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**DETERMINING THE IMPACT OF SELECT MACROECONOMIC VARIABLES
AND BANK-SPECIFIC DETERMINANTS ON THE PROFITABILITY OF
COMMERCIAL BANKS IN KENYA .**

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ABSTRACT

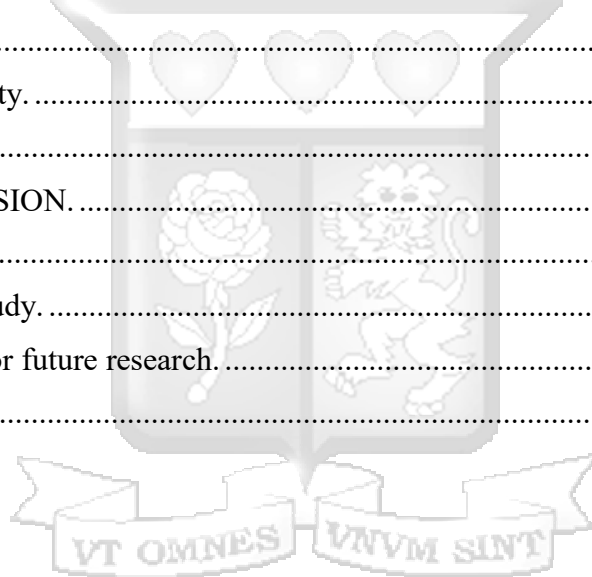
This study seeks to evaluate how internal factors (bank-specific determinants) and external factors (macroeconomic variables) influence the financial performance (profitability) of commercial banks in Kenya. The select macroeconomic variables include Gross Domestic Product, Inflation rate, Exchange rate and Real interest rates. The select bank-specific determinants include capital adequacy, asset quality and liquidity. The study employs panel data approach to obtain empirical findings in line with the objectives. Moreover, the study utilizes correlation and regression analysis to identify the impact of each independent variable on commercial bank profitability. Fixed and random effects, together with various diagnostic tests, such as serial correlation, unit root stationarity, multicollinearity and cross-sectional dependency, are employed to evaluate the characteristics of the data for the commercial banks listed at the Nairobi Stock Exchange as at 2013. Moreover, the period under consideration will be the period 2013 to 2023. Furthermore, the study employs an unbalanced panel data so as to obtain empirical findings in line with the research objectives and hypothesis; commercial bank profitability is influenced by the select macroeconomic variables and bank-specific determinants. In addition, the profitability metrics to be employed in this study will be Return on Assets (ROA). Moreover, the study utilizes secondary data and various sources such as annual reports from the Central Bank of Kenya, bank supervision reports, economic surveys and statistical abstracts from the Kenya National Bureau of Statistics will be employed. The study found that asset quality, interest rates and exchange rates were significant factors affecting profitability of commercial banks in Kenya. The study therefore concludes that banks should focus on effective risk management strategies, prioritize high quality assets, develop pricing strategies that maximize on favourable interest rate movements and formulate and implement robust foreign exchange management strategies.



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CHAPTER ONE

INTRODUCTION

1.1. Background Information.

1.1.1. Definition and brief elaboration of key concepts.

Banks play a vital role in the distribution of financial sources to demanding units in the economy (Topak and Talu, 2017). The three key roles are the intermediary role, payment and settlement role and ensuring financial stability. They collect savings from individuals and businesses, thereby help to mobilize the funds collected for productive use and lend the funds to individuals and businesses for various purposes, such as starting new ventures. Such an activity is key for economic growth as it allows for investment and consumption. Furthermore, banks facilitate transactions by providing various payment services, for example, cheques, credit and debit cards, etc. thus allowing for efficient transfer of money within an economy. Moreover, they play a crucial role in the clearing and settlement of transactions, ensuring the completeness of transactions. In addition, Banks help manage various financial risk by offering different financial products, such as insurance, derivatives, etc. thus mitigating certain risks, for example, default risk, interest rate risk, etc. The increased access to credit and financial services has contributed to job creation and economic growth (Odhiambo, Nyasha and Musakwa, 2022).

The Kenyan banking sector has undergone a number of changes and development. According to the Kenya Bankers' Association, during the period 1990-2000, Kenya embarked on financial sector reforms, for example, the liberalization of interest rates and removal of credit control. This therefore led to increased competition and efficiency in the banking sector. Additionally, introduction of technology in the banking sector, such as mobile banking services (M-Pesa), paved a way for the revolutionary delivery of banking services. The Central Bank of Kenya (CBK) has made use of regulatory reforms to enhance the stability and soundness of the banking sector, including the introduction of risk-based supervision and enforcing higher capital requirements. The CBK is responsible for formulating and implementing monetary policy and ensuring liquidity, solvency and proper functioning of the financial system. According to the study conducted by the Kenya Institute for Public Policy Research and Analysis (KIPPRA), higher capital requirements led to improved risk management and stability in the banking sector. Additionally, according to the NCBA group, there has been a trend towards the consolidation, with mergers and acquisitions aimed at creating stronger financial institutions. Kenyan banks have expanded their operations outside of Kenya, establishing subsidiaries in other East African countries. For example, according to the East African, KCB has regional operations in Uganda, Tanzania, Burundi, etc. This regional expansion has assisted in the diversification of revenue streams and the reduction of reliance on the domestic market.

Bank profitability is normally influenced by various factors, including economic conditions, technological advancements and regulatory changes. Higher interest rates have recently

increased the net interest margins, which, in turn, boost bank profitability. However, elevated interest rates also raise funding costs, which can squeeze the margins (Wade, Tomlinson and Srinivas, 2023). The adoption of digital technologies, consisting of Artificial Intelligence and FinTech innovations, is refining the landscape of banking. According to the global banking annual review by McKinsey and Company, banks are investing in digital platforms to enhance customer experience and operational efficiency. Additionally, Diversifying income sources beyond traditional interest income, such as fees from wealth management and other financial services, is proving to be an important aspect in bank profitability (McKinsey and Company, 2023). Stricter regulations, especially during the times of financial crises have had an impact on bank profitability. Compliance costs have increased, but these regulations also aim to ensure financial stability (McKinsey and Company, 2022). Additionally, according to the global banking annual review in 2022, banks are shifting their focus on Environmental, Social and Governance (ESG) criteria, which can influence profitability through reputational benefits and compliance with regulatory standards.

1.1.2. Identification of main developments in the study area and any gaps present in the study area.

Empirical evidence has shown different results regarding the impact of GDP on bank profitability. Some research indicates positive significant relationship, thereby suggesting that higher economic growth leads to increased lending and profitability (Evans and Kiganda, 2014). Other research indicates insignificant effect on commercial bank profitability (Akther, Rahman and Rahman, 2023). Additionally, the effect of inflation also sparks some debate. Some research suggests that moderate inflation can enhance profitability by increasing interest margins (Kiganda and Evans, 2014) and the reliance of banks on sophisticated forecast models to predict future Inflation rates (Akther, Rahman and Rahman, 2023). Conversely, some research indicates inflation rates can negatively affect financial performance of banks (Jepkemoi, 2017). Additionally, fluctuations in exchange rates can affect a commercial bank's foreign currency transactions and profitability. Some research indicates strong significant effect on bank profitability (Ongeri, 2014), while other studies found a weak significant effect on bank profitability (Gikombo, 2018). Previous empirical evidence suggests that real interest rates have been found to have strong positive significant effect on bank profitability, thereby influencing both the return on loans and investments and the cost of funds (Gikombo, 2018). Conversely, other studies found a significant, though negative, effect on bank profitability (Jepkemoi, 2017).

Regarding the aspect on the impact of internal factors affecting bank profitability, empirical evidence also suggests different results regarding the impact of capital adequacy on bank profitability. Some studies indicate an insignificant impact (Akther, Rahman and Rahman, 2023), while other studies associate capital adequacy with significant positive effect on bank profitability, thereby suggesting the importance of a buffer against financial losses (Owiti, 2013).

Conversely, other studies indicated a negative relationship, suggesting the increased opportunity cost of holding higher capital levels. Moreover, assessing the quality of a bank's portfolio, is critical in assessing financial performance of a bank. Some studies indicate that higher levels of asset quality negatively affect bank profitability, characterized by the higher proportion of non-performing loans, leading to reduced income (Akther, Rahman and Rahman, 2023) and increased

provisioning costs, thereby reducing profitability (Owiti, 2013). Liquidity is also necessary in assessing financial performance of a bank as this factor ensures that banks can meet their short-term obligations. Most studies indicate a significant positive relationship with profitability (Owiti, 2014), (Jepkemoi, 2017), thereby suggesting financial stability in meeting short-term obligations and increased investment opportunities. Furthermore, the bank size plays a key role in assessing financial performance as it reflects the bank's ability to achieve economies of scale and diversification of its portfolio. Most studies indicate a positive significant relationship (Jepkemoi, 2017), while other studies indicate a negative relationship (Akther, Rahman and Rahman, 2023), suggesting that larger banks are susceptible to increased operational complexity and more stringent regulatory requirements, increasing compliance costs (Reguhr and Sengupta, 2016).

There are certain gaps that present themselves in the identifications in the study area. Concerning the impact of macroeconomic variables and some bank-specific determinants, there are some divergent views, with some studies presenting some significant effects, while others do not. This therefore presents the need for a further and more comprehensive research. Furthermore, the impact of different regulatory environments on bank profitability also presents another gap. Different countries are subject to different regulatory environment, thus the banking sector may be subject to different regulations, thereby catering for different empirical findings. Therefore, understanding the role of Kenya's regulatory environment in affecting profitability could bring about valuable insights and findings that may be beneficial to policy makers, bank management, etc.

1.1.3. Brief conceptualization of the study.

Kenya has experienced growth in assets and lending. Banks have significantly increased their lending activities, thus contributing to their higher interest income. Bank assets in Kenya reached a little over six trillion Kenyan shillings in 2021 (Statista Banking Industry in Kenya report, 2023). An increase in loans and advances brought about an 11% growth in the sector's assets. Increased investments in government securities contributed to assets volume, therefore providing stable returns. Moreover, the adoption of digital banking and mobile money services (M-Pesa) has revolutionized the banking sector. The formal access to financial services in Kenya has reached roughly 84% as of 2021, against 27 % in 2006, mainly due to mobile banking and mobile money (Statista Banking Industry in Kenya report, 2023).

With regard to the Kenya Bankers Association, the outlook on the banking industry in Kenya continues to be unknown due to many interconnected risks that consist of persistent inflationary pressures, impact of tighter monetary policy conditions on economic activity, tax laws according to the Finance Act and sustained depreciation of the Kenya shilling versus major currencies, brought about by wider current account deficit and monetary policy tightening in advanced economies.

Furthermore, due to the expected slow-down on economic growth and sustained depreciation of the national currency, the asset quality of the banking sector may experience levels of deterioration, forcing banks to come up with additional loan loss provisions. The banking sector is expected to control for these factors with adequate capitalization and liquidity levels (Kenya Bankers Association report, 2023).

According to the Kenya Banker's Association report regarding the state of the Banking industry in Kenya (2023), the industry's total pre-tax profits rose by 23.0% from KES 241.52 billion in 2022 from KES 196.44 billion in 2021. In the banking sector, regarding the largest increase in pre-tax profits, was the small banks where the profits experienced an increase by 88.1% from KES 2.2 billion to KES 4.2 billion. Medium banks also experienced significant growth, with profits experiencing an increase by 24.0% to KES 29.25 billion. Meanwhile, the pre-tax profits by large banks' increased steadily by 22.0% to KES 208.1 billion in 2022. Some of the factors attributable to the increase consist of increased lending activities, regulatory support from Central Bank of Kenya, diversification of revenue streams, etc.

According to the Kenya Bankers Association, such developments translated to an average Return on Assets of 3.7% in 2022 from 3.3% in 2021 and an average Return on Equity of 26.5% in 2022 from 22.1% in 2021. Moreover, the ratios varied across the banks. Large banks reported an average Return on Equity (ROE) of 30.6% and an average Return on Assets (ROA) of 4.2%. In addition, medium banks reported an ROE of 18.6% and an ROA of 2.1%, whereas small banks recorded an ROE of 5.6% and an ROA of 1.98%. (Kenya Bankers Association report, 2023).

1.2. Problem Statement.

Despite the fact that several studies have been done to establish the influence of external factors (macroeconomic variables) and internal factors (bank-specific determinants) on the financial performance of banks, studies have been limited towards the specific region which in turn experiences limitations specific to the country. The empirical findings can therefore not be generalized to other regions. Islam (2014) assessed the impact of influence factors on the profitability of banks in the United Kingdom. Akther, Rahman and Rahman (2023) conducted a study to establish the determinants that have an influence on commercial bank profitability in Bangladesh. The economies may be subject to different economic conditions, such as inflation rates, GDP growth and regulatory frameworks thus cannot be generalized.

Although numerous studies have been done in Kenya to establish the impact of macroeconomic variables on bank profitability, few studies have included the aspect of bank-specific determinants which also have the ability to affect bank profitability, for example, capital adequacy, bank size, etc, which can also have an effect on bank profitability. Ongeru (2014) determined the effect of select macroeconomic variables on financial performance (profitability) of non-bank financial institutions. Gikombo and Mbugua (2018) evaluated the influence of select external factors (macroeconomic variables) on the profitability of commercial banks in Kenya.

In addition, despite some studies covering the aspect of bank-specific determinants and industry-specific variables, few studies in Kenya include the aspects in the latest banking environment. The banking regulatory environment has undergone many reforms over the past years, for example, the liberalization and removal of credit control, thereby enhancing the operational efficiency of banks, higher capital requirements therefore leading to enhanced stability of commercial banks. Furthermore, the enhanced role of the CBK in ensuring the stability of the entire financial system in which banks operate over the recent years also has a vital role on the operational efficiency of banks. Few studies in Kenya have covered the aspect of the regulatory reforms that also have role on the internal factors of the bank, such as regulatory requirements on capital adequacy.

With regard to the above gaps present in the study area, this research purports to fill the research gaps, together with the use of the metrics of Return on Asset as a proxy for bank profitability. Additionally, the study aims to include bank-specific determinants that may also have an effect on bank profitability. Furthermore, the study aims to bridge the gap among the macroeconomic variables and bank-specific determinants on the impact on bank profitability and the region of study.

1.3. Objectives of the Study.

- To assess the influence of external factors (macroeconomic variables) on the financial performance (profitability) of commercial banks in Kenya.
- To assess the influence of internal factors (bank-specific determinants) on the financial performance (profitability) of commercial banks in Kenya.

1.3.1. Research Hypothesis.

H₀: Financial performance (profitability) of commercial banks does not have a relationship with the select internal factors (macroeconomic variables) and external factors (bank-specific determinants).

H₁: Financial performance (profitability) of commercial banks does have a relationship with the select internal factors (macroeconomic variables) and external factors (bank-specific determinants).

1.4. Value of the study.

The empirical results of the study will be invaluable to bank management in understanding and assessing the impact of different variables and assists in making informed strategic decisions to enhance financial performance. Furthermore, the study will provide insights into determinants of profitability so as to help investors make informed and sound decisions about where to allocate their investments and resources. Shareholders can evaluate and assess their financial performance and areas for potential growth based on the study. To academic personnel and researchers, the study can refine the existing theories and tap into new theories that have not been developed. Additionally, researcher may use the findings to either support or challenge existing hypothesis and the study serves as reference for literature and research gaps.

To regulators and policymakers, the empirical results of the study can inform the development of regulations that promote a stable and profitable banking sector and policymakers can use the insights to come up with economic policies that support the banking sector and overall economic growth. Moreover, financial analysts can use the data and results to forecast the trends associated with bank profitability and provide recommendations to the clients. Furthermore, financial analysts can also incorporate the determinants into their valuation models so as to enhance the accuracy of financial forecasts.

CHAPTER 2

LITERATURE REVIEW.

2.1. Theoretical Literature review.

2.1.1. Efficient Market Hypothesis.

The Efficient Market Hypothesis was developed by Fama in 1969. His original paper, **“The Behavior of Stock-Markets Prices”**, which was published in 1965, laid the foundation for the hypothesis. Fama had later expanded on the hypothesis in 1970, by categorizing market efficiency into three main forms, weak form efficiency, semi-strong form efficiency and strong form efficiency. The weak form efficiency posits that all past trading information, for example, volumes and historical prices, are already reflected on stock process. Furthermore, it assumes that market information on past prices and returns is not relevant in achieving excess returns. Therefore, technical analysis may not be effective in bringing about excess returns. The semi-strong form of market efficiency posits that all information available to the public, for example, economic and political news, has already been incorporated into prices of stock, including announcements on dividends. In regard, both fundamental and technical analysis have low chances in generating excess return. Moreover, the strong form of market efficiency suggests that prices reflect all available information, including public information and private information. This thus means that insider information is rapidly absorbed into prices in the market. Additionally, it assumes the market is perfect and no investor has monopolistic access to information. Therefore, no one can consistently achieve higher returns.

The EMH has significant implications on the influence of determinants specific to the bank and macroeconomic variables on the financial performance (profitability) of banks. In line with the hypothesis, the macroeconomic variables such as GDP, inflation and interest rates are already factored into the stock prices reflected in the market. Therefore, in any case of a change in the variables, there should not be an added advantage to the investors. However, some studies show that the variables do impact bank profitability in case of a change. (Clarke, Jandik and Mandelker, n.d). For example, higher interest and inflation rates can positively affect the profitability of banks by widening the spread between lending and deposit rates. Moreover, while the EMH claims that capital adequacy, bank size and operational efficiency have been factored into the stock market prices, there is empirical evidence suggesting that they have a significant effect on the performance of banks. Larger banks with higher capital ratios tend to be more profitable due to economies of scale and better risk management (Grzeta, Zikovic and Zikovic, 2023). However, there is some empirical evidence supporting the hypothesis. Studies found that professional fund managers, on average, do not outperform the market after accounting for fees and expenses, thereby supporting the semi-strong form of EMH (Tamplin, 2023).

This hypothesis is relevant to the study as it posits that all available information, including macroeconomic variables and bank-specific determinants, is already reflected in stock prices. This therefore means that any change in the macroeconomic variables or bank-specific determinants should be quickly incorporated into the bank stocks. Furthermore, based on the

assumption of efficient markets, investors cannot consistently achieve higher returns by exploiting information on macroeconomic variables or bank-specific determinants. This suggests that profitability is based on the inherent risk and return characteristics of the bank, rather than information asymmetry. However, EMH does not account for the irrational biases or behavior of investors. Factors such as overconfidence and loss aversion can lead to mispricing and deviations from market efficiency. Such behavioral aspects can significantly impact bank profitability, especially during periods of economic uncertainties. The EMH does not fully account for the impact of regulatory changes on the bank profitability, for example, capital requirements, liquidity ratios, etc. Such factors have significant effects on bank performance and the information may not be immediately reflected in stock prices.

2.1.2. Arbitrage Pricing Theory.

The theory was developed by economist Ross (1976) as an alternative to the Capital Asset Pricing Model. The economist had aim to provide a more flexible and comprehensive framework for understanding asset returns by adding in multiple sources of systematic risk (Tamplin, 2023). The theory considers multiple factors that can affect an asset's return, unlike the CAPM. Furthermore, the APT suggests that the expected return on an asset is a linear function to the sensitivities (betas) to these multiple factors. The formula is given by:

$$E(R_i) = \beta_1 \text{factor 1} + \beta_2 \text{factor 2} + \dots + \beta_n \text{factor } n.$$

whereby $E(R_i)$ is the expected return on the asset, R_f is the risk-free rate, β_n is the sensitivity to factor (n) and factor (n) is the risk premium associated with factor n. Additionally, the theory assumes that any arbitrage opportunities (mispricing) will be quickly exploited by investors, leading to a correction in asset prices.

The APT is significant in this study as it explicitly incorporates macroeconomic factors into the model for a deeper understanding of how the changes in these variables affect bank profitability. For instance, higher interest rates might increase the cost of borrowing for banks but also increase the returns on their lending activities (Olokoyo, Ibhagui, Babajide, Yinka-Banjo, 2021). Moreover, the APT can also be adapted to include the bank specific factors such as capital adequacy, operational efficiency, etc. Through the analysis of the sensitivities of bank returns to these factors, there is a comprehensive understanding of the drivers of bank profitability. Some studies have supported the approach. A study on the Jordanian stock market found that macroeconomic variables like inflation and industrial production significantly impacted stock returns, thereby supporting the APT's multifactor approach (Elshqirat, 2019).

The APT includes multiple macroeconomic factors, allowing for a more comprehensive analysis of how the macroeconomic variables and other economic indicators affecting bank profitability. The flexibility of APT in incorporating various factors makes it suitable for analyzing the bank-specific determinants such as capital adequacy, size, etc. By examining the sensitivities of the bank returns to these factors, insights can be gained into the specific factors that affect bank profitability. However, the APT assumes that any arbitrage opportunities could be quickly exploited, which, in turn, leads to a correction in asset prices. In reality, markets may not always be perfectly efficient and arbitrage opportunities can persist, affecting the accuracy of the APT. Macroeconomic variables and bank-specific determinants can change over time, which makes it

challenging to maintain a stable set of factors for analysis. Such a dynamic nature can impact the reliability of the APT in predicting bank profitability.

2.1.3. Liquidity Preference Theory.

This theory is a fundamental concept in economics and was developed by John Maynard Keynes (1936). It tries to explain the determination of interest rates stemming from a consumer's liquidity preference. According to this theory, interest rates are determined by the supply and demand for money. The supply and demand for money are influenced by demand, precautionary and speculative. Keynes (1936) further suggested that people hold money to invest when interest rates are perceived to be low with an expectation to rise in the future. Although, Keynes (1936) believed that money is held to finance expenditures, he believed that money is held for more purposes other than the medium of exchanges.

If individuals believed that interest rates present in the market are expected to experience increased levels in the future, individuals are exposed to an opportunity to take hold of their wealth in the matter of liquid assets so as to curtail capital losses that are normally in relation to the long-term assets that could be brought about by the anticipated interest rate increase (Nzotta, 2004). Those who hold money expected that the money balance will be greater than the yield on alternative assets are said to exhibit a behavior normally termed as liquidity preference (Jhingan, 2004). The money demand in an economy combines the speculative motive with the other motives for holding money; precautionary motives and transaction motives (Okpara, 2007). Keynes called M1 which he made a function of nominal income. The part that was reserved for speculative purposes (M2) depends on the market rate of interest.

This theory is evident in real-world scenarios. For example, in line with the theory's prediction, an average saver holding excess amounts of money should have a liquidity preference based on precautionary and transaction motives. However, if they expect interest rate to fall, they may choose to invest now so as to take advantage of the higher rates as opposed to their future expectations. Demand for bonds increases, therefore driving bond prices up and the interest rates down. Financial institutions also put this theory into practice in their observations. They lend out money they receive as deposits so as to earn interest. However, if the institutions anticipate interest rates to rise, they would normally prefer to hold onto their cash reserves and lend out less now and more later when the interest rate are higher so as to benefit from higher rates.

This theory is relevant to the study as it provides a clear explanation for the determination of the interest rates based on the demand for liquidity, which is a vital factor for banks' interest income. Furthermore, during economic downturns, the theory helps explain the shift in consumer behavior towards greater liquidity, impacting banks' deposit levels and lending activities. However, this theory does not consider external factors like government policies or other international events that influence interest rates, and consequently, bank profitability. Moreover, the theory minimizes the role of monetary authorities in influencing interest rates, which can have significant impact on the banks' net interest margin. The theory assumes that money supply is fixed and controlled exogenously. This therefore does not account for the dynamic nature of the monetary policy in regulating money supply.

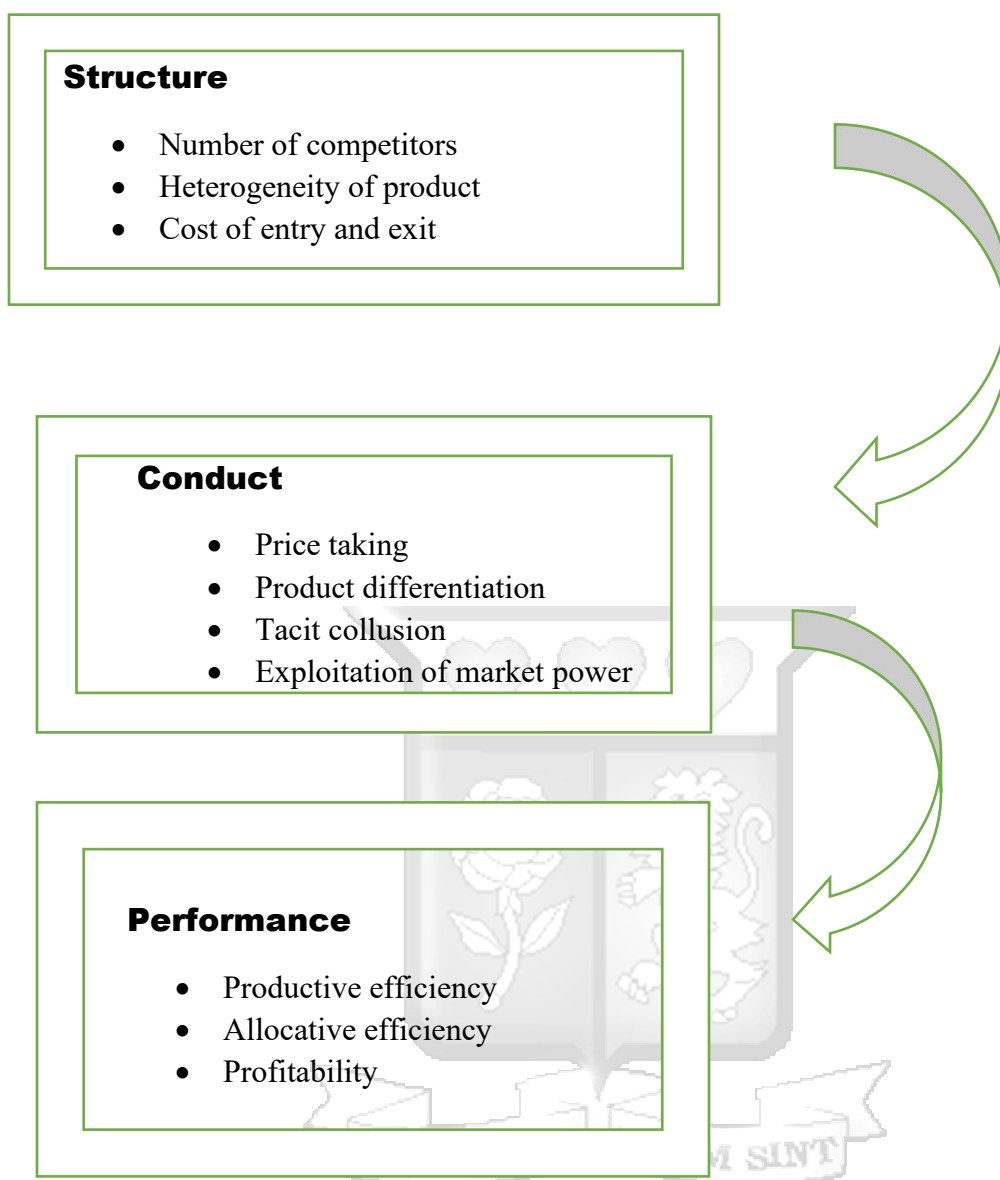
2.1.4. Structure Conduct Performance Paradigm.

The Structure-Conduct-Performance (SCP) model, initially established by economists Edward Chamberlin and Joan Robinson in 1933, and later expanded by Bain, normally serves as a framework in industrial economics. It attempts to explain the causal relationship and theoretical basis for firm performance and market imperfections (Structure Conduct Performance Model – Explained, 2024). According to the model, the market environment directly and immediately impacts the market structure, which, in turn, influences the firms' economic behavior. Such economic behavior of the firm subsequently has an effect on the market's overall performance.

The structure of a market can be evaluated through a number of factors, such as the number of competitors within an industry, the product diversity and costs associated with entering and exiting the market. The performance of a firm can be evaluated by indicators, such as, productive efficiency, allocative efficiency and profitability. In industries where competition is at a high level, firms are normally encountered with a number of constraints and a limited variety of options. Such firms in the highly competitive industry usually have a target to maximize social welfare and their returns only cover the cost of capital with time. There are three primary components of a market that are considered to influence market behaviors of both buyers and sellers; **Structure** consisting of the composition and organization of the industry, **Conduct**, which pertains to the behaviors and actions of the participants; buyers and sellers, within the framework of the market, **Performance**, which relates to the outcomes and successes achieved by a specific market or industry. The variables considered in the market include product quantity, product quality and production efficiency. (Structure Conduct Performance Model – Explained, 2024).

Basically, industry structure determines firm conduct and long-run firm performance. On the other hand, firms operating in a less competitive environment enjoy a broader selection of strategic choices and face fewer restrictions. Such firms can exploit these opportunities so as to establish a dominant market position. For example, firms in these industries can leverage market power to set prices that bring about significant economic value. However, the longevity of this dominance is contingent upon the existence of entry barriers, which happens to be an attribute of industry structure. Without the barriers to entry, the competitive advantage of the firms is likely to erode as new entrants challenge the market. Therefore, firms should come up with competitive strategies to sustain their market leadership and high performance.

This paradigm is useful to this study as it can predict how the changes in the market structure, for example, market concentration, may affect the conduct of banks and thus its performance. (Lelissa and Kuhil, 2018). Furthermore, the straight forward approach of the model eases understanding of the relationship between market structure, firm conduct and performance. However, the direction of causality in the SCP may be ambiguous in the role of market structure determining performance or the performance influencing market structure. The paradigm may overemphasize the role of the market structure as a determinant of performance, suggesting that high entry barriers lead to greater market concentration, allowing existing firms to maintain monopoly profits. (Ajlouni, 2010). Additionally, market concentration is used as a measure of market structure and correlates it with performance measures like Return on Assets (ROA) (Ajlouni, 2010).



Source: (Business Professor- Structure Conduct Performance Model – Explained, 2024).

2.1.5. Efficiency Structure Hypothesis.

The hypothesis dates back to the work of Harold Demsetz in 1970, challenging the traditional Structure Conduct Performance, postulating that more efficient firms naturally acquire larger market shares because of their lower costs and superior market management, leading to higher profits and market concentration as a byproduct of their efficiency. The efficient structure hypothesis consists of two main theories: **X-efficiency version (ESX)** and the **Scale-efficiency version (ESS)**. The X-efficiency version suggest that banks with superior management or production technologies have lower operational costs. The lower operational costs thus bring about higher profits. According to Allen Berger, these banks also tend to gain larger market shares, which may result in higher levels of market concentration. The positive relationship between profitability and market structure is seen to be false under this hypothesis, with

efficiency driving both profits and market structure (Berger, 1995). Furthermore, Leibenstein (1966) proposed the concept of x-efficiency in a paper titled **Allocative efficiency vs X-efficiency**. Allocative efficiency is achieved when the marginal cost of a company is identical the price, typically occurring in industries where competition is high. Leibenstein initiated the concept that management or worker-related factors might prevent maximum productivity or production costs at its lowest levels. The theory of the firm does not normally obtain its reliance on minimization of costs, although, unit costs are affected by x-efficiency, which normally obtains its influence from pressure of competition and other motivational factors (Leibenstein, 1966). The Scale-Efficiency model posits that some banks operate in a certain way that suggests more efficient scales, thereby bringing about lower unit costs and higher unit profits. Such banks usually have market shares which are larger, thereby leading to higher concentration levels and potentially misleading profit which is positive (Berger, 1995).

This hypothesis is relevant to the study as it emphasizes the role of efficiency in profitability, suggesting that banks with superior management or production technologies can achieve lower costs and higher profits. Furthermore, the hypothesis takes into account how banks adapt to regulatory changes, for example, Basel 3, and the manner in which the adaptations affect their efficiency and profitability. (Zikovic and Zikovic, 2023). Additionally, this theory recognizes that the impact of efficiency on profitability may vary in bank size, offering insights into banks with different sizes differ in operational dynamics (Zikovic and Zikovic, 2023). However, this theory assumes market concentration as a result of efficiency. This may not always be the case as regulatory policies and barriers to entry can also lead to market concentration. The theory may overlook situations in which market power does not have a significant role in profitability, in the case of less competitive markets.

2.2. Empirical Literature review.

2.2.1. Studies conducted in Kenya.

Owiti (2013) conducted a study to evaluate the impacts of bank-specific factors and macroeconomic factors on the financial performance (profitability) of commercial banks in Kenya. The study employed time series data analysis techniques so as to come up with empirical findings in line with research objectives. Furthermore, the study utilized data from annual Bank survey reports from Central Bank and economic surveys from Kenya National Bureau of Statistics (KNBS) for the years 1983 to 2012. A multiple linear regression was utilized so as to obtain empirical findings. Moreover, the study employed additional tests such as the Jarque-Bera test to assess normality of data, Augmented-Dickey Fuller (ADF) test for check for stationarity in the model, etc. The analysis of the study showed that both macroeconomic factors and bank-specific determinants have a significant statistical impact on commercial bank profitability. Furthermore, the study brings about policies that would initiate the acts of bank capitalization, reduce operational costs and minimize credit risk while also harmonizing the effects of the macroeconomic factors.

The paper uses the multiple linear regression approach to determine the effects of bank-specific and macroeconomic factors on the profitability of commercial banks in Kenya. However, the study utilized a time frame between 1983 and 2012. The banking environment has undergone

some significant changes, for example, a more developed regulatory framework. The Central Bank of Kenya, during the period 1983 to 2012, focused solely on maintaining monetary stability and controlling inflation (Owiti, 2013). However, according to Standard Chartered, the role of the Central Bank has been more developed to enhance the stability and the integrity of the banking sector at large, through the introduction of Banking Sector Charter, risk-based credit pricing, etc. Furthermore, according to standard chartered, stricter capital adequacy measures have been introduced, with banks required to maintain higher capital buffers so as to protect against financial losses, compared to the period 1983 to 2012, where banks were permitted to operate with lower capital buffers for financial losses. The changes in the banking regulatory environment with varying periods, thereby different empirical findings in the study, due to differences in the impact of bank-specific determinants. Therefore, this study seeks to contribute to the gap by utilizing the time frame 2013 to 2023 so as to capture the changes in the banking regulatory environment in Kenya. Furthermore, the study only uses Return on Assets as a profitability metric. However, there are other profitability metrics that could prove useful to determining the profitability aspect, for example, Return on Equity, Net Interest Margin, etc. The study also seeks to contribute to the gap by including the profitability metrics of Return on Equity and Net Interest Margin.

Ongeri (2014) conducted a study with a purpose to examine the influence of selected macroeconomic variables on financial performance of non-bank financial institution in Kenya. The study utilized the profitability metrics: Return on Assets (ROA), to assess the impact of selected macroeconomic variables: currency exchange growth rate, inflation rate, quarterly average interest rate and quarterly GDP growth rate. By employing a correlation and regression analysis design for research, the study analyzed secondary data, spanning ten years (2004 to 2013) on a quarterly basis, covering 112 Non-Bank Financial Institutions. Data for the analysis was sourced from the Central Bank of Kenya and the Kenya National Bureau of Statistics and processed using software such as SPSS. The empirical results of the study revealed that Return on Assets for the Non-Bank Financial Institutions had a strong and positive correlation with the exchange rate and a positive, though weaker correlation with GDP, inflation rate and average interest rate.

The study utilized a correlation and regression analysis to evaluate the influence of the macroeconomic variables in observation on the financial performance of non-bank financial institutions in Kenya. However, by employing this research design, and using time-series data, the data may not capture the full variation, thus leading biased estimated. Furthermore, this research design may be susceptible to omitted variable bias if important variables are not included. Additionally, regression analysis may also suffer from multicollinearity, thus individual effects on the profitability of the variables may not be catered for. The study therefore seeks to contribute to the gap by employing the panel data approach which allows for enhanced data variation, reduced multicollinearity and the control for unobserved heterogeneity. Furthermore, the study only utilized macroeconomic variables, thus the variables affected the profitability metric, Return on Assets with an adjusted R^2 of 11.9%. This therefore means that 88.1% was not explained by the variables selected. With regard to the gaps, the study seeks to contribute to the gap by including internal factors (bank-specific determinants) that could also have an impact on profitability of banks in Kenya.

Jepkemoi (2017) conducted a study to establish the financial performance of the banking industry in Kenya, assessing the influence of factors specific to the bank, factors specific to the industry and macroeconomic variables in Kenya. The study employed a descriptive research design so as to investigate the determinants of bank profitability. The population in observation was the commercial banks listed in the Nairobi Securities Exchange (NSE), as at December 2014. In addition, the researcher employed secondary data which was obtained from various sources, such as banks' financial statements (audited) for the period in years 2010 to 2014. Furthermore, the data analysis approach utilized inferential statistics and descriptive to assess the relationships between the variables. The empirical findings indicated a positive significant relationship between bank specific factors and profitability metrics, positive and statistically significant relationship with macroeconomic variables and a positive, though insignificant, relationship with industry factors.

The study utilizes industry factors, together with determinants specific to the bank and macroeconomic determinants to assess profitability of commercial banking industry in Kenya. However, the researcher employs a research design, mainly descriptive to explain the relationship between the independent variables in assessing the profitability of commercial banks. Descriptive research describes characteristics and patterns without establishing causal effects, therefore makes it difficult to evaluate the causal effect of macroeconomic variables and bank-specific determinants on profitability (Sirisilla, 2023). Furthermore, descriptive research may not capture the dynamic environment of banking, leading to inaccurate and biased conclusions. With regard to the challenges, the current research study therefore seeks to contribute to the gap by employing the panel data approach, catering for the analysis of causal factors by tracking the independent variables over time (Yuan, Issa, Harymawan, Dhar and Hossain, 2022). Moreover, panel data captures changes over time, thereby allowing for the dynamic analysis of economic conditions and regulatory environments over time.

Gikombo and Mbugua (2018) conducted a research study to examine the influence of select macroeconomic variables on the financial performance of banks (commercial) in Kenya. The macroeconomic variables in observation was real interest rates, gross domestic product, exchange rate and inflation. The study employed a descriptive design along with the longitudinal design to assist in tracking changes with time with respect to the period under study. The study utilized the licensed 44 commercial banks in Kenya as at December 2016. Additionally, the study used secondary data. Data was collected over a five year period spanning from 2012 to 2016. The profitability metrics employed to assess the influence was the Return on Equity and Return on Assets.

The analyzed empirical findings displayed that real interest rates had a crucial impact on both Return on Equity and Return on Assets as measures of profitability. The beta coefficients in each case were positive, implying that real interest rates significantly increase both the ROA and ROE. Moreover, GDP had a statistically significant and positive impact on commercial bank profitability, registering a positive coefficient on both ROA and ROE, implying that GDP is a vital element in assessing the financial performance of commercial banks. Furthermore, findings indicated that the variable, exchange rate had a significant impact on both ROE and ROA. With a positive beta coefficient, an increase in exchange rate improved the profitability of commercial bank. In addition, inflation had significant influence, however, only the ROA proxy. When

inflation was regressed against ROE, the result indicated an insignificant impact. The beta coefficients were positive, indicating that an increase in inflation would improve the profitability of commercial banks.

The study evaluated the influence of macroeconomic variables on the financial performance (profitability) of commercial banks in Kenya. Furthermore, the study employed a descriptive research design along with the longitudinal research design to track changes over time. However, the study did not consider the effect of internal factors that could also have an impact of commercial bank profitability, for example, capital adequacy, liquidity, etc. The study therefore seeks to contribute to the gap by including bank-specific determinants that may also have an impact on commercial bank profitability.

2.2.2. Studies conducted internationally.

Davydenko (2011) conducted a research study to determine the determinants of bank profitability in Ukraine, relating factors specific to the bank, factors specific to the industry and macroeconomic indicators as the independent variables to the overall profitability to the Ukrainian banks. The profitability metrics in the study were employed to assess the financial performance, namely, Return on Assets and Return on Equity. The study used detailed balance sheets, on quarterly basis and income statements. The individual bank information and the foreign capital stake information regarding banks was obtained from the National Bank of Ukraine. The macroeconomic variables employed to determine the impact in this study were obtained from the International Financial Statistics and the State Statistics Commission of Ukraine. The unit root tests (Fischer type tests) were used to assess the stationarity of the unbalanced panels. Furthermore, the model was estimated using the Hausman tests, fixed and random effects. Additionally, the GMM estimation was used to evaluate the standard error robustness to panel specific autocorrelation and heteroskedasticity.

According to empirical results, the loan provision had a negative significant impact with a coefficient of -0.83. The loans to total assets ratio had a significant, though negative impact on financial performance (profitability) with a coefficient of -.146. The coefficient of capital, at 1% confidence level, is statistically significant and positive, implying that those banks that increase or aim to enhance their equity levels lower their cost of capital and therefore more profitable. Administrative expenses, as a percentage of total assets, had a negative impact, implying the lack of competence in the management of expenses. Liquidity and deposits measured relative to bank size had a statistically significant, though negative influence on bank performance. The influence on size on a bank's profitability is significant at only 10% confidence level, implying the economies of scale and higher profits. GDP had an expected positive effect on the bank's profitability. Moreover, the exchange rate had a positive significant effect while the foreign ownership had negative significant effect on the financial performance of banks. Inflation was found to have a positive effect on banks' profitability, indicating the expected levels of inflation during the period under study.

The study employed an unbalanced panel data together with various tests, such as stationarity tests, Hausman tests, etc. to evaluate the influence of bank-specific, industry-specific and macroeconomic determinants on the profitability on the overall profitability of commercial banks in Ukraine. However, the empirical findings of the study cannot be generalized towards the

Kenyan environment due to differences in economy and the banking regulatory environment. Ukraine's banking sector is more diverse, including a mix of state-owned, foreign-owned and privately-owned banks, with 63 banks (six state-owned) banks as at April 2024 (Hrazhdan, 2024), compared to the concentrated banking industry of Kenya, with nine commercial banks having the lion's share on the market share (Statista Banking Industry in Kenya, 2024). Furthermore, the different economies can also have an impact on the empirical findings in terms of the macroeconomic variables. For example, the fluctuating GDP growth rates resulting from the conflicts with Russia, experiencing a period of contraction of 28.8% in 2022, according to FocusEconomics, compared to the expansion of GDP in Kenya, with an estimation to grow by 5.4%, according to World Bank. This thus shows that empirical findings can be affected by different economies. The findings can therefore not be generalized to other economies. The study, despite the ever present gap, seeks to contribute to the gap by determining the impact of macroeconomic variables and bank-specific determinants in Kenya, so as to provide valuable insights with regard to the Kenyan environment.

Alper and Anbar (2011) conducted a research study with an aim to assess the bank profitability determinants, specifically those related to the bank and macroeconomic determinants in the country of Turkey over the time period in years spanning from 2002 to 2010. The researcher assessed financial performance using certain profitability metrics, such as Return on Assets and Return on Equity, considering both bank-specific determinants and macroeconomic determinants. The study analyzed a balanced panel data set of 10 commercial banks listed at on the Istanbul Stock Exchange, utilizing the period spanning 2002 to 2010. The bank-specific determinants were sourced from income statements and balance sheets of the commercial banks in observation. Financial statement data was obtained from the Statistical Bulletin of the Banking Regulation and Supervision Agency in Turkey. Macroeconomic variable data was sourced from the Turkish Statistical Agency, with the real interest rate derived from the Fischer equation. Panel data approach was employed to examine the bank profitability determinants.

According to the findings, asset size was found to have a statistically significant and positive effect on the financial performance of banks, proving the evidence of the economies of scale. The loans to assets and loans under follow up to loans were found to have significant though negative, influence on Return on Assets, indicating that credit portfolio volume and weak asset quality management impact profitability negatively. The ratio regarding non-interest income to assets was found to have a positive influence on ROA. Moreover, the real interest rates was found to have a positive influence on profitability, with ROE as a profitability metric. The other bank-specific factors in observation; capital adequacy, liquidity, deposits/assets ratio, net interest margin, and the macroeconomic indicators; real GDP growth rate and inflation rate were found to have insignificant influence on bank profitability.

Topak and Talu (2017) conducted a research study with an attempt to assess the influence of the determinants of financial performance of commercial banks in Turkey, specifically the utilizing determinants specific to the bank and macroeconomic determinants, over the period in years 2005 to 2015. The bank-specific variables utilized were Net Interest Margin, Capital Adequacy, Bank Size, credit risk, liquidity and other operating expenses. The macroeconomic factors employed were inflation, interest rate and GDP. Data comprised of the commercial banks listed in the BIST bank index over the period between 1 January 2005 and 30 September 2015. The

researcher utilized balanced panel data spanning 43 periods from January 2005 to September 2015. The financial performance of banks was assessed using certain profitability metrics, such as Return on Assets and Return on Equity. Financial data was gathered on quarterly basis from the banks' unconsolidated financial statements. Moreover, macroeconomic determinant information was sourced from the official websites of the Central Bank of Turkey and the Undersecretariat of Turkey.

The empirical findings indicate that the factors specific to the bank, such as the ratio of interest on loans to deposits used as a profitability measure for net interest margin, the ratio of net fees and commissions revenue to total operating expenses, and the bank's relative size, had a positive and statistically significant influence on the financial performance (profitability). On the other hand, the ratio of operating expenses to total operating revenue, the ratio of non-performing loans to total loans (credit risk), and capital adequacy, had negative influence on the financial performance (profitability) on the banks. In regard to the external factors (macroeconomic variables) real GDP and interest rates had a positive influence on profitability, while the exchange rate had a negative influence on the financial performance of the banks in Turkey.

The study employs panel regression data approach assess the influence of bank-specific and macroeconomic determinants on the profitability of commercial banks in Turkey. However, the empirical findings of the study cannot be generalized to other banking environments due to differences in the regulatory environments and macroeconomic impacts. The impact of macroeconomic variables may differ due to different economic conditions and regulatory environments. For example, Turkey's high rates of inflation may have a more significant impact on profitability of commercial banks compared to the inflation rates in Kenya (Caliskan and Lecuna, 2020). Moreover, the effect of bank-specific determinants on profitability of commercial banks may also have differences. In Turkey, the adoption of digital banking, through the establishment of banks operation on 'digital-only' structure and enhanced interest on crypto-friendly banking and the diverse banking sector, with 24 foreign-controlled banks and participation banks that offer Sharia-compliant financing products (Mileiko, 2024), compared to the concentrated aspect of commercial banks in Kenya, with nine banks having the lion's share on the market share.

Islam (2023) conducted a study to examine the influence of macroeconomic variables on the financial performance (profitability) of commercial banks listed at the London Stock Exchange (LSE), over the period in years from 2015 to 2019. The panel data approach was employed, utilizing the population in observation; listed banks (23) in the LSE. Panel data regression analysis with random effects was employed to examine the effects of the five macroeconomic variables; Gross Domestic Product (GDP), Real Interest Rate, Inflation rate, unemployment rate and Exchange rate on the profitability metric Return on Assets (ROA) and Return on Equity (ROE). The empirical results of the study indicated that variable, real GDP growth rate had a significant, though negative effect on the profitability of commercial banks in the UK, with the rest of the variables having an insignificant influence on profitability as measured by Return on Assets and Return on Equity. According to the findings, internal factors have an impact on the profitability of commercial banks in the UK as compared to the external macroeconomic variables.

Despite the study providing adequate findings on the impact of macroeconomic variables using the panel data approach, the study does not employ internal factors that could also have an impact on commercial bank profitability, such as capital adequacy, liquidity, etc. This study therefore seeks to contribute to the gap by including bank-specific determinants that could have an impact on commercial bank profitability.

Akther, Rahman and Rahman (2023) conducted a study to evaluate the relationship of factors specific to the bank and macroeconomic factors with profitability in the banking industry of a developing country. The country under study was Bangladesh. The profitability metric that the researcher used in the study was the Return on Assets (ROA). Moreover, the study also employs independent variables, such as the internal factors specific to the bank, which include capital adequacy (CAD), asset management, bank branches, deposits and assets quality. Furthermore, the paper also utilized macroeconomic variables, for example, the study analyzed various external factors, such as Gross Domestic Product (GDP), inflation rate, exchange rate and turnover on stocks traded. Moreover, the researcher utilized pooled, fixed and random effects along with unit root tests, on panel data from 24 commercial banks listed on the Dhaka Stock Exchange, covering the period from 2014 to 2020. The results indicated that all internal (bank specific) factors except capital adequacy and deposits had a statistically significant impact on commercial bank profitability. Asset management (0.0286%), bank branches (-0.05283%), asset quality (-0.01115%). Furthermore, in the case of external (macroeconomic) factors, inflation rate had a positive and significant impact (0.006929%) while the exchange rate had a significant, though negative impact (-0.000566%) on bank profitability. The empirical results of the study found that Gross Domestic Product had a negligible effect on the financial performance on commercial banks. Furthermore, the study noted that the turnover of stocks traded did not have a significant influence on the financial performance of banks. The empirical results suggested that commercial banks should avoid considering operations on stock market when managing the day-to-day operations of banking activities in Bangladesh. Instead, enhancing bank profitability is tied to the foreign exchange rate. In addition, the authors recommended not considering GDP whenever the investment strategy develops.

The study employs panel data regression approach to evaluate the impact of macroeconomic variables and bank-specific determinants on the profitability of commercial banks in Bangladesh. However, the empirical findings of the study are limited to the banking environment of Bangladesh. Therefore, with regard to the location under study the findings of the study cannot be generalized to other banking environment of other countries. The impact of macroeconomic variables may differ due to the varying economic conditions and regulatory environments of the two countries. The increased focus on digital transformation in Bangladesh may curtail the negative effects of inflation, while Kenya's focus on sustainable banking may have an effect on GDP growth on profitability. Bangladesh Bank has introduced various regulatory reforms, such as Bangla QR and Binimoy so as to automate transactions, to enable innovation and improve financial inclusion while Kenya has a strong focus on sustainable banking practices, with banks employing environmental risk managements into risk management frameworks. Additionally, the banking sector in Bangladesh is more diverse, due to the presence of more fintech companies, more mobile financial services, together with their traditional banks, whereas in Kenya, the banking industry is dominated by few large banks, with nine commercial banks holding about 75% of the market share (Statista, Banking Industry in Kenya, 2023). Therefore, the impact of

bank-specific determinants may vary due to different regulatory environments and concentration of market share. The study aims to conduct the impact of select macroeconomic variables and bank-specific determinants on the profitability of commercial banks in the Kenyan banking environment, so as to provide valuable insights on the Kenyan banking environment.

2.3. Conceptual Framework.

2.3.1. Macroeconomic variables.

Macroeconomics focuses on economy-wide occurrences such as inflation, price levels, economic growth rates, national income, gross domestic product and changes in unemployment. The macroeconomic determinants affecting bank profitability are the external economic factors that influence bank profitability, namely, inflation rate, interest rate, gross domestic product and the exchange rate (Onger, 2014).

2.3.1.1. Inflation rate.

Inflation rate is a vital macroeconomic variable as it reflects the overall economic health and stability of a country. Inflation can impact bank profitability in several ways. When inflation rises, central banks normally increase interest rates so as to manage and control for inflation. According to American Banker, Such an effect can increase the Net Interest Margin for banks, as the interest income from loans rises faster than the interest expense on deposits. However, according to the Federal Deposit Insurance Corporation (2023), if inflation leads to a rapid increase in interest rates, it can also increase the cost of funds for banks, potentially reducing the NIM if deposit rates rise faster than the loan rates. Furthermore, according to garnet capital advisors, moderate inflation can stimulate economic activity, leading to higher demand for loans and increased bank revenues. However, high inflation can increase credit risk, as borrowers may struggle to repay loans due to higher costs of living. This can ultimately lead to higher default rates and negatively affects bank profitability (OnPoint, 2021). Additionally, inflation can increase the operational costs for banks, including wages, utilities and other expenses. If these costs rise faster than the revenues that the bank normally obtains, it can squeeze profit margins (OnPoint, 2021).

2.3.1.2. Gross Domestic Product.

GDP can affect bank profitability in a number of ways. Higher GDP growth usually indicates a growing economy, leading to increased demand for loans and other banking services, which can eventually boost bank revenues and profitability. However, during periods of low GDP growth rates, loan demand may decrease, thereby reducing bank profitability. Furthermore, in a growing economy, businesses and individuals are more likely to repay loans, reducing the risk of defaults and improving bank profitability (Combey and Togbenou, 2016). However, during economic downturns, higher unemployment and business failures can increase credit risk, leading to higher loan defaults and negatively impacting bank profitability. Moreover, a growing GDP can lead to more investment opportunities for banks, entailing lending, expanding businesses and investing in new projects, thereby enhancing profitability. Conversely, in an economy with a declining GDP, investment opportunities may be limited. This therefore constrains bank profitability.

2.3.1.3. Exchange rate.

Banks normally engage in foreign exchange trading and can profit from fluctuations in exchange rates. A volatile exchange rate environment can increase trading volumes and profits from currency transactions. However, excessive levels of volatility can also bring about higher risks and potential losses in foreign exchange trading. According to the Reserve Bank of Australia, banks with diversified international loan and investment portfolios can benefit from favorable exchange rate movements, increasing the value of their foreign assets. However, adverse exchange rate movements can reduce the value of foreign assets and increase the cost of servicing foreign-denominated debt, thereby negatively impacting profitability (Islam, 2014). Furthermore, exchange rates are usually influenced by interest rate differentials between countries. This implies that banks can benefit from higher interest rates in one country compared to another, thereby increasing the net interest margins (Olokoyo, Ibhagui, Babajide, Yinka-Banjo, 2021). Conversely, if exchange rate fluctuations lead to significant changes in the interest rates, it can affect the cost of borrowing and lending, which can negatively affect bank profitability.

2.3.1.4. Interest Rates.

Interest rates are crucial in influencing the financial performance (profitability) of commercial banks. Banks normally generate profits mainly from the difference between the interest paid on deposits and the interest obtained from investments and loans (Wheelock, 2016). Moreover, higher interest rates can lower the levels of loan demand as the levels of borrowing cost rise. On the other hand, lower interest rate can increase enhance borrowing, thereby bringing about the increase in the number of loans and leads to a potential occurrence of enhancing profit levels (Wheelock, 2016). Additionally, while higher interest rates can increase income from loans and investments, they also increase the cost of funds for banks, bringing about the need to offer higher interest rates to attract deposits. Higher interest rates normally signal a growing economy, thereby leading to increased lending and higher bank profits. However, if interest rates have a significant rise, they can reduce borrowing levels and economic activity. Furthermore, banks must carefully manage the balance between interest income and funding costs to maintain profitability (Wheelock, 2016). In developing economies, for example, Kenya, studies have established a positive relationship between interest rates and bank profitability, thus highlighting the importance of managing interest rate volatility (Ngure, 2014).

2.3.2. Bank-Specific Determinants

Apart from the impact of macroeconomic variables on the bank profitability, there are variables internally related to the bank that also have an impact on the profitability of banks. These variables are the internal factors that are specific to each bank and have an effect the financial performance of the banks. They include capital adequacy, asset quality, liquidity, etc.

2.3.2.1. Capital Adequacy.

Capital adequacy is crucial for maintaining the levels of stability and solvency of financial entities, which thus minimizes the bank failures in a financial system and enhances financial stability in the economy as a whole. Capital adequacy normally consists of various components: Tier 1 capital, which entails core capital, for example, common equity, retained earnings and any other reserves that the bank may hold. This tier is considered the most effective for buffers

against financial losses. Tier 2 capital, conversely, entails supplementary capital, for example, subordinated debt and financial instruments that are hybrid in nature. According to the Reserve Bank of India, the hybrid instruments may include preference shares, convertible bonds, as regarded by the Basel III guidelines, which cater for additional loss absorption capacity but are of lower quality compared to tier 1 capital. Capital adequacy can also be regarded as the equity-to-total assets ratio (Akther, Rahman and Rahman, 2023).

A higher ratio indicates a robust nature of the bank's financial health, thereby enhancing its capability to endure financial distress and absorb any encountered financial losses. Conversely, a lower ratio may, among certain parties, for example, investors, raise doubts about the capability of the bank to absorb encountered financial losses and fulfill its obligations toward its stakeholders. Capital Adequacy is a vital bank-specific indicator that directly impacts bank profitability. A higher capital adequacy ratio implies that a bank has a larger buffer to absorb potential losses, thereby reducing the risk of insolvency. According to Finance Strategists, this reduces the risk bank failures within the financial system, which therefore enhances investor confidence and attracts more deposits and investments (O'Connell, 2022). However, maintaining high capital adequacy can be costly as it requires banks to hold more capital which could otherwise be used for lending or investments. This, in turn, limits the bank's ability to generate higher returns. Furthermore, banks with adequate capital are better positioned to invest in infrastructure and technology, thereby enhancing levels of operational efficiency and reduction of costs long term. However, the need to maintain high capital adequacy levels can divert resources from profitable sectors, which may potentially reduce the overall profitability.

2.3.2.2. Asset Quality.

High asset quality means that the bank loans and investments are expected to be repaid in full and on time, while low asset quality indicates a higher risk of defaults and losses. (Faster Capital, 2024). There are key metrics for assessing asset quality, namely; **Non-performing assets** consisting of loans or advances that are in default or arrears. High levels of asset NPAs indicate poor asset quality. **Provision Coverage Ratio** consisting of the ratio of provisioning to gross NPAs. A higher PCR indicates better coverage of potential losses. **Loan Loss Reserves** consists of funds set aside to cover potential loan losses. According to Faster Capital, adequate reserves are crucial for maintaining asset quality (Capital, 2024). Moreover, asset quality can be calculated by dividing the loans to the total assets of a bank. (Akther, Rahman, Rahman, 2023).

Asset quality is a critical bank-specific indicator that impacts bank profitability. High asset quality reduces the risk of loan defaults, ensuring steady interest income and minimizing losses. According to Faster Capital, effective credit risk management enhances profitability by maintaining healthy loan portfolio. Conversely, poor asset quality increases the events of default, thereby leading to higher loan loss provisions and write offs, which can significantly reduce profitability. Furthermore, loans and advances with high asset quality normally generate consistent interest income, contributing to the bank's revenue and profitability (O'Connell, 2022). However, non-performing assets do not generate interest income, reducing the bank's overall revenue and profitability (O'Connell, 2022). Moreover, maintaining high asset quality supports a strong capital adequacy ratio, enhancing the bank's ability to absorb losses and maintain profitability (Al-Jafari, Altaee, Adam, 2021). However, poor asset quality can erode capital, thus

weakening the capital adequacy ratio and reducing the bank's ability to cope with financial stress and adverse events, ultimately impacting profitability (Al-Jafari, Altaee, Adam, 2021).

2.3.2.3. Liquidity.

Liquidity involves having sufficient liquid assets, such as cash or assets that can be quickly converted to cash, so as to cover immediate and short-term liabilities. The key metrics for assessing liquidity include; **Working Capital Ratio**, consisting of current assets – current liabilities, and the **current ratio**, given by current assets divided by current liabilities.

Liquidity is an important bank specific indicator that has a direct impact on profitability. Adequate liquidity allows banks to meet customer withdrawal demands and fund new loans, generating interest income. It also helps banks avoid the need to borrow at high rates, thus reducing interest expenses (O'Connell, 2022). However, excessive liquidity normally leads to lower returns, as liquid assets typically yield lower interest compared to loans and other investments (Takoni and Mgbado, 2020). Additionally, high liquidity ensures operational stability, allowing banks to manage unexpected cash outflows without disrupting operations. This stability can therefore enhance customer confidence and attract more deposits (Sahyouni and Wang, 2018). However, maintaining high liquidity can be costly, as it requires holding a significant portion of assets in low-yielding liquid forms, therefore reducing overall profitability (Liquidity regulation and bank performance, (2024), Sihui, Pushp and Rastogi).

2.3.3. Financial Performance.

One of the important aspects of financial performance is profitability, which is the ability to generate income relative to revenue, assets and equity. In the case of banks, financial performance directly impacts their profitability as banks earn revenue primarily through interest on loans and fees for services (Nisar, Peng, Wang, Ashraf, 2018). Furthermore, good financial performance reflects effective management of credit risk, market risk and operational risk, which are essential for maintaining profitability (Berger and Udell, 1997). Additionally, efficient management of assets and liabilities, as indicated by strong financial performance, helps banks optimize their operations and reduce costs (Sufian and Habibullah, 2009). Some of the common profitability metrics include Return on Assets (ROA), Return on Equity (ROE) and the Net Interest Margin (NIM).

Return on Assets is a profitability ratio measuring how efficiently a bank uses its assets to generate profit. A higher Return on Assets (ROA) reflects superior asset management, therefore relating to the fact that a company is more effective in utilizing its resources (Ongeri, 2014). ROA is normally expressed as a percentage and it is calculated as:

Return on Assets = Net Income / Average Total Assets.

CHAPTER 3.

RESEARCH METHODOLOGY.

This chapter intends to explain the methodology that was presented in this study so as to address the research questions and research hypothesis.

3.1. Research regression model.

The panel data regression model equation is as follows:

$$\begin{aligned} Profitability_{it} &= \alpha_i + \beta_1 CapitalAdequacy_{it} + \beta_2 AssetQuality_{it} + \beta_3 Liquidity_{it} + \\ &+ \beta_4 InflationRate_{it} + \beta_5 GDP_{it} + \beta_6 ExchangeRate_{it} + \beta_7 InterestRates_{it}. \end{aligned}$$

In this study, the integrated panel data regression model approach will be employed. The Ordinary Least Squares Approach can be an alternative but the approach brings about certain limitations. It does not take care of individual heterogeneity and it does not exploit the time dimension of the data-set (Sharma, 2018). Furthermore, the OLS regression model approach is susceptible to the omitted variable bias if relevant variables are not included in the model (Krishnamoorthy and Alok, 2022). By considering such limitations, the panel data is more appropriate for this study due to the control for unobserved heterogeneity and catering for dynamic analysis due to the dynamic nature of the study

Additionally, by employing the integrated panel data regression approach, it allows for the combined effect of all variables to determine the impact of bank profitability, thus providing a more comprehensive understanding of the determinants under study (Loprevite, Ricca and Rupo, 2018). Moreover, an integrated model has the ability to capture potential interaction effects between macroeconomic variables and bank-specific determinants under study. Such an advantage helps in comprehending the impact of the variables and their joint influence of commercial bank profitability. Conversely, with the use of separate models, the approach may not capture the joint effect of all variables and could potentially bring about omitted variable bias if relevant variables are not included in any of the models.

3.2. Research design.

In this study, correlation and regression analysis is employed to identify the key drivers of bank profitability and establish the extent to which each variable contributes to commercial bank profitability. Furthermore, panel data is employed so as to evaluate the relationship among bank-specific determinants and macroeconomic variables in determining bank profitability. Panel data, also referred to as longitudinal data, involves obtaining repeated observations from data of the same subject, for example, in this study, commercial banks, over multiple time period. This enables the analysis of both cross-sectional and time-series variations (UC Berkeley, 2015). Additionally, panel data enables the control for unobserved heterogeneity and the capture of dynamic changes over time. Moreover, the methodology can help reduce endogeneity problems by employing techniques liked fixed effects or instrumental variables. Panel data enables the use of various econometric models, for example, fixed effects, random effects and dynamic panel models, enabling the researcher to access a wide range for the most appropriate model to address

the specific research questions and hypothesis. Furthermore, diagnostic tests will be utilized to ensure the robustness and accuracy of the empirical findings.

The Hausman test is used to determine the appropriateness between the fixed effects and random effects model in testing hypothesis. Additionally, it tests whether the unique errors (individual-specific effects) are correlated with the regressors in the model (Statistics How to, 2024). This test will support the hypothesis and enable the proper evaluation of profitability of commercial banks using select bank-specific determinants and macroeconomic variables (Akther, Rahman and Rahman, 2023). The effects of the fixed and random effects are estimated and the appropriate test statistic is chosen based on the difference between the estimators, which follows a chi-squared distribution. If the p-value of the test statistic is less than the chosen significance level, the null hypothesis is rejected in favor of the fixed of the fixed effects model (Frost, 2024). If the test statistic p-value is greater than the applied significance level, we fail to reject the null hypothesis and utilize the random effects approach.

The fixed effects model is in line with the alternative hypothesis the financial performance (profitability) of commercial banks is influenced by select internal factors (bank-specific determinants) and external factors (macroeconomic variables). (Akther Rahman and Rahman, 2023). In addition, to test the hypothesis that commercial bank profitability is not influenced by select bank-specific determinants and bank profitability, the random effects model will be applied, together with the assumption that individual specific effects are assumed to have no correlation with regressors. The model allows for efficient estimations by using both within and between variations in the data. The benefit of utilizing the panel data approach normally lies in the enhanced information content for estimation and the fundamental logic of panel regression. The approach considers a group of individuals with diverse characteristics and generates assumptions that there are also unique factors for each individual, in addition to the time-varying factors (Loprevite, Ricca and Rupo, 2018).

Moreover, a balanced panel data is employed if we have complete data for all commercial banks in observation across the time period under study, thereby simplifying analysis and ensuring consistency in the empirical findings (Topak and Talu, 2017). However, with the presence of missing observation from the data in certain years, an unbalanced panel approach will be employed, as this approach is more flexible and realistic. Additionally, such an approach will enable us to obtain robust and accurate empirical findings into evaluating the impact of bank profitability in this study.

3.2.1. Diagnostic tests.

The Breusch-Pagan LM and the Pesaran CD test is utilized to check for cross-sectional dependence in the data. Macroeconomic variables are susceptible to common shocks, in that the often impact multiple banks simultaneously, with each variable having their distinct effect. The Breusch-Pagan LM test can be used to detect the dependence, ensuring that the model accounts for the common shocks in the variables (Hoyos and Sarafidis, 2006).

Moreover, the Durbin Watson test and the Breusch-Godfrey/Wooldridge test is employed to evaluate the presence of serial correlation in the data (Torres-Reyna, 2010). These tests are

critical in identifying whether the residuals from the regression model exhibit correlation over time, ensuring the validity and accuracy of our analysis.

Additionally, the Augmented Dickey-Fuller test is employed to evaluate the presence of unit root stationarity in the panel data. This test is vital as it helps establish whether the data series is stationary. Ensuring stationarity in the data is important so as to avoid spurious results and accurately determine the relationship between the variables under study.

Furthermore, to ensure the reliability and validity of the empirical findings, a multicollinearity test was carried out. Multicollinearity occurs when variables are highly correlated with one another, thereby inflating the standard errors of the coefficient estimates, which, in turn, leads to imprecise estimates. Various measures can be used to test for multicollinearity, such as the Variance Inflation Factor, correlation matrix, etc. The Variance Inflation Factor measures how much the variance of an estimated regression coefficient increases due to multicollinearity (Akther, Rahman and Rahman, 2023). A VIF value greater than 10 indicates high multicollinearity. Multicollinearity usually diminishes the accuracy of the estimated coefficients, which, consequently reduces the statistical power of the regression model (Frost, 2024). Alternatively, the Pearson correlation matrix is used to test for multicollinearity. The correlation matrix shows the pairwise correlations between all independent variables. High correlation coefficients, for example, above 0.8, between the pairs of independent variables indicate potential multicollinearity (Lindner, Puck and Verbeke, 2022).

3.3. Population and Sampling Design.

The study evaluates the impact of select bank-specific determinants and macroeconomic variables in determining bank profitability of commercial banks in Kenya.

The study utilizes listed commercial banks at the Nairobi Stock Exchange, as at 2012 to 2023, as operational banks in Kenya. Given that the total population consists of only nine entities, it was practical and feasible to include the entire population in the study. This approach enables all possible variations and characteristics are captured, providing a comprehensive analysis of the impact of bank-specific determinants and macroeconomic variables. Due to the small size of the population, stratification and other complex sampling techniques prove to be unnecessary.

The period under study was the banks listed on the Nairobi Securities Exchange from 2012 to 2023. This period would provide a comprehensive view of the banking sector's performance over different economic conditions, such as periods of growth and recession (Borroni and Rossi, 2019).

3.4. Data.

In this study, secondary data will be most appropriate for this study. Various sources are used in the data collection, such as the Central Bank of Kenya annual reports and bank supervision reports that provide comprehensive data of the select bank-specific determinants in this study, for example, capital adequacy, profitability metrics, etc. Additionally, the bank supervision reports offer insights into the regulatory environment and performance of the banking sector (Ngahu, 2012). Furthermore, the Kenya National Bureau of Statistics (KNBS) economic surveys and statistical abstracts provide detailed macroeconomic data, such as GDP growth, inflation rates,

etc. These publications provide detailed economic and financial statistics which are relevant to the study. Annual financial statements are utilized as they provide detailed information on the bank's financial performance of the individual banks, such as their profitability, capital adequacy, etc. Moreover, the Nairobi Stock Exchange will also be used as a source of secondary data, including annual reports, market data, etc. They include stock prices, market capitalization and trading volumes of listed banks. They are important to this study as they reflect investor perceptions and market conditions. Such factors can have an effect on bank profitability. Additionally, the International Monetary Fund reports are used to provide insights into the economic conditions and financial stability of Kenya.



CHAPTER 4.

EMPIRICAL RESULTS AND DISCUSSIONS.

4.1. Descriptive statistics.

The table below describes the characteristics of the population under observation, with the mean, median, maximum and minimum value and the standard deviation being considered. Asset quality has a mean of 0.081200 and a standard deviation of 0.0428374. Capital adequacy has a mean of 0.15084 and a standard deviation of 0.0283088. Liquidity has a mean of 0.3586 and a standard deviation of 0.0976400. Interest rates has a mean of 14.16 and a standard deviation of 1.970942. Inflation rates has a mean of 6.388 and a standard deviation of 1.043115. Gross Domestic Product has a mean of 4.573 and a standard deviation of 1.844949. Exchange rates has a mean of 104.93 and a standard deviation of 13.99676. These statistics offer insights into understanding the financial health and performance of the banks under study, together with the economic environment in which they operate in.

Table 1. Descriptive statistics

Variables	Mean	Median	Maximum	Minimum	S.D	Obs.
ROA	0.12811	0.12244	0.89128	0.08028	0.0757639	110
Asset Quality	0.081200	0.075678	0.220114	0.009515	0.0428374	110
Capital Adequacy	0.15084	0.15447	0.20736	0.04495	0.0283088	110
Liquidity	0.3586	0.3586	0.5830	0.1125	0.0976400	110
Int.rates	14.16	13.59	17.31	12.00	1.970942	110
Inflation rates	6.388	6.300	8.010	4.690	1.043115	110
GDP	4.573	5.000	7.600	-0.300	1.844949	110
Exchange rates	104.93	101.99	139.85	86.12	13.99676	110

4.2. Correlation analysis.

The Pearson correlation analysis enables one to observe the strength and direction between the independent variables and their association with the dependent variable, Return on Asset. The table shows the correlation among the independent variables, Asset quality, Capital adequacy, liquidity, Interest rates, inflation rates, gross domestic product and exchange rates.

From the table, the dependent variable, return on asset, has positive correlation, though weak, with all the independent variables, with the highest correlation with the exchange rates (0.15) and inflation rates (0.14). The weak correlations suggest that none of the independent variables have a strong linear association with return on asset. Additionally, there are strong correlations within some independent variables, for example, asset quality having a strong negative correlation with interest rates (-0.61) and a strong positive correlation with exchange rates (0.54). These correlations show that as interest rates increase, asset quality may decrease and as exchange rates increase, asset quality tends to increase.

Table 2. Pearson Correlation analysis.

	ROA	AQ	CA	LIQ	INT	INF	GDP	EXR
ROA	1.00	0.08	0.08	0.05	0.13	0.14	0.05	0.15
AQ	0.08	1.00	-0.08	0.08	-0.61	0.02	0.00	0.54
CA	0.08	-0.08	1.00	0.51	-0.05	-0.07	-0.07	-0.06
LIQ	0.05	0.08	0.51	1.00	-0.41	-0.12	-0.04	0.18
INT	0.13	-0.61	-0.05	-0.41	1.00	0.09	0.00	-0.56
INF	0.14	0.02	-0.07	-0.12	0.09	1.00	0.14	0.43
GDP	0.05	0.00	-0.07	-0.04	0.00	0.14	1.00	0.17
EXR	0.15	0.54	-0.06	0.18	-0.56	0.43	0.17	1.00



4.3. Model test results.

Table 3. Pooled OLS results.

Variable	Pooled OLS	
	Coefficient.	Prob.
Intercept	-0.40019	0.003341 **
Asset Quality	0.40966	0.071053 .
Capital Adequacy	0.18750	0.525755
Liquidity	0.11788	0.221225
Interest rates	0.018768	0.001109 **
Inflation rates	0.000021057	0.997983
Gross Domestic Prod.	0.00066405	0.864294
Exchange rates	0.0014830	0.062498 .
R-squared	0.13798	
Adj. R-squared	0.078825	
F-statistic	2.33246	
p-value (F-stat.)	0.030001	

The poolability test was conducted to determine whether the data could be pooled across the cross-sectional units (banks) for the analysis. The results are as follows;

The test statistic (F) was **3.8484**, with the degrees of freedom, df1 and df2, being **63** and **30** degrees of freedom respectively. The p-value for the test is **6.601 e-05**, which is less than the usual significance level of 0.05.

The significant test statistic and the p-value being lower than the usual significance level indicate that the null hypothesis of poolability is rejected. This therefore notes that there is significant evidence of instability in the data, signifying that the data cannot be pooled across the cross-sectional units (banks). Thus, it is necessary to utilize models that account for individual-specific effects, for example, fixed effects or random effects, compared to the approach of pooling the data.

4.3.1. Fixed and random effect.

The Hausman test was conducted to determine which model would be more appropriate for the analysis between the fixed effects model or the random effects model. The results are as follows:

The chi-square test statistic for the Hausman test is **3.5528**, while the degrees of freedom for the test was **7** and the p-value is **0.8296**, which is greater than the usual significance level of 0.05.

The p-value, being higher than the typical significance level, signifies that we fail to reject the null hypothesis, suggesting that the random effects model is appropriate for the analysis due to the fact that the individual-specific effects are not correlated with the independent variables. Additionally, the tests suggest that the random effects model provides consistent and efficient estimates for the data analysis, compared to the fixed effects model. For the purpose of the analysis, the random effects model will be utilized.

The tables below show the results for the fixed and random effects:

Table 4. Fixed effect results.

Variable	Fixed effect	
	Coefficient	Prob.
Asset Quality	0.72512774	0.020788 *
Capital Adequacy	0.00306399	0.992679
Liquidity	-0.01894644	0.884918
Interest rates	0.01843344	0.002265 **
Inflation rates	0.00028281	0.973256
Gross Domestic Prod.	0.00067251	0.864213
Exchange rates	0.00108366	0.195064
R-squared	0.1465	
Adj. R-squared	-0.00034419	
F-stat.	2.28036	
p-value (F-stat)	0.034501	

Table 5. Random effect results.

Variable	Random effect	
	Coefficient	Prob.
Intercept	0.40019	0.0026550 **
Asset quality	0.40966	0.0681251 .
Capital Adequacy	0.18750	0.5243283
Liquidity	0.11788	0.2183941
Interest rates	0.018768	0.0007883 ***
Inflation rates	0.000021057	0.9979777
Gross Domestic Prod.	0.00066405	0.8639542
Exchange rates	0.0014830	0.0596495 .
R-squared	0.13798	
Adj. R-squared	0.078825	
Chi-square	16.3272	
p-value (chi-square)	0.02229	

The total sum of squares for the random effects is 0.62568, the residual sum of squares is 0.53934, while the R-squared for the model is 0.13798, meaning that approximately 13.8% of the variability in ROA is explained by the independent variables in the model. The low p-value for the Chi-squared statistic signifies that the overall model is statistically significant. This therefore indicates that the independent variables collectively have a significant impact on ROA.

According to the findings, the significant variables in the study is asset quality, interest rates and exchange rates are significant variables in the study as their p-values are statistically significant on the profitability of commercial banks, with ROA serving as a metric for profitability. The positive coefficient (0.40966) of asset quality signifies that a unit increase in asset quality will bring about a 0.40966 increase in ROA. Despite the p-value being slightly above 0.05, the value is still marginally significant, suggesting a positive effect. These results are in conflict with Mumbe (2015), who conducted a study on the internal factors affecting the profitability of commercial banks listed in the Nairobi Stock Exchange, who found an insignificant effect of bank profitability, despite finding a positive effect.

Additionally, interest rates proved to be highly significant, indicating that the a unit increase in interest rates is associated with a 0.018768 increase in profitability of commercial banks. These

results are in line with Gikombo et al (2018), who established a significant positive relationship with ROA as the profitability metric on a study conducted in Kenya.

Furthermore, exchange rate was found to have a positive coefficient, indicating that a unit increase in the exchange rate (weaker Kenyan shilling) is associated with a 0.0014830 increase in the profitability of commercial banks. The p-value is marginally significant, signifying a potential positive significant impact. These results are in line with Gikombo et al (2018), who found that an increase in exchange rates would significantly affect profitability of commercial banks. However, the findings conflict with Akther et al (2023), who established a significant negative impact on commercial bank profitability in Bangladesh.

The insignificant variables in the study is found to be capital adequacy, liquidity, inflation rates and Gross Domestic Product. Capital adequacy was found to have a p-value of 0.5243283, which is higher than the typical significance level of 5%, thus proving to be insignificant, despite having a positive relationship with ROA. These results are in line with Akther et al (2023), who also found an insignificant effect with ROA as the profitability metric in the study conducted in Bangladesh. However, these results conflict with Mumbe (2015), who established a positive effect of capital adequacy on ROA as the profitability metric in the study conducted in Kenya.

Additionally, liquidity was found to have a p-value of 0.2183941, which is higher than the typical significance level of 0.05, thereby indicating insignificance, despite having a positive relationship. These results conflict with Mumbe (2015), who established a significant negative relationship with commercial bank profitability.

Moreover, inflation rates was found to have a p-value of 0.9979777, which is significantly higher than the typical significance level, thereby suggesting insignificance. These results are in conflict with Gikombo et al (2018) and Akther et al (2023), who established a significant and positive relationship with ROA as the profitability metric. In addition, Gross Domestic Product was found to have a p-value of 0.8639542, which is significantly higher than the typical significance level of 0.05, thereby suggesting that the variable is insignificant, despite having a positive relationship (0.00066) with ROA as the profitability metric. These results conflict with Gikombo et al (2018), who established a positive significant relationship with the profitability of commercial banks.

4.4. Diagnostic tests.

4.4.1. Cross-sectional dependence.

The Breusch-Pagan LM test was conducted to evaluate the presence of cross-sectional dependence in the panel data. The test results are as follows:

The chi-squared test statistic was **263.75**, with **45** degrees of freedom and the p-value of **2.2e-16**, which is significantly lower than the usual significance level of 0.05.

The low p-value indicates that we reject the null hypothesis of no cross-sectional dependence. This therefore suggests that there is significant cross-sectional dependence in the panel data, meaning that the residuals are correlated across the cross-sectional units (banks) in the data.

Additionally, the Pesaran CD test was utilized to assess the existence of cross-sectional dependence in the panel data. The test results are as follows:

The test statistic (z) was **8.9483** with a p-value of **2.2e-16**, which is significantly lower than the usual significance level of 0.05.

The p-value (2.2e-16) indicates that we reject the null hypothesis of no cross-sectional dependence. This test also concludes that there is significant cross-sectional dependence in the panel data, thus the residuals are correlated across the cross-sectional units in the data.

Since the tests suggest cross-sectional dependence in the panel data, estimate tests are carried out to control for the cross-sectional dependence. (Akther et al, 2023).

Given the existence of cross-sectional dependence in the panel data, Driscoll-Kraay standard errors approach was employed to enable accurate and reliable estimates (Hoechle, 2007). According to the findings with the robust standard errors, interest rates and exchange rates are significant predictors of profitability (ROA) in commercial banks, while other variables, such as asset quality, capital adequacy, liquidity, inflation rates and GDP do not portray significant effects on ROA in the model. Interest rates positively significantly affects the ROA, with a unit increase in interest rates bringing about a 0.018768 increase in ROA. Additionally, the exchange rates positively significantly affected the ROA, with a unit increase in the exchange rate (weaker Kenyan Shilling), being associated with a 0.0014830 increase in ROA.

Table 6. Cross-sectional dependence test.

Variable	Coefficient	Prob.
Intercept	-0.40019	0.04130*
Asset Quality	0.40966	0.28605
Capital Adequacy	0.18750	0.21317
Liquidity	0.11788	0.25012
Interest rates	0.018768	0.01429 *
Inflation rates	0.000021057	0.99584
Gross Domestic Prod.	0.00066405	0.67821
Exchange rates	0.0014830	0.000004115 ***

4.4.2. Serial correlation.

The Breusch-Godfrey/Wooldridge test was conducted to assess the presence of serial correlation in the panel data (Torres-Reyna, 2010) The test results are as follows:

The chi-squared test statistic was **1.7682**, with **11** degrees of freedom and a p-value of **0.9992**.

The higher p-value (0.9992) compared to the typical significance level of 0.05 means that we fail to reject the null hypothesis of no serial correlation. This indicates that there is no significant evidence of serial correlation in the idiosyncratic errors of the panel data. (Torres-Reyna, 2010).

The Durbin-Watson test was also employed to assess the existence of serial correlation in the data. The Durbin Watson (DW) statistic was **1.9748**, with a p-value of **0.3734**.

The p-value (0.3734) is higher than the typical significance level of 0.05 thus we fail to reject the null hypothesis. This suggests that there is no significant serial correlation in the idiosyncratic errors in the model.

4.4.3. Unit root stationarity.

The Augmented Dickey-Fuller test was utilized to test for the existence of unit roots in the panel data.

The p-values for all the variables are less than the usual significance level of 0.05. This therefore means that we reject the null hypothesis of a unit root, suggesting that all the variables are stationary.

Table 7. Unit root stationarity results.

Variable	Dickey-Fuller	Lag order	P-value
ROA	-5.7993	2	0.01
Asset Quality	-5.2678	2	0.01
Capital Adequacy	-4.9422	2	0.01
Liquidity	-4.5489	2	0.01
Interest rates	-6.886	2	0.01
Inflation rates	-7.3304	2	0.01
GDP	-11.111	2	0.01
Exchange rates	-6.901	2	0.01

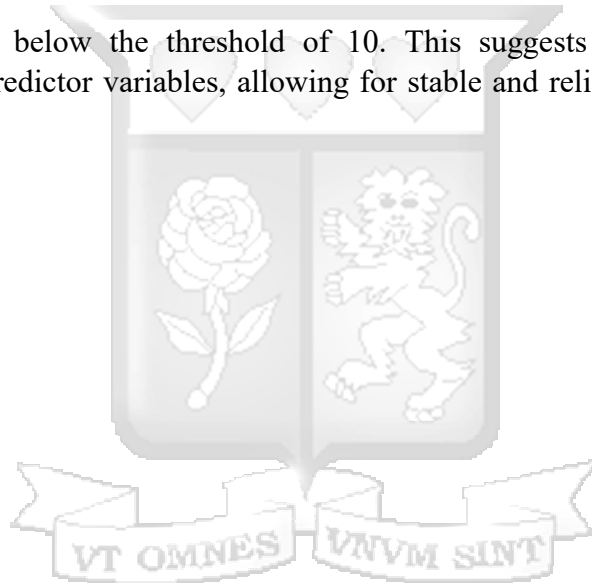
4.4.4. Multicollinearity.

To assess any potential multicollinearity among the predictor variables, the Variance Inflation Factor was conducted. The table below shows the results of the Variance Inflation Factor of the predictor variables.

Table 8. Multicollinearity test.

Variable	Variance Inflation Factor
Asset Quality	1.907769
Capital Adequacy	1.432756
Liquidity	1.802813
Interest rates	2.503102
Inflation rates	1.548233
Gross Domestic Product	1.053887
Exchange rates	2.503879

All the VIF values are below the threshold of 10. This suggests that there is no severe collinearity among the predictor variables, allowing for stable and reliable coefficient estimates in the regression model.



CHAPTER 5.

CONCLUSION.

Our study examined the impact of bank-specific determinants (Asset Quality, Capital Adequacy and Liquidity) and macroeconomic variables (Interest rates, Inflation rates, Gross Domestic Product and Exchange rates) on the profitability (ROA) of commercial banks in Kenya. The study utilized the panel data regression analysis to examine the impact of each independent variable on commercial bank profitability. The profitability metric (ROA) was regressed against 7 variables of 9 commercial banks in Kenya.

The results of the random effect, as guided by the Hausman test, indicated that variables, asset quality, interest rates and exchange rates, had a statistically significant impact on the profitability of commercial banks. The analysis revealed that Interest rates variable was highly significant, with a p-value of 0.0007883, signifying a strong positive relationship with ROA. These results are in line with Gikombo et al (2018), who also established a significant positive relationship with ROA. Asset quality, despite being marginally significant at the 10% confidence level, positively affected the profitability of commercial banks. Akther et al (2023), despite establishing a significant effect in their study, found a negative relationship with ROA. Moreover, Exchange rates, despite its marginal significance, positively affected ROA at the 10% confidence level. These results are in line with Gikombo et al (2018) who also established a significant positive effect with ROA. However, the results differ with Akther et al (2023) who established a significant negative effect with ROA.

Furthermore, the study revealed insignificant effect of Capital adequacy on ROA. These results are in line with Akther et al (2023), who also established an insignificant effect with ROA. Moreover, Liquidity was revealed to have an insignificant effect with ROA. However, these results are in conflict with Mumbe (2015), who established a significant negative relationship with ROA. The study also revealed an insignificant positive relationship of Inflation rates with ROA. These results are in conflict with Gikombo et al (2018) and Akther et al (2023), who found a significant positive relationship with ROA. In addition, Gross Domestic Product was established to have an insignificant effect with ROA. These results are in conflict with Gikombo et al (2018) who established a positive significant relationship with ROA.

5.1. Implications.

The positive relationship between asset quality and ROA signifies that maintaining high asset quality can improve profitability of commercial banks. The study implies that banks should focus on effective risk management practices, for example, credit assessments and monitoring loan portfolios, to ensure that any non-performing assets were minimized. Furthermore, managers should focus on high-quality assets that bring about stable returns.

The positive impact of interest rates on ROA suggests that favourable interest rate policies can improve bank profitability and policymakers should consider the impacts of interest rate adjustments on the banking sector's health when coming up with monetary policies. Additionally, banks should develop pricing strategies that maximize on favourable interest rate environments,

entailing offering competitive loan and deposit rates that attract customers while maintaining profitability.

The positive relationship between exchange rates and ROA implies that effective management of foreign exchange operations can bring about and improve profitability. Bank managers should formulate and implement robust foreign exchange risk management strategies to mitigate adverse currency fluctuations. Moreover, banks can diversify their income sources by expanding their foreign exchange services and participating in international trade finance. Thus, this can leverage favourable exchange rate movements to enhance profitability. Furthermore, policymakers should ensure that exchange rate policies enhance predictability and stability. This can assist banks manage foreign exchange risks effectively and support overall financial stability.

The variables (Capital Adequacy, Liquidity, Inflation rates and Gross Domestic Product) did not show a statistically significant impact on ROA in this study. This lack of significance could be attributed to variations in the data set, economic conditions surrounding the data collection period or specific conditions in the Kenyan banking sector.

5.2. Limitations of the study.

While this study provides invaluable insights, it has certain limitations. The analysis was limited to commercial banks listed on the Nairobi Securities Exchange (NSE). This scope excludes other financial institutions and non-listed commercial banks, which might have different characteristics and performance metrics.

The study focused on seven specific variables, comprising three bank-specific determinants (Asset Quality, Capital Adequacy and Liquidity) and four macroeconomic variables (Interest rates, inflation rates, GDP, Exchange rates). While these variables are vital in determining bank profitability, they may not capture all the factors that influence bank profitability.

The regression model used in the study had a R-squared value of 0.13798, indicating that approximately 13.8% of the variability in the profitability (ROA) of commercial banks was explained by the selected variables. While this provides invaluable insights, it suggests that other variables not included in the study but may have an effect on commercial bank profitability, may also play a significant role.

Some variables that were found to be insignificant in this study (Capital Adequacy, Liquidity, Inflation rates and GDP), have been established to have a significant effect in previous studies. These differences could be attributed to data set variations, economic conditions during the data collection period, etc.

5.3. Recommendations for future research.

Future studies should consider including a wider range of financial institutions, for example, non-listed commercial banks and other types of financial institutions, to gain a more comprehensive understanding of bank profitability determinants.

Incorporating more variables, for example, bank size, operational efficiency, technological investments, could bring about deeper insights into the factors influencing bank profitability.

Additionally, future researchers should consider and explore alternative modelling techniques to improve the explanatory power of the models, for example, dynamic panel data models, time-series estimations, etc.

Furthermore, conducting cross-comparative studies between different regions or countries could help identify common determinants of bank profitability and region-specific factors, providing a more nuanced understanding of the regional and global banking landscape.

Moreover, extending the analysis to longer time period could help capture the effects of economic cycles and structural changes in the banking sector, enabling one to gain a better and more comprehensive understanding. This could provide more robust and generalizable results.

In conclusion, this study shed light on the key determinants of commercial bank profitability in Kenya. By identifying the significant impact of asset quality, interest rates and exchange rates, it contributes to the existing literature and provides actionable insights for bank managers, policymakers, future researchers, etc. The findings underscore the importance of considering actions that enhance better exchange rate strategies and prioritizing high quality investments, in enhancing the profitability and stability of commercial banks in Kenya.



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