

**THE IMPACT OF INTEREST RATE AND EXCHANGE RATE  
ON BANKS PROFITABILITY**

**BY**

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BENIN CITY**

**OCTOBER, 2023**

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**A PROJECT WRITTEN AND SUBMITTED TO THE DEPARTMENT OF  
BANKING AND FINANCE, FACULTY OF MANAGEMENT SCIENCES  
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE  
AWARD OF BACHELOR OF SCIENCE(B.Sc) DEGREE IN BANKING  
AND FINANCE, UNIVERSITY OF BENIN, BENIN CITY.**

**OCTOBER, 2023**

## **DECLARATION**

I, **Osazee Perpetual OGIEMADE**, do hereby declare that this project is entirely undertaken by me and a product of my composition. The work embodied in this project has not previously been submitted for the award of any other degree. All references made to works of other persons have been duly acknowledged.

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**Osazee Perpetual OGIEMADE**

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**Date**

## CERTIFICATION

This is to certify that this project work was carried out by **Osazee Perpetual OGIEMADE** in the Department of Banking and Finance, Faculty of Management Sciences, University of Benin, Benin city, Edo state in partial fulfillment for the award of Banking and Finance (B.Sc) degree in Banking and Finance.

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## **DEDICATION**

This Project is dedicated to God Almighty, my source and strength who enabled me through this programme and to my Miraculous family whose love has been a source of strength.

## ACKNOWLEDGEMENTS

I wish to acknowledge the Almighty God, for his unending love and has kept me throughout my programme and for the success of this work.

I wish to express my profound appreciation to my project supervisor Dr. O.G. Omorokunwa for his kindness, corrections and accessibility throughout the duration of this work.

Due appreciation to the amiable lecturers of the department of banking and finance, University of Benin especially Mr Aigbovo, Dr Isibor and Dr Izekor for they are men of great qualities.

My undiluted thanks goes to my Parents Prince E.E Ogiemade and Princess Mabel Ogiemade for all they did, My Siblings, Princess Faith Ogiemade, Prince Andrew Ogiemade, Princess Adesuwa Ogiemade, Princess Susan Ogiemade, And Princess Abigail Ogiemade for their financial and moral support, continuous prayers throughout my programme.

I will also like to acknowledge Tehillah Sanctuary R.C.C.G for their encouragement and guidance throughout my stay in the University of Benin.

My appreciation also goes to all my banking and finance friends whom God use to make my stay in school a memorable one especially Sandra Idehen the first friend I made in the department.

Finally, a general thanks to all who may not be mentioned here, but has sincerely contributed to the success of this work.

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## ABSTRACT

*This project examines the intricate relationship between interest rates, exchange rates, and their combined effect on the profitability of financial institutions, with a primary focus on banks. The study employs comprehensive data analysis and regression models to evaluate how fluctuations in interest rates and exchange rates influence the financial performance of banks. It also investigates the strategies and risk management techniques employed by banks to navigate these dynamic economic variables. The findings of this research contribute to a better understanding of the challenges and opportunities banks face in a global financial landscape characterized by changing interest rates and exchange rates, thereby aiding financial institutions in making informed decisions to enhance their profitability.*

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the Study

The stability and sustainability of the financial system and the economy depend significantly on the banks' ability to generate profits, as noted by Berger and Bouwman (2013) and Claessens, Coleman, and Donnelly (2019). Banks achieve profitability through a range of activities, including lending, investments, and foreign exchange transactions. Several key factors impact the profitability of banks, with interest rates and exchange rates being especially influential.

Interest rates, which are determined by central banks through monetary policy to affect economic activity and banking behaviors (Bernanke & Gertler, 1995; Mishkin, 2016), represent the cost of borrowing and the return on lending for banks. Changes in interest rates can have a significant impact on bank profitability by altering their net interest income, which is the difference between the interest earned on loans and investments and the interest paid on deposits and borrowings (Hutchison, McDill, & Woodward, 2018). Higher interest rates can lead to increased interest income and greater profitability for banks, while lower interest rates may reduce interest income and potentially decrease profitability.

On the other hand, exchange rates, which signify the value of one currency relative to another and are crucial for banks engaged in international transactions (Eichengreen & Hausmann, 2005; Fatum & Hutchison, 2018), can influence banks' profitability by impacting their foreign exchange gains or losses. Unfavorable changes in exchange rates can result in losses or reduced gains for banks, which can affect their overall profitability.

Understanding the interplay between interest rates, exchange rates, and bank profitability is crucial for various stakeholders, including policymakers, regulators, investors, and bank managers. This knowledge informs policymakers in developing effective monetary policies while considering their impact on banks' profitability (Borio & Zhu, 2012; Rime, Sarno, & Sojli, 2010). Regulators can use this understanding to create appropriate measures to manage banks' exposure to interest rate and exchange rate risks (Basel Committee on Banking Supervision, 2016; International Monetary Fund, 2015). Investors can make informed decisions regarding bank investments by considering the potential impact of interest rates and exchange rates on profitability (Demirgüç-Kunt, Horváth, & Huizinga, 2017; Lepetit, Nys, Rous, & Tarazi, 2008). Bank managers can use this insight to make strategic decisions about managing their balance sheets, optimizing practices for interest rate and foreign exchange risk management, and improving profitability (De Haas & Van Horen, 2012; Pasiouras, Gaganis, & Zopounidis, 2007).

## **1.2 Statement of Research Problem**

The profitability of banks is affected by a range of factors, including interest rates and exchange rates. It is essential for banks, policymakers, and researchers to comprehend how these variables relate to bank profitability in order to make informed decisions and devise effective strategies. Nonetheless, there is a shortage of comprehensive research that investigates how interest rates and exchange rates impact bank profitability, particularly in the context of developing economies. This research project aims to fill this gap by conducting a thorough analysis of how interest rates and exchange rates influence bank profitability, taking into account relevant theoretical frameworks and empirical evidence.

Interest rates have a significant impact on banks' profitability because they affect borrowing costs, lending rates, and investment choices. Changes in interest rates can directly affect banks' net interest margin, which is the difference between the income generated from interest and the expenses associated with interest. Higher interest rates can raise the borrowing costs for banks, resulting in a reduced net interest margin and lower profitability. Conversely, lower interest rates can lower borrowing costs and potentially stimulate lending, which can lead to increased profitability for banks (Kosmidou, 2014).

Exchange rates also play a pivotal role in determining banks' profitability, especially for those involved in international operations. Fluctuations in exchange rates can impact the assets, liabilities, and off-balance sheet items of banks, leading to changes in their earnings and capital positions. Changes in exchange rates can also affect the quality of loans, credit risk, and capital adequacy of banks, which ultimately influence their profitability (Wang, Liu, & Wu, 2017). Furthermore, the volatility of exchange rates can affect banks' ability to manage foreign currency risk, potentially resulting in increased costs related to hedging and reduced profitability.

However, the relationship between interest rates, exchange rates, and banks' profitability is intricate and subject to various factors such as the economic environment, regulatory policies, and specific characteristics of each bank. Additionally, the existing literature on this subject has primarily focused on developed economies, with limited research conducted in developing economies. Developing economies possess unique economic characteristics, including differences in interest rate and exchange rate systems, regulatory frameworks, and market conditions, which may cause the relationship between interest rates, exchange rates, and banks' profitability to behave differently.

### **1.3 Research Questions**

The research project seeks to address the following research questions:

1. To what extent do interest rates affect banks' profitability?

2. To what extent do exchange rates affect banks' profitability?

#### **1.4 Objectives of the Study**

The main objective of this research project is to investigate the effect of interest rates and exchange rates on banks' profitability. The specific objectives are:

1. To examine the relationship between interest rates and banks' profitability.
2. To investigate the relationship between exchange rates and banks' profitability.

#### **1.5 Hypotheses of the Study**

H0<sub>1</sub>: There is a significant relationship between interest rates and banks' profitability.

H0<sub>2</sub>: There is a significant relationship between exchange rates and banks' profitability.

#### **1.6 Significance of the Study**

The significance of the research project examining the impact of interest rates and exchange rates on banks' profitability is multifaceted. Firstly, it adds to the existing body of knowledge in banking and finance by presenting empirical evidence regarding how interest rates and exchange rates are connected to the profitability of banks. The results of this study can advance our comprehension of the mechanisms through which these factors affect banks' profitability and enhance existing theoretical frameworks.

Secondly, the research project holds practical implications for a range of stakeholders including policymakers, regulators, investors, and bank managers. Policymakers and regulators can utilize the research findings to formulate suitable monetary and exchange rate policies that support the profitability and financial stability of banks. Investors can use the insights from this research to make well-informed decisions when it comes to investing in bank stocks and bonds. For bank managers, the findings can be applied to develop strategies for managing risks related to interest rates and exchange rates, ultimately improving their profitability.

Lastly, the research project bears relevance for the broader economy. The profitability of banks is intricately tied to their ability to extend credit to households, businesses, and governments, which, in turn, influences economic growth and development. Therefore, grasping how interest rates and exchange rates impact banks' profitability is crucial for cultivating a stable and sustainable financial system and fostering economic well-being.

### **1.7 Scope of the Study**

This research will focus on examining the relationship between interest rates, exchange rates, and banks' profitability. The research will cover 12 commercial banks fully licensed by the CBN to conduct operations in Nigeria, with a particular focus between 2015 to 2021. The chosen time frame (2015-2021) is relevant for the research questions, considering significant changes in interest rates, exchange rates, and bank profitability

during this period. Additionally, Nigeria is a relevant location for this research, given its status as a major economy in Africa and its importance in the global financial system. The study will employ quantitative research methods to analyze the data collected and test the hypotheses formulated.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter delves into a comprehensive examination of bank profitability, interest rates, exchange rates, and their impact on a bank's profitability, incorporating both theoretical and empirical perspectives.

#### **2.2 Conceptual Review of Bank Profitability**

The main goal of any organization, including banks, is to maximize their profits. Profitability is the outcome of efficient management and the optimal use of resources, which leads to higher returns on the capital invested (Kyssima, Tesha, Lello, & Mtitu; 2020). Effective management involves identifying the organization's strengths, weaknesses, opportunities, and threats to achieve profit.

According to Hall (2023), a bank is considered 'profitable' when it can generate financial gains from the capital it invests in its operational activities. The success of a bank is measured by the profit it generates during a specific financial period. To be profitable, banks must take on a reasonable level of risk; being excessively risk-averse can have a negative impact on a bank's performance (Xing, Lin, Yingying, & Jamie; 2021).

Banks encounter various risks that can adversely affect their profitability (Adeusi, Kolapo, & Aluko, 2019). Because they handle assets and liabilities, banks are exposed to significant risks, particularly credit risk, interest rate risk, and liquidity risk, which are closely associated with their lending activities that contribute significantly to their profits (Adeusi, Akeke, Adebisi, & Oladunjoye; 2019).

### **2.2.1 Determinants of Bank Profitability**

The profitability of banks varies from one institution to another due to differences in shareholder and managerial decisions and activities (Adeusi, 2019). Prior research has identified a range of factors that influence bank profitability, including capital size, deposit liabilities, credit portfolio size and composition, interest rate policies, risk exposure, management quality, labor productivity, bank size, bank age, ownership, ownership concentration, and structural affiliation (Charles, Alinda, Camelia, José-Luis, & Presbitero, 2019). Achieving high profitability is associated with factors like capital ratios, loan-loss provisions, and expense control (Le & Thanh, 2020). Bank profitability reflects the risk-taking behavior of bank management, with highly profitable banks being less likely to engage in risky lending, while inefficient banks may take on high levels of problematic loans in an attempt to maintain profitability (Boudriga, 2019). Poor management can result in weak cost monitoring and credit quality oversight, leading to significant capital losses (Haneef, 2012). In his study, Osuagwu, Eze (2014) identified three factors determining overall bank profitability: Return on Asset (ROA), Return on

Equity (ROE), and Return on Investment (ROI). ROA measures the efficiency in asset utilization and how well bank management generates profits from available assets (Gadise, 2014). ROE relates to the return on shareholders' equity, considering the risks associated with financial leverage (Olorunniwo & Hsu, 2016). ROI is calculated by dividing net income by total investment, demonstrating a bank's ability to channel funds into profitable ventures (Osuagwu, Eze, 2014).

### **2.3 Review of Interest Rate**

An interest rate is the cost of borrowing money, expressed as a percentage of the principal, that a borrower pays to a lender for using the borrowed funds. A high interest rate can discourage private investment and hinder economic growth, while conversely, it may attract foreign capital inflows, leading to increased debt. In Nigeria, interest rate policy is a critical tool of monetary policy used to mobilize financial resources for promoting economic growth and development. Interest rates function as a fundamental economic price, impacting the cost of capital and influencing the availability of credit by encouraging savings (Acha, 2011). They play a central role in financial intermediation in the economy, affecting the savings and investment decisions of economic agents and guiding the flow of funds from savers to borrowers. Interest rates can be expressed in nominal or real terms, depending on whether changes in the price level (inflation) are taken into account. Nominal interest rates do not account for inflation, while real interest rates adjust for changes in the price level, accurately reflecting the true cost of borrowing

(Jibrin Yakubu; Toyin S. Ogunleye; Barka A. Sunday and Abdulkadir R. Ahmadu, 2016). Central banks primarily influence interest rates in an economy, using rates like the Monetary Policy Rate (MPR) or Discount Rate to influence other rates in the country, ultimately affecting inflation, output, and employment levels. Interest rates are categorized into policy rates, deposit rates, and lending rates, each serving distinct purposes in the financial landscape (Jibrin, Toyin, Barka, and Abdulkadir; 2016).

#### **2.4 Review of Exchange Rate**

The exchange rate represents the value of one country's currency (domestic currency) concerning another country's currency (foreign currency). It's also defined as the price at which one unit of a country's domestic currency can be exchanged for another country's currency. Osiegbu and Onuorah (2012) emphasize the vital role of the exchange rate in international economic transactions, connecting price systems and enabling direct comparisons of traded goods in international trade. Movements in the exchange rate have significant effects on various economic variables, such as interest rates, inflation rates, import and export volumes, and overall economic output. These effects underscore the pivotal role of the exchange rate in the economic well-being of any country engaged in international trade in goods and services. While the Naira's exchange rate has experienced periods of relative stability since the implementation of the Structural Adjustment Programme (SAP) in 1986, its continued depreciation poses challenges to Nigeria's economic performance. The combination of increasing oil prices and exchange

rate instabilities presents substantial challenges to macroeconomic stability and economic growth, particularly for oil-producing nations like Nigeria (Usman, 2019). Nigeria heavily relies on revenue from oil exports but also imports refined petroleum and related products on a massive scale. Exchange rate fluctuations indicate the strength or weakness of a currency concerning foreign currencies and act as a standard for illustrating the competitiveness of domestic industries in the global market (Razazadehkarsalari, Haghiri & Behrooznia, 2011). Exchange rate volatility occurs when there is a deviation over time from the benchmark or equilibrium rate, often stemming from multiple markets operating in parallel with the official market (Azeez, Kolapo, & Ajayi, 2012).

#### **2.4.1 Exchange Rate Volatility**

The exchange rate signifies the price of one unit of foreign currency concerning the domestic currency (Nydahl, 2019). It acts as a vital connection between local and international markets for goods, services, and financial assets. The fluctuations in exchange rates can have a direct impact on both actual inflation rates and expectations regarding future price changes (Omagwa, 2015). Alterations in the exchange rate directly affect the prices of imported goods and services, thus influencing the country's external trade sector and the cost of servicing foreign debt (Omagwa, 2015). In a system of freely floating exchange rates, the value of foreign currency in relation to the local currency is determined by the forces of supply and demand, similar to the dynamics of any

commodity or service in a market (Nydahl, 2019). In contrast, in a fixed exchange rate system, a central bank establishes a fixed rate between the local and foreign currencies.

## **2.4.2 Nominal and Real Exchange Rates**

The exchange rate can be expressed in two ways: as a nominal exchange rate or a real exchange rate. The nominal exchange rate measures the relative price of two currencies, such as the Naira in comparison to the dollar (N/\$). Conversely, the real exchange rate is a concept grounded in reality, assessing the relative price or value of products between different countries. Exchange rate systems can fall into two categories: fixed, where the rate remains constant or fluctuates within a narrow margin around a fixed par value, and floating, where there is no government or central bank intervention to maintain stability (Black, 2003). Floating rates offer more flexibility and are less vulnerable to external shocks, making monetary policy more effective in influencing overall demand and supporting economic growth (Pugel, 2007).

## **2.5 Theoretical Review**

### **Interest Rate Spread Theory**

Interest Rate Spread Theory, also known as the Interest Rate Spread Theory or the Net Interest Margin Theory, is a foundational concept in banking that explains how banks generate profits by capitalizing on the difference between the interest rates they pay on

deposits and the interest rates they earn on loans and investments. Understanding this theory is crucial for grasping how commercial banks achieve profitability.

According to Saunders and Cornett (2017), the crux of the Interest Rate Spread Theory is that banks primarily make profits by capturing the difference between the interest rates they receive on their assets (like loans and investments) and the interest rates they pay on their liabilities (such as deposits). This difference is referred to as the net interest margin (NIM).

## **Exchange Rate**

### **Purchasing-Power Parity Theory**

The idea of purchasing power parity (PPP) was initially proposed by Gustav Cassel in 1918 and became significant in the field of international economics. PPP emerged as a compelling alternative to the fixed exchange rate system, especially after its collapse. According to this hypothesis, the exchange rate between two currencies is primarily determined by changes in their relative demand and supply. In a scenario where two currencies are fixed at parity, any fluctuations in their exchange rates should reflect changes in their purchasing power compared to a base exchange rate established by the international community (Cassel, 1918).

To illustrate this concept, Ayodele (2014) offered a real-world example related to the market price of semolina in Nigeria and Ghana. If, due to various factors like

transportation costs, semolina becomes more expensive in Nigeria compared to Ghana, consumers in Ghana may choose to buy wheat instead. Consequently, demand for semolina in Nigeria would decrease while it would increase in Ghana. This shift in demand dynamics could lead to an appreciating exchange rate for Ghana's domestic currency compared to Nigeria's, which is generally seen as beneficial for the economy. A stronger domestic currency stimulates higher demand for goods and services, resulting in increased production levels and subsequently a higher gross domestic product (GDP) (Ayodele, 2014).

The Purchasing Power Parity Hypothesis has evolved over time and gained widespread acceptance among participants in international financial markets, as highlighted by Das and Das in 2012. This recognition underscores the importance of PPP as a fundamental concept in comprehending and predicting exchange rate movements in the global economic landscape (Das, 2012).

## **2.6 Empirical Review**

Horobet (2021) conducted a study on the determinants of bank profitability in Central and Eastern European economies (CEE) from 2009 to 2018. The research revealed that factors such as inflation rate (IR), budget balance, and non-government spending had a notably adverse effect on profitability. Additionally, the study identified credit, lending

rates, capitalization percentage, and concentration rate as variables that influenced a bank's profitability.

Uralov (2020) investigated the factors affecting the profitability of banks in Central European countries from 1996 to 2017 and found that economic growth had a positive impact on a bank's return on assets (ROA).

Dao and Nguyen (2020) examined the variables impacting the profitability of 27 banking sectors in Asian countries from 2012 to 2016. They found a significant inverse relationship between operational risk and banking profitability, especially in terms of ROA and return on equity (ROE).

Mosharrafa and Islam (2021) studied bank profitability in Bangladesh from 2007 to 2017 and identified a positive association between loans, efficient management, and bank profitability.

Osen (2020) explored 23 commercial banks in Bangladesh and found that factors like interest rate spread, capital adequacy, and liquidity were crucial determinants of bank profitability.

Lestaria (2021) discovered that liquidity and leverage had a negative impact on profitability (ROE), while bank size had a positive effect.

Phan (2020) examined 10 Vietnamese-listed commercial banks between 2008 and 2018 and identified that variables such as state ownership, loan size, loan to GDP ratio, inflation rate (IR), and operating efficiency had a positive influence on profitability.

Takon, Nsofor, and Ugwuegbe (2016) investigated the impact of foreign exchange transactions on the profitability of Nigerian banks from 2010 to 2014. They found a long-term relationship between the variables under study and revealed that foreign exchange income had a negative and insignificant effect on bank profitability, while total assets had a positive impact.

Agbeja, Adelokun, and Udi (2016) explored the effect of counterparty risk and exchange rate risk on the profitability of deposit money banks in Nigeria. They found that both counterparty risk and exchange rate risk significantly affected bank profitability.

Carolyn and Daniel (2016) examined the influence of foreign exchange rate fluctuations on the financial performance of commercial banks listed on the Nairobi Securities Exchange. They found a strong positive relationship between foreign exchange rates and financial performance indicators.

Diala and Igwe-Kalu (2016) investigated the relationship between the commercial property market and foreign exchange markets in Nigeria from 2000 to 2010, specifically examining the effects of Naira/US Dollar exchange rate volatility on commercial property returns in Nigeria.

Oladele, Amos, and Adedeji (2017) conducted a study on how the prevailing interest rate environment impacted the profitability of deposit money institutions in Nigeria. Their research spanned 21 different deposit money banks in Nigeria for the years 2005–2014. Their results revealed a positive and statistically significant relationship between interest rates on loans and bank profitability, as well as correlations with interbank interest rates, Treasury bill rates, and monetary policy rates. The study recommended government policies to enhance the profitability of Nigerian banks, focusing on improving lending rates, interbank rate policy, Treasury bill rates, and monetary policy rates through effective regulatory and supervisory mechanisms.

Musah, Anokye, and Gakpetor (2018) researched the effect of varying interest rates on the profitability of commercial banks in Ghana. They analyzed data from 24 financial institutions over a span of 10 years and identified a statistically significant and positive correlation between the interest rate spread and bank profitability in Ghana.

Eyigege and Nguavese (2019) explored the influence of bank lending rates on the financial outcomes of deposit and money banks traded on the Nigerian stock market. Their study used panel data from 2004 to 2015 and found that Nigerian deposit money banks should enhance deposit collection and develop realistic financial strategies to improve their financial performance.

Ismaila (2016) examined the impact of exchange rate depreciation on Nigeria's economic growth during the SAP and post-SAP period (1986–2012). The research revealed the influence of various factors on real output performance, with the exchange rate having a direct but insignificant effect on Nigeria's economic growth.

Amassoma and Odeniyi (2016) studied the effect of exchange rate fluctuation on Nigerian economic growth from 1970 to 2013 and found a positive but insignificant impact, attributed to effective government regulation of other macroeconomic variables.

Khan and Sattar (2014) investigated the impact of interest rates on the profitability of major commercial banks in Pakistan between 2008 and 2012, demonstrating a positive and significant relationship.

Ogunbiyi and Peters (2014) analyzed how interest rates affected the profitability of Deposit Money Banks (DMBs) in Nigeria from 1999 to 2012 and found varying effects on the profitability of Nigerian DMBs.

Okoye and Eze (2013) examined the impact of bank lending rates on the performance of Nigerian DMBs between 2000 and 2010, revealing significant and positive effects on bank performance.

Riaz and Mehar (2013) analyzed the impact of bank-specific variables and macroeconomic indicators on the profitability measures of commercial banks in Pakistan

from 2006 to 2010, demonstrating a complex interplay of factors influencing bank profitability.

## **CHAPTER THREE**

### **RESEARCH METHODS**

#### **3.1 Introduction**

In this chapter, we delve into the techniques and methods used to investigate the objectives of this study. This chapter encompasses the study's population, research design, sampling approach, sample size, research tools, variable measurement, data collection methods, and the plan for data analysis.

#### **3.2 Research Design**

A research design serves as the structured plan or strategy utilized by a researcher in a predetermined investigation to address the research questions. As per Boafo and Kokuma (2016), this study will employ a longitudinal research design. Longitudinal research design involves collecting data from a specific group of participants over an extended period to track trends, changes, and developments within the subject over time. This design is valuable for utilizing historical data to make informed forecasts and projections into the future. It combines quantitative and qualitative research methods for gathering relevant secondary data spanning different time periods (McCombes; 2020).

### **3.3 Population of the Study**

This research focuses on the impact of interest rates on bank profitability, encompassing all registered and licensed deposit money banks operating in Nigeria. As of June 2019, according to the Nigerian Deposit Insurance Commission (NDIC), there were 29 DMBs, including 22 Commercial Banks, 5 Merchant Banks, and 2 Non-Interest Banks licensed by the Central Bank of Nigeria (Abdulrasheed, 2022; NDIC 2019). Therefore, the study will select 12 deposit money banks from the period 2015 to 2021 as the study's sample.

### **3.4 Sources of Data**

The required information for this research will primarily consist of secondary data sourced directly from the Central Bank of Nigeria (CBN) statistical bulletin and the annual financial statements of deposit money banks spanning from 2015 to 2021.

### **3.5 Theoretical Framework**

This study is based on the Interest Rate Spread Theory, often referred to as the "Net Interest Margin Theory." It is a fundamental concept in finance and banking that explores the relationship between interest rates and the profitability of financial institutions, particularly banks. Developed in the 19th century and expanded upon by economists and banking theorists like Walter Bagehot and Knut Wicksell, this theory is rooted in the traditional banking model, where banks profit by borrowing money at lower interest rates and lending it out at higher rates, capturing the spread between the two rates. The Interest

Rate Spread Theory focuses on Net Interest Margin (NIM), which is the difference between interest income from interest-earning assets and interest expenses from interest-bearing liabilities.

**3.6 Model Specification**

The multiple linear regression analysis model which would be used is functionally expressed as follows;

$$ROA = f(\text{interest rate, exchange rate, money supply, inflation rate})$$

$$ROI = f(\text{interest rate, exchange rate, money supply, inflation rate})$$

$$ROA = f(INTR, EXCR, MS, INFR) \dots \dots \dots (3.1)$$

$$ROI = f(INTR, EXCR, MS, INFR) \dots \dots \dots (3.2)$$

The mathematical (econometric) form of equations above are expressed as

$$ROA_t = \alpha_0 + \alpha_1 INTR_t + \alpha_2 EXCR_t + \alpha_3 MS_t + \alpha_4 IFLR_t + \mu_t \dots \dots \dots (3.3)$$

$$ROI_t = \alpha_0 + \alpha_1 INTR_t + \alpha_2 EXCR_t + \alpha_3 MS_t + \alpha_4 IFLR_t + \mu_t \dots \dots \dots (3.4)$$

Where:

ROA = Return on Asset

ROI = Return on Investment

$INTR_t$  = Interest Rate *at time 't'*

$EXCR_t$  = Exchange Rate *at time 't'*

$MS_t$  = Money Supply *at time 't'*.

$INFL_t$  = Inflation rate *at time 't'*.

Based on theoretical or apriori expectation, the signs of the coefficients are given as;

$\alpha_0$  is the mean or intercept

$\mu_t$  = represent the error term at time 't'

The behavioural assumptions are  $\alpha_1, \alpha_2, \alpha_3$  and  $\alpha_4 > 0$

In other words, we expect a positive relationship between the dependent and independent variables.

### 3.7 Measurement and Operationalization of Variables

**Table 3.1: Operationalization and Measurement of Variables**

<b>Item</b>	<b>Operational Definition</b>	<b>Variable Type</b>	<b>Measurement</b>	<b>Source</b>
Return on Assets	Return on assets (ROA) is a financial ratio that indicates how profitable a company is in comparison to its total assets.	Dependent variable	Aggregate return on assets of the banking sector	Elsayed (2013) and Miko (2010)
Return on Investment	Return on Investment (ROI) is a financial metric used to evaluate the profitability or efficiency of an investment relative to its cost.	Dependent variable	Total investment by the firm with the study period.	Okafor (2020)
Interest rate	Represents the cost of borrowing money or the return on investment for lending or saving money.	Independent variable	Interest rates across the time period	Adewoye (2013)
Exchange Rate	The rate at which one currency exchanges for another	Independent variable	Exchange rates across the study horizon	Adewoye (2013)
Money Supply	the total volume of money held by the public at a particular point in time	Independent variable	the sum of currency in circulation and reserve balances	Abdulrasheed, (2022)
Inflation rate	Inflation is the rate of increase in	Independent	comparing the current prices of a	Ismaila, (2016)

	prices over a given period of time.	variable	set of goods and services to previous prices set of goods and services to previous prices	
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**Source: Author's compilation (2023)**

### **3.8 Method of Data Analysis**

The research will use the ordinary least squares (OLS) econometric method to analyze the empirical model and assess how interest rates affect bank profitability. Various tests will be employed, including t-tests, R-squared, and f-tests, to evaluate the results. Time series analysis will be performed to check for data stationarity issues using the Augmented Dickey-Fuller (ADF) test, an extension of the Dickey-Fuller test. Following this, a cointegration test will be conducted to determine if non-stationary variables are cointegrated, indicating a long-term relationship between them. Additionally, a unit root test will be carried out to verify the compatibility of variable integration orders with the chosen econometric approach. Once cointegration is established, an error correction model will be formulated to illustrate short-term dynamics while maintaining the long-term equilibrium relationship.

## **CHAPTER FOUR**

### **DATA PRESENTATION AND ANALYSIS**

#### **4.1 Introduction**

This chapter delves into the presentation, analysis, and interpretation of the panel data gathered to assess the models developed in this study. Our analysis here encompasses investigations aimed at understanding how interest rates and inflation rates impact the profitability of Deposit Money Banks (DMBs) in Nigeria. To provide a comprehensive foundation for our study, we employ econometric methods. This econometric analysis goes beyond basic statistics, with the objective of conducting empirical analysis and deriving valid coefficient estimates essential for hypothesis testing. As previously discussed, the econometric analysis employs the Panel Data Analysis method.

#### **4.2 Empirical Tests and Results Based on Panel Data Analysis**

In this section, we present and analyze the outcomes of the panel data estimations for the models outlined in the previous chapter. Our primary focus during this analysis centers on evaluating the goodness of fit statistics and examining the coefficient results, which are essential for hypothesis testing. These estimates aim to reveal the relationship between interest rates and exchange rates concerning DMBs in Nigeria. The panel data estimation approach we adopt here acknowledges that biases in the aggregated data may stem from cross-sectional differences or time-based fluctuations. Therefore, we

commence with the Hausman test for heterogeneity to identify the most appropriate effects model (random or fixed) for our analysis. The results of the Hausman test are provided in Table 4.1 below. Notably, the Chi-square statistic's value in the equations is not statistically significant. Consequently, if the p-value is significant, the fixed-effect model should be utilized. Conversely, if the p-value is not significant, the random-effect model is the more suitable choice. Therefore, the optimal method to apply in this context is the random-effect model.

**Table 4.1: Hausman Test for Effects**

<i>Test Summary</i>		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
<i>Cross-section random</i>		0.0000	4	1.0000
<i>Variable</i>	<i>Fixed</i>	<i>Random</i>	<i>Var(Diff.)</i>	<i>Prob.</i>
INTR	0.6299	0.6299	-0.0000	NA
EXRT	0.0357	0.0357	-0.0000	NA
MS	0.1280	0.1280	-0.0000	NA
INFLR	-0.4501	-0.4501	-0.0000	NA

#### **4.2.1 Impact of Interest Rate and Exchange Rate on Banks' Profitability**

The findings regarding the influence of interest rates and exchange rates on banks' profitability in Nigeria, using variables such as interest rate (INTR), inflation rate

(INFLR), broad money supply (MS), and exchange rate (EXRT), are presented in Table 4.2 below.

The diagnostic statistics for the model are moderate and not particularly impressive due to the nature of the panel dataset. The adjusted R-squared value of 0.084 indicates that slightly over 8.4 percent of the systematic variations in Nigerian bank profitability can be explained by the explanatory variables. The F-value of 2.9113 is significant at the 5 percent level, suggesting that the hypothesis of a significant relationship between banks' profitability and all the independent variables collectively holds.

To understand the specific impact of each explanatory variable on bank profitability, we need to examine individual coefficients in terms of their signs and significance. In the results presented, the coefficients for INTR, EXRT, and MS have positive signs, while INFLR has a negative sign.

The relationship between interest rates and bank profitability in Nigeria is positive and significant at the 5 percent level. This implies that a 1 percent increase in interest rates tends to increase bank profitability by 0.63, while keeping other variables constant. In other words, the coefficient for interest rate is 0.63, representing the elasticity of bank profitability concerning interest rates. This suggests that as interest rates rise, bank profitability tends to increase.

The coefficient for exchange rates is also positive and significant at the 1 percent level, indicating that a 1 percent increase in exchange rates leads to a 0.036 increase in bank profitability, holding other independent variables constant. The coefficient for exchange rate is 0.036, representing the elasticity of bank profitability concerning exchange rates. This implies that as exchange rates increase, bank profitability tends to rise.

However, the coefficients for inflation rate and broad money supply are not statistically significant at the 5 percent level.

<i>Variable</i>	<i>Coefficient</i>	<i>t-Statistic</i>	<i>Prob.</i>
<i>C</i>	-5.1595	-0.5806	0.5632
<i>INTR</i>	0.6299	2.1441	0.0351
<i>EXRT</i>	0.0357	3.2847	0.0015
<i>MS</i>	0.1280	0.3876	0.6994
<i>INFLR</i>	-0.4501	-2.2325	0.0284
<i>R-squared</i>	0.1284	<i>F-statistic</i>	2.9113 (0.0266)
<i>Adjusted R-squared</i>	0.0843	<i>Durbin-Watson stat</i>	1.0200

Source: Eview 10 output, 2023

### 4.3 Hypothesis Testing

The results presented in the previous section provide the basis for conducting statistical tests of the study's hypotheses and give rise to noteworthy points for discussion. When

testing these hypotheses, the focus is primarily on the statistical significance of the variables examined in the empirical analysis.

### **Hypothesis One**

The hypothesis that interest rates have no significant impact on banks' profitability in Nigeria is examined. The findings from the estimates indicate that interest rates have a positive and significant impact. Through a t-test of significance, the t-value is found to be significant at the 5 percent level, leading us to reject the null hypothesis.

### **Hypothesis Two**

Next, the hypothesis concerning the impact of exchange rates on the profitability of banks in Nigeria is tested. The results from the estimates reveal that exchange rates have a positive and significant impact. A t-test of significance indicates that the t-value is significant at the 1 percent level, causing us to reject the null hypothesis.

### **Hypothesis Three**

The third hypothesis pertains to the influence of money supply on banks' profitability in Nigeria. The results from the estimates show that while money supply has a positive impact, it is not statistically significant. The t-value obtained from the t-test of significance is not significant at the 5 percent level, leading us to fail to reject the null hypothesis.

## **Hypothesis Four**

Lastly, the fourth hypothesis examines the impact of exchange rates on banks' profitability in Nigeria. The results from the estimates suggest that exchange rates have a negative and non-significant impact. The t-value, based on the t-test of significance, is not significant at the 5 percent level, causing us to also fail to reject the null hypothesis.

### **4.4 Discussion of Findings**

Banks serve as intermediaries between entities with excess funds and those in need of funds. The financial well-being and sustainability of banks hinge on their ability to generate profits, with a significant portion of these profits stemming from interest charged on loans. The study's results reveal a positive relationship between interest rates and bank profitability, aligning with economic theories.

Furthermore, the study finds a positive relationship between exchange rates and bank profitability. This implies that banks with substantial investments and deposits in foreign exchange benefit from the continuous increase in exchange rates.

## CHAPTER FIVE

### SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

#### 5.1 Summary of Findings

This study centers on empirically gauging the connection between interest rates and exchange rates concerning the profitability of Nigerian banks. We analyzed data from twelve banks over the years 2015 to 2021, resulting in 84 balanced observations. Panel regression was the chosen statistical method, combining all 84 observations for analysis, without taking into account the time series and cross-sectional aspects of the data.

Ordinary Least Squares estimations were utilized to estimate the models. The empirical analysis unveiled a significant relationship between macroeconomic factors (interest rate and exchange rate) and the profitability of Nigerian banks. The key findings are as follows:

1. Interest rates have a positive impact on the profitability of Nigerian banks.
2. Exchange rates also have a positive impact on the profitability of Nigerian banks.
3. Money supply has no discernible impact on the profitability of Nigerian banks.
4. Inflation rate does not significantly affect the profitability of Nigerian banks.

## **5.2 Recommendations**

Based on the study's findings, the following recommendations are suggested:

1. Banks should continue to maintain a healthy balance between deposits and loans to sustain their profitability.
2. Banks should proactively manage their foreign exchange departments to ensure profitability.
3. The government should employ appropriate monetary policies to regulate the money supply in the economy, focusing on key economic areas to stimulate economic activities without causing inflation.
4. Effective monetary and fiscal policies should be implemented by the government to control inflation in the economy, thereby preserving the value of deposits.

## **5.3 Conclusion**

This study has illuminated the influence of interest rates and exchange rates on the profitability of Nigerian banks. The empirical results demonstrate that both interest rates and exchange rates have a positive impact on the profitability of these banks. It is recommended that the government should implement robust and effective monetary and fiscal policies to maintain price stability in the economy.

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**APPENDIX**  
**Regression Result**

Dependent Variable: ROE				
Method: Panel Least Squares				
Date: 10/19/23 Time: 19:11				
Sample: 2015 2021				
Periods included: 7				
Cross-sections included: 12				
Total panel (balanced) observations: 84				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.159512	21.96881	-0.234856	0.8149
INTR	0.629860	0.747321	0.842823	0.4019
EXRT	0.035720	0.027664	1.291192	0.2004
MS	0.127999	0.840089	0.152364	0.8793
INFLR	-0.450138	0.512934	-0.877575	0.3828
R-squared	0.022271	Mean dependent var		12.57964
Adjusted R-squared	-0.027234	S.D. dependent var		7.693201
S.E. of regression	7.797257	Akaike info criterion		7.003100
Sum squared resid	4802.981	Schwarz criterion		7.147791
Log likelihood	-289.1302	Hannan-Quinn criter.		7.061265
F-statistic	0.449867	Durbin-Watson stat		0.157609
Prob(F-statistic)	0.772186			

Dependent Variable: ROE				
Method: Panel Least Squares				
Date: 10/19/23 Time: 19:11				
Sample: 2015 2021				
Periods included: 7				
Cross-sections included: 12				
Total panel (balanced) observations: 84				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.159512	8.635719	-0.597462	0.5522
INTR	0.629860	0.293765	2.144098	0.0356
EXRT	0.035720	0.010875	3.284725	0.0016
MS	0.127999	0.330231	0.387605	0.6995
INFLR	-0.450138	0.201629	-2.232505	0.0289

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.869958	Mean dependent var	12.57964
Adjusted R-squared	0.841272	S.D. dependent var	7.693201
S.E. of regression	3.065023	Akaike info criterion	5.247631
Sum squared resid	638.8170	Schwarz criterion	5.710643
Log likelihood	-204.4005	Hannan-Quinn criter.	5.433758
F-statistic	30.32715	Durbin-Watson stat	1.184994
Prob(F-statistic)	0.000000		

Dependent Variable: ROE				
Method: Panel EGLS (Cross-section random effects)				
Date: 10/19/23 Time: 19:12				
Sample: 2015 2021				
Periods included: 7				
Cross-sections included: 12				
Total panel (balanced) observations: 84				
Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.159512	8.886533	-0.580599	0.5632
INTR	0.629860	0.293765	2.144098	0.0351
EXRT	0.035720	0.010875	3.284725	0.0015
MS	0.127999	0.330231	0.387605	0.6994
INFLR	-0.450138	0.201629	-2.232505	0.0284
Effects Specification				
			S.D.	Rho
Cross-section random			7.262093	0.8488
Idiosyncratic random			3.065023	0.1512
Weighted Statistics				
R-squared	0.128474	Mean dependent var	1.981685	
Adjusted R-squared	0.084346	S.D. dependent var	3.203082	
S.E. of regression	3.065023	Sum squared resid	742.1550	
F-statistic	2.911391	Durbin-Watson stat	1.019995	
Prob(F-statistic)	0.026583			
Unweighted Statistics				

R-squared	0.022271	Mean dependent var	12.57964
Sum squared resid	4802.981	Durbin-Watson stat	0.157609

Correlated Random Effects - Hausman Test				
Equation: Untitled				
Test cross-section random effects				
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		0.000000	4	1.0000
* Cross-section test variance is invalid. Hausman statistic set to zero.				
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
INTR	0.629860	0.629860	-0.000000	NA
EXRT	0.035720	0.035720	-0.000000	NA
MS	0.127999	0.127999	-0.000000	NA
INFLR	-0.450138	-0.450138	-0.000000	NA
Cross-section random effects test equation:				
Dependent Variable: ROE				
Method: Panel Least Squares				
Date: 10/19/23 Time: 19:12				
Sample: 2015 2021				
Periods included: 7				
Cross-sections included: 12				
Total panel (balanced) observations: 84				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.159512	8.635719	-0.597462	0.5522
INTR	0.629860	0.293765	2.144098	0.0356
EXRT	0.035720	0.010875	3.284725	0.0016
MS	0.127999	0.330231	0.387605	0.6995
INFLR	-0.450138	0.201629	-2.232505	0.0289
Effects Specification				
Cross-section fixed (dummy variables)				

R-squared	0.869958	Mean dependent var	12.57964
Adjusted R-squared	0.841272	S.D. dependent var	7.693201
S.E. of regression	3.065023	Akaike info criterion	5.247631
Sum squared resid	638.8170	Schwarz criterion	5.710643
Log likelihood	-204.4005	Hannan-Quinn criter.	5.433758
F-statistic	30.32715	Durbin-Watson stat	1.184994
Prob(F-statistic)	0.000000		