

**CAMEL RATING MODEL AND FINANCIAL PERFORMANCE OF COMMERCIAL
BANKS IN RWANDA**

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DECLARATION

This research project is my authentic work and has not been presented to any other institution for any award.

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DEDICATION

This project is dedicated to my lovely mother Uwimana Theresie, David and Ruth Stromswold for their support, tireless prayers and huge encouragement to pursue my Master's studies.

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ABBREVIATIONS AND ACRONYMS

BNR	National Bank of Rwanda
BRD	Rwanda Development Bank
CBA	Commercial Bank of Africa
CMA	Capital Market Authority
EOQ	Economic Order Quantity
FDIC	Federal Deposit Insurance Corporation
FR	Federal Reserve
FRW	Rwandan Francs
GDP	Gross Domestic Product
IMF	International Monetary fund
KCB	Kenya Commercial Bank
MINEFOFIN	Ministry of Finance and Economic Planning (Rwanda)
NIM	Net Interest Margin
NPLs	Non-Performing Loans
NSE	Nairobi Securities Exchange
OCC	Office of Controller of the Currency
OECD	Organization for Economic Co-operation and Development
ROA	Return on Asset
ROE	Return on Equity
RSE	Rwanda Stock Exchange
USD	United States Dollar

OPERATIONAL DEFINITION OF TERMS

Asset Quality	It is defined as the quality of the loan and is taken as the measure asset that is employed to generate income in the banking sector.
Capital Adequacy	It is defined as the minimum regulatory capital owned by the financial institutions to support the sustainability of their business operations and act as hedging during the hostile atmospheres.
Earning	It refers to the income after tax generated by an individual or organization during a certain period of time (monthly, quarterly, semi-annually or yearly). It is found by taking income subtract operating expenditures.
Earnings Management	It is defined as the process at which the firm's management manipulates accounting techniques to improve the company's financial picture during a certain time.
Financial Performance	It is defined as the level at which the financial objectives of the firm has attained through the efficient usage of organizational resources (financial resources, material resources, and human resources and information) as it measures the results of it in monetary term.

Liquidity It is defined as the degree to which assets or security are easily transformed into cash without any transaction having a significant influence on its price so that a firm can smoothly pay back the financial obligations due.

Liquidity Management It is defined as a bunch of strategies and processes used by the firm's management to ensure the company's ability to access cash as needed to pay the obligations due and invest in the forthcoming opportunities.

Management Efficiency It is defined as the degree at which the management of a certain firm has used the lower input materials to generate greater amount of output.

ABSTRACT

Financial institutions hugely contribute to Rwandan economic development. However, different studies showed that they expose to risks that limit them from attaining their objectives. The global crisis of 2007/2008 affected Rwandan financial institutions in such a way that banks' loans and other assets deteriorated and did not work adequately. During this period, the main clients withdrew their deposits due to the high inflation rate. The banking sector's liquidity, efficiency, and profitability in Rwanda have weakened in the past four years (2015 to 2018), and its performance indicators (return on equity and return on assets) collapsed. This study intended to examine the effect of the CAMEL rating model on the financial performance of commercial banks in Rwanda for the period ranging from 2014 to 2018. It focused on five components of the CAMEL model as its major factors affect financial performance in the banking sector. Return on assets would measure financial performance. This study was guided by four theories; cash management theory, agency theory, liability management theory, and market power theory. The target population was the 11 commercial banks operating in Rwanda. The study adopted secondary data that is published by the Central Bank of Rwanda and the official websites of various banks. The collected data processed, edited and analyzed with STATA 16.1. Descriptive research design and panel regression were employed to evaluate the correlation between the predictor and outcome variables. The findings concluded that capital adequacy and asset quality are positively correlated to determine the value of financial performance at a 5% level. Liquidity management, management efficiency, and earnings management have a negative correlation. However, only management efficiency is statistically significant to predict the ROA. The study recommends that both the banks' management and financial regulatory body should work together to formulate policies that help improving banking sector efficiency without violating the right of their clients. When it comes to the evaluation of financial institutions, all the CAMEL model factors should be considered.

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

The banking sector has been playing a pivotal role in economic growth through the creation of financial inclusion to its customers. But it has also been exposed to some problems such as liquidity management problems, asset quality problems, capital adequacy problems, and so many more problems that hinder banks achieving their planned objectives. According to Dang (2011), The banking sector is considered as the spine of the financial sector, because it supports the proper use of funds in the country. Today, banks operate in an innovative and rapidly changing environment that requires them to create a favorable environment to meet the needs of their customers. This changing environment exposes financial institutions to a variety of risks that make the environment complex.

The banking sector in Africa is at a critical level of development where opportunities are increasing. The banking sector's digitization rose customers' trust, attracts more people from over the sea, contributes to financial inclusion, and better access to financial services. It has taken off in the Southern and Northern regions of Africa compared to the rest of it, due to the maturity systems drivers. However, the East Africa banking sector became most innovative, where people are being fascinated with using mobile banking than any other technological means that require consistent maintenance and security costs. Mobile banking took off in East Africa where people prefer exchanging money over the telephone network. The recent global financial crunch affected financial institutions where banks' loans and other assets became worse and were not performing very well. During this period, customers' withdrawal was exceeding the availability of funds. The interest rate reduced the value of the bonds controlled by commercial

banks, which resulted in a higher increase in banks' liabilities. Due to the result of the credit disaster, the global economy had been affected where financial firms lost USD 2.8 Trillion. The deficit of liquidity in the financial institutions have become worse in Nigerian banks where the Central Bank decided to lower interest rate to assist financial institutions becoming liquid (Okorie, 2014).

In the same period, Kenya's net foreign cash flow activity dropped off from KShs. 143billion to negative KShs 879 billion (CMA Kenya, 2008). One of the public listed companies at NSE (Cooperative bank of Kenya) managed only 81% of its subscription after its target went down from KShs 10 billion to KShs 6.7 billion (Mwega, 2009). The Rwandan banks were also affected in a way their large customers took their deposits away due to the high inflation rate, and they were wondering about the security of their deposits (Sayinzoga, 2009). According to Sambaza (2016); Banks are always critical due to the way they link borrowers and lenders. They ensure that there are enough funds to borrowers while banks are attracting depositors and pay them back at a reasonable return for their deposits.

1.1.1. CAMEL Rating System

CAMEL is the acronym stands for; capital adequacy, assets quality, management efficiency, earnings management, and Liquidity management that has developed in 1979 by the three American federal banking supervisors (FR, OCC, and FDIC). The CAMEL rating system came into existence to detect the healthy of banking conditions at a given period. In the beginning, It was usually applicable to all banks and credit unions in the USA and later on became the uniform financial institution rating system over the world. The application of the CAMEL model is usually based on ratio analysis of financial statements and on-site examination made by supervisory regulators. Dang (2011), states that the CAMEL rating system is the most

convenient measurement of performance in the banking sector as five components touch to all aspects of the bank.

During the financial crisis in 2007/2008, the American government used the CAMEL model to decide which banks need special assistance (Dahiyat, 2012). It is taken as an efficient tool to evaluate banks' performance and helps them to take the preventive measurement as they harness failure and inefficiencies. Since then, the central bank of Rwanda has been employing this model to measure the efficiency of financial institutions. The banking supervisory authority score banks according to their performance. If the banks scored two or less than they might be considered to be sound and stable if they scored three, a deep supervisory needed in one or more component than normal, and if they scored between four and five, banks exhibit unsafe and unsound condition.

Table 1.1. CAMEL Composite Ratings

Rating 1	Banks have better sound and they are safe in every aspect.
Rating 2	Banks are fundamentally Sound and stable.
Rating 3	Banks need thorough supervisory in one or more components than normal.
Rating 4	Banks are not safe and they are in bad condition.
Rating 5	Banks are extremely riskier and are in unsound condition.

Source: Federal Reserve (2019)

1.1.1.1. Capital Adequacy

Capital adequacy refers to the Statutory minimum capital requirement for financial institutions. It measures the Banks' and other financial institutions' ability to pay the loan due when their debtors refused to pay back the money borrowed. Generally, it's the amount of money held by the financial institutions to support the sustainability of business operations and act as hedging

during unfavorable conditions. It has considered a crucial aspect that has a direct impact on the performance of commercial banks (Kamande, 2017).

Capital is the number of funds owned by an organization to support its daily business activities and acts as a reserve for the puzzling situation in the future (Athanasoglou, 2011). Enough capital helps the banking sector to minimize the chances of distress. Some financial ratios measure capital adequacy in financial institutions to demonstrate their strength and how they are resilient to overcome the unfortunate situation. Some of the common financial ratios to measure capital adequacy are capital adequacy ratio and Equity to Assets ratio. The capital adequacy ratio is found by taking the core capital over the risk-weighted asset, while equity to Assets is determined by taking equity for the period over total Assets.

1.1.1.2. Asset Quality

Asset quality is one of the main aspects determining financial performance in financial institutions where the commercial banks are attached. According to Ombaba (2013), Asset quality (loan quality) refers to the risks attached to the various asset that a person or organization held. Some of the universal financial ratios used to measure the quality of loans in the banking sector are non-performing loans ratio (NPLs ratio) and loan to deposit. NPLs ratio is the ratio of non-performing loans over total outstanding loans. The loans to deposit ratio found by taking the Total loan over the Total deposit. The lower quality of assets, the more it can lead banks to bankruptcy.

The soundness in the banking sector; is determined by the quality of assets that the bank possesses. According to Echekeba, Francis, & Kasie (2014), the poor asset quality and the minuscule amount of liquidity taken as some of the root causes of bank failure. The rise of non-performing loans brings high pressure on bank balance sheets with the possible effects on bank

lending operations. It means that NPL might harm the profitability of commercial banks (Klein, 2013).

1.1.1.3. Management Efficiency

The efficiency of financial firms is usually measured using five factors that compose the CAMEL model. Besides, financial performance might also be looked at in a mirror of corporate governance. The way its executive management recognize, quantify, and control risks helps the firms achieving their planned objectives and ensure efficient operation in compliance of companies norms.

It refers to the ability of senior management to utilize a firm's resources (material, financial, human, and informational resource) to maximize income. Examining management quality by looking at the financial statements is intricate, for the characteristics of good governance are generally qualitative. Some ratios used to measure it are total expenditure over total income and profit per employee. The higher expenses to income ratio, the more the firm becomes inefficient that indicates the weaknesses of management (Wachira, 2010).

1.1.1.4. Earnings Management

Earnings are the measure sources of capital to a business organization as they help the firm to operate day to day business activities. The more earnings increase, the better firms can support the foreseeable future as they absorb losses and finance business expansion. The quality of earnings represents the defense tool against risks as they allow banks to sustain the competitive position, improve strategic management initiative, and finance their expansion strategy (Aguenaous, Lahrech, & Bounakaya, 2017).

There is a couple of indicators to measure the earnings and profitability of any organization. The very common ratios to make a thorough analysis of earning and profitability in financial institutions are ROA, ROE, and NIM. ROA is found by taking net profit over the average total asset, ROE is found by taking net earnings after tax and divide by shareholders' equity and NIM is found by taking net interest income over average total assets.

1.1.1.5. Liquidity Management

Liquidity is defined as the company's ability to convert its assets into cash without losing its market price at cost-effective. It is always good for a company to hold some liquidity for the sake of short term obligations like paying employees' salaries, payment of short term debts, and buying the stock. Gryglewicz (2011) revealed that liquidity management is necessary when the firms are in a good mood but more crucial when they are in trouble. Though, every financial department ensures that the fund is positive enough to pay financial obligations and run business activities to maximize profitability and the welfare of business owners. It has confirmed by Dang (2011), where the study concluded that liquidity is positively related to banks' profitability. For achieving these objectives, the banks have to maintain their assets and liabilities by taking into consideration a couple of risks that hinder banks from performing well.

Liquidity asset is generally composed of cash at handheld by the firm, cash reserved at the central bank, and cash equivalent that can be ready to be converted into cash. The success of the companies comes from their equilibrium between assets and liabilities. A study conducted by Alshatti (2018), revealed that a financial institution to remain viable needs to have enough liquid assets to meet the near-term obligations like withdrawals. Popular ratios to measure liquidity position in financial institutions are liquid assets divided by total deposits and liquid assets over total assets.

1.1.2. Bank Size

Firm size is taken as the crucial driver to the alteration of banking financial performance. Some years back, different bank observers reveal their concerns about small banks that need to grow to be successful. Small community banks certainly face a couple of obstacles like high costs to adopt new regulations after the financial crisis of 2007 – 2009 and the cost of switching to new technology. According to Regebr & Sengupta (2016), the high increase in fixed costs may hinder small banks achieving their objectives and fall off competition that may lead to the higher loan rate and lowering the deposit rate. Firms of different size distinguish themselves in various dimensions. There are a couple of ways used by different observers to define a firm's size. According to OECD (2005), firm sizes get classified according to the number of employees. SME's are those enterprises that use employees between 10 to 250. Firms employ ten employees are micro firms, those of more than 250 employees taken as large firms. The variation of this may depend on the country's policies.

Rwandan government categorizes firms according to different factors such as Capital, Annual turnover, and the number of employees. According to MINECOFIN (2010), micro-enterprises are those firms that employ a maximum of 3 people, a maximum turnover of 0.3 Million, and 0.5 Million of net capital investment. A small enterprise is defined as a firm that employs between 4 to 30 people, has a turnover of 0.3 to 12 million, and has 0.5 to 15million of net capital investment. Medium enterprises are firms that employ 31 to 100employees, an annual turnover of 12 to 50million, and a capital investment of 15 to 75 million. Rwanda Revenue Authority defines business size differently due to tax purposes. The study will measure bank size as the logarithm of the Total Assets.

1.1.3. Financial Performance

Financial performance plays a huge role in business activities as it affects the sustainability of the firm at a given period. Simply, financial performance is the health of an entity (Gatauwa & Murungi, 2015; Wangui, 2017). The company measures financial performance in different ways through consideration of the profit generated, sales, assets, and capital it holds. It is measured using some financial ratios such as investment returns (ROA), ROE, and earnings per share (EPS). The ROE is derived from earnings after tax over common shareholders equity, the ROA found from the net profit over average total assets, and the EPS derived from net profit over the weighted average of the shares outstanding.

Generally, it measures the way at which a firm has used the resources it owns (financial resources, material resources, and human resources and information) to generate revenues. The company's effectiveness might be found by comparing the profits it has obtained during a financial period and the asset utilized. The primary objective of the company is profit maximization and shareholders well off maximization. The wealth is well maximized when the firm has generated positive net cash flow (Net Profit). From the investors' view, performance is measured in terms of the return from the funds they have invested. That means that poor financial performance fails to attract new investors that may lead to insolvency and getting collapse as well (Amalendu & Sri, 2011). The profit generated might be distributed among them as dividends and the remaining part used as capital reserves.

1.1.4. Banking Sector in Rwanda

Rwanda is a small country with a growing market where its population is almost 12 Million. Rwanda has made tremendous progress in terms of economic development, where its economic growth averaged at 7% since the beginning of 21 century. Currently, the financial sector in

Rwanda is composed of banking, insurance, and pension funds as sub-sectors. Like other developing countries, the banking sector in Rwanda plays a contribution to economic growth; it dominated the financial industry with 66.9%. The banking sector in Rwanda composed of 11 commercial banks, 3 Microfinance Institutions, a development bank, and a Cooperative Bank (BNR Report, 2018). All these banks are under the supervision of BNR as the regulatory body of the financial sector. Rwanda Development Board established a new strategy called “Visit Rwanda” to attract foreign investments. This strategy attracted foreign investment like commercial banks KCB, Equity Bank, I&M Bank, Access Bank, and many more to start their operation in the country. This increased competition level that has made each bank to set strategies that are helpful to harness this competition and look forward to sustaining competitive advantage.

During the period from 2012 to 2016, Rwanda has made a significant increase in financial inclusion. The banked population rose from 23% to 26%, while other formal (non-banking) financial services made a remarkable increase as they grew from 33% to 65% (The Finscope Surveys, 2016). Commercial Banks in Rwanda reported a unified report of results in nine months from January to September 2018. During this period, Ecobank Rwanda declared a loss of FRW 1.9 billion, in 2017 reported a net profit of FRW 1 billion. In the same era, BRD divulged a loss of FRW 4.9 billion, from the FRW234 million loss it recorded during the same period in the previous year. Cogebank’s profit fell from FRW 3.9 billion to FRW 2.7 billion. CBA bank, after acquiring Crane bank disclosed a loss of FRW 2 billion above the loss of FRW 845,155 declared in the past year.

Table 1.2. Financial Soundness in Rwanda

	June, 2015	June, 2016	June, 2017	June, 2018
Capital Adequacy	24.3%	23.3%	20.8%	21.4%
Asset Quality	5.9%	7%	8.2%	6.9%
Liquidity	57.3%	42.8%	44%	32.7%
ROA	2.4%	1.7%	1.7%	1.6%
ROE	13.1%	9.2%	9.6%	9.6%
Efficiency	46%	49.9%	48.2%	45.5%

Source: BNR (2019)

1.2. Statement of the Problem

The continuous decline of financial performance within the Rwandan banks needs attention and thorough analysis to discover the causal factor of this drop and take measures to improve banking efficiency. Based on BNR Report (2019), banking efficiency, profitability, and liquidity have weakened over the last four years. As it appears in table 1.2, Banking sector earning indicators (ROA and ROE) have been reducing from June 2015 to 2018. ROA reduced from 2.4% as of June 2015 to 1.6% the same period in the previous year; ROE reduced from 13.1% to 9.6%. The efficiency ratio has weakened over the last three years; it dropped from 49.9% by June 2016 to 45.5% by June 2018.

The liquid assets to deposit ratio stood at 32.7% by June 2018, above the regulatory requirement of 20%, but lower in the same era 2015, where it stood at 57.3%. Banks reserve in Rwanda was exceeding the statutory requirement where it rose from 17 percent in the year between 2003 – 2008, 38% in 2009 – 2012, and 46% percent in 2013 – 2016 (IMF, 2008). Several studies discovered that the overstatement of liquidity in the banking industry results in a destitute

monetary policy transmission mechanism (Saxegaard, 2006). The loan to deposit ratio rose to 97% in March 2017, and it may suggest possible liquidity and credit problems in the future period.

Banks are always the measured source of finance for both small and big companies. The great recession of 2007 – 2008 shows the tremendous importance of banks' performance to both national and international economies as it requires continuity of surveillance (Athanasoglou, 2008). A bunch of studies on commercial banks got conducted in Rwanda like; the analysis of financial statements for the prediction of business sustainability (Harelimana, 2017), financial statements analysis and the performance (Rwemalika, 2013), and analysis of the performance of commercial banks (Sylvain 2015). All these studies have focused on one or two commercial banks; this motivated me to apply the CAMEL model to the entire sector where all 11 commercial banks have considered. The CAMEL rating system got applied as the appropriate performance evaluation approach as; It has been proposed to be used by the supervisory regulators since its five components touch on different aspects of banks.

1.3.Objective of the Study

1.3.1. General Objectives

The main objective of the study is to analyze the effect of the CAMEL rating system on the financial performance of commercial banks in Rwanda.

1.3.2. Specific Objectives

- i. To establish the effect of capital adequacy on the financial performance of commercial banks in Rwanda.

- ii. To determine the effect of assets quality on the financial performance of commercial banks in Rwanda.
- iii. To establish the effect of management efficiency on the financial performance of commercial banks in Rwanda.
- iv. To establish the effect of earnings on the financial performance of commercial banks in Rwanda.
- v. To establish the effect of liquidity on the financial performance of commercial banks in Rwanda.
- vi. To establish the effect of bank size on the financial performance of commercial banks in Rwanda.

1.4. Research Hypothesis

HO₁: Capital adequacy doesn't have any statistically significant effect to determine the financial performance in Rwandan commercial banks.

HO₂: Asset quality doesn't have any statistically significant effect to determine the financial performance in Rwandan commercial banks.

HO₃: Management efficiency doesn't have any statistically significant effect to determine the financial performance in Rwandan commercial banks.

HO₄: Earnings Management doesn't have any statistically significant effect to determine the financial performance in Rwandan commercial banks.

HO₅: Liquidity management does not have any statistically significant effect to determine the financial performance in Rwandan commercial banks.

HO₆: Bank size does not have any statistically significant effect to determine the financial performance in Rwandan commercial banks.

1.5. Significance of the Study

The study findings contribute to the previous researches, inform the general public on the current issues and propose ways to handle them. Academically, scholarly researchers shall benefit from this study as it contributes to the existing theories during their research conduct. It also suggests further review to strengthen financial institutions.

This study provides some policy recommendations that will solve issues of low profitability in the banking sector. It produces policy recommendations that will help regulatory bodies such as BNR and the government as well to take measures on the factors affecting efficiency in Rwandan banks. The findings depict the current situation for investors' investment management. For the new investors, the study findings helps them to make accurate decisions on where to invest their money based on the current information.

1.6. Scope of the Study

This study intends to investigate the effect of the CAMEL Rating model on the financial performance in the Rwandan commercial banks during the period from 2014 to 2018. It adopted 11 commercial banks operating in Rwanda as of the BNR report (2018). The study was conducted from July 2020 to September 2020. The Financial statements were obtained from the formal websites of the commercial banks as per Appendix II, BNR, and RSE.

1.7. Limitation of the Study

The primary objective of this investigation was to find out the relationship between CAMEL model elements and the financial performance of commercial banks in Rwanda. The study was limited to its scope, where it would focus on commercial banks operating in Rwanda, which is part of the financial sector but will not consider the whole industry. Due to the confidentiality

and intense rivalry among financial institutions, all commercial banks do not publish their financial statements to the public, even though some do not disclose all their information except those listed at Rwanda Stock Exchange. For information to be accurate and reliable, the researcher used audited financial statements obtained from the recognized resources. Due to the Covid-19, the study's scope changed over time and took longer than expected to last. Finally, this experiment is anchored on Ratio analysis to measure financial performance. However, there are other non-financial indicators to measure firm performance.

1.8.Organization of the Study

This study is made of five chapters. The first chapter is an introductory part composed of the study background, the purpose of the survey with the general and specific objectives, and a statement of the problem. The second chapter is composed of literature review, theories to underpin the study, research gap, and conceptual framework to guide the study. The third chapter is composed of the research methodology, the data collection method, diagnostic tests, and ethical considerations. The fourth chapter comprises of the study analysis and findings. Finally, the fifth chapter is composed of the conclusion, recommendation, and recommendation for further study.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter comprises an overview of some literature related to the study of thematic areas. It constitutes sections that include the theoretical framework to support both independent and dependent variables. A conceptual framework is given to show the alliance between explanatory and outcome variables. It makes up empirical literature reviewed with the emphasis on the objective of the study and the gaps that have been identified to guide the study.

2.2. Theoretical Literature Review

This section comprises theories underpinning the study like cash management theory, agency theory, liability management, and market power theory. The CAMEL model factors were used as the main factors to determine financial performance in Rwandan commercial banks.

2.2.1. Cash Management Theory

The theory of Cash management was developed by Baumol (1952), it intends to determine the optimum cash under precariousness time. It is based on inventory management through the minimization of costs by an entity during its market activities. It suggests that cash can be managed like any other inventory to determine the optimum cash balance under certainty. The model states that cash balance is optimized when its total cost is minimum. However, It has been criticized due to its assumptions. Firstly, a firm can predict cash requirements since the rate of cash usage is known and constant under certainty. Secondly, holding much cash balance would cost the firm some opportunity costs from not investing in marketable security. Thirdly, the firm will bear the same costs due to the marketable security conversion into cash.

Baumol's theory gets criticized by Miller and Orr Model (1966) due to its assumption that the size and timing of cash flows are known under certainty. Miller and Orr's theory states the cash flow can get controlled under two limits control such are lower and upper control limits. These limits help the tracking of cash while taking into consideration the fluctuations of cash flow. If the cash flow balance touches any of the boundaries, the firm will buy or resell the marketable securities. The firm would decide to purchase Security when the cash balance arrives at the upper limit and resale when the cash flow balance touches the lower limit.

Some researches were conducted on liquidity management and financial performance and discovered that holding a lot amount of cash would lower the firm's returns (Muthoga, 2019). For a business to take off is usually tied on how the cash flow of the firm has planned and controlled (Allman-Ward, & Sagner 2003). Gitman (2009), in the book of principles of Managerial Finance, observed that optimal cash is always useful to support business operations and for investment in marketable securities, which is certainly suitable for the operation cycle. This study underpinned this theory in order to evaluate liquidity management and how it influences the financial performance in Rwandan commercial Banks.

2.2.2. Agency Theory

This model proposed by Jensen and Meckling (1976), It is about the governance of a business entity which is usually based on separate interest between the management of the business and its stakeholders. Agency theory is a management and economic principle expanded to explain the close contact between two parties in a contract that is made by owners of the business entity (principal) and the managers (Agent) who run the daily business activities in the interest of the owners. Though, each party in a contract has self-interest intend to get in business organizations.

It is easy to say that not all shareholders are qualified to run the business successfully. However, professionals get hired to manage its operations so that the firm can get managed efficiently and effectively. Good quality governance leads to a positive influence on firm evaluation (Prince, Roma, & Rountree, 2011).

When the theory came up into existence, shareholders entrust the management to manage and utilize their resources to maximize both the firm's profit and owners' well-off (Blair, 1995). For this purpose, managers are assigned some duties and responsibilities and decide on behalf of the principal. The financial performance of an entity heavily depends on several decisions like investment decisions, financing decisions, and dividends decisions that the managers take on behalf of the shareholders. Sometimes, agreements made by the parties get breached due to one's interests and expectations.

Some measures got made to avoid adverse decisions and losses, where the owners put in place mechanisms to monitor and govern managers (Eshna, 2019). Some of the crucial measures to be taken are monitoring and evaluations where the owners hire qualified people like professional auditors to check the practices of the firm to ensure prudent utilization of resources. Apart from this, owners need to provide incentives to praise their employees and recognize they are hard-working. These incentives will affect the performance of the firm since the employee's efforts are recognized. Finally, the firm will not also tolerate people failed to carry out their duties as it has planned. This theory was adopted in order to support the dependant variable – the performance of commercial banks.

2.2.3. The Liability Management Theory

It is a neoclassical theory developed by Klein (1971). Since then, the banks' loan portfolio has been affected by the trends in theory development that is now known as the liability management

theory. It is concerned with risk management in the banking sector, and it is useful to measure and monitor banking market risks (Rosen & Zenios, 2007). It states that banks don't need to follow customs liquidity management norms like holding liquidity assets and liquid investment; it can hold some reserves by building extra liabilities against itself employing various sources. This theory of liquidity management proposes that they can satisfy their liquidity needs through borrowing from other commercial banks, and the central banks, raising capital from the capital market through the issuance of new shares, etc. Short-term borrowings are more favourable than the long term since shareholders would choose short-term over long-term securities, for they are easily converted into cash with little risks (Kyalo, 2015).

It is easy to say that liability management theory encourages the management to encounter bank balance as stated in the balance sheet. Holding high asset quality and high capital improve the bank to access fund at lower costs which result in the high performance in commercial banks. According to Sinkey (1992), liability management has been helping banks to reduce their secondary reserves but invest their funds in different investments that yield higher returns. This theory underpins this study due to the way it supports some of the independent variables such as asset quality, capital adequacy, and liquidity management, and financial performance as well.

2.2.4. Market Power Theory

This model has developed by Landes & Posner (1981). It states that Company's power to influence the market usually depends on its ability to manipulate the commodities or services' prices in the market place without losing its customers. A company has market power if itself can influence commodity price decisions. Shapiro (2011) discovered that the market power of a firm gained from successful innovation that is an inevitable part of the competitive process.

However, imitation can reduce demand. It means that imitation has a tremendous influence after conducting research and development investment decisions.

Burger (1995) claimed a hypothesis for the American dataset for the banks. The link between market structure and financial performance reflected from two hypotheses the Structure Conduct Performance (SCP) and The Relative Market Power (RMP). SCP presupposes the correlation between market structure, firm conduct, and market performance. It is where the barriers to enter the market are taken as the core determinant of the profit. The barriers to enter the market may influence the revenue of new entrants to drop and profit diminishing as well. Contrast to RMP, which suggest that the firms that possess large market share and well-differentiated product are the price maker which result in huge profit.

The firm with a small market share is a price taker, and it is hard for it to maximize profit. Kocisova (2016) reviewed the market structure and banking sector performance. The study discovered a statistically positive significant effect on profitability. This theory supports the moderation variable which is the bank size where it has integrated to see whether it has an impact on financial performance.

2.3. Empirical Review

2.3.1. Capital Adequacy and Financial Performance of Commercial Banks

Research conducted by Amin, Sanusi, Kusairi, & Abdallah (2014) the inverse relationship between financial risk on the performance of banks in Tanzania. The investigation employed a descriptive research design where secondary data grabbed from 21 Tanzanian commercial banks. The motif of the study was to review the link between their financial performance and financial risks. It employed data that have collected for ten consecutive years from; 2003 to 2012. The

examination found that financial risks and profitability in Tanzanian banks have an inverse correlation. However, capital adequacy itself affects the performance significantly.

Al-Tamimi & Obeidat (2013) studied the impact of the financial risks on the performance of the Islamic Bank in the Gulf region. The survey assessed the effect of credit risk, liquidity risks, operational risks, and capital risks. Descriptive statistics got utilized to examine the collected data. The review discovered that both capital and operational risks had a negative correlation at a significant level of 5%. It concluded that capital risk led to poor performance in the Gulf region banks.

An examination by Lake (2013), on financial risks and profitability of commercial banks in Ethiopia. This review anchored on credit risk, liquidity risks, and capital adequacy risks among the banks in Addis Ababa. This research adopted a quantitative research design and descriptive statistics. The findings reported that both credit and liquidity risks inversely affected Ethiopian banks' profitability. Alshatti (2015) researched liquidity management and profitability in Jordanian commercial banks. The study sought to review the influence of liquidity supervision on the performance of Jordanian banks from 2005 to 2012. The study findings revealed a negative effect of capital adequacy and liquid assets ratio to determine bank prosperity in Jordanian banks.

2.3.2. Asset Quality and Financial Performance of Commercial Banks

Kimanzi (2015) sought to establish the consequence between asset quality and the financial performance of commercial banks in Kenya. The study targeted 43 Commercial banks and a sample of 5 years from 2010 to 2014. The survey revealed a negative connection between asset quality and financial performance. It has supported by studies conducted by Batra (2003) and

Mausya (2009). However, Asset quality is not the only determinant of financial performance. This study will employ the CAMEL model to see how other factors affect the bank's performance.

The same review was conducted in Turkey's bank on 55 banks for ten years from 2005 to 2016. It employed a panel regression method. It revealed a statistically significant negative correlation between the variables. NPL ration was used as the measure of Asset quality while the profitability was measured using ROE and ROA. It concluded that the lower NPLs it goes, the higher the asset quality leads to higher profitability (Kadioglu, Telcken, & Nurcan, 2017). This result got confirmed by another survey by Ozurumba (2016). Aguenalous, Lahrech, & Bounakaya (2017), analyzed bank efficiency in Moroccan bank. The study adopted the CAMEL framework to measure efficiency. The study used secondary and panel regression model. It concluded that except management efficiency has a negative correlation, other CAMEL factors have a positive correlation on efficiency in Moroccan banks.

2.3.3. Management Efficiency and Financial Performance of Commercial Banks

Kaneza (2016) researched on factors affecting the financial performance of commercial banks quoted at NSE for the period from 2010 to 2014. A sample population of 10 commercial banks was selected. It employed secondary data and a descriptive statistic design. The research disclosed that Management efficiency is positively associated with performance. It means that one unit increase in management efficiency would lead to an increase in the performance of commercial banks quoted at NSE at a certain point.

Itumo (2013) studied the alliance between efficiency and financial performance in Kenyan commercial banks. This review employed a descriptive statistic for a sample period of 5

consecutive years from 2007 - 2012. The study revealed that the efficiency ratio dropped from 2008 to 2012, which means that banks were generating lower-income compare to their operating expenditures. However, the correlation between banks' efficiency and their financial performance was positive.

Karemera (2013) investigated the correlation between the Regulation and Financial Performance of commercial banks in Rwanda. The study chose ten commercial banks in which eight of them were able to participate in this investigation. The findings showed that both management efficiency and liquidity management do not explain commercial banks' performance.

2.3.4. Earnings Management and Financial Performance of Commercial Banks

Earnings and profitability in financial institutions bring the persistency generation of income that keeps the firm continue to raise funds that helps the settlements of obligations. This statement got confirmed by Kumar (2006), where the research revealed that the more the income rise, the more the firm captures a large market share and takes hold of other many opportunities.

Ongore & Kusa (2013) researched on factors that determine the financial performance in Kenyan commercial banks. Linear multiple regression and least square method employed to generate the correlation between the variables. The study used CAMEL model factors, GDP Growth rate, and inflation as independent variables to determine banks' performance. The review revealed a significant impact between CAMEL and financial performance. However, earnings management got excluded from the CAMEL model when analyzing the performance.

Mengistu (2015), Evaluated Financial Performance of the banking sector in Ethiopia: the case study of Zemen bank. The study used appropriate financial ratios derived from the annual report

as published by the banks during the period from 2009 to 2014. The review used a descriptive statistical method to describe and summarize data in a meaningful way. Data was gathered from annual reports published by the banks. The result discovered that the zemen bank is at the exciting point where their assets managed to generate revenues. It means that there is a positive association between earning ability and banks' performance in Ethiopian banks.

2.3.5. Liquidity Management and Financial Performance of Commercial Banks

Mwangi (2014) studied the effect of liquidity risk management on the financial performance of commercial banks in Kenya for a period from 2010 to 2013. The research showed a negative interdependence between liquidity management and financial performance. It means that an increase in liquid assets drops ROA by 2.2%. Holding more liquidity result in lower returns in commercial banks, but the effect was not significant at 5%. However, research-based on Kenya.

Muthoga (2019) researched on liquidity risks and performance of commercial banks listed at NSE for six consecutive years from 2010 to 2016. The research focused on the effects of net loan holdings, asset quality, and liquidity on the profitability of commercial banks listed at NSE. A descriptive analysis and panel regression model was employed. It revealed that there is a significant inverse outcome from holding a large portion of liquidity. Keeping much liquidity requires many costs that may cause a fall in the profits of the banks.

Sylvain (2015) conducted research titled; Analysis of the financial performance of commercial banks in Rwanda, a case study of BPR and I&M Bank. It employed the CAMEL model as the supervisory tool to evaluate Financial institutions. It concluded that a drop in liquidity and credit quality deterioration reduces commercial banks' profitability in Rwanda. Though, the study focused on only two among nine commercial banks operating in Rwanda as of June 2013.

Mucheru, Shukla, & Kibachia (2017) researched on liquidity management and the financial performance in Rwandan commercial banks during the period from 2014 to 2016. The sample population of the research was 14 Commercial banks. A random sampling of 42 respondents was selected. The study adopted multiple regression techniques to measure the correlation between variables. It concluded that liquidity risk management has a significant negative relation to financial performance. Holding more liquidity would lead to lower returns and the effects were significant at 5%.

2.3.6. Bank Size and Financial Performance

A number of reviews have been conducted to discover the effect of firm size and the banks' profitability. These studies have been done globally and have given a unanimous result of how bank size affects profitability. Bank size has been taken to be the key driver in the determination of financial performance in the banking sector. Staikouras & Wood (2004) surveyed the determinants of the European bank's profitability. The study discovered an inverse correlation effect of bank size on the profitability of large banks and a significant positive impact on small banks. Similarly in Kenya, Kamau, Gatawa and Mwambia (2018) in their study on bank size and financial performance of banks have found a positive and significant relationship.

Shahnaz, Minhajul, & Ferdous (2019) conducted research on Liquidity and Bank size and the profitability of Bangladesian commercial Banks for five years from 2011 to 2015. The study targeted seven commercial banks and employed a descriptive research design. It revealed a positive correlation between the bank and the profitability of commercial banks in Bangladesh but no significant influence.

Suleiman (2015) investigated review on bank size and profitability, an empirical study on listed Jordanian commercial banks. It employed a simple regression to figure out the link between bank size and profitability of listed Jordanian commercial banks. The survey showed a significant correlation between the banks' size and profitability in Jordanian banks. It means that the higher the asset size, the more the profitability goes down.

Nzioka (2013) examined the relationship between firm size and the financial performance of Kenyan commercial banks. The analysis applied correlational research design. It targeted 43 commercial banks for an era stating from 1998 to 2012. Secondary data published on the Central Bank of Kenya website and the consecutive commercial banks' websites get used. It concluded that there is a statistical influence between bank size and financial performance in Kenyan commercial banks.

2.4. Summary of Literature Review and Research Gaps

The research adopted four theories cash management theory, liability management theory, agency theory, and market power theory to underpin the study. Many studies were conducted to figure out how the banking sector's financial performance is being affected by a couple of factors. Even though these studies do not give a consistent conclusion, they focused on some determinants of financial profitability; and they were oblivious to the usage of the CAMEL rating system as the customary regulatory model to evaluate financial performance in financial institutions. This research study sought to fill out all the gaps discovered and has covered the recent period ranging from 2014 to 2018. It used the CAMEL model as the regulatory system to manage the financial institution; it took into consideration bank size as the moderating variable.

Table 2.1. Summary of Literature Review and Research Gaps

Researcher	Objective	Result	Research Gaps	Addressing the gap
Kimanzi (2015)	Effect of asset quality on the financial performance of commercial banks in Kenya	The study revealed a negative relationship between Asset quality and financial performance of commercial Banks in Kenya.	The study considered asset quality as the only determinant of financial performance and was focusing on Kenyan Banks.	The study took into consideration other factors by employing CAMEL model factors.
Muthoga (2019)	Liquidity risks and profitability of commercial banks listed at NSE, Kenya	The study found that there is a negative and significant effect of holding a large portion of liquidity on the profitability of commercial banks listed at the NSE, Kenya.	Due to the scope of the study, the research relied on commercial banks listed at NSE, which is a small number compared to 43 commercial banks operating in Kenya. And it was addressing issues in	Further study needed to be done in consideration of other factors affecting financial performance and would apply to the Rwandan banking sector.

			<p>Kenya.</p> <p>Secondly, it considered two variables (Asset quality and Liquidity management) as the factors affecting the financial performance.</p>	
<p>Aguentaous, Lahrech, & Bounakaya (2017)</p>	<p>Analysis of Banks' efficiency as a measurement of performance in Moroccan Banks.</p>	<p>The study found that Capital requirement, Asset quality, earnings, and liquidity management affect the Bank's efficiency positively.</p>	<p>The scope of study focused on Moroccan Banks; only 6 Banks got selected among 32 Banks.</p>	<p>This study addressed these issues in Rwandan commercial banks.</p>
<p>Karemera (2013)</p>	<p>The relationship between regulation and financial performance of Rwanda</p>	<p>Return on assets and liquidity management had a negative correlation but no</p>	<p>The research focused on the relationship between regulation and financial</p>	<p>This study focused on CAMEL Model to see how other factors affect</p>

	commercial banks.	significant influence.	performance.	the financial result in the Rwandan banking sector.
Alshatti (2015)	Effect of liquidity management on profitability in the Jordanian commercial banks.	The study findings revealed that an increase in the capital ratio and the liquid assets ratio results in a reduction in the prosperity of commercial banks.	The study considered capital and liquidity as the only factors that determine financial performance in Jordanian Banks.	This study has considered other factors and would apply to all commercial banks operating in Rwanda.
Mwangi (2014)	Effect of liquidity risk management on the performance of commercial banks in Kenya.	The study revealed that liquidity risk management and asset quality have a significant negative relationship on the financial result.	The scope of the study focused on commercial banks quoted at NSE. Further investigation was needed to consider other banks not listed at NSE.	This review was applied to Rwandan banks and will consider the entire commercial banks operating in Rwanda as of December 2018.
Sylvain (2015)	Analysis of the financial performance of	A drop in liquidity and credit deterioration led to a	This review considered only two commercial	By filling the gap, this study took into account all

	commercial banks in Rwanda, a case study of BPR and I&M Bank	fall in the profitability of commercial banks in Rwanda.	banks (BPR and I&M) among 9 Commercial banks as of 2013.	11 Commercial Banks operating in Rwanda. CAMEL Rating Model was adopted as the regulatory system to measure financial soundness in Financial institutions.
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Source: Researcher (2021)

2.5. Conceptual Framework

This research is anchored on the CAMEL rating model and the performance of commercial banks in Rwanda. The CAMEL model five components got used as explanatory variables, bank size as a moderating variable, and Return on assets manipulated to measure the financial performance of the Rwandan commercial banks as the outcome variable.

Independent Variables

Dependent Variable

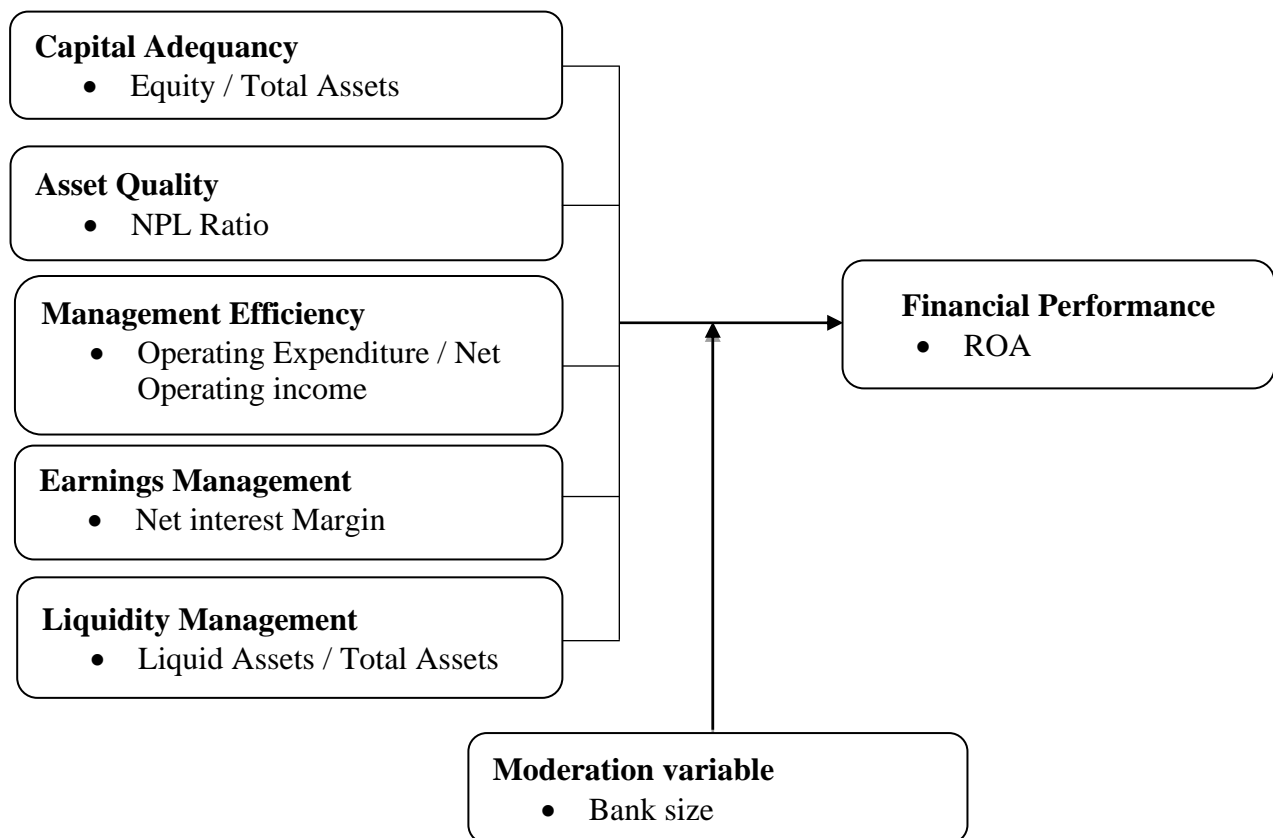


Figure 2.1. Conceptual Framework

Source: Researcher (2021)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This chapter describes the general methodology embraced during the review to collect, analyze, and present information about the CAMEL Rating system and the performance of Rwandan commercial banks. It makes up the research design, target population, data collection instrument, empirical model, and ethical considerations.

3.2. Research Design

Research design comprises the pattern in data collection, data measurement and analysis in research (Cooper & Schindler, 2014). The review employed a causal research design. Research design has usually taken as the research plan that guides the overall work as it helps the researcher to find the solution to the research question. Causal research design has chosen to figure out the valid and the cause and effect among the study variables (Gatauwa, 2020; Gatauwa, Kaijage & Kiriti-Nganga, 2020). It has also adopted panel regression model to guide this study as the study would comprise of quantitative, time series, and cross-sectional data.

3.3. Target Population

The target population is defined as the group of interest in a study; It shows where research data has obtained from. This review focus on 11 commercial banks operating in Rwanda as the target population (Appendix II). Since 11 commercial banks is a small number in size, a census was adopted.

3.4. Data Collection Instrument

Data collection involves the procedure of accumulating evidence and facts to confirm the reliability of the work done (Mugenda, 2008). The CAMEL rating system has been adopted as the proposed method to judge the soundness of finance in financial institutions. It's a Ratio based model that relies on the financial statements that have already prepared. Its five acronyms touch all aspects of banks to improve their efficiency. For ratio purposes, these financial statements have been obtained from the Central Bank of Rwanda (BNR), Rwanda Stock Exchange, and the official websites of the companies as well. The study covered a period from 2014 to 2018 and followed the secondary data collection schedule as per the appendix III.

3.5. Empirical Model

This research used a descriptive statistic design and panel regression model to inspect the correlation between the explanatory variables and the outcome variable. Since the data to be collected is a panel data model, the model summarized below:

Direct Effect Model

$$Y = \beta_0 + \beta_1X_{1t} + \beta_2X_{2t} + \beta_3X_{3t} + \beta_4X_{4t} + \beta_5X_{5t} + \epsilon_t \dots \dots \dots \text{Equation 3.1}$$

Moderating Effect Model

$$Y = \beta_0 + \beta_1X_{1t} + \beta_2X_{2t} + \beta_3X_{3t} + \beta_4X_{4t} + \beta_5X_{5t} + \beta_6S*X_{1t} + \beta_7S*X_{2t} + \beta_8S*X_{3t} + \beta_9S*X_{4t} + \beta_{10}S*X_{5t} + \epsilon_t \dots \dots \dots \text{Equation 3.2}$$

Where:

Y = Return on Assets

β_0 = Constant

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = coefficients

β_6 to β_{10} = Moderating variable effect

X_1 = Capital Adequacy

X_2 = Asset Quality

X_3 = Earnings Management

X_4 = Management Efficiency

X_5 = Liquidity Management

S = Bank size

ε = error term

t = time constraint

3.6. Operationalization of Variables

The study has five independent variables capital adequacy, asset quality, efficiency management, earnings management, and liquidity management. ROA has been used to measure financial performance as the outcome variable. All the variables in this study are operationalized below:

Table 3.1. Operationalization and Measurement of Variables

Variable	Nature	Measurement	Ratio
Financial Performance	Dependent	ROA	EAT / Average Total Assets
Capital Adequacy	Independent	Equity to Assets	Total Equity / Total Assets
Assets Quality	Independent	Non-performing Loan Ratio	NPLs / Total Loan
Management Efficiency	Independent	Operating Expenses to Net operating Income	Operating expenses / Net operating Income
Earning Management	Independent	NIM	Net interest income / Average Assets
Liquidity	Independent	Liquid Assets to Total Deposit	Liquid Assets / Total Assets
Bank size	Moderating	Value of Total Assets	Ln (Total Assets)

Source: Researcher (2021)

3.7. Data Analysis and Presentation

Data collected during the period of investigation was analyzed and presented to help research transform it into usable to raise conclusions, formulate policy recommendations, and suggest further study. Data collected has been edited, analyzed, and processed with the guidance of the STATA 16 version and Excel. It employed panel data modeling to figure out the correlation between predictor and outcome variables. The study adopted a descriptive statistic to analyze the quantitative data that helped to produce minimum, maximum, mean, and standard deviation for all variables.

3.8. Diagnostic Testing

The diagnostic test is a research technique that ensures the reliability and validity of the study. It considers the existing knowledge in a specific area of study, conducts a thorough investigation, and compares the findings with those obtained previously to assess the model validity. The review tested the bivariate correlation, multicollinearity, normality, stationarity, autocorrelation, heteroscedasticity, and Hausman specification test.

3.8.1. Bivariate Correlation Analysis

Correlation is a statistical term used to measure the linkage between two or more variables. When a measurement on each observation is made the study applies univariate analysis. Bivariate Correlation is also known as the Pearson Correlation. It creates a scatter plot to conduct the relationship between two variables to verify whether they all have a linear relationship.

3.8.2. Multicollinearity Test

According to Horne (1998), the Multicollinearity test is defined as a test conducted to test the variables when independent variables in regression seem to be correlated. The problems may arise due to a high inter-association between the independent variables. Due to the high correlation between them, the data with multicollinearity may not be reliable (Damodar, 2003). This study employed the Variance Inflation Factor to conduct a multicollinearity test. The rule of thumb says that any value above or equal to ten might propose the presence of multicollinearity.

3.8.3. Normality Test

Normality distribution plays a crucial role in statistics. Before research conducts tests to compare the mean of several populations, it is good to sort out a normality test to ensure that the data are reliable (Das & Imon, 2016). The normality test is defined as a test used to perform a hypothesis test to discover whether the observations has followed the normal distribution. There are several tests to test the normality like Kolmogorov-Smirnov, Shapiro- Wilk, etc. This study employed the Shapiro–Wilk test; it lies between zero and one. A value of one indicates the normality of the variables. If the value is below one, it shows a destitute normal distribution.

3.8.4. Stationarity Test

The usage of non-stationarity time series data in the forecasting model produces an unreliable result that leads to the impecunious understating and destitute forecasting as well (Cohen, 2019). This test gets conducted to change the time series data into stationarity to make it understandable. Generally, It makes assumptions to get to know whether the study might or fail to reject the null hypothesis with a specified level of certainty.

3.8.5. Auto-Correlation Test

It was conducted to test the variables when the error term is correlated. According to Damodar (2003), the auto-correlation test can sometimes be positive or negative. It moves upward or downward over an extended period.

3.8.6. Heteroscedasticity Test

Regression analysis assumes that the variance between observations is constant. So, if the error term has a uniform variation, the error is called homoscedastic. Typically residues are generally recorded to assess this hypothesis. According to Goldberger (1964), standard estimation methods are inefficient when the errors are heteroscedasticity or have no constant variance. There are several ways to deal with heteroscedasticity. Such are Robust Standard Errors and Weighted Least Squares.

3.8.7. Hausman Specification Test

This test detects endogenous independent variables in a regression. Ordinary least square (OLS) assumes that there is no connection between the error term and a regressor. Due to this assumption, endogenous regression makes OLS estimators fail. It is positive to have significant fixed and random effects during the study. If the research study has both fixed and random effects, Hausman's specification is applicable where the preferable model is the null hypothesis (Green, 2008). It tests whether one or more predictor variables in regression are endogenous.

3.9. Ethical Considerations

Research ethical consideration is a censorious issue. It is a very crucial part that every researcher needs to consider while conducting a study. The study might not be reliable if this part is missing. It is a philosophical discipline that distinguishes good and bad for individuals or society. According to Mugenda (2008), research ethics is the professional rules, standards, and guidance considered by a researcher during the research conduct. These standards prevent research against any data falsification. It is necessary as a researcher to take into consideration the confidentiality

code of the data have given, and many other issues like objectivity issues, honesty issues, intellectual and social responsibility. For this purpose, a formal letter from the school was obtained. The rule of conduct requires every researcher conducting a research study in Kenya to present a NACOSTI approval for research. Since this research is about Rwanda and has employed financial statements published on the banks' websites, a data collection permit was not necessary. However, other rules of conduct would get complied.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1. Introduction

The purpose of this chapter is to present data analysis results and findings to meet the general objective of this study, which is to determine the effect of the CAMEL rating model on the financial performance of Rwandan commercial Banks. It intends to present the findings on each CAMEL factor and moderation variable and how they impact the banks' financial performance. The data analysis employed STATA version 16.1, the results were presented in tables and figures to compare, interpret, and draw conclusions. The data collected were for 11 banks operating in Rwanda over the period from 2014 to 2018.

4.2. Descriptive Statistics

Descriptive statistics analysis was conducted to depict the feature characteristics of research variables. Table 4.1 below summarizes the characteristics of the study variable by providing mean, maximum, minimum, standard deviation, and observations.

Table 4.1 Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations		
Return on Assets	overall	0.385	3.574	-13.02	4	N	=	51
	between		4.61	-12.775	3.64	n	=	11
	within		1.283	-6	5.12	T-bar	=	4.636
Capital Adequacy	overall	16.272	8.998	8.08	52.62	N	=	51
	between		9.822	9.952	40.345	n	=	11
	within		4.682	0.344	31.254	T-bar	=	4.636
Asset Quality	overall	8.065	5.67	1.98	32	N	=	51
	between		5.071	2.864	19.85	n	=	11
	within		3.783	-4.085	20.215	T-bar	=	4.636
Management Efficiency	overall	96.322	61.094	49.88	392.7	N	=	51
	between		83.272	53.466	347.2	n	=	11
	within		19.815	40.265	172.785	T-bar	=	4.636
Earnings Management	overall	7.235	1.882	4.61	11.8	N	=	51
	between		1.755	5.296	10.632	n	=	11
	within		0.72	5.192	8.403	T-bar	=	4.636
Liquidity Management	overall	39.445	12.539	17.5	68.1	N	=	51
	between		11.682	25.76	61.7	n	=	11
	within		7.045	21.465	59.465	T-bar	=	4.636
Bank Size	overall	18.698	0.932	16.38	20.59	N	=	51
	between		1.029	16.715	20.282	n	=	11
	within		0.297	17.882	19.822	T-bar	=	4.636

Source: Researcher (2021)

The table above presents a summary of panel data statistics of Rwandan commercial banks for five years from 2014 to 2018. It delineates that there are 51 observations for 11 firms. It shows that a firm with a high ROA had 4%, a firm with lower ROA had -13.02, and the mean value of ROA stood at 0.385 during the period of study. The mean Capital adequacy ratio stood at 16% slightly above the minimum prudential standard of 15% as it has set by the central bank of Rwanda. The mean Asset quality ratio stood at 8.065% and indicates the quality of loan management. The mean of Management Efficiency ratio stood at 96%, and mean Earnings management stood at 7%. The Liquidity mean was 39% above the regulatory requirement of 20%, and the bank sizes' stood at 18.7%.

4.3. Inferential Statistics

This research adopted a panel regression model to figure out the significant correlation between predictor variables and outcome variables. The panel regression model is appropriate to establish a statistically significant connection between explanatory and outcome variables since the data made of cross-sectional and time-series data (Schmidheiny, 2019). This section presents diagnostic tests and hypothesis tests.

4.3.1. Diagnostic Testing

Panel model analysis was employed to test the hypothesis. A bunch of diagnostic tests was conducted to see whether the study has not violated the classical linear regression model assumptions. It ensures the appropriate model to analyze the selected variables mentioned in figure 2.1.

4.3.1.1. Bi-Variate Correlation Test

This study employed a matrix correlation to sort out the link between the study variables. It tests the association between variable x and variable Y; the table below shows the relationship between the CAMEL rating system factors and return on assets.

Table 4.2 The Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) Return on assets	1.000					
(2) Capital adequacy	-0.482	1.000				
(3) Asset quality	-0.511	0.296	1.000			
(4) Management efficiency	-0.963	0.533	0.636	1.000		
(5) Earnings management	0.062	0.118	-0.158	-0.090	1.000	
(6) Liquidity management	-0.405	0.296	0.325	0.432	-0.486	1.000

Source: Researcher (2021)

The research findings demonstrate that the correlation between return on assets and capital adequacy stood at -0.482, assets quality -0.511, management efficiency -0.963, liquidity

management -0.405, and earnings management 0.062. Except for earning management with a positive correlation, other factors have a negative statistical association to predict the return on assets.

The correlation between Capital adequacy and asset quality was 0.296, management efficiency 0.533, earnings management 0.118, and liquidity management 0.296. The correlation coefficient was positive. It means that an increase of one unit in any factor increases the capital adequacy. The correlation between asset quality and management efficiency was 0.636, earnings management -0.158, and liquidity management 0.325. Except for earnings management with a negative correlation, management efficiency and liquidity management have a negative association on asset quality.

The correlation between management efficiency and earnings management was negative with -0.090. It implies that an increase of one unit in earnings management will drop management efficiency at 0.090 and vice versa. The correlation coefficient between management efficiency and liquidity management stood at 0.432. It means that a one-unit change in liquidity management implies a change of management efficiency by 0.432. the correlation between earnings management and liquidity management was -0.486. It means that a change of one unit in liquidity management reduces earnings management by 0.486 and vice versa.

4.3.1.2. Multicollinearity Test

The multicollinearity rule of thumb proposes that any value above ten would bring multicollinearity problems. Since variance inflation factor results are below ten, our data does not have any multicollinearity problem. Table 4.3. below presents multicollinearity test results.

Table 4.3 Variance Inflation Factor

	VIF	1/VIF
Management efficiency	2.284	.438
Liquidity management	1.716	.583
Asset quality	1.711	.585
Capital adequacy	1.526	.655
Earnings management	1.465	.683
Mean VIF	1.741	.

Source: Researcher (2021)**4.3.1.3. Normality Test**

The normality test plays a crucial role since it confirms whether the sample data got distributed normally. The study employed the skewness and kurtosis test; it states that the probability above 0.05 shows that the data variable is the normal distribution, while the probability below 0.05 shows that the data is not a normal distribution.

Table 4.4 Skewness and Kurtosis Tests for Normality

Variable	Obs.	Pr.(skewness)	Pr.(kurtosis)	Adj. Chi2(2)	Prob. >chi2
Return on assets	51	0	0	32.13	0
Capital adequacy	51	0	0	32.66	0
Asset quality	51	0	0	28.39	0
Management efficiency	51	0	0	41.77	0
Earnings management	51	0.008	0.94	6.47	0.039
Liquidity management	51	0.168	0.616	2.26	0.323

Source: Researcher (2021)

The table above presents the normality distribution of our data. The result from the skewness kurtosis test concluded that; we can reject the null hypothesis that ROA, capital adequacy, assets quality, management efficiency, and earnings management have distributed normally. Alternatively, we may fail to reject the null hypothesis that the Liquidity management has a normal distribution at a probability of 0.323. The Kurtosis rule of thumb says that a kurtosis

variable equivalent to 3 is a normal distributed and called mesokurtic. A variable with Kurtosis lesser three is platykurtic, while over three is called leptokurtic. The Kurtosis results in table 4. 4 conclude that the distribution of the variables is platykurtic. These results are similar to those of Gatauwa (2020) and Gatauwa, Kaijage and Kiriti-Nganga (2020). Since the data haven't been distributed normally, pooled regression is not appropriate for this study. However, fixed and random effects models should be employed.

4.3.1.4. Heteroskedasticity Test

Heteroskedasticity's assumption may sometimes violate the linear regression modeling that could impact the analysis of the study. The violation of linear regression modeling could make the result not to be trusted and reliable. The White IM test was employed to test whether regression error variation was depending on independent variables. Data would be homoscedastic if the error term indicated a constant P-value <0.05 .

Table 4.5 IM-Test

White's test for Ho: homoskedasticity
 against Ha: unrestricted heteroskedasticity
 chi2(20) = 48.75
 Prob. > chi2 = 0.0003

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df.	p
Heteroskedasticity	48.750	20	0.000
Skewness	12.060	5	0.034
Kurtosis	2.340	1	0.126
Total	63.150	26	0.000

Source: Researcher (2021)

From the result above, the IM test shows the Heteroskedasticity problem with a Chi-square of 48.75 at a 5% level. Since the test propose the heteroskedasticity problem, the Robust error test would be employed.

4.3.1.5. Autocorrelation Test

This study sorted out the auto-correlation test to find out the extent of similarities in time series. It measures the similarity between the present and the preceding variable value. The correlation outcome might range between negative one and positive one. An autocorrelation of one exhibits a perfect positive association between the variables; an autocorrelation corresponding negative one represents a perfect negative interdependence between the variables. The study utilized the Breusch-Godfrey test as the results shown in the table below.

Table 4.6 Breusch-Godfrey LM Test for Autocorrelation

chi2	df	Prob>Chi2
3.389	5	0.640

H0: no serial correlation

Source: Researcher (2021)

Based on the statistical data, Chi-squared had a value of 3.389, the degree of freedom was 5, and the P-value stood at 0.640. since the P-value is above the significance level of 5%, the test was statistically insignificant. The study failed to reject the null hypothesis with a probability of 0.640. It means that there is no problem with autocorrelation among the data.

4.3.1.6. Stationarity Test

This study carried out a stationarity test to see whether the variables have no spurious regression. Since the Augmented Dickey-Fuller (ADF) modifies the Dickey-Fuller test as it adds the lagged various term of the regressand. The researcher preferred to adopt the Phillips-Perron test since it uses a nonparametric method to consider the serial correlation. It employs Neweast-west to take care of the serial correlation.

Table 4.7 Phillips-Perron Test for Unit Root

Variable	Test statistics	Critical value			Comment
		1%	5%	10%	
Return on assets	-3.653	-4.15	-3.5	-3.18	Stationary
Capital adequacy	-4.397	-4.15	-3.5	-3.18	Stationary
Asset quality	-4.343	-4.15	-3.5	-3.18	Stationary
Management efficiency	-3.796	-4.15	-3.5	-3.18	Stationary
Earnings management	-2.89	-4.15	-3.5	-3.18	Non-stationary
Liquidity management	-4.602	-4.15	-3.5	-3.18	Stationary

Source: Researcher (2021)

The table above presents the outcome of the Phillips-Perron test. It reveals that except earnings management, other CAMEL factors are stationary since they are above the critical value of 1% and 5%. The researcher concluded that the study would fail to reject the null hypothesis that earning management is stationary. However, it might reject the null hypothesis that the return on asset, asset quality, management efficiency, and liquidity management are stationary.

4.3.2. Regression Analysis and Hypothesis Testing

This section presents the results found from the analysis to meet the general objective of the study, which is to establish the relation between the CAMEL rating system and financial performance in Rwandan commercial banks. It presents the results of the pooled regression model, the random effect model, and the fixed effect model.

Table 4.8 Pooled Regression Model

Return on assets	Coef.	St. Err.	t-value	p-value	[95% Conf. Interval]	Sig
Capital adequacy	0.024	0.017	1.4	0.168	-0.01 0.058	
Asset quality	0.107	0.029	3.76	0	0.05 0.165	***
Management efficiency	-0.064	0.003	-21.01	0	-0.07 -0.058	***
Earnings management	-0.045	0.08	-0.56	0.576	-0.205 0.115	
Liquidity management	-0.004	0.013	-0.32	0.754	-0.03 0.022	
Constant	5.808	0.882	6.58	0	4.031 7.585	***
Mean dependent var.	0.385	SD dependent var.			3.574	
R-squared	0.946	Number of obs.			51	
F-test	158.008	Prob. > F			0	
Akaike crit. (AIC)	136.684	Bayesian crit. (BIC)			148.275	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Researcher (2021)

In the beginning, the Pooled regression model has conducted to estimate the predictors. From the results of the pooled regression model in Table 4.8, Capital Adequacy and asset quality have a positive correlation on the financial performance though only assets quality is statistically significant at a p-value of 5%. Other factors Management of efficiency, Earnings Management, and Liquidity management have a negative correlation though only management efficiency has a statistically significant at a 5% level.

Table 4.9 Random Effects Estimation Model

Return on assets	Coef.	St. Err.	t-value	p-value	[95% Conf. Interval]	Sig
Capital adequacy	0.048	0.016	2.98	0.003	0.016 0.079	***
Asset quality	0.105	0.025	4.27	0	0.057 0.153	***
Management efficiency	-0.063	0.003	-19.97	0	-0.069 -0.057	***
Earnings management	-0.098	0.103	-0.96	0.339	-0.3 0.103	
Liquidity management	-0.002	0.011	-0.14	0.886	-0.024 0.02	
Constant	5.605	1.106	5.07	0	3.438 7.772	***
Mean dependent var.	0.385	SD dependent var.			3.574	
Overall r-squared	0.942	Number of obs.			51	
Chi-square	495.9	Prob. > chi2			0	
R-squared within	0.882	R-squared between			0.969	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Researcher (2021)

Based on the Random effect estimation on the table above, all the results bear a resemblance to the pooled regression model. Both assets quality and management efficiency continued to be significantly at 5% level. However, capital adequacy became statistically significant compared to the Pooled regression results where it was insignificant. The R-squared within, between, and overall represent a well fit of this model.

Table 4.10 Fixed Effect Estimation model

Return on assets	Coef.	St. Err.	t-value	p-value	[95% Conf. Interval]	Sig
Capital adequacy	0.07	0.023	3.043	0.005	0.023 0.117	***
Asset quality	0.076	0.034	2.22	0.033	0.006 0.146	**
Management efficiency	-0.057	0.006	-9.32	0	-0.069 -0.044	***
Earnings management	-0.097	0.128	-0.76	0.455	-0.356 0.163	
Liquidity management	0.005	0.013	0.35	0.725	-0.022 0.031	
Constant	4.63	1.474	3.14	0.003	1.638 7.623	***
Mean dependent var.	0.385	SD dependent var.			3.574	
R-squared	0.886	Number of obs.			51	
F-test	54.49	Prob. > F			0	
Akaike crit. (AIC)	70.357	Bayesian crit. (BIC)			81.948	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Researcher (2021)

Based on fixed effect estimation results, the model takes after random effect estimation results where capital adequacy, assets quality, and management efficiency continued to be statistically significant to explain financial performance at a confidence level of 5%. Though capital Adequacy and asset quality remained to be positively correlated, management efficiency and Earnings management negatively correlated, and liquidity management became positively correlated. To choose a compatible method for our panel data between the Random and the Fixed-effect model, the researcher conducted the Hausman test.

Table 4.11 Hausman Specification Test

	Fixed (b)	Random (B)	Difference (b-B)	$\sqrt{\text{diag}(V_b - V_B)}$ S. E.
Capital adequacy	0.0699307	0.0476463	0.0222844	0.0169818
Assets quality	0.076212	0.105012	-0.0288	0.023949
Management efficiency	-0.0568865	-0.063231	0.0063449	0.0052168
Earnings management	-0.0966407	-0.098449	0.0018078	0.759036
Liquidity management	0.0045667	-0.001604	0.0061704	0.0063041

b = consistent under Ho and Ha; obtained from xtreg

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

Test Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(5) &= (b-B)'[(V_b - V_B)^{-1}](b-B) \\ &= 2.22 \end{aligned}$$

Prob >chi2 = 0.8182

Source: Researcher (2021)

The Hausman test in table 4.11 presents a chi-square of 2.22 with a probability of 0.8182 higher than 0.05 of significance. Since the Hausman test p-value is higher than 0.05, the Random effect is appropriate to analyze the panel data (Schmidheiny, 2019). However, the Random effect model robust would be conducted to correct homoskedasticity problems.

Table 4.12 Random Effect Model Robust

ROA	Coef.	St. Err.	t-value	p-value	[95% Conf. Interval]	Sig
Capital adequacy	0.048	0.016	2.99	0.003	0.016 0.079	***
Assets quality	0.105	0.034	3.08	0.002	0.038 0.172	***
Management efficiency	-0.063	0.004	-15.75	0	-0.072 -0.054	***
Earnings management	-0.098	0.095	-1.03	0.302	-0.285 0.089	
Liquidity management	-0.002	0.012	-0.14	0.892	-0.025 0.022	
Constant	5.605	1.221	4.59	0	3.213 7.998	***
Mean dependent var.	0.385	SD dependent var.			3.574	
Overall r-squared	0.942	Number of obs.			51	
Chi-square	4106.233	Prob. > chi2			0	
R-squared within	0.882	R-squared between			0.969	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Researcher (2021)

From these outcomes in table 4.12, the model below might be formulated.

$$\text{ROA} = 5.605 + 0.048\text{CA} + 0.105\text{AQ} - 0.063\text{ME} - 0.098\text{EM} - 0.002\text{LM} + \text{E}$$

Where:

CA = Capital Adequacy, AQ = Assets Quality, ME = Management Efficiency, EM = Earnings Management, LM = Liquidity Management, and E = Error term

This model Random effect fit the data with $R^2 = 94.2$ and statistical significant at 5% (p-value = 0.000). It presents that capital adequacy, asset quality, and management efficiency are statistically significant at a 5% level. Any increase of one percentage in capital adequacy, assets quality, and management efficiency, ROA is anticipated to rise by 0.048, 0.105, and drop by 0.063 consecutively. Earnings management and liquidity management have a negative correlation to explain ROA though their correlation is insignificant at a p-value of 5%. It means that an increase of one percent in earnings management and liquidity management make the financial performance to reduce by 0.098 and 0.002 consecutively. The study findings contrast with Sylvain's study where liquidity management and asset quality were positively correlated.

4.3.3. Effect of Moderation on Financial Performance

The sixth objective of this study was to examine the effect of bank size on the performance of Rwandan commercial banks. It had been introduced in the study as a third variable to seek the way it impacts the relationship between the predictor and dependent variables.

Table 4.13 Bank Size as an Interaction Term Between Capital Adequacy and Return on Assets

Return on Assets	Coef.	St. Err.	t-value	p-value	[95% Conf. Interval]	Sig
Capital adequacy	0.539	1.121	0.48	0.63	-1.657 2.736	
Bank size	3.097	1.857	1.67	0.095	-0.544 6.737	*
c.Capital adequacy#c.Bank.Size	-0.026	0.06	-0.43	0.664	-0.143 0.091	
Constant	-58.96	35.372	-1.67	0.096	-128.289 10.369	*
Mean dependent var.	0.385	SD dependent var.			3.574	
Overall r-squared	0.412	Number of obs.			51	
Chi-square	6.958	Prob. > chi2			0.073	
R-squared within	0.107	R-squared between			0.495	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Researcher (2021)

Table 4.13 above presents the effect of bank size (moderating variable) between capital adequacy and financial performance that is measured by the return on investment (ROA). The study found that the bank size standard deviation above the mean, below the mean and within have a slightly parallel positive effect. Though the effect is insignificant at a 5% level as it has shown in the table above. The table presents that the moderating variable itself has a positive correlation of 3.097 at R-squared of 0.412, it would lower the value of capital adequacy by 0.026. In this case, there is a positive predictive relation between capital adequacy and financial performance.

Table 4.14 Bank Size as an Interaction Term Between Asset Quality and Return on Assets

Return on assets	Coef.	St. Err.	t-value	p-value	[95% Conf. Interval]	Sig
Asset quality	-1.213	0.463	-2.62	0.009	-2.121 -0.305	
Bank size	1.766	0.86	2.05	0.04	0.08 3.451	
c.Asset quality#c.Bank Size	0.06	0.026	2.36	0.018	0.01 0.11	
Constant	-31.986	16.683	-1.92	0.055	-64.683 0.711	
Mean dependent var.	0.385	SD dependent var.			3.574	
Overall r-squared	0.618	Number of obs.			51	
Chi-square	290.933	Prob. > chi2			0	
R-squared within	0	R-squared between			0.884	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Researcher (2021)

The results concluded that a two-way interaction is statistically significant at a p-value of 0.05.

Bank size has a positive effect on financial performance at a value of 1.766. The interaction term c.asset quality#c.bank size has a positive relation of 0.060. It means that one unit change in interaction will make the value of asset quality increase to -1.153. The effect of asset quality's on banks' performance is being determined by the plot. It shows a negative correlation as per appendix IV. The bank size standard deviation above the Mean, within, and below the Mean show a negative association between asset quality and financial performance.

Table 4.15 Bank Size as an Interaction Term Between Management Efficiency and Return on Assets

Return on assets	Coef.	St. Err.	t-value	p-value	[95% Conf. Interval]	Sig
Management efficiency	0.042	0.12	0.35	0.728	-0.193 0.277	
Bank size	0.731	0.4	1.84	0.066	-0.049 1.512	*
c.Management efficiency#c.Bank size	-0.006	0.01	-0.78	0.438	-0.02 0.009	
Constant	-7.473	6.6	-1.13	0.257	-20.402 5.455	
Mean dependent var.	0.385	SD dependent var.		3.574		
Overall r-squared	0.941	Number of obs.		51		
Chi-square	199.054	Prob. > chi2		0		
R-squared within	0.719	R-squared between		0.984		

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Researcher (2021)

From table 4.15 above, the results conclude that the interaction term (Bank size) has a negative correlation with an insignificant value of 0.438. The Bank size itself has a positive impact on ROA at 0.731. However, the table itself cannot produce a straight interpretation to conclude the effect of management efficiency on financial performance when an interaction term gets introduced. The results have plotted to give the right link between management efficiency and financial performance. The margins plot (appendix IV) shows a negative correlation when the bank's size standard deviation is above, below, and within the mean. Though, the relation is insignificant at a p-value of 0.438.

Table 4.16 Bank Size as an Interaction term Between Earnings Management and Return on Assets

Return on assets	Coef.	St. Err.	t-value	P-value	[95% Conf. Interval]	Sig
Earnings management	10.103	7.76	-1.3	0.193	-25.306 5.099	
Bank size	-2.273	3.5	-0.65	0.516	-9.138 4.592	
c.Earnings management#c.Bank Size	0.518	0.4	1.28	0.2	-0.274 1.31	
Constant	45.07	67.1	0.67	0.502	-86.436 176.577	
Mean dependent var.	0.385	SD dependent var.			3.574	
Overall r-squared	0.457	Number of obs.			51	
Chi-square	19.762	Prob. > chi2			0	
R-squared within	0.179	R-squared between			0.508	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Researcher (2021)

The findings show that bank size's standard deviation above the mean is slightly positive. The standard deviation below the mean exhibits a negative link; the standard deviation at the mean is a bit negative. It means that the standard deviation below the mean, the Earnings management is statistically negative associated with banks' performance. The standard deviation of moderator above the mean produces a slightly positive effect between our predicting variable and outcome variable, and standard deviation at the mean shows a negative correlation to some degree between predicting variable and financial performance. However, the effect is insignificant at the 0.05 level. The findings in the table above concluded that Bank size has a negative correlation on ROA with a value of 2.273; the interaction variable has a positive connection with Earnings by 0.518.

Table 4.17 Bank Size as an Interaction Term Between Liquidity Management and Return on Assets

Return on assets	Coef.	St. Err.	t-value	p-value	[95% Conf. Interval]	Sig
Liquidity management	0.026	1.45	0.02	0.986	-2.82 2.872	
Bank size	2.02	2.83	0.71	0.476	-3.53 7.569	
c.Liquidity management#c.Bank Size	-0.001	0.08	-0.01	0.991	-0.15 0.148	
Constant	-38.181	54.7	-0.7	0.485	-145.435 69.072	
Mean dependent var.	0.385		SD dependent var.		3.574	
Overall r-squared	0.509		Number of obs.		51	
Chi-square	6.937		Prob. > chi2		0.074	
R-squared within	0		R-squared between		0.708	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Researcher (2021)

The results in the table above show that each unit increases from bank size will increase the value of ROA by 2.020, Liquidity management would reduce by 0.001, and interaction term will drop to 2.019 (2.020 – 0.001). The overall R-squared is 0.509 at a p-value of 0.074. It finally shows that standard deviation above the mean, below, and at the mean Liquidity management has a slightly positive link on financial performance in Rwandan Commercial Banks.

Table 4.18 Summary of Hypothesis

Hypothesis	P-Value	Decision
H0 ₁ : Capital adequacy has no significant connection to predict ROA	0.003	Reject
H0 ₂ : Asset quality has no significant connection to predict ROA	0.002	Reject
H0 ₃ : Management efficiency has no significant connection to predict ROA	0.000	Reject
H0 ₄ : Earnings Management has no significant connection to predict ROA	0.302	Accept
H0 ₅ : Liquidity Management has no significant connection to predict ROA	0.892	Accept

Source: Researcher (2021)

4.4. Discussion of Findings

Based on the study findings, capital adequacy has a significant positive statistical impact to ascertain the financial performance in financial institutions. This study shares the same results with research conducted by Dahiyat (2012). However, some studies contradict this result Alshatti, (2015). It can be said that more studies are still needed to construct more substantive judgments.

It is summarized that asset quality and financial performance are positively significant correlated. It means that the lower the NPLs ratio, the higher profit. It unanimously confirms some studies conducted globally like Ozurumba (2016); Kadioglu, Telcken, & Nurcan (2017). However, there a mismatch with some studies like Mausya (2009) and Kamanzi (2015).

The results from findings indicate that operational expenditure over net operating income has a negative and significant influence on financial performance in commercial banks. It got confirmed by some studies conducted at both the national and international levels. The more management efficiency goes up, the more the performance in commercial banks will increase.

Based on the statistical results, the findings show that earnings management and return on assets have a negative statistical correlation. It has approved by Aguentaous, Lahrech, & Bounakaya (2017), the effect is not significant. However, this contradicts different studies conducted at the international where other studies found a positive association study confirmed by Kumar (2006) and Mengistu (2015).

Based on the statistical findings, the study shows unanimous results between the literacy of liquidity management and the financial performance among commercial banks. Mwangi (2014), Mucheru, Shukla, & Kibachia (2017), and Muthoga (2019) revealed that there is a negative relation between holding much liquid asset and financial performance in commercial banks. Because retaining more liquidity requires many costs that may cause a fall in the profits. This study shows that ROA and liquidity management are negative correlated with -0.002 of the coefficient. However, the effect is not significant.

The study has been conducted to establish the moderating effect of bank size and financial performance in commercial banks. However, the result still shows a discrepancy among literacy. Nevertheless, Staikouras and Wood (2004) found a negative and positive on large and small banks respectively. Suleiman (2015) concluded that there is a significant inverse impact between the banks' size and financial performance. Based on the finding, the bank size has a direct positive effect on financial performance. However, the impact is statistically significant when it interacted with asset quality. Also Kamau, Gatauwa and Mwambia (2018) have similar findings that bank size affects financial performance of banks.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter summarizes the study findings based on the purposes that the researcher anticipated to attain. It exhibits conclusions extracted from the sequences retrieved from the analysis in Chapter four on the CAMEL rating model and financial performance in Rwandan Commercial Banks. The chapter suggests some recommendations, contributions to knowledge, and counsel further studies.

5.2 Summary of Findings

The primary objective of this study was to investigate the effect of the CAMEL rating model on Financial performance of Rwandan commercial banks. The secondary aim was to figure out the impact of capital adequacy, asset quality, management efficiency, earnings management, and liquidity management on financial performance. It also sought out to discover the influence of bank size as a mediator between predictor and outcome variables.

Establishing the effect of capital adequacy on ROA was one of the objectives that the researcher intended to investigate. From the findings, the descriptive statistics show that the high value of capital adequacy was 52% above the minimum requirement and low at 8% below the minimum requirement. However, the Mean Capital adequacy stood at 16% slightly above the minimum requirement of 15%. The correlation is significant at 5% and R^2 of 94%.

The study sought to investigate the effects of asset quality on the bank's performance. It concluded that a firm with the maximum value of Asset quality stood at 32%, it proposes the

worse situation in loan management. The firm with the minimum value stood at 1.98 and it presents better conditions in loan management. However, the overall mean is still high by 8% above the minimum requirement of 6%. Assets quality has a positive statistically significant effect on Rwandan commercial bank performance at R^2 of 94%.

The management efficiency ratio is high as it has shown in table 4.2. The findings revealed that a firm with a high value had 393%. It means that it was spending almost four times more than its income; this might propose a complicated situation in the future. However, the overall management efficiency Mean stood at 96%. It means that their expenditure is slightly below income but still high. Management efficiency effect on performance is negative correlated. It means that a one-unit drop in management efficiency ratio will make financial performance to raise at 6% and vice versa.

The study concluded that earnings management has a negative correlation on the financial performance of Rwandan Commercial Banks. From the random effect model in table 4.7, the coefficient of it stood at -0.098. It concludes that a decrease in NIM will raise the value of ROA at a p-value of 0.302. From descriptive statistic results, the overall earnings management ration stood at 7%, the high ratio at 11.8%, and lower ration at 4.6%. We might conclude that earnings management in Rwandan is performing well.

From the study findings, liquidity management has a negative correlation on ROA. It revealed that an increase of one unit in liquidity management reduces the value of financial performance

by 0.002 at a p-value of 0.892 and vice versa. Liquid assets ratio in Rwandan commercial banks stood at 39.4% below the regulatory requirement of 50% .

The bank size was introduced as third party variable to interact between explanatory and outcome variables to well understanding the correlation among the variables. This study concluded that bank size does not have a significant impact on Financial performance when it gets introduced as a moderating variable. The finding present that it would be significant at a p-value of 0.05 when it interacts between asset quality and ROA. However, it does not influence other factors of the CAMEL model.

5.3. Conclusion

The CAMEL Rating model has been recommended as the best tool to detect the strengths and weaknesses of banking institutions. It intended to determine the performance of the banking sector in Rwanda, mainly commercial banks since they are the backbones of the sector. It anchored on CAMEL ratios analysis as it has proposed by the regulatory authority (BNR).

From the findings, Capital adequacy has significantly and positively correlated with the financial performance of the banking sector in Rwanda. The central bank of Rwanda (BNR) set the minimum requirement at 15%; this contends that holding high and enough capital adequacy ratio helps the financial institution to remain solvent. It helps them coping financial risks associated with financial intermediations. Analysis and discussion in the proceeding pages show that commercial banks were able to manage capital adequacy slightly above the minimum requirement.

The study discussion and analysis conclude that liquidity management is negatively correlated to determine the financial performance of Rwandan Banks. It means that holding high liquidity in financial institutions would lower returns; this got confirmed by an investigation conducted by Mucheru, Shukla, and Kibachia (2017), where liquidity effect was negative; the influence was significant at 5% level. However, financial institutions have advised holding enough liquidity in the conformity of the central bank's norms. The study analysis revealed that asset quality is positively significant to determine the return on assets. The maximum asset quality ratio stood at 32%; the minimum maintained at 1.98%. However, the average was at 8.065% above the minimum standard.

The highest earnings management ration was maintained at 11.8% and the lowest at 4.61% and the average at 7.23%. The average earnings management ratio shows a good performance in the net interest margin. In terms of management efficiency, the analysis reveals a poor performance where its indicator has maintained at 96%. This ration proposes a dangerous problem in the coming era since the banks are using much expenditure higher than income.

5.4. Policy Implications

The study outcomes have crucial implications for the public, regulators, academicians, and policymakers. Based on the study findings and conclusion above, several recommendations should be drawn. Managers of commercial banks in Rwanda should formulate new policies and strategies that would improve financial inclusion and make it easier access to everyone. This would be achieved through increasing agents, number of ATMs and mobile banking services,

and other methods that require small costs. This will help banks to get closer to their customers and will heighten customers' deposits.

The financial regulatory body (BNR) and bank managements should work together to come up with some policies that should improve banking sector efficiency. All the CAMEL model factors should be employed to evaluate the soundness of financial institutions. The regulators and management should also work hand in hand to deliver suitable policies that would not endanger financial intermediation and guarantee the customers' deposits aren't more precarious.

Based on the study findings, this research will contribute to the existent study on financial institutions. Since most studies conducted on some factors and excluded others, the results will assist future researchers while referring to this study. The findings will inform the public on how the CAMEL factors influence the performance and show the current condition in the Rwandan banks. However, it recommends that investigators and academicians can employ this study to enhance vigorous analysis through the consideration of different interaction effects.

This study contributed to knowledge through the research hypothesis test that capital adequacy, asset quality, management efficiency, and liquidity management have no significant effect on predicting financial performance in Rwandan banks. Additionally, bank size was introduced to test the effect of moderator between the CAMEL factors and financial performance. Future researchers are recommended to consider the improved CAMEL Rating model with a sensitivity factor.

From the study findings, Capital adequacy has a statistically significant influence on financial performance. In line to improve financial performance in the banking sector, the management recommended setting remedies that will attract new investors so that banking capitalization should be enhanced. Since capitalization has taken as the cornerstone for the firm existence, more capital is needed to ensure the financial stability that will make them lower the financial risks in the future.

Management efficiency in Rwandan banks has a negative statistically significant effect on the determination of financial performance. The study findings show that some banks are spending much more than they generate. This would propose some problems in the future that can drive to bankruptcy. Banks Managers need to be meticulous on the usage of the company's resources, especially when it comes to spending.

Liquid Assets have a tremendous impact on financing business operations, especially when other sources of finance seems to be scarce. From the conclusion above, the liquid assets to total assets ratio stood at 39% below the minimum prudential standard. Banks should ensure that they hold enough funds that would assist them in risk minimization and future puzzling situations. Retaining enough liquidity will allow the banks to meet their financial obligations.

5.4.1. Suggestion for Further Study

This study is anchored on the CAMEL rating system to assess the performance of Rwandan commercial banks. It urges further examination in other financial intermediaries to ensure the strengths and weaknesses of the entire financial industry and their contribution to economic

growth. Other financial intermediaries are insurance and pension companies, non-commercial banks institutions, and microfinance institutions. Since this study adopted the CAMEL model, future researchers should consider other factors like corporate governance and sensitivity to evaluate banks' efficiency. The study relied on secondary data generated from each bank's website. The later researchers also suggested considering the primary data for more consistency.

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APPENDICES

APPENDIX I: RESEARCH AUTHORIZATION


**KENYATTA UNIVERSITY
GRADUATE SCHOOL**

E-mail: dean-graduate@ku.ac.ke P.O. Box 43844, 00100
Website: www.ku.ac.ke NAIROBI, KENYA
Tel. 020-8704150

Our Ref: D53EA/26240/2018 **DATE: 22nd September, 2020**

Republic of Rwanda,
Ministry of Education
P.O. Box 622
KIGALI –RWANDA.

Dear Sir/Madam,

**RE: RESEARCH AUTHORIZATION FOR MR. HAKIZAKUBANA NGOBOKA
JEAN PAUL – REG. NO. D53EA/26240/18**

I write to introduce Mr. Hakizakubana Ngoboka Jean Paul who is a Postgraduate Student of this University. He is registered for MBA degree programme in the **Department of Accounting & Finance.**

Mr. Hakizakubana intends to conduct research for a MBA Project Proposal entitled, **“Camel Rating Model and Financial Performance of Commercial Banks in Rwanda.”**

Any assistance given will be highly appreciated.

Yours faithfully,


**PROF. ELISHIBA KIMANI
DEAN, GRADUATE SCHOOL**



APPENDIX II: LIST OF COMMERCIAL BANKS IN RWANDA

1. Bank of Kigali Ltd
2. I&M Bank Plc
3. COGEBANQUE Plc
4. KCB Bank Rwanda Ltd
5. Ecobank Rwanda Ltd
6. Banque Populaire Du Rwanda Ltd
7. Equity Bank Rwanda Plc
8. Access Bank (Rwanda) Plc
9. Bank of Africa Rwanda Plc
10. Guarantee Trust Bank (Rwanda) Plc
11. Commercial Bank of Africa (Rwanda) Plc

Source: National Bank of Rwanda (2018)

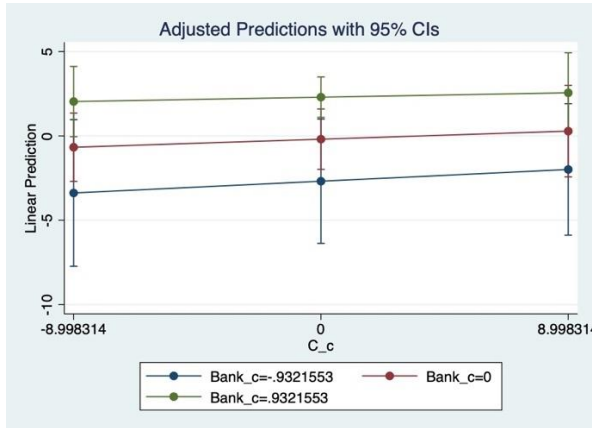
APPENDIX III: SECONDARY DATA COLLECTION SCHEDULE

Bank Name:

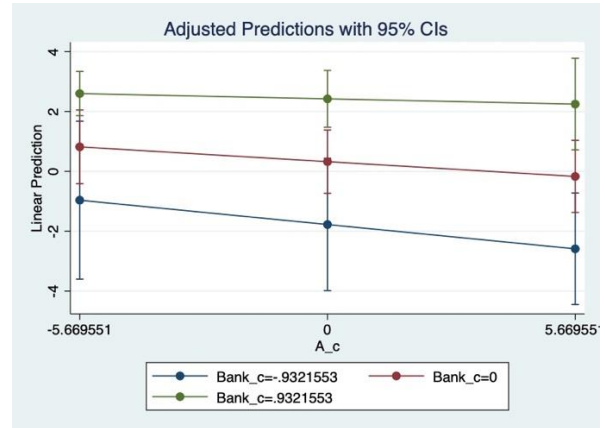
Date:.....

PARTICULARS	2014	2015	2016	2017	2018
ROA					
Equity to Total Assets					
NPLs ratio					
Total Expenditure to Total Income					
NIM					
Liquid Assets to Total Assets					
Ln (Total Assets)					

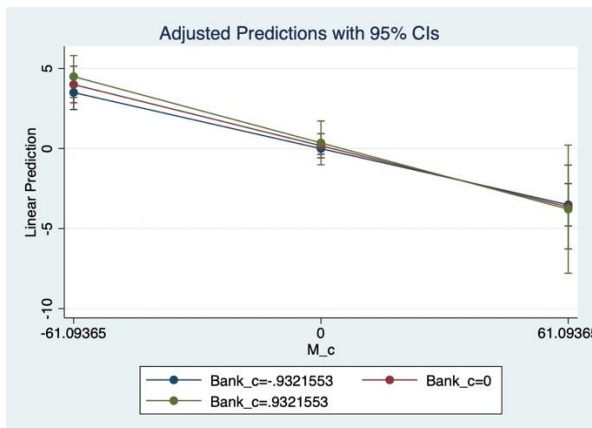
APPENDIX IV: EFFECT OF MODERATION ON FINANCIAL PERFORMANCE



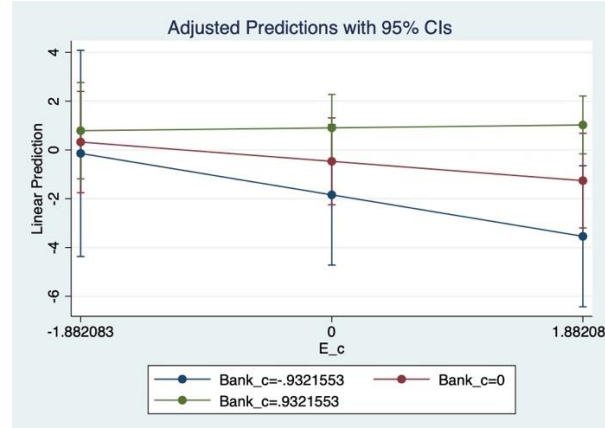
Bank size intermediated between CA and ROA



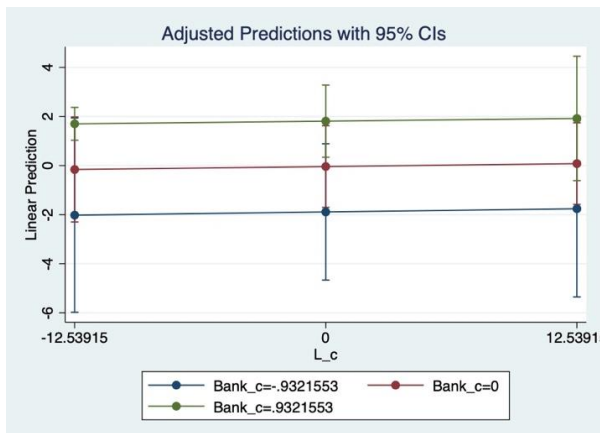
Bank size intermediated between AQ and ROA



Bank size intermediated between ME and ROA



Bank size intermediated between EM and ROA



Bank size intermediated between LM and ROA