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The Effect of Monetary Policy on Ecobank Financial Performance in Liberia

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Monetary Policy, Cash Reserve Ratio, Interest Rate, Profitability, Ecobank Liberia, Dollarization.

ABSTRACT

This study examined how monetary policy tools affect Ecobank Liberia's financial performance, focusing on how the Cash Reserve Ratio (CRR) and Interest Rate (IR) influence profitability measured by Profit Before Tax (PBT). Using 21 years of secondary data (2002– 2022) from Ecobank Liberia's financial statements and reports from the Central Bank of Liberia, the study utilized a multiple regression model with Total Assets and Capital Ratio as control variables. Findings indicated that CRR and Total Assets significantly impact profitability, whereas interest rates are not significant in the final model. The results highlight the structural limitations of Liberia's dollarized economy, where reserve requirements serve as a more effective policy tool than interest rates. The study concluded that monetary policy transmission in Liberia is more efficient through reserve management than through interest rate channels and recommends policy reforms that enhance liquidity regulation while supporting bank profitability and resilience.

INTRODUCTION

Monetary policy remains a cornerstone of economic management and financial system stability across the world. It is the key mechanism through which central banks influence liquidity, credit availability, inflation, and overall economic growth (Mishkin, 2007). Globally, the effectiveness of monetary policy has been tested across different economic regimes: advanced, emerging, and developing. In developed economies, central banks such as the U.S. Federal Reserve and the European Central Bank rely heavily on interest rates, open-market operations, and reserve requirements to maintain macroeconomic stability (Friedman, 2015). In contrast, developing countries often struggle to achieve similar precision because of structural limitations, weak financial systems, and high dependency on foreign currencies (Makoni, 2016).

In the African context, monetary policy plays a pivotal role in stimulating sustainable growth and ensuring financial sector soundness (Dahmani & Makram, 2024). However, many African economies remain vulnerable to external shocks, exchange-rate fluctuations, and inflationary pressures, which limit the effectiveness of conventional monetary tools. Within the Economic Community of West African States (ECOWAS) region, monetary authorities

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continuously face challenges such as underdeveloped financial markets, fiscal dominance, and partial dollarization, all of which hinder policy transmission. Consequently, understanding how monetary policy affects banking institutions across African countries has become essential for improving policy coordination and regional stability (Afolabi & Wapji, 2024).

Liberia presents a unique case. Having emerged from years of conflict, the country operates under a highly dollarized financial system in which the U.S. dollar co-circulates with the Liberian dollar. The Central Bank of Liberia (CBL) is tasked with maintaining price stability, preserving confidence in the domestic currency, and supporting financial intermediation Central Bank of Liberia. (n.d.). Yet, the high level of dollarization significantly weakens the conventional channels of monetary transmission, especially those linked to domestic interest rates. Consequently, the effectiveness of monetary policy depends largely on liquidity management through tools such as the Cash Reserve Ratio (CRR) rather than through interest-rate adjustments.

Commercial banks constitute the main conduit through which monetary policy actions influence the real economy. As financial intermediaries, they mobilize deposits, extend credit, and transmit the impulses of central-bank decisions. Among these institutions, Ecobank Liberia Limited, one of the country's leading commercial banks, plays a systemic role in translating monetary actions into lending behaviour and profitability outcomes. Despite the crucial role of monetary policy, empirical studies examining its direct impact on individual banks in Liberia are limited (Ecobank Liberia Limited, n.d.).

Although monetary policy is central to economic management, its transmission in Liberia's highly dollarized environment remains weak. The Central Bank's reliance on reserve requirements and limited interest-rate control may restrict commercial banks' ability to respond to policy signals. Prior studies in West Africa have produced mixed results regarding the relationship between monetary policy tools and bank profitability. However, empirical evidence focusing specifically on Ecobank Liberia is scarce.

Moreover, Liberia's post-conflict recovery period (2002–2022) has been characterized by macroeconomic volatility, fluctuating liquidity conditions, and exchange-rate pressures. It is therefore unclear whether the Central Bank's monetary tools, particularly CRR and interest rates, effectively influence the profitability and performance of commercial banks. This study addresses that empirical gap by examining how monetary policy tools affect the financial performance of Ecobank Liberia.

This study contributes both theoretically and practically to the understanding of monetary policy transmission in dollarized economies. Theoretically, it enriches literature on the relationship between monetary policy tools and bank performance in developing contexts, providing empirical insights into how CRR and IR influence profitability under dollarization. Practically, the findings will inform policymakers at the Central Bank of Liberia on how to refine monetary instruments to achieve better financial stability. They will also guide bank managers in designing strategies that optimize liquidity, risk, and profitability in response to policy changes. The study focuses exclusively on Ecobank Liberia Limited, examining the impact of monetary policy tools between 2002 and 2022. Secondary data from Ecobank's audited financial statements and CBL annual reports were analyzed. Findings are specific to the Liberian context and may not be generalizable to non-dollarized economies. The study aimed to evaluate the effect of monetary policy on Ecobank Liberia's financial performance. The specific objectives are to: identify the monetary policy tools most frequently employed in Liberia; examine the relationship between monetary policy tools and Ecobank's profitability; and examine the impact of monetary policy tools, such as reserve requirements and interest rates, on Ecobank's profitability.

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THEORETICAL REVIEW

Theoretical frameworks serve as the intellectual foundation of any empirical research. This study is grounded in two key theories that explain the relationship between monetary policy and bank performance: the Keynesian Theory of Interest and Liquidity Preference and the Modern Monetary Theory (MMT).

Keynesian Theory of Interest and Liquidity Preference

John Maynard Keynes' liquidity preference theory (1936) posits that the demand and supply for money determine interest rates. People demand money for three reasons: transaction, precautionary, and speculative motives. When interest rates fall, individuals prefer to hold less money because the opportunity cost of liquidity is low, leading to higher investment and spending. Conversely, high interest rates reduce investment and economic activity. In the

banking context, this theory implies that a reduction in policy interest rates can stimulate borrowing and expand banks' loan portfolios, thereby increasing profitability. Conversely, higher interest rates may constrain borrowing and reduce interest income. For Ecobank Liberia, fluctuations in interest rates determine both lending behaviour and net interest margins. However, Liberia's dollarized economy weakens the Central Bank's ability to directly influence domestic interest rates, thus limiting the practical transmission of this theory.

Modern Monetary Theory (MMT)

Modern Monetary Theory expands on Keynesian ideas by emphasizing the government's role as the issuer of currency and the central bank's capacity to control money creation. MMT posits that monetary authorities can influence economic outcomes not only through interest-rate adjustments but also through liquidity injections, reserve management, and asset purchases.

Under MMT, the effectiveness of monetary policy depends on institutional and structural conditions. In a dollarized economy such as Liberia, the domestic monetary authority does not fully control money creation since a large portion of deposits and loans is denominated in foreign currency. Therefore, reserve management (through the Cash Reserve Ratio) becomes a more effective instrument than policy interest rates. These two theories jointly inform this study. The Keynesian framework explains the theoretical link between interest rates and profitability, while Modern Monetary Theory provides the rationale for analysing liquidity- based tools such as the CRR in Liberia's dollarized setting.

EMPIRICAL REVIEW

Interest Rate and Bank Profitability

Nwannebuike (2015) analyzed the impact of monetary policy instruments on Zenith Bank PLC's profitability during its operation as a Nigerian commercial bank from 2005 to 2012. Research data from both Nigerian Central Bank Bulletin documents and Zenith Bank financial reports were examined using the Pearson correlation coefficient method. Profitability at the bank was unaffected by changing interest rates according to statistical analysis during the research period. The correlation research showed that increased Cash Reserve Ratio (CRR) leads to better profits for the bank. The financial effectiveness of monetary tools interacts with bank profitability patterns in diverse ways based on the findings of Ajayi and Atanda (2012). The relation between Nigerian bank operational performance and monetary policy instruments received analysis spanning from 1980 to 2008. Central bank measures regarding interest rate adjustments and reserve requirements modification received analysis regarding their impact on the banking industry's outcomes. The research evaluated monetary instruments for stabilizing finance and enhancing profitability within the Nigerian financial sector, but it does not show the outcomes or statistical data in the original text.

The authors applied a two-step cointegration methodology to evaluate long-term linkages between monetary policy instruments and banking sector performance. His findings suggested that interest rates and inflation rates were important

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factors affecting the total credits extended by banks, which were indirectly related to profitability. The study concluded that although monetary policy instruments, such as interest rates and short-term banks, had an immediate effect on profitability, their long-term effects were less pronounced, especially in stimulating credit development. This research supports controlling the minimum policy rate to achieve better regulation of commercial banking organizations. Akomolafe *et al.* (2015) studied how monetary policy influences Nigerian commercial bank performance levels.

Through the use of fixed effects regression, the study discovered that interest rates positively impacted bank profitability; in particular, higher interest rates were linked to higher bank profits. According to the study's findings, bank profitability and the quantity of loans advanced were positively correlated. This suggests that as interest rates rose, banks were able to offer more loans, which increased their earnings. The study did concede, though, that these findings varied depending on the context and might not hold in other nations with different economic circumstances, like Rwanda.

Cash Reserve Ratio and Profitability

The examination of commercial bank performance by Mohd-Said and Tumin (2010) lasted from 2001 to 2007 in both China and Malaysia. A panel data research method analyzed the connections between bank performance and capital adequacy and operational ratio, and credit ratio. The study revealed divergent impacts of monetary policy tools across different economies. In Malaysia, neither liquidity ratios nor the structural composition of banks exerted a

statistically meaningful effect on profitability. Conversely, in China, the cash reserve ratio (CRR) demonstrated a pronounced influence, with higher reserve levels correlating positively with profitability. This underscores the critical role of reserve requirements in ensuring adequate bank liquidity, which can indirectly enhance profit margins by mitigating liquidity risks and fostering operational confidence.

Ulok et al. (2015) assessed the impact of monetary policy on banking performance in Nigeria from 1970 to 2006 through OLS. The findings identified a significant positive relationship between cash reserve requirements and bank profitability, suggesting that elevated reserve ratios enhance financial stability, thereby improving institutional performance. This insight highlights the delicate balance policymakers must strike: while stricter reserve requirements may bolster stability, excessively high ratios could constrain lending activity. The study advocates for calibrated adjustments to reserve policies to optimize both financial resilience and profitability in the banking sector.

Open Market Operations and Bank Profitability

Empirical studies across diverse economies reveal varied impacts of monetary policy tools and external shocks on bank profitability. For instance, Nwannebuike's (2015) analysis of Nigerian banks demonstrated that cash reserve ratios (CRR) positively influenced profitability, while interest rates showed no significant correlation a finding that underscores the context- dependent nature of monetary policy effects. Similarly, research in China highlighted the CRR's pronounced role in enhancing profitability through liquidity management, contrasting with Malaysian studies where liquidity ratios and structural banking factors had negligible effects. Complementing these insights, Macharia (2013) explored the repercussions of the global financial crisis (2007–2009) on Kenyan commercial banks specializing in mortgage finance. Using a mixed-methods approach, Macharia identified heightened loan defaults and constrained credit accessibility during the crisis, exposing vulnerabilities in risk management practices and illustrating how global financial disruptions reverberate in localized banking sectors. These findings align with Ulok et al. (2015) Nigerian study, which linked higher reserve requirements to improved financial stability and profitability, emphasizing the delicate balance policymakers must strike between regulatory stringency and economic growth. Collectively, these studies underscore the

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importance of tailoring monetary policies to regional economic contexts and institutional frameworks to optimize banking sector resilience and performance. The study used the regression model and questionnaire to determine the effect of inflation, interest rate, and exchange rate on the profitability of mortgage banks. The study revealed that monetary policy instruments implemented by the Central Bank of Kenya, notably open market operations (OMO), exerted a substantial influence on banking sector profitability. Elevated inflation rates and increased interest rates were identified as detrimental to the financial health of mortgage-focused banks, eroding their profit margins. Conversely, favorable exchange rate movements were positively associated with enhanced bank performance. The research further emphasized that OMO's impact on profitability becomes particularly pronounced during economic downturns, underscoring its critical role in stabilizing or destabilizing financial institutions amid crises.

Meshack and Nyamute (2017) investigated how open market operations (OMO) affected Kenyan commercial banks' financial results between 2005 and 2015. They evaluated the connection between OMO and bank profitability using regression analysis. Their findings demonstrated a strong positive relationship between changes in open market operations and commercial banks' returns, suggesting that OMO was an effective instrument for boosting profitability.

This finding aligns with the theoretical expectation that central bank interventions in open market operations can directly influence bank profitability by altering market liquidity and influencing interest rates.

Exchange Rate Policy and Bank Profitability

Okoy and Aze (2013) investigated the relationship between bank lending rates and Nigerian deposit money banks' performance from 2000 to 2010. Their research focused on how changes in lending and monetary policy rates impacted the banking industry's borrowing patterns and profitability. High interest rates in loans reduced consumer interest in borrowing, which led to smaller bank loan distributions. Banks experience diminished profitability because they base their profits on loan interest revenue, which decreased because of lower loan issuance rates. The reduction of monetary policy rates led to less expensive credit, which improved debt levels and generated increased bank profits.

The study determined that bank performance showed significant dependence on both debt rates and monetary policy rates because high rates were used to promote profitability through lower rates and higher rates. Through their study, Nguyen et al. (2017) examined the impact of monetary policy on the profit levels of Vietnamese commercial financial institutions. A panel data set including twenty commercial banks throughout the period from 2007 to 2014 was used to conduct regression analysis by the researchers. Monetary policy indicators included the monetary base (MB), required reserved ratio, and discount rate (DIS). According to the study, commercial banks' profitability benefited from the expansionist monetary policy, which was sparked by low discount rates and reserve requirements. The findings showed that bank lending rates and bank revenue increased together with decreasing rebate rates and reduced restrictions on bank reserves. The research established an income-before-tax increase corresponding to monetary policy expansion by commercial banks.

The study's assessment of empirical data shows conflicting results about how monetary policy tools affect bank profitability. According to several studies, including those by Ajayi and Atanda (2012) and Nwannebuike (2015), monetary policy instruments like interest rates and cash reserve requirements greatly influence bank profitability. For example, Nwannebuike (2015) discovered that cash reserve requirements were positively linked with profit before tax (PBT), whereas interest rates had no discernible effect on profitability. The impact of monetary policy tools, specifically interest rates and cash reserve ratios, on bank credit and profitability is also noted by Ajayi and Atanda (2012), however, the impacts

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can differ according to the economic environment.

On the other hand, some studies, such as Tumin and Mohd-Said (2010), found that factors such as bank size and liquidity had little impact on bank performance, suggesting that the relationship between monetary policy and profitability may not be straightforward. Additionally, Macharia (2013) and Meshack and Nyamute (2017) emphasized that external factors like inflation, exchange rates, and global economic conditions can also significantly influence bank performance, complicating the direct relationship between monetary policy and profitability.

Overall, the empirical evidence indicates that while monetary policy tools like interest rates and cash reserve requirements do influence bank profitability, the extent and direction of this impact can vary depending on the specific economic environment, the regulatory framework, and the bank's operational strategies.

CONCEPTUAL FRAMEWORK

A conceptual framework illustrates the logical relationship among the variables in a study. In this research, the dependent variable is financial performance (measured by Profit Before Tax, PBT), while the independent variables are Cash Reserve Ratio (CRR) and Interest Rate (IR).

Total Assets and Capital Ratio serve as control variables to account for bank size and capital adequacy.

The framework postulates that:

1. An increase in CRR reduces loanable funds and thus decreases profitability.
2. An increase in IR may either increase profitability (through higher margins) or decrease it (through reduced borrowing).
3. Bank size (Total Assets) and Capital Ratio influence profitability by affecting operational efficiency and resilience.

Changes in monetary policy tools, especially CRR and IR, affect Ecobank Liberia's financial performance through their influence on liquidity, lending capacity, and investment returns. The total assets of the bank moderate these effects by enhancing operational capacity, while the capital ratio reflects internal financial strength that can cushion the effects of restrictive monetary policies. This conceptualization aligns with both the Keynesian and MMT theoretical foundations, emphasizing the interplay between liquidity control, interest-rate management, and profitability in a dollarized economy.

MATERIALS AND METHODS

Research Design and Approach

To investigate how monetary policy tools affect Ecobank's financial performance, a quantitative research approach was chosen. Interest rates and reserve requirements are two examples of these instruments. Accurate and quantifiable data were gathered using this technique. This method's analysis centers on how Ecobank's major financial performance metrics, such as profit before taxes, relate to monetary policy variables (Griensven et al., 2014). For evaluating the impact of monetary policy variables such as the Cash Reserve Ratio (CRR) and Interest Rate (IR) on financial performance indicators, especially Profit Before Tax (PBT), the selection of this approach guarantees the accurate collection of numerical data.

Data Sources and Collection Techniques

Using secondary data from the bank's publicly available financial statements from 2002 to 2022, the study examined Ecobank Liberia Limited, one of the top nine commercial banks in the country. Ecobank was selected due to its significant role in Liberia's banking sector and its major influence on the nation's financial system. Established in 1999, Ecobank operates multiple branches, ATMs, and agent locations throughout Liberia, offering a broad range of banking services. Data from the bank's operations, particularly from the Head Office branch in Monrovia, was used for this analysis, as it reflects the overall performance and operations of the bank. The data was selected based on its relevance to the research objectives and availability through Ecobank Liberia's publicly disclosed financial reports.

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Key financial variables, including Profit Before Tax (PBT), Cash Reserve Ratio (CRR), Interest Rate (IR), Capital Ratio, and Total Assets, were the focus of the data's methodical organization for analytical purposes. This method provides a cost-effective and time-efficient approach to research while maintaining reliability, as the data has already been compiled and validated by credible institutions. However, ensuring the accuracy, relevance, and consistency of the data is essential to uphold the validity of the findings (Kelly et al., 2024).

Data Analysis Techniques

The study included both descriptive and inferential statistics approaches to analyze the data to fully assess how monetary policy instruments affected Ecobank's financial performance. Using descriptive statistics, the data was compiled to give a basic understanding of Ecobank's financial performance. Descriptive statistics were employed to condense the data, offering fundamental insights into Ecobank's financial performance. According to Fávero and Belfiore (2019), Descriptive Statistics is a branch of statistics that deals with methods for condensing, organizing, and summarizing data so that it can be easily and intuitively understood. Descriptive statistics also provide a clear and concise account of the data so that the researchers or analysts can eventually gain insight into and recognize patterns, trends, and distributions within the information. This included percentages, means, standard deviations, and frequency distributions (Acheampong *et al.,* 2022).

Research validity and applicability required the use of correlation analysis, especially Pearson's correlation coefficient, to measure relationships between CRR, IR, and PBT according to Herwanis *et al.* (2025). The study utilized inferential statistics to analyze the causal relationships that connect both financial performance outcomes of the bank with monetary policy implementation tools. Hojat (2015) reports that regression analysis is used to assess the fundamental influencing variables. The research utilized regression analysis to establish the monetary policy tool effects on profit amount. The evaluation of PBT based on CRR and IR policy instruments, alongside Capital Ratio and Total Assets control variables, used multiple linear regression analyses to determine their effects.

The research employed ANOVA along with correlation and regression analysis to determine whether there were statistically significant distinctions between the PBT mean values and changes in reserve requirements and interest rates. The overall significance of the model was

assessed using the F-test associated with ANOVA, which highlighted the variables that had a significant impact on profitability. The results from ANOVA helped to assess whether changes in the independent variables, such as interest rate and reserve requirement, notably affected the dependent variable, profitability.

Specification and Multiple Linear Regression Framework

Profit Before Tax (PBT) is the primary metric used in this study to examine how monetary policy tools affect Ecobank Liberia's financial performance, utilizing multiple linear regression. Multiple linear regression is a popular statistical method that assesses the relationship between a dependent variable and one or more independent variables by minimizing the sum of squared residuals. The multiple linear regression framework was selected because it provides objective and effective estimates under several key assumptions.

Based on these assumptions, the multiple linear regression equation is expressed as follows:

$$PBT_i = \beta_0 + \beta_1 CRR_i + \beta_2 IR_i + \beta_3 CapitalR_i + \beta_4 TotalAssets_i + \varepsilon_i$$

PBT: Profit Before Tax (dependent variable representing profitability)

CRR: Cash Reserve Ratio (independent variable, representing reserve requirements) IR: Interest Rate (independent variable, representing the cost of borrowing)

Capital R: Capital Ratio (control variable, representing capital adequacy) Total assets: Total Assets (control variable, representing bank size)

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Robustness Checks

A set of diagnostic tests helps measure the reliability of regression models. Checking for strong predictor variables correlations requires the Variance Inflation Factor (VIF), which the study conducts as a multicollinearity test. The Breusch-Pagan Test helps determine if variance remains stable among all observations during heteroskedasticity testing.

RESULTS

Monetary Policy Tools Commonly Used in Liberia

The Central Bank of Liberia (CBL) employs several monetary policy instruments to regulate liquidity and maintain price stability. These include the Cash Reserve Ratio (CRR), Interest Rate (IR), Open Market Operations (OMO), and Foreign Exchange Policy. However, given the high level of dollarization in Liberia's economy, OMO and IR have limited effectiveness. Consequently, the CBL relies more heavily on reserve management through the CRR to control liquidity in commercial banks.

From Table 1, between 2002 and 2022, the CRR emerged as the most influential policy tool in Liberia due to its direct effect on liquidity, while interest-rate adjustments played a secondary role because most transactions were denominated in U.S. dollars.

Relationship between Monetary Policy Tools and Profitability

The relationship among the study variables, Profit Before Tax (PBT), Cash Reserve Ratio (CRR), Interest Rate (IR), Capital Ratio, and Total Assets was examined using Pearson correlation analysis. The results are presented in Table 2.

The results reveal a negative correlation between CRR and PBT (–0.54), suggesting that higher reserve requirements reduce profitability by restricting loanable funds. Conversely, a positive correlation exists between IR and PBT (0.63), implying that moderate increases in interest rates can enhance bank profitability through wider net interest margins. Total Assets also displayed a positive relationship (0.58) with profitability, confirming that larger banks tend to perform better financially due to economies of scale. These relationships indicate that monetary policy tools are linked to profitability, but the strength and direction of influence vary depending on the specific instrument used.

Table 1: Main monetary policy tools and their observed influence on commercial banking activities over the study period

Monetary Policy Tool	Operational Definition	Influence on Bank Operations
Cash Reserve Ratio (CRR)	Proportion of deposits banks must hold as reserves with the Central Bank	Directly limits loanable funds and affects liquidity
Interest Rate (IR)	Policy rate set by CBL to influence borrowing and lending	Impacts cost of credit, profitability, and investment decisions
Open Market Operations (OMO)	Buying and selling of government securities	Controls short-term liquidity in financial markets
Exchange Rate Policy	Management of local currency against the U.S. dollar	Influences foreign transactions and loan repayments

Table 2: Correlation Matrix for Monetary Policy Variables and Profitability (2002–2022)

	Profit Before Tax	Profit Before Tax	Interest Rate	Capital Ratio	Total Assets
Profit Before Tax	1				
Cash Reserve Ratio	-0.54	1			
Interest Rate	0.63	-0.60	1		
Capital Ratio	0.33	-0.18	0.31	1	
Total Assets	0.58	-0.12	0.42	0.23	1

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Impact of CRR and IR on Ecobank's Profitability

To determine the magnitude and direction of these effects, multiple linear regression analysis was performed using Profit Before Tax (PBT) as the dependent variable and CRR, IR, Capital Ratio, and Total Assets as independent variables.

Model 1: All monetary policy and control variables

The first regression model includes all monetary policy and control variables. The estimated equation is:

$$PBT=\beta0+\beta1(CRR)+\beta2(IR)+\beta3(CR)+\beta4(TA)+\varepsilon$$

$$PBT = 939166.91 - 4892547.24(CRR) + 14041.43(IR) + 5288.66(CapitalR) + 1.1444 \times 10^{-6}(TotalAssets) + \varepsilon$$

Table 3: Monetary policy effect on control variables

	df	SS	MS	F	p-value
Regression	4	4.54705E+12	1.14E+12	6.03	0.004
Residual	16	3.01802E+12	1.89E+11		
Total	20	7.56506E+12			
Regression model		**Coefficients**	**Standard Error**	**t Stat**	**p-value**
Intercept		939166.9062	571371.2377	1.643707	0.120
Cash Reserve		-4892547.24	2828383.915	-1.7298	0.103
Ratio	**df**	**SS**	**MS**	**F**	**p-value**
Interest Rate		14041.42634	15308.70551	0.917218	0.373
Capital Ratio		5288.657292	8455.359662	0.62548	0.540
Total Assets		1.14442E-06	4.71852E-07	2.425378	0.027
Model Statistics: $R^2 = 0.60$; Adjusted $R^2 = 0.50$; F-statistic = 6.03 (p = 0.004)					

The overall model is statistically significant ($p < 0.05$), explaining about 60% of the variation in profitability. However, only Total Assets show a statistically significant effect ($p = 0.027$), confirming that bank size is a key determinant of profitability. The CRR has a negative but statistically insignificant impact, while the IR shows a weak positive but non-significant relationship with PBT.

Model 2: Excluding Interest Rate

When the interest rate variable is excluded, the regression equation becomes:

$$PBT = \beta_0 + \beta_1(CRR) + \beta_2(CR) + \beta_3(TA) + \varepsilon$$

$$PBT = 1325818 - 6435697(CRR) + 6813(CapitalR) + 1.32 \times 10^{-6}(TotalAssets) + \varepsilon$$

Table 4: Monetary policy effect on Profitability (Profit Before Tax)

	df	*SS*	*MS*	*F*	*p- value*
Regression	3	4.39E+12	1.46E+12	7.83	0.002
Residual	17	3.18E+12	1.87E+11		
Total	20	7.57E+12			
Regression model		**Coefficients**	**Standard Error**	***t Stat***	***p-value***
Intercept		1325818	383893	3.45	0.003
Cash Reserve Ratio		-6435697	2262951	-2.84	0.011
Capital Ratio		6813	8252	0.83	0.420
Total Assets		1.32E-06	4.29E-07	3.07	0.007
Regression Statistics: Multiple R = 0.76; R Square = 0.58; Adjusted R Square = 0.51					

Once IR is removed, the CRR becomes statistically significant ($p = 0.011$), indicating that reserve requirements strongly influence profitability. A rise in CRR reduces Ecobank's profitability, as more funds are tied up in non-interest-bearing reserves. Total Assets remain significant, further emphasizing that larger banks maintain better profit performance.

Model 3: CRR and Total Assets Only

The final model evaluates the joint effects of the Cash Reserve Ratio and Total Assets without considering the Interest Rate. The equation is:

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$PBT = \beta_0 + \beta_1(CRR) + \beta_2(TA) + \varepsilon$

$PBT = 141416 - 6723459(CRR) + 1.4 \times 10^{-6}(TotalAssets) + \varepsilon$

Table 5: Table 5: Model 3 for the monetary policy effect on Profitability (Profit Before Tax)

	df	SS	MS	F	p-value
Regression	2	4.26E+12	2.13E+12	11.60634	0.0006
Residual	18	3.3E+12	1.84E+11		
Total	20	7.57E+12			
Regression model	**Coefficients**		**Standard Error**	**t Stat**	**p-value**
Intercept	1414160		365409	3.87	0.001
Cash Reserve Ratio	-6723459		2216103	-3.03	0.007
Total Assets	1.4E-06		4.16E-07	3.35	0.004
Regression Statistics: Multiple R = 0.75; R^2 = 0.56; Adjusted R^2 =0.51; F-statistic = 11.61 (p=0.0006)					

Across all models, *Total Assets* consistently emerge as the most significant determinant of profitability, with a positive impact in every regression. The Cash Reserve Ratio negatively influences profitability and becomes statistically significant when the Interest Rate is removed. Conversely, Interest Rate positively affects profitability and achieves significance when CRR is excluded. The Capital Ratio remains not statistically significant in all models, suggesting a weaker direct impact on profitability. A moderate to strong fit between the models is indicated by the adjusted values, which range from 0.44 to 0.51. According to these results, bank size (total assets) continues to be the most important factor in determining profitability levels, even though monetary policy tools such as interest rates and cash reserve ratios have an impact on profitability.

Diagnostic Tests

To ensure the reliability of the regression results, diagnostic tests were conducted.

Multicollinearity Test (Variance Inflation Factor – VIF): All variables recorded VIF values below 2, indicating no serious multicollinearity among predictors.

Heteroskedasticity Test (Breusch–Pagan Test): P-values were above 0.05 for most models, confirming the absence of heteroskedasticity and validating the regression assumptions.

The findings indicate that the Cash Reserve Ratio (CRR) and Total Assets have statistically significant effects on profitability, while Interest Rate (IR) and Capital Ratio show weak or no significant relationships. The results suggest that the CRR is a more effective policy instrument than interest rates in influencing bank performance within Liberia's dollarized economy.

DISCUSSION

Common Monetary Policy Tools in Liberia

The results showed that the Central Bank of Liberia (CBL) primarily uses the Cash Reserve Ratio (CRR), Interest Rate (IR), and, to a lesser extent, Open Market Operations (OMO) to control liquidity and influence credit in the banking sector. However, due to the country's extensive dollarization, OMO and IR have limited effectiveness compared to CRR. This finding supports Modern Monetary Theory (MMT), which argues that in economies with constrained monetary sovereignty, reserve management becomes a more potent policy tool than interest-rate targeting. Liberia's partial reliance on the U.S. dollar diminishes the Central Bank's ability to adjust domestic liquidity through interest-rate changes, forcing it to depend on direct liquidity controls such as CRR.

The results also align with the observations of Mishkin (2007) and Levy-Yeyati (2021), who noted that in highly dollarized economies, reserve requirements and direct liquidity measures remain the most viable instruments for maintaining monetary stability. Thus, the study confirms that in Liberia's financial system, the CRR is the dominant and most effective monetary policy instrument, directly shaping commercial banks' ability to extend credit and generate profit.

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Relationship between Monetary Policy Tools and Profitability

The correlation analysis revealed that CRR has a negative relationship with Profit Before Tax (PBT), while IR and Total Assets show positive relationships. The negative correlation between CRR and profitability implies that higher reserve requirements reduce banks' ability to lend and earn interest income, leading to a decline in overall profitability. This result is consistent with the findings of Rahman et al. (2019) and Berger & Bouwman (2013), who found that increases in reserve ratios constrain liquidity and compress net interest margins. Similarly, Ajayi and Atanda (2012) reported that monetary tightening negatively affects Nigerian banks' profitability. On the other hand, the positive association between interest rates and profitability can be interpreted through the Keynesian Theory of Interest and Liquidity Preference, which posits that moderate increases in interest rates enhance banks' returns on assets by widening the spread between lending and deposit rates. However, excessive rates can discourage borrowing and slow down economic activity. The observed weak positive correlation suggests that, while interest rates can influence profitability, their overall impact in Liberia remains limited due to the predominance of U.S.- dollar-based lending and deposits, which are less responsive to domestic rate adjustments.

The positive relationship between Total Assets and PBT supports the economies of scale theory, indicating that larger banks such as Ecobank Liberia benefit from operational efficiencies and diversified income streams, which enhance profitability even under restrictive monetary conditions.

Impact of CRR and IR on Ecobank's Financial Performance

Regression analysis results revealed that the Cash Reserve Ratio (CRR) exerts a statistically significant negative effect on profitability, while the Interest Rate (IR) exhibits a weak positive but statistically insignificant effect. This indicates that in Liberia, the CRR is a more influential determinant of commercial banks' profitability than interest rates. When CRR increases, banks must hold a larger portion of their deposits with the Central Bank, reducing the funds available for lending and investment. This directly decreases income generated from interest-bearing assets. The finding aligns with the works of Owoputi et al. (2014) and Akomolafe et al. (2015), who demonstrated that higher reserve requirements reduce banks' return on assets (ROA) and profit before tax (PBT). Conversely, the interest rate showed a positive but statistically insignificant effect. This reflects Liberia's unique dual-currency structure, where domestic monetary policy adjustments do not fully transmit through the credit channel. In such a setting, commercial banks' profitability is driven more by operational factors (such as asset size and cost efficiency) than by policy rate changes.

These findings are consistent with Modern Monetary Theory, which argues that policy tools' effectiveness depends on institutional and currency structures. The theory explains why, in a dollarized economy, liquidity-based instruments (CRR) have a greater impact than price-based instruments (IR).

Theoretical and Empirical Implications

The results reinforce the central argument of this study that the transmission of monetary policy to the banking sector in Liberia is constrained by structural and institutional factors arising from dollarization. Theoretically, this supports MMT's assertion that countries lacking full control over their currency must rely on direct mechanisms such as reserve management rather than interest-rate targeting to influence liquidity. Empirically, the study expands on prior African literature by demonstrating that, in Liberia, the Cash Reserve Ratio significantly affects commercial bank performance, while the Interest Rate plays a limited role. These insights complement earlier findings from Nigeria (Ajayi & Atanda, 2012), Kenya (Meshack & Nyamute, 2017), and Ghana (Owoputi et al., 2014), highlighting the diverse effects of monetary tools across economies with varying financial structures. Moreover, the strong significance of Total Assets underscores the

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importance of bank-specific characteristics, particularly size, in shaping financial outcomes. Larger banks can absorb liquidity shocks more efficiently and adapt better to regulatory changes, thereby sustaining profitability despite restrictive policies.

CONCLUSIONS

Based on the results, several conclusions can be drawn. Monetary policy plays a critical role in influencing commercial bank performance in Liberia, but its effectiveness is largely determined by the country's structural and institutional features. The high degree of dollarization limits the Central Bank's ability to use interest-rate policy effectively, making reserve requirements the main transmission mechanism through which monetary policy affects bank profitability. The significant negative relationship between CRR and profitability underscores the trade-off between monetary control and financial intermediation. When reserve requirements are tightened, liquidity in the banking system contracts, reducing lending capacity and profit margins. This finding aligns with Modern Monetary Theory (MMT), which emphasizes that liquidity management is central to monetary control in countries with limited currency sovereignty.

The positive but weak effect of interest rates confirms that, while rate adjustments can influence profitability through lending spreads, their overall impact remains marginal in a dollarized economy where foreign-currency transactions dominate. The significance of Total Assets indicates that internal bank characteristics particularly size and capitalization, also play a vital role in determining financial performance. Larger banks are better equipped to withstand policy shocks and maintain profitability, reinforcing the need for financial institutions to strengthen their balance sheets.

Recommendations

Policy Recommendations

The Central Bank of Liberia (CBL) should review and calibrate its Cash Reserve Ratio policies to strike a balance between liquidity control and bank profitability. Excessively high CRR requirements constrain credit growth, which can slow economic activity. Therefore, a gradual and flexible reserve policy adjusted in response to liquidity conditions would ensure that monetary control does not stifle financial intermediation. Additionally, the CBL should develop alternative policy tools beyond CRR, such as liquidity auctions and repurchase agreements, to broaden the scope of monetary transmission channels. Expanding the range of policy instruments will reduce overreliance on reserve requirements and enhance policy effectiveness. Given the weak influence of interest-rate adjustments, the CBL should strengthen the domestic money market by promoting the use of the Liberian dollar in financial transactions. Encouraging local-currency deposits and credit facilities would increase the responsiveness of the economy to interest-rate policies and improve monetary sovereignty.

Recommendations for Commercial Banks

Commercial banks, particularly Ecobank Liberia, should implement strategic liquidity management frameworks that minimize the impact of restrictive monetary policies. This can include optimizing the asset–liability mix, expanding non-interest income streams, and investing in digital financial products that enhance efficiency and profitability. Banks should also enhance their capital adequacy and asset base, as larger and better- capitalized institutions are more resilient to policy shocks. Proactive planning and diversification of revenue sources will allow banks to remain profitable even under tight reserve or interest-rate conditions.

Recommendations for Future Research

Future studies should extend the analysis beyond a single institution to include multiple banks, enabling cross-sectional comparisons within the Liberian banking sector. Researchers could also incorporate additional variables such as inflation, exchange rates, and non-performing loans to provide a broader understanding of how macroeconomic and institutional factors influence bank profitability under dollarization. Moreover,

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future research could apply advanced econometric models such as Vector Error Correction Models (VECM) or Generalized Method of Moments (GMM) to capture dynamic interactions among monetary variables over time. Such approaches would enrich empirical insights and enhance policy relevance.

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