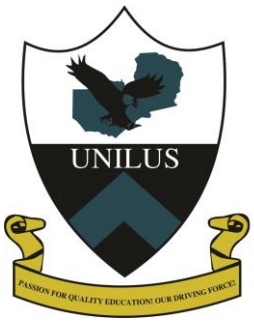


UNIVERSITY OF LUSAKA

SCHOOL OF POSTGRADUATE STUDIES

AN EVALUATION OF THE IMPACT OF STATUTORY RESERVE REQUIREMENTS ON ECONOMIC STABILITY IN ZAMBIA: A MACROECONOMIC PERSPECTIVE (2023Q1 – 2024Q2)

A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, UNIVERSITY OF LUSAKA IN PARTIAL FULFILLMENT OF THE AWARD OF THE MASTER OF SCIENCE IN ECONOMICS AND FINANCE.

BY

NATASHA NAKAWALA

MSCECF21211245

Declaration

I, Natasha Nakawala, do hereby declare that this piece of work is my own and to the best of my knowledge, it has never been produced previously at this University and that where other people's work has been used, it has been duly acknowledged.

Author's-Signature:  Date: 20th March 2025

Supervisor's Signature:  Date: 20th March 2025

Dedication

I dedicate this thesis to my father, Luckwell Sonja Simwanza and my mother, Serah Nanyangwe Simwanza.

Acknowledgements

I thank God for his grace throughout my postgraduate journey. His grace has been sufficient through my varied weaknesses in this process. I would also like to my friends and family (too numerous to name) who have been an immense support throughout my journey. The support through encouragement, advice, food, opening their homes for me to charge my devices at the height of loadshedding and so many other acts of kindness are the reason I was able to complete this body of work. I am forever indebted to you for the immense support. I further like to acknowledge my supervisor, Mr. Chimuka Matongo for his availability, invaluable insights and directions throughout this process. His direction was critical in completing this work.

Table of Contents

Declaration ii

Dedication iii

Acknowledgements iv

List of Tables viii

List of Figures ix

List of Equations x

List of Acronyms xi

Abstract xii

CHAPTER ONE 1

INTRODUCTION AND BACKGROUND OF THE STUDY 1

1.0 Introduction 1

1.1 Background of Study 1

1.2 Overview of Macroeconomic Performance in Zambia 4

1.3 Statement of the problem 7

1.4 General Objective 8

1.4.1 Specific Objectives 8

1.4.2 Research Hypothesis 9

1.5 Significance of the study 9

1.6 Scope of the Study 10

1.7 Organization of the Report 10

CHAPTER TWO 12

LITERATURE REVIEW 12

2.0 Introduction 12

2.1 Empirical Review 12

2.1.1 Global Context 12

2.1.2 Regional Context 15

2.1.3 Zambian Context 18

2.2. Theoretical Framework 20

2.2.1 Monetary Theory 20

2.2.2 Banking and Financial Intermediation Theory 21

2.2.3 Macroeconomic Stabilization Theory **22**
2.2.4 Transmission Mechanism of Monetary Policy **23**
2.3 Conceptual Framework **24**
CHAPTER THREE **26**
METHODOLOGY **26**
3.0 Introduction **26**
3.1 Research Design **26**
3.2 Model Specification **26**
3.3 Data and Analysis **28**
3.3.1 Data Sources **28**
3.3.2 Data Analysis **28**
3.4 Description of variables **28**
3.4.1 GDP (Gross Domestic Product) **28**
3.4.2 Exchange Rate (ER) **29**
3.4.3 Lending Rate (LR) **29**
3.4.4 Statutory Reserve Ratio (SRR) **29**
3.5 Data Estimation Techniques **29**
3.6 Post Diagnostic tests **30**
3.7 Chapter Summary **30**
CHAPTER FOUR **31**
DATA PRESENTATION AND ANALYSIS **31**
4.0 Introduction **31**
4.1 Descriptive Statistics 31
4.2 Stationarity Tests 32
4.2.1 Stationarity test at level 32
4.2.2 Stationarity test at first difference 32
4.3 Cointegration Test **33**
4.4 Vector Error Correction Models 34
4.4.1 Short-run Model 34
4.4.2 Long-run Model 37
4.5 Post-Diagnostic Tests 38

4.5.1 Normality Tests 38
4.5.2 Autocorrelation 39
4.5.3 Model Stability 39
4.5.4 Impulse Response Function (IRF) 40
4.5.4.3 IRF for lnER model **42**
4.5.4.4 IRF for lnLR model **42**
CHAPTER FIVE **44**
DISCUSSION OF FINDINGS **44**
5.0 Introduction **44**
5.1 The Impact of SRR on Inflation **44**
5.2 The Impact of SRR on Exchange Rate **45**
5.3 The Impact of SRR on Interest Rate **46**
5.4 The Impact of SRR on GDP Growth Rate **47**
CHAPTER SIX **49**
CONCLUSION AND RECOMMENDATIONS **49**
6.0 Conclusion **49**
6.1 Recommendation **50**
6.2 Study Limitations and Delimitations **51**
6.2.1 Study Limitations **51**
6.2.2 Study Delimitations **51**
6.3 Suggestions for Future Studies **52**
7. References **53**
Appendix III **56**

List of Tables

Table 1: Descriptive Statistics of the Variables, Source: Authors' Computations (2024)……...32

Table 2: Results of ADF test for Stationary at Level, Source: Authors' Computation (2024)……..…33

Table 3: Results of ADF test for stationarity at first-difference, Source: Authors' Computations (2024)……..……...33

Table 4: Results of the Johansen Test for Cointegration, Source: Author's Computations (2024)……..……...34

Table 5: Results of Multivariate Regression Analysis (and ***) statistically significant at 0.10, 0.05 and 0.01 level of significance, Source: Author's Computations (2024)……....35-37*

Table 6: Results of the long-run model, Source: Author's Computations (2024)……..38-39

Table 7: Results of the Jarque-Bera test for normality, Source: Author's Computation (2024)……...40

Table 8: Results of the Breusch-Pagan LM test for Autocorrelation, Source: Author's Computation (2024)……...40

List of Figures

Figure 1: Trend Analysis of MPR, SRR, GDP, CPI, LR and ER……..……...3

Figure 2: Prevailing Statutory Reserve ratio's- Peer group (source: CEIC Data, Reserve Bank of Zimbabwe, Bank of Zambia and Reserve Bank of Botswana)…….……4

Figure 3: Conceptual framework……...…...26

Figure 4: Results of the Eigen Stability test……...41

Figure 5: Results of the Impulse Response Function (IRF) for the lnGDP model……...42

Figure 6: Results of the Impulse Response Function (IRF) for the lnCPI model……42

Figure 7: Results of the Impulse Response Function (IRF) for the lnER model…..…43

Figure 8: Results of the Impulse Response Function (IRF) for the lnLR model……...44

List of Equations

Equation 1: Liquidity Preference-Money Supply……..….22
Equation 2: Quantity Theory of Money……..….22
Equation 3: Balance Sheet Constraint……..……23
Equation 4: Liquidity Ratio……...…23
Equation 5: Phillips Curve……24
Equation 6: Nominal and Real Interest Rates……..25
Equation 7: Uncovered Interest Rate Parity Condition……..…….25

List of Acronyms

ADF - Augmented Dickey-Fuller

ARDL - Autoregressive Distributed Lag

BOZ-Bank of Zambia

CPI-Consumer Price Index

GDP-Gross Domestic Product

ER-Exchange Rate

IMF-International Monetary Fund

LR-Lending Rate

OMO-Open Market Operations

MPR-Monetary Policy Rate

MDRP-Multi-Donor Budget Support

ROA-Return on Assets

SRR-Statutory Reserve Ratio

UIP-Uncovered Interest Rate Parity

Abstract

This study examines the impact of Statutory Reserve Ratio (SRR) adjustments on economic stability in Zambia from 2013Q1 to 2024Q2. Economic stability is assessed through four macroeconomic indicators: inflation rate, exchange rate, interest rates, and GDP growth. The study aims to analyze the relationship between SRR adjustments and inflation, examine their impact on the exchange rate, assess their effect on interest rates, and evaluate their influence on GDP growth.

The Vector Error Correction Model (VECM) was employed, preceded by stationarity tests using the Augmented Dickey-Fuller (ADF) test and cointegration analysis via the Johansen test. The findings indicate that SRR adjustments have statistically significant effects on macroeconomic variables both in the short and long run. In the short run, an increase in SRR led to a rise in GDP, an increase in inflation, and a depreciation of the exchange rate, suggesting limited immediate stabilizing effects. However, in the long run, SRR adjustments contributed to economic stability by promoting GDP growth, reducing inflation, increasing lending rates, and stabilizing the exchange rate.

The study focuses on the 2013Q1–2024Q2 period to capture a full cycle of monetary policy adjustments, including multiple SRR changes implemented by the Bank of Zambia in response to varying macroeconomic conditions. This period provides a comprehensive dataset for evaluating both short- and long-term impacts of SRR adjustments.

The findings have key policy implications for central bank decision-making. A carefully calibrated SRR policy can enhance economic stability by balancing inflation control, exchange rate stability, and economic growth. The study recommends that monetary authorities complement SRR adjustments with other policy tools to mitigate unintended consequences on credit availability and investment. Future research could explore how SRR interacts with broader fiscal policies to improve macroeconomic outcomes.

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.0 Introduction

This chapter presents the background to the study, an overview of Zambia's macroeconomic performance, the problem statement, objectives of the study and discusses the hypotheses on which the study is based. It also provides justification for the study and presents the scope of the study and its organization.

1.1 Background of Study

The performance of an economy is significantly influenced by the effectiveness of various policies, particularly monetary and fiscal policies, which encompass a range of tools and measures aimed at regulating economic activity (Mankiw, 2021). Monetary policy includes components such as interest rate adjustments, which influence borrowing and spending; Open Market Operations (OMO), where central banks buy or sell government securities to control the money supply; and the Statutory Reserve Ratio (SRR), which determines the minimum reserves banks must hold against deposits. Other tools include discount lending, where banks can borrow from the central bank at a specified interest rate, and forward guidance, which involves communicating future policy intentions to shape market expectations (Madura, 2015; Bank of Zambia, 2016).

Fiscal policy, on the other hand, involves government spending and tax policies that influence economic conditions. Expansionary fiscal measures can stimulate economic growth through increased public spending or tax cuts during periods of economic downturn, while contractionary fiscal policies may be employed to reduce deficits and stabilize inflation (Keynes, 1936). Successful implementation of both monetary and fiscal policies requires a high level of coordination, as each can significantly impact the overall economic environment (Akhtar, 2006). The interplay between these policies has become essential for achieving broader economic stability and growth (Schoenholtz, 2015).

Monetary policy plays a fundamental role in economic stability, with statutory reserve requirements being one of the key tools employed by central banks to regulate liquidity and maintain financial stability. The Statutory Reserve Ratio (SRR) refers to the minimum percentage of total deposits that commercial banks must hold as reserves, either with the central bank or in their vaults (Mishkin, 2019). Adjustments to the SRR influence the money supply, credit availability, interest rates, inflation, and overall economic growth. An increase in SRR reduces the lending capacity of banks, tightening liquidity and potentially curbing inflation, whereas a reduction encourages credit expansion, stimulating economic activity but potentially increasing inflationary pressures (Friedman, 1968).

Economic stability is a broad concept that refers to an economy's ability to sustain consistent growth, moderate inflation, and a stable financial environment (Blanchard, 2017). In macroeconomic terms, economic stability is often assessed through indicators such as GDP growth, inflation rates, exchange rate fluctuations, and interest rate movements. Policymakers adjust monetary instruments, including SRR, to mitigate volatility and promote long-term stability (Taylor, 1993).

Zambia's SRR policy has evolved over the years as a response to changing macroeconomic conditions. Historically, the Bank of Zambia (BoZ) has utilized SRR adjustments as a tool for liquidity management (Bank of Zambia, 2019). In the early 2000s, SRRs were maintained at moderate levels to support financial sector development and credit expansion. However, with increasing inflationary pressures, the BoZ raised the SRR multiple times between 2013 and 2024 to curb excess liquidity and stabilize the economy (Cheelo & Banda, 2016).

Notably, between 2013 and 2024, Zambia experienced fourteen (14) adjustments in the SRR, reflecting the central bank’s efforts to respond to economic fluctuations (Bank of Zambia, 2024). The most recent increase, in February 2024, raised the SRR from 17% to 26%, the highest level recorded in recent years. This sharp increase was aimed at tightening liquidity to control inflation and stabilize the exchange rate amid macroeconomic uncertainties (Mwenda & Muuka, 2018).

Figure 1 below shows the trend of money policy, SRR adjustments and the key macroeconomic indicators.

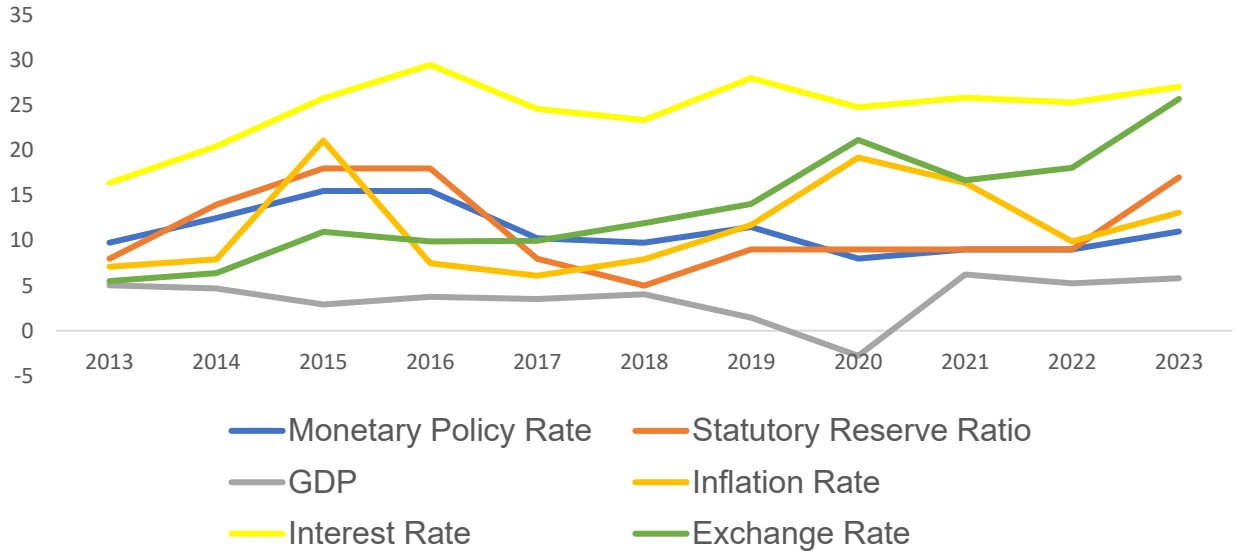


Figure 1: Trend Analysis of MPR, SRR, GDP, CPI, LR and ER

Research indicates that frequent adjustments to reserve requirements can create uncertainty in the banking sector, potentially impacting lending behaviour and, ultimately, economic stability (Borio, 2012).

An analysis of the SRRs among regional peers between 2017 and 2024 shows that the prevailing SRRs in Zambia have seen a steeper rise over time culminating in the highest SRR among peers at 26% in 2024. In comparison, peers such as Malawi and Botswana have experienced relatively flat growth with their SRR ranging between 2.90% and 7.85%. The only regional peer that has also experienced a sustained upward trend in SRR is Zimbabwe that has grown from 5% in 2018 to 15% in 2024. A key difference between Zambia and Zimbabwe's SRR growth is twofold; firstly, Zimbabwe in 2020 adjusted its SRR downwards to 2.50% from 4.5% to free up liquidity at the advent of the Covid-19 Pandemic. This trend was also noted in Malawi and Botswana; On the contrary, Zambia did not make any adjustment to its SRR. Though Zimbabwe has seen a gradual increase in SRR it has not experienced a similar steep increase as seen in Zambia. In 2024, Zambia had the highest SRR at 26% followed by Zimbabwe at 15%, Malawi at 7.80% and Botswana at 3.3%. The different levels of SRR means that the banks with a presence in the region all have different liquidity to

create loans and drive growth in their respective jurisdictions. The strategy for a bank stationed in Zambia may thus vary from one based in Botswana.

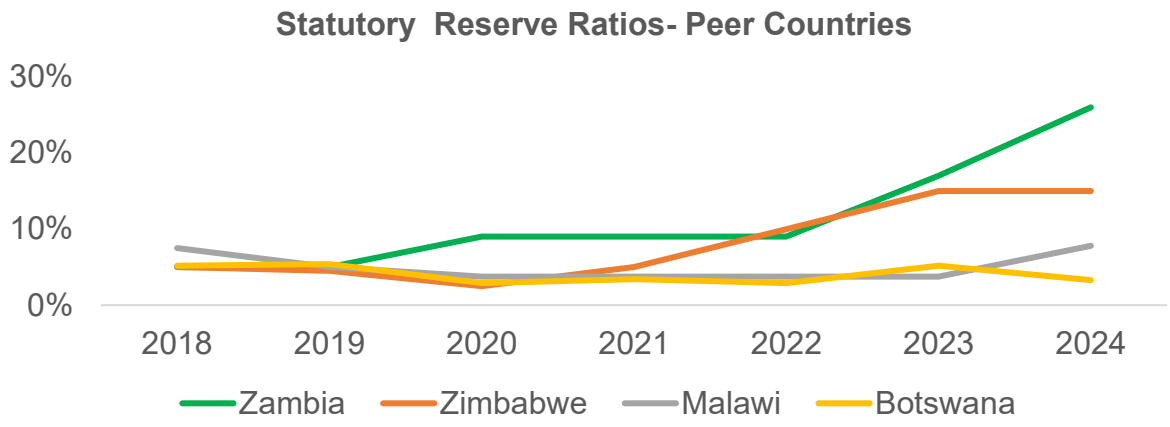


Figure 2: Prevailing Statutory Reserve ratio's- Peer group (source: CEIC Data, Reserve Bank of Zimbabwe, Bank of Zambia and Reserve Bank of Botswana).

This study aims to evaluate the impact of these SRR adjustments on economic stability in Zambia, providing a macroeconomic perspective on how such policy measures affect overall economic health. By analysing the relationship between SRR changes and key macroeconomic indicators, this research seeks to contribute to the understanding of monetary policy effectiveness in the Zambian context, offering insights for policymakers aiming to enhance economic stability.

1.2 Overview of Macroeconomic Performance in Zambia

Since gaining independence in 1964, Zambia's economy has seen several changes that represent the benefits and difficulties that come with being a developing nation. The main stages of Zambia's macroeconomic performance are examined in this review, with particular attention paid to important policy shifts, outside factors, and the ensuing effects on economic stability and growth. Assessing the state of the economy now and the effects of changes to monetary policy, especially statutory reserve requirements (SRR), requires an understanding of this historical background.

1964: Independence

Zambia became independent of the British colonial rule on October 24, 1964, marking the beginning of a new era led by President Kenneth Kaunda. By nationalizing important businesses like copper mining, the government implemented a socialist

economic model that served as the backbone of the economy. This strategy sought to increase social welfare and redistribute wealth, but its over reliance on copper exports quickly exposed weaknesses.

1970s: Economic Challenges

The early 1970s experienced an economic boom as global copper prices surged, contributing to rapid GDP growth. However, by the late 1970s, the economy began to falter. Declining copper prices, coupled with poor management and excessive government expenditure, led to significant economic contraction. Inflation began to rise, reaching approximately 15% by the end of the decade, and public debt escalated, creating a precarious fiscal environment.

1980s: Structural Adjustment Programs

In response to the country's escalating economic challenges, Zambia adopted systematic Structural Adjustment Programmes (SAPs) in 1983. This constituted a fundamental policy shift from previous attempts at economic reform and was adopted in part as a requirement to receive external finance from international financial institutions, especially the IMF and the World Bank (Simutanyi, 1996). These programs aimed at liberalizing the economy, reducing state involvement, and promoting private sector growth. The implementation of SAPs led to the privatization of numerous state-owned enterprises, which resulted in job losses and social unrest. Despite these hardships, the reforms were designed to lay the groundwork for long-term economic stability.

1991: Political and Economic Transition

The political landscape shifted dramatically in 1991 when Kenneth Kaunda was ousted in favour of Frederick Chiluba, leading to the establishment of a multi-party democracy. Economic reforms continued, focusing on privatization and liberalization. However, the transition was marked by high inflation and economic instability, with rates often exceeding 25% during the mid-1990s (Chipili, 2021). The government's challenges included managing the social impacts of privatization and ensuring economic recovery.

1990s: Economic Recovery and Multi-Donor Budget Support (MDRP)

The Multi-Donor Budget Support (MDRP) was introduced in the late 1990s to provide financial assistance to the Zambian government in return for implementing necessary economic reforms. This support was crucial in stabilizing the economy and promoting growth, particularly in the mining sector. By the end of the decade, Zambia experienced moderate economic recovery, with GDP growth rates averaging around 4% per year, driven by improved copper prices and increased foreign investment.

2000s: Continued Reforms and Growth

Throughout the 2000s, Zambia experienced consistent GDP growth, often exceeding 6%. Economic policies focused on fiscal discipline, governance reforms, and macroeconomic stability. The government also engaged in the Heavily Indebted Poor Countries (HIPC) Initiative, which resulted in substantial debt relief, freeing up resources for development and social services. The mining sector saw significant foreign investment, contributing to economic diversification efforts.

2010s: Economic Growth and Challenges

The early 2010s were marked by robust economic growth, largely driven by the mining sector. However, rising inflation, which fluctuated between 6% and 15%, and currency depreciation posed challenges. The Bank of Zambia implemented various fiscal and monetary measures, including frequent adjustments to the SRR, to manage inflation and stabilize the economy. The economic landscape was further complicated by political instability and governance issues, which undermined investor confidence.

2015-2016: Economic Slowdown

A combination of declining copper prices, severe drought affecting hydroelectric power generation, and high inflation led to an economic slowdown in 2015 and 2016. Inflation surged, peaking at approximately 21% in early 2016, severely impacting consumer purchasing power. The government sought assistance from the IMF to implement structural reforms aimed at stabilizing the economy and addressing fiscal challenges.

2017-2019: Recovery and Continued Vulnerabilities

Economic growth began to recover in 2017, supported by rising copper prices and improved agricultural output. However, public debt levels remained a concern, increasing significantly and raising questions about fiscal sustainability. The government faced pressure to balance social spending with the need for debt management, as external borrowing continued to grow.

2020-Present: COVID-19 and Economic Challenges

The COVID-19 pandemic had a severe impact on Zambia's economy, leading to a contraction in GDP in 2020. Inflation spiked due to supply chain disruptions and currency depreciation. In 2021, Zambia defaulted on its sovereign debt for the first time, prompting the government to engage in negotiations with creditors and seek debt restructuring. The government has since focused on economic recovery efforts, including negotiations with the IMF for a new support program and continued reforms in fiscal and monetary sectors.

2023: Recent Developments

As of 2023, the Zambian government is actively working to stabilize the economy and restore confidence. Key initiatives include promoting economic diversification beyond copper, enhancing agricultural productivity, and attracting foreign investment. However, the macroeconomic landscape remains fragile, with ongoing concerns about inflation, debt sustainability, and the need for comprehensive policy reforms to foster sustainable economic growth.

1.3 Statement of the problem

The effectiveness of the Statutory Reserve Ratio (SRR) as a monetary policy tool in Zambia remains an area of debate, particularly in its role in maintaining economic stability. While SRR adjustments are meant to regulate liquidity and influence macroeconomic variables, their impact on key indicators such as inflation, interest rates, exchange rates, and GDP growth is not well understood in the Zambian context. The frequent changes in SRR, fourteen (14) adjustments between 2013 and 2024,

suggest an active but possibly inconsistent policy approach by the Bank of Zambia (BoZ) in response to economic shocks (Bank of Zambia, 2024).

Existing studies have primarily analyzed the impact of SRR on commercial bank lending and profitability (Cheelo & Banda, 2016; Haabazoka, 2024), but there remains a critical gap in understanding how SRR adjustments influence overall macroeconomic stability. The few studies that have examined broader economic effects have produced mixed results, with some findings suggesting that SRR changes can stabilize inflation and exchange rates, while others argue that such adjustments constrain credit growth and investment, potentially slowing economic expansion (Simutanyi & Simatele, 2017; Mwenda & Muuka, 2018).

Furthermore, Zambia's SRR trajectory has been significantly more aggressive compared to regional peers such as Malawi, Botswana, and Zimbabwe, yet its macroeconomic outcomes have remained volatile (IMF, 2023). It is therefore unclear whether SRR adjustments have effectively achieved their intended goals or whether alternative policy tools would be more appropriate for ensuring stability.

This study seeks to fill these research gaps by empirically evaluating the impact of SRR adjustments on Zambia's inflation rate, interest rates, exchange rate, and GDP growth. The findings will provide evidence-based insights to guide the formulation of more effective monetary policies that balance liquidity management, inflation control, and economic growth.

1.4 General Objective

The general objective of this study is to empirically assess the impact of the Statutory Reserve Ratio Adjustments on economic stability in Zambia.

1.4.1 Specific Objectives

The specific objectives of the study are to:

I. Analyse the relationship between SRR adjustments and inflation rates in Zambia.
II. Examine the impact of SRR adjustments on the exchange rate in Zambia.

III. Assess the effect of SRR adjustments on interest rates.
IV. Evaluate the impact of SRR adjustment on GDP growth rate.

1.4.2 Research Hypothesis

I. H0: There is no statistically significant relationship between SRR adjustments and inflation rates in Zambia.
H1: There is a statistically significant relationship between SRR adjustments and inflation rates in Zambia.
II. H0: SRR adjustments do not have a significant impact on the exchange rate.
H1: SRR adjustments have a significant impact on the exchange rate.
III. H0: There is no statistically significant relationship between SRR adjustments and interest rates in Zambia.
H1: There is a statistically significant relationship between SRR adjustments and interest rates in Zambia.
IV. H0: There is no significant relationship between SRR adjustments and GDP growth rate.
H1: There is a significant relationship between SRR adjustments and GDP growth rate.

1.5 Significance of the study

This study is significant in its potential to contribute both theoretical and practical insights on the impact of Statutory Reserve Ratio (SRR) adjustments on Zambia's economic stability.

The findings will provide empirical evidence on how SRR adjustments influence inflation, exchange rates, interest rates, and GDP growth. This knowledge will help the Bank of Zambia (BoZ) refine its monetary policy strategies to achieve a balance between liquidity management, inflation control, and economic growth. Policymakers will gain data-driven insights into whether SRR is an effective tool for economic stabilization or whether complementary policy adjustments are necessary.

The study will also be useful for commercial banks by clarifying the extent to which SRR changes affect credit availability, lending rates, and liquidity management.

Understanding these effects will enable banks to better anticipate monetary policy shifts and adjust their lending strategies accordingly.

By addressing gaps in existing literature, this study will add to the body of knowledge on SRR's macroeconomic effects, particularly in developing economies. Unlike previous research that has focused mainly on the banking sector, this study provides a holistic macroeconomic perspective. The findings can serve as a foundation for further research on the interplay between SRR and other monetary policy instruments in Zambia and similar economies.

A well-calibrated SRR policy can contribute to macroeconomic stability, which is crucial for investment, business growth, and job creation. This study will offer recommendations that can guide economic policy reforms aimed at achieving sustainable economic development in Zambia.

1.6 Scope of the Study

The study aims to evaluate the impacts of the Statutory Reserve Ratio adjustments on the macroeconomic stability of Zambia. This study will focus on the statutory reserve ratio and key macroeconomic indicators which are interest rates, economic growth, which will be proxied by GDP, inflation rates and foreign exchange rates. The study will be limited to Zambia analysing data from 2013Q1 to 2024Q2. Data will be collected on SRR rates, interest rates, GDP, exchange rates and inflation rates from the Bank of Zambia and the Zambia Statistics Agency. The study will employ quantitative analysis which will involve the collection of secondary data from the sources listed above.

1.7 Organization of the Report

This report is organized into six chapters, each addressing a critical aspect of the study:

Chapter One: Introduction

This chapter provides an overview of the study, including the background, problem statement, objectives, research questions, significance, and scope of the study. It sets

the foundation by highlighting the role of Statutory Reserve Ratio (SRR) adjustments in Zambia's monetary policy framework.

Chapter Two: Literature Review

This chapter reviews theoretical and empirical literature related to SRR and its impact on macroeconomic variables. It discusses key concepts, theories, and findings from previous studies, forming the basis for the research hypotheses and methodology.

Chapter Three: Methodology

This chapter outlines the research design, data sources, and econometric methods used in the analysis. It details the processes for conducting stationarity tests, cointegration analysis, and regression modeling to evaluate the relationships among the variables.

Chapter Four: Data Analysis and Results

This chapter presents the findings from the data analysis, including descriptive statistics, stationarity test results, cointegration analysis, and regression outputs. It highlights the significant relationships and trends observed in the study.

Chapter Five: Discussion of Results

This chapter interprets the findings in the context of economic theory and existing literature. It provides insights into the implications of SRR adjustments on Zambia’s macroeconomic stability and identifies the limitations of the findings.

Chapter Six: Conclusion and Recommendations

The final chapter summarizes the key findings and their implications, providing actionable recommendations for policymakers, and suggests areas for further research. It emphasizes the importance of a coordinated approach to monetary policy for achieving sustainable economic growth and stability.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The chapter will begin by discussing the empirical review, using a top-down approach, stretching between the global, regional, and local perspective. This will be followed by a narrow theoretical framework from the plethora of theories debating the impact of statutory reserve ratio adjustments on economic stability.

2.1 Empirical Review

Evidence of studies conducted on the topic at hand by other researchers and in certain countries will be reviewed in this section. Dissecting the global perspective, then taking on the regional findings on the subject. In concluding, selected Zambian studies are reviewed, covering different time periods.

2.1.1 Global Context

Statutory Reserve Ratios (SRRs) are a critical monetary policy tool used by central banks worldwide to control money supply and influence economic stability. Adjustments to the SRR can impact liquidity in the banking system, affecting lending rates, inflation, and overall economic growth (Mishkin, 2019). Empirical studies indicate that changes in SRRs can have significant macroeconomic effects. For instance, (Montoro and Moreno, 2011) found that SRR adjustments in emerging markets could help mitigate credit cycles and stabilize the economy during volatile periods.

In advanced economies, the relationship between SRR adjustments and economic stability is often moderated by well-developed financial markets and institutional frameworks. (Bianchi and Bigio, 2014) conducted a study on the United States and found that adjustments to SRRs can affect bank lending practices and, in turn, economic activity. The International Monetary Fund (IMF) has suggested that in emerging markets, SRRs can be particularly effective in controlling capital flows and managing exchange rate volatility (IMF, 2015). In the United States, SRRs have historically played a crucial role in monetary policy. Similarly, (Kashyap and Stein ,2000) demonstrated that SRR adjustments can impact bank lending capacity and

influence economic activity. Their research indicated that lower reserve requirements increase bank reserves, enabling more lending and stimulating economic growth. Conversely, higher SRRs restrict bank lending, leading to slower economic growth. In the Eurozone, SRR adjustments are used in conjunction with other monetary policy tools to manage liquidity and ensure financial stability. Research by (Bindseil ,2004) found that SRR changes can influence the interbank lending market, thereby affecting short-term interest rates and overall economic stability. Emerging markets on the other hand often rely on SRR adjustments to manage economic volatility. For instance, in China, the People's Bank of China frequently adjusts the SRR to control liquidity and stabilize the economy. An empirical study by (He and Wang, 2012) found that SRR adjustments were effective in controlling inflation and managing economic growth during periods of rapid expansion and contraction. In Brazil, SRR adjustments have been used to manage credit growth and inflation. A study by de (Mello and Moccero, 2011) indicated that changes in SRR had a significant impact on credit supply and demand, which in turn affected economic stability. They found that higher SRRs helped control inflation but also led to reduced credit availability, highlighting the trade-offs involved in using this policy tool.

(Borio and Disyatat, 2011) investigated the relationship between the global financial imbalances and the financial crisis of 2007–2008, emphasizing the role of macroprudential measures like reserve requirements in preserving financial stability. They argue that poor financial risk management, not just imbalances, was the main cause of the crisis and emphasize how systemic risks can be decreased and credit growth moderated by using reserve requirements effectively. Central banks can prevent overheating economies and lessen the emergence of credit bubbles by managing the financial system's liquidity through the adjustment of reserve requirements (Borio & Disyatat, 2011). The authors emphasize how crucial reserve requirements are to preserving stability in the face of global financial instability. During the financial crisis, nations with robust macroprudential policies—such as higher reserve requirements were more resilient. In contrast to Western economies with more lenient regulations, Asian economies with larger reserve ratios were better equipped to protect their financial systems (Borio & Disyatat, 2011).

In Brazil, SRRs have been a key tool in the Central Bank's monetary policy to manage inflation and stabilize the economy. (Silva, 2014) found that increasing RRs helped reduce inflationary pressures by curbing liquidity in the banking system, while lowering RRs during periods of low inflation facilitated economic growth by boosting lending. The dual role of reserve requirements allowed the Central Bank to effectively balance the need for inflation control with economic stimulus, ensuring sufficient liquidity during downturns while preventing overheating in times of economic expansion.

Statutory Reserve Requirements are a vital instrument for macroeconomic management and financial stability, with a wide range of uses around the world. (Tovar, 2015) examined SRR as a macroprudential tool in 27 economies, including both advanced and emerging nations. The study evaluated SRR adjustments from 1996 to 2015 using a weighted index and found that, particularly in less competitive banking markets, higher SRRs raise borrowing costs and limit credit availability. While preserving financial stability, this adjustment has an indirect effect on production. The results highlight how well SRRs work to limit excessive credit expansion, highlighting their dual function as a monetary policy and macroprudential tool.

(Agénor, 2018) studied countercyclical SRRs associated with loan expansion alongside foreign exchange (FX) interventions. A time varying SRR model was employed in the study to assess how various economies responded to external shocks and the results showed that, in addition to FX interventions, countercyclical SRR changes considerably lower financial volatility and stabilize macroeconomic conditions. This study emphasizes the importance of SRRs in monetary frameworks, especially in economies that frequently face external financial shocks.

In the context of emerging markets, (Glocker and Towbin, 2015) explored the effects of SRRs in Brazil using a structural econometric model. The results of the study showed that increased SRRs effectively lowered credit availability, leading to higher unemployment and exchange rate depreciation. Although the current account improved as a result of the depreciation, there was short-term economic strain. This study illustrates the trade-offs policymakers face when leveraging SRRs to balance financial stability and economic activity.

(Armas, 2014) focused on Peru, revealing how SRRs mitigated the effects of capital inflows triggered by expansionary policies in developed countries. By increasing the cost of credit, SRRs encouraged firms to seek funding through capital markets, fostering financial market development. Similarly, (Reinhart and Reinhart, 1999) demonstrated that SRRs prevented monetary expansion during massive capital outflows in countries like Malaysia, and Chile. Both studies underline SRRs' dual function in enhancing financial resilience and promoting market stability.

(Loeffler, 2015) studied the macroeconomic effects of RRs across Latin America, East Asia, and Eastern Europe. The results of this study revealed that RRs caused depreciation in real exchange rates and widened the gap between deposit and lending rates, thereby influencing overall economic activity. This research emphasizes RRs' role in managing exchange rate pressures and maintaining financial stability during periods of economic volatility.

(Gul, Mughal & Rahim, 2012) reported on how monetary tools affect macroeconomic variables in Pakistan. The study used OLS to estimate for its outcome. The outcome indicated that money supply had a strong positive connection with inflation but a negative relationship with output and that exchange rate influenced output negatively.

2.1.2 Regional Context

In the Sub-Saharan African context, SRR adjustments are frequently used to address liquidity issues and stabilize the financial system. According to the (African Development Bank, 2019), many African central banks use SRRs alongside other monetary policy tools to control inflation and stimulate economic growth.

(Amassoma, Nwosa and Olaiya, 2011) examined the effect of monetary policy on macroeconomic variables in Nigeria for the period 1986 to 2009 by adopting a simplified Ordinary Least Squared technique. The results of this study where that monetary policy had a significant effect on exchange rate and money supply while it was also observed to have an insignificant influence on price instability. The study of (Udude, 2014), examined the impact of monetary policy on the growth of the Nigerian economy between the period 1981 and 2012, using Vector Error Correction Method,

with the objective of finding out the impact of various monetary policy instruments (money supply, interest rate, exchange rate and liquidity ratio) in enhancing economic growth of the country within the period considered. The empirical result revealed that monetary policy did not impact significantly on economic growth of Nigeria within the period under review and that the inability of monetary policies to effectively maximize its policy objective most times is because of the shortcomings of the policy instruments used in Nigeria as such limits its contribution to growth. (Uanguta and Ikhide, 2002) investigated the monetary transmission mechanism in Nigeria and found that SRR adjustments had a notable impact on credit availability and inflation control. Their findings suggested that while SRR increases were effective in curbing inflation, they also reduced the overall credit available to the private sector, highlighting the need for a balanced approach in policy application.

A study by (Godwin E. Bassey, Pius E. Akpan, Okon J. Umoh, 2018) was undertaken to empirically examined the effectiveness of Open Market Operations (OMO) instrument of monetary policy management in Nigeria. The study adopted the monetarist theory as the basis for measuring the effectiveness of OMO instrument of monetary policy management in Nigeria. The investigation was carried out using the Ordinary Least Squares (OLS) method of estimation. Unit Root and Co-integration tests were performed on all the variables (loans to banks by the Central Bank, monetary policy rate and Open Market Operations) and the results showed that the variables have long run relationship and are suitable for OLS estimation. The empirical results further indicated a significant relationship between monetary policy instruments such as open market operations, required reserve and monetary policy rate with broad money supply which is the proximate target for monetary policy management. This implies that Open Market Operations has been an effective instrument of monetary policy management in Nigeria. The study further showed that monetary policy rate could serve as a veritable instrument for the control of money supply and effective monetary policy management in the economy. It was recommended that the Central Bank of Nigeria should review periodically the performance of monetary policy with a view to enhancing the effectiveness of monetary policy instruments in order to achieve macroeconomic stability.

(Onyeiwu ,2012) studied monetary policy and economic growth in Nigeria using the Ordinary least square regression using liquidity ratio, cash reserve ratio, money supply, monetary policy rate and Treasury bill rate, the study adopted monetarist theory and discovered that liquidity and cash reserve ratio showed a positive and significant relationship with economic growth.

(Edmund Obeng Amaning and Ali Napari Seidu,2020) examined the impact and causal relationship between monetary policy and inflation in Ghana. Using annual time series data from 1985 to 2017 and employing the Auto Regressive Distributed Lag (ARDL) model, the study found that the monetary policy rate had an insignificant negative relationship with inflation in both the short and long run. Conversely, interest rates, domestic investment, and money supply had a significant positive impact on inflation over the same periods. Additionally, the causal relationship analysis indicated that the monetary policy rate Granger-causes money supply within the period under study. A study by (Jadah, 2020) on Monetary Policy and Economic Stability: The Role of Statutory Reserve Requirements in Ghana found that adjustments in the statutory reserve ratio where effective in controlling inflation and stabilizing the economy, but at the same time led to higher lending rates and a reduction in credit availability.

(Moyo and Sibanda, 2019) studied the Impact of Statutory Reserve Requirements on Bank Lending and Economic Growth in Zimbabwe from 2000 to 2018. This study used a Vector Autoregressive (VAR) model to analyze the relationship between statutory reserve requirements, bank lending, and economic growth. The study found that higher reserve requirements led to a significant reduction in bank lending, which in turn negatively impacted economic growth. The results suggested that reserve requirements were an effective tool for controlling inflation but had adverse effects on economic expansion.

Empirical evidence from countries like Kenya and South Africa showed mixed results. (Ngugi and Kabubo, 1998) found that in Kenya, adjustments in the SRR had limited impact on credit availability due to the high level of informal financial activities. Conversely, South Africa's experience, as examined by (Aron and Muellbauer, 2007), indicates that SRR adjustments can effectively control money supply and influence economic stability in a more structured financial environment. Another study by

(Kasekende and Brownbridge, 2011) examined the use of SRR in South Africa and found that while SRR adjustments helped stabilize the banking sector during periods of financial stress, their impact on overall economic stability was moderated by the country's advanced financial markets.

A study done in Kenya by (Misati and Kamau, 2012), had shown that SRR adjustments can significantly influence interest rates and inflation. Their research indicated that higher SRRs led to increased interest rates, which helped control inflation but also reduced credit growth. In Uganda, the Bank of Uganda has used SRR adjustments to manage liquidity and control inflation. According to a study by (Opolot, Kayizzi-Mugerwa, and Barungi, 2008), SRR increases were effective in reducing excess liquidity and controlling inflation. However, the study also highlighted that these adjustments led to higher borrowing costs and reduced credit availability, which could hinder economic growth.

(Oudat and Ali, 2020) studied the Impact of Reserve Requirements on Bank Lending and Economic Stability in Egypt and the study results showed that higher reserve requirements acted as a tax on bank deposits, increasing the cost of financial intermediation and affecting lending rates negatively.

The effectiveness of SRR adjustments in Sub-Saharan Africa varies by country, depending on the structure and development of the financial markets. In countries with more developed financial systems, such as South Africa, SRR adjustments can have a more pronounced impact on economic stability. In contrast, in countries with higher levels of informal financial activity, like Kenya, the impact of SRR changes may be more limited.

2.1.3 Zambian Context

In Zambia, the Bank of Zambia (BoZ) has periodically adjusted the SRR to manage liquidity and stabilize the economy. According to BoZ reports, significant SRR adjustments were made during economic crises, such as the global financial crisis of 2008 and the COVID-19 pandemic in 2020. The SRR in Zambia has been used to address both inflationary pressures and currency depreciation. For example, during

periods of high inflation, the BoZ increased the SRR to curb excessive money supply (Bank of Zambia, 2019).

A study by (Cheelo and Banda, 2016) analyzed the impact of SRR adjustments on commercial bank lending in Zambia. The findings indicated that higher SRRs led to reduced liquidity in the banking sector, resulting in higher lending rates. This, in turn, affected investment and consumption patterns, leading to slower economic growth in the short term. The study also highlighted the importance of considering the trade-offs involved in SRR adjustments, as tighter monetary policy could restrict credit availability and economic activity. (Lwando Miyoba and Lubinda Haabazoka, 2024) studied the impact of changes in statutory reserve ratio requirements on the financial performance of commercial banks in Zambia using time series data analysis and the Autoregressive Distributed Lag (ARDL) model. They focused on the relationship between these requirements and bank profitability, measured by Return on Assets (ROA). The study also evaluated the influence of other monetary policy tools on bank profitability and the findings revealed that a significant inverse relationship between statutory reserves and bank performance exists, indicating that higher reserve requirements negatively affect profitability. The study further highlighted the complexity added by shifts in policy rates and statutory reserves, compounded by exchange rate volatility. The results confirmed a long-lasting and significant effect of reserve requirement changes on the financial performance of commercial banks, supported by statistical evidence of a cointegrating relationship.

Another study by (Mwenda and Muuka, 2018) analyzed the impact of SRR adjustments on inflation and exchange rate stability in Zambia. Their results indicate that while SRR increases helped control inflation, they also led to a contraction in credit to the private sector, highlighting the trade-offs involved in using SRR as a policy tool. (Simutanyi and Simatele, 2017) explored the broader macroeconomic impacts of SRR adjustments in Zambia. The researchers found that SRR changes influenced not only bank lending rates but also overall economic activity, including investment and consumption. Higher SRRs were associated with reduced economic growth due to tighter credit conditions, while lower SRRs were linked to increased liquidity and economic activity. The study recommended that the BoZ should use SRR adjustments

in conjunction with other monetary policy tools to achieve a balanced approach to economic stability.

The impact of statutory reserve ratio adjustments on economic stability varies significantly across different contexts. Globally, SRRs are an effective tool for managing liquidity and stabilizing the economy, particularly in emerging markets. In Sub-Saharan Africa, the effectiveness of SRRs is influenced by the structure and development of financial markets. In Zambia, empirical evidence shows that SRR adjustments have significant implications for liquidity, inflation, and economic growth, but also pose challenges such as reduced credit availability.

2.2. Theoretical Framework

The study's theoretical framework will draw on key economic theories and concepts to explain the relationship between statutory reserve ratio (SRR) adjustments and economic stability. This framework will provide a structured approach to understanding how changes in SRR influence macroeconomic variables and overall economic stability in Zambia.

2.2.1 Monetary Theory

Monetary theory is fundamental to understanding the role of SRR as a monetary policy tool. According to classical monetary theory, the central bank can influence the money supply and, consequently, economic activity through various instruments, including the SRR. By adjusting the SRR, the central bank controls the amount of reserves that commercial banks must hold, thereby influencing their ability to create credit and supply money (Mishkin, 2019). Two of the monetary theories will be explored i.e., the Keynesian theory and the monetarist theory.

I. Keynesian Perspective

Keynesian economics states that changes in the money supply can influence interest rates, investment, and aggregate demand. An increase in the SRR reduces the money supply, leading to higher interest rates, which can cause a reduction in investment and consumption, thereby slowing economic growth. A decrease in the SRR on the other hand increases the money supply, lowering interest rates, and stimulating economic activity (Keynes, 1936).

The IS-LM model is often used to illustrate the concepts above. The LM (Liquidity Preference-Money Supply) curve is particularly relevant:

$$M^s = kY - hi$$

Equation 1

Where M^s is the money supply, Y is income, i is interest rate, k is the sensitivity of money demand to income and h is the sensitivity of money demand to interest rate. An increase in SRR reduces M^s, shifting the LM curve upwards, leading to higher i and lower h.

II. Monetarist Theory

Monetarists, led by Milton Friedman, argue that changes in the money supply directly affect price levels and inflation. According to Friedman, increasing the SRR decreases the money supply, helping to control inflation. Conversely, reducing the SRR can lead to inflation if it results in an excessive increase in the money supply (Friedman, 1968).

The Quantity Theory of Money is central to monetarists thinking:

$$MV = PQ$$

Equation 2

Where M is the money supply, V is the velocity of money, P is the price level and Q is the real output. An increase in SRR reduces M, which, assuming V is constant, leads to a decrease in PQ, thereby helping control inflation.

2.2.2 Banking and Financial Intermediation Theory

Banking and financial intermediation theory provides insights into how SRR adjustments affect the banking sector's ability to lend and manage liquidity.

I. Reserve Requirement and Bank Lending

According to the theory of financial intermediation, banks play a crucial role in channelling funds from savers to borrowers. The SRR affects this intermediation process by influencing the amount of funds banks can lend. Higher SRRs mean banks must hold more reserves, reducing the funds

available for lending. This can lead to higher interest rates and reduced credit availability (Diamond & Dybvig, 1983).

The balance sheet constraint of a bank can be expressed as follows:

$$R = rD$$

Equation 3

Where R is the required reserves, r is the reserve ratio, and D is the demand deposits. An increase in r reduces funds available for lending (L = D – R), thus decreasing credit availability.

II. Liquidity Management

Banks need to manage their liquidity to meet withdrawal demands and regulatory requirements. Changes in the SRR impact banks' liquidity positions. An increase in the SRR can strain banks' liquidity, leading to tighter credit conditions, while a decrease can ease liquidity constraints, promoting more lending (Diamond & Rajan, 2001).

The liquidity ratio is represented as follows:

$$Liquidity\ Ratio = \frac{Liquid\ Assets}{Total\ Assets}$$

Equation 4

Higher SRRs reduce liquid assets by increasing required reserves, thereby impacting the liquidity ratio negatively.

2.2.3 Macroeconomic Stabilization Theory

Macroeconomic stabilization theory focuses on policies aimed at stabilizing the economy by controlling inflation, smoothing business cycles, and promoting sustainable growth.

I. Aggregate Demand and Supply

Changes in the SRR influence aggregate demand and supply through their impact on interest rates, investment, and consumption. Higher SRRs reduce aggregate demand by increasing borrowing costs and reducing consumer spending and business investment. Lower SRRs increase aggregate demand by reducing borrowing costs and stimulating spending (Blanchard, 2017).

II. **Inflation Control**

Controlling inflation is a primary goal of macroeconomic stabilization. By increasing the SRR, the central bank can reduce the money supply and demand pressures, helping to control inflation. Conversely, reducing the SRR can increase inflationary pressures if it leads to excessive money supply growth (Taylor, 1993).

The Phillips curve illustrates the trade-off between inflation and unemployment:

$$\boldsymbol{\pi_t = \pi_{t-1} - \alpha(u_t - u^*)}$$

Equation 5

Where π_t is the inflation rate, u_t is the unemployment rate, u^* is the natural rate of unemployment, and α is a positive constant. An increase in SRR can reduce inflation but may increase unemployment.

2.2.4 Transmission Mechanism of Monetary Policy

The transmission mechanism of monetary policy explains how policy actions, such as changes in the SRR, affect the economy through various channels.

I. **Interest Rate Channel**

Changes in the SRR influence short-term interest rates, which in turn affect long-term interest rates, investment, and consumption. An increase in the SRR typically leads to higher interest rates, reducing investment and consumption, while a decrease in the SRR leads to lower interest rates, stimulating economic activity (Bernanke & Gertler, 1995).

The relationship between nominal and real interest rates is given by the equation below:

$$i = r + \pi^e$$

Equation 6

Where i is the nominal interest rate, r is the real interest rate, and π^e is the expected inflation rate. SRR adjustments affect i directly.

II. **Credit Channel**

The credit channel emphasizes the role of banks' lending capacity in transmitting monetary policy. Higher SRRs constrain banks' ability to lend by

reducing their reserves, while lower SRRs enhance their lending capacity by increasing available reserves (Kashyap & Stein, 2000).

III. Exchange Rate Channel

Changes in the SRR can also influence the exchange rate. An increase in the SRR can lead to an appreciation of the currency by attracting foreign capital seeking higher returns, while a decrease may lead to depreciation by making domestic assets less attractive (Obstfeld & Rogoff, 1995).

The exchange rate channel is illustrated by the uncovered interest rate parity condition (UIP) condition which is given below:

$$i_d = i_f + \frac{E_{(e_{t+1})} - e_t}{e_t}$$

Equation 7

Where i_d is the domestic interest rate, i_f is the foreign interest rate, e_t is the current exchange rate and $E_{(e_{t+1})}$ is the expected future exchange rate. Higher SRRs increase i_d, leading to currency appreciations if capital inflows follow.

2.3 Conceptual Framework

The conceptual framework below is a representation of the relationship between SRR adjustments and economic stability incorporating the various macroeconomic indicators and transmission mechanisms. The framework encompasses four main variables, these being inflation, GDP, exchange rate and interest rate as dependent variables, being influenced by adjustments in the SRR, being the independent variable. The transmission mechanisms are the interest rate channel, credit channel and exchange rate channel.

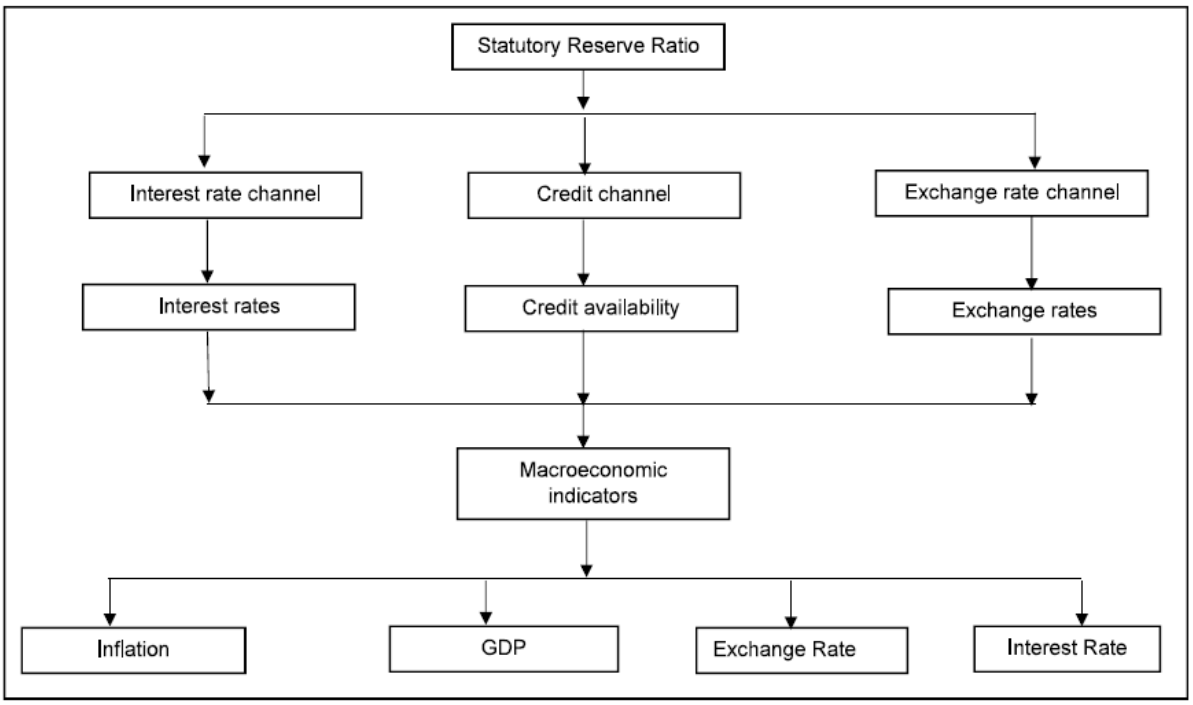


Figure 3: Conceptual framework

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This study sought to evaluate the impact of changes in the SRR on economic stability in Zambia. This section will outline the research methodology used to study the impact of the statutory reserve ratio on economic stability in Zambia.

3.1 Research Design

Research design is defined as a plan that provides the underlying structure to integrate all elements of a quantitative study so that the results are credible, free from bias, and maximally generalizable. “Research design provides the glue that holds the research project together” (Asenahabi, 2019). Given the nature of the problem this study seeks to address, involving analysis of numerical data to be collected over a long period of time, it will adopt a correlational research design.

3.2 Model Specification

The study will employ a complete time series sampling, using all quarterly data points from 2013Q1 to 2024Q2 as this approach will ensure that the temporal sequence is preserved. In this study, the Vector Error Correction Model (VECM) is employed to examine the dynamic relationships between GDP, CPI, exchange rate, and interest rate in Zambia. The use of the VECM is justified by the findings that all variables are non-stationary at levels but stationary at first differences, and they exhibit long-run cointegration as determined by the Johansen cointegration test. The VECM, originally developed by (Sargan,1964) and later popularized by (Johansen, 1988), allows for the estimation of both short-term dynamics and long-term equilibrium relationships among the variables.

The model is specified for each dependent variable as follows:

$$\Delta lnGDP_t = \propto_1 ECM_{t-1} + \sum_{i=1}^{p-1} \gamma_{11,i}\, \Delta lnGDP_{t-i} + \sum_{i=1}^{p-1} \gamma_{12,i}\, \Delta CPI_{t-i} + \sum_{i=1}^{p-1} \gamma_{13,i}\, \Delta EX\ R_{t-i} + \sum_{i=1}^{p-1} \gamma_{14,i}\, \Delta IR_{t-i} + £_{1t}$$

$$\Delta lnCPI_t = \propto_2 ECM_{t-1} + \sum_{i=1}^{p-1} \gamma_{21,i}\, \Delta lnGDP_{t-i} + \sum_{i=1}^{p-1} \gamma_{22,i}\, \Delta CPI_{t-i} + \sum_{i=1}^{p-1} \gamma_{23,i}\, \Delta EX\ R_{t-i} + \sum_{i=1}^{p-1} \gamma_{24,i}\, \Delta IR_{t-i} + £_{2t}$$

$$lnEXR_t = \propto_3 ECM_{t-1} + \sum_{i=1}^{p-1} \gamma_{31,i}\, \Delta lnGDP_{t-i} + \sum_{i=1}^{p-1} \gamma_{32,i}\, \Delta CPI_{t-i} + \sum_{i=1}^{p-1} \gamma_{33,i}\, \Delta EX\ R_{t-i} + \sum_{i=1}^{p-1} \gamma_{34,i}\, \Delta IR_{t-i} + £_{3t}$$

$$lnIR_t = \propto_4 ECM_{t-1} + \sum_{i=1}^{p-1} \gamma_{41,i}\, \Delta lnGDP_{t-i} + \sum_{i=1}^{p-1} \gamma_{42,i}\, \Delta CPI_{t-i} + \sum_{i=1}^{p-1} \gamma_{43,i}\, \Delta EX\ R_{t-i} + \sum_{i=1}^{p-1} \gamma_{44,i}\, \Delta IR_{t-i} + £_{4t}$$

3.3 Data and Analysis

3.3.1 Data Sources

The study collected data from archival sources. The study relied on secondary sources of data. (Sekaran, 2016) defines secondary sources as data that was not collected directly from respondents by the researcher. Secondary data can consist of raw or compiled data collected by another organization (Saunders, 2009).

The key sources of data were data sets from the Bank of Zambia website and the Zambia Statistics' Agency. The data sets provided historical records of bank LRs, MPRs, SRRs, GDP, inflation rates and exchange rates.

3.3.2 Data Analysis

To make analysis simple, data was sorted, categorised, coded and tabulated. Both descriptive and inferential statistics were used to analyse the secondary data that had been gathered. Data analysis was done using Stata version 17.0, an econometric tool. Data was entered into the Stata and put through descriptive analysis, regression analysis and correlation analysis. The study employed the mean and standard deviation in descriptive statistics. Multivariate regression analysis was employed in the study's inferential statistics to establish the relationship between the dependent and independent variables.

3.4 Description of variables

3.4.1 GDP (Gross Domestic Product)

GDP measures the total economic output of a country within a specific time period. It reflects the value of all goods and services produced and is used as an indicator of economic health. GDP is influenced by various factors, including investment, consumption, government spending, and net exports. Changes in monetary policy, such as SRR adjustments, are expected to indirectly impact GDP by affecting liquidity, investment, and borrowing costs.

Inflation (CPI - Consumer Price Index)

Inflation is measured by the Consumer Price Index, which tracks changes in the average price level of a basket of goods and services over time. It indicates the purchasing power of the currency. Higher SRR may reduce inflationary pressures by

limiting the money supply, while lower SRR can increase inflation by boosting liquidity and spending.

3.4.2 Exchange Rate (ER)

The exchange rate represents the value of the Zambian Kwacha relative to foreign currencies, commonly expressed as the amount of ZMW needed to purchase one unit of another currency (e.g., USD). Adjustments in SRR can influence the exchange rate by altering liquidity and interest rates, which in turn affect foreign exchange flows and currency valuation.

3.4.3 Lending Rate (LR)

The lending rate is the interest rate at which banks provide loans to consumers and businesses. It is a critical determinant of borrowing costs and investment levels in the economy. An increase in SRR is expected to raise lending rates as banks pass on the cost of holding higher reserves to borrowers, potentially reducing credit demand and economic activity.

3.4.4 Statutory Reserve Ratio (SRR)

The SRR is the percentage of a bank's total deposits that must be held in reserve, either in the bank's vaults or with the central bank. It is a monetary policy tool used to control liquidity and credit in the economy. A higher SRR reduces the amount of money banks can lend, tightening liquidity, which may increase lending rates, reduce inflation, and potentially slow down economic growth. Conversely, a lower SRR increases liquidity, potentially stimulating economic activity but also risking higher inflation.

3.5 Data Estimation Techniques

The study conducted preliminary tests to determine whether stationarity and a long run links exist in the data. Checking for stationarity, this inquiry employed the Augmented Dickey Fuller (ADF) test. The Johansen test for cointegration was further conducted.

3.6 Post Diagnostic tests

Post diagnostic tests for normality, autocorrelation and model stability were conducted using the Jarque-Bera, Breusch-Pagan Lagrange Multiplier (LM) and Eigen Stability tests, respectively.

3.7 Chapter Summary

Data sources, research approach and analysis were discussed in this chapter. Further, the model specification and estimations techniques comprising of pre/post diagnostic tests were discussed and the evaluation of the model's long run stability was highlighted.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.0 Introduction

This chapter details the outcomes of the data analysis and interprets the findings. It begins with an overview of the descriptive statistics, followed by the results of the stationarity tests and the cointegration tests. Next, it presents the correlation matrix and the results of the Vector Error Correction Model (VECM). Finally, it concludes with the post-diagnostic test results of the model.

4.1 Descriptive Statistics

This section presents an overview of the key statistics for the variables in the study, including their mean, standard deviation, minimum, and maximum values over the period under study (2013 Q1-2024 Q2). The descriptive statistics of the variables are shown in Table 1 below.

Variable	Obs.	Mean	Std. Dev.	Min. Value	Max Value
RRR (%)	46	11.07	5.23	5.00	26.00
CPI (Index)	46	245.21	95.89	127.74	452.40
ER (ZMW/USD)	46	13.22	5.87	5.33	25.95
LR (%)	46	24.15	3.72	16.18	29.20
GDP (ZMW “millions”)	46	79,977.70	37,014.40	36,367.00	164,159.00

Table 1: Descriptive Statistics of the Variables, Source: Authors’ Computations (2024)

The average Statutory Reserve Ratio (SRR) was 11.07%. The SRR reached its minimum of 5% in the first half of 2013 and again from the second quarter of 2018 to the third quarter of 2019, while its maximum was 26% in the second quarter of 2024. The average Consumer Price Index (CPI) was 245.21. The mean exchange rate (ZMW/USD) was K13.22, with the lowest rate being K5.33 in the first quarter of 2013 and the highest rate being K25.95 in the second quarter of 2024. The average lending rate was 24.15%, with the lowest rate at 16.18% in the first quarter of 2013 and the highest rate at 29.20% in the final quarter of 2016.

4.2 Stationarity Tests

The variables were tested for stationarity using the Augmented Dickey-Fuller (ADF) to ascertain whether they were stationary or not.

4.2.1 Stationarity test at level

The results of the ADF test for stationarity at levels are presented in table 2. Note that the null hypothesis for the test is that a variable is non-stationary or has a unit root. The decision rule is to reject the null hypothesis if the absolute value of the test statistic is greater than the absolute value of the critical value or if the p-value is less than 0.05.

Variable	Test Statistics	Critical Value	P-Value
SRR	-1.715	-2.950	0.4234
lnCPI	-1.943	-3.532	0.6323
lnER	-2.742	-3.528	0.2192
LR	-2.496	-3.528	0.3298
lnGDP	-2.709	-3.528	0.2324

Table 2: Results of ADF test for Stationary at Level, Source: Authors' Computation (2024)

The results of the ADF test at level show that the p-values of *lnSRR, lnCPI, lnER, lnLR and lnGDP* were greater than 0.05. The p-value of *lnSRR* was 0.4234, *lnCPI* was 0.6323*, lnER* was 0.2192, *lnLR* was 0.3298 and lnGDP was 0.2324. Based on this and the decision rule, the null hypothesis was not rejected. Thus, all the variables where non-stationary at 5% level of significance.

4.2.2 Stationarity test at first difference

The variables were further tested for stationarity at first difference using the ADF test. The results of the stationarity test at first difference are shown in table 3 below. The decision rule is to reject the null hypothesis if the absolute value of the test statistic is greater than the absolute value of the critical value or if the p-value is less than 0.05.

Variable	Test Statistics	Critical Value	P-Value
SRR	-3.061	-2.950	0.0296
lnCPI	-3.264	-2.952	0.0166
lnER	-4.107	-2.950	0.0009
LR	-3.537	-2.950	0.0071
lnGDP	-7.656	-2.950	0.0000

Table 3: Results of ADF test for stationarity at first-difference, Source: Authors' Computations (2024)

At first difference, the p-values for all the variables were below 0.05, as show in table 4 above, leading to the rejection of the null hypothesis. This indicates that all variables became stationary at first difference and are integrated of order one (I (1)).

4.3 Cointegration Test

The variables were tested for cointegration using the Johansen test for cointegration. The results of the test are shown in table 4 below. The null hypothesis for the test is that there are (maximum rank value) cointegrating equations. The decision rule for the test is that accept the null hypothesis if the trace statistic is less than the critical value at 5% level of significance.

The trace statistic was less than the critical value at the maximum rank of 2. This indicated that there were two cointegrating equations in the model. The presence of two cointegrating equations confirms that there are stable long-run relationships among the variables. This suggests that, despite short-term fluctuations, the variables exhibit tendencies to move together in the long term.

Maximum rank	Params	LL	Eigenvalue	Trace statistic	Critical value (5%)
0	80	162.36	.	105.29	68.52
1	89	190.90	0.75	48.21	47.21
2	96	202.64	0.56	24.73*	29.68
3	101	211.91	0.41	6.18	15.41
4	104	215.00	0.29	0.00	3.76
5	105	215.00	0.11		

Table 4: Results of the Johansen Test for Cointegration, Source: Author's Computations (2024)

The stationarity test results showed that all the variables were stationary at first difference and the co-integration results indicated that there is a long-run relationship among the variables. Considering that four of the five variables tested for stationarity are dependent variables and only one is an independent variable – the Vector Error Correction Model (VECM) was considered an appropriate model for the regression analysis.

4.4 Vector Error Correction Models

This section of the chapter presents the short-run and long-run model results of the VECM.

4.4.1 Short-run Model

Table 5 displays the outcomes of the multivariate regression model. It includes four distinct regression models that illustrate the effects of the statutory reserve ratio (SRR) on GDP, CPI, exchange rate, and lending rate.

The VECM results indicate that the SRR had statistically significant coefficients at the 5% significance level in the lnCPI model and at the 10% level in the lnGDP and lnER models. Specifically, the coefficient of the second lag of SRR (L3D.SRR) was 0.004 in the lnCPI model, suggesting that a 1 percentage point increase in SRR results in a 0.004% rise in CPI after two quarters. In the lnGDP model, the SRR coefficient was 0.014, indicating a 0.014% increase in GDP following a 1 percentage point rise in SRR after two quarters. Additionally, the L3D.SRR coefficient was 0.025 in the lnER model, implying that a 1 percentage point increase in SRR leads to a 0.026% increase in the exchange rate after three quarters.

Models	Variables	Coefficient	Std. Dev.	Z-Statistic	P-Value
D_lnGDP					
	ECT	-0.272*	0.157	-1.74	0.083
	LD.lnGDP	-0.597***	0.197	-3.03	0.002
	L2D.lnGDP	-0.702***	0.186	-3.78	0.000
	L3D.lnGDP	-0.528***	0.183	-2.89	0.004
	LD.lnCPI	-0.071	1.044	-0.07	0.946
	L2D.lnCPI	0.397	0.828	0.48	0.631
	L3D.lnCPI	0.136	0.847	0.16	0.872
	LD.LR	-0.006	0.018	-0.34	0.737
	L2D.LR	-0.015	0.022	-0.70	0.486
	L3D.LR	-0.019	0.020	-0.98	0.328
	LD.lnER	-0.209	0.174	-1.20	0.229
	L2D.lnER	-0.060	0.176	-0.34	0.734
	L3D.lnER	0.023	0.159	0.15	0.883
	LD.SRR	-0.001	0.006	-0.27	0.783
	L2D.SRR	0.014*	0.008	1.71	0.088
	L3D.SRR	-0.001	0.009	-0.14	0.891
	Constant	0.021	0.024	0.87	0.382
D_lnCPI					
	ECT	-0.171***	0.035	-4.92	0.000
	LD.lnGDP	0.069	0.044	1.58	0.113

	L2D.lnGDP	0.057	0.041	1.39	0.166
	L3D.lnGDP	-0.040	0.041	-0.98	0.325
	LD.lnCPI	-0.645***	0.232	-2.79	0.005
	L2D.lnCPI	-0.573***	0.184	-3.12	0.002
	L3D.lnCPI	-0.114	0.188	-0.16	0.544
	LD.LR	0.010***	0.004	2.58	0.010
	L2D.LR	-0.008***	0.005	-1.67	0.096
	L3D.LR	-0.011***	0.004	-2.61	0.009
	LD.lnER	0.012	0.039	0.31	0.759
	L2D.lnER	-0.061	0.039	-1.56	0.119
	L3D.lnER	-0.001	0.035	-0.02	0.987
	LD.SRR	0.000	0.001	0.06	0.955
	L2D.SRR	0.001	0.002	0.68	0.499
	L3D.SRR	0.004**	0.002	2.00	0.049
	Constant	0.017***	0.005	3.22	0.001
D_LR					
	ECT	1.201	1.632	0.74	0.462
	LD.lnGDP	-0.188	2.054	-0.09	0.927
	L2D.lnGDP	0.353	1.934	0.18	0.855
	L3D.lnGDP	-4.180**	1.903	-2.20	0.028
	LD.lnCPI	11.033	10.883	1.01	0.311
	L2D.lnCPI	-24.050***	8.629	-2.79	0.005
	L3D.lnCPI	18.350**	8.825	2.08	0.038
	LD.LR	0.885***	0.189	4.69	0.000
	L2D.LR	-0.221	0.229	-0.97	0.334
	L3D.LR	-0.210	0.205	-1.03	0.305
	LD.lnER	0.567	1.811	0.31	0.754
	L2D.lnER	2.582	1.839	1.40	0.160
	L3D.lnER	2.434	1.657	1.47	0.142
	LD.SRR	0.022	0.063	0.36	0.720
	L2D.SRR	-0.039	0.088	-0.44	0.659
	L3D.SRR	0.109	0.092	1.19	0.234
	Constant	0.276	0.250	1.10	0.270
D_ER					
	ECT	-0.231	0.212	-1.09	0.275
	LD.lnGDP	-0.356	0.267	-1.33	0.182
	L2D.lnGDP	-0.229	0.251	-0.91	0.362
	L3D.lnGDP	-0.401	0.247	-1.62	0.105
	LD.lnCPI	-2.961**	1.413	-2.10	0.036
	L2D.lnCPI	-0.827	1.120	-0.74	0.460
	L3D.lnCPI	-1.109	1.146	-0.97	0.333
	LD.LR	0.004	0.025	0.15	0.885
	L2D.LR	-0.010	0.030	-0.34	0.731
	L3D.LR	-0.028	0.027	-1.05	0.296
	LD.lnER	0.168	0.235	0.71	0.476
	L2D.lnER	-0.124	0.239	-0.52	0.605

L3D.lnER	0.370*	0.215	1.72	0.086
LD.SRR	0.012	0.008	1.44	0.150
L2D.SRR	-0.014	0.011	-1.19	0.233
L3D.SRR	0.026**	0.012	2.14	0.032
Constant	0.129	0.032	3.98	0.000

Table 5: Results of Multivariate Regression Analysis (and ***) statistically significant at 0.10, 0.05 and 0.01 level of significance, Source: Author's Computations (2024)*

In the lnGDP model, the coefficients for the variables lnGDP (LD.lnGDP, L2D.lnGDP, and L3D.lnGDP) were statistically significant at the 5% level. The coefficient for LD.lnGDP was 0.069, indicating that a 1% increase in GDP results in a 0.069% rise in GDP in the following quarter. The L2D.lnGDP coefficient was 0.057, meaning a 1% GDP increase leads to a 0.057% rise after two quarters. Conversely, the L3D.GDP coefficient was -0.040, suggesting a 1% GDP increase causes a 0.040% decline after three quarters.

In the lnCPI model, the first and second lags of lnCPI and the first and third lags of lnLR were statistically significant at the 5% level. The LD.lnCPI coefficient was -0.645, indicating that a 1% increase in CPI leads to a 0.645% decrease in CPI in the next quarter. The L2D.lnCPI coefficient was -0.573, showing a 1% CPI increase results in a 0.573% reduction after two quarters. The coefficients for LD.LR, L2D.LR, and L3D.LR were 0.010, -0.008, and -0.011, respectively, implying that a 1 percentage point increase in lending rates leads to a 0.010% increase in CPI the next quarter, a 0.008% decline after two quarters, and a 0.011% decline after three quarters.

In the lnLR model, the coefficients for the second lag of lnCPU and the third lags of lnCPI and lnGDP were statistically significant at the 5% level. Specifically, the coefficient for L3D.lnGDP was -4.180, indicating that a 1% increase in GDP results in a 4.180 percentage point decrease in the lending interest rate after three quarters. The coefficients for L2D.lnCPI and L3D.lnCPI were -24.050 and 18.350, respectively, showing that a 1% increase in CPI leads to a 24.050 percentage point decrease in the lending interest rate after two quarters and an 18.350 percentage point increase after three quarters.

In the ER model, the coefficients for the first lag of lnCPI and the third lag of ER were statistically significant at the 5% level. The coefficient for LD.lnCPI was -2.961, implying that a 1% increase in CPI causes a 2.961% decline in the exchange rate in the next quarter. Additionally, a 1% increase in the exchange rate results in a 0.370% increase in the exchange rate after three quarters.

4.4.2 Long-run Model

Table 6 presents the long-run model results, showing that the SRR variable was statistically significant at the 5% level across all models. In the lnGDP model, the SRR coefficient was 0.007, indicating that a 1 percentage point increase in SRR results in a 0.007% rise in GDP. For the lnCPI model, the SRR coefficient was -0.020, suggesting a 0.020% decrease in consumer prices with a 1 percentage point increase in SRR. In the lnLR model, the SRR coefficient was 1.137, meaning a 1 percentage point increase in SRR leads to a 1.137 percentage point rise in lending interest rates, ceteris paribus. Lastly, in the lnER model, the SRR coefficient was 0.061, implying a 0.061% increase in the exchange rate with a 1 percentage point rise in SRR, ceteris paribus.

In the lnGDP model, all control variables were statistically significant at the 5% level, except for LR. The coefficient for lnCPI was 0.320, indicating that a 1% increase in CPI results in a 0.320% rise in GDP. The LR coefficient was -0.006, suggesting that a 1 percentage point increase in lending interest rates leads to a 0.006% decline in GDP. The lnER coefficient was 0.878, meaning a 1% increase in the exchange rate causes a 0.878% decline in GDP.

In the CPI model, the lnGDP coefficient was 3.861, indicating that a 1% increase in GDP results in a 3.861% rise in CPI. The LR coefficient was 0.018, suggesting that a 1 percentage point increase in lending interest rates leads to a 0.018% increase in CPI. The lnER coefficient was -2.745, indicating that a 1% increase in the exchange rate causes a 2.745% decline in CPI.

Models	Variables	Coefficient	Std. Dev.	Z-Statistic	P-Value
lnGDP					
	SRR	0.007***	0.002	3.03	0.002

	lnCPI	0.320***	0.121	2.63	0.008
	LR	-0.006	0.006	-0.89	0.371
	lnER	0.878***	0.139	6.32	0.000
	Constant	3.723			
lnCPI					
	SRR	-0.020***	0.006	-3.18	0.001
	lnGDP	3.126***	0.323	9.68	0.000
	LR	0.018***	0.020	0.89	0.372
	lnER	-2.745***	0.436	-6.29	0.000
	Constant	-3.204			
LR					
	SRR	1.137***	0.405	2.80	0.005
	lnCPI	55.491	82.298	0.67	0.500
	lnGDP	-173.491**	17.667	-8.62	0.013
	lnER	1.137***	0.405	2.80	0.000
	Constant	1321.169			
lnER					
	SRR	-0.007***	0.003	-2.77	0.000
	lnCPI	-0.364	0.538	-0.68	0.498
	lnGDP	1.139**	0.455	2.50	0.012
	LR	0.007***	0.005	1.23	0.219
	Constant	5.502			

Table 6: Results of the long-run model, Source: Author's Computations (2024)

In the LR model, the coefficients were as follows: lnCPI at 55.491, lnGDP at -173.491, and lnER at 152.345. This means that a 1% increase in CPI results in a 55.491 percentage point rise in lending interest rates, while a 1% increase in GDP leads to a 173.491 percentage point decrease in lending interest rates. Additionally, a 1% increase in the exchange rate results in a 152.345 percentage point increase in the exchange rate.

In the lnER model, the coefficient for lnCPI was -0.364, indicating that a 1% increase in CPI causes a 0.364% decline in the exchange rate. The lnGDP coefficient was 1.139, suggesting that a 1% increase in GDP leads to a 1.139% rise in the exchange rate. The LR coefficient was 0.007, meaning a 1 percentage point increase in lending rates results in a 0.007% increase in the exchange rate.

4.5 Post-Diagnostic Tests

4.5.1 Normality Tests

The normality of the four models was assessed using the Jarque-Bera test. The null hypothesis for this test posits that the model is normally distributed. According to the

decision rule, the null hypothesis is rejected if the p-value is less than 0.05 at the 5% significance level. Table 7 presents the results of the Jarque-Bera test for normality.

Model	chi2	Df	P-Value
D_lnGDP	6.493	2	0.064
D_lnCPI	3.800	2	0.198
D_lnER	2.545	2	0.349
D_lnLR	2.011	2	0.854
ALL	11.146	8	0.194

Table 7: Results of the Jarque-Bera test for normality, Source: Author's Computation (2024)

Since the p-values for all four models (lnGDP, lnCPI, lnER, and lnLR) were greater than 0.05, the decision rule was to not reject the null hypothesis. Therefore, the conclusion is that all four models are normally distributed.

4.5.2 Autocorrelation

The models were also tested for autocorrelation using the Breusch-Pagan Lagrange Multiplier (LM) test. The null hypothesis for this test is that there is no autocorrelation. According to the decision rule, the null hypothesis is rejected if the p-value is less than 0.05. The results of the Breusch-Pagan LM test are presented in Table 8.

Model	chi2	Df	P-Value
1	41.161	36	0.255
2	47.405	36	0.097
3	30.471	36	0.729

Table 8: Results of the Breusch-Pagan LM test for Autocorrelation, Source: Author's Computation (2024)

Since the p-values for all lags (1, 2, and 3) were greater than 0.05, the decision was to fail to reject the null hypothesis. This indicates that there was no autocorrelation in the models.

4.5.3 Model Stability

The model was checked for stability using the Eigen Stability test. The results of the test are shown in figure 4 below.

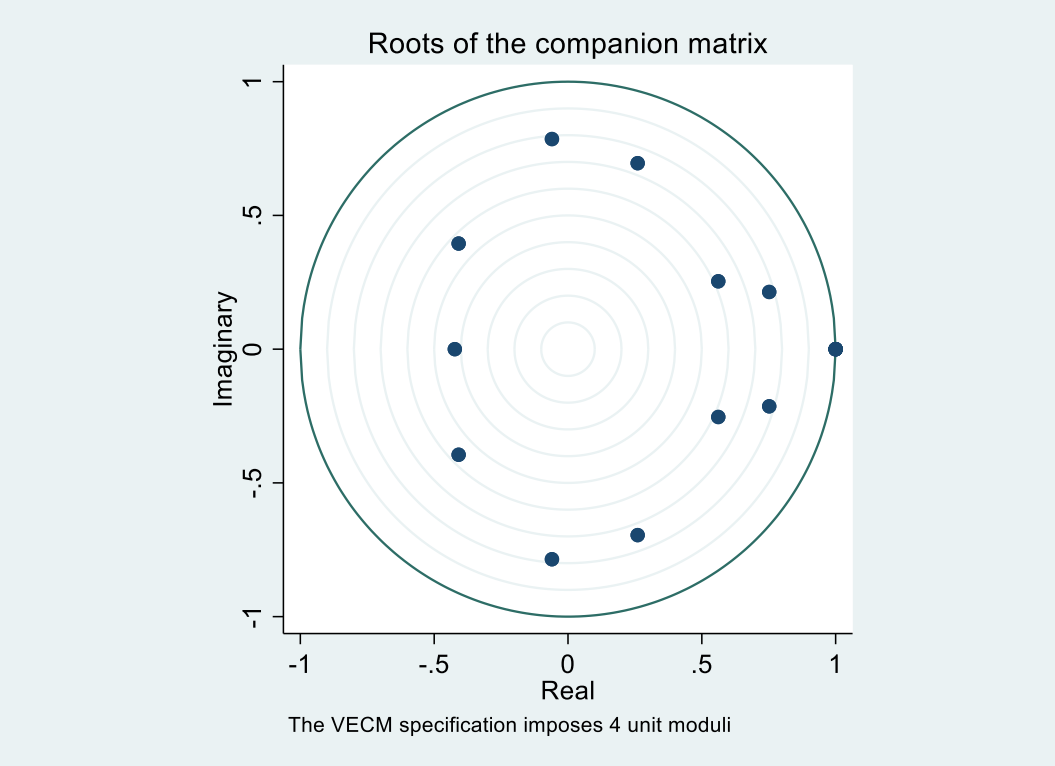


Figure 4: Results of the Eigen Stability test

The VEC stability graph for the lnAll_Items model, as shown in Figure 12, indicates that the eigenvalues of the root of the companion matrix are within the unit circles. This suggests that the model is stable.

4.5.4 Impulse Response Function (IRF)

This section shows the IRF of the models.

4.5.4.1 IRF for lnGDP model

Figure 5 below displays the Impulse Response Function (IRF) for the lnGDP model. The results indicate that all variables (lnLR, MPR, RRR, lnCPI, and lnER) exert a continuous and permanent impact on GDP.

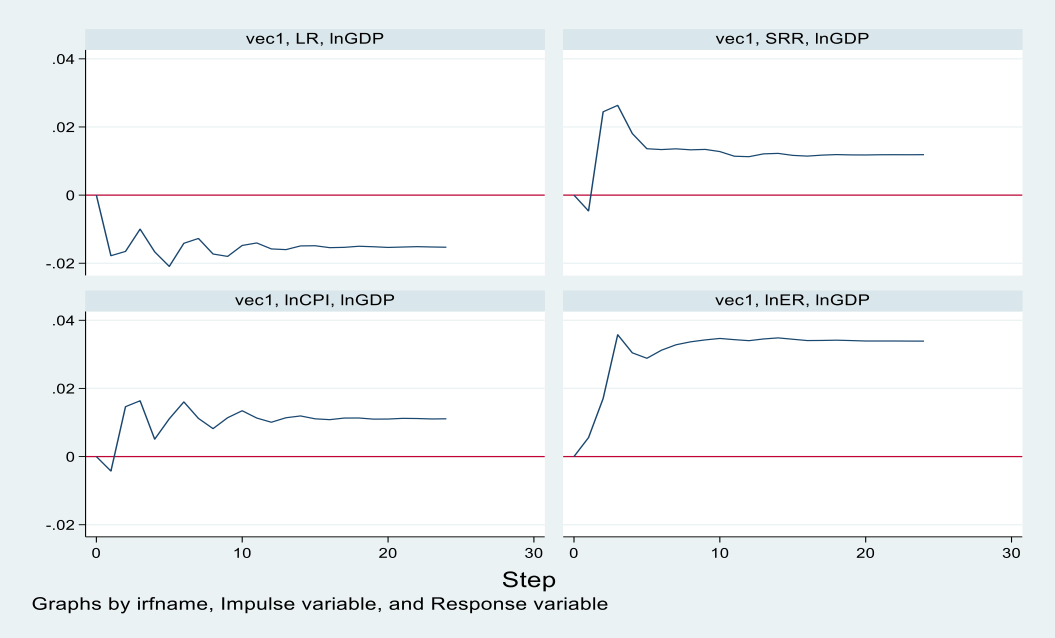


Figure 5: Results of the Impulse Response Function (IRF) for the lnGDP model.

4.5.4.2 IRF for lnCPI model

Figure 6 below presents the Impulse Response Function (IRF) for the lnCPI model. The findings indicate that all variables (lnLR, MPR, RRR, lnGDP, and lnER) have a continuous and lasting impact on CPI.

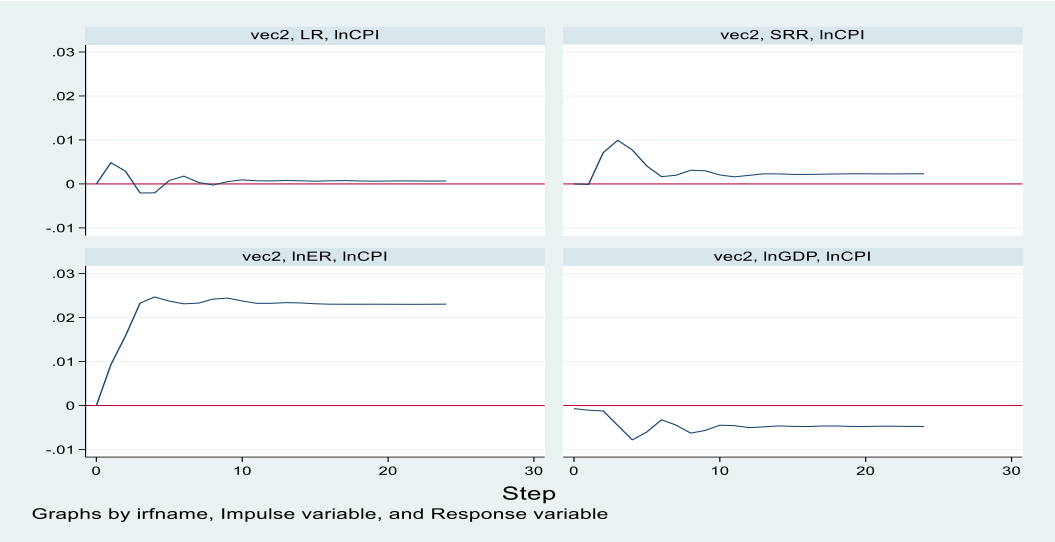


Figure 6: Results of the Impulse Response Function (IRF) for the lnCPI model.

4.5.4.3 IRF for lnER model

Figure 7 below illustrates the Impulse Response Function (IRF) for the lnER model. The results demonstrate that all variables (lnLR, MPR, RRR, lnGDP, and lnCPI) exert a continuous and lasting impact on the exchange rate.

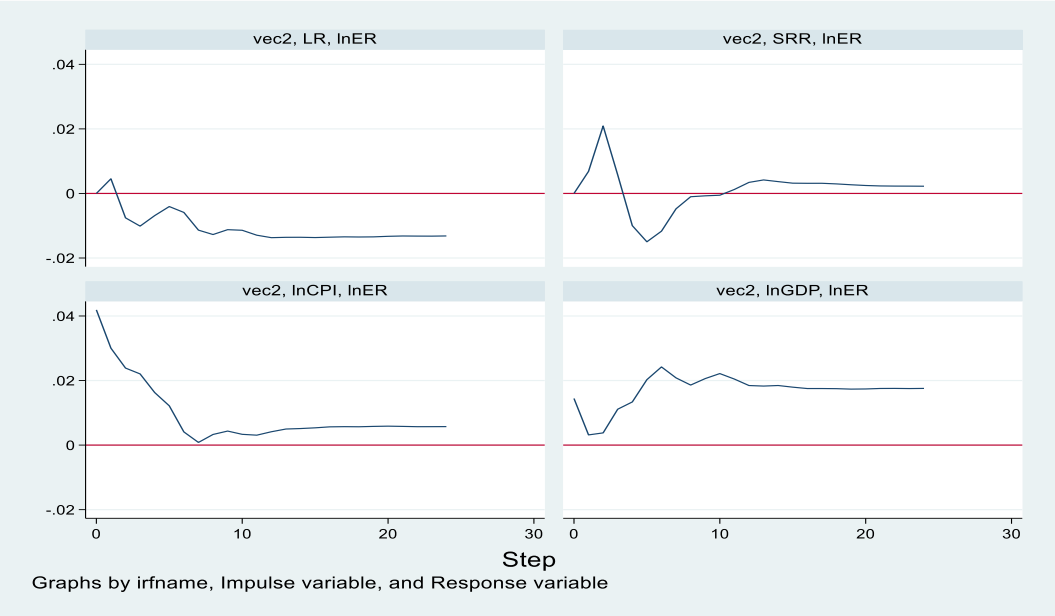


Figure 7: Results of the Impulse Response Function (IRF) for the lnER model.

4.5.4.4 IRF for lnLR model

Below is figure 8 showing the Impulse Response Function (IRF) for the LR model. The results indicate that all variables (lnER, MPR, RRR, lnGDP, and lnCPI) have a continuous and lasting impact on lending interest rates.

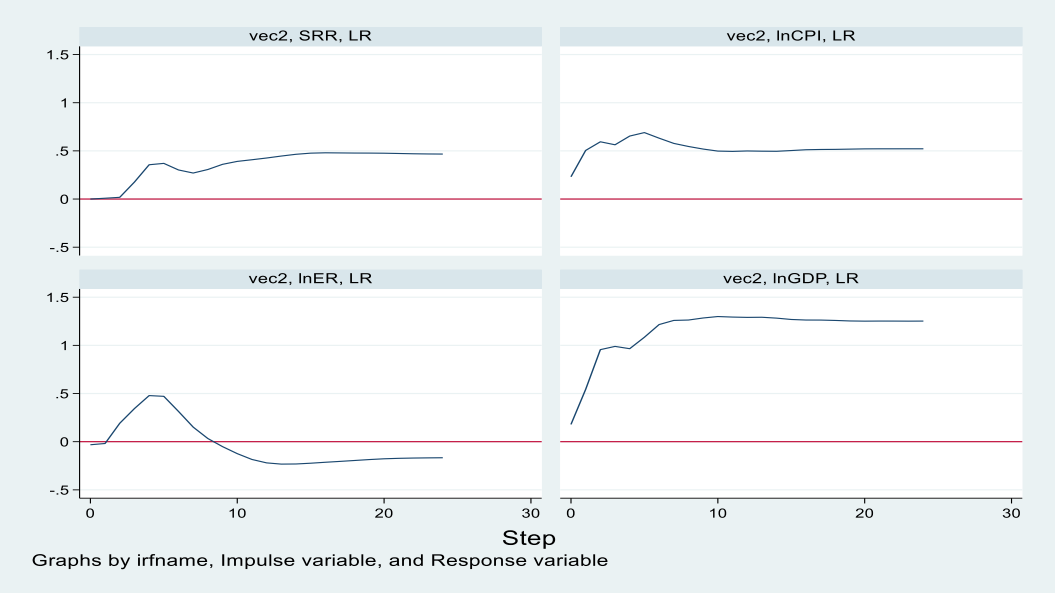


Figure 8: Results of the Impulse Response Function (IRF) for the lnLR model.

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.0 Introduction

This chapter discusses the findings from the empirical analysis. The first section investigates the impact of the Statutory Reserve Ratio (SRR) on inflation. The second section analyzes the effect of SRR on the exchange rate. The third and fourth sections evaluate the influence of SRR on interest rates and economic growth, respectively.

5.1 The Impact of SRR on Inflation

The VECM model results indicate that the SRR has a statistically significant impact on CPI in the short run. The coefficient for the second lag of SRR was 0.007, significant at the 5% level, suggesting that a 1 percentage point increase in SRR raises CPI by 0.007%. This implies that SRR can stimulate inflation. This finding contradicts the correlation matrix results, which showed a positive statistically significant relationship between lnCPI and SRR. It also opposes the alternative hypothesis that SRR adjustments inversely affect inflation rates in Zambia. The results suggest that SRR positively influences inflation and is not an effective tool for combating short-term inflationary pressure. However, several studies (Cheelo and Banda, 2006; Mwenda and Muuka, 2018; and Simutanyi and Simatele, 2017) have found that SRR can help control inflation.

The long-run model analysis supports the findings of (Cheelo and Banda, 2006; Mwenda and Muuka, 2018; and Simutanyi and Simatele,2017) that SRR can help reduce inflationary pressure. The model showed that SRR negatively affects lnCPI, with a coefficient of -0.020. This means that a 1 percentage point increase in SRR would result in a 0.020% decrease in CPI. The long-run models indicate that SRR directly impacts inflation in Zambia, suggesting that increasing SRR can lead to a reduction in inflation. Therefore, SRR appears to be an effective measure for controlling long-term inflation.

(Mishkin, 2019) suggests that SRR impacts banking system liquidity, which in turn affects lending interest rates and inflation. This long-term relationship between SRR

and inflation might explain the moderated effect of SRR on inflation, as observed by (Bianchi and Bigio, 2014) in the United States. They found that adjusting SRR can influence lending practices, capacity, and macroeconomic factors related to lending rates.

In Brazil, (Silva, 2014) identified SRR as a useful tool for managing inflation and stabilizing the economy. Increasing SRR helped reduce inflationary pressure by limiting banking system liquidity, while lowering SRR had the opposite effect. In Zambia, inflation is often attributed to external factors and exchange rate pressure. Studies by (Chipili, 2022; Roger et al., 2017; Chinyemba, 2021; and BoZ, 2024) noted that inflationary pressure mainly stems from external shocks and exchange rate volatility. However, (Cheelo and Banda, 2006; Mwenda and Muuka, 2018; and Simutanyi and Simatele, 2017) found that SRR is an effective tool for controlling inflation.

5.2 The Impact of SRR on Exchange Rate

The empirical results demonstrate that SRR impacts the exchange rate both in the short and long run. The coefficients of SRR were statistically significant in both models at the 5% significance level. In the short-run model, the coefficient for the third lag was 0.026, indicating that a 1 percentage point increase in SRR leads to a 0.026% rise in the exchange rate after three quarters. This suggests that SRR can be utilized to achieve short-term exchange rate stability.

The long-run model's coefficient of -0.007 indicates that SRR has an inverse effect on the exchange rate. Specifically, a 1 percentage point increase in SRR would lead to a 0.007% appreciation in the exchange rate. This finding aligns with the (IMF, 2015) suggestion that SRR can effectively manage exchange rate volatility and what (Loeffler, 2015) observed that SRR can cause the real exchange rate to depreciate (and the nominal exchange rate to appreciate). (Mwenda and Muuka,2018) also noted that SRR can help stabilize the exchange rate.

The mechanism through which SRR influences the exchange rate is similar to its impact on inflation. An increase in SRR reduces banks' lending capacity, as commercial banks factor in SRR when setting their lending interest rates and determining loanable funds (Ngoma and Chanda, 2020). Higher SRR restricts

domestic lending (denominated in local currency) (Miyoba and Habazoka, 2024), which in turn reduces the money supply and liquidity in the financial market. This reduction in liquidity and money supply leads to an appreciation of the local currency, thereby lowering the nominal exchange rate.

This mechanism is akin to the exchange rate channel for the monetary policy rate (MPR) (BoZ, 2025), making SRR an effective tool for managing exchange rate stability. It serves as an additional monetary policy option alongside open market operations and MPR to control exchange rate volatility. (Loeffler, 2015) noted that SRR can help control nominal exchange rates and maintain financial stability during periods of economic volatility.

5.3 The Impact of SRR on Interest Rate

The empirical analysis shows that SRR has a long-term impact on lending interest rates. While the coefficients of SRR were statistically insignificant at the 10% level in the short-run model, they were significant at the 5% level in the long-run model. The long-run model's coefficient of 1.137 indicates that a 1 percentage point increase in SRR results in a 1.137% rise in lending interest rates. This aligns with the theory that increasing SRR reduces a bank's lending capacity by decreasing its liquidity, prompting banks to raise their lending interest rates to compensate for the reduced availability of loanable funds (Cantu et al., 2024).

Several scholars, including (Cantu et al., 2024; Bianchi and Bigio, 2014; Kashyap and Stein, 2000), have confirmed that SRR adjustments affect bank liquidity. (Cantu et al, 2024) observed that the reserve ratio inversely impacts bank liquidity. In the United States, (Mishkin,2019; Bianchi and Bigio,2014) revealed that SRR adjustments can influence banking system liquidity, thereby affecting lending rates. Kashyap and Stein also found that SRR adjustments impact banking lending capacity. In the Eurozone, SRR has been identified as an effective tool for managing liquidity (Bindseil, 2004), including short-term liquidity. In Brazil, (Glocker and Towbin, 2015) observed that increasing SRR decreases credit availability in the market, suggesting that SRR can help avert financial crises linked to credit bubbles. The liquidity channel is crucial for controlling lending interest rates, subsequently influencing inflation and promoting financial market development.

Overall, SRR tends to increase lending interest rates. (Cantu et al.,2014) found that a higher reserve ratio positively impacts lending interest rates. In Colombia, (Herrera et al.,2010) observed similar long-term effects, noting that the reserve ratio positively influences interest rates. However, unlike in Zambia, they found a positive short-term impact on lending interest rates, suggesting that SRR can complement the interest rate pass-through effect of monetary policy rates. (Glocker and Towbin,2011) also noted that raising SRR tightens lending interest rates. Therefore, the regression results indicate that SRR in Zambia can be used as an independent or complementary tool to manage long-term interest rates and ensure financial stability.

5.4 The Impact of SRR on GDP Growth Rate

The empirical results showed that SRR has a short-run and long-run impact on economic growth. The coefficient of the second lag of SRR was 0.014, and it was statistically significant at 5% level of significance. This implied that a 1 percentage point increase in the SRR leads to a 0.014% increase in GDP. This result is like what (Oh, 2011) observed that the required reserve ratio has a positive impact on GDP in the short run. This finding suggests that SRR should be a considerable option for controlling short-run economic stability (financial instability, inflationary pressure and exchange rate volatility) since it does not distort economic growth.

The coefficient of SRR in the long-run model was 0.007. This is an indication that a 1 percentage point increase in the SRR will lead to a 0.007% increase in GDP. This finding is inconsistent with what (Oh, 2011) postulated that SRR has an inverse relationship with economic growth. However, the negative long-term relationship between economic growth and lending interest rates suggests that SRR could still help stabilise economic growth through the interest rate channel. Besides, the magnitude of the impact of lending interest rate is greater than that of SRR. This could validate (Bianchi and Bigio's, 2014) suggestion that the relationship between SRR adjustment and economic stability tends to be moderated. (Kashyap and Stein, 2000) found that SRR adjustments can impact bank lending capacity and influence economic activity.

In Summary, the results show that SRR has a positive long-run impact on the lending interest rates. This finding simply confirms that SRR adjustments have an impact on bank liquidity and supply of loans, this reduction in the supply of loans raises the cost of loans (lending interest rates). In addition, SRR was found to have a positive short-run and inverse long-run relationship with the exchange rate. An increase in the SRR reduces liquidity and money supply creating an imbalance that leads to the appreciation of the domestic currency. SRR has a negative impact on inflation. An increase in the SRR reduces bank liquidity, credit availability and money supply. This reduction causes consumers' spending power to reduce, driving down the inflation rate. Finally, unexpectedly the SRR was found to dampen economic growth. However, consideration of the interest rate channel indicates that this increment is offset by a larger decline in GDP due to the increase in lending interest rates and a decline in inflation.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.0 Conclusion

This study evaluated the impact of statutory reserve requirements adjustments on economic stability in Zambia. Specifically, the purpose of the study was to assess the impact of Statutory Reserve Ratio adjustments on economic stability in Zambia from 2013Q1 to 2024Q2. Macroeconomic stability is represented by four separate variables: inflation rate, exchange rate, interest rates and GDP growth rates. The specific objectives were to: (i) analyse the relationship between SRR adjustments and inflation rates; (ii) examine the impact of SRR adjustments on the exchange rate (iii) assess the effect of the SRR adjustments on interest rates; and (iv) evaluate the impact of the SRR adjustments on GDP growth rates.

The Vector Error Correction Model (VECM) was used to investigate this relationship. Before the VECM was adopted the variables were first tested for stationarity using the Augmented Dickey-Fuller (ADF) Tests, first, at levels and then, at first difference. The ADF test results revealed that the variables were stationary at first difference. Thereafter, the variables were checked for cointegration using the Johansen test for Cointegration – the results of the test revealed the presence of cointegration. The finding of stationarity at first difference and cointegrating equations subsequently pointed to the use of the VECM. Afterwards, the model passed the autocorrelation, normality and stability tests.

The short-run model results of the VECM showed that SRR has a statistically significant impact on GDP, CPI and exchange rates. Specifically, the results showed that a 1 percentage point increase in the SRR leads to a 0.014% increase in GDP. The same increment in the SRR leads to a 0.004% increase in the CPI and a 0.026% increase in the exchange rate. These results showed that SRR is not an effective tool for short-term macroeconomic stability – an increase in SRR can promote economic growth but cause inflationary pressure and exchange rate depreciation in the short run. However, in the long run model. A 1 percentage point increase in the SRR was found to cause a 0.032% increase in GDP; a 0.015% decline in CPI, a 0.012%

percentage point increase in the lending interest rates and a 0.021% decline in exchange rate. This implied that the SRR can be an effective direct and complementary tool for macroeconomic stability. An increase in the SRR can mitigate inflationary and exchange rate pressure and promote economic growth.

6.1 Recommendation

The empirical analysis revealed that the SRR can be an effective tool for managing macroeconomic stability. The following are some of the measures that can be implemented to improve the effectiveness of SRR.

- *Research on the exact cause of macroeconomic instability:* The effectiveness of the adjustment of SRR is determined by the purpose of its implementation. An informative decision can improve the effectiveness of the SRR. For instance, the empirical results have revealed that the SRR in Zambia has an impact on economic growth, inflation, lending rates and exchange rates. Thus, a diagnostic check of macroeconomic instability should always help guide the measures to implement and the size of the adjustment in the SRR.
- *SSR can be used to mitigate the impact of external shocks.* The empirical results revealed that the SRR has an inverse relationship with the nominal exchange rate. An indication that an increase in the SRR can lead to a reduction in the nominal exchange rate (appreciation of the Zambian Kwacha). This suggests that the adjustment of the SRR can be used as a complementary intervention to control inflationary pressure arising from external shocks such as (currency depreciation and increases in fuel prices) to ease imported inflation.
- *The SRR should be implemented together with other monetary policy tools:* The effectiveness of the SRR is tied to prevailing fiscal and macroeconomic conditions. The implementation of the SRR has the potential to produce unexpected results and have adverse impacts in the short run on the exchange rate and other economic factors. Thus, the central bank needs to consider complementing it with adjustments in the monetary policy rates (MPR) and open market operations to moderate or strengthen the policy decision to use the SRR.

- *Alignment of Monetary and Fiscal Policies:* The effectiveness of monetary policy is linked to its alignment with fiscal policy. Imprudent fiscal policy has the potential to erode the effectiveness of SRR and other monetary policy tools. Thus, the central government and central bank must align their policies to promote macroeconomic stability.

6.2 Study Limitations and Delimitations

6.2.1 Study Limitations

Despite its contributions, this study has certain limitations:

- Data Constraints: The study relies on secondary data from institutions such as the Bank of Zambia (BoZ) and the Zambia Statistics Agency. The accuracy and consistency of this data may affect the robustness of the findings.
- Modeling Limitations: The study employs a Vector Error Correction Model (VECM), which assumes a stable long-run relationship among variables. However, real-world economic dynamics may involve nonlinear effects that are not fully captured by this approach.
- External Factors: The study focuses on SRR adjustments as a monetary policy tool, but other macroeconomic factors (e.g., fiscal policy, external shocks, and global economic conditions) also influence Zambia's economic stability. These interactions are beyond the study's scope.

6.2.2 Study Delimitations

To maintain focus, the study defines its scope as follows:

- Timeframe: The study analyzes data from 2013Q1 to 2024Q2 to capture multiple SRR adjustments and their effects on macroeconomic stability.
- Macroeconomic Indicators: The research examines the impact of SRR adjustments on inflation, exchange rates, interest rates, and GDP growth, excluding other potential economic variables such as employment or foreign direct investment.

- Geographic Focus: The study is limited to Zambia, meaning findings may not be directly generalizable to other economies with different monetary policy frameworks.

6.3 Suggestions for Future Studies

There is need for more studies that look at the impact of SRR on various economic phenomena. In addition, there is need for diagnostic studies that assess the causes of the various economic crises that Zambia has experienced. These studies could form the platform for further studies on the determinants of economic crises and macroeconomic stability.

7. References

Akhtar, M. A. (2006). "The Coordination of Monetary and Fiscal Policies." *Journal of Policy Modeling*.

Agénor, P.-R., Alper, K., & da Silva, L. P. (2018). Monetary and macroprudential policies in the presence of external shocks. *Journal of Economic Studies*.

Armas, A., Vega, M., & Castillo, P. (2014). Reserve requirements in Peru: Practical lessons. *IMF Working Papers*.

Bank of Zambia, 2023. *CB Circular 30/2023 Adjustment to the Kwacha and Foreign Currency Statutory reserve ratio.* s.l.:Bank of Zambia.

Bank of Zambia, 2023. *CB Circular 31/2023 Adjustment to the Kwacha and Foreign Currency Statutory reserve ratio.* s.l.:Bank of Zambia.

Bank of Zambia, 2023. *Monetary Policy.* [Online] Available at: https://www.boz.zm/monetary-policy-instruments.htm

Bank of Zambia, 2023. *Monetary Policy Transmission Mechanism.* [Online] Available at: https://www.boz.zm/monitory-policy-transmission-mechanisms.htm

Bank of Zambia, 2024. *Banks- Financial Statements.* [Online] Available at: https://www.boz.zm/banks-financial-statements.htm [Accessed 4 June 2024].

Bank of Zambia, 2024. *CB Circular 02/2024 Adjustment to the Kwacha and Foreign Currency Statutory reserve ratio.* s.l.:Bank of Zambia.

Bank of Zambia, 2024. *Registered Commercial Banks.* [Online] Available at: https://www.boz.zm/registered-commercial-banks.htm

Bank of Zambia. (2014). *Monetary Policy Framework*.

Borio, C. (2012). "The Financial Stability Macro Policy Nexus." *BIS Working Papers*.

Bustamante, C., & Hamann, F. (2015). Countercyclical reserve requirements in a small open economy. *Journal of Economic Dynamics and Control*.

Bhati, S. D. Z. A. a. J. W., 2019. Factors affecting the liquidity of commercial banks in India: a longitudinal analysis. *Banks and Bank Systems,* 14(4), pp. 78-88.

Brooks, P. K., 2007. Does the Bank Lending Channel of Monetary Transmission Work in Turkey?. *IMF Working Paper,* December.272(07).

Brown, F. K. R. a. K. C., 2012. *Investment Analysis & Portfolio Management.* Tenth ed. s.l.:South-Western Cengage Learning.

Copelovitch, S. &. S. D., 2008. Financial Regulation, Monetary Policy, and Inflation in the Industrialized World. *The Journal of Politics,* 70(3), pp. 663-680.

Cornett, A. S. a. M. M., 2012. *Financial Markets and Institutions.* 5th ed. s.l.:McGraw-Hill/Irwin.

Crespo Cuaresma, J., Hlouskova, J., & Obersteiner, M. (2019). Reserve requirements and economic stability: An empirical analysis. *Quarterly Journal of Economics*

Federico, P., Vegh, C. A., & Vuletin, G. (2013). "Reserve Requirements in the Face of the Business Cycle." *Journal of Economic Dynamics and Control*.

Friedman, M. (1968). *The Role of Monetary Policy*. *American Economic Review*.

Glocker, C., & Towbin, P. (2015). The macroeconomic effects of reserve requirements in Brazil. *Journal of Monetary Economics*.

Haabazoka, L. M. a. L., 2024. A Study of the Effect of Changes in the Statutory

Keynes, J. M. (1936). *The General Theory of Employment, Interest, and Money*.

Loeffler, G. (2015). The impact of reserve requirements on real exchange rates in emerging economies. *IMF Working Papers*.

Madura, J. (2015). *Financial Markets and Institutions*.

Mishkin, F. S. (2007). *Monetary Policy Strategy*.

Schoenholtz, A. I. (2015). *Monetary Policy and the Economy*.

Reinhart, C. M., & Reinhart, V. R. (1999). Capital inflows and reserve requirements: The recent experience of Kenya, Malaysia, and Chile. *International Monetary Fund*.

Tovar, C. E., Garcia-Escribano, M., & Vera-Martin, M. (2014). Reserve requirements as a policy tool in Latin America. *BIS Quarterly Review*.

Appendix III

VECM Results – Short Run

```
Vector error-correction model

Sample: 5 thru 46                               Number of obs     =        42
                                                AIC               =  -4.852358
Log likelihood =  190.8995                      HQIC              =  -3.502685
Det(Sigma_ml)  =  7.76e-11                      SBIC              =  -1.170154

Equation           Parms      RMSE     R-sq      chi2     P>chi2
------------------------------------------------------------------
D_lnGDP               17     .055273   0.7470   73.81876   0.0000
D_lnCPI               17     .012259   0.9282   323.2358   0.0000
D_LR                  17     .576077   0.8153   110.3851   0.0000
D_lnER                17     .074796   0.6015   37.74194   0.0027
D_SRR                 17     1.76926   0.5775    34.1668   0.0080
```

	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
D_lnGDP						
_ce1						
L1.	-.2718034	.1566145	-1.74	0.083	-.5787621	.0351553
lnGDP						
LD.	-.5974899	.1970413	-3.03	0.002	-.9836836	-.2112961
L2D.	-.7021765	.1855734	-3.78	0.000	-1.065894	-.3384593
L3D.	-.5282595	.1826085	-2.89	0.004	-.8861656	-.1703533
lnCPI						
LD.	-.0712886	1.04419	-0.07	0.946	-2.117863	1.975286
L2D.	.3971235	.827926	0.48	0.631	-1.225582	2.019829
L3D.	.1364519	.8466983	0.16	0.872	-1.523046	1.79595
LR						
LD.	-.0060837	.0181219	-0.34	0.737	-.0416019	.0294345
L2D.	-.0153244	.0220007	-0.70	0.486	-.058445	.0277962
L3D.	-.0192823	.0196976	-0.98	0.328	-.0578889	.0193242
lnER						
LD.	-.2091338	.1737135	-1.20	0.229	-.5496059	.1313384
L2D.	-.059964	.1764226	-0.34	0.734	-.405746	.285818
L3D.	.0233719	.1589476	0.15	0.883	-.2881596	.3349034
SRR						
LD.	-.0016489	.0059973	-0.27	0.783	-.0134035	.0101056
L2D.	.0143979	.0084373	1.71	0.088	-.0021389	.0309347
L3D.	-.0012047	.008815	-0.14	0.891	-.0184818	.0160723
_cons	.0209901	.0240146	0.87	0.382	-.0260777	.0680579
D_lnCPI						
_ce1						
L1.	-.170886	.0347368	-4.92	0.000	-.2389688	-.1028032
lnGDP						
LD.	.0691856	.0437034	1.58	0.113	-.0164714	.1548426
L2D.	.0570594	.0411598	1.39	0.166	-.0236124	.1377312
L3D.	-.0398508	.0405022	-0.98	0.325	-.1192337	.0395321
lnCPI						
LD.	-.645039	.2315992	-2.79	0.005	-1.098965	-.1911129
L2D.	-.572822	.1836323	-3.12	0.002	-.9327347	-.2129093
L3D.	-.1139155	.187796	-0.61	0.544	-.4819889	.2541578
LR						
LD.	.0103758	.0040194	2.58	0.010	.0024979	.0182537
L2D.	-.0081313	.0048797	-1.67	0.096	-.0176954	.0014327
L3D.	-.0114074	.0043689	-2.61	0.009	-.0199702	-.0028445
lnER						
LD.	.0118286	.0385293	0.31	0.759	-.0636874	.0873447
L2D.	-.0609774	.0391302	-1.56	0.119	-.137672	.0157163
L3D.	-.0085877	.0352542	-0.02	0.987	-.0696848	.0685094
SRR						
LD.	.0000757	.0013302	0.06	0.955	-.0025314	.0026829
L2D.	.0012645	.0018714	0.68	0.499	-.0024034	.0049323
L3D.	.0039031	.0019551	2.00	0.046	.0000711	.0077351
_cons	.0171358	.0053264	3.22	0.001	.0066963	.0275754
D_LR						
_ce1						
L1.	1.20094	1.632306	0.74	0.462	-1.998321	4.400202
lnGDP						
LD.	-.1882567	2.053653	-0.09	0.927	-4.213342	3.836829
L2D.	.3526941	1.93413	0.18	0.855	-3.438131	4.143519
L3D.	-4.180217	1.903228	-2.20	0.028	-7.910476	-.4499584
lnCPI						
LD.	11.03286	10.88302	1.01	0.311	-10.29746	32.36318
L2D.	-24.04967	8.629017	-2.79	0.005	-40.96223	-7.137108
L3D.	18.34985	8.82467	2.08	0.038	1.05381	35.64588
LR						
LD.	.8852908	.1888744	4.69	0.000	.5151039	1.255478
L2D.	-.2214592	.2293013	-0.97	0.334	-.6708814	.227963
L3D.	-.2104432	.205297	-1.03	0.305	-.612818	.1919316
lnER						
LD.	.5671271	1.81052	0.31	0.754	-2.981427	4.115681
L2D.	2.58236	1.838756	1.40	0.160	-1.021535	6.186256
L3D.	2.434369	1.656623	1.47	0.142	-.8125521	5.68129
SRR						
LD.	.0223693	.0625071	0.36	0.720	-.1001423	.1448809
L2D.	-.0388082	.0879372	-0.44	0.659	-.2111619	.1335455
L3D.	.1094308	.0918736	1.19	0.234	-.0706382	.2894998
_cons	.2760777	.2502911	1.10	0.270	-.2144838	.7666393
D_lnER						
_ce1						
L1.	-.2311597	.2119331	-1.09	0.275	-.6465409	.1842216
lnGDP						
LD.	-.3558177	.2666393	-1.33	0.182	-.8784211	.1667857
L2D.	-.2287763	.2511208	-0.91	0.362	-.7209641	.2634116
L3D.	-.4007791	.2471087	-1.62	0.105	-.8851032	.083545
lnCPI						
LD.	-2.960736	1.413814	-2.10	0.036	-5.730192	-.1912801
L2D.	-.8272379	1.120362	-0.74	0.460	-3.023107	1.368632
L3D.	-1.10946	1.145765	-0.97	0.333	-3.355118	1.136199
LR						
LD.	.0035595	.0245228	0.15	0.885	-.0445043	.0516233
L2D.	-.0102514	.0297717	-0.34	0.731	-.0686028	.0481001
L3D.	-.0278819	.0266551	-1.05	0.296	-.0801249	.0243611
lnER						
LD.	.1677336	.2350717	0.71	0.476	-.2929986	.6284657
L2D.	-.123604	.2387378	-0.52	0.605	-.5915215	.3443136
L3D.	.369842	.2150903	1.72	0.086	-.0517272	.7914112
SRR						
LD.	.0116962	.0081157	1.44	0.150	-.0042103	.0276027
L2D.	-.0136134	.0114175	-1.19	0.233	-.0359912	.0087644
L3D.	.0255739	.0119286	2.14	0.032	.0021944	.0489535
_cons	.1292653	.0324969	3.98	0.000	.0655724	.1929581

VECM: Cointegrating Equations (Long-Run Models) - lnGDP

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	4	2520.888	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
_ce1						
lnGDP	1	.	.	.	.	.
lnCPI	-.3198475	.121416	-2.63	0.008	-.5578185	-.0818765
LR	.005764	.0064451	0.89	0.371	-.0068682	.0183962
lnER	-.8781176	.1388881	-6.32	0.000	-1.150333	-.6059019
SRR	-.0065513	.0021652	-3.03	0.002	-.0107951	-.0023075
_cons	-7.615207	.	.	.	.	.

VECM: Cointegrating Equations (Long-Run Models) - lnCPI

Vector error-correction model

Sample: 5 thru 46		Number of obs	= 42
		AIC	= -4.852358
Log likelihood = 190.8995		HQIC	= -3.502685
Det(Sigma_ml) = 7.76e-11		SBIC	= -1.170154

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	4	251.6238	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
_ce1						
lnCPI	1	.	.	.	.	.
lnGDP	-3.12649	.3229338	-9.68	0.000	-3.759429	-2.493551
LR	-.0180211	.0201837	-0.89	0.372	-.0575805	.0215383
lnER	2.745426	.4364038	6.29	0.000	1.89009	3.600762
SRR	.0204826	.0064497	3.18	0.001	.0078414	.0331239
_cons	23.80887	.	.	.	.	.

VECM: Cointegrating Equations (Long-Run Models) - LR

Vector error-correction model

Sample: 5 thru 46		Number of obs	= 42
		AIC	= -4.852358
Log likelihood = 190.8995		HQIC	= -3.502685
Det(Sigma_ml) = 7.76e-11		SBIC	= -1.170154

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	4	89.29573	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

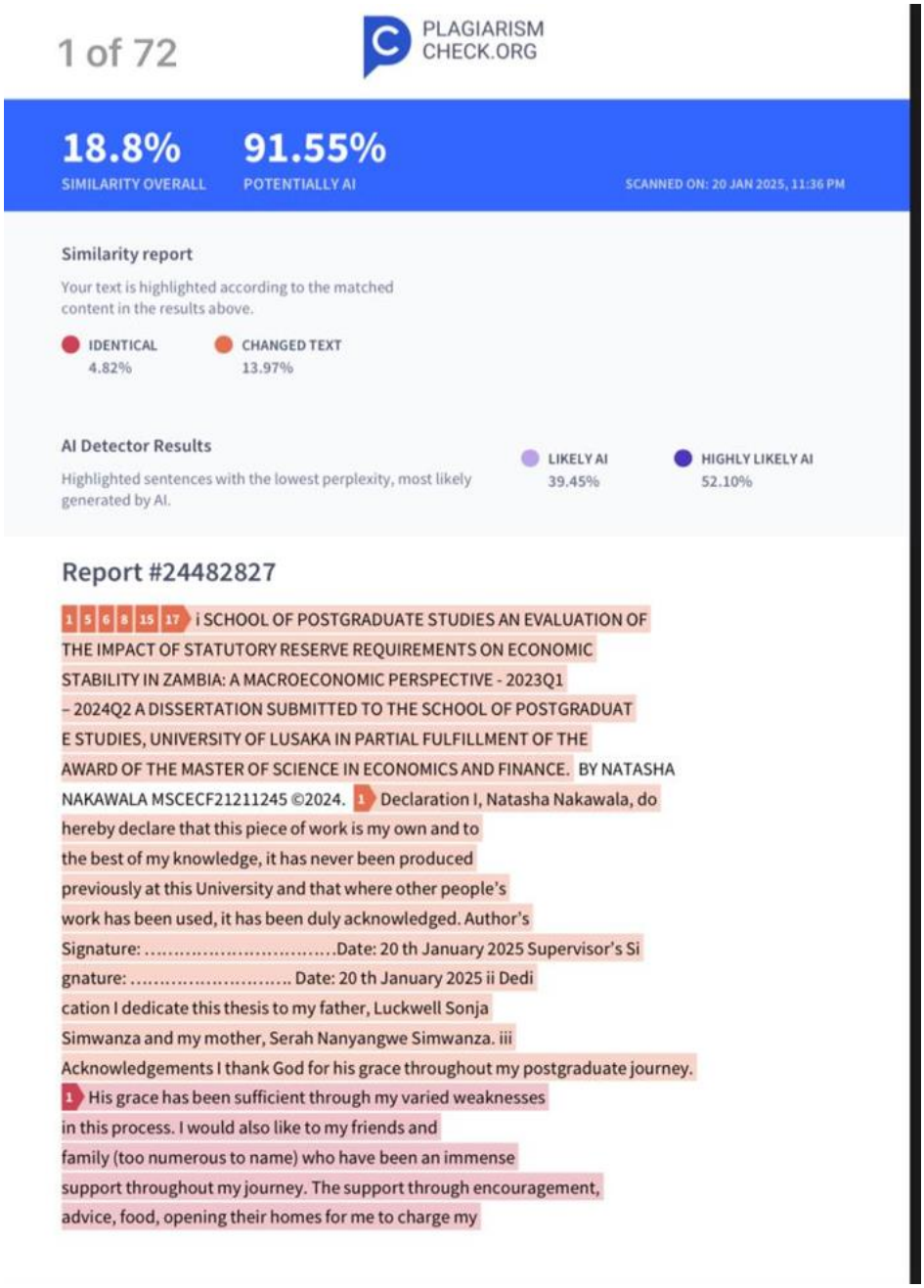
beta	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
_ce1						
LR	1	.	.	.	.	.
lnCPI	-55.4906	82.29775	-0.67	0.500	-216.7912	105.81
lnGDP	173.4908	69.89656	2.48	0.013	36.49608	310.4856
lnER	-152.3453	17.66722	-8.62	0.000	-186.9725	-117.7182
SRR	-1.136593	.4054359	-2.80	0.005	-1.931233	-.3419535
_cons	-1321.169	.	.	.	.	.

VECM: Cointegrating Equations (Long-Run Models) – lnER

```
Vector error-correction model

Sample: 5 thru 46                               Number of obs     =        42
                                                AIC               =  -4.852358
Log likelihood =  190.8995                      HQIC              =  -3.502685
Det(Sigma_ml)  =  7.76e-11                      SBIC              =  -1.170154

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                   4   1514.343   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                Johansen normalization restriction imposed

------------------------------------------------------------------------------
        beta |      Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
       lnER |            1          .       .       .            .           .
      lnCPI |     .3642422   .5379805     0.68   0.498    -.6901802    1.418665
      lnGDP |      -1.1388   .4553871    -2.50   0.012    -2.031342   -.2462574
         LR |     -.006564   .0053415    -1.23   0.219    -.0170331     .003905
        SRR |     .0074606   .0026965     2.77   0.006     .0021756    .0127456
      _cons |     8.672195          .       .       .            .           .
------------------------------------------------------------------------------
```

Correlation Matrix

	lnGDP	SRR	lnCPI	lnER	LR
lnGDP	1.000				
SRR	0.046	1.000			
	0.764				
lnCPI	0.992*	0.074	1.000		
	0.000	0.626			
lnER	0.936*	0.131	0.948*	1.000	
	0.000	0.386	0.000		
LR	0.632*	0.285*	0.653*	0.731*	1.000
	0.000	0.055	0.000	0.000	



1 of 72

PLAGIARISM CHECK.ORG

18.8% SIMILARITY OVERALL

91.55% POTENTIALLY AI

SCANNED ON: 20 JAN 2025, 11:36 PM

Similarity report

Your text is highlighted according to the matched content in the results above.

IDENTICAL 4.82%

CHANGED TEXT 13.97%

AI Detector Results

Highlighted sentences with the lowest perplexity, most likely generated by AI.

LIKELY AI 39.45%

HIGHLY LIKELY AI 52.10%

Report #24482827

1 5 6 8 15 17 i SCHOOL OF POSTGRADUATE STUDIES AN EVALUATION OF THE IMPACT OF STATUTORY RESERVE REQUIREMENTS ON ECONOMIC STABILITY IN ZAMBIA: A MACROECONOMIC PERSPECTIVE - 2023Q1 – 2024Q2 A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUAT E STUDIES, UNIVERSITY OF LUSAKA IN PARTIAL FULFILLMENT OF THE AWARD OF THE MASTER OF SCIENCE IN ECONOMICS AND FINANCE. BY NATASHA NAKAWALA MSCECF21211245 ©2024. 1 Declaration I, Natasha Nakawala, do hereby declare that this piece of work is my own and to the best of my knowledge, it has never been produced previously at this University and that where other people's work has been used, it has been duly acknowledged. Author's Signature: ……Date: 20 th January 2025 Supervisor's Si gnature: …….. Date: 20 th January 2025 ii Dedi cation I dedicate this thesis to my father, Luckwell Sonja Simwanza and my mother, Serah Nanyangwe Simwanza. iii Acknowledgements I thank God for his grace throughout my postgraduate journey. 1 His grace has been sufficient through my varied weaknesses in this process. I would also like to my friends and family (too numerous to name) who have been an immense support throughout my journey. The support through encouragement, advice, food, opening their homes for me to charge my

UNIVERSITY OF LUSAKA

UNIVERSITY OF LUSAKA

SCHOOL OF POSTGRADUATE STUDIES

SUBMISSION OF DISSERTATION FOR EXAMINATION

Name of student: Natasha Nakawala

Student number: MSCECF21211245

Programme of study: Master of Science in Economics and Finance

Dissertation title: AN EVALUATION OF THE IMPACT OF STATUTORY RESERVE REQUIREMENTS ON ECONOMIC STABILITY IN ZAMBIA: A MACROECONOMIC PERSPECTIVE (2013Q1 – 2024Q2)

Signature of student: 

Date: 20.01.2025

Supervisor's Comments:

I recommend/ do not recommend this dissertation for submission for examination (If you do not recommend, kindly provide a written report and attach hereto).

Name of Supervisor: Chimuka Matongo

Signature of Supervisor: 

Date: 20.01.2025