and ownership were used. This study differs from the previous studies in that it is addressing the problem in Ethiopian Commercial banks and considers bank specific and macroeconomic variables in the study. The dependent variable of this study is Capital adequacy ratio (CAR) as a proxy to risk management efficiency in banks and the bank specific variables were credit risk, liquidity risk, profitability, bank size, operation efficiency and market risk. The macroeconomic variables used in this study were GDP growth, inflation, lending interest rate and foreign exchange rate.

The main purpose of the study was to follow a comprehensive approach towards identifying determinant factors of risk management effectiveness taking into account some private commercial banks in the country. In the context of this study, the risk management effectiveness, as indicated above, was measured through the CAR while investigating the internal and external factors that may affect risk management effectiveness in private commercial banks in Ethiopia.

### **1.3. Research Questions**

In the study of investigating the key determinants of risk management effectiveness of private commercial banks in Ethiopia, two basic research questions were identified.

1. What are the internal/Bank specific Determinants of Risk Management effectiveness in private commercial banks in Ethiopia?
2. What are the external/Macroeconomic Determinants of Risk management effectiveness in private commercial banks in Ethiopia?

### **1.4. Objectives of the study**

#### **1.4.1. General Objectives**

The general objective of the study was to examine the determinants of risk management effectiveness in private commercial banks in Ethiopia.

#### **1.4.2. Specific Objectives**

The specific objectives of the study are

- To examine the Impact of Bank Specific factors (credit risk, liquidity risk, profitability, bank size, operation efficiency and market risk) on risk management effectiveness of private commercial banks in Ethiopia.
- To determine the Impact of Macroeconomic factors (GDP growth, inflation, foreign exchange rate, lending interest rate) on risk management effectiveness of private commercial banks in Ethiopia.

### **1.5. Significance of the Study**

This study aims to examine the key determinants of risk management effectiveness of private commercial banks in Ethiopia where it is expected to contribute to the existing knowledge in the area of risk management effectiveness in banks. The findings and recommendations of this study will be very important for management of private banks, risk management experts, National bank of Ethiopia (NBE) responsible body and it can draw attention to some of the

points where corrective actions are necessary related to issues of risk management effectiveness in banks and enables them to make such corrections in developing regulatory and operational guidelines. Furthermore, this study will serve as an input and basis for other researchers, academicians, consultants and some associations who are in affinity of conducting further researches on related issues.

## **1.6. Scope and limitation of the study**

The study was designed to assess factors affecting risk management effectiveness of private commercial banks of Ethiopia. Even though the concept of risk management effectiveness is important to all types of banks, this study focuses only on private commercial banks in Ethiopia due to the state owned bank is believed to have different business motive which may have an outlier effect on the result. It is also preferable to work on a homogeneous sample to ensure the econometric estimations are strong.

The study selects eight private commercial banks. The banks were selected considering their experience in the market, age and availability of data for ten fiscal years. And because of their experience, the challenges of risk and its efficient management is expected to be pronounced in these banks. This study focuses on the evaluation of bank specific and macroeconomic determinants of risk management effectiveness taking capital adequacy ratio as a dependent variable.

## **1.7. Organization of the paper**

This study is organized in to five chapters. Following the first chapter, the second chapter discusses review of related theoretical and empirical literature in the area of risk management effectiveness in banks. The third chapter comprises the research design and methodology of the study. The fourth chapter discusses the result and the fifth chapter contains summary of conclusion and recommendation of the study. Finally list of references and appendices were annexed at the end of the page.

## **CHAPTER TWO: REVIEW OF RELATED LITREATURE**

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*This literature part tries to determine the association between the determinant factors and risk management effectiveness of commercial banks. It comprises the relevant theoretical review of risk management effectiveness of commercial banks and the empirical review internal and external determinants of risk management effectiveness in banks.*

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### **2.1. Theoretical Review**

#### **2.1.1. Concept of Risk and Risk Management**

Risk can be defined as the possibility of unfortunate occurrence, possibility of loss, combination of hazards or it is the tendency that actual results may differ from predicted results (Mittal & Gupta, 2006). Risk can also be the uncertainty about an outcome in a given situation which may be financial and non-financial risk, business and personal risk etc. According to Emmett (1997) definition, it is obvious that risk is a condition of the real world; it expertise from an undesirable event. Undesirable event in this context is described as an adverse deviation from a desired outcome that is expected and hoped for.

Risk management involves risk identification, risk measurement (and quantification), and mitigation where it can be defined in a number of ways. Risk management can be defined as the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the impact of unfortunate events or maximize the realization of positive opportunities (Edward, 2006). According to Rejda(2011) risk management is a process by which the identification as well as assessment of loss exposures faced by an entity and the adoption of best possible techniques and strategies to handle with these risk exposure. Anderson and Terp (2006) also defines risk management as a process that should seek to eliminate, reduce and control risks, enhance benefits, and avoid detriments from speculative exposures. The objective of risk management is to maximize the potential of success and to minimize the probability of future losses.

According to Mittal & Gupta (2006) in their book of insurance and risk management defined risk management as the identification, analysis and economic control of those risks which can threaten the assets or earning capacity of an enterprise. Considering various definitions to risk

management it is characterized as a scientific approach to deal with the problems of pure risks with the objective of cost minimization and effective utilization of resources. Schmit and Roth (1990) describe risk management as the accomplishment of different activities formulated to reduce the adverse effect of uncertainty regarding potential losses.

Risk management is characterized by the complete set of risk management processes and models permitting banking institutions to put in place different risk-based procedures and practices and contains all the tools and methods necessary for measuring, monitoring and controlling different risks (Besis, 2002). Different scholars have developed various theoretical descriptions regarding risk management in banks and some of them are described below.

#### **2.1.1.1. Financial Economics Theory**

This approach is based on the classical Modigliani-Miller paradigm (Miller and Modigliani, 1958) that proposes the conditions for irrelevance. In 1984, Stulz conducted a study on the *Optimal Hedging Policies* and he deduces the rationales for risk management in firms based on the irrelevance conditions. After that several alternative propositions as well as justifications have been developed to rationalize the risk management. Santomero (1995) in his research work points out different distinctive motives for risk management including securing internal financing, tax effects, the cost of financial distress and capital market imperfections. According to the first motive, the managers of a firm have limited resources and ability to spread out the investment in the firm because of limited capital as well as the concentration of human capital returns. This promotes aversion to risk and a priority for stability in the firm. Oldfield and Santomero (1997) advocate: Any one of these reasons is sufficient to motivate management to concern itself with risk and embark upon a careful assessment of both the level of risk related with any financial product and potential risk mitigation techniques.

Smithson, Smith and Wilford (1995) argues also as risk management in financial institutions is as a value boosting strategy such as securing internal financing, tax effects, the cost of financial distress and the capital market imperfections, rationalize the adoption of risk management in banks where the ultimate goal of risk management activities is to maximize the firm value.

### **2.1.1.2. Institutional Theory**

Institutional theory focuses on the rules and regulations which are forced on institutions by the outsiders, particularly by the government regulatory bodies; and all the norms and values which are incorporated in roles by means a part of socialization processes or procedures (Powell and DiMaggio 1991).

Various studies refer to the institutional theory in explaining the phenomenon of risk management implementation (Collier and Woods, 2011; Hudin and Hamid, 2014). They propose that institutionalization prevails when the risk management activities in the most of institutions becomes highly homogeneous. This homogeneity can be attained via the coercive isomorphic mechanism by which political, legitimacy or regulatory pressures are exercised on firms in the forms of persuasion, direction or invitation (Hudin and Hamid, 2014). For instance in Ethiopian context, all the banks have been directed by National bank to develop an active framework for risk management. Considering the homogeneity assumption of institutional theory, the fundamental principles relating to risk management are applied by every banking institution irrespective of their sizes and complexities. For that reason, the current theory provides an important insight into promising rationale for risk management in banks.

### **2.1.1.3. Agency Theory**

Agency theory states that management and owners have different interests (Jensen and Meckling as cited in Kaguri, 2013). According to this theory agency costs arise from conflicts of interest between shareholders and managers of the company which calls for efficient risk management in banks. This theory helps to examine a social phenomenon from a principal-agent (investor-manager) perspective. In this case agency relationship is considered as a contract under which one or more persons (the principals) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent (Fatemi and Luft, 2002). Smith and Stulz (1985) have applied agency issues in corporate risk management and indicate the managers (agents) attitudes toward risk taking and hedging. Tufano (1998) has also made an argument for risk management based on agency theory. He argues that managers go for hedging as much as they can without

considering the interest of their shareholders. The rationale behind such conduct is the difference between the levels of risk aversion of managers and shareholders. The level of managerial risk aversion is generally more advanced than the risk aversion level of the shareholders as managers have more exposure to the market threats. However, the proponents of agency theory consider that wealth of shareholders transfers to managers because of much extensive hedging and oppose such risk management practices (Fatemi and Luft, 2002).

#### **2.1.1.4. Stakeholder Theory**

This theory focuses clearly on the symmetry of stakeholders' interests as the foremost determinant of the corporate policy (Freeman, 1984). The most important contribution towards the risk management is an addition of implicit contracts theory from employment to other contracts (Klimczak, 2007). In certain businesses, mainly services and high-tech industries, customer confidence on firms is very important to carry on offering their services in the future and can considerably contribute to firms' values. On the other hand, the value of such implied claims is extremely sensitive to estimated costs of bankruptcy and financial distress. Since the risk management practices in a company induce to a reduction in these estimated costs, its value increases (Klimczak, 2007). This implies that the risk management can be seen in banking institutions: to fulfill the regularity requirements; to align the interests of managers with their shareholders interest; to reduce expected tax payments of the bank; to lower the probability of financial distress, business failures or bankruptcy; to safeguard specific investments of the organization; to help the banking business organization in developing financial plans and investment activities; and to maximize the shareholders' value of the bank. In addition, it is also obvious from the above mentioned propositions that risk management is also useful within a bank to control different kinds of risks and to mitigate the possible negative effects of these exposures.

#### **2.1.1.5. The efficiency theory**

The efficiency hypothesis explains that banks earn high profits because they are more efficient than others due to their concern on risk management issues. There are two distinct approaches within the efficiency hypothesis; the X-efficiency and Scale-efficiency hypothesis. X-efficiency approach argues that more efficient firms earn more profits because they incur low costs and gain larger market shares, which may manifest in higher levels on

market concentration, but without any causal relationship from concentration to profitability (Amdemikael, 2012).

The scale approach highlights economies of scale rather than differences in management or production technology. Large firms can obtain lower unit cost and higher profits through economies of scale. This facilitates large firms to acquire market shares, which may manifest in higher concentration and then profitability (Athanasoglou, 2006).

## **2.2. Common risks in banking**

Risk is of different types and different risks are faced by individuals and business. Commercial banks commonly face with financial and non-financial risks. Financial risks are the common type of risk that is associated with financial part which means the possible loss due to financial variables. Financial risks associated with the provision of banking services are risks related to the financial operation of a business, such as credit risk, liquidity risk, interest rate risk and currency risk. Non-Financial risks on the other hand are risks that arise from the non-financial part and may or may not have financial implications and are difficult to measure like financial risks in business. Here under is a brief description of the common risks faced by commercial banks.

### **A. Credit risk**

Basel Committee on Banking Supervision (2001), defines credit risk as it is the possibility of losing the outstanding loan partially or totally, due to default risk. It can also be defined as the potential that a contractual party will fail to meet its obligations in accordance with the agreed terms. Credit risk is also variously referred to as default risk, performance risk or counterparty risk (Brown and Moles, 2012). Credit risk is the uncertainty attached with the collection of loans.

The source of credit risk includes like limited institutional capacity, inappropriate credit policies, volatile interest rates, poor management, inappropriate laws, low capital and liquidity levels, direct lending, massive licensing of Banks, poor loan underwriting, carelessness in credit assessment, poor lending practices, government interventions and inadequate supervision by the central Bank are the common ones (Kithinji, 2010).

### **B. Liquidity Risk**

Liquidity Risk is the risk of a funding crisis, such as unexpected event in the form of

large charge off, loss of confidence, or a crisis of national proportion like existence crisis. It is the potential for loss to an institution arising from either its inability to meet its obligations or to fund increases in assets as they fall due without incurring unacceptable cost or losses. This risk is one of the risks a bank faces (Santomero (1997)).

Based on the definition of the Basel Committee on Banking Supervision (1997), liquidity risk arises from the inability of a bank to accommodate decreases in liabilities or to fund increases in assets. When a bank has poor liquidity, it cannot obtain sufficient funds, either by increasing liabilities or by converting assets on time, at a reasonable cost, and thus affecting profitability. This case results from the inability of the bank to repay liabilities and obligations due on their maturity dates because the bank does not harmonize the maturity date of assets and liabilities through investment in assets with maturity date greater than those of liabilities, something which leads to the inability to meet the demands for the withdrawal of deposits when they are due.

The purpose of liquidity management is to make sure 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. Hence, managing liquidity is among the most important activities conducted by banks. Sound liquidity management is also reducing the probability of serious problems. 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 (NBE, 2010).

### **C. Interest Rate Risk**

Interest rate risks are raised from movements in interest rates. A bank is exposed to interest rate risk when it experiences a situation of imbalance in terms of size or maturity dates between assets and liabilities susceptible to interest rates, leading to potential losses for the bank when interest rate raises or declines and this influences the net asset value in the budget, which some call risk gap (Claudiu and Daniela, 2009). In the scenario of rising interest rate, when liabilities re-price faster than assets, interest spread would fall and hence profitability of the bank would be unfavorably affected. And thus accepting this risk is a normal part of banking business and can be an important source of profitability.

The main goal of interest rate risk management is to sustain a bank's interest rate risk

exposure within self-imposed parameters over a variety of possible changes in interest rates.

As expressed in Basel Committee on Banking Supervision (2003), a system of interest rate risk limits and risk taking guidelines provides the means for achieving that goal. Such a system should lay boundaries for the level of interest rate risk for the bank. It should also provide the capability to allocate limits to individual collections, activities or business units. The limit systems should also ensure that positions that go beyond certain predetermined levels receive timely management attention. Such limits should be appropriate to the size, complexity and capital adequacy of the bank as well as its ability to measure and manage risk.

#### **D. Foreign exchange rate risk**

Bessis (2002) defines foreign exchange risk as incurring losses due to changes in exchange rates. Such loss of earnings may occur due to a mismatch between the value of assets and that of capital and liabilities denominated in foreign currencies or a mismatch between foreign receivables and payables that are expressed in domestic currency. Currency volatility is a major risk faced by companies doing business outside their home countries. There are a number of factors that influence a currency's exchange rate like; Speculation, Balance of payments, Government policy, Interest-rate differentials and Inflation rate differential.

#### **E. Operation Risks**

Operational risk is defined as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events (Kanchu and Kumar, 2013).

Operational risks are created by a large range of different external events ranging from power failures to floods or earthquakes to terrorist attacks. Similarly, operational risk can also arise because of internal events such as the potential for failures or inadequacies in any of the bank's processes and systems or those of its outsourced service providers. Operational risk may arise from human resources management due to mismanaged or poorly trained employees, employees negligence, misconduct; conflict of interests; fraud; rogue trading etc. In this regard surfacing of mistrust, breakdown to communicate, low morale and skepticism among staff members, as well as increased turnover of staff, should be regarded as indicative for potential increase in operational risk (Basel II, 2004).

#### **F. Legal and Regulatory Risk:**

Legal and regulatory risk comes from the non-fulfillment of regulatory requirements by banks. Bessis (2002) takes it as the risk of disputes emerging from the different laws at play in banking transitions. This risk arises from violations or negligence of legal requirements, regulations, procedure and ethical standards (Tahir, 2006). In case of failure to provide adequate privacy protection as per rules, banks may face financial losses in the form of fines, payments of damages, civil money penalties, and the rescinding of contracts. Furthermore, this risk has also the potential to create an adverse impact on the reputation which may lead to lower the business opportunities or reduce banks' growth and may generate liquidity issues within banks (Galai and Mark, 2006).

#### **G. Market Risk:**

Market risk is a risk related to the change in assets value due to systematic factors. The market risk in banks emerges from different sources including securities portfolios, instruments and equities or in shape of interest rate or foreign exchange risk (NBE, 2010). For instance, this risk is associated with the unfavorable change in the market value of the trading portfolio, caused by market movements, over the transactions liquidation period (Bessis, 2002).

#### **H. Reputation Risk:**

According to Basel Committee (2009), reputation risk is the possibility of losses emerging from a negative perception on the side of customers, depositors, counter-parties, market analysts, investors, shareholders, regulators and other concerned parties. This risk is associated with the trusts and beliefs of customers and other stakeholders of the banking institutions (Arby, 2006). This risk can have an unfavorable impact on banks' ability to sustain existing or to develop new business affairs in order to maintain a continuous source of obtain funding.

#### **I. Technology Risk:**

Bessis (2002) describes the technology risk in banks as the imperfections of information systems and systems failures caused by virus attack, network failure, hacking, poor system integration and lack of skills. Crouhy, Galai and Mark (2006) point out that principally technology risk falls into the operational risk category. Financial institutions face different forms of risks due to their nature and due to the way they follow risk management procedures

and the effectiveness of risk management is determined by different internal and external factors.

## **2.3. Empirical Review of literature**

### **2.3.1. Determinants of Effectiveness of Risk management**

Risk management is affected by a number of aspects commonly considered as internal and external factors. A study by Ali,K., Akhtar,M.F. & Sadaqat,S (2011), Piyananda et al, (2015) were made considering capital adequacy as a dependant variable and examines the bank specific factors of risk management efficiency of the listed commercial banks in Sri Lanka. The study discovered that the profitability, credit risk, liquidity risk, operational efficiency and size of banks are the important factors of risk effectiveness of commercial banks in Sri Lanka. Additionally, risk management of banks is highly influenced by macroeconomic conditions, such as inflation rate, real GDP, and lending interest rate.

Based on the study by Driga (2012), the most potential determinants of risk management in the corporate sector are credit risk, liquidity risk and market risk. According to the notes to financial statement of all private commercial banks in Ethiopia foreign exchange risks in Ethiopia are controlled by maintaining major currencies whose exchange rate against the reporting currency has always appreciating. The banks settle foreign exchange transaction of customers at the exchange rate ruling on the date of transactions. Customers bear the cost of the increasing in exchange rate. Samina (2015) in his study of investigating the factors affecting risk management efficiency of Pakistan banks considering bank specific and macroeconomic factors shows a positive relationship between the liquidity, profitability, operating efficiency, merger and economic growth with capital adequacy ratio while the asset portfolio risk and inflation rates have the opposite effect.

Available literature regarding risk management effectiveness in Ethiopian commercial banks focuses on points such as the relationship between risk management and profitability; credit risk issues and risk management practices. In this regard a study by Eneyew(2013) examines the impact of financial risk on profitability of commercial banks in Ethiopia. Fasika(2012) has investigated selected Ethiopian commercial banks operational risk management and Tibebu (2011) has studied on the impact level of credit risk management towards the profitability of commercial banks in Ethiopia. Emawayih(2017)

assesses the determinants of financial risks in private commercial banks using credit risk and liquidity risk indicators. In all cases the literature doesn't provide clear cut determinants of risk management effectiveness in Ethiopian commercial banks.

### **2.3.2. Internal Factors to Risk management**

#### **A. Profitability**

Profitability refers to how well organized banks are using their assets to make earnings. It is identified as one of the bank specific determinant of risk management efficacy in banks. Saunders and Wilson (2001) concluded that the better performing banks with good return on assets and consistent management policies can be well capitalized for future operations.

A study by Zribi and Younes (2011) found that profitability is positively and statistically significant with credit risk which shows that the most profitable banks are the riskiest banks that they take more risks considering their profitability to size risk. This finding also supported by another study conducted in developing country, Ghana, by Boahene, Dasah, and Agyei(2012).They found credit risk has a positive and significant relationship with bank profitability and finally argued that banks in Ghana enjoy high profitability in spite of high credit risk. A comparative study between conventional and Islamic banks of Pakistan on liquidity risk management by Ali *et al.*,(2011) covering the period 2006 up to 2009 liquidity risk has significant positive associated with return on assets in Islamic banks with 95% confidence level but insignificant in conventional banks. The overall study shows that return on assets is one of the bank specific determinants of risk management effectiveness in banks.

#### **B. Size of the Bank**

Size of the bank which is represented by natural logarithm of total asset is the other bank specific variable identified by a number of studies conducted on financial risks of banks. Size of the bank is important that will help to understand risks that are unstable when a firm grows. A study by Misman (2012) studying the relationship between financing structures, bank specific variables and credit risk by taking a sample of 16 Malaysian Islamic banks found that bank asset size has a positive and significant relationship with credit risk.

Similarly, a study on bank credit risk determinants covers both developed and emerging economy by Ahmad and Ariff (2007) reveal different result across countries. Banks asset size found that insignificant in a number of countries; while significant and positively related with credit risk in India and negative relation with credit risk in Japan.

Another study by Piyananda et al ( 2015) on the bank specific determinants of risk management efficiency in commercial banks in Srilanka found that Bank size as a bank specific determinants of risk management efficiency shows a significant positive impact on CAR which means banks having larger assets base tends to have more capital and wise versa. An investigation on liquidity risk and performance in twelve advanced economies (Australia, Canada, France, Germany, Italy, Japan, Luxembourg, Netherlands, Switzerland, Taiwan, United Kingdom and United States); revealed that the relationship between size and liquidity risk is significantly positive (Shen *et al.* (2009). Having this result, researchers argue that large banks believe too big to fail where the effect of banks asset size on risk management efficiency is considered to be very important.

### **C. Age of the bank**

Age of the can significantly impact its approach to risk management effectiveness, with older and more established institutions generally employing more traditional, conservative methods, while newer banks may prioritize innovation and flexibility. As a firm continues longer in business, it establishes itself as an ongoing business and therefore increases its capacity to take on more debt; hence age is positively related to debt. Before granting a loan, banks tend to evaluate the creditworthiness of entrepreneurs as these are generally believed to pin high hopes on very risky projects promising high profitability rates. If the investment is profitable, shareholders will collect a significant share of the earnings, but if the project fails, then the creditors have to bear the consequences (Myers, 1977).

As firms become aged, the long years of track record will enable them to easily convince creditors and also will expertise in finding alternative credit source cost effectively in favorable terms while going for debt capital (Montesano, 2010).

In sum, while older banks have a deeply ingrained risk management culture and experience in navigating various financial cycles, newer banks often use advanced technology and innovation to address risks but face challenges due to limited historical data and sometimes a

higher appetite for risk. Both approaches have advantages and disadvantages and the effectiveness of risk management ultimately depends on a bank's ability to balance these factors.

#### **D. Liquidity risk**

Liquidity risk refers to Banks inability to meet their obligation and thereby forcing them to sell part of fixed assets at value less than their market value. A study by Ahmad and Ariff (2007) Multi-country study of bank credit risk determinants from both developed and emerging economy; Ali *et al.*,(2011) financial and non-financial business risk perspectives empirical evidence from commercial banks in Pakistan are some of them. Study of bank credit risk determinants on multi-country by Ahmad and Ariff (2007) find the coefficient estimate for liquidity ratio is significantly positively related to credit risk in several countries: This is because low liquidity of banks affects their capital ratio negatively, and therefore has positive impact with Capital Adequacy ratio.

An empirical study by Ali *et al.*, (2011) on financial and non-financial business risk in 28 Pakistan commercial banks which include public, private and Islamic banks covering a period of 2006 up to 2009 revealed that liquid assets found to be a positive relationship with credit risk and operational risk, whereas it is found to have significantly and insignificantly on credit and operational risks respectively. The positive relation of liquid asset is supported by Koasmidou, & Doumpos (2002); Al-Tamimi (2005).

Another related study by Worku (2006), conducted the study on the impact of liquidity risk on the performance of commercial banks of Ethiopia. He argued that liquidity has an impact on the performance of commercial banks in Ethiopia and there was an inverse relation between deposit/net loan and ROE. And the coefficient of liquid asset to total asset was positive and directly related with ROE. In addition, the study also found that the capital adequacy of all banks in Ethiopia were above threshold, means there was sufficient capital that can cover the risk weighted assets. Depositors who deposit their money in all banks were safe because all the studied banks fulfilled NBE requirement (Worku, 2006).

#### **E. Operational efficiency**

Operational efficiency indicates how successfully banks manage internally their assets

and liabilities in hedging against their risk dimensions. Inefficient managers will not cope successfully with the process of granting and monitoring loans that will lower the banks' credit quality and bring about a growth in problem loans (Salas and Saurina, 2002). Besides study by Waweru and Kalini (2009) indicates lack of proper skill amongst loan officials, speedy process of evaluating loans mainly due to external pressure, are among the factors that lead to huge concentration non-performing loans.

Berger and De Young (1997) argued that poor management in the banking institutions results in bad quality loans, and therefore, escalates the level of non-performing loans. Ali *et al.* (2011) operational efficiency found a negative but insignificant relationship with credit risk of Pakistan commercial banks.

## **F. Credit Risk**

Credit risk is the current or prospective risk to earnings and capital arising from an obligor's failure to meet the terms of any contract with the financial institution or if an obligor otherwise fails to perform as agreed. Credit risk one of the major risks in commercial banks and the ability to manage it effectively determines banks' stability (Ruth, 2011). The potential that a commercial bank borrowers or counterparty will fail to meet their obligations in accordance with agreed terms is termed as credit risk. Credit risk management has an objective of maximizing size of bank's risk-adjusted rate of return by maintaining credit risk exposure within acceptable conditions. Commercial banks should manage the credit risk that may be inherently available in their portfolio or credit related transactions. Commercial banks should consider the associations between credit risk and other type of risks because the effective management of credit risk is a critical component of a comprehensive approach to risk management and success of the organization (Piyanda et al, 2015).

A study by Eneyew (2013) examines the impact of financial risk on profitability of commercial banks in Ethiopia. Girma (2011) study credit risk management and its impact on performance on Ethiopian commercial banks taking nonperforming loan and loan provision data as indicator of credit risk. Tibebu(2011) study credit risk management and profitability of commercial banks in Ethiopia. While others such as Wondimagegnehu (2012) study determinants of nonperforming loan focused on only bank specific variables and lack econometrics application which helps to strongly quantify relationship between variables and involves subjectivity. Tewodros (2013) study

the determinants of financial risk on Ethiopian banks with a proxy of nonperforming loan to total loan for credit risk and financing gap to total asset for liquidity risk for seven years' period.

## **G. Market Risk**

Market risk is generally considered as the risk that causes a decrease in value of investments because of the changes in value of the market risk factors such as liquidity risk, exchange rate risk and interest rate risks. Market risk management provides a comprehensive outline for measuring, monitoring and managing these factors as well as commodity price risk of commercial banks. In a study by Piyananda et al (2015), the empirical result shows a positive relationship with capital position of commercial banks.

### **2.3.3. External Determinants of Effectiveness of Risk management Economic Growth (GDP)**

Risk management efficiency is correlated with macroeconomic variables or risk factors such as economic growth. Awojobi and Amel (2011) in their study of macro-determinants of risk management efficiency in Nigerian banks found that economic growth which is a proxy for business cyclical has positive impact on capital adequacy of Nigerian banks. By implication, Nigerian banking industry is pro-cyclical to economic cycles. Shen,C.H., Chen,Y.K., Kao,L.F., & Yeh ,C.Y(2009) regarding macroeconomic environment, found that both annual percent change of GDP and GDP annual percent change of last year have positive effect on bank's liquidity risk. This provides that higher economic growth recorded each year make commercial banks maintain their liquidity cushion and induce them to provide more loans. But less customer deposits are attracted during higher economic growth years.

## **A. Inflation Rate**

Inflation reflects a situation where the demand for goods and services exceeds their supply in the economy (Karl *et al*, 2002). Inflation causes many distortions in the economy mainly to those who are retired and expect a fixed income only where their purchasing power declines. It also affects the repayment of loans and discourages savings due to the fact that the money is worth more presently than in the future and inflation therefore affects the

liquidity of the of the Commercial Banks (Emawayih,2017).

According to a study by Brownbridge (1998) inflation contributed to a rapid erosion of banks equity and increased credit risks in Kenya, Nigeria and Zambia. Fofack (2005) unexpected rise in inflation under cyclical downturns is likely to negatively affect the performance of the banking sector and recovery of loans to private operators and investors. In the extreme case, hyperinflation may erode banks assets and equity and weaken banks position through the interest rate channel. In contrast Zribi and Boujelbène (2011), found negative relationship between inflation and the credit risk in Tunisia.

### **B. Interest Rate**

Bank Lending rate is the bank rate that usually meets the short and medium term financing needs of the private sector which is normally set apart based on creditworthiness of borrowers and financial objectives. The availability of money in the market, on prevailing rates and on the specific terms of the contract, such as term lengths are important to determine to the interest rate to be charged. Bank lending rate is measured by average interest rate on lending (Emawayih, 2017).

A study by Vodová (2011) identifies determinants of liquidity of Czech commercial banks. The result showed that, among other things, there is a positive link between bank liquidity and interest rates on loans and on interbank transaction. Since, a high interest rate on loan does not encourage banks to lend more they left with high liquidity. Positive effect of interest rate on loans can be quite surprising can be said normal. Since, it highlights the fact that higher lending rates do not encourage banks to lend more results banks to be more liquid.

Njanike (2009) in his qualitative study seeks to establish factors that led to the banking crisis and to outline the components of an effective credit risk management system of Zimbabwe's banks' in 2003/2004 bank crisis. The research identified poor corporate governance, inadequate risk management systems, poor planned expansion drives, chronic liquidity challenges, foreign currency shortages and diversion from core business to speculative non-banking activities as other factors that caused the crisis.

### **C. Foreign exchange Rate**

The exchange rate is set by the legally authorized exchange market about currencies. In Ethiopia Fixed rate is used and calculated considering the averages of local currency units relative to the U.S. dollar. When a bank holds assets or liabilities in foreign currencies and affects the earnings and capital of bank based on the fluctuations in the exchange rates, it causes a foreign exchange risks in banks. According to Evans, Songul Kakilli (2013) Turkish banking sector's profitability factors found positive relationship between exchange rate and profitability. Thus this variable has significant and positive impact on profitability. Since most of profitability of banks is related to risk management efficiency of banks foreign exchange rate is expected to have an impact on risk management effectiveness of commercial banks.

## **2.4. Conceptual Framework**

Risk Management is a process by which the identification as well as assessment of loss exposures faced by an entity and the adoption of best possible techniques and strategies to deal with these risk exposures. Determinants of the risk management effectiveness can be internal and external. Internal factors are the bank specific factors whereas the external determinants are macroeconomic factors (Bohachova, 2008).

Based on the available literature regarding risk management effectiveness in commercial banks, the researcher identifies ten variables categorized as dependent and independent variables. In this study capital adequacy was used as a dependent variable and credit risk, liquidity risk, operational effectiveness, bank size, profitability and market risk was taken as bank specific factors. Economic growth, inflation, interest rate and foreign exchange rate were taken as macro-economic factors that may affect risk management effectiveness in banks.

## **2.5 Dependent and Independent variables**

### **A. Dependent variable**

#### **Capital Adequacy as Indicator of Risk Management Effectiveness**

Basel guideline for risk management is centered on capital adequacy, where internal risk models are in a way that capital augmentation is suggested to cover for possible consequences of risk-taking (Ojo, 2008). In Commercial banks requirements of capital

adequacy is the core of prudential regulation and supervision. In legal terms, capital adequacy is a term used to describe the adequacy of a bank's aggregate capital in relation to the risks which arise from its asset portfolio, off balance sheet transactions, its common operations and all other risks associated with its business (Hitchins et al., 2001).

Capital adequacy analysis as a proxy of risk management efficiency is used to measure the financial solvency of a bank by identifying whether the risk it has incurred is adequately balance with resources to take up possible losses (Salinger & Saltzman, 1998). Evans et al. (2000) assumes as the robustness of financial institutions to shocks to their balance sheets is determined by capital adequacy ratio which provides lagged indicators of many problems in banks and other financial institutions. In this study the proxy to capital adequacy ratio is ratio of equity to total assets.

**CAR:** Total Capital / Total Assets

## B. Independent Variables

According to the model presented, there are ten variables that are expected to be key determinants of risk management effectiveness measured by capital adequacy ratio. The variables are credit risk (CR), liquidity risk (LQR), profitability (ROA), bank size (BS), operating efficiency /OE/, Market Risk (MaR) inflation rate (INF), economic growth (GDP), interest rate (LIR), and foreign Exchange rate (EXR). The following table 3.1 depicts each independent variable and its measurement techniques in this study.

**Table 3.1: Summary of Variables, indicators and measurements**

Construct	Variable	Indicator	Measurement
Risk management effectiveness	Capital Adequacy ratio /CAR/	Dependent Variable	Total Capital ÷ Total Assets
Bank specific /Internal/ Factors	Credit Risk /CR/	Independent Variables	Loans / Total Assets
	Liquidity Risk (LR)		Loans /Deposits
	Profitability		ROA= Net income / Total Assets
	Bank size		Natural logarithm of total assets
	Operation efficiency		Operating income / operating expense
	Market Risk		Natural logarithm of total assets

Macroeconomic/ External factors	GDP	In dependent Variables	Annual growth rate of real GDP
	Inflation Rate		Percentage change in price index
	Interest Rate		Average lending interest rate
	Exchange rate		Annual Average Exchange rate from NBE

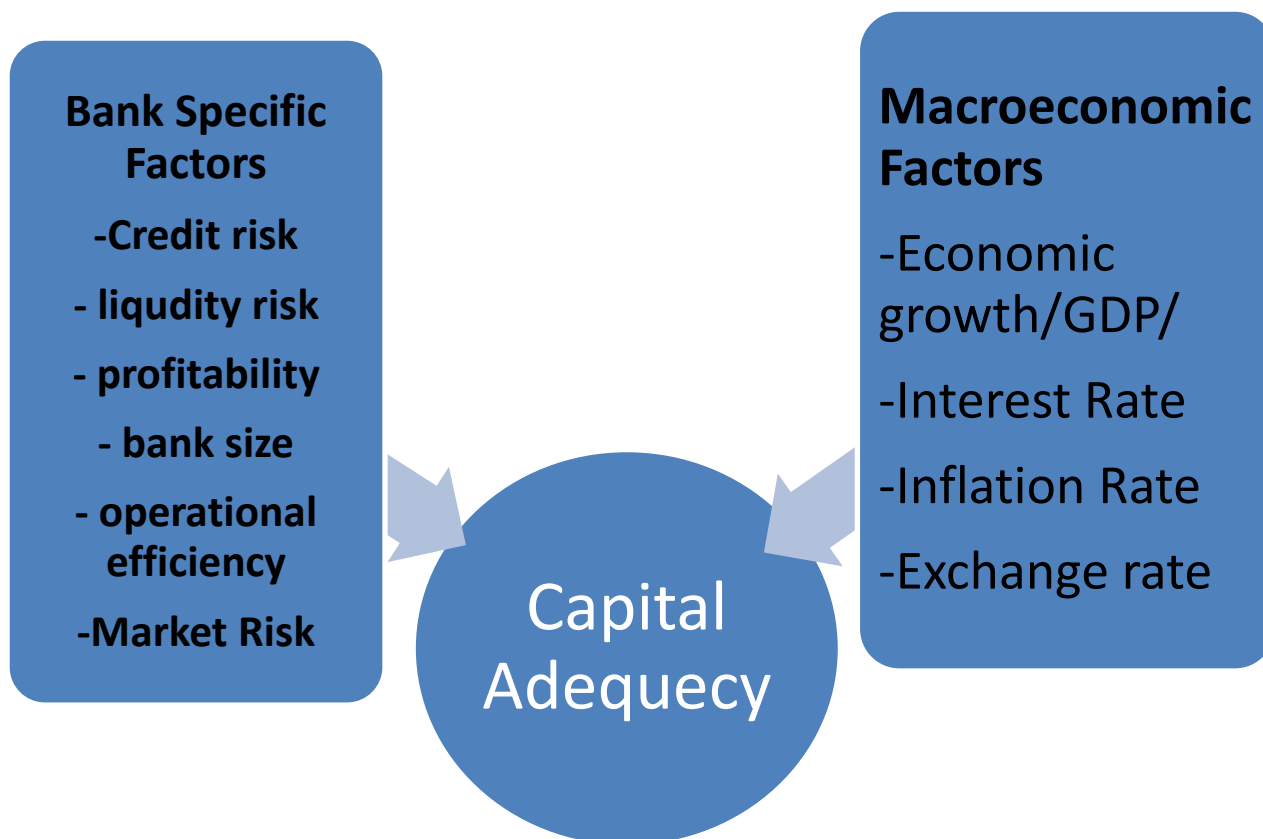


Fig 2.1- Conceptual Framework (own Design)

## 2.6. Hypothesis of the study

In order to investigate the determinant factors of risk management effectiveness in commercial banks, the following research hypothesis was tested through the research process.

**H01:** Credit risk has a positive impact on risk management effectiveness in banks.

**H02:** Liquidity risk has a negative impact on risk management effectiveness of banks.

**H03:** Profitability has a positive impact on risk management effectiveness of banks.

**H04:** Bank size has a positive impact on risk management effectiveness of banks.

**H05:** operational efficiency has a positive impact on risk management effectiveness of banks.

**H06:** Market risk has a negative impact on risk management effectiveness of banks’.

**H07:** GDP has a positive impact on risk management effectiveness of banks.

**H08:** Inflation has a negative impact on risk management effectiveness of banks.

**H09:** Interest rate has a negative impact on risk management effectiveness of private banks.

**H10**; Foreign exchange rate has a negative impact on risk management effectiveness of banks.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

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*This chapter summarizes the research process that comprises research design, population and sampling, data types and sources, collection methods, analysis process and the model to be employed in the study with a description of dependent and independent variables.*

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### **3.1. Research Design**

In a research process research design is used as strategy or roadmap to obtain answers to research questions. This paper was done in order to examine the relationship between the determinant factors and risk management effectiveness of private commercial banks in Ethiopia.

As noted by Kothari (2004), explanatory research design examines the cause and effect relationships between dependent and independent variables. Therefore, this study examines the cause and effect associations between capital adequacy ratios (dependent variable) and the bank specific (credit risk, liquidity risk, profitability, bank size, operating efficiency, market risk) and macroeconomic factors (GDP growth, inflation, lending interest rate, foreign exchange rate) and is an explanatory research. The objective to be achieved in the study is a base for determining the research approach for the study. Hence this research work is an explanatory with a quantitative approach.

### **3.2. Population, Sampling and Sample Size**

Since this study aims at examining the determinants of risk management effectiveness in banks, all commercial banks operating in Ethiopia are the total population of this study. But the focus of this study is on Private commercial banks in Ethiopia. This study chooses private commercial banks because the state banks are government affiliated banks .

As noted by Kothari (2004), good sample design must be viable in the context of time and funds available for the research process. This study uses a non-probability sampling method of which purposive sampling technique was used. This technique was used because the data to be processed in this study was ten years data (balanced panel data) that can be collected only from the top ten private banks considering their age and experience in the banking sector in Ethiopia. Out of the total population of around 30 commercial banks in Ethiopia, this study selects 8 private commercial banks namely AB, DB, BOA, WB, UB, NIB, CBO, and LIB. These banks were selected considering their experience in the market, age and availability of data for ten fiscal years. The rationale to choose this period is to collect the published data which helps to achieve the stated research questions.

### **3.3. Sources of Data and Data Collection Methods**

Since the research is quantitative in nature secondary sources of data were used in the study. Secondary data sources are less expensive in terms of time and money while collecting and affords an opportunity to collect high quality data (Saunders et al., 2007) cited in (Gadise, 2014). Secondary data were obtained from the audited annual financial statements of selected private commercial banks of Ethiopia. The data includes both bank specific and external factors. 10 years data (from 2012 to 2022 G.C) were taken to see the relationship between dependent and independent variables of the study. Bank-specific data were sourced from annual reports and statement of accounts of the selected banks.

However, data on external variable (GDP growth, interest rate, exchange rate and inflation) were sourced from annual report bulletins published by the National Bank of Ethiopia (NBE) and Ministry of Finance and Economic Development (MoFED).

### **3.4. Analysis Techniques and Tools**

Analysis of data refers to seeing the data in the light of research questions and theories so that to formulate a conclusion and a theory as possible. This idea is supported by Hanison (2007), who states that “in an embedded design for mixed study, the analysis also proceeded independently of each other”.

As noted by Kothari (2004), data has to be analyzed in line with the purpose of the research plan after raw data was edited, coded and cleaned and analyzed through quantitative analysis

with STATA 20 –software application. Thus, this study utilizes descriptive statistics and econometric analysis based on balanced panel data taken for ten consecutive years to examine the relationship between capital adequacy and its determinant factors in commercial banks. The study employs Panel model to investigate the determinant factors of risk management effectiveness of private commercial banks in Ethiopia. To check the effectiveness of the model used various diagnostic and specification tests such as normality, multicollinearity and model specification tests were made.

### **3.5. Model Specification and Definition of Variables**

#### **3.5.1. Model Specification**

This section presents a framework of analysis on the basis of the study, and involves adopting a model that would help to demonstrate the responsiveness of certain key variables that influence risk management effectiveness in Ethiopia.

This study evaluates the relationship between the dependent and independent variables through testing the hypotheses, regarding to the relationships between capital adequacy as a proxy of risk management effectiveness in banks and firm specific and macroeconomic factors affecting it of private commercial banks in Ethiopia.

Risk Management is a process by which the identification as well as assessment of loss exposures faced by an entity and the adoption of best possible techniques and strategies to deal with these risk exposures. The primary aim of risk management in banks is to avert situation of insolvency.

Hence, effectiveness of risk management in banks signals their solvency level. According to Saunders and Cornett (2006), insolvency has been characterized by prolonged liquidity issues and severe capital depletion.

A general function accommodating all the hypotheses that explains about risk management effectiveness and the variables obtained there from, the study can therefore adopt a model. The model is consistent with research hypothesis that addresses the internal and external factors for different cross sections. Panel regression model will be employed to test the relationship between capital adequacy ratio and the internal and external determinants.

To decompose the model into its actual variables to be estimated, the equation can be presented as below: -

$$CAR_{it} = \alpha_i + \beta_1 * CR_{it} + \beta_2 * LQR_{it} + \beta_3 * ROA_{it} + \beta_4 * BS_{it} + \beta_5 * OE_{it} + \beta_6 * MR_{it} + \beta_7 * GDP_{it} + \beta_8 * INF_{it} + \beta_9 * IR_{it} + \beta_{10} * FXR_{it} + \epsilon_{it}$$

Where:  $i=1, 2, \dots, N$  is the  $i$ -bank;  $t=1, 2, \dots, T$  corresponds to the year  $t$

$\alpha, \beta_1, \beta_2, \dots$  vectors and parameters and  $\epsilon_{it}$  – representing effects

$CAR_{it}$  : Capital Adequacy ratio /CAR/ of bank  $i$  at time  $t$

$CR_{it}$ : Credit Risk /CR/ of bank  $i$  at time  $t$

$LQR_{it}$ : Liquidity risk/LQR/ of bank  $i$  at time  $t$

$ROA_{it}$ : profitability (ROA) of bank  $i$  at time  $t$

$BS_{it}$ : Bank size /BS/ of bank  $i$  at time  $t$

$OE_{it}$ : Operation efficiency /OE/ of bank  $i$  at time  $t$

$MR_{it}$ : Market risk /mr/ of bank  $i$  at time  $t$

$GDP_{it}$ : Economic growth (GDP) measured as change in the real domestic product/GDP growth of Ethiopia on the year  $t$ . The proxy will be change in growth rate of real GDP.

$IR_{it}$ : interest rate /IR/ of a commercial bank  $i$  at time  $t$

$FXR_{it}$ : foreign exchange rate of a commercial bank  $i$  at time  $t$

$INF_{it}$  : Inflation measured as percentage change in consumer price index in Ethiopia on the year  $t$ . and  $\epsilon_{it}$ : Is the error term

## CHAPTER FOUR: RESULT AND DISCUSSION

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*This chapter tries to discuss the findings of the study based on the descriptive and regression analysis results. All major diagnostic tests and assumptions were considered in testing the validity of the model used in the study.*

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### 4.1. Descriptive statistics

The study was designed to identify the determinant factors of risk management efficiency in private commercial banks in Ethiopia. In this study the descriptive statistics was used to summarize and explain the dependent and independent variables included in the study using mean, standard deviation, minimum and maximum. In this study capital adequacy ratio (CAR) is taken as a dependent variable and the independent variables are categorized as bank specific determinants (credit risk (CR), liquidity risk (LQR), profitability (ROA), bank size (BS), Operation efficiency (OpE), and market risk(MR)) and macroeconomic determinants (economic growth (GDP), inflation (INF), lending interest rate (LIR) and exchange rate (FXR)). The descriptive statistics analysis was made based on balanced panel data set of 80 observations. Data were taken from selected private banks (AB, DB, BOA, WB, UB, NIB, CBO, and LIB) from 2012 to 2022 fiscal years.

**Table 4.1: Descriptive statistics of Dependent variables (obs. = 80)**

	CAR
Mean	0.114334
Std. Dev.	0.03885
Min	0.0326
Max	0.192177

Source: Researcher 2024

As it can be seen in the above table 4.1, the dependent variable capital adequacy ratio (CAR) of the selected private commercial banks is 11.43% mean with 19.22% maximum and 3.26% minimum. The mean value of 11.43% deviates by 3.88% in the banking industry which

shows some of the private commercial banks in Ethiopia have the capacity to cover losses and some others not because the minimum is 3.26% which is below the requirement set by NBE (8%).

Based on the average data private banks have meet the capital adequacy requirement set by National Bank of Ethiopia, which shows as the banks have fulfilled the minimum requirement of capital reserve (8%) set by National Bank of Ethiopia. Studies by Lelisa (2014), Beyene (2014), have got results that the average capital adequacy ratio (3.6%) of commercial banks in Ethiopia is below the minimum requirement (8%) set by National bank of Ethiopia. But the mean value in this study shows as private banks keep excess of the minimum level needed by national bank of Ethiopia which resembles to Kenyan commercial banks as studied by Kusa and Ongore (2013).

**Table 4. 2: Descriptive statistics of Bank specific variables (obs. = 80)**

Variable	Bench mark or Standard	Result of Analysis			
		Mean	Std. Dev.	Min	Max
CR	1-5%	0.038971	0.020286	0.012226	0.098273
LQR	80-90%	0.688804	0.135532	0.48847	0.9552
ROA	0.5-2%	0.026876	0.008591	-0.00175	0.040283
BS	10-500bln	0.973125	0.003784	0.876567	0.104016
OE	50-70%	0.029564	0.007831	0.017987	0.054369
MR	0.5-2%	0.282433	0.030266	0.1804	0.3276

Source: Researcher 2024

Based on the table 4.2, the average credit risk of the selected private commercial banks in Ethiopia is 3.89% with 1.22% minimum and 9.82% maximum. Regarding credit risk, the banking sector deviates by 2.02% which shows private banks have different level of credit risk which is considered as the same with the international standard (2%) described by Al-Smadi & Ahmad (2009). The result shows selected private banks have meet the international standard credit average which is considered to be good for the overall effectiveness of the banks.

The liquidity risk of selected private commercial banks in Ethiopia is 68.88% with a standard deviation of 13.55%. This indicates that the sample banks average loan to deposit ratio is 68.88% with a minimum of 48.8% and maximum of 95.5%. This shows commercial banks in

Ethiopia lend 68.88 percent of their deposit while they keep the remaining (31.12%) as reserve or caution to meet their obligations that kept excess of the statutory liquidity requirement and have less problem of liquidity. This is similar with the findings of Lelisa (2014), Beyene (2014), that Ethiopian commercial banks have no liquidity problem rather holding excess liquid asset and it is below the average 80-90% (NBE, 2023).

Profitability (ROA) was another bank specific determinant of risk management effectiveness in private banks measured as proxy of net income to total assets. In the study the mean of ROA was 2.68% with a maximum of 4% and a minimum of 0.18% loss and it is around the bench mark of Ethiopian Banks (0.5-2%). The deviation of ROA of selected private banks is 0.86% which shows the banks have a very small level of variation in their profitability. The mean value 2.68% of the selected banks indicated that, Ethiopian private commercial banks that were considered in this study earned an average of 2.68 cents of net income for a single birr invested in their assets. In this case the most profitable bank among the sampled banks earned 4 cents of net income for a single birr invested in the assets of the bank and the least profitable bank of the sampled banks incurred a loss of 0.18 cents of net income for each birr invested in the assets of the bank. The overall result shows the average ROA of commercial banks in Ethiopia is above average (2.35%) where in Kenya it is 1.96% (Beyene, 2014).

Bank size was the other explanatory variable considered as determinant of Risk management effectiveness of private banks in Ethiopia and is measured as natural logarithm of total assets. The selected private commercial banks have an average asset size of 97.3% with a deviation of 0.37% and with a minimum of 87.6% and a maximum of 104%. The result of banks size explanatory variable shows the banks are in a good position of asset size with a minimum of above 215 million and maximum of above 26 billion and an average of 6.8 billion as of in the original data observations. According to Tilahun and Dugasa (2014), banks with large size have better risk management strategies that usually translate into more superior loan portfolios vis-à-vis their smaller counterparts.

Operating efficiency which was measured by operating income to operating expense has an average of 2.95% with a minimum of 1.79% and maximum of 5.43%. This shows the banking sector has an average of 2.95% efficiency in its banking operations with a deviation of 0.78%. The deviation among the selected banks shows that private commercial banks have very narrow difference in their banking process and operations. The variation in the operation

efficiency of commercial banks arises from management ability and efficiency of controlling expenses and converting resources in to income generating resources (Beyene, 2014).

The other explanatory variable was market risk which is measured as the natural logarithm of risk weighted assets that has an average of 28.24% with a deviation of 3.02% and a minimum of 18.04% and a maximum of 32.76%. Market risk is about the level of risk weighted assets that the commercial banks must have in relation to the capital adequacy level expected by national bank. The average market risk 28.24% shows that the market risk factors liquidity, interest rates and foreign exchange rates will decrease and deviate by 3.02% in the banking sector. The market risk levels of the selected banks have a minimum of 18.04% that can be decreased by the market risk factors and a maximum of 32.76%.

**Table 4.3: Descriptive statistics of Macroeconomic variables (obs. = 80)**

Variable	Mean	Std. Dev.	Min	Max
GDP	0.1054	0.0089433	0.077	0.116
INF	0.13015	0.105008	0.025	0.364
LIR	0.116395	0.006079	0.105	0.1225
FXR	0.1926	0.043091	0.118	0.274

Source: Researcher 2024

Table 4.3 above summarizes the macroeconomic determinants of risk management effectiveness of private commercial banks in Ethiopia. As it is in the table 4.3 above GDP growth rate has registered on average 10.5% in the study period with 7.7% minimum and 11.6% maximum and the mean of GDP has deviated on average by 8.9% and the higher variability in the study period. This shows a broad base continuous growth was registered in all sectors in the study period. This may create an opportunity to commercial banks in Ethiopia to convert their deposit in to high return loans through financing different investments and manage various risks that the banks may face.

Inflation is the other macroeconomic variable with an average variability of 10.5% among the selected private banks in Ethiopia. The overall mean, minimum, and maximum inflation rate of the selected private commercial banks in the study period were 13.01%, 0.25% and 36.4% respectively. The average inflation rate shows that selected banks are affected by a lower 0.25% and very higher rate above 36% that affects banks equity and banks recovery of loans, (Fofack, 2005).

In determining risk management effectiveness of private commercial banks in Ethiopia, lending interest rate was used and has an average of 11.63% with 10.5% minimum and 12.25%. The variation among the selected private banks was 0.6% which is considered as very small variation and refers as all private banks have already the same lending interest with a minimum of 10.5% and 12.25%.

Foreign exchange rate is the other macroeconomic explanatory variable, as can be seen in table 4.3 above 19.26, 4.3, 11.8, and 27.4 Birr per US Dollar was an overall mean, standard deviation, minimum and maximum of the exchange rate in the study period respectively. This shows a continuous depreciation of Ethiopian Birr against US dollar in the past decade where it affects the risk management effectiveness of commercial banks.

## **4.2. Econometric Analysis**

This study concentrates on how risk management effectiveness of private commercial banks is determined by different bank specific and macroeconomic factors. To do this the researcher used the econometric model of panel data regression analysis and the model contains one dependent variable, and ten independent variables, the constant term and the error term. The dependent variable is total capital adequacy ratio and the explanatory variables are bank specific factors (credit risk, liquidity risk, profitability, bank size, operation efficiency and market risk) and macroeconomic factors (economic growth (GDP), inflation, lending interest rate and foreign exchange rate).

In order to ensure the collected data suit for the linear regression model assumptions and carry out reliable estimations econometric model assumptions such as normality, multicollinearity, heteroskedasticity and model specification tests have been conducted before running the regressions.

### **4.2.1. Normality Test**

In this study raw data were analyzed using descriptive statistics and normality test is made to ensure normal distribution of error terms. As noted by (Gujarati, 2004), OLS estimators are BLUE regardless of whether the error terms are normally distributed or not. If the

disturbances are independently and identically distributed with zero mean and constant variance and if the explanatory variables are constant in repeated samples, the OLS coefficient estimators are asymptotically normally distributed with means equal to the corresponding. This can also be done either by graphical like histogram and dot plot or non-graphical like skewness or Kurtosis tests for normality. In this study normality test was conducted to ensure normal distribution of the error terms using Shapiro-Wilk W test.

Table 4.4: Shapiro-Wilk W test for Normal data (obs. =80)

Variable	W	V	Z	Prob>z
E	0.97275	1.87	1.372	0.08509

Source: Researcher 2024

Shapiro-Wilk W test is a statistical hypothesis test mechanism that assess how well a sample of data fits a normal distribution.

Table 4. 5: Skewness/Kurtosis tests for Normality

Variable	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
E	0.8254	0.1345	2.36	0.3065

Source: Researcher 2024

The decision rule for Skewness/Kurtosis tests for normality states that if the p-value of the error term is greater at the chosen level of significances, that is, 5%, it indicated that the error terms are normally distributed. In this study to test whether the data is normally distributed or not a non-graphical test the Shapiro-Wilk test and Skewness and Kurtosis test for normality were used. Accordingly, if the p value is greater than 5 percent, then the residuals are normally distributed and hence the model is normal, however if the p value is less than five percent it is not normally distributed. Therefore based on table 4.5 the Skewness and Kurtosis of the p value is greater than 5% level of significance and thus indicates that the residuals are normally distributed. The Shapiro-Wilk test in the table 4.4 also assures that similar results has been found where the result of normality test for each of the model was found insignificant at 5% confidence level. Hence the error terms are normally distributed.

#### 4.2.2. Multicollinearity test

An important assumption for the multiple regression models is that independent variables are not perfectly multicollinear. One regressor should not be a linear function of another. When multicollinearity is present standard errors may be inflated. Stata will drop one of the variables to avoid a division by zero in the OLS procedure (Stock and Watson, 2003).

In this study multicollinearity is the existence of strong linear relationship among explanatory variables which are bank specific determinants (credit risk, liquidity risk, profitability, bank size, operation efficiency, market risk) and Macroeconomic determinants (GDP growth, inflation, lending interest rate and foreign exchange rate). Variance Inflation Factor (VIF) and correlation coefficient were used to check the existence of collinearity problem among the explanatory variables.

Table 4.6: VIF test

Variable	VIF	1/VIF
BS	9.54	0.104821
MR	6.76	0.147928
FXR	3.52	0.283798
LIR	3.28	0.304462
LQR	3.15	0.317815
CR	2.1	0.475591
ROA	1.68	0.595345
OE	1.66	0.600714
INF	1.39	0.720522
GDP	1.3	0.770044
Mean VIF	3.44	

Source: Researcher 2024

In Econometric analysis a value of 10 for VIF and 0.8 for correlation coefficient indicate the existence of multicollinearity problems and it needs correction (Gujarati, 2004). The result above, table 4.6, shows that the model has not multicollinearity problem.

#### 4.2.3. Autocorrelation Test

The term auto correlation may be referring to the correlation between members of series of observation ordered in time series data or cross-sectional data. In time series data the successive residuals tend to be highly correlated so if the violation of the basic assumption that the residuals are mutually independent residuals in serial autocorrelation. The Durbin-Watson method is used to test for autocorrelation. A Durbin Watson statistics around two is generally accepted through there are zones of indifference and zones of both positive and negative correlation. . Numbers are Pearson correlation coefficients; go from -1 to 1. Closer

to 1 means strong correlation. A negative value indicates an inverse relationship (roughly, when one goes up the other goes down).

**Table 4.7: Correlation of independent variables**

	CR	LQR	ROA	BS	OE	MR	GDP	INF	LIR	FXR
CR	1									
LQR	0.2084	1								
ROA	-0.3932	-0.1694	1							
BS	-0.4894	-0.7207	0.3629	1						
OE	0.2105	0.2196	-0.4599	-0.2572	1					
MR	-0.382	-0.6521	0.3544	0.9463	-0.2803	1				
GDP	-0.0621	-0.0792	-0.0524	0.1976	0.1362	0.2505	1			
INF	0.2901	0.0817	-0.2174	-0.1618	0.0922	-0.199	-0.2658	1		
LIR	0.034	-0.6636	0.1781	0.5075	-0.082	0.4295	0.1167	0.1517	1	
FXR	-0.2394	-0.5906	0.1205	0.6996	0.1187	0.6243	0.1688	-0.086	0.66	1

Source: Researcher 2024

As in the above tables 4.6, 4.7, the VIF and correlation coefficients are below 10 and 0.8 respectively. This shows that there is no existence of series multicollinearity and correlation problems among the explanatory variables. Correlation is used for two different variables and autocorrelation is used for two different values of the same variable at different time periods.

#### 4.2.4. Heteroscedasticity

According to (Gujarati, 2004) this is the problem of non-constant variance of error terms that makes estimator inefficient and the test of hypothesis are no longer valid. To solve such a problem of heteroskedasticity, the study continues through robust estimations. In addition, to check weather problem exists or not and if it exists to take remedial action, heteroscedasticity test was conducted. Breusch-Pagan test was used to test the homogeneity of variance of error terms of the null hypothesis. Theoretically statistically significant p-value tells presence of

hetroscedasticity problem. All of the Breusch-Pagan test results were statistically insignificant at 5% confidence level. Hence, there is no hetroscedasticity problem in the regression.

#### 4.2.5. Test of Model Specification

Balanced panel data were collected about the dependant and independent variables. The data is balanced because all banks have the same data for the study period. In this study to run the regression model Capital adequacy ratio was taken as a dependant variable and other ten bank specific and macroeconomic independent variables were used to estimate the risk management effectiveness of private commercial banks in Ethiopia. To determine the relationship between the determinants of risk management effectiveness of private commercial banks panel model was applied. The table below shows the huasman test to select random effect or fixed effect model.

Table 4.8: Huasman Test

	---- Coefficients ----			sqrt(diag(V_b-V_B))
	b(fe)	B(re)	(b-B) Difference	S.E
CR	-0.3025564	-0.3430165	0.0404601	0.0301227
LQR	-0.0021515	-0.0064659	0.0043144	0.0043774
ROA	0.6277634	0.6487794	-0.021016	0.0711183
BS	0.0937191	0.0734146	0.0203045	0.0117931
OE	0.0646255	0.1255351	-0.0609096	0.0754405
MR	0.3207678	0.3246088	-0.003841	0.0258629
GDP	0.0032599	0.001935	0.0013249	0.0010573
INF	0.0018806	0.0153965	-0.0135159	0.0080658
LIR	0.6120327	0.4572918	0.154741	0.1040699
FXR	0.4703206	0.3476891	0.1226315	0.0701678

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(10) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 3.25 \end{aligned}$$

$$\text{Prob}>\text{chi2} = 0.9748$$

Source: Researcher 2024

There are two acceptable panel models, fixed effects and random effects. The random effects assumption (made in a random effect model) is that the individual specific effects are uncorrelated with the independent variables. The fixed effect assumption is that the individual specific effects are correlated with the independent variables. The selection of fixed effects or random effects model is based on hausman test (Gujarati, 2004). The random effect model is favorable if the P-value is insignificant and the fixed effect model is used when the p value is found statistically significant. As in table 4.8 above the huasman test

result shows that the P value is statistically insignificant that the model should be estimated using random effect. In this study then random effect model was used to estimate the determinants of risk management effectiveness of private commercial banks in Ethiopia.

In this study where random effects model is used to estimate the variables, serial correlation, time effect and individual bank effect were tested and their result has confirmed statistically insignificant at 5% confidence level.

### 4.3. Regression results and discussion

The panel model in this study was composed of one dependent variable, capital Adequacy Ratio (CAR), and ten independent variables categorized as bank specific (CR, LQR, ROA, BS, OE, MR) and macroeconomic variables (GDP, INF, LIR, FXR). Besides to the included explanatory variables the error term represents to other variables that may affect the risk management effectiveness of private commercial banks in Ethiopia.

The model used in the estimation of the explanatory variables is presented below taking capital adequacy as dependent variable and bank specific and macroeconomic explanatory variables and considering error term for other not included variables.

$$CAR_{it} = \alpha_i + \beta_1 * CR_{it} + \beta_2 * LQR_{it} + \beta_3 * ROA_{it} + \beta_4 * BS_{it} + \beta_5 * OE_{it} + \beta_6 * MR_{it} + \beta_7 * GDP_{it} + \beta_8 * INF_{it} + \beta_9 * IR_{it} + \beta_{10} * FXR_{it} + \epsilon_{it}$$

Where: I=1, 2... N is the i-bank; t=1, 2..T corresponds to the year t

$\alpha, \beta_1, \beta_2, \dots$  vectors and parameters and  $\epsilon_{it}$  – representing effects

The summary of regression results has been presented in table 4.9 below that the overall variation of dependent variable, 30.34%, were explained by the explanatory variables. This refers to capital adequacy ratio is explained by the identified explanatory variables, 30.34% where the adjusted R square result shows as there are other variables that should be included in further study. The result also shows the dependent variable is explained by the explanatory variables included within and between the model for 33.57% and 7.89% respectively. In the other case the random effect model is considered to be relevant because the p value is less

than 0.05 and 9.01% of the variation is due to the difference across the panels or intra class correlation.

Table 4.9: Regression results

Random-effects GLS regression

	Coef.	Std. Err.	Z	P> z	[95% Conf.	Interval]
CR	-0.34302	0.150258	-2.28	0.022	-0.63752	-0.04852
LQR	-0.00647	0.026452	-0.24	0.807	-0.05831	0.04538
ROA	0.648779	0.394289	1.65	0.1	-0.12401	1.421572
BS	0.07341	0.031755	2.31	0.021	0.13565	0.01118
OE	0.125535	0.41121	0.31	0.76	-0.68042	0.931492
MR	0.324609	0.217143	1.49	0.135	-0.10098	0.750202
GDP	0.001935	0.006615	0.29	0.77	-0.01103	0.0149
INF	0.015397	0.028804	0.53	0.593	-0.04106	0.07185
LIR	0.457292	0.546726	0.84	0.403	-0.61427	1.528855
FXR	0.347689	0.158444	2.19	0.028	0.037144	0.658234
Constant	0.611171	0.247266	2.47	0.013	0.126538	1.095804
Obs.	80					
No .bank	8					
corr(u_i, X) = 0 (assumed)				Prob > chi2	= 0.0006	
Ad.R.Square	Within	0.3358		Waldchi2=31.02		
	Between	0.0789				
	Overall	0.3034				
Sigma u	.04543477					
Sigma e	.01503832					
Rho	.90126426					

Source: Researcher 2024

Based on the regression results the basic objectives of the study can be interpreted as below. The first objective of the study was to investigate the effect of bank specific (credit risk, liquidity risk, profitability, bank size, operating efficiency and market risk) determinants of risk management effectiveness in private commercial banks of Ethiopia.

As it can be seen in table 4.9 above, credit risk (CR) is a bank specific variable which was measured by the ratio of total loans to total assets and had -0.34302 coefficient of parameter with Capital adequacy ratio (CAR). It has statistically significant and negative effect with risk management effectiveness of private commercial banks as measured by CAR in the study period. This result is consistent with Piyananda, etal (2015) that found as credit risk is statistically and negatively affects capital adequacy ratio of banks in Sri Lanka. It is also consistent with Al-Tamimi and Obeidat (2013) that conclude as there exists statistically significant relationship between credit risk and capital adequacy ratio of banks. Hence, this study reveals that credit risk has a negative and statistically significant effect on risk management effectiveness (Capital Adequacy) of private commercial banks in Ethiopia. This shows banks with high credit risk exposure are likely to be negatively affected in their solvency level or capital adequacy ratio. Thus, the null hypothesis should be rejected that states as credit risk has a significant positive impact on risk management effectiveness in banks.

Liquidity risk is also the other bank specific explanatory variable measured by the ratio of loans to deposits that had -0.00647 coefficient of parameters with CAR. The value shows as it has statistically insignificant and negative relationship between private commercial banks capital adequacy ratio and liquidity risk. The result is supported by Piyananda, etal (2015) and is against to the works of Tilahun & Dugasa (2014) in their study of bank specific determinants of credit risk where liquidity risk is statistically and positively correlated with credit risk of commercial banks in Ethiopia. Thus, the null hypothesis that states as Liquidity risk has a significant negative impact on risk management effectiveness in banks should be rejected.

Profitability of private banks measured by ROA was the other bank specific explanatory variable used in this model and had a value of 0.648779 coefficients of parameters with CAR. ROA has found to statistically significant and positively related to CAR of private commercial banks in Ethiopia in the study periods at 10% significant level. This result is consistent with the findings of Piyananda, etal (2015) who found as ROA is significantly and positively affects CAR of banks. In relation to credit risk determinants ROA has insignificant and negative effects (Tilahun & Dugasa, 2014). Therefore, in this study ROA is found to have statistically significant effect on risk management effectiveness of private commercial banks in Ethiopia. This shows when banks are profitable they are less likely to be affected by

hazards and can easily control risk related losses. The null hypothesis which states as profitability has a significant positive impact on risk management effectiveness in banks should be accepted.

Bank size which was measured as the natural logarithm of total assets was the other internal determinant of risk management effectiveness of private commercial banks. This had 0.07341 coefficients of parameters with CAR of selected banks in the study period. The result shows as the size of banks has a positive and statistically significant effect on risk management effectiveness of private commercial banks in Ethiopia. This result is consistent with the study by Piyananda, et al (2015), who found as bank size has a statistically significant and positive effect on CAR in Sri Lanka banks. It is also similar to the result of Tilahun & Dugasa (2014) that bank size has a statistically significant negative effect on credit risk in Ethiopian Commercial Banks. Hence, in this study bank size has statistically significant and positive effect on risk management effectiveness of private commercial banks in Ethiopia. The null hypothesis which states as Bank size has a significant positive impact on risk management effectiveness in banks should be accepted in that it has positive effect on risk management effectiveness in banks.

Operating efficiency measured by the ratio of operating income to operating expense was also the other bank specific explanatory variable regressed against CAR of private commercial banks in Ethiopia. Operating efficiency has 0.125535 coefficient of parameters with CAR in the study period and it shows as it has positive and statistically insignificant effect on risk management effectiveness of private commercial banks in Ethiopia. If this ratio is increase, it indicates that management has better positioned for profit and impact of this for capital is positive. Thus, the null hypothesis which states as operational efficiency has a significant positive impact on risk management effectiveness in banks should be rejected because the impact is found to be insignificant.

Market risk is the last bank specific determinant of risk management effectiveness included in this panel model which is measured by the natural logarithm of risk weighted assets. In general market risk is identified based on three perspectives such as correlated part of the interest rate, correlated part of the securities and the related part of the foreign exchange profits. In this study market risk had 0.324609 coefficients of parameters with CAR of private commercial banks in Ethiopia. This result reveals as market risk has statistically insignificant

and positive impact on CAR of commercial banks in the study period. The result is consistent the study of Piyananda, etal (2015), who found as market risk has a statistically insignificant and positive effect on CAR in Sri Lanka banks. The empirical results show a positive relationship between market risk and capital position of banks. The  $z$  statistic of this parameter is statistically insignificant. The null hypothesis which states as market risk has a significant negative impact on risk management effectiveness in banks should be rejected.

The second specific objective of this study was to identify the relationship between macroeconomic determinants and risk management effectiveness of private commercial banks in Ethiopia. GDP growth is one of the external determinants of risk management effectiveness of private commercial banks in Ethiopia. It had 0.001935 coefficients of parameters with CAR of private commercial banks in Ethiopia. The result shows as GDP growth has a positive and statistically insignificant association with CAR of banks in the study period. The result in this study is supported by Emawayih (2017) who found as GDP has a positive impact on liquidity risk of private commercial banks. The null hypothesis is rejected in that GDP was found as it has a insignificant positive impact on risk management effectiveness in private commercial banks in Ethiopia.

Inflation is another macroeconomic explanatory variable. It was found with coefficient of parameters of 0.015397 with CAR of private commercial banks in the study period. It has statistically insignificant positive effect on risk management effectiveness of private commercial banks in Ethiopia. The result is consistent with Emawayih (2017) in his study about the determinants of financial risks in private commercial banks in Ethiopia that found as inflation is positively associates with credit risk of banks. Thus, the null hypothesis which states as Inflation has a significant negative impact on risk management effectiveness in banks should be rejected.

Lending interest rate was the other explanatory variable that has 0.457292 coefficients of parameters with CAR of private commercial banks in Ethiopia. Lending interest rate was found to be statistically insignificant and positively associated with risk management effectiveness of private commercial banks in Ethiopia in the test period. The results of this study was against the finding of Emawayih (2017), that lending interest rate is significant determinants of liquidity risk with 1% level of significant at very high negative coefficient of -6.862108. The null hypothesis which states as interest rate has a significant negative impact

on risk management effectiveness in banks should also be rejected because the finding shows as it has positive and insignificant impact on risk effectiveness of banks.

Foreign exchange rate was the other macroeconomic variable that has 0.347689 coefficients of parameters with capital adequacy ratio of private commercial banks in Ethiopia in the test periods. The result reveals that exchange rate has a positive but significant effect on risk management effectiveness of private commercial banks in Ethiopia with 5% confidence level. The null hypothesis states that Foreign exchange rate has significant negative impact on risk management effectiveness in banks which should be rejected as the result shows exchange rate has statistically significant and positive impact on risk management effectiveness of private commercial banks in Ethiopia.

## **CHAPTER FIVE: CONCLUSION AND RECOMMENDATION**

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*This chapter summarizes all of the findings of the study. It comprises summary of conclusion of the findings of the study and the ideas forwarded for further studies in the recommendation part.*

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### **5.1. Conclusion**

The study was designed to examine the cause and effects relations between determinant factors and risk management effectiveness of private commercial banks where capital adequacy was taken as dependent variable to be estimated by various bank specific and macroeconomic determinants.

The descriptive analysis result of capital adequacy ratio shows that private commercial banks have meet the minimum requirement set by National bank of Ethiopia. The overall average of bank specific determinants shows that private banks have average credit risk, no liquidity problem, above average profitability, healthy bank size and acceptable market risks in the study period.

The macroeconomic determinants average shows that inflation, GDP growth has a growing trend in the study period where as exchange rate shows a very high rate change where the birr

value declines. The lending interest rate remains almost the same with a very narrow deviation during the study period.

The regression result shows that credit risk has negative effect and bank size have statistically significant and positive effect on risk management effectiveness of private banks in Ethiopia. The other factor profitability has positive and significant effect on risk management effectiveness of the banks. In this regard operation efficiency and market risk have found to be positively related and liquidity risk was found as negatively related with risk management effectiveness in banks insignificantly.

The estimation value of macroeconomic determinants to risk effectiveness of banks shows that exchange rate has a positive and significant effect on risk management effectiveness in private commercial banks in Ethiopia. The other factors GDP growth, inflation and lending interest rate have insignificant and positive effect on risk management effectiveness of private commercial banks in Ethiopia.

## **5.2. Recommendations**

Based on the findings in the preceding study the following recommendations were forwarded.

Private commercial banks should evaluate the overall risk identification, assessment and control activities of their specific area banks in relation to credit risk, asset size, profitability and exchange rate related factors that may affect risk effectiveness of the banks.

The bank specific determinants credit risk have confirmed that risk management effectiveness of private commercial banks is significantly and negatively affected by the factors. This shows private banks are not good in credit risk management and have more loan related problems. So the banks management and other concerned bodies should develop specific credit risk management procedures to specific area banks with their specific features and should develop a sound credit management technique that makes the banks to be free of default loans, excess liquid assets and get efficient and profitable in asset management.

Profitability has a significant positive effect on capital adequacy ratio of private banks which shows private commercial banks should increase mechanisms of their operation efficiency and control all risk exposures to their bank.

Market risk and operation efficiency are the other factors that were found as they affect risk management effectiveness of private banks positively. So private commercial banks should develop a risk based approach in all bank processes to be more effective and efficient.

The macroeconomic determinants confirmed that they have a positive effect on risk management effectiveness of private commercial banks in Ethiopia. This shows private commercial banks should consider and develop risk management procedures that can consider the effect of macroeconomic factors on risk management effectiveness of commercial banks together with National Bank of Ethiopia (NBE).

### **5.3. Recommendations for Further Research**

The study was focused on risk management effectiveness in private commercial banks in Ethiopia. The variables used in the econometrics model did not include all factors that can affect Risk Management effectiveness of Ethiopian commercial banks. Thus, future research could incorporate other variables such as age of banks, unemployment rate, reputational risk, management efficiency, employee efficiency, regulatory risk, IT risk etc by including public bank risk management effectiveness determinants at local and regional levels.

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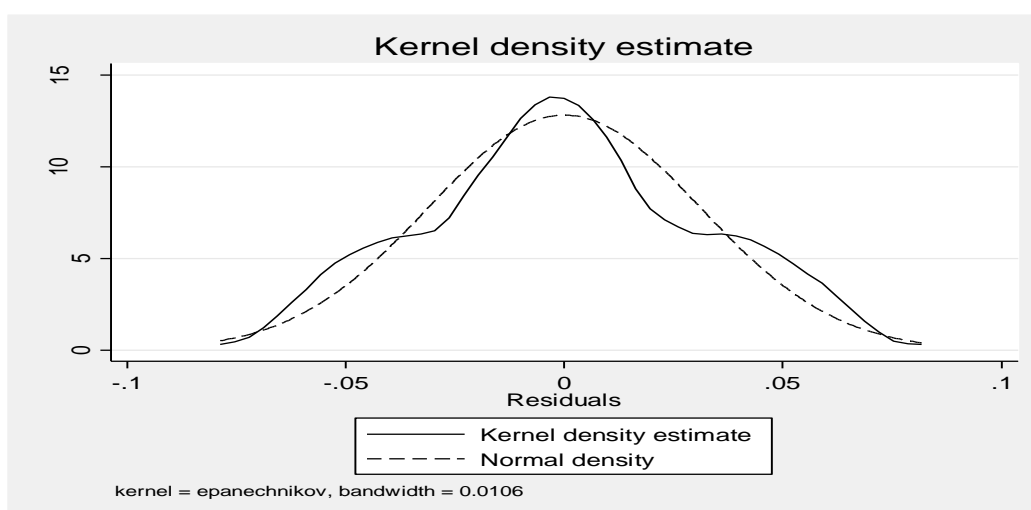
## APPENDIXES

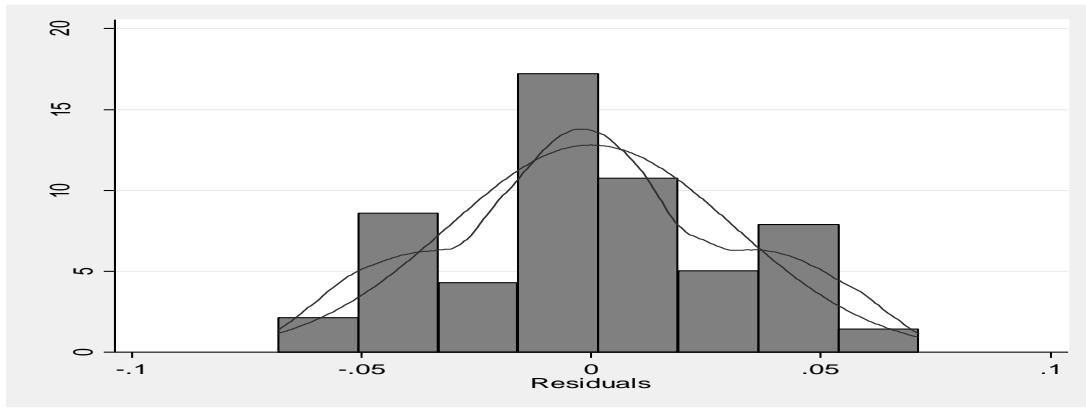
### Appendix A- Descriptive statistics

```
. summarize
```

Variable	Obs	Mean	Std. Dev.	Min	Max
bank	80	4.5	2.305744	1	8
year	80	2012.5	2.890403	2008	2017
car	80	.1143335	.0388495	.0326	.192177
cr	80	.0389705	.0202857	.012226	.098273
lqr	80	.6888037	.1355321	.4884696	1.0553
roa	80	.0268756	.0085897	-.00175	.040283
bs	80	.0973125	.0037849	.0876567	.104016
oe	80	.0295637	.0078305	.0179874	.0543693
mr	80	.282433	.0302655	.1804	.3276
gdp	80	.1949	.3004525	.077	1.09
inf	80	.13015	.0836684	.0663	.3323
lir	80	.116395	.0060785	.105	.1225
exp	80	.1926	.0430912	.118	.274
e	80	3.71e-11	.031141	-.0681771	.0712943

### Appendix B- Normality Tests





## Skewness/Kurtosis tests for Normality

```
. sktest e
```

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
e	80	0.7780	0.2472	1.46	0.4819

```
. swilk e
```

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
e	80	0.97766	1.534	0.937	0.17434

## Appendix C- Breusch- Pagan test for Heteroskedasticity test

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of car

chi2(1) = 4.83

Prob > chi2 = 0.0280

## Appendix D- Hausman Test FE, RE



```
. xtreg car cr lqr roa bs oe mr gdp inf lir exr, re
```

```
Random-effects GLS regression
Group variable: bank
```

```
Number of obs   =      80
Number of groups =       8
```

```
R-sq:
```

```
within = 0.3356
between = 0.0788
overall = 0.3034
```

```
Obs per group:
min = 10
avg = 10.0
max = 10
```

```
corr(u_i, X) = 0 (assumed)
```

```
Wald chi2(10) = 31.02
Prob > chi2 = 0.0006
```

car	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
cr	-.3490165	.1502583	-2.28	0.022	-.6375173 -.0485157
lqr	-.0064659	.0264522	-0.24	0.807	-.0583112 .0453795
roa	.6487797	.3942894	1.65	0.100	-.1240134 1.421573
bs	-.007341	0.031755	-2.31	0.021	-.013565 -1.117594
oe	.1255358	.41121	0.31	0.760	-.6804209 .9314925
mr	-.3246082	.2171434	1.49	0.135	-.1009849 .7502014
gdp	.001935	.0066146	0.29	0.770	-.0110294 .0148995
inf	.0153965	.0288035	0.53	0.593	-.0410573 .0718503
lir	.457291	.5467261	0.84	0.403	-.6142725 1.528854
exr	.3476875	.1584442	2.19	0.028	.0371427 .6582324
_cons	.6111686	.2472661	2.47	0.013	.1265359 1.095801
sigma_u	.04543477				
sigma_e	.01503832				
rho	.90126426	(fraction of variance due to u_i)			