FIRM CHARACTERISTICS AND FINANCIAL INTERMEDIATION EFFICIENCY OF COMMERCIAL BANKS LISTED AT THE NAIROBI STOCK EXCHANGE IN KENYA

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DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contain no material written or published by other people except where due reference is made and author duly acknowledged.

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ABSTRACT

Commercial banks play an integral role in the financial intermediation. Financial intermediation is defined as the process through which commercial banks connect savers and borrowers. The efficiency and stability of commercial banks are regarded integral in the stability and eventual growth of the economy. Firm characteristics of commercial banks refer to those attributes that are largely determined by the management and the other organizational stakeholders including the employees. These variables are integral in the determination of the financial stability of commercial banks. However, there are various instances that have depicted the Kenyan banking sector sometimes unstable as well as inefficient especially following recent collapse of the Imperial bank and Chase bank. This study focused on the firm characteristics and their influence on the financial intermediation efficiency of commercial banks listed at the Nairobi stock exchange. A descriptive research design was adopted. Data was collected from consolidated reports for years 2017 to 2021. Data analysis was done through descriptive statistics and inferential statistical analysis including correlation and regression analysis. STATA and E-Views were used to incorporate the data forming the pooled model. Output from the data analysis were presented through tables, figures, and graphs. There was positive and not significant effect of capital adequacy on financial intermediation efficiency of listed commercial banks in Kenya. Further, operating efficiency and asset quality has inverse and not significant effect on financial intermediation of listed commercial banks. Moreover, there was an inverse and significant effect of liquidity on financial intermediation efficiency of listed commercial banks in Kenya. Based on the findings it can be concluded that increase in capital adequacy increases financial intermediation efficiency of listed commercial banks in Kenya. An inverse contribution of asset quality on financial intermediation efficiency we can conclude that an increased level of non-performing loans decreases financial intermediation efficiency. Further, there is a negative co-movement between liquidity and financial intermediation of listed commercial banks in Kenya. Moreover, an increase in outcomes with increase in level of financial intermediation efficiency of respective listed commercial banks in Kenya. From the findings it was recommended that the management approach ought to have vale chain design by incorporating the value benefit from respective firm characteristics. Financial services provision should be anchored on measures aim at precipitating demand for financial services in the target market niche. Moreover, commercial banks should stimulate demand for deposit and credit through linking deficit and surplus saving customers. Furthermore, banks should adopt data mining approaches so as to eradicate spillage of resources and optimize intermediation efficiency.

Key words: Capital Adequacy, Asset quality, Operating Efficiency, Liquidity, Firm Characteristics, Financial Intermediation Efficiency.

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Any errors in this research project are the sole responsibility of the author and not for any individuals mentioned in this acknowledgement.

DEDICATION

This dissertation is dedicated to my dad Samuel Njuguna, my loving husband Gabriel and my children Linet, Crispus, and Maryann. You are a great source of inspiration.

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ACRONYMS AND ABBREVIATIONS

ABSA	Absa Bank Kenya Ltd
BKG	BK Group Plc
CAR	Capital Adequacy Ratio
CBK	Central Bank of Kenya
CFC	CFC Stanbic Holdings
COOP	Cooperative Bank of Kenya
DEA	Data Envelopment Analysis
DMU	Decision making unit
DTK	Diamond Trust Bank Group
DTS	Deposit Taking SACCOs
EQTY	Equity Group Holdings Limited
FSD	Financial Sector deepening
GDP	Gross Domestic Product
HFCK	Housing Finance Company of Kenya
I&M	I&M Holdings Limited
KCB	Kenya Commercial Bank Group
NCBA	NCBA Group Plc
NSE	Nairobi Securities Exchange
SACCO	Savings and Credit co-operative
SCBK	Standard Chartered Bank of Kenya

OPERATIONAL DEFINITION OF KEY TERMS

Asset Quality	Refers to the ability of the resources held by banks to create income; thus, relates to ability of banks borrowers to meet their obligations on repayment of borrowed funds. Asset quality will be measured as a ratio of non-performing loans to total loans (Alhassan, Kyereboah-coleman, & Andoh, 2014).
Bank Liquidity	Refers to the capacity of a commercial bank to service its commitments when they fall due. Bank liquidity will be measured as a ratio of current assets to current liabilities (Akhtar, Ali, & Sadaqat, 2011).
Capital Adequacy	Refers to the statutory requirements for a commercial bank to hold a specified amount of core capital to total assets to protect the financial institutions against possible capital challenges. It will be measured as a ratio of core capital to total assets (Fatima, 2014).
Data Envelopment Analysis (DEA)	This is a multifactor productivity analysis model used in the measurement of relative efficiencies for decision making units regarded homogeneous (Coelli, 1996).
Firm Characteristics	These refers to the attributes which are often under the control of the firm's management. In this study the characteristics of interest will be capital adequacy, liquidity, asset quality, and operational efficiency (Arora, 2009).
Financial Intermediation Efficiency	Refers to the process of financial institutions mobilizing funds from savers

	and depositors who are also regarded as the capital surplus units and making the same funds available to borrowers at the lowest cost possible (Sufian, 2009).
Operational Efficiency	It refers to the ability of a financial institution to turn the resources at its disposal into revenue. This variable will be measured as a ratio of cost of operations to total operating income (Zhu & Zhang, 2018).

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Financial intermediation is described as the process through which financial institutions undertake to incur liabilities on their own account with the aim of acquiring financial assets. The process requires the financial institutions to engage in financial transactions in the market involving lenders and borrowers, while acting as an intermediary (Garr, 2021). Over the years, banks have aimed at growing their market shares, asset bases, efficiency, and profits with the aim of outperforming their competitors (Kiemo & Kamau, 2020). The only sure way of attaining such objectives has been through embracing various reforms that lead to change in the structure of the banks, acquisitions and mergers, exit and entry of banks, adoption of technology, new models of business, as well as the conversion of non-bank institutions to banks.

The Kenyan banking sector has largely been controlled by few large banks with smaller players for many years (Long & Ombongi, 2018). Nevertheless, the recent past has been characterized by an upsurge in exits of some banks and mergers as well as acquisitions of some others. The outcome has been an increasing level of scrutiny on the competitiveness of these banks as well as overall efficiency levels of the banking industry in general. Both internal and external factors have a greater influence on the efficiency of the commercial bank's intermediation and ultimate stability. Shocks emanating from either the economic policies, external environment or the macroeconomic conditions have a major influence on the efficiency of commercial banks.

Indeed, weak financial systems are susceptible to externalities which can lead to the collapse of the entire system (Wafula, 2020). It is therefore important to have strong financial institutions in an economy to ensure sustainable financial intermediation. Stability and efficiency of the financial system are critical components in the attainment of economic growth of any country. Indeed, Kenya's vision 2030 envisages a scenario whereby the financial sector can be able to improve the stability of the economy, bring about efficiency in the delivery of financial services such as credit, and ensure improved access to the requisite financial products and services to many Kenyan households.

1.1.1 Firm Characteristics

Firm characteristics refer to the internal variables attributable to the efficiency of commercial banks. In literature, firm characteristics do not just refer to banks but encompass a wide array of organizations. According to Okpanachi, Doha and Mohammed (2018), firm attributes are variables that are mostly controlled by the management. Firm attributes are described as those parts of the organization that are influenced by the firm-level administration (Kariuki, 2016). The demographic as well as managerial variables mainly comprising the internal environment of the firm describe the firm characteristics of any firm (Wafula, 2020).

A firm portrays such characteristics as liquidity, diversification levels, capital, and leverage, composition of the board, institutional shareholding, assets, and growth as well as economic environmental factors. These firm characteristics play an integral role in the monetary performance of the firm and thus determine whether the firm is a going concern (Wafula, 2020). Indeed, commercial bank characteristics such as funding costs, operational

efficiency, liquidity, and diversification greatly influence the soundness and hence the intermediation efficiency (Gulzara, Hongxing, & Muhammad, 2018).

Efficiency of commercial banks can be viewed in terms of the ability of both managers and staff to maintain the rate of increase of income and revenues at levels above the rate of increase of the operational costs. The individual elements of a financial system such as the banking sector determine its stability. The modern competitive environment has made the banking sector a critical component of any financial system due to the numerous services and products it provides. Commercial banks need to build a competitive advantage to remain resilient through the various challenges.

Financial intermediaries play an integral role in channeling funds from lenders to borrowers through the intermediation process. Commercial banks are especially crucial for the efficient functioning of the financial sector and the economy as a whole. Through commercial banks, savers are able to deposits their surplus monies at a pre-determined interest rates and also withdraw the same funds when need arises (Garr, 2021). On the other hand, borrowers obtain loans from the commercial banks which they repay with interest. The intermediation function of the commercial banks is seen in terms of the surplus spending exhibited by the savers while borrowers are regarded as the deficit spending units with more expenditure demands than their disposable incomes. In this paper, the purpose will be to investigate the specific firm characteristics of commercial banks than influence the efficiency of intermediation role.

The stability and efficiency of the banking sector guarantees the strength of the entire financial system in any economy. Indeed, the magnitude of the contributions made by

commercial banks to a country's GDP is estimated to be at least 43.22% (Plecher, 2020). The evaluation of financial stability of a commercial bank requires special consideration of both the endogenous and exogenous factors that influence the functioning of a commercial bank (Wafula, 2020). Exogenous factors include social, economic and political elements. On the other hand, endogenous factors include the specific characteristics of the commercial bank such as asset quality, management efficiency, level of profitability, liquidity, solvency of the bank and capital adequacy. Indeed, endogenous factors are common for all banks and have a massive influence on the realization of effective intermediation role as well as financial stability.

1.1.2 Financial Intermediation Efficiency

The concept of intermediation efficiency has particularly gained prominence over the recent past as it is viewed as an important alternative to the evaluation of a commercial banks' performance. One concept that has a close relationship with intermediation efficiency is the productivity. Efficiency is mostly related to the ability of a firm to attain a given output level within the minimum level of resources input. Thus, it refers to the distance between input quantity and output, specifically the quantity of output and output that define the best frontier for an industry of cluster (Kiemo & Kamau, 2021).

The measurement of efficiency in the financial sector is associated with the extent of impacts the system has on macroeconomic and microeconomic economy levels. Banking reforms in Kenya have been intended to spur efficiency and competition for commercial banks. The reforms have resulted in higher profitability levels, improvements in efficiency, rise in capitalization as well as improved quality of assets (Kiemo & Kamau, 2020).

Banks always aim at implementing measures that guarantee their growth in terms of market share, profitability levels, asset base, and efficiency in an attempt to outperform their competition (Maudos, 2017). Thus, commercial banks often embrace reforms aimed at lead to transformation in their structure of banking, acquisitions and mergers, exit and entry of banks, transformation of non-bank institutions to commercial banks, technological adoption as well as change of business models (Kiemo & Kariuki, 2020).

The measure of efficiency in Kenyan commercial banks is mainly based on the output data envelope analysis (DEA) model that uses variable returns to scale based on assumptions of constant returns to scale. Banks are assessed in terms of inputs and outputs is evaluated on the basis of three major components including profitability, intermediation, and production. Intermediation considers the relevance of banks in linking borrowers and depositors. Thus, the desire for banks to make profits endears banks to seek measures to effectively manage risks, deposits as well as costs in an attempt to be profitable at all times. Therefore, efficient utilization of inputs is an important determination of intermediation efficiency (Paradi et al., 2018).

1.1.3 Firm Characteristics and Financial Intermediation Efficiency

Financial intermediation efficiency has been an issue of concern for many financial institution's worlds over. The monetary policies implemented by the central bank have a major influence on the economy of any country. Therefore, the nature of change on the financial intermediation can greatly impact on how monetary policy is conducted. The recent past has been characterized by significant growth in financial markets, intermediaries, and instruments,

largely driven by advancements in technology, globalization effects, and deregulation processes (Genberg, 2019).

Rahman, Ashraf, Zheng and Begun (2017), researched on the impact cost efficiency has on financial intermediation and bank capital through an analysis of panel data from 1190 banks from Brazil, Russia, India, China, and South Africa. The researchers argue that bank efficiency generates incentives that can lead to positive outcomes on the costs of financial intermediation and banks' capital holdings. An extension of the sample also revealed that cost efficiency marginally positively impacted on the banks' capital during the global financial crisis.

Efficiency of commercial banks can be viewed in terms of the ability of both managers and staff to maintain the rate of increase of income and revenues at levels above the rate of increase of the operational costs. Elahi and Poswal (2017), investigated the factors affecting cost efficiency in commercial banks operating in Germany and UK, listed on London stock exchange. Using a sample of 8 leading banks from each of the two countries, they collected data on for a period of 10 years during either side of the global financial crisis. In total, 80 observations for each country were recorded. The study used cost efficiency was the dependent variable while net interest margin, profitability, bank size, credit risk, financial leverage, and income diversification were used as the independent variables. The results indicated that bank size, income diversification, profitability, and net interest margin have a positive significant relationship with cost efficiency in both economies.

On the other hand, financial leverage and credit risk were found to be insignificantly related to cost efficiency in Germany banks, but had a positive significant relationship with cost efficiency for UK banks. The findings from this study were supported by a similar study

undertaken in Indonesia that sought to analyze the determinants of financial intermediation efficiency such as credit growth, credit risk, and funds structure on profitability (Buchory, 2021). The findings from the study revealed that partially, credit growth and fund's structure portray a positive significant impact on net interest margin, while non-performing loans significantly influenced net interest margin. Effectively, the researchers established that net interest margin had a positive significant impact on the return on assets.

The individual elements of a financial system such as the banking system determine its stability. The modern competitive environment has made the banking sector a critical component of any financial system due to the numerous services and products it provides. Commercial banks need to build a competitive advantage to remain resilient through the various challenges. A study on Slovak commercial banks to assess their efficiency through the use of data envelopment analysis (DEA) models revealed that the three largest banks in Slovak were efficient for all the years of the analysis (Grmanova & Ivanova, 2018). The study is an indicator of Slovak's banking sector's commitment towards efficiency in order to be effective in the financial intermediation role.

A similar study to establish the efficiency of Indian banks in generating returns in the context of risks taken revealed that on average, Indian banks portrayed lower levels of efficiency in their trade-off between risks and return (Navas, Dhanavanthan, & Lazer, 2020). These findings were confirmed by Sangeetha, (2020) in his study to find out the level of efficiency of Indian banks using data envelopment analysis (DEA) model for 19 public sector banks. Overall, there is a global trend by commercial banks towards improving intermediation efficiency based on the individual characteristics of each bank.

In the African context, commercial banks are integral for the intermediation role of providing financial services and products to the economies of African countries. Most African nations are developing economies and thus have weak financial systems unlike European and American financial systems. Financial intermediation plays a critical role in the development of SMEs in Nigeria. In a study to establish the extent of the effect of financial intermediation on SMEs in Anambra State Nigeria, the author concludes that there is a significant effect of intermediation on the performance of SMEs (Chinwe, 2021).

Adeyinka, Akanmu, & Innocent (2020) also concluded that depending on the minimum level of reserve held by deposit money banks with the central bank of Nigeria, it is possible to provide adequate credit to the real sector to facilitate investments in the real sector. The researchers also established that high interest rates discourage private borrowers of the deposited money thus opting for other sources of finance. Nevertheless, there is a growing uptake of bank credit in the Nigerian economy to enhance the production of goods and services indicating the need for commercial banks in Nigeria to improve their intermediation efficiency.

In Ghana, bank competition and stability have a positive effect in the economic growth in the long-run. Antwi (2020) investigated the link between bank reforms, competition and the stability of the banking industry in Ghana. Based on the relevance of competition and stability, the author was interested in determining the most influential between two factors for banks in Ghana. The study found that a rise in the market power of banks led to increased financial stability, although recapitalization policies of the central bank of Ghana did not have major impacts on the financial stability of Ghanian banks. With the intensification of competition

among banks within the Sub-Saharan region, it was established that both stability and competition had a positive influence on the economic growth of the countries.

A similar study (Gyeke-Dako, Flador, Agbloyor, Abor, 2021) to investigate the relevance of competition in the Ghanian banking sector and the intermediation behavior found that competition led to improvements in financial inclusion. Thus, the researchers recommended that the Bank of Ghana to come up with policies on competition to include such areas as open banking as well as integration of mobile banking as well as technology in the banking sector.

A review of the evolution of the Egyptian banking sector alongside main trends in the development of the financial sector revealed a strong relationship between per capita growth and financial development (Mohieldin, Hussein, Rostom, 2019). The study drew comparisons on the basis of critical financial indicators between select emerging markets, developing economies and Egypt. The researchers used data set on financial development indexes drawn from the International Monetary Fund. Kassem and Sakr (2018) sought to investigate the relationship between specified commercial Egyptian banks' factors and profitability. The motivation of the study was to establish the major internal characteristics of Egyptian commercial banks that contributed to profitability.

Findings from the study revealed that loan loss provision ratio and bank size majorly determined the level of profitability of commercial banks in Egypt. The study also demonstrated that capital ratio had a significant relationship with return on assets and net interest margin, while an insignificant relationship existed with return on equity. It was also

confirmed that deposit ratio and loan ratio have an insignificant relationship with the profitability of commercial banks in Egypt.

Financial intermediation has also been found to stimulate economic growth in the Southern African region. According to a study by Allen and Ndikumana (2018), there is a positive correlation between growth rate as measured through GDP and financial development. The implication is that there is a long-run relationship between finance and growth, thus the need to establish appropriate intermediation practices for commercial banks to ensure continued economic growth. Sakarombe (2018), through a study on the relevance of financial inclusion and the stability of banks in Zimbambwe found out that indeed, stability is enhanced through financial inclusion.

On the other hand, Sanderson (2018) argues that commercial banks in Zimbambwe are mostly profit inefficient; implying that the most highly profitable banks utilize fewer resources to generate profits in comparison to their competitors. This is an implication that commercial banks' intermediation efficiency leads to increased levels of profitability at reduced costs. Similarly, Makena (2021) argues that competition in the Zimbambwean banking sector is strongly related to stability as competition seems to drive the intermediation efficiency of the banks.

Closer home, in Tanzania, it has been established that bank liquidity and adequacy of capital positively impact on operating efficiency. A study by Lotto (2019), on the factors influencing bank operating efficiency in Tanzania, the scholar used a sample of 36 commercial banks in Tanzania for the period 2000 to 2017. The findings confirmed the strong association between capital adequacy and bank liquidity leading to operating efficiency.

In Uganda, interest rate spreads in the banking system are influenced by diverse factors. In a study by Jefferis, Kasekende, Rubatsimbira, & Ntungire (2020), the researchers sought to investigate the factors leading to the high interest rates in Uganda. The findings revealed that overhead costs have a positive significant relationship with bank interest spreads. Therefore, it is imperative that banks work towards reducing levels of overheads to ensure increased levels of competition.

Stability of the banking sector is an important determinant of economic growth in Kenya, since it ensures an efficient, stable and sound financial system. Wafula (2020), in his study on the characteristics of a firm that ensures financial stability of Kenyan commercial banks, contends that the banking sector is hugely fragile owing to the ever-increasing levels of non-performing loans. The study revealed that there is a significant positive relationship between operating efficiency and commercial banks stability in Kenya. On the contrary, capital adequacy had a significant negative relationship with financial stability of commercial banks.

Furthermore, there was an insignificant negative correlation between financial stability and bank liquidity. The intermediation role of commercial banks cannot be overemphasized. Commercial banks facilitate the flow of funds to capital deficient units from capital surplus units. Therefore, efficiency in financial management plays a critical role in the performance of commercial banks in Kenya (Ikapel, Namusonge, & Sakwa, 2019). Indeed, a positive significant relationship exists between the financial performance of commercial banks and return on assets and equity.

Financial intermediaries play an integral role in channeling funds from lenders to borrowers through the intermediation process. Commercial banks are especially crucial for the

efficient functioning of the financial sector and the economy as a whole. Through commercial banks, savers are able to deposits their surplus monies at a pre-determined interest rates and also withdraw the same funds when need arises (Garr, 2021). On the other hand, borrowers obtain loans from the commercial banks which they repay with interest. The intermediation function of the commercial banks is seen in terms of the surplus spending exhibited by the savers while borrowers are regarded as the deficit spending units with more expenditure demands than their disposable incomes. In this paper, the purpose will be to investigate the specific firm characteristics of commercial banks than influence the efficiency of intermediation role.

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Commercial banks play an integral role in financial intermediation. In Kenya, there are at least 42 commercial bank institutions which are fully licensed by the Central Bank of Kenya

(CBK). CBK undertakes the regulatory role of microfinance banks, foreign exchange bureaus, credit reference bureaus and commercial banks. In Kenya, the distribution of commercial banks is based on local banks, publicly owned banks and privately owned banks. There are only 11 commercial banks listed at the Nairobi Stock Exchange (NSE).

The effectiveness of the intermediation role of commercial banks in Kenya is highly dependent on the extent of each individual institution to undertake innovations and adopt them accordingly. Thus, continued adoption of technological advancements has hugely been credited with increased ease in the delivery of financial services by commercial banks thus guaranteeing higher profitability levels for commercial banks (Mwai, 2021). The soundness of commercial banks is an important pointer about the ability of an economy to withstand both internal and external shocks (Span & Dutta, 2018).

In Kenya, CBK is the sole representative of all business banks and continuously comes up with banking acts as well as prudential regulations (Wafula, 2020). The main objective of the various acts and prudential regulations is to ensure that the country attains a dynamic, effectively sound, stable and proficient budgetary framework. In the recent past, CBK had to intervene to curb exorbitant interest rates that banks had been charging borrowers, thus the interest capping law was implemented in order to lower the cost of credit as well as increase access levels to more people (CBK, 2017). Nevertheless, there were no major positive gains from the interest capping law leading to reversal of the same to create level playing ground for all players. With the interest capping law in place, commercial opted for the risk-free treasury bills as opposed to unsecured loans.

1.1.4 Listed Commercial Banks in Kenya

Nairobi Securities Exchange (NSE) was established in 1954 as a voluntary organisation of brokers and is recognised under the Societies Act. The privatization of NSE didn't occur until later in 1988. In 2006, the NSE deployed Automated Trading System (ATS) to enable first come, first served live trading. This system was also connected to the Central Depository System (CDS) and the Central Bank of Kenya in order to enable the trading of government bonds. Since then, it has undergone numerous modifications and improvements, including the 2015 elimination of the aggregate foreign ownership cap for NSE-listed businesses. The Nairobi Securities Exchange is licenced and governed by the Capital Markets Authority (CMA). The CMA also approves public listings and offers of securities issued and traded on the NSE. Currently, there are sixty-three (63) firms that are listed at NSE categorized into thirteen (13) different sectors comprising agricultural, automobiles and accessories, banking, commercial and services, construction and allied, energy and petroleum, insurance, investment, investment services, manufacturing and allied, telecommunication and technology, real estate investment trust and exchange-traded fund (NSE, 2022).

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1.2 Statement of the Problem

Financial intermediation is an integral component of any economic growth in a given country. Commercial banks and other financial institutions play an important role in determining the efficiency of financial intermediation. Indeed, the proliferation of financial technology and especially the application of mobile banking technology as well as internet banking have all been key pointers to improvements in intermediation efficiency (Wafula, 2020). Commercial banks have also been undergoing extensive competitions over the recent past with the aim of increasing their market share in relation to customer numbers and levels of uptake of their various financial products and services (Chinwe, 2021; Elahi & Poswal, 2017).

Commercial banks' intermediation efficiency is highly dependent on individual bank's characteristics (Garr, 2021). In the recent past, there has been an increasing level of non-performing loans among many commercial banks in Kenya, an indication of underlying efficiency challenges or existence of adverse selection (Kiemo & Kamau, 2020; Kariuki, 2016; Wafula, 2020). An increase in the levels of non-performing loans has been trending at average rates of 13.5% since 2018, surpassing the globally recommended rate of 5% (Wafula, 2020). It is therefore true to say that commercial banks in Kenya have been hinging towards instability levels in relation to the non-performing loans. Increasing levels of defaults by loan borrowers creates an intermediation challenge for commercial banks since they risk the possibility of failing to meet their major responsibility of linking savers and borrowers. Consequently, savers might lose trust with financial institutions and opt for other methods of saving their surplus capital. The net effect of such a situation would be dire for an economy as borrowers use borrowed funds to undertake economic activities that further lead to economic growth (Kiemo & Kamau, 2020; Wafula, 2020).

In view of the inherent and emerging challenges faced by commercial banks in their pursuit for efficiency in financial intermediation, many scholars have set out to study the stability aspects of commercial banks in relation to intermediation role (Jefferis et al., 2020; Ikapel et al., 2019; Lotto, 2019; Makena, 2021; and Gyeke-Dako et al., 2021). Although most of the studies have attempted to delve into aspects of intermediation and economic growth as well as stability of the financial system, most have failed to look into the specific characteristics of commercial banks and their influence of the efficiency of financial intermediation in Kenya. This study, therefore, sought to fill this existing gap in empirical

literature by investigating the impacts firm characteristics have on the efficiency of financial intermediation by commercial banks listed on the Nairobi Stock Exchange (NSE).

1.3 Research Objectives

1.3.1 General Objective

The general objective of this study was to investigate the effect of firm characteristics on financial intermediation efficiency of listed commercial banks in Kenya

1.3.2 Specific Objectives

i. To investigate the effect of capital adequacy on the financial intermediation efficiency of listed commercial banks in Kenya.
ii. To establish the effect of asset quality on the financial intermediation efficiency of listed commercial banks in Kenya.
iii. To determine the effect of bank liquidity on financial intermediation efficiency of listed commercial banks in Kenya.
iv. To examine the effect of operational efficiency on financial intermediation efficiency of listed commercial banks in Kenya.

1.4 Research Questions

i. What is the effect of capital adequacy on financial intermediation efficiency of listed commercial banks in Kenya?
ii. What is the effect of asset quality on financial intermediation efficiency of listed commercial banks in Kenya?

iii. What is the effect of bank liquidity on financial intermediation efficiency of listed commercial banks in Kenya?

iv. What is the effect of operational efficiency on financial intermediation efficiency of listed commercial banks in Kenya?

1.5 Significance of the Study

1.5.1 Boards and Management of Banks

The management team and the board of a commercial bank is the top-most decision-making organ of the institution. It is mandated to steer the commercial bank to the highest level of profitability at the minimum cost possible. These study's findings were crucial for this team in determining the appropriate measures that can impact on intermediation efficiency.

1.5.2 Government and Policy Makers

The Central Bank of Kenya is mandated to supervise all commercial banks in Kenya, deposit taking microfinance institutions, and mortgage companies. The findings from this study were crucial in providing important reference to the CBK in its regulatory policies to enhance intermediation efficiency of commercial banks in Kenya.

1.5.3 Academicians and Scholars

Although a wide array of empirical literature exists on commercial banks' role on intermediation, financial stability and economic growth, there are limited studies on firm characteristics and influence on financial intermediation efficiency. The findings from this

study added to the growing literature in this important area of study, thus greatly benefit scholars and academicians.

1.6 Scope of the Study

This study covered all listed commercial banks in Kenya. Currently, Kenya has 42 registered commercial banks. 28 of these banks are regarded as domestic while the 14 are foreign. This study was limited to commercial banks listed on the Nairobi Stock Exchange, which are 11 in total. The study relied on secondary data obtained from consolidated annual financial reports for the period 2017 to 2021. The choice of secondary data in this study is majorly due to the ease of obtaining the required data due to the statutory requirements for publicly listed firms to report their consolidated annual reports.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the empirical literature review and related studies on firm characteristics and financial intermediation efficiency of commercial banks. The chapter contains theoretical review, empirical literature review, the conceptual framework, and the summary of the gaps in literature from previous studies.

2.2 Theoretical Review

This study is anchored on various theories to help shape the premises to clarify existing connections between dependent and independent variables. Theory is described as an explanation confirmed through a proof to an issue that causes a certain level of confusion (Saunders, Lewis & Thornhill, 2009). In this chapter, effort is devoted towards the analysis of theories regarded relevant to anchor this study. In particular, the theories discussed in this section include: efficiency structure theory, buffer capital theory, the theory of financial intermediation, and liquidity shiftability theory.

2.2.1 Buffer Capital Theory

The buffer capital theory was developed by Caleb and Rob in 1996. The main contention of this theory is the forecast that when a commercial bank moves towards the minimum regulatory capital requirements, it could have the incentive to boost its capital while also reducing the possible risk to stay clear of costs of regulation brought about by any breaches in capital requirements (Kariuki, 2017). Indeed, based on this theory, it is possible to predict the

behaviour the banks based on the size of their buffer capital. Banks that have higher levels of capital buffer often aim at ensuring that the buffer is maintained at all times, while those with lower levels strive to rebuild the same to appropriate levels. Consequently, high levels of capital buffer mean a positive correlation between capital and risk adjustments and the vice versa (Heid, Porath, & Stolz, 2004).

The Central Bank of Kenya uses capital adequacy as one of the CAMEL variables to ascertain the level of financial stability and soundness of banks in Kenya. The regulator emphasizes the need for commercial banks in Kenya to adhere to the capital adequacy requirements at all times. Therefore, capital adequacy is viewed as a critical internal factor that is associated with financial intermediation efficiency by commercial banks. In this study, capital adequacy is chosen as a firm characteristic of commercial banks to establish its implications on intermediation efficiency. Thus, capital adequacy in this study is viewed in terms of the core capital to deposit ratio, whereby if the ratio is higher, it is more desirable. The theory thus expounds on the objective on the influence of capital adequacy on intermediation of efficiency.

2.2.2 Theory of Financial Intermediation

Allen and Santomero (1997) developed the modern theory of financial intermediation. This theory is based on the studies related to imperfect information and is hinged on the contention that there is a justification for the existence of banks owing to the imperfections of the financial markets brought about by information asymmetries and transactions costs (Kariuki, 2017). On the other hand, the financial markets have been experiencing higher levels of deregulation, increased adoption of technology and innovations such as derivatives and internet banking.

There have been changes in the portfolios held by the consumers of financial services such as risky assets, as well as the ever-intensifying sizes of pension funds and mutual funds in comparison to the assets held by banks. The outcome of these scenarios has been a desire by economists on the importance of informational asymmetry and transactions costs in the financial intermediation process.

Intermediaries are regarded as the facilitators of risk transfer and often involved with complex financial instruments and markets. The founders of intermediation theory (Allen & Santomero, 1997) contend that intermediaries have to consider the effect of participation costs and especially in deciding on the appropriate actions to undertake to mitigate against possible risks (Kariuki, 2017). Credit markets are the main functionality of intermediaries and brings along diverse levels of risks for commercial banks. Therefore, intermediaries must undertake specified actions and measures to enhance their ability to obtain information, undertake project evaluation, monitor the performance of borrowers, and share the risk information about borrowers.

In this study, the theory of intermediation is relevant to offer explanations on the role of financial intermediaries and the need for their existence. Through this theory, it will be possible to understand the existing dynamics about the financial markets and the associated intermediation role by banks. Furthermore, the theory will provide highlights on the influence of asset quality on intermediation efficiency of listed commercial banks in Kenya.

2.2.3 Liquidity Shiftability Theory

The liquidity shiftability theory was developed by Moulton in 1915. The theory is founded in the premise that it is feasible for banks holding resources to dodge non-attendance to liquidity as they can be sold viably. Therefore, it is possible for banks to protect themselves against possibilities of massive withdrawals by holding credit instruments that can act as a form of liquidity and easily convertible into liquid money in the secondary markets. Thus, a commercial bank's liquidity can be assessed in terms of its ability to transfer assets to another entity without a fall in material value of the asset when urgent liquidity is needed.

The application of the liquidity shiftability theory in this study is particularly crucial in the sense that commercial banks require the use of short-term market investments to meet their emergency obligations. The liquidity capacity of commercial banks is especially critical for efficiency in financial intermediation (Wafula, 2020). The liquidity shiftability theory is assessed by finding the ratio of loans to deposits. The higher the ratio, the more liquid a commercial bank is regarded. This theory is important in understanding the study's objective on the influence of liquidity on financial intermediation efficiency of listed commercial banks in Kenya.

2.2.4 Efficiency Structure Theory

The efficiency structure theory is credited to Demsetz (1973). The theory contends that the firm's proficiency is connected to its market structure and execution. The efficiency structure view argues that the performance of banks leads to the establishment of a structure. In particular, when firms increase their levels of efficiency, they are likely to gain additional

market share to the detriment of the firms that have failed to establish efficiency in their operations.

The outcome is often more concentration of the efficient firms which is argued to go hand in hand with levels of efficiency of banking systems. Efficiency structure has been tested through a number of studies in past studies (Mensi & Zouari, 2011; & Catena, 2000). In these studies, efficiency structure has been applied to understand the levels of concentration of commercial banks on account of increased or decreased efficiency levels. Efficiency structure has been associated with firm growth in the sense that increases in a bank's concentration leads to reductions in the costs of efficiency (Tetsushi, Yoshiro, & Hirofumi, 2012).

The relevance of this theory in this study is the fact that it clarifies the crucial role of commercial bank's efficiency in market share growth and eventual profitability within the lowest costs possible. Financial institutions need to embrace improvements in efficiency to attain increased concentration at the lowest costs. Operational efficiency for commercial banks can thus be evaluated on the basis of expenses to income ratio. This theory is crucial in this study's objective on the influence of operational efficiency on intermediation efficiency.

2.3 Empirical Literature Review

This section is devoted to the existing empirical literature on the problem of the study. Therefore, the aim is to ensure that the content of the study is based on past studies related to financial intermediation and commercial banks' firm characteristics.

2.3.1 Capital Adequacy and Commercial Banks' Intermediation Efficiency

Bank capital is an integral component of the banking system based on the Basel Prudential Requirements and is one of the most widely researched area in literature (Wieczorek-Kosmala, 2019). The post financial crisis changes on the prudential norms relating to bank risk capital have sought to pursue three objectives namely: tightening capital requirements to strengthen quality and size of the banks' equity, implementing liquidity requirements and determining the maximum leverage ratio for commercial banks.

There has not been a conclusive consensus from empirical literature on the actual implications of capital adequacy on intermediation efficiency of commercial banks. Indeed, a number of past studies have concluded that commercial banks with higher levels of capital holdings have increased efficiency of intermediation thus decreased costs of financial intermediation (Rahman et al., 2017). Indeed, research has established that commercial banks in BRICS countries have a tendency to increase the costs of intermediation in periods of crises, but helped by the efficiency to reduce the costs of intermediation to optimal levels.

Zheng at al. (2017), found out that increased levels of regulatory capital ratios for commercial banks in Bangladesh contributed to reductions in the costs of financial intermediation thus increasing the levels of profitability. In the Euro area, it has been established that although risk capital generates high costs, it has the effect of protecting commercial banks from insolvency (Pyka & Nocon, 2021). Thus, an assessment of the interdependencies between efficiency of Eurozone commercial banks and risk capital concludes that capital at risk and specific capital adequacy regulations hugely impacts on efficiency.

The CAR level of banks is often determined by the number of deposits held in order to reap benefits from lending. Thus, banks often gain from lending since this is their primary source of income. Stricter capital regulations can lead to decreases in the performance of the banking industry. Indeed, Dao and Nguyen (2020) argue that internal factors including CAR negatively impact on the profitability of commercial banks. Therefore, they made a suggestion that Vietnam commercial banks need to maintain an adequate level of capital that do not lead them into incurring costs and instead use the extra capital to invest in profitable activities. Nevertheless, Irawati et al. (2019) have argued that tighter Basel II positively correlates to the performance of commercial banks through the effect of decreasing the loans default rates during bad economic conditions. There was also a suggestion that an implementation of new capital adequacy requirement can lead to improved performance of commercial banks' governance, support the banks towards the reduction of bad loans as well as improve their income levels and efficiency (To & Le, 2020). However, there have been various conflicting arguments on the association between CAR and commercial banks operational efficiency.

The Bank of Ghana has progressively revised the minimum capital requirements for commercial banks in the country in order to ensure a stable banking sector. Indeed, there have been unwanted consequences of regulations on capital requirements in the country which has evoked different studies on the same. However, it has been established from different studies that minimum capital requirements significantly influence commercial banks performance as measured through return on equity and return on assets (Sandow, Duodu, & Abayie, 2021). In another study, Anti (2019) argues that capital adequacy has a negative relationship with commercial banks' performance measured through return on equity and return on assets in Ghana.

The usefulness of capital adequacy ratio for banks in Nigeria is an important factor in the control of risk appetite for commercial banks, and ensure effectiveness and efficiency in their operations. Indeed, the proponents of capital adequacy ratio (CAR) believe that it has major effects in ensuring the soundness as well as stability of the banking system, while the proponents argue that CAR can impede the capacity of commercial banks to intermediate effectively as well as sometimes lead to credit crunch, thus inducing a decrease in the output levels (Yaaba, & Sanusi, 2020). The central bank of Nigeria has set the lowest level for commercial banks to limit losses or risks in order to protect financial stability of deposit money banks. The rate is always above the international minimum requirement of 8% based on Basel II.

The financial intermediation of deposit taking SACCOs in Kenya is significantly influenced by capital quality. This has been established through a study of financial intermediation efficiency and capital quality of 103 DTS for the period 2011 to 2014 using two staged methodologies (Kariuki, 2017). In a different study to find out the relationship between firm characteristics and financial stability of commercial banks in Kenya, Wafula (2020) found that capital adequacy had a statistically significant negative impact on commercial banks' financial stability.

Kimeu (2020), in a recent study, found that there was a steady decline in the average core capital for the listed commercial banks in Kenya. It has also been established that core capital has a significant influence on the performance of commercial banks listed at the Nairobi Stock Exchange. Wafula (2020), in his study of firm characteristics and financial stability of commercial banks in Kenya, found that capital adequacy had a statistically significant negative

impact on commercial banks' financial stability in Kenya. Using 17 fragile commercial banks in Kenya, the researcher obtained data for the period 2011 to 2018. The analysis of the data was done through the use of generalized method of moments guided by dynamic panel regression.

Conversely, Rahman et al. (2017), in their analysis of panel dataset of 1190 banks found in the BRICS countries, found evidence that more efficient banks were associated were associated with higher levels of capital holdings thus were able to charge lower costs of financial intermediation. The study first used data for the period 2007 to 2015 and later extended the sample to period 2000 to 2015. The results indicated a positive impact of cost efficiency on bank capital especially during the global financial crisis of 2007-2009. It was also evident that banks had a tendency of increasing the costs of intermediation during the crisis period, but were greatly helped by efficiency to keep the intermediation costs optimal.

Kimeu (2020), investigated capital adequacy and performance of listed commercial banks in Kenya. Using a descriptive and explanatory research designs, the study targeted the 11 commercial banks listed at the NSE for the period 2014 to 2018. Data was obtained from published reports and income statements for the listed firms, and analyzed using regression model. Findings from the study revealed that there was a steady decline in the average core capital for the listed commercial banks in Kenya. There was also a declining trend in the supplementary capital during the period under review. The study concluded that there was a significant influence of core capital on the performance of commercial banks listed at the NSE.

Zheng, Rahman, Begum, and Ashraf (2017) sought to investigate the effects of capital regulation and cost of financial intermediation on the profitability of Bangladesh commercial

banks. The researchers used panel data of 32 banks for the period 2000 to 2015. The data was analyzed through dynamic generalized method of moment's estimation. The findings revealed that higher levels of bank regulatory capital ratios led to reductions in financial intermediation hence increased profitability levels. The study also did not find any significant impact by switching from BASEL I to BASE II on the cost of intermediation as well as profitability.

Lotto (2017) researched on the efficiency of capital adequacy regulatory requirements in deterring risk-taking behavior of commercial banks in Tanzania. Using a two stage least squares method to analyze data for period 2009 to 2014, the study findings indicated that there is a direct relationship between capital ratio and the risk-taking behaviour of banks, an indication that capital ratio increased with the level of risk. The idea is to prevent the commercial banks from violating the regulatory requirements on the minimum capital. Thus, there is a positive relationship between pressure from the regulator and capital adequacy.

2.3.2 Asset Quality and Commercial Banks' Intermediation Efficiency

The banking sector is characterized by extreme uncertainty in terms of demand, supply as well as the market price stemming from operational challenges and the risks from the market shocks. Commercial banks are always faced with the risk of value erosion in the event that their assets value falters as a result of market uncertainties (Titman, 2018). The requirement for commercial banks to have additional capital is imperative to enable banks undertake intermediation role effectively. Therefore, capital pays a crucial role for banks as it supports business expansion, risk covers, and conformity to regulatory requirements (Burchory, 2019).

The Indonesian banking sector has put stringent measures to ensure that commercial banks increase their capital holdings as a regulatory requirement. A review of profitability and efficiency for commercial banks in Portugal and Spain showed that performance is influenced by internal management factors and macroeconomic environmental factors (Neves, Proenca, & Dias, 2020). Indeed, there is a non-linear relationship between size of the commercial banks with efficiency and profitability. The decline in total liquidity of commercial banks can lead to instability.

Indeed, Mohammad and Gang (2017), through their study on the impact of bank liquidity on the stability of the Chinese commercial banks noted that total liquidity was on a decline. Lawal (2018) investigated the impact of financial soundness of banks on the operational efficiency in Nigeria. Using data obtained from 21 Nigerian banks, data was collected for the years 2007 to 2016 and analyzed using balanced panel regression method. The findings from the analysis indicated that there was a significant influence of commercial banks' financial soundness on their efficiency. The extended conclusion from this study was that the soundness of commercial banks could lead to a reduction in the mismatch in the asset liabilities as well as possible agency problems.

Mnyampanda and Chindengwike (2021) investigated the association of asset quality on commercial bank financial performance in Tanzania, moderated by the shifting of the capital city. The study used panel data obtained from secondary sources through document review. A purposive sample of three commercial banks, the researchers collected quarterly data for the period 2010 to 2020. The findings from the study indicated that there was a significant

relationship between the asset quality and performance of the commercial banks under study before and after shift of the capital to Dadoma from Dar es Salaam.

Sile, Olweny, and Sakwa (2019), investigated asset quality as a determinant of financial performance of commercial banks in Kenya. The study sought to examine the banks' asset quality in relation to the financial performance using secondary data obtained from the financial reports for the period 2012 to 2017. Ratios were used to measure financial performance and quality of asset based on the level of activities of the firm. The data analysis was conducted using Pearson's moment correlation alongside regression in SPSS. It was established that asset quality had a statistically significant relationship with the financial performance of banks.

The pursuit for financial stability in the financial sector is an integral aspects of commercial banks performance. In Kenya, commercial banks are governed by the central bank which sets regulations for standards of operations and set the regulatory framework. Indeed, financial stability of banks greatly determines the stability of the overall economy. Therefore, banks seek to ensure stability through various measures such as ensuring quality assets to enable them attain desired profitability levels (Mburu, 2017). Commercial banks operate under the regulations of the central bank of Kenya, but there are cases of bank failure in the recent past which can be blamed on operational efficiency and other corporate governance challenges. Asset quality thus focuses on the nature of the assets held by the commercial bank in the measurement of their sizes and level of credit risk arising from operations.

According to a study by Sile, Olweny, and Sakwa (2019), on the impact of asset quality on financial performance of commercial banks in Kenya, it was evident that asset quality had a

statistically significant relationship with financial performance of banks. Wafula (2020) established that asset quality portrayed a statistically significant positive impact on financial stability. Conversely, Kariuki (2017) concluded that asset quality had a significant influence on intermediation efficiency of deposit taking microfinance institutions.

Ofeium and Afure (2020) studied the effect of capital adequacy on banks performance in Nigeria. Panel data from 2010 to 2019 was collected among 50 banks. Results of the study indicated that loan and advances and shareholders' equity have positive and significant effect on financial performance. Further, there was an inverse effect of customer deposits on financial performance.

Okoye et al., (2017) applied regression analysis to examine effect of capital adequacy on financial performance of listed Nigerian banks. Capital adequacy have positive effect on financial performance of quoted Nigerian banks. Sanathanee (2020) studied impact of asset quality on profitability in Sri Lanka. Panel data was collected from 2008 to 2016 among 9 banks. The study reported inverse effect of asset quality on bank profitability. Further, there was an effect of management efficiency, earnings performance and liquidity has significant effect on banks profitability in Sri Lanka. The study may have considered reporting diagnostic tests prior to modelling. Further, the study posed contextual gap since the study findings can only be generalized in Sri Lankan banking sector.

2.3.3 Liquidity and Commercial Banks' Intermediation Efficiency

Liquidity is an essential aspect of banking sector operations. Indeed, banks that have sufficient liquidity often generate trust and prestige from the customers which leads to promotion of its

business leading to increased capital, bigger loan portfolio, and many other activities (Nguyen & Vo, 2021). The converse is also true for commercial banks that have liquidity problems which can weaken their capital as well as assets. In the context of commercial banks listed at the Vietnam stock exchange, liquidity is impacted by numerous factors including internal activities of the banks as well as their status at the stock exchange market (Nguyen & Vo, 2021). Commercial banks may suffer liquidity challenges as a result of existing imbalances between assets and liabilities. Therefore, liquidity is often reviewed in relation to the performance of commercial banks since it is often regarded as the major source of risk for banks.

The linkage to economic situations in Europe and the globe at large has created the need for policymakers to look beyond a country's borders when undertaking policy decisions. In an investigation of the performance and efficiency of European commercial banks, Neves, Gouveia, and Proenca (2020), found that efficiency of commercial banks in the Eurozone countries depended greatly on specific firm characteristics. Liquidity of the commercial banks was seen as one important factor that impacted on the efficiency of commercial banks in the Eurozone countries. Liquidity of commercial banks closely relates to assets quality and nature of capital. Thus, European commercial banks have particularly been keen to ensure that there are minimal nonperforming loans within their loan books to reduce erosion of assets quality (Velliscig, Floreani, & Polato, 2022).

The optimum level of a commercial banks' liquidity can be attained in the event that sustainable credit growth is maintained. Commercial banks should also the overall firm growth in terms of assets should be maintained in comparison to liabilities. Ghanaian banks have in the

recent past demonstrated a trend towards enhancing their liquidity by maintaining an average of liquid assets at 20% of the total assets (Charmler, Musah, Akomeah, & Gakpetor, 2018). The sustained optimal liquidity level by the Ghanaian commercial banks has led to the increased levels of profitability.

The Nigerian banking sector considers the issue of liquidity and profitability management as integral components of efficiency. Indeed, commercial banks in Nigeria have faced massive challenges when attempting to increase profitability levels without considering liquidity levels. This was evident from a study by Idowu, Essien, and Adegboyega (2017), on four deposit money banks. Indeed, it was evident that good management and exertion of control on the factors that influence liquidity of commercial banks hugely improved their financial performance.

Market power of commercial banks in Kenya influences intermediation efficiency. A study to investigate the influence of market power on the intermediation efficiency of listed banks in Kenya demonstrated that a significant relationship exists between market concentration and efficiency of commercial banks (Osoro & Josea, 2020). Bank liquidity statistically significantly impacts on the financial stability of commercial banks in Kenya (Wafula, 2020).

Elsewhere, liquidity has been seen to influence on the intermediation efficiency of deposit taking SACCOs in Kenya (Kariuki, 2017). Commercial banks' efficiency influences the competition dynamics in Kenya. A study to evaluate efficiency and competition dynamics for the period 2001 to 2017 using DEA showed that there was an upward trend towards efficiency of commercial banks as the managerial team sought to focus on efficiency alongside

improved liquidity. Wafula (2020) argued that bank liquidity has a statistically insignificant negative impact on commercial banks' financial stability. This was through a study of the effects of firm characteristics on financial stability of commercial banks in Kenya for the period 2011 to 2018. A similar conclusion was found by Kariuki (2017) in his study on firm characteristics and financial intermediation efficiency of DTS in Kenya for the period 2011 to 2014.

Charmler, Musah, Akomeah, and Gakpetor (2018) investigated the effects of liquidity on commercial banks' performance in Ghana. The study relied on a sample of 21 Ghanaian banks and obtained panel data for the period 2007 to 2016. Descriptive statistics, correlation and panel regression analyses were used for the study. From the findings, it was evident that commercial banks in Ghana average liquid assets to total assets was 20%. The banks also had a liquid assets cover compared to total interest-bearing liabilities stood at 1.19. The regression analysis revealed a positive relationship with return on assets but a weak positive relationship with liquid assets to total assets ratio. The implication from the study was that there is a need for the establishment of a pre-determined optimal level of liquid assets to enhance the profitability of commercial banks.

Nguyen and Vo (2021) investigated the determinants of commercial banks' liquidity in the Vietnamese Stock Exchange. The study used 17 listed commercial banks and obtained quarterly audited financial statements for the period 2006 to 2020, a total of 496 observations. The study also obtained GDP and inflation data from IMF and the General Statistics Office of the Vietnam. The obtained data was organized in an unbalanced panel data. From the analysis, done through panel data regression analysis, it was established that asset size, return on assets

and credit growth had a positive relationship with banks' liquidity. On the other hand, bank size and return on assets had a negative influence on the liquidity if listed commercial banks in Vietnam. Therefore, to ensure an optimum level of commercial banks' liquidity, there was a need to ensure that focus was devoted towards sustainable credit growth, higher rates of growth over total assets as well as put efforts towards the development of total assets.

Osoro and Josea (2020) researched on market power and intermediation efficiency in the Kenyan banking sector. The study used banks specific consolidated financial reports – balance sheet, profit and loss data for the period 2003 to 2018. The study utilized DEA to assess efficiency. The study also estimated a panel Tobit regression using random effects estimator to understand the association between efficiency of intermediation and market concentration based on Herfindahl-Hirshman Index (HHI). The findings from the analysis indicated that there was a significant relationship between market concentrations on efficiency. Thus, economies of scale have an overbearing on allocation efficiency for big commercial banks in Kenya.

Diamond, Hu, and Rajan (2019), researched on the liquidity and structure of intermediation. The authors describe the events preceding the global financial crisis in regards to the dwindling importance of commercial banks role of intermediation. The period was characterized by unprecedented growth of newer financial products which were aggressively pushed in the market. For instance, new banking products were developed from the sale of commercial and industrial loans as well as residential mortgages which were securitized and sold in the secondary markets. The outcome was an increased leverage on financial firms thus leading to reductions in liquidity levels. The study established that liquidity enhances the

leverage levels of a firm leading to crowding out of the external and internal corporate governance.

Kiemo and Kamau (2020) evaluated efficiency and influence on competition dynamics in the banking sector in Kenya for the period 2001 to 2017. The study used data from 37 commercial banks and undertook a three-step approach in the estimation: non-parametric DEA, Panzar-Rosse H-statistics model in assessing competition and efficiency scores through DEA through re-estimation of P-R equation to determine the role of intermediation efficiency on competition. From the findings, it was evident that there was an upward trend towards efficiency of commercial banks. Importantly, managerial ability was found as integral determinant of efficiency. Managerial ability is a function of various factors, and determination of the rightful level of liquidity is essential in this context.

2.3.4 Operational Efficiency and Commercial Banks' Intermediation Efficiency

Banks play an essential role in the economy as they are the main players in the financial systems of any country. Commercial banks need to be highly efficient to spearhead reforms in the economy thus lead to improved performance and creation of better returns on investments. Since the introduction of banking sector reforms in 1992, commercial banks have embraced efficiency reforms to guide their operations hence create value to shareholders. Banking operational efficiency majorly focuses on technical efficiency, cost efficiency, scope efficiency and scale efficiency (Alber, Elmofty, Walied, & Sami, 2019).

Zhu and Zhang (2018) undertook a comparative analysis of operational efficiency of Indian and Chinese commercial banks. The authors utilized two models with varying input and

output variables to demonstrate efficiency scores variations. Data envelopment analysis was used in the measurement of the efficiency. Findings from the study revealed that mean technical efficiency score for Chinese banks was significantly higher compared to that of Indian banks for the period 2012 to 2013. On the other hand, evaluation of the technical efficiency and pure technical efficiency indicated that foreign banks located in China had a lower figure compared to those in India.

A 2012 study of the Indonesian regional development bank sought to analyze the underlying factors impacting on intermediation process including capital operational efficiency profitability and credit risk (Buchory, 2014). The study used descriptive methods on the secondary data obtained from 26 regional development banks of Indonesia. The study also utilized multiple regression analysis of the data and tested hypotheses using t-tests and f-tests. Findings from the analysis indicated that there was a positive relationship between operational efficiency-operating income ration and return on assets.

Aramonte, Schrimpf, and Shin (2022), investigated the non-bank financial intermediaries and financial stability in the context of growing importance of non-bank intermediaries. The study sought to examine structural changes in financial intermediation after the financial crisis of 2007 to 2008. The framework for systemic-risk propagation for the non-bank intermediaries was also assessed to establish leverage enablers as well as possible spikes in margins stemming from increased efficiency. Results indicated that deleveraging and pursuit for cash, as seen during the Covid-19 crisis, were portrayed as similar issues. Therefore, the design of regulating non-bank financial intermediaries for efficiency should be regarded as a crucial role by the regulatory authority.

Metri (2017) sought to examine the role of operational efficiency on the performance of commercial banks in India. The study measured operational performance through the use of variable returns to the scale scores on efficiency assessed through data envelopment analysis. Capital adequacy, non-performing assets, and return on assets were used in the measurement of financial performance. Regression analysis was used in analyzing the data. The results indicated that there was a statistically significant relationship between capital adequacy, and operational efficiency.

Mukoswa (2014), studied the determinants of operating efficiency for commercial banks in Kenya through a market share index analysis. The researcher obtained secondary data from financial reports of 43 commercial banks in Kenya for the period 2005 to 2011. The study used fixed effects regression in the analysis of the collected data. Statistical significance was tested using F-tests and T-tests on the individual parameters of the study. Findings from the analysis indicated that operating efficiency of the previous year and the equity capital to total assets were proxies for capital adequacy.

Sporta et al. (2018), investigated operational efficiency as a financial distress factor stemming from mismatches in maturity whereby liabilities had a shorter tenor in comparison to assets. The study aimed at assessing operational efficiency as one of the measures of financial performance through return on capital and return on equity. Secondary data was obtained from annual financial reports of 38 commercial banks for 2005 to 2015 and analyzed through generalized least squares method. Findings from the study indicated that a positive relationship existed between operating efficiency and the financial performance of commercial banks in Kenya.

In the Ghanaian banking industry, the integration of technology and deregulations have led to increased competition and financial integration. Thus, studies have been devoted to understand the determinants of efficiency in the sector, especially with the increasing levels of competition from global banks (Sarpong, & Winful, 2017). It has been established that operational cost, bank size and credit risk majorly impact on the cost efficiency of commercial banks in Ghana. In addition, credit risk and operational costs have a significant impact on profit efficiency.

Musah, Kong, and Mensah (2019), in their study to establish the association between operational efficiency and firms' financial performance in Ghana stock exchange established that operational efficiency significantly negatively impacts on financial performance. It is therefore possible for firms to achieve meaningful operational efficiency through improvements on their asset quality, diversifying revenue, and maintenance of optimum liquidity (Musah, Kong, & Mensah, 2019).

Operating efficiency for commercial banks in Kenya is dependent on diverse factors as evident through market share index analysis. Operating efficiency of firms listed in the Nairobi stock exchange for the years 2005 to 2011 indicated the previous year's operating efficiency and equity capital to total assets were proxies for capital adequacy (Mukiswa, 2014). Operational efficiency can be viewed in terms of financial distress stemming from mismatches in maturity whereby liabilities have shorter tenure compared to assets. Thus, operational efficiency of commercial banks should be regarded as a measure of financial performance based on return on capital and equity (Sporta et al., 2018). Indeed, research has indicated an

existence of a significant relationship between operational efficiency and financial performance of commercial banks in Kenya.

2.4 Research Gaps

From the review of empirical literature above, it is evident that significant gaps exist in the assessment of firm characteristics and intermediation efficiency. The studies reviewed in the empirical literature review thus present gaps based on conceptual, empirical, theoretical, methodological, and contextual approaches. Commercial banks and deposit taking microfinance institutions have been credited for major progress towards the realization of financial intermediation. However, it is prudent to assess the extent to which their individual characteristics lead to success in financial intermediation efficiency. Although some studies have recently attempted to look at the firm characteristics on deposit taking microfinance institutions in Kenya (Kariuki, 2017) other studies have focused on firm characteristics and financial stability (Wafula, 2020).

There is a contextual and population gap in Kariuki (2017) study on firm characteristics and financial intermediation efficiency of DTSs in Kenya. On the other hand, Wafula (2020) study on firm characteristics and financial stability of commercial banks in Kenya presents both a population and empirical gap since the study did not look at financial intermediation efficiency of commercial banks in Kenya, and also did not focus on listed commercial banks. Other studies, at global, regional and local scope present gaps in methodological approaches, contextual and conceptual aspects (Musah, Kong, & Mensah, 2019; Sporta et al., 2018; Aramonte, Schrimpf, & Shin, 2022; Nguyen & Vo, 2021; & Mnyampanda and Chindemgwike,

2021). Studies done outside Kenya present contextual gaps owing to different geographical locations and existing divergences in regulatory, and economic framework.

In this current study, the objective is to fill the gaps identified in past empirical literature in the recent studies. The study will particularly focus on intermediation efficiency during the Covid-19 crisis that brought drastic containment measures leading to massive reductions in face-to-face interactions. During this period commercial banks opted for other forms of service delivery, especially the use of mobile money banking and internet banking, while reducing the number of staff at physical branches. This study is the first of its kind post the Covid-19 crisis period and may fill an important empirical literature gap on how firm characteristics of individual banks have helped improve intermediation efficiency.

2.5 Conceptual Framework

A conceptual framework refers to the research apparatus proposed in helping a researcher come up with a diagrammatic explanation of the context of the study to create a mindfulness and comprehension of the variables under the discussion (Smith, 2004). The selected firm characteristics for this study include: capital adequacy, asset quality, liquidity and operational efficiency.

Efficiency relates to the firm's ability to attain a given output level within the lowest possible number of resources. In this study, the focus on efficiency will be technical efficiency which is majorly driven by the desire to obtain maximum outputs from a specified minimum input. Financial intermediation efficiency thus refers to the aspect of the commercial banks to mobilize funds from savers and availing the same to borrowers through the lowest possible

costs but maximizing the level of output through the available technology and other inputs (Sufian, 2009).

In this study, financial intermediation efficiency will be used as the dependent variability of the study measured through the weighted sum of outputs over the weighted sum of inputs. The measurement of the financial intermediation efficiency will thus be based on nonparametric approach through the use of data envelopment analysis (DEA). DEA is a multi-factor productivity analysis model used to measure relative efficiencies of homogeneous decision making units (DMUs) (Coelli, 1996). Indeed, an efficient firm is not always associated with the maximum level of output for specified inputs; however, the firm is considered the best practice firm in consideration of the selected sample (Talluri, 2000).

Capital adequacy is a fundamental component of the commercial banks and generally the entire financial sector. Regulators all over the world are hugely concerned with the capital requirements of the financial secror players, especially post the 2007/2008 global financial crisis. Bank capital is an integral component of the banking system based on the Basel Prudential Requirements and is one of the most widely researched area in literature (Wieczorek-Kosmala, 2019). In this study, capital adequacy will be measured through a ratio of the core capital and total assets. The central bank of Kenya is mandated in ensuring that minimum capital requirements are met by all commercial banks operating in Kenya. The objective is to ensure stability of the banking sector.

Assets quality is hugely important in the banking sector. Commercial banks are at the forefront in obtaining deposits from savers and onward lending the same to borrowers. The processed loans are regarded as the assets of the commercial banks owing to their ability to

create future cash flows for the commercial banks. For commercial banks and other financial institutions, asset quality is regarded as the ability of the banks to receive repayments of the loans issued to borrowers on a timely basis and fully adhering to the repayment requirements (Alhassan et al., 2014). Therefore, non-performing loans have a negative implication on the asset quality of a commercial bank. In this study, asset quality will be examined as a ratio of nonperforming loans and total loans issued.

Liquidity is the ability of a financial institution to fulfil all the obligations relating to withdrawal of deposits, requests for loans as well as servicing of pending liabilities without facing constraints (Akhtar et al., 2011). Indeed, liquidity can be seen as a sign of a commercial bank's ability to maintain an optimal level between financial outflows and inflows. Liquidity is a major concern of regulators as it can easily lead to bank runs that can massively affect the entire financial system. In this study, liquidity will be measured through a ratio of current assets and current liabilities.

Operational efficiency of commercial banks refers to the ability of the bank to provide optimum level of services and products at the lowest possible costs. Thus, a commercial bank with high levels of operational efficiency is able to play the role of intermediation optimally while reducing operating costs in its operations. In this study, operating efficiency will be measured using a ratio of total costs of operations and total operating income. The diagrammatic relationship among the independent variables and the dependent variable are given in the figure below:

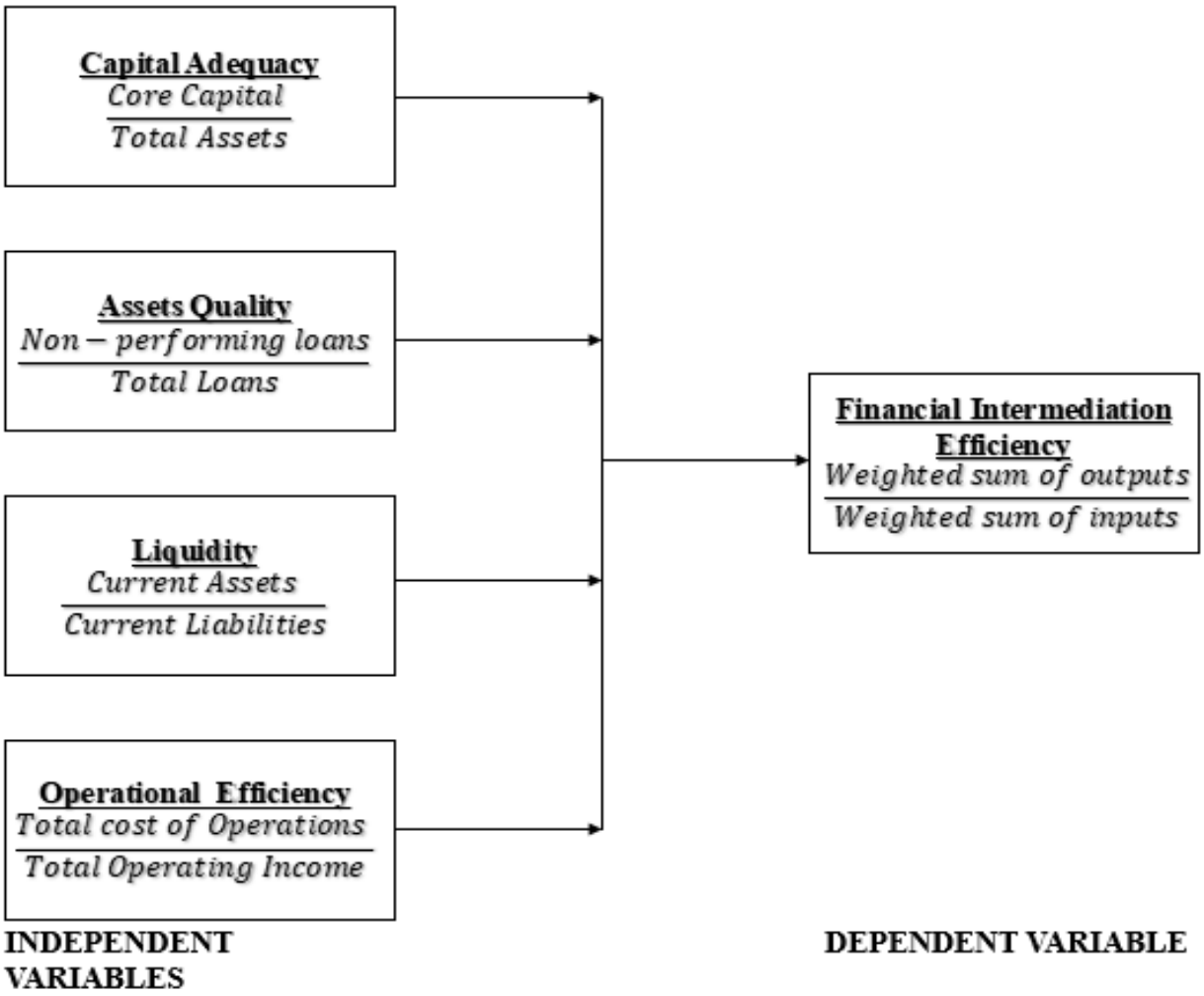

FIGURE 1

Conceptual Framework

Source: Author (2022)

2.6 Operationalization of Research Variables

TABLE 1

Operationalization of Research

Variable	Variable Name	Measurements	Theory
Y	Financial Intermediation efficiency	$\frac{Weighted\ sum\ of\ outputs}{Weighted\ sum\ of\ inputs}$	Efficiency Structure Theory
X_1	Capital Adequacy	$\frac{Core\ Capital}{Total\ Assets}$	Buffer Capital Theory
X_2	Asset Quality	$\frac{Non-performing\ loans}{Total\ Loans}$	Theory of Financial Intermediation
X_3	Liquidity	$\frac{Current\ Assets}{Current\ Liabilities}$	Liquidity shiftability theory
X_4	Operational Efficiency	$\frac{Total\ cost\ of\ Operations}{Total\ Operating\ Income}$	Efficiency Structure Theory

Source: Author (2022)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers the methodological approach towards this study through a detailed description of the research design, the population of the study and sampling design, the methods of data collection, and analysis of the data collected.

3.2 Research Design

Research design refers to the blueprint benchmarked by a researcher in the implementation of the study based on the collection of data and analysis of the same to achieve study objectives. A resign design ensures that the research in question attains relevance to the phenomena under investigation through the utilization of stipulated procedure. According to Cooper and Schindler (2009), a research design determines the reasons for the existence of the status quo for the phenomenon under investigation. Thus, the study adopted a descriptive research design. The descriptive study design was adopted as the study involved investigating the effect of firm characteristics on intermediation efficiency of listed commercial banks in Kenya. Descriptive research was further used to collect data on the existing state of a phenomena in order to describe "what exists" in relation to the variables or conditions of a scenario (Bloomfield & Fisher, 2019).

3.3 Target Population

Cooper and Schindler (2009) contend that a population of study includes the elements the researcher wishes to make reference during the study. Study population also refers to the

elements derived from a specified area where the study findings are to be generalized (Daymon & Holloway, 2010). Lune and Berg (2016), define a population as a given group of individuals of objects that contain observable traits. The target population for this study were listed commercial banks in Kenya, which are currently 11 in total. Convenience sampling will be used for this study to select the 11 commercial banks listed at the Nairobi stock exchange. The table below shows the list of currently listed commercial banks in Kenya at the NSE.

3.4 Data Collection Instrument

Secondary data was used for this study as obtained from the financial statements of the listed commercial banks using a study review guide document to obtain and compile financial information for the analysis. The main information to be obtained from the financial statements will include income statement, note to the accounts, and statements of the financial position. Data was obtained from the years 2017 to 2021 for 5 years.

3.5 Data Analysis and Presentation

This study used quantitative data encompassing cross section and time series data. Thus, there will be descriptive and inferential statistical analysis. The descriptive statistics used for the study included mean, standard deviation, minimum and maximum values as well as trend analysis. On the other hand, inferential statistics to be used in the study included correlation and regression analysis. The importance of undertaking correlation analysis was to establish the direction of the effect for the dependent and independent variables. On the other hand, the use of regression analysis by the researcher is motivated by the desire to ascertain the nature of the

effect of firm characteristics on the intermediation efficiency of listed commercial banks in Kenya.

In particular, the data obtained was subjected to two stages of analysis for each of the study variables. The researcher generated efficiency scores through data envelopment analysis (DEA) methodology. This was subsequently followed by multiple regression analysis in order to regress the efficiency scores obtained from DEA on the selected firm characteristics. STATA and EViews were used to incorporate the data forming the pooled model. DEA approach is preferred in this study due to its non-parametric nature and the fact that it focuses on individual observations as opposed to averages. The output from the analysis were presented through tables, figures, and graphs. The model regression model for this study was as follows:

$$y_{i,t}=\alpha+\beta_1 x_{1i,t}+\beta_2 x_{2i,t}+\beta_3 x_{3i,t}+\beta_4 x_{4i,t}+\acute{\varepsilon}_{i,t}$$

Where:

$\boldsymbol{Y}$ - refers to the dependent variable (financial intermediation efficiency)

$\boldsymbol{\beta_0}$ – refers to the constant coefficient of the intercept

$\boldsymbol{\beta_{1-4}}$ – refers to the vector coefficients of the independent variables

$\boldsymbol{X_1}$ – Capital adequacy

$\boldsymbol{X_2}$ – Asset quality

X_3 – Liquidity

X_4 – Operational efficiency

ϵ – represents the error term

3.6 Diagnostic Tests

The classical regression modelling is established on the basis of various important assumptions namely: normality, multicollinearity, heteroscedasticity, and autocorrelation.

3.6.1 Lagrange Multiplier Test

Lagrange multipliers Test is a strategy that was used to establish the study maxima and minima of a function subject to equality constraints (Cheng, Liu & Shen, 2020). As such, Lagrange multiplier test was carried with a null hypothesis that there is no panel effect against an alternative that there is panel effect.

3.6.1 Tests of Normality

Normality test is either done graphically or statistically. In the graphical method, normality can be done through box plot, PP plots, QQ plots, stem and leaf plots. Statistical tests include Kolmogorov Smirnov, Jarque Berra test, etc. The assumption in normality is that data is normal against non-normality. Therefore, if the p value is greater than 0.05, it is concluded that normality exists and hence no need to undertake data transformation (Woodbridge, 2012).

3.6.3 Multicollinearity Tests

The assumption in regression analysis is that independent variables are not related. In the event that independent variables are correlated, it is important to undertake a model re-specification (Shrestha, 2020). In this study multicollinearity was examined using correlation matrix and if correlation coefficient between two independent variables was greater than 0.8, then there was a multicollinearity and model specification ought to be considered.

3.6.4 Test for Homoscedasticity

The assumption in regression analysis is that the error term has equal variation. This is examined through statistical tests or graphical methods. Breusch-Pagan test was used to test for heteroscedasticity of the error terms. If non-uniform variance is present, the p value should be less than 0.05. This can be corrected through the use of robust standard errors or FGLS (Woodridge, 2012).

3.6.5 Auto-Correlation Test

The assumption in regression analysis is that the error term is not correlated. The Durbin Watson for time series is often used to test for serial autocorrelation. On the other hand, panel data used likelihood ratio to test for serial autocorrelation ((Liebhold & Sharov, 2020). In the event that serial autocorrelation is present, it can be corrected by fitting feasible generalized lest squares (FGLS).

3.6.6 Hausman Test

The purpose of fixed effects model is to explain the unobserved variables are not allowed to have any associations with observed variables. Thus, fixed effects model control for, or partial out the effects of time-invariant variables with time-invariant effects. The random effects model provides and explanation that unobserved variables should be uncorrelated with all the observed variables (Hamaker & Muthén, 2020). The purpose of this test was to see if there is a link between the random effects of unobserved firm financial variables and the predictors. If there is no such association, the random effects hypothesis is favored. A failure to reject the null hypothesis indicates that the sampling variance in the estimates of fixed effects is too substantial to permit the conclusion of statistically significant differences.

The following diagnostic tests were considered in the study as tabulated in Table 2.

TABLE 2
Panel Data Diagnostic Tests

Test	Test Used	Conclusion
Use of pooled or random effects model	Breusch Pagan LM test	If P value >0.05, use pooled effects model.
Time Fixed Effects	F statistics	If p value >0.05, there are no time fixed effects do not use two-way model or introduce dummy variables
Heteroskedasticity	Modified Wald Test	If P value <0.05, presence of non-uniform variance.
Serial correlation	Likelihood ratio test	If P>0.05, no serial correlation
Random or fixed effects	Hausman test	If p value>0.05, use random effects model.

Source: Author (2022)

CHAPTER FOUR

FINDINGS AND INTERPRETATION

4.1 Introduction

The current study aimed at examining the effect of firm financial characteristics on financial intermediation efficiency on listed commercial banks in Kenya. Specifically, the study examined the effect of capital adequacy, operating efficiency, asset quality and liquidity on financial intermediation efficiency. Descriptive and inferential statistics were applied for data analysis.

4.2 Descriptive Statistics

Descriptive measures of central tendency and dispersion were applied as tabulated in Table 4.1. From the findings the mean financial intermediation efficiency of commercial banks listed was 0.688, with a minimum of 0.1 and maximum of 1.357. There was a wider variation as indicated by standard deviation of 0.254. Concerning capital adequacy, the average capital adequacy was 13.1% with a minimum of 2.4% and maximum of 20.4%. This indicates that there were some listed commercial banks that did not meet the minimum capital adequacy in some period. The average operating efficiency was 0.688, with a maximum of 0.362 and maximum of 2.043. There was a wider variation as indicated by standard deviation 0.378. Asset quality has a mean of 0.141, with a minimum of 0.005 and maximum of 0.658. There was a minimal variation as indicated by standard deviation of 0.153. The average liquidity was 0.485, with a minimum of 0.208 and maximum of 0.724.

TABLE 3

Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
FIE	overall	0.688	0.254	0.1	1.357	N=55
	between		0.24	0.111	0.954	n=11
	within		0.106	0.41	1.262	T=5
Capital Adequacy	overall	0.131	0.035	0.024	0.204	N=55
	between		0.031	0.045	0.153	n=11
	within		0.169	0.093	0.182	T=5
Operating efficiency	overall	0.688	0.378	0.362	2.043	N=55
	between		0.326	0.416	1.582	n=11
	within		0.125	0.152	1.149	T=5
Asset quality	overall	0.141	0.153	0.005	0.658	N=55
	between		0.154	0.009	0.551	n=11
	within		0.037	0.059	0.248	T=5
Liquidity	overall	0.485	0.129	0.208	0.724	N=55
	between		0.128	0.243	0.712	n=11
	within		0.039	0.369	0.577	T=5

Source: Author (2022)

4.3 Correlation Analysis

Product moment correlation coefficient was applied to examine the strength of the effect of capital adequacy, operating efficiency, asset quality, liquidity and financial intermediation efficiency. Results in Table 4.2 indicates that there was a positive and not significant effect of capital adequacy and financial intermediation efficiency (rho = 0.003, p value > 0.05). Secondly, there was a positive and not significant effect of operating efficiency and financial intermediation efficiency (rho = 0.136, p value > 0.05). Thirdly, there was an inverse and not significant effect of financial intermediation efficiency (rho = -0.134, p value > 0.05). Further, there was an inverse and significant effect on financial intermediation efficiency (rho = -0.374, p value < 0.05). Further, there was no multicollinearity since none of the predictors have correlation coefficient greater than 0.7.

TABLE 4

Correlation

Variables	(1)	(2)	(3)	(4)	(5)
(1) Financial Intermediation Efficiency	1.000				
(2) Capital Adequacy	0.003	1.000			
	(0.980)				
(3) Operating Efficiency	0.136	-0.457	1.000		
	(0.322)	(0.000)			
(4) Asset Quality	-0.134	-0.197	0.553	1.000	
	(0.331)	(0.000)	(0.000)		
(5) Liquidity	-0.374	0.216	-0.541	-0.253	1.000
	(0.005)	(0.114)	(0.000)	(0.063)	

Source: Author (2022)

4.4 Trend Analysis

Trend analysis in Figure 2.1 indicates that listed commercial banks recorded co-movement between firm financial characteristics and financial intermediation efficiency. Notable are the changes in listed banks 9 recorded declining trend within the period under consideration while number 7 recorded decreasing trend which was reversed in 2019.

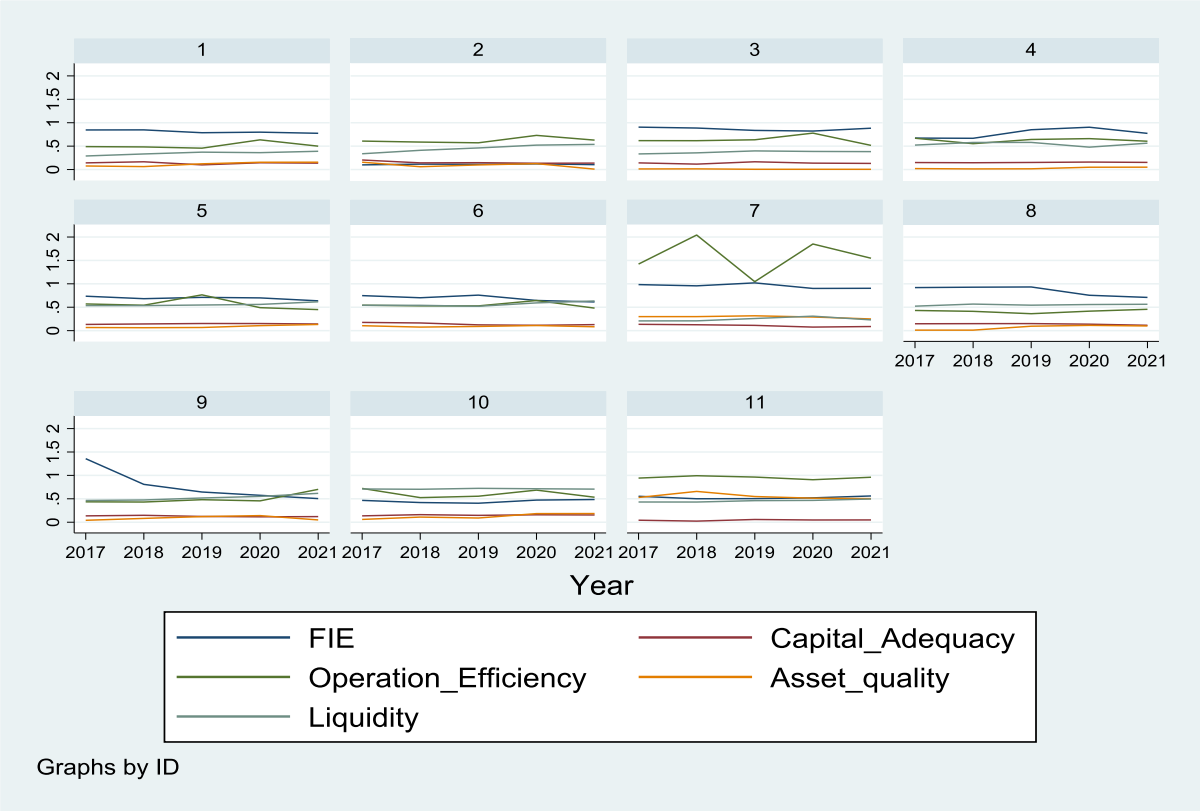

FIGURE 2

Trend Analysis

Source: Author (2022)

4.5 Diagnostic Tests

Prior to regression analysis diagnostic tests were carried. They included Lagrange multiplier test, normality test, heteroskedasticity, serial correlation and Hausman test.

4.5.1 Lagrange Multiplier Test

Lagrange multiplier test was carried with a null hypothesis that there is no panel effect against an alternative that there is panel effect. Results in Table 4.3 has a p value of 0.000 and chi square of 58.19. This indicates that there is enough evidence to warrant rejection of the null

hypothesis and conclusion that there are panel effect and pool effect least square model is not the most appropriate for examination of the effect of firm financial characteristics on financial intermediation efficiency of listed commercial banks in Kenya.

TABLE 5

Lagrange Multiplier Test

	VAR	**sd=sqrt (Var)**
FIE	0.0644	0.25387
E	0.01085	0.10428
U	0.04368	0.20898
	Chi square = 58.19	P value =0.000

Source: Author (2022)

4.5.2 Normality Test

Normality test of the error term was examined using Jarque Berra tests. The null hypothesis stated that the error term was normally distributed against an alternative that the data was not normally distributed. Results in Table 4.4, has a chi square 1.58 and p value > 0.05, this indicates that the error term is normally distributed.

TABLE 6

Normality Test

Chi Square	**P value**
1.58	0.4538

Source: Author (2022)

4.5.3 Heteroskedasticity Test

Heteroskedasticity is an assumption that the error term has uniform variance against an alternative that the error term does not have uniform variance. Heteroskedasticity was examined using Breusch Pagan test. Results in Table 4.5, has a chi square of 98517.10 and p value <0.05. This indicates that there is enough evidence for rejection of the null hypothesis and conclusion that the error is not homoscedastic. Hence, the study fitted regression model with robust standard errors.

TABLE 7

Heteroskedasticity

Chi Square	P value
98517.10	0.0000

Source: Author (2022)

4.5.4 Serial Correlation Test

Serial correlation test was carried the link between current and past period error term. Serial correlation test was carried out using likelihood ratio. The null hypothesis stated that there was no first order serial correlation against an alternative that there was a first order serial correlation. Results in Table 4.6 has a chi square of 277.530 and p value < 0.05. This indicates there is enough evidence for rejection of the null hypothesis and conclusion that there is first order serial correlation. Hence, the study adopted robust standard errors.

TABLE 8

Serial Correlation

Chi Square	P value
277.530	0.0000

Source: Author (2022)

4.5.6 Hausman Test

The choice between fitting random and fixed effects was examined using Hausman test. The test had a null hypothesis that the most appropriate model to fit was random effects against an alternative of fitting fixed effects. Results in Table 4.7 has a p value of 0.248 which is greater than 0.05. Hence, the most appropriate model to fit was random effects while examining the effect of firm financial characteristics on financial intermediation efficiency of listed commercial banks in Kenya.

TABLE 9

Hausman Test

Test Summary		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
		5.413	4	0.248
Variable	**Fixed**	**Random**	**Var (Diff.)**	**Prob.**
Capital adequacy	0.287	0.020	0.164	0.509
Operation efficiency	-0.128	-0.094	0.002	0.493
Asset quality	-0.733	-0.554	0.053	0.437
Liquidity	-1.162	-1.150	0.065	0.962

Source: Author (2022)

4.6 Random Effects Regression Analysis

Regression analysis in Table 4.8, has an r squared of 0.283, which indicates that 28.3% of changes in financial intermediation efficiency can be explained by capital adequacy, operating efficiency, asset quality and liquidity. A Chi square of 16.85 and p value < 0.0021, which indicates that there is a significant effect of capital adequacy, operating efficiency, asset quality and liquidity and financial intermediation efficiency and at least one slope coefficient is non-zero.

The first objective of the study examined the effect of capital adequacy on financial intermediation efficiency of listed commercial banks in Kenya. Results of the study indicates that there was a positive and not significant effect of capital adequacy on financial intermediation efficiency ($\beta = 0.025$, p value > 0.05). The second objective of the study examined the effect of operating efficiency on financial intermediation efficiency of listed commercial banks in Kenya. Results of the study indicates that there is an inverse and not significant effect of operating efficiency on financial intermediation efficiency of listed commercial banks in Kenya ($\beta = -0.095$, p value > 0.05).

The third objective of the study examined the effect of asset quality on financial intermediation efficiency of listed commercial banks in Kenya. Results of the study indicates that there is an inverse and not significant effect of asset quality on financial intermediation efficiency of listed commercial banks in Kenya ($\beta = -0.554$, p value > 0.05). The fourth objective of the study evaluated the effect of liquidity on financial intermediation efficiency of listed commercial banks in Kenya. Results of the study indicates that there was a negative and significant effect of liquidity on financial intermediation efficiency of listed commercial banks in Kenya ($\beta = -1.15$, p value <0.05). This implies that unit decrease in liquidity of listed

commercial banks increases financial intermediation efficiency of listed commercial banks by 1.15 units. The resultant model for the study is of the form:

Financial Intermediation Efficiency = 1.38 + 0.025*Capital Adequacy – 0.095*Operating Efficiency – 0.554*Asset quality -1.15*Liquidity.

TABLE 10

Random Effect Regression Analysis

Financial Intermediation Efficiency	**Coefficient**	**Robust Standard Error**	**t-value**	**p-value**	**[95% Conf**	**Interval]**	**Sig**
Capital Adequacy	.025	.629	0.04	.969	-1.207	1.256	
Asset Quality	-.554	.336	-1.65	.099	-1.213	.104	*
Liquidity	-1.15	.553	-2.08	.038	-2.234	-.065	**
Operating Efficiency	-.095	.075	-1.26	.208	-.242	.053	
Constant	1.38	.397	3.48	.001	.602	2.158	***
Mean dependent var		0.683	SD dependent var			0.254	
Overall r-squared		0.179	Number of obs			55	
Chi-square		16.85	Prob > chi2			0.0021	
R-squared within		0.283	R-squared between			0.165	

**** p<.01, ** p<.05, * p<.1*

Source: Author (2022)

4.7 Discussion of the Study Findings

The need for the current study arose from theoretical, methodological, contextual and conceptual gaps. Methodologically, the study identified gaps associated with choice of data and research design. Although, some studies had considered panel data they had not carried out its respective diagnostic tests hence there were higher odds of drawing biased conclusion. Further, there were some studies that had considered descriptive research design though the most appropriate was causal research design.

Contextually, some studies were carried out among deposit taking savings and credit cooperative banks and all banks in Kenya whose firm specific risks were heterogeneous to the listed commercial banks. Hence, the current study aimed at examining the effect of firm financial characteristics on financial intermediation efficiency of listed commercial banks in Kenya. The study applied correlation research design and collected commercial banks data from 2017 to 2021. Data was analysed using descriptive and inferential statistics. There was positive and not significant effect of capital adequacy on financial intermediation efficiency of listed commercial banks in Kenya. Further, operating efficiency and asset quality has inverse and not significant effect on financial intermediation of listed commercial banks. Moreover, there was an inverse and significant effect of liquidity on financial intermediation efficiency of listed commercial banks in Kenya.

The first objective of the study examined the effect of capital adequacy on financial intermediation efficiency of listed commercial banks in Kenya. Since there was a positive and not significant effect of capital adequacy on financial intermediation efficiency of listed banks

in Kenya. The results are in support of Rahman et al., (2017) who argued that positive effect of capital holdings increases efficiency of financial intermediation. Also, the study support Zheng et al., (2017) who asserts that in Bangladesh commercial banks efficiency is enhanced through increased regulatory ratios regulations. In line, with Pyka and Nocon (2021) commercial banks should comply with regulatory ratios requirements so as to minimize insolvency risks. The results were in support with buffer capital that argues that banks increase their buffer capital levels so as to enhance their risk adjustment levels.

The development of Basel I, II, and III by the Basel Committee on Banking Supervision was prompted by the objective of supporting banks in the process of dealing with potential risks as well as easing the process of loss absorption. This is especially driven by the fact that commercial banks operate in contexts whereby they cannot avoid interacting with other businesses and competitors through globalization and interdependence (Luong & Nguyen, 2021). The requirements on capital adequacy according to Basel I, II, & III, commercial banks should maintain a minimum capital adequacy ratio of 8% and 10.5% respectively. An estimation of the optimal CAR for 26 commercial banks in Vietnam between 2016 and 2020 showed that those banks whose CAR exceeded 8% and 10.5% accounted for 98% and 88% respectively (Luong & Nguyen, 2021).

Unprecedented attention is always put on the profitability of commercial banks owing to the extent of the factors involved in the attainment of objectives. Stakeholders are always concerned by the level of profitability attained by commercial banks. Thus, most commercial banks in Nigeria have devoted efforts towards growing their profitability levels at all times to increase shareholders' wealth. Elsewhere, it has also been found that there is a direct

relationship between capital ratio and the risk-taking behavior of commercial banks in Tanzania (Lotto, 2017).

The second objective of the study of the study examined the effect asset quality on financial intermediation efficiency of listed commercial banks in Kenya. It was found that asset quality has inverse and not significant effect on financial intermediation efficiency of listed commercial banks in Kenya. Financial soundness has a major role in the performance and efficiency of commercial banks. According to a study by Lewal (2018), on the impacts of financial soundness of commercial banks on operational efficiency in Nigeria, there is a significant influence of financial soundness on efficiency. Indeed, soundness of commercial banks can lead to a reduction in the mismatch in asset liabilities and agency problem. Intermediation efficiency is associated with commercial banks' performance as measured through profitability. Omokayode and Olufemi (2017), in their study of intermediation efficiency and profitability performance of Nigerian banking sector argue that commercial banks register one to the highest profitability levels in the country compared to the global performance.

Asset quality and the performance of commercial banks have been widely studied by different scholars. Mnyampanda and Chindemgwike (2021), in their study of the relationship between asset quality and commercial banks' financial performance in Tanzania established that there is a significant relationship between asset quality and the performance of commercial banks. A wide array of factors is associated with the deterioration of the quality of assets held by Ghanaian commercial banks, especially during the crisis's periods. Based on the results from a study to investigate the factors leading to deterioration of asset quality in Ghana,

Alhassan, Kyereboah-Coleman, and Andoh established that, just like other countries in Africa, banks in Ghana are susceptible to deterioration of assets quality. Nevertheless, the protection of commercial banks' stability is driven by the desire to ensure stable financial sector and increased efficiency of operations across the banking sector.

The third objective of the study examined the effect of liquidity on financial intermediation efficiency of listed commercial banks in Kenya. It was found that there was a negative and not significant effect of liquidity on financial intermediation efficiency of listed commercial banks in Kenya. Liquidity risk has the possibility of not only endangering the commercial bank but also the entire banking system in an economy. In their study to investigate the impact of liquidity risk and bank performance of Southeast Asian countries, Huong, Nga, and Oanh (2021), the researchers established that liquidity risk positively affected the performance of banks. The study also established that commercial banks that had good performance were characterized with high liquidity risk on normal circumstances.

Banks often undertake measures to improve their liquidity levels during financial crises so as to improve their levels of profitability. However, the effect of such measures would be increased financial costs and reduced efficiency (Huong, Nga, & Oanh, 2021). Liquidity and intermediation structure of commercial banks are associated with leverage increases. Indeed, the pre-global financial crises period was characterized by increased leverage levels and the rise of new financial products such as commercial and industrial loans as well as securitized mortgage loans. Increased leverage resulted in lower levels of liquidity hence crowding out of internal and external corporate governance (Diamond, Hu, & Rajan, 2019).

Decline in the total liquidity level of commercial banks leads to instability in the commercial banks. This was evident through a study by Muhammad and Gang (2017) assessing the impact of bank liquidity on the stability of Chinese commercial banks. Through a panel data extracted from 197 commercial banks in China during the period 2005 to 2014, the researchers noted that total liquidity was on a decline. Wafula (2020) established that asset quality portrayed a statistically significant positive impact on financial stability. Conversely, Kariuki (2017) concluded that asset quality had a significant influence on intermediation efficiency of deposit taking microfinance institutions.

The fourth objective of the study examined of operating efficiency and financial intermediation efficiency of listed commercial banks in Kenya. There was an inverse and not significant effect of operating efficiency and financial intermediation efficiency of listed commercial banks in Kenya. Operational efficiency of commercial banks is driven by strategy, strategy execution, and environmental factors. The Chinese and Indian commercial banks regard operational efficiency as important considerations for success. A comparison of the technical efficiency of commercial banks in China and India shows that Chinese commercial banks have a significantly higher levels of technical efficiency (Zhu, & Zhang, 2018). A study of the Indonesian regional development banks assessed the factors affecting intermediation process argued that there is a positive relationship between operational efficiency-operating income and return on assets (Buchory & Ekuitas, 2019).

Non-bank intermediaries have been increasing in importance over the past few years. Structural changes in financial intermediation post the global financial crisis have particularly focused on the importance of operational efficiency (Aramonte, Schrimpf, & Shin, 2022).

Thus, the framework for systemic-risk propagation for non-bank intermediaries is also associated with increased efficiency. Reduced levels of leverage and increased liquidity are seen as essential undertakings for commercial banks especially during financial downturns. Regulation of non-bank financial intermediaries to achieve operational efficiency. Banks in India have a statistically significant relationship between capital adequacy and operational efficiency (Metri, 2017). Operational performance is measured through variable returns to the scale scores as assessed through data envelopment analysis.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The current chapter presents summary, conclusion and recommendations of the findings. Further, limitations of the study are presented too.

5.2 Summary of Study Findings

This section provided a detailed summary of the results findings on the effect of firm characteristics on financial intermediation efficiency of listed commercial banks in Kenya. The summary provided was in regards to the four key firm characteristics in terms of capital adequacy, asset quality, liquidity and operating efficiency.

5.2.1 Capital Adequacy and Financial Intermediation Efficiency

The first objective of the study examined the effect of capital adequacy on financial intermediation efficiency of listed commercial banks in Kenya. Results of the study indicates that there was a positive and not significant effect of capital adequacy on financial intermediation efficiency of listed commercial banks in Kenya.

5.2.2 Asset Quality and Financial Intermediation Efficiency

The second objective of the study of the study examined the effect asset quality on financial intermediation efficiency of listed commercial banks in Kenya. It was found that asset quality has inverse and not significant effect on financial intermediation efficiency of listed commercial banks in Kenya. Financial soundness has a major role in the performance and

efficiency of commercial banks. Indeed, soundness of commercial banks can lead to a reduction in the mismatch in asset liabilities and agency problem. Intermediation efficiency is associated with commercial banks' performance as measured through profitability.

5.2.3 Liquidity and Financial Intermediation Efficiency

The third objective of the study examined the effect of liquidity on financial intermediation efficiency of listed commercial banks in Kenya. It was found that there was a negative and not significant effect of liquidity on financial intermediation efficiency of listed commercial banks in Kenya. Liquidity risk has the possibility of not only endangering the commercial bank but also the entire banking system in an economy. Banks often undertake measures to improve their liquidity levels during financial crises so as to improve their levels of profitability.

However, the effect of such measures would be increased financial costs and reduced efficiency. Liquidity and intermediation structure of commercial banks are associated with leverage increases. Indeed, the pre-global financial crises period was characterized by increased leverage levels and the rise of new financial products such as commercial and industrial loans as well as securitized mortgage loans. Increased leverage resulted in lower levels of liquidity hence crowding out of internal and external corporate governance.

5.2.4 Operating Efficiency and Financial Intermediation Efficiency

The fourth objective of the study examined of operating efficiency and financial intermediation efficiency of listed commercial banks in Kenya. There was an inverse and not significant effect of operating efficiency and financial intermediation efficiency of listed commercial banks in Kenya. Operational efficiency of commercial banks is driven by strategy, strategy execution,

and environmental factors. The Chinese and Indian commercial banks regard operational efficiency as important considerations for success. A comparison of the technical efficiency of commercial banks in China and India shows that Chinese commercial banks have a significantly higher levels of technical efficiency.

5.3 Conclusion of the Study

The study examined the effect of firm financial characteristics and financial intermediation efficiency of listed commercial banks in Kenya. The study revealed positive effect of capital adequacy on financial intermediation efficiency of listed commercial banks in Kenya. This implies that increase in capital adequacy increases financial intermediation efficiency of listed commercial banks in Kenya. It can be implied that to enhance financial intermediation efficiency listed commercial banks ought to comply with regulatory requirements.

The second objective of the study revealed inverse and not significant effect of asset quality on financial intermediation efficiency of listed commercial banks in Kenya. The findings indicate an inverse contribution of asset quality on financial intermediation efficiency. Thus, it can be concluded that positive change of asset quality inhibits achievement of financial intermediation efficiency. Thus, it can conclude that an increased level of non-performing loans decreases financial intermediation efficiency.

The third objective of the study revealed significant effect of liquidity on financial intermediation efficiency of listed commercial banks in Kenya. It can be concluded that there is a negative co-movement between liquidity and financial intermediation of listed commercial banks in Kenya.

The fourth objective of the study revealed an inverse and not significant effect of operating efficiency on financial intermediation efficiency of listed commercial banks in Kenya. From the findings it can be concluded that there an increase in outcomes with increase in level of financial intermediation efficiency of respective listed commercial banks in Kenya.

5.4 Recommendation

This section provided both the general and policy recommendations that were made following the findings of the study. General recommendations were discussed first based on the study findings followed by the policy recommendations that were discussed based on those who benefited from the findings of this study.

5.4.1 General Recommendations

Based on the findings of positive effect of capital adequacy on financial intermediation efficiency. Though this effect was not significant it indicates that through listed commercial banks have achieved the required capital adequacy levels. The core movement with financial intermediation efficiency is not guaranteed. Non –significant effect may be mitigated by continuously monitoring level of core deposits to minimize odds of not holding bank resources in non –profitable ventures. Moreover, there is need for ought to be consolidated to eradicate odds of banks panics and runs.

The inverse effect of asset quality through insignificant depicts that their odds of listed commercial banks' lending loans among borrowers who exposes them into moral hazard and adverse selection. Thus, there is need for adoption of risk-based lending models so as to minimize the level of costs associated with information asymmetry. Further listed commercial

banks should enhance their loan portfolio management strategies through continuous monitoring. The level of non-performing loans should be minimized which is achievable through continuous evaluation of the entire credit framework and more emphasis to be on credit appraisal and debt collection strategies.

Inverse effect of liquidity on financial intermediation efficiency of listed commercial banks in Kenya was documented. Based on this the study, the management should continuously monitor liquidity levels so as to minimize odds of eroding benefits to be accrued through achievement of financial intermediation efficiency. The management of listed banks should evaluate their working capital strategies and ensure that they deploy those models that aids in achievement of their financial intermediation efficiency.

The inverse effect of operating efficiency on financial intermediation efficiency of listed commercial banks underpins the value of management developing strategies aimed generating wealth for all its stakeholders. This implies that bank management ought to examine their internal strategies and adopt options that enhances their efficiency. Furthermore, banks should adopt data mining approaches so as to eradicate spillage of resources and optimize intermediation efficiency.

5.4.2 Policy Recommendations

Commercial banks have a significant contribution in achievement of vision 2030. By promoting saving and investment culture. This will be achieved through development of management strategies aimed at managing capital adequacy, asset quality /operating efficiency and liquidity. The management approach ought to have vale chain design by incorporating the

value benefit from respective firm characteristics. Financial services provision should be anchored on measures aim at precipitating demand for financial services in the target market niche.

Moreover, commercial banks should stimulate demand for deposit and credit through linking deficit and surplus saving customers. Owing to risks associated with to strategies aimed at optimizing financial services provision. Caution ought to be exercised by commercial banks whose financial intermediation efficiency is below average and above 1. Further, there is for management to evaluate their policies in place so as to bridge gaps associated with human capital development among the top management.

5.5 Limitations of the Study

This study was limited to the context of listed commercial banks in Kenya, hence, the findings are limited to Kenyan context. Hence, findings and generalization may not be replicated in other context in exclusion of Kenya. In Kenya commercial banks are clustered into tiers, listed, non-listed, local and foreign. Moreover, listed commercial banks are regulated by central bank and capital market authority. The study was limited to four financial characteristics which were capital adequacy, operating efficiency, liquidity and asset quality. The study was limited to historical quantitative data thus the data failed to incorporate qualitative views of management and policy makers. The study was limited to regression modelling which is based on assumptions, that may have limitations on study findings.

5.5 Suggestion for Further Research

The study investigated the effect of firm financial characteristics on financial intermediation efficiency of listed commercial banks in Kenya. Subsequent studies should consider incorporating industry characteristics and controlling effect of other attributes. This may improvement in model explanatory. Further, the study was limited to five years ranging from 2017 to 2021. Subsequent studies may expand the time period to cover at least 10 years. Longer period may allow for examination of long and short run effect of firm characteristics and financial intermediation efficiency. This may allow an examination of the effect of political transitions and management changes. Future studies may consider drawing data from more commercial banks and examine the effect of tiers of respective banks.

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APPENDICES

Appendix I: Letter of Introduction

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11/04/2022
DIRECTOR, BANK SUPERVISION
CENTRAL BANK OF KENYA
P.O BOX 60000-00200
Nairobi.
Dear Sir/Madam,

RE: Letter of Request for Permission to Collect Data

I am a student pursuing a Master's of Commerce (Finance and Accounting) at KCA. I am requesting for secondary data to complete my research titled 'Firm Characteristics and Financial Intermediation Efficiency of Listed commercial banks in Kenya'. The research is purely academic conducted under the school of business and public management towards the requirements for my award of my degree of Masters of Commerce. The information you provide will be treated with utmost confidentiality.

Yours Sincerely,

Eunice Wairimu Njuguna.

Student Reg No. KCA10/00935

Appendix II: Secondary Data Collection Sheet

Financial Year	2017	2018	2019	2020	2021
Core capital					
Total assets					
Non-performing loans					
Total loans					
Current assets					
Current liabilities					
Total cost of operations					
Total operating income					
Weighted sum of inputs					
Weighted sum of outputs					

Appendix III: Listed Commercial Banks

	Bank Name	Symbol
1	Absa Bank Kenya Ltd	ABSA
2	CFC Stanbic Holdings	CFC
3	Diamond Trust Bank Group	DTK
4	Equity Group Holdings Limited	EQTY
5	Housing Finance Company of Kenya	HFCK
6	I&M Holdings Limited	I&M
7	Kenya Commercial Bank Group	KCB
8	NCBA Group Plc	NCBA
9	Standard Chartered Bank of Kenya	SCBK
10	Cooperative Bank of Kenya	COOP
11	BK Group Plc	BKG