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Research Article

The Effect of the Statutory Reserve Ratio on Bank Interest Rates: Evidence from Commercial Banks in Zambia

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About Article

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ABSTRACT

his study investigated the effect of statutory reserve (SRR) on the interest rates in commercial bank, with focus on setting the deposit and loan interest rates and also the effectiveness of SRR in managing the commercial banks general interest rate. Using a mixed method approach, more than five different commercial banks were engaged in this study. The findings of the study revealed that a continuous increase in the central bank SRR has no significant effect on bank deposit interest rates. (p-value-0.1484, χ^2= 13.32, 9 df). However, moderate changes in interest rate had influence on the adjustment of the deposit interest rate. This implies that while banks submit to changes in SRR, the elasticity is limited at some point as they consider other factors such as liquidity and competitor offers rather than the rate of SRR. In the similar way, the statutory reserve ratio was found to have a significant effect on Commercial Banks Loans and Advances. The study found that 60% of the commercial banks increase loan interest rates when SRR increases. Hence the study established a significant positive relationship between Commercial Banks Loan rates and SRR changes (p-value- $1.32e^{-05}$, S.d -0.966, R^2 0.063). The study revealed that SRR is an effective monetary tool policy only at a certain range of rates for regulating the commercial banks (p-value-0.0032, χ^2 =24.79 at df = 9). The study therefore concluded that statutory reserve ratio has significant effect on both loan and deposit rates changes but a continuous increase in the ratio tends to become non responsive to both deposit and loan rates due to other considerations such as availability of liquidity and competition in the industry. The study recommended that central bank should know the appropriate SRR corridor that would control banks rates and to increase the trading and banking book, banks should develop strategies to attract private sector deposits, to fill the void created by the implementation of the SRR and also come up with innovative solutions. The study further recommended that the Ministry of Finance and the regulator should consider allowing Commercial Banks involved in revenue collection from other sources apart from traditional banking services.

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1. INTRODUCTION

1.1. Background

The Statutory Reserve Ratio (SRR) is a crucial monetary policy tool used by central banks to regulate the amount of liquidity in the banking system. It requires commercial banks to hold a certain percentage of their deposits in reserve, rather than lending them out (Mishkin, 2019). This reserve is typically held at the central bank and is used to maintain financial stability and control inflation. The reserve requirement ratio is a percentage of banks' deposits that is required by law to be kept with the central bank (Feinman *et al*., 2023).

The importance of SRR lies in its ability to influence the money supply in the economy. By adjusting the SRR, central banks can control the amount of liquidity in the banking system, which can impact interest rates and credit availability (Bernanke, 2018). A higher SRR can reduce the amount of funds available for lending, potentially leading to higher interest rates. Conversely, a lower SRR can increase the supply of credit and potentially lead to lower interest rates. According to a study by the International Monetary Fund (IMF), changes in SRR can have a significant impact on the banking system and the overall economy (IMF, 2020).

Central banks use three main tools to manage the monetary supply system: open market operations, discount rates, and reserve requirements. Open market operations involve buying or selling securities on the open market to influence the money supply (Friedman, 2017). Discount rates refer to the interest rate at which commercial banks borrow money from the central bank. Reserve requirements, including SRR, dictate the percentage of deposits that commercial banks must hold
in reserve. These tools can be used to influence interest rates, credit availability, and the overall direction of the economy.

The effect of SRR on deposit interest rates in banks is complex and can vary depending on market conditions and the overall direction of monetary policy. According to a study by the African Development Bank, changes in SRR can have a significant impact on deposit interest rates in African countries (African Development Bank, 2019). In Zambia, commercial banks may adjust their deposit interest rates in response to changes in SRR, depending on their liquidity needs and overall business strategy.

An increase in the SRR widens the spread between the deposits and lending rates, hence, this higher spread makes it less attractive for investors to lend to domestic banks at the same time makes it expensive for the domestic sector to borrow from banks (Chapswike, 2016). A study in China by Haiyang (2012) found that changing reserve ratios does not have any direct effect on controlling surplus liquidity, preventing inflation or controlling the lending activity. Abid and Lodhi (2015) stated that whenever the reserve requirements increased, it acts as a tax burden on bank deposits. This is due to the fact that financial intermediation becomes costlier, spreads between lending and deposit rates rises (Kariuki, 2013). Considering the aforementioned, the study examines the effect of changes in the Statutory Reserve Ratio Requirement on commercial banks‟ performance in Lusaka Zambia.

1.2. Statement of the problem

Despite the expected importance of statutory reserve requirement (SRR) to the management of the interest rate, we have seen that banks have different interest rates placed on deposit interest payment and loan charges. This variation in interest rates has raised concerns about the effectiveness of SRR in regulating the banking system. Statutory reserve requirements are perceived and considered by banks as a source of limitation to their operational and financial activities and growth. A review of researches by Bianchi & Bigio (2013) and Robitaille (2011) indicates that opposing views are held about whether reserve requirements come to hinder banks' growth and output. In this study, it is made evident that statutory reserve requirements may limit banks' operational and financial activities at a time, but their role as measures to safeguard the banking sector and the economy is relatively weightier in importance than the growth and financial interests of individual banks. The paradox is that reserve requirements are instituted to promote the success of banks and their bankruptcy (Bianchi & Bigio, 2013; Bouwman, 2013; Calomiris *et al*., 2012; Robitaille, 2011).

The findings of this study will have implications for monetary policy and the banking sector in Zambia. By understanding the effect of the SRR on deposit interest rates, policymakers can make more informed decisions about the use of this monetary policy tool. The study's findings will also contribute to the existing literature on the relationship between SRR and interest rates, and will provide insights for banks and other financial institutions in Zambia.

1.3. Objectives of the study

1.3.1. General objective

To assess the effects of statutory reserves ratio on the deposit interest rates on commercial banks in Lusaka, Zambia.

1.4. Specific objectives

i. To access the effect of statutory reserve ratio (SRR) on setting the deposit interest rate payment in banks.

ii. To examine or assess the effect of SRR on setting the loan interest rate changes in banks.

iii. To investigate the effectiveness of statutory reserve ratio in managing the commercial banks in Lusaka, Zambia.

1.5. Theoretical frameworks

The conceptual or theoretical framework of this study presents the obligation that the bank must fulfill and are classified as liabilities on its balance sheet. Banks use a portion of their deposits for lending in form of Loans and Advances.

1.5.1. The financial intermediation

According to this theory, banks act as intermediaries between savers (depositors) and borrowers (those seeking loans). Banks collect deposits from individuals and institutions and then lend them to borrowers who need capital for various purposes. (Dewatripont *et al*., 2010) assert that banks create liquidity by borrowing short and lending long, meaning that

banks borrow from depositors with short term maturities and lend to borrowers at longer maturities. The study was also guided by the liquidity preference theory, which suggests that an increase in the SRR would lead to a decrease in the amount of funds available for lending, which would, in turn, lead to an increase in interest rates (Keynes, 1936). The study will also draw on recent empirical studies that have found a significant relationship between SRR and interest rates (Kasekende & Brownbridge, 2016; Mwansa, 2020). The financial intermediation theory rests on the notion that intermediaries strive to minimize the inherent transaction costs as well as the information asymmetries between savers and investors (Akims, 2022). Banks as repositories and custodians of very important financial information have the potential to eliminate the information asymmetry related to problems in the financial sector.

1.5.2. Theory of fraction reserve

In this approach, banks only keep a small required reserve ratio of cash on hand and lend out the rest in the interest of expanding the money supply (Rossouw *et al.*, 2015). The principle of fractional reserve banking implies that Commercial Banks take on (deposit) surplus funds from the public (individuals and businesses) that wish to save. A certain percentage of such deposits are placed as prescribed reserves with the Central Bank. The bank can use the balance of the deposits above the reserve ratio to make loans to the public. The fractional reserve banking system (FRBS) is one of the most significant phenomena in banking history and predominates worldwide (Van den Hauwe, 2016; Newman, 2020; Huerta de Soto, 2020). It allows banks to lend part of their clients' deposits to finance investment activities, holding a small "fraction" of the original deposits as a "reserve" to meet redemption demands. The FRBS aims to increase loanable funds above the natural monetary base to earn additional profits.

1.6. Conceptual framework

The summary of the variable interactions is as shown in the conceptual framework in figure 1 below where the dependent variables are as loan, deposits and interest management influenced by the statutory reserve ratio.

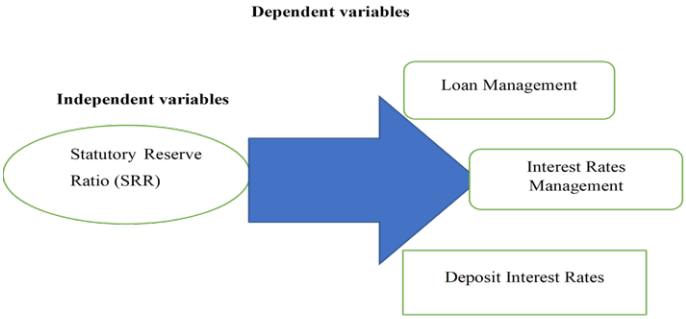

Figure 1. Conceptual framework

1.7. Justification and significance of the study

The study is so important that it shall lead to the development of strategic policies which will enable firms to adjust their production and supply policies. Firms will be able to understand the impact of statutory reserve ratio on commercial banks and on the productivity and efficiency of their operation.

The study shall unveil various impact of statutory reserve ratio in order to understand how they affect the deposit interest rates and its efficiency and productivity in the depository banks, Lusaka. Therefore, a sample of 50 respondents shall be collected by use of questioners in a survey.

2. LITERATURE REVIEW

2.1. Overview

This chapter presents the literature review. It discusses the theories around deposits (liabilities) creation by the banking sector and how they relate to deposit rates. It also reviews the impact of statutory reserve ratio in setting the loan and deposit interest rates and gives insight on the effectiveness of statutory reserve ratio in managing the commercial banks in Lusaka, Zambia.

2.2. Effect of statutory reserve ratio (SRR) on deposit interest rate

Abid and Lodhi (2020) say statutory reserve requirements are like a minimum amount of deposits that banks have to keep with the central bank. They can't use this money to give out loans or buy stuff. Al-Homaidi *et al.* (2018) figured out that if you crank up reserve requirements, it shrinks the money banks can play with. So, if reserve requirements go up, the overall money supply goes down. Jermann and Xiang (2023) think of deposits as a debt that can mature at any time. The more debt coming due, the riskier it is for the bank.

Ndiritu (2017) says checking out how well a company is doing financially means seeing if they're hitting their money goals. It's about measuring their success in terms of cash. Gwaya and Mungai (2019) say that this is done by using different checking methods and looking at financial numbers. Chirwa *et al.* (2022) pointed out that banks get money from three kinds of deposits. The real economic variable that is affected by interest rates is deposits. It is intimately related to economic savings. The amount of deposits is influenced by both individual and institutional savings. The purpose of time deposits, investments, income, and needs is one of the main functions of a bank, according to an article written by Shin (2021). Setting a suitable interest rate for deposits is crucial since it represents a resource cost.

Shin (2021) talks about why people use time deposits – investment, income, and needs. Setting the right interest rate on deposits matters big time, because it's how much the bank has to pay for the money, and also what gets customers to save. Cihak (2020) said banks usually pay higher interest on fixed deposits if you leave the money there longer. So, figuring out the interest rate is super important. Too high, and the bank loses money. Too low, and nobody wants to save there.

Benmelech *et al.* (2023) found that if people aren't insured, interest rate worries can make them pull their deposits out of a bank. Suryawan *et al* (2021) explain that Current deposits are great for business people because they can take money out whenever they want. Savings deposits aren't really for day-to-day stuff. Acharya and Rajan (2023) found that some rules and money policies after the crisis might have caused a bunch of

uninsured deposits to flood in, making bank liquidity unstable and causing financial stability worries.

Sattar *et al.* (2019) checked out how interest rate changes affected how profitable four big banks in Nepal were. The main point was to see how interest rates and exchange rates played into bank profits.

Calim (2018) and Rjoub *et al.* (2017) thinks interest rates matter a lot to bank profits. Gu (2020) believes that internal stuff like how risky the bank's assets are and how much capital they have matters for profits. However, Chen (2021) thinks liquidity isn't the main thing affecting how profitable banks are. Baral and Dhakal (2016) did a study on how the difference between the interest rate a bank charges on loans and what it pays on deposits affects bad loans and profits. They figured out that this difference matters for how well banks perform because it makes loans more expensive for people. Ndiritu, (2024) thinks rules about interest rates really affect bad loans and profits. These rules set the interest rate spread and can help stop some of the problems that lead to bad loans. Windsor, 2023 supports and shows that big interest rate spreads mean higher lending costs and people can't payback their loans.

Dulal (2019) studied how a change in the interest rate affects how much money banks take in and how profitable they are. The study gives information on interest rate trends, deposit, and lending amounts, earning capacity, how well things are running within the bank, profitability, and future growth.

2.3. To examine the effect of SRR on setting the loan interest rates in banks

Bekhet *et al.* (2020) looked at what affects how profitable Jordanian banks are. They learned that bank size and doing different things helps profits, but things like credit risk and operational risk hurt profits. These risks also mess with clients, whose financial situation get bad by currency swings, which increases the odds of loan defaults (Taiwo & Adesola, 2018). Phan *et al.* (2020) in Vietnam and Jadah *et al.* (2020) in Iraq also researched this area and discovered links between bank-specific, financial and regulatory factors on bank profits.

Goet (2021) looked into how total deposits, cash reserve ratio, interest rate spread, inflation rate, and loans relate to each other. Credit strategies provide a system to accomplishing resource quality and goals. Bank officers and managers must make effective credit management choices. However, Dewatripont *et al.* (2020) says that banks gain by borrowing short term and lending longer term. Krugman (2019) thinks banks are just middlemen, buying assets with money from deposits or selling stocks or bonds.

Casu *et al.* (2017) says banks funnel money from savers to borrowers. Matthews and Thomson (2024) states that banks need obtain deposits into loans. Akims (2022) holds banks play a part in economy development.

Ogunleye (2019) studied the Nigerian banking system and found that when they upped the SRR, lending rates went up because banks had less money to lend. Kara and Mwashita (2021) found the same thing in South Africa – higher SRR, higher lending rates. These findings show that the SRR matters for loan rates in growing countries.

Kwashie *et al.* (2022) checked out how credit risk affected how well banks in Ghana did financially, especially regarding bad loans. They also looked at bank size and age, and things like inflation and GDP. Jackson and Tamuke (2022) analyzed bank performance and credit risk management in Sierra Leone. The researchers took information ROA, bank liquidity, PL, and credit.

Oudat and Ali (2020) studied how reserve requirements Impact on Bank Lending and Economic Stability in Egypt and results showed that higher reserve requirements, increased the cost of money and affected lending rates poorly. Cheelo and Banda (2016) analyzed how SRR changes affect bank lending in Zambia. They learned that higher SRRs meant less money in the banking system, which made lending rates go up.

2.4. Effectiveness of statutory reserve ratio in managing the commercial banks

The African Development Bank (2019) says many African central banks use SRRs to control inflation and boost the economy. SRR changes help fix money problems and keep the system steady.

Lwando *et al.* (2024) studied 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 evaluates policy.

Miyooba *et al.* (2024) also stated higher reserve requirements reduces profits, leading banks to adjust lending rates. The Bank of Zambia changes the SRR based on how the economy's doing (Bank of Zambia, 2019).

Banda and Mwansa (2024) note that how countries manage reserve ratios varies. International studies suggest that the SRR can be limited by financial things. Mwanza (2022) thinks people should use fancy math and other comparisons to figure out how much the SRR matters but one has to research properly.

Haiyang (2012) discovered that shifts in the reserve ratio had little impact on interest rates and no direct impact on managing excess liquidity or lending activity. This might be explained by the unique structural features of the Chinese financial system. With a focus on China, Haiyang (2012) discovered that shifts in the reserve ratio had little impact on interest rates and no direct impact on managing excess liquidity or lending activity. This may be explained by the active application of additional monetary policy tools as well as the unique structural features of the Chinese financial system.

3. METHODOLOGY

3.1. Overview

This Chapter presents the approach and methodology which was used in this study. Information and data available from scientific research reports and organizational reports available in Zambia were also reviewed.

3.2. Research design

The study used a mixed-methods approach, integrating both qualitative and quantitative research designs to gain a comprehensive understanding of how monetary policy tools

impact the deposit interest rates in Lusaka's banking sector.

3.3. Target population
The study targeted Lusaka Commercial banks. For the study to be effective, the data collected was coming from different respondents rather than one commercial bank. The five banks chosen were from the top list from the total of 15 commercial banks in Zambia.

3.4. Sampling design
In this research study, a simple random sampling was used to select the respondent from Lusaka commercial banks.

3.5. Sample size determination
The study employed the sample size of 50 respondents.

3.6. Data collection methods
Questionnaires formed the major source of primary data used in the study. The data collected for this was obtained through use of structured questions which targeted the objectives.

3.7. Data analysis
Data was analysed using the Megastat software after completing the field work, the quantitative data was coded, entered into, cleaned and verified.

4. RESULTS AND DISCUSSION
This chapter presents the results in accordance with the objectives of this study based on the approach and methodology from chapter 3. It presents data collected from the study area. The regression and trends analysis results are presented in detail, together with discussion of the implications of the results. The relationship between variables was tested using mega stat.

4.1. Demographic profile
Demographic characteristics of the participants involved in the study provide a refined perspective for understanding the research results. The gender and position in the bank were only picked as indicators under demographic.

4.1.1. Gender distribution
Gender distribution from the sampled respondents of 50 commercial banks reveal 58% as male folk while 42% were female. Therefore, the results in Figure 2 below indicate male dominated

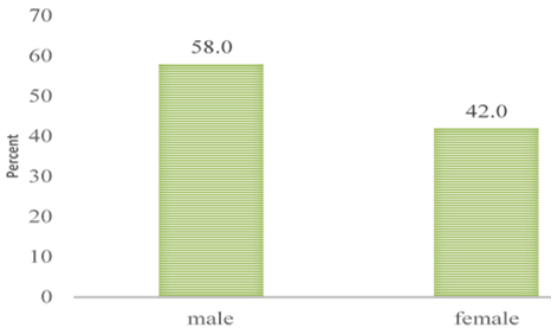

Figure 2. Gender distribution

4.1.2. Position in the bank
As shown by figure 3 below, various respondents were engaged to assess the observed effect of changes in statutory research ratio on both deposit and loan interest setting. About a third or 27% of the study indicates that they were financial or accounts officer, 25% credit officers and 22% tellers. While the remaining 14.6 were policy/regulatory officer, 8.3 branch manager and the least were others which presents a 2.1%.

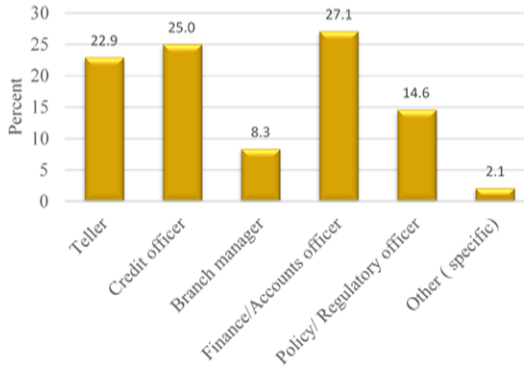

Figure 3. Position in the Bank

4.2. Effect of Increased SRR In setting the deposit interest rates in commercial banks
Under this objective, two indicators were used to assess the effect of the SRR on deposits rates, and these are as presented below.

4.2.1. The influence of SRR on the banks deposit interest rates
Respondents were asked how often a change in SRR influences your bank's deposit interest rates according to their opinions. The majority of respondents representing 36.7%, indicated that often influenced their banks deposit interest rates, 14.5 indicated sometimes and 24.5 said always while the 12.2 said rarely and non-said never as shown in figure 4 below.

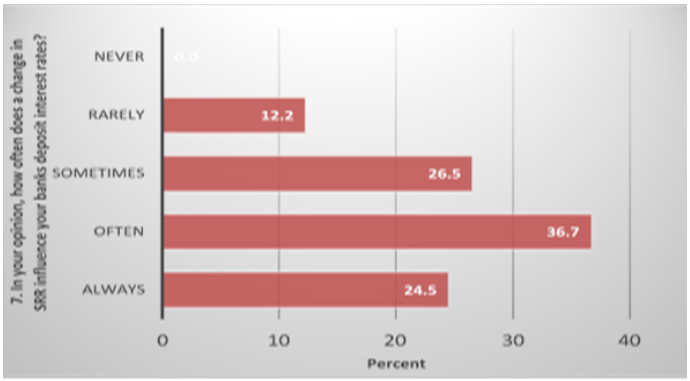

Figure 4. The influence of SRR on the banks deposit interest rates

4.2.2. Effect of SRR on deposit interest rates
Respondents were further asked on the effect of SRR on deposit interest rates. Figure 5 shows the responses, 34.0% of the respondent said no change, 32.0% said it decreases deposit interest rates and while 30% said it increases the deposit interest rates. This shows that the effect of SRR

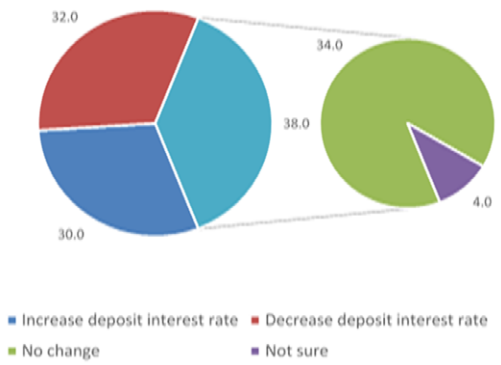

Figure 5. Effect of SRR on deposit interest rates

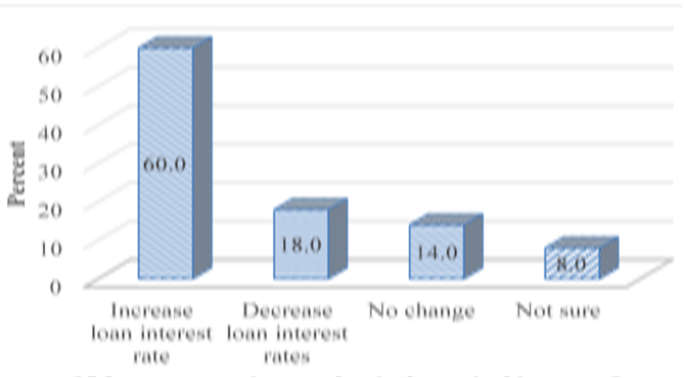

Figure 6. Typical impact of increased SRR on loan interest rates

4.2.3. Significant test results – mean vs hypothesis value

A mean vs hypothesis test was used to test the significant of the effect of increased SRR on deposit rates and its effectiveness in setting the deposit interest rates in commercial banks shown in Table 1. The value of the hypothesized values is 3.00, with 49 degrees of freedom and a P-value of 3.97e-09 which is less than the level of significance (0.05), indicating that there is a significant relationship between statutory reserve ratio and setting the deposit interest rates in these bank within a certain range, though the effect is in either direction depending on the level of liquidity as shown in figure 5 and upto a certain range which varies from bank to bank.

Table 1. Significant test effectiveness of SRR on deposits

Hypothesis test: mean vs. hypithesized Va	
3.000	hypothesized value
2.120	mean
0.895	std. dev.
0.127	std. error
50	n
49	df
-6.95	t
3.97E-09	p-value(one-tailed,lower)

4.3. Effectiveness of commercial banks engagement with BOZ

Under this objective, two indicators were used which were typical impact of increased SRR on loan interest rates and percentage change in loan interest rates per 1% increase in SRR. The frequencies are shown below.

4.3.1. Typical impact of increased SRR on loan interest rates

The study inquired on the typical impact of an increase in SRR on loan interest rates. It was found that 60% of commercial banks increase loan interest rates, 18% decrease the loan interest rates, 14% had no change and 8% were not sure as summarised in Figure 6.

4.3.2. percentage change in loan interest rates per 1% increase in SRR

Furthermore, the researcher inquired on the typical percentages implied on loan interests rate due to 1% increase in SRR. Results show that 24 use more than 1% increase, 11 less than 1%, and 9 by the same 1% and 6 had no change.

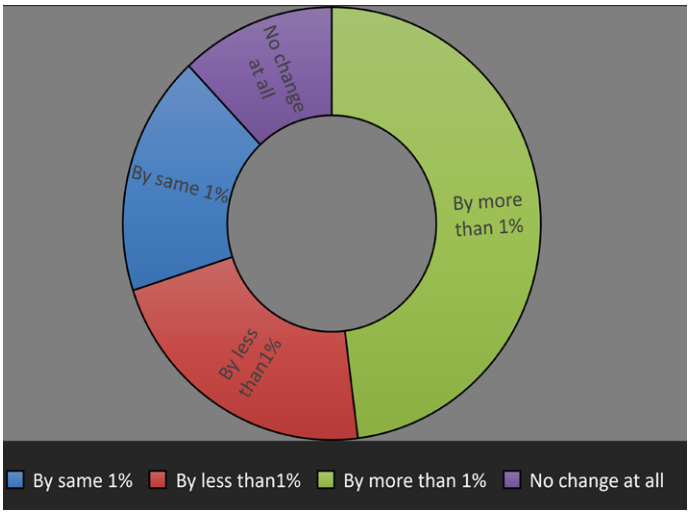

Figure 7. percentage change in loan interest rates per 1% increase in SRR

Regression analysis was used analyze the percentage change of loan interest rates per 1% increase in SRR. The regression (R squared) 0.9331, adjusted R square of 0.9290. regression output includes coefficient for intercepts $1.32e^{-5}$, and the P value of $1.32e^{-05}$. This shows that statutory reserve ratio has an effect on the loan deposit interest rate.

4.3.3. Change of loan interest rates per 1% increase in SRR

Regression analysis was used to analyze the percentage change of loan interest rates per 1% increase in SRR. The regression (R squared) 0.9331, adjusted R square of 0.9290. regression output includes coefficient for intercepts 1.94, and the P value of $1.32e^{-05}$. This shows that statutory reserve ratio has a significant effect on the loan deposit interest rate as in table 2 below.

Table 2. Increase in loan interest rate per every 1% increase in SRR

Regression analysis							
	r^2	0.063					
	Adjusted r^2	0.043					
	r	0.250					
	Std. Error	0.966					
	n	50					
	k	1					
	Dep. Var. 19. How many times in the past year has your bank adjusted loan interest rates due to SRR changes?						
ANOVA Table							
Source	**SS**	**df**	**MS**	**F**	**p-value**		
Regession	2.9889	1	2.9889	3.20	.0798		
Residual	44.7911	48	0.9331				
Total	47.7800	49					
Regession Output					**Confidence interval**		
Variables	**coeffcients**	**std.error**	**t(df=48)**	**p-value**	**95% lower**	**95% upper**	**std.coeff**
Interoept	1.9458	0.4007	4.856	1.32E-05	1.1401	2.7515	0.000
hange in SRR?	0.2664	0.1483	1.790	.0798	-0.0328	0.5637	0.250

4.4. Effective of SRR in managing commercial banks in Zambia

This section deals with the effective of statutory reserve ratio in managing commercial banks in Zambia. Two important indicators were used and are presented below;

4.4.1. Effectiveness of SRR as a monetary policy tool

Respondents were asked if they believed SRR is an effective. figure 8 below shows the responses, the majority of the respondents representing 95.9% indicated yes, implying that SRR is an effective monetary tool policy for regulating the commercial banks. On the other hand, 4.1% said no.

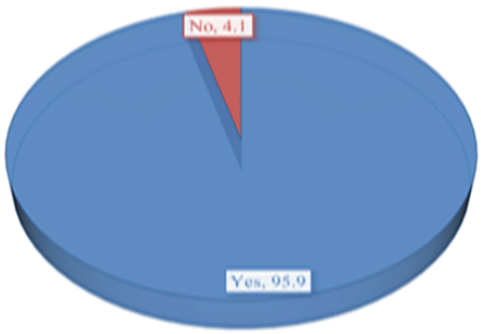

Figure 8. SRR and Monetary Policy.

4.4.3. Percentage of Total Costs Influenced by SRR Compliance

Respondents were asked to estimate the percentage of total cost influenced by SRR compliance. Out of the sample of 50, 24 respondents said less than 10%, 12 said it was between 10-20% and 8 were between 20-30%, while the remaining 5 said it was more than 30%.

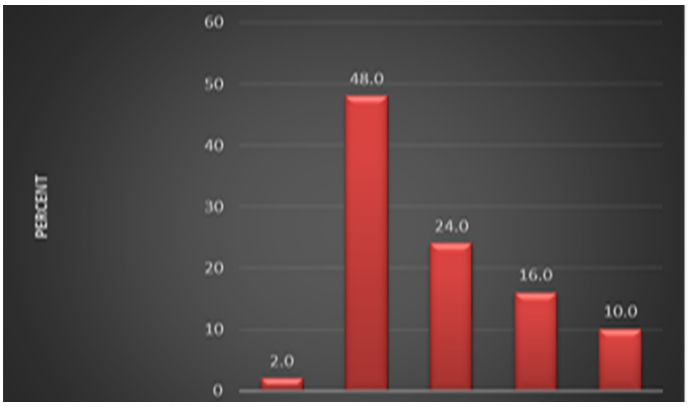

Figure 9. Cost of SRR Compliance

A test to assess the significance of how often the commercial banks engages with Bank of Zambia on SRR policy issues or changes and the main challenges the commercial banks faces in complying with SRR requirements was conducted using ANOVA. Table 2 shows the ANOVA results. The null hypothesis of no joint significance was tested against the alternative hypothesis that there exists a joint significant impact of the regressors on the effectiveness of statutory reserve ratio on commercial banks.

5. CONCLUSION

From the empirical results linked to the study objectives, the

Table 3. Test for Cost of Compliance to SRR

What percentage of total costs (e.g. interest expenses, compliance cost) do you estimate influences In financial terms, estimate the average monthly cost (in kwacha) associated with maintaing the required SSR					
Less than K1000		**K1000-K2000**	**K3000**	**K4000**	**Total**
Less than 1	18	3		3	24
10%-20%	3	6	2	1	12
21%-30%	3	3	2	1	8
More than 3	1		3	1	5
Total	25	12	7	7	50
	24.79 chi-square				
	9 df				
	.0032 p-value				

study established that statutory reserve has no significant impact on the deposit interest rates but instead has an impact on the loan interest rates. The results show that there is a long-run relationship between statutory reserve ratio and non-performing loans. This implies that an increase statutory reserve ratio would lead to an increase in interest rates would affect the bank risks in the long-run as attested by the results. This is evidence that regulating price stability through the variation of interest rates is not sufficient and it does not guarantee financial stability. The policy makers should ensure that changing interest rates have an adverse effect on the economic growth and price stability. The variation in interest rate can cause economic and price fluctuations. However, the price stability does not necessarily cause financial stability. Therefore, policy makers should consider using monetary policy instruments together with other macro-prudential instruments to complement price and financial stability.

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