# PROFITABILITY OF COMMERCIAL BANKS IN KENYA: DOES INTEREST RATE SPREAD MATTER?

**By**

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## DECLARATION

This research paper is my original work and has not been presented for the award of a degree in the University or other institution of higher learning.

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This research paper has been submitted for examination with my approval as University Supervisor.

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## DEDICATION

Special dedication to my spouse Grace and our two sons Marquis and Ryan for their moral support. I further dedicate it to my parents Hannah and Samuel who has seen me through my academic journey.

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May our Lord God bless you, grant you all the wishes and His star guide you through in all your ways.

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**ABSTRACT**

Banks have witnessed a declining profitability, as characterized by their trend on the return on assets and return on equity. Between the years 2012 and 2018, the industry registered a fall on ROA by 1.9 percentage points from a high of 4.7% to a low of 2.8%. Equally the ROE decreased by 6.3 percentage points from a high of 30% to a low of 23.7%. The legislation on Banking Act 2016 introduced interest rate capping and have not borne the desired effect on stimulating access of credit to private sector. The study sought to empirically analyze the relationship on commercial banks profitability, interest rate spread and macroeconomic determinants in Kenya. The study used a one-step GMM estimation technique on panel data for the 30 commercial banks between years 2004 to 2018. The data used in the study was obtained from Central Bank of Kenya, World Development Indicators and Kenya National Beaureu of Statistics publications. The study results indicated that interest rate spread is positive and statistically significant at 1% level of significance on tier one and tier two bank's profitability, but negatively affects profitability for the tier three banks. The lagged profitability was positive and statistically significant across all the tier banks. GDP was found to have positive but not statistically significant on tier one banks profitability but was negative and statistically significant to tier two banks profitability at 10% level of significance. Inflation had a positive relationship on the tier one banks. The study also established a positive relationship on real interest rates across all the tier banks performances. Money supply was observed to have a positive effect on profitability to all the tier banks. The study recommends that the government through CBK, should work on an efficient monetary policy to ensure the Central Bank Rate, which is a component of interest charged by commercial banks is always at its minimum. This will ensure commercial banks' price their loans at reasonable rates after consideration on their risk and profit margins. On the other hand, it proposes formulation of bank management policies that will counter over reliance on interest rates margins and become more market oriented to spur a sustainable banks performance.

## LIST OF ABBREVIATIONS

| | | |
|---|---|---|
| **CAMEL** | - | Capital Adequacy, Asset Quality, Management Efficiency, Earnings Ability & Liquidity |
| **CBK** | - | Central Bank of Kenya |
| **CBR** | - | Central Bank Rate |
| **GDP** | - | Gross Domestic Product |
| **GMM** | - | Generalized Method of Moments |
| **IMF** | - | International Monetary Fund |
| **IRS** | - | Interest Rate Spread |
| KBA | - | Kenya Bankers Association |
| **KES** | - | Kenya shillings |
| **KNBS** | - | Kenya National Bureau of Statistics |
| **MP** | - | Market Power |
| **MPC** | - | Monetary Policy Committee |
| **ROA** | - | Return on Assets |
| **ROE** | - | Return on Equity |
| **SCP** | - | Structure Conduct Performance |
| **SMEs** | - | Small and micro enterprises |
| **UK** | - | United Kingdom |
| **WCI** | - | Weighted Composite Index |
| **WDI** | - | World Development Indicators |

# CHAPTER ONE
# INTRODUCTION

## 1.1 Background

A stable financial system is vital for growth of an economy. Banks play the biggest role in resources allocation by ensuring continuous circulation of funds from the depositors to borrowers. Banking system is therefore seen as one of the most reliable barometer for tracking the strengths and weaknesses of an economy.

Banks incur costs in process of discharging their intermediation role because most of the deposit receipts and loans are not harmonized. Some of the costs include; operational, administration, default, transaction and information costs. Banks therefore levy a charge on intermediation services and fix an interest rate for loans and deposits, whose difference constitutes part of the profit to intermediary party. An efficient banking sector leads to increased lending, investment and economic growth (Levine, 1997).

In the Kenyan economy, commercial banks have dominated the financial sector. The high number impacts greatly on the country's growth. This would therefore have immense spillover effects from bankruptcy in the sector, which can lead to an overall financial crisis. It's imperative therefore to have specific indicators that measure the stability of the banks. Nkegbe & Yazidu (2015), reveals that a sound performance is measured by the profitability levels. Profit therefore is one main parameter for measuring performance of a business (Ogbadu, 2009). It is important that any bank's leadership and management make profits to guarantee the bank's going concern and generate fair returns to shareholders (Ponce, 2011). Profitability is an important measure of business continuity and sustainability, which instills confidence to the stakeholders.

The financial markets, bank leadership and academic research have shown much interest on the factors determining profitability on commercial banks. Most recent studies classify and express profitability as the internal determinants, factors banks can control, among them size of capital and the loan portfolio, labor productivity, technology, quality of management and ownership of banks. The soundness of banks is rated using the CAMEL system (CBK, 2016). The other classification is on external factors largely described by the economic environment they operate on. They include; Gross Domestic Product, inflation, interest rate. To ensure

sustainability on banks in their intermediation role, they must be profitable. It's imperative therefore to study the indicators that measures on soundness of the banks.

### 1.1.1 Evolution of interest rates in Kenya, 2000 - 2018

Interest rate is a macroeconomic determinant and forms the main focus of this study. According to Folawewo & Tennant (2008), it's a price one pays for using borrowed money expressed as a percentage on an annual basis over the principle amount.

There have been a number of studies contributing to the debate on interest rates most of which underpins its importance to an economy. Ngugi (2004), observes that interest rates influence job creation, corporate profits as well as monetary policy. On his working paper Randall (1998), observes that interest rates facilitate formation of capital. Low interest rates keep the costs of funds low and allow access to cheap credit that promotes development through increased investment. The changes in capital formation are what stimulate investment opportunities. Controlling interest rate in an economy has a big impact on economic growth since it directly determines savings and investment through the flow of money in an economy, (Dougall &Gaumnitz, 1975). An increase in interest rates curbs inflation because the appetite to borrow is suppressed and implies that economic activity slows down. On the other hand, Mwega (2012), a decrease in interest rates drives uptake of loans, drives the demand for purchase on new goods and investments resulting to an improved economic growth and rise in employment. Overall, the effect of lower interest rates has benefits to consumers as it increases the consumer propensity to spend due to an increase in the disposable income.

A liberalized economy fuels competition and gives room for innovations that facilitates improvement on service delivery in the banking industry. However commercial banks in Kenya have demonstrated a slow response to the market forces prompting a sustained government regulation by controlling interest rates charged on credit and deposits. Under the CBK act section 36(4) the bank through its monetary tool, and by way of monetary policy committee determines prevailing CBR rates applicable on the commercial banks. The CBR rate is then published by CBK as reviewed by MPC. Since most of businesses and equally the financial institutions are profit motivated, the rate charged by commercial banks is determined by the central banks rate, Giovanni (2006).

Interest rate spread is the difference between the borrowing and lending rate. It varies across the world and measures the efficiency levels of the financial sector, which sprouts from a competitive environment (Demirgüç-Kunt and Harry Huizinga ,1999).

**Table 1.1: Commercial Banks IRS in Kenya 2000-2018**

| YEAR | IRS RATE |
|---|---|
| **2000** | **14.238%** |
| **2001** | **13.026%** |
| **2002** | **12.966%** |
| **2003** | **12.441%** |
| **2004** | **10.098%** |
| **2005** | **7.812%** |
| **2006** | **8.496%** |
| **2007** | **8.178%** |
| **2008** | **8.715%** |
| **2009** | **8.838%** |
| **2010** | **9.814%** |
| **2011** | **9.418%** |
| **2012** | **8.151%** |
| **2013** | **8.672%** |
| **2014** | **8.141%** |
| **2015** | **6.898%** |
| **2016** | **7.873%** |
| **2017** | **5.993%** |
| **2018** | **4.8%** |

**Source:** World development indicators, 2018.

Interest rate spread decreased by 9.4 percentage points from 2000 to 2018. There was a negative average annual growth rate of IRS over that period for about 0.49%. The maximum growth of IRS in Kenya from 2000 to 2018 was recorded in 2010 at 0.977 percentage points and the maximum fall was in 2003 at 2.3 percentage points. The IRS reached a high of 14.2% in 2000 and a low of 4.8% in 2018. The primary effect on interest rates during year 2000 was mainly due to high interest rates applicable on Treasury bills. Consequently, there was expansion on public debt. From a proposed expenditure of Kes 266.2 billion on yearly budget for 2000/2001,

a total of Kes 109. 9 billion was directed towards debt servicing. The government was issuing Treasury Bills at high rates to attract bids to settle the maturing bills. The financial institutions were heavily investing on government securities due to the high returns. This in turn created a progressive cycle on government expenditure towards redemption of debts. There were also huge budget deficits which fueled the rise on interest rates. The budget deficit stood at Kes 182 billion rendering the government to perennial borrowing to finance expenditure. The high cash ratios of 10 % on the total deposits, attracting no interest from CBK, also made the banks make up for this interest by passing it to borrowers to finance their increased cost of operations.

### 1.1.2 Evolution of banking in Kenya

The financial evolution in Kenya is traced back to the colonial periods. The National Bank of India was the first bank to open a branch in Mombasa. It was later followed by opening of Barclays Bank in 1910. In 1953, Bank of Baroda was set up and followed by opening of Habib Bank Ltd in the year 1956.As time progressed, there was a change in landscape of banking and this created an enabling environment for setting up fully indigenous banks. In 1968, Co-operative Bank was opened as the first locally owned commercial bank then operating as a cooperative society. In 1971 saw the formation of National Bank as first fully owned bank by government of Kenya.

Since independence, Kenya's banking sector has grown, reflecting on the country's growth towards economic prosperity. According to CBK (2018), Kenya's banking sector was comprised of 42 commercial banks and one mortgage finance. Banks in Kenya have collapsed and this has majorly been attributed to high nonperforming loans, taking excessive risks, insufficient capital, including conflict of interest by shareholders. In 1980's Continental Bank of Kenya Ltd collapsed while in year 2003 saw the collapse of Daima bank and Euro bank. Recent years have also seen CBK putting Charterhouse, Fidelity Commercial, Chase, and Imperial Commercial Banks under receivership.

Banking sector has grown in inclusivity, stability and efficiency at the backdrop of regulatory and supervisory reforms. In 2016, parliament enacted the Banking Amendment Act which introduced a cap on the rates of lending to a maximum of four per cent above the CBR. It also set a minimum 70 percent of the CBR on the interest rate payable to deposits. The amendment became effective on 14th September 2016.

The soundness of banks is rated on the CAMEL system (CBK, 2016). According to (Sehrish, Irshad & Khalid, 2010), ROA and ROE are the most common accounting ratios for measuring profitability. ROE measures the effectiveness in utilizing shareholders capital while the ROA measures the management efficiency. Both a high ROE and ROA reflects on a highly effective and efficient management in utilization of the resources.

The profitability ratios consist of tests used to evaluate a firms earning performance. In our study we shall use these indicators to measure/proxy the bank's profitability since they are the major ratios in measuring banks profitability, (Murthy and Sree, 2003).

**Table 1.2: Kenya commercial banks performance indicators: 2000-2018**

| **YEAR** | **RATIO** | |
|---|---|---|
| | **ROE** | **ROA** |
| **2000** | **13.99%** | **0.53%** |
| **2001** | **16.55%** | **1.61%** |
| **2002** | **10.06%** | **1.44%** |
| **2003** | **23.65%** | **2.38%** |
| **2004** | **22.86%** | **2.32%** |
| **2005** | **29.74%** | **2.50%** |
| **2006** | **28.31%** | **2.8%** |
| **2007** | **28.04%** | **3.5%** |
| **2008** | **26.5%** | **2.6%** |
| **2009** | **25.0%** | **2.6%** |
| **2010** | **28.2%** | **3.8%** |
| **2011** | **30.9%** | **4.4%** |
| **2012** | **30.0%** | **4.7%** |
| **2013** | **29.2%** | **4.7%** |
| **2014** | **26.7%** | **3.4%** |
| **2015** | **23.9%** | **2.9%** |
| **2016** | **24.6%** | **3.3%** |
| **2017** | **22.2%** | **2.8%** |
| **2018** | **23.7%** | **2.8%** |

**Source: CBK annual supervision reports: 2000-2018**

Table 1.2 shows the banks performance as measured on ROA and ROE. From the table, ROE recorded a high of 30.9 percent in year 2011 and a low of 10.06 percent in the year 2002. Equally ROA recorded a high of 4.7 percent in year 2012 and a low 0.53 percent in the year 2000. From table 1.1, the IRS shows an increase every year but became a little volatile since year 2011. The ROA dropped from a high of 4.4 percent in 2011 to a low of 2.8 percent in year 2018. This was due to a high assets growth as compared to the profitability growth.

A comparison between performance of banks on table 1.2 and IRS on table 1.1 depicts a similar trend. For the year with high interest spread, for instance 2008 to 2013, the banks are seen to report higher profitability.

### 1.2 Statement of the Problem

The financial sector witnessed declining profitability in 1990s due to the high non-performing assets and distress borrowing (Ngugi, 2001). This was an indication of high costs of intermediation from high levels of inefficiency. The liberalization of interest rates in 1991, narrowed the spread. The immediate experience was very promising but over a period of financial reforms interest rate spread widened. The desired effect of liberalization was for the financial sector to grow and become more efficient. Despite the efforts and the continued push for financial reforms, the banking sector seems to develop an oligopolistic structure with few large banks controlling the market. CBK (2018), the banking sector net asset was reported at Kes. 4.27 trillion, customer deposits at Kes 3.16 trillion and capital reserves at Kes 642 billion where the large eight controlled a total net asset of Kes 2.64 trillion, customer deposits of Kes 2.01 trillion and capita reserves of Kes 414.8 billion representing a market share of 65.9 percent.

The implementation of the Banking Act 2016 introduced a cap on the rates of lending to a maximum of four percent on the CBR.[*] As alluded to above, when the spread is low demand for loans goes up driven by the cheap credit and this thereby stimulates enterprises in the economy. Consequently, banks will report more interest income which has positive contribution on profitability. KNBS (2017), indicated that capping on interest rates puts Kenya at risk of financial stability and is likely to slow the country's ambitions of leading in financial

[*] The regime of interest capping was recently lifted by the parliament following the amendment of Finance Bill 2019

inclusion. According to a report by the Kenya Bankers Association, SMEs have limited access to loans since the enactment of Banking Amendment Act of 2016. The commercial banks private sector lending declined by 1.5 percent during the first seven months in the year 2017 from 5.1 percent in 2016. This has been as a result of adverse selection by banks to invest heavily in treasury bills and bonds at the expense of lending to private sectors. The banks registered heavy investment in Government securities, a rise of Kes 1 trillion in quarter two of 2017 to 2.5 trillion in quarter three of 2019. Overall, banks became more averse to lending and prefer investing in treasury bonds and bills instead of offering credit to the private sector. This has occasioned a disproportionate access to credit to sectors with the biggest contribution to the GDP like real estate, manufacturing, trade, real estate, transport and agriculture since they have remained starved of credit. This could be addressed if banks are allowed to offer credit on market-based regime and risk. Banks are therefore slowly adjusting to the new operating environment characterized by the cap on the lending rate. There is need to comprehensively assess the effects of the legislation on capping of interest rate to credit expansion on the private sector which has led to slow economic growth (CBK, 2018). Incidentally, this regime of interest capping came to an end after the parliament lifted the cap following the amendment of Finance Bill 2019. This therefore follows that; determination of interest is left to the market forces. This amendment has been informed by the unintended effects felt across the economy especially by private sector access to credit. Since banks have lived up to the conditions of this regime, they must have achieved a business model to allow the industry adjust gradually to an equilibrium.

The recent experience of highly volatile profits has caused a number of financial intermediaries' severe financial management problems like staff turnovers. An area of particular concern has been the impact of rate volatility on bank interest margins or spreads which has been more aggravated by the capping of interest rates. This has seen banks report decline in profits. From a credit survey report (CBK September 2017), return on assets decreased from a high of 2.8 percent in June 2016 to a low of 2.6 percent in September 2017. Both the ROE and ROA for Kenya's commercial banks has been on declining trend from high of 30.9 percent to a low of 24.6 percent and 4.4 percent to a low of 3.3 in 2011 and 2016 respectively. The financial services industry contributes an approximate of 6.8 percent on the GDP but withstood a challenging year to post a 6.1 percent growth in quarter three of the year 2016 as compared to 10.3 percent growth recorded in the quarter three of year 2015 (KNBS, 2016).

There are number of reasons that can be put forward in explaining this development. These include reducing the banks reliance on interest income while at the same time placing a greater emphasis on quality of loans in their asset portfolio. Interest-sensitive liabilities have tended to grow faster than interest-sensitive assets making it difficult for banks to counter the adverse effects of interest rate spread. Despite a growing concern over these trends, few theoretical models have explained the determination of profitability. In this paper, we empirically assess how IRS and macroeconomic variables impact on profitability of Kenyan banks.

### 1.3 Study Questions

The study endeavored to answer the following research questions:

1. What is the effect of Interest Rate Spread (IRS) on commercial banks' profits in Kenya?
2. What is the significance of the macroeconomic variables on commercial banks' profits in Kenya?
3. What policy implications can be drawn from the findings of the study?

### 1.4 The study objectives

#### 1.4.1 The general objective

The overall aim of this study was to determine the effect of Interest Rate Spread and macroeconomic variables on commercial banks' profits in Kenya. It will empirically analyze the effect of interest rate spread on bank profitability with the macroeconomic determinants as the control variables.

#### 1.4.2 Specific objectives

1.To estimate the effect of IRS on commercial banks profits in Kenya.

2.To estimate the effect of macroeconomic variables on commercial banks' profits in Kenya.

3.To offer policy recommendations from the study findings.

### 1.5 Relevance of the study

Most of the studies done relating to the performance of banks focused on sector-specific factors. A recent study by Olweny and Shipho (2011) dwelt on specific factors that affect the commercial banks performance. There is a need to broaden the range of variables by including the macroeconomic variables to capture the important element on moderating for the internal factors.

The methodology followed of Generalized Method of Moments estimator is a dynamic model that control for potential endogeneity, and the persistence on profits. This methodology yielded consistent estimators.

The decline on profitability could be attributed from capping of interest rates; a trend that has also motivated this study with the intent of evaluating the impact of IRS. Consequently, the banks can take precautionary and mitigating measures on how to adjust to achieve a new business model.

The study adds to the body of knowledge by offering an empirical analysis for conducting a further research on Kenyan economy. In expanding this scope of research, most recent data for the period 2004-2018 was used, during which there has been major policy changes.

### 1.6 Organization of the study

Following this introduction, the next chapter discusses the literature review divided into; theoretical literature, review of recent empirical studies in the area under study and overview of literature upon which the study was based. Chapter three outlines the theoretical and empirical methodology used, discusses sources of data and the estimation techniques applied. The analysis and study findings are discussed in chapter four while the summary, conclusions and policy implications are outlined in chapter five.

# CHAPTER TWO
# LITERATURE REVIEW

## 2.1 Introduction

This chapter presents the theoretical and empirical literature on this area and focuses on profitability on commercial banks. It then discusses the overview on the reviewed literature and highlight the existing research gaps. The literature seeks to explore more into understanding the key determinants of profitability.

## 2.2 Theoretical Literature Review

There are various profitability theories that have attempted to explain a theoretical aspect on the determinants of bank profits.

One such theory is the Market Power which postulates that more external forces result into increased profits. Our study attempts to capture the effect of external forces by examining the effects of the macroeconomic variables. The theory goes further to suggest that firms with a large market share earn highest profits. In our study, banks in tier one group commands the biggest market share and consequently make huge profits.

There is also the Efficiency Structure Theory as expounded by Demsetz (1973), which observes that banks with a high operational efficiency is attributed to their high interest margins and good management. As such, interest rate spread is expected to have a positive relationship on profitability. This also offers some bearing to the return on assets ratio, as a measure of how efficient banks management utilize the bank assets at their disposal. The theory asserts that large commercial banks with experienced management and efficient production technologies earns higher returns due to reduced operational costs, (Soana, 2011). This has been the case with the tier one banks in Kenya that have demonstrated huge investments on information technology thereby reaping much on efficient service delivery.

The other theory is the Structure Conduct Performance and postulates that banks profits are explained by financial ratios. Mamatzakis (2003), studied performance on the Greek banks and found that financial ratios largely explained their profits. Our study has adopted the same approach by considering the financial ratios to measure the profitability. This also in line with IMF (2002), which observes that ROA and ROE are key ratios in evaluating profitability of banks. The ratios are measured as a running year average for each bank at the given time period.

There are several studies and mainly focused on the internal and the external determinants in explaining the bank's profitability. Among the internal factors are capital size, labor productivity, information technology, and quality of management. The external determinants have been identified to include the GDP, inflation, interest rate and money supply as the main macroeconomic determinants on the banks performance.

Capital investment is one of the internal factors with great significance on ROE and ROA. A study by Kosmidou and Pasiouras (2008), showed that a bank capital strength positively effects on its profitability. Demirguc-Kunt and Huizinga (1999), studied on the effect of the macroeconomic conditions, taxation size, regulations, and financial pattern on the banks profitability revealing a significant contribution on profits to the well capitalized banks. According to Aremu, Ekpo and Mudashiru (2013), liquidity and macroeconomic variables, labor efficiency and capital adequacy affects bank profitability significantly. These studies could have a policy implication on commercial banks in Kenya towards putting more focus on innovating effective strategies of becoming more capitalized.

Bank size has also been broadly identified with growth of banks profitability. A study by Sawe (2011), show that capital and the market size of a bank significantly influenced banks profitability. This agrees with findings by Kosmidou (2008) which showed that bank size and macroeconomic variables positively contributes on its profitability. Abebe (2014), established that income diversification, capital and bank size significantly influence the bank's performance. On contrary findings a study by Aremu and Ekpo (2013), showed cost efficiency and the bank size have insignificant impact on its profitability.

High loan default rates impact on banks profitability negatively due to the increased costs on loans provisions. Valverde (2004), explains by noting that a high intermediation cost results into a high interest spread which implies a high cost of borrowing thus, affecting borrower's capability to repay loans. The high risk of loan default upsets the banks income due to the high loan provisions. Raza *et al* (2013), studied profitability of 18 Pakistan banks and assessed the impact of profitability by bank size, credit risk, provision on loans, taxation, banks capitalization, and inflation. The results revealed that increased credit risk and taxation results into reduced profits. Credit risk therefore becomes an important aspect in determination of banks performance as the same affects bank profitability significantly in long run. Kamunge

(2012), found out that cost of debt collections and interest rate spread were important in explaining level of nonperforming loans.

Macro-economic conditions significantly impacts on banks profitability. Kyalo (2013), established that GDP and inflation have significant effect on ROE on equity. This agrees with Kosmidou (2008), who showed a great significance of GDP but established a negative relationship on inflation and profitability.

**2.3 Empirical literature review**

This section reviewed findings on the recent empirical studies in the area under study. It also discusses the macroeconomic determinants on profitability. This study offers an empirical analysis on the relationship between the IRS and profit in the Kenyan commercial banks economy during the period 2004 to 2018.

Interest rate has a direct or indirect effect on the banks financial performance. A study by Wambua and Were (2013), inferred that a drop on earned interest rate has a direct impact on the bank profitability. High interest rate impacts on the economy through a multiplier effect; it discourages borrowing resulting to decreased investment thus negatively affecting the bank performance, Ngugi (2004). An assessment by Rono, Wachilonga and Simiyu (2014), banks earn profits based on their interest rate spreads. The study revealed an existing correlation between IRS, ROA and ROE. Study result from an analysis by Maigua and Mouni (2016), showed a positive relationship on inflation rates and exchange rates on profitability. A study by Peng et al (2003), showed a marginal increase on the net profit margin at a low interest rate.

Siddiqui (2011), concluded that non-performing loans, an increase on the administration costs, and a rising return on assets causes significant increase on IRS. Ghasemi & Rostami (2015), studied the determinants of IRS using data on 19 Iranian banks. The study concluded on the great significance from exchange rate and inflation on the interest rate spread.

In examining the macroeconomic variables and how they determine profitability, GDP, inflation, real interest rate, and money supply were discussed as the main control variables.
There are many different channels through which the macroeconomic environment influence bank profitability. The prevailing macro-economic environment influences performance of the banking sector through demand on loans for investment and the ability to repay those borrowed

loans. With an unstable macroeconomic environment there is a lot of uncertainty from investors about investment return.

Gross domestic product measures the country's total economic activity. Economic growth contributes to increased profits to a large number of economies (Demirgüç-Kunt and Harry Huizinga,1999). Also, most of the developing countries' economies with high levels of real interest rates foster profitability. The high interest volatility allows banks to transfer the high risks to clients by charging a high interest margin, (Fernández de Guevara 2004).

Inflationary effect on performance depends on the banks anticipation in future, Perry (1992), If the bank anticipates inflation, they adjust the interest rates to increase on revenues. Resultantly, banks cost increases faster than the bank revenues. Chenn (2011), argued that globalization has led Kenyan economy into experiencing high inflation regimes. This has resulted into volatility on interest rates, consequently making banks to shift the spread to their clients hence making lending process unstable.

Money supply depends on the CBK monetary policy and money held by households and banks. The quantity theory of money asserts that change is money supply causes a change in the price level, interest rates and nominal GDP. Mamatzakis and Remoundos (2003), quantity of money in circulation significantly influence profitability on banks.

From the above reviews some of the internal factors include management efficiency, capital, bank size, and capacity on risk management. The studies also contend that variables like interest rate, economic growth and inflation influences on the bank performances.

### 2.4 Overview of the literature

The review on the studies show a great association with the variables under study. Also, performance on banks is greatly influenced both internally and externally. The reviews on these studies also provide us with information on the research area and highlight the relationship between IRS and profitability. The reviews reveal IRS as an indicator of efficiency on the bank management and macroeconomic factors. Empirical studies have shown inflation to significantly impact on interest rate spread. The reviews reveal gaps in the existing body of knowledge by showing whether previous studies have adequately tackled the significance of IRS and the other macroeconomic variables in determination on levels of banks profitability.

From the reviewed literature most of the studies have focused on internal factors among them bank size, bank capitalization, loans provisions, management efficiency as opposed to external factors. The wide study on the internal determinants has greatly contributed into best practices for adoption by bank management to ensure sustainable financial performance by banks. However, the macroeconomic factors have shown prominence in determination of banks performance and therefore an emphasis of this study. The study endeavors to fill this gap by incorporating the macroeconomic variables in determination of impact of IRS on profitability.

# CHAPTER THREE
# METHODOLOGY

## 3.1 Introduction

The section presents the research methods used in this study. It discusses the theoretical framework, theoretical and empirical model, definition and measurement of the variables, data type and sources, and outlines estimation techniques and pre-estimation tests carried out.

## 3.2 Theoretical framework

In a number of previous studies such as Panayiotis P. Athanasoglou (2005), classification on factors determining profitability has been defined into internal and external determinants. The study considered factors specific to the industry, bank, and macro-economic determinants by incorporating them in general linear model.

$$\prod it = C + \sum_{n=1}^{N} \beta_n X_{it}^n + \varepsilon_{it} \quad (1)$$

$$\varepsilon_{it} = v_i + u_{it}$$

Where;

$\pi_{it}$, is the profitability of bank *i* at time period *t*, with *i = 1,…,K; t = 1,..., T,*

*c* is an unknown intercept for bank i,

$X_{it}^n$ are n explanatory variables

$\varepsilon_{it}$ is the error term with $v_i$ the un observable bank effects and $u_{it}$ error changing overtime.

The bank's profitability was measured on the ROA and ROE. According to Levonian (1993) & Roland (1997), there is persistence of banks profitability, where current level of profits determines future banks' profits, and laid down a relationship which considers profitability of banks as a function of one period lagged profits, IRS, inflation, real interest rate, and money supply.

The study assumed the following relationship.

Bank profitability = f (one-period lagged profit, IRS, GDP, inflation, real interest rate, and money supply).

$$\pi_{it}=f(\pi_{it-1}, IRS_t, GDP_t, INF_t, IR_t, MS_t) \quad (2)$$

Where profitability on bank is expressed as a function of ;
One period lagged profit. According to a study by Mueller (1977), the firm's profit at two points in time is independent of one another, given a reasonable separation of the two points of time.

Interest rate spread forms the main variable under study. Interest rate fosters bank profitability. A high interest rate implies higher profits margins on banks.

The real economic conditions have positively influenced the level of financial transactions. It follows that GDP is one of macroeconomic determinants employed on the study. Sufian and Habibullah (2010), asserts that fast growing economy enhances the profitability of banks.

According to Fisher, a rise in price levels raises the nominal value of goods and services. Marinkovic and Redovic(2014) asserts that a high inflation threatens the household liquidity affecting the capability to pay loans. Inflation is therefore an important macroeconomic determinant on profitability.

Positive interest rate promotes financial deepening which improves on the productivity of investment. Staikouras (2004) reviewed the banks performance industry in Europe for years 1994-1998 and revealed interest rate to positively impact on ROA.

The country's money stock is given by the money supply. When foreign interest rates rise a country experiences capital outflow. This in return reduces the money supply resulting into an increase in domestic interest rate. However, a huge budget deficit increases on government spending resulting into an increase in money supply. The government increases on local and foreign borrowing leading to monetary expansion that results to increase on interest rates.

### 3.3 Empirical model

The study adopted the above theoretical model but considered one period lagged profits, IRS, inflation, GDP, real interest rates and money supply. A similar approach was adopted by Panayiotis P. Athanasoglou (2005) as specified on model (1) with the determinants grouped as follows;

$$\prod it = C + \sum_{j=1}^{J} \beta_j X_{it}^{j} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \varepsilon_{it} \qquad (3)$$

Where;

$X_{it}^{j}$ , denotes a bank specific determinant

$X_{it}^{l}$ , denotes determinants specific to the industry

$X_{it}^{m}$ , denotes macro-economic determinants

The model incorporated with previous period profitability therefore takes the form:

$$\prod it = C + \delta \prod i,_{t-l} + \sum_{j=1}^{J} \beta_j X_{it}^{j} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \varepsilon_{it} \quad (4)$$

Where

$\prod i,_{t-l}$ is bank's previous year profits

$\delta$ is the speed of adjustment to equilibrium.

Profits tend to persist at a value between 0 and 1; where 0 and 1 implies no competition and high competition respectively. A slow adjustment is a signal to barriers of competition or information asymmetry. It may also be indicative of the presence on market power in the industry.

Our study extends the linear model adapted by Panayiotis P. Athanasoglou (2005) to the Kenyan case to measure profitability. To estimate our model in equation (2), we transform the data into natural logs to deal with skewness. The estimation models measured profitability independently both as ROA and ROE. The model for profitability as measured on ROA was as follows;

$$InROA_{it} = \beta_0 + \delta InROA_{it-1} + \beta_1 InIRS_t + \beta_2 InGDP_t + \beta_3 InINF_t + \beta_4 InIR_t$$
$$+\beta_5 InMS_t + v_i + u_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Where;

$\beta_0$= the intercept, capturing the impact of the unobservable effects

$\delta$= unknown slope coefficient for the lagged profitability (as measured on ROA) in the model

$\beta_1, \beta_2 \ldots\ldots, \beta_5$= are coefficients estimated in the model.

$v_i$ is the un observable bank effects constant overtime

$u_{it}$ is the idiosyncratic error.

Subscript i captures bank's i profitability time t.

Subscript t captures the time period

And the model for profitability as measured on ROE was as follows;

$$InROE_{it} = \beta_0 + \delta InROE_{it-1} + \beta_1 InIRS_t + \beta_2 InGDP_t + \beta_3 InINF_t + \beta_4 InIR_t + \beta_5 + \beta_5 InMS_t + v_i + u_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Where;

$\beta_0$= the intercept

$\delta$= unknown slope coefficient for the lagged profitability (as measured on ROE) in the model

$\beta_1, \beta_2 \ldots\ldots, \beta_5$= are exogenous variables of unknown slope coefficients

$v_i$ is the un observable bank effects constant overtime

$u_{it}$ is the idiosyncratic error.

Subscript i captures profitability of bank i

Subscript t captures the time period

### 3.4 Definition & measurement of variables

Table 3.1 summarizes on the measurement of dependent and independent variables. ROE and ROA are the variables for measuring profitability.

**Table 3.1: Definition, measurement and source of dependent & independent variables**

| Variable Used | Definition | Measurement | Expected Signs | Source |
|---|---|---|---|---|
| **Dependent** | | | | |
| ROA | Profitability as measured on ratio of pre-tax profits to the bank's assets | Ratio on profits before tax to total banks assets | | CBK |
| ROE | Profitability as measured on ratio of pre-tax profits to shareholders equity | Ratio on profits before tax to shareholders equity | | CBK |
| **Independent** | | | | |
| $ROA_{it-1}$ | One period lagged profitability as measured using ROA | Proportion of one period lagged pre-tax profits to the total assets | +VE | CBK |
| $ROE_{it-1}$ | One period lagged profitability as measured using ROE | Proportion of one period lagged pre-tax profits to shareholders equity | +VE | CBK |
| IRS | Difference on lending and borrowing rate | Weighted average rate on loans and deposits | + _ | WDI |
| GDP | Value of output in Kenyan economy | Ratio of nominal GDP to real GDP | +VE | KNBS |
| Inflation | Price rise on goods and services | Growth in consumer price index | -VE | KNBS |
| Real interest rate | Interest rate after allowing for the inflation | Nominal interest rate less inflation | +VE | KNBS |
| Money Supply | Money stock circulating in an economy | M3 | +VE | CBK |

The relationship on bank profitability was defined by our study equation (2). The expected empirical results of the variables as described above were as follows;

$\pi_{it}$= Profitability on i bank at time t.

Return on Assets and Return on Equity were the variables used for measuring profitability

$\pi_{it-1}$= One period lagged profit of bank i at time t.

This is the profit of previous year period as measured on both ROA and ROE. Profits are assumed to persist and previous year profits determines current year banks' profits.

$IRS_t$=Interest rate spread at period t. According to Khan and Sattar (2014), there exists a positive relationship between IRS and profitability.

$GDP_t$= The real GDP of Kenya at period t
Growth Domestic Product (GDP). (Pervan et al (2015) suggested a positive impact on the financial performance. The expected results were that real GDP will positively and significantly affect profitability.

$INF_t$= country's annual inflation rate at period t.
Inflation (INF) is computed as annual consumer price index. Inflation was expected to have a negative relationship on the profitability.

$IR_t$= country's real interest rate at period t representing the rates adjusted for inflation
The expected result was that interest rate will positively affect profitability. Aburime (2008), established a strong positive link on real interest rate ROE and ROA.

$MS_t$= country's money stock at period t
The expected results were that growth in money supply positively affects banks' profits. The study used broad money as a measure for money stock.

### 3.6 Data type and source

The study was conducted on panel data for 30 commercial banks in Kenya from the year 2004 to 2018. The data mainly constituted of IRS, GDP, inflation, real interest rate, and money supply as the control variables. We utilized secondary data from WDI, CBK, IMF, KNBS, databases. The control variables used in the study are all common variables to all banks, changes over time and not to a respective bank, but uniform across the banking industry. The data on these variables was collected over the study period for the 30 banks and regression run over these two dimensions.

### 3.7 Estimation technique

Equations (5) and (6) were our estimation models. The GMM estimator, Arellano and Bond (1991), was employed and aided in capturing the dynamic behavior of ROA and ROE, used as lagged dependent variable. GMM also checked for the endogeneity bias by introducing instruments. The study analyzed three data sets on the Kenya commercial banks as classified under the three peer groups namely tier one, tier two and tier three. The division under these tier groups is informed by the classification of CBK using the weighted composite index (WCI) which comprises of the customer deposits, deposit accounts, loan accounts, capital reserves net assets. A bank with a WCI of five percent and above is classified as a tier one. A tier two has a WCI of between one and five percent while tier three has a WCI of less than one percent. Regression analysis was undertaken to empirically show how interest rate spread and the macroeconomic variables impacts on bank profitability.

### 3.8 Pre-estimation tests

Various diagnostic tests were carried out and included.

#### 3.8.1 Sargan test

This tested for the validity of the instruments. Arellano Bond provides a solution to the problem of endogeneity. This is by introducing lags of the differenced endogenous variables, in this case the lag of dependent variables which act as instruments. Sargan test will help in checking whether or not the instruments are highly correlated with the lagged variables and not correlated with the error term.

#### 3.8.2 Normality Test

The test was important to determine which model fits the data on our study. For the normally distributed data, linear models are most appropriate models. If normality is absent the nonlinear models are the most appropriate. The independent variables were subjected to Shapiro-Wilk normality test and the significance of their p value was investigated.

#### 3.8.3 Multicollinearity test

The linear association between variables was ascertained by the correlation matrix, variables used with itself and between variables, (Gujarati 2003). Multicollinearity has a tendency of making it difficult to obtain the correct signs according to theories.

# CHAPTER FOUR

# DATA ANALYSIS, RESULTS AND DISCUSSIONS

## 4.1 Introduction

This chapter presents the empirical results from the analysis of the data obtained on banks as classified under the three peer groups. The adoption GMM model was due to the dynamic state of the data which considered a lag on profitability. The study commences with the descriptive analysis followed by the pre estimation tests and finally model estimation.

## 4.2 Descriptive Statistics

The study considered the mean, standard deviation, minimum and maximum values for all the variables. There was a total of 6 observations for tier one banks, twelve observations each on tier two and tier three banks. The explained variables were ROE and ROA while the independent variable is the interest rate spread. The control variables considered in the study include the lagged profitability, real GDP, Inflation, real interest rate and broad money.

**Table 4.1: Descriptive statistics Tier 1**

| Variable | Variation | Mean | Std. Dev. | Min | Max | Observations |
|---|---|---|---|---|---|---|
| ROA | overall | -3.215786 | 0.4372002 | -5.167289 | -2.56395 | N = 90 |
| | between | | 0.2520243 | -3.514404 | -2.889357 | n = 6 |
| | within | | 0.3709705 | -4.868671 | -2.667555 | T = 15 |
| ROE | overall | -1.208431 | 0.301693 | -2.233059 | -0.6933472 | N = 90 |
| | between | | 0.1344086 | -1.396613 | -1.066907 | n = 6 |
| | within | | 0.2753086 | -2.044876 | -0.751893 | T = 15 |
| IRS | overall | -2.525929 | 0.1869293 | -3.036554 | -2.292833 | N = 90 |
| | between | | 0 | -2.525929 | -2.525929 | n = 6 |
| | within | | 0.1869293 | -3.036554 | -2.292833 | T = 15 |
| GDP | overall | 28.74018 | 0.3688615 | 27.94437 | 29.19856 | N = 90 |
| | between | | 0 | 28.74018 | 28.74018 | n = 6 |
| | within | | 0.3688615 | 27.94437 | 29.19856 | T = 15 |
| INF | overall | -2.438286 | 0.468855 | -3.228575 | -1.337892 | N = 90 |
| | between | | 0 | -2.438286 | -2.438286 | n = 6 |
| | within | | 0.468855 | -3.228575 | -1.337892 | T = 15 |
| IR | overall | -2.742415 | 0.497541 | -3.581776 | -2.117913 | N = 78 |
| | between | | 0 | -2.742415 | -2.742415 | n = 6 |
| | within | | 0.497541 | -3.581776 | -2.117913 | T = 13 |
| MS | overall | 27.96594 | 0.6272158 | 26.94018 | 28.83634 | N = 90 |
| | between | | 0 | 27.96594 | 27.96594 | n = 6 |
| | within | | 0.6272158 | 26.94018 | 28.83634 | T = 15 |

**Source: Author computation (2019)**

The mean gives the average value of a given variable over the period under consideration. The GDP showed the highest of mean of 28.74018 followed by MS with mean value of 27.96594. The least values of mean were ROA and IR with negative 3.215786 and 2.742415 respectively. The standard deviation illustrates the variation of the observations from the true mean. For instance, the results show that IRS deviates from its true mean by 0.1869293. It had the least standard deviation of 0.1869293 among the variables considered in the study. This indicates that the IRS data is closely clustered around the mean and was more reliable in our analysis. From the results showed the highest MS standard deviation of 0.6254613 an indication the data is spread over a range of values. It also shows that the values on these data largely contribute to the results of standard deviation. Among the variables under study, GDP had the highest attainable value of 29.19856 followed by MS at 28.83634, while the least maximum was IRS with -2.292833. The last column captures the observations for the variables under study. From the above results it can be concluded that there is no outlier in any of the variables used.

**Table 4.2: Descriptive statistics Tier 2**

| Variable | Variation | Mean | Std. Dev. | Min | Max | Observations |
|---|---|---|---|---|---|---|
| ROA | overall | -3.487166 | 0.5454411 | -6.571283 | -2.263364 | N = 172 |
| | between | | 0.3403567 | -4.159652 | -2.971616 | n = 12 |
| | within | | 0.4396424 | -6.063256 | -2.467903 | T-bar = 14.3333 |
| ROE | overall | -1.573695 | 0.6561188 | -7.156217 | -0.8746691 | N = 173 |
| | between | | 0.3803064 | -2.67631 | -1.241163 | n = 12 |
| | within | | 0.547419 | -6.053602 | -0.4391644 | T-bar = 14.4167 |
| IRS | overall | -2.525929 | 0.1864064 | -3.036554 | -2.292833 | N = 180 |
| | between | | 0 | -2.525929 | -2.525929 | n = 12 |
| | within | | 0.1864064 | -3.036554 | -2.292833 | T = 15 |
| GDP | overall | 28.74018 | 0.3678297 | 27.94437 | 29.19856 | N = 180 |
| | between | | 0 | 28.74018 | 28.74018 | n = 12 |
| | within | | 0.3678297 | 27.94437 | 29.19856 | T = 15 |
| INF | overall | -2.438286 | 0.4675435 | -3.228575 | -1.337892 | N = 180 |
| | between | | 0 | -2.438286 | -2.438286 | n = 12 |
| | within | | 0.4675435 | -3.228575 | -1.337892 | T = 15 |
| IR | overall | -2.742415 | 0.4959334 | -3.581776 | -2.117913 | N = 156 |
| | between | | 0 | -2.742415 | -2.742415 | n = 12 |
| | within | | 0.4959334 | -3.581776 | -2.117913 | T = 13 |
| MS | overall | 27.96594 | 0.6254613 | 26.94018 | 28.83634 | N = 180 |
| | between | | 0 | 27.96594 | 27.96594 | n = 12 |
| | within | | 0.6254613 | 26.94018 | 28.83634 | T = 15 |

**Source: Author computation (2019)**

The GDP had a high mean of 28.74018 followed by MS with mean value of 27.96594. The least values of mean were ROA and IR with negative 3.487166 and 2.742415 respectively. The standard deviation shows that IRS deviates from its true mean by 0.186406. From the results MS has the highest standard deviation of 0.6254613 followed by IR with 0.497541. IRS had the least standard deviation of 0.1864064 among the variables considered in the study. Among the variables under study, GDP had the highest attainable value of 27.94437 followed by MS at 26.94018, while the least maximum was IRS with -2.292833.

**Table 4.3: Descriptive statistics Tier 3**

| Variable | Variation | Mean | Std. Dev. | Min | Max | Observations |
|---|---|---|---|---|---|---|
| ROA | overall | -4.120357 | 0.8238478 | -7.418581 | -1.006763 | N = 146 |
| | between | | 0.3320595 | -4.732965 | -3.625342 | n = 12 |
| | within | | 0.7608877 | -6.805974 | -1.501778 | T-bar = 12.1667 |
| ROE | overall | -2.298197 | 0.7693918 | -5.521461 | -0.7476034 | N = 147 |
| | between | | 0.370818 | -2.825477 | -1.695105 | n = 12 |
| | within | | 0.6797276 | -4.994181 | -0.851378 | T-bar = 12.25 |
| IRS | overall | -2.525929 | 0.1864064 | -3.036554 | -2.292833 | N = 180 |
| | between | | 0 | -2.525929 | -2.525929 | n = 12 |
| | within | | 0.1864064 | -3.036554 | -2.292833 | T = 15 |
| GDP | overall | 28.74018 | 0.3678297 | 27.94437 | 29.19856 | N = 180 |
| | between | | 0 | 28.74018 | 28.74018 | n = 12 |
| | within | | 0.3678297 | 27.94437 | 29.19856 | T = 15 |
| INF | overall | -2.438286 | 0.4675435 | -3.228575 | -1.337892 | N = 180 |
| | between | | 0 | -2.438286 | -2.438286 | n = 12 |
| | within | | 0.4675435 | -3.228575 | -1.337892 | T = 15 |
| IR | overall | -2.742415 | 0.4959334 | -3.581776 | -2.117913 | N = 156 |
| | between | | 0 | -2.742415 | -2.742415 | n = 12 |
| | within | | 0.4959334 | -3.581776 | -2.117913 | T = 13 |
| MS | overall | 27.96594 | 0.6254613 | 26.94018 | 28.83634 | N = 180 |
| | between | | 0 | 27.96594 | 27.96594 | n = 12 |
| | within | | 0.6254613 | 26.94018 | 28.83634 | T = 15 |

**Source: Author computation (2019)**

The GDP had a mean of 28.74018 followed by MS with mean value of 27.96594. The least values of mean were ROA and IR with negative 4.120357 and 2.742415 respectively. The standard deviation shows that IRS deviates from its true mean by 0. 1864064.From the results highest standard deviation was on ROA at 0.8238478 followed by MS with 0.6254613. IRS had the least standard deviation of 0.1864064among the variables considered in the study.

Among the variables under study, GDP had the highest attainable value of 29.19856 followed by MS at 28.83634, while the least maximum was IRS with -2.292833. The last column captures the observations for the variables under study.

### 4.3 Correlation matrix

The table 4.4 presents the Pearson product correlation. The test measures the linear association between variables.

**Table 4.4: Correlation matrix**

| | IRS | GDP | INF | IRR | MS |
|---|---|---|---|---|---|
| IRS | 1 | | | | |
| GDP | -0.5493 | 1 | | | |
| INF | 0.3569 | -0.5387 | 1 | | |
| IR | -0.0093 | 0.129 | -0.637 | 1 | |
| MS | -0.621 | 0.9532 | 0.5496 | 0.1924 | 1 |

**Source: Author computation (2019)**

The study tested for linear relationship among the explanatory variables to check on presence of strong correlation that may lead to biased estimates. The results show existence of a strong positive correlation between MS and GDP. This high correlation could point to presence of multicollinearity. There is a weak association among other variables. There is positive but weak association between real interest rate and GDP.

### 4.4 Normality test

The test was important to determine which model fits the data on our study. The test was also important to allow for transformation on our data structures, as such transformed into natural log. The study tested for normality of the error term using Shapiro -Wilk test both on ROA and ROE models. Tested for the null hypothesis that the error term is normally distributed.

The ROA and ROE p-values on table 4.5 and 4.6 respectively are less than 0.05, as such rejected the null hypothesis.

**Table 4.5: Normality test ROA model**

| TIER 1 | | | TIER 2 | | TIER 3 | |
|---|---|---|---|---|---|---|
| Variable | Obs | Prob>z | Obs | Prob>z | Obs | Prob>z |
| ROA | 90 | 0 | 172 | 0 | 146 | 0.00009 |
| IRS | 90 | 0 | 180 | 0 | 180 | 0 |
| GDP | 90 | 0 | 180 | 0 | 180 | 0 |
| INF | 90 | 0.0422 | 180 | 0.0008 | 180 | 0.00083 |
| IR | 78 | 0.0003 | 156 | 0 | 156 | 0 |
| MS | 90 | 0.001 | 180 | 0 | 180 | 0 |

**Table 4.6: Normality test ROE model**

| TIER 1 | | | TIER 2 | | TIER 3 | |
|---|---|---|---|---|---|---|
| Variable | Obs | Prob>z | Obs | Prob>z | Obs | Prob>z |
| ROE | 90 | 0.0171 | 173 | 0 | 147 | 0.00005 |
| IRS | 90 | 0 | 180 | 0 | 180 | 0 |
| GDP | 90 | 0 | 180 | 0 | 180 | 0 |
| INF | 90 | 0.0422 | 180 | 0.0008 | 180 | 0.00083 |
| IR | 78 | 0.0003 | 156 | 0 | 156 | 0 |
| MS | 90 | 0.001 | 180 | 0 | 180 | 0 |

### 4.5 Sargan test

This tested the validity of the instruments on the following hypothesis. The results are illustrated in table 4.7.

Ho: The instruments are valid

Ha: The instruments are not valid.

**Table 4.7: Sargan Test Results**

| TIER 1 | | | TIER 2 | | TIER 3 | |
|---|---|---|---|---|---|---|
| VARIABLE | Instruments | Prob>z | Instruments | Prob>z | Instruments | Prob>z |
| ROA | 55 | 0.5771 | 86 | 0.2163 | 66 | 0.3550 |
| ROE | 55 | 0.7286 | 86 | 0.0002 | 66 | 0.5242 |

For the p-value less than 0.05, we reject the null hypothesis. Since ROA and ROE p-values are greater than 0.05, we fail to reject Ho and conclude that the instruments are valid. This shows that that the instruments can be used in place of the lagged ROA and ROE.

### 4.6 Estimation Results and Discussion

The study adopted the GMM model on dynamic panel-data as suggested by Arellano-Bond on both ROA and ROE estimation models.

**Table 4.8: One -Step Generalized Method of Moments Estimation Results**

| | **TIER 1** | | **TIER 2** | | **TIER 3** | |
|---|---|---|---|---|---|---|
| | **InROA** | **InROE** | **InROA** | **InROE** | **InROA** | **InROE** |
| InROAt-1<br>InROEt-1 | 0.5094967***<br>(0.1355136) | 0.5923611***<br>(0.1156118) | 0.7357829***<br>(0.0945932) | 0.313726***<br>(0.0702017) | 0.3712867***<br>(0.120647) | 0.3766072***<br>(0.1257712) |
| InIRS | 0.6059176***<br>(0.2174393) | 0.5668522**<br>(0.2216352) | 0.6564378***<br>(0.2520297) | 0.8219861***<br>(0.1974532) | -0.3887117<br>(0.5909507) | -0.5706539<br>(0.6106355) |
| InGDP | 0.0986361<br>(1.207295) | -0.4372205<br>(1.193998) | -0.4575403<br>(1.344718) | -1.994459*<br>(1.064736) | -3.612797<br>(3.20946) | -5.347977<br>(3.39925) |
| InINF | 0.0531159<br>(0.085627) | 0.0951497<br>(0.086741) | -0.0647483<br>(0.0993202) | 0.0117591<br>(0.0783421) | -0.2009171<br>(0.2154281) | -0.1242202<br>(0.2173425) |
| InIR | 0.0796619<br>(0.0547651) | 0.0463403<br>(0.056035) | 0.0515616<br>(0.0629757) | 0.0114879<br>(0.0499073) | 0.1717029<br>(0.1462117) | 0.2355475<br>(0.1499177) |
| InMS | 0.0967302<br>(0.479428) | 0.2408481<br>(0.4629134) | 0.2168506<br>(0.5215061) | 0.8931644**<br>(0.410168) | 0.6617336<br>(1.232955) | 1.294642<br>(1.311308) |
| Constant | 0.4893302<br>(21.36133) | 7.146858<br>(21.46974) | 7.869368<br>(24.16066) | 33.49676*<br>(19.2144) | 81.957<br>(58.10772) | 115.2714*<br>(61.3902) |
| F-statistic<br>Prob>chi2 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**Standard errors in parenthesis ***p<0.01, **p<0.05, *p<0.1**

### 4.6.1 Discussion of the Results

We proceeded to estimate the relationship using the one step system GMM estimator. We tested the validity of the instruments in levels and differences that could potentially suffer from the problem of endogeneity.

The coefficients of lagged profitability, In ROA t-1 and In ROE t-1 are positive and statistically significant across all the tier banks at 1 percent level of significance. The outcome effect shows the importance of previous year's profits in determination of current or future levels of banks' profits. The interpretation is that, when all factors are held constant , a one percent increase on previous year profits, banks profitability increases by 0.5 percent , 0.7 percent and 0.4 percent as measured on ROE on tier one, tier two and tier three respectively .On the other hand, a one percent increase on a previous year profit increases the bank's profitability by 0.6percent , 0.3 percent and 0.4 percent as measured on ROE for tier one, tier two and tier three banks respectively . This agrees with Mueller(1977) who established that profits tends to persist given a reasonable separation of the two points of time. On the other hand, the value of coefficients is high in tier one banks, an indication of high competition followed by tier two banks with lower value coefficients as compared to the tier three banks with the lowest coefficients.

IRS was found to positively affect the profitability on the tier one and tier two banks but negatively affecting profitability on the tier three banks. It also showed the importance of IRS in explaining the profitability to tier one and tier two banks given their statistically significant coefficients at 1 percent as measured on ROA and ROE. The importance of IRS is further demonstrated by the coefficient at 5 percent level of significance on the tier one banks as measured on ROE. Specifically, a one percent increase on the interest rate spread increases the bank profitability by a 0.6 percent and 0.6 percent on tier one banks profitability as measured on both ROA and ROE respectively. It also shows that, a one percent increase on IRS increases profitability by 0.7 percent and 0.8 on tier two banks as measured ROA and ROE respectively. This can clearly explain why there was decline on banks profitability immediately after the introduction of interest rates capping through amendment of banking act in the year 2016. From a credit survey report (CBK September 2017), return on assets decreased to 2.6 percent in quarter three in year 2017 from a high of 2.8 percent in quarter two in the year 2016. The return on equity also dropped to 20 percent in September 2017 as compared to 22.3 percent in June 2016. The study results are in line with Khan and Sattar (2014), who established a positive relationship between IRS and profitability. On the other hand, IRS negatively impacts on

profitability for the tier three banks. Thus, changes in interest rate spread may not influence the small banks profitability.

Real GPD was found to positively impact on profitability on tier one banks as measured on ROA. This shows an increase in GDP by one percent, increases the banks profitability by a 0.1 percent for the tier one banks. This in line with Sufian and Habibullah (2010) who established that favorable economic conditions positively influence the level of financial transactions. However, the study revealed a negative relationship on GDP and banks profitability to both tier two and tier three banks, but the coefficients were statistically significant only to the tier two banks as measured on ROE. This implies that an increase in GDP by one percent causes the profitability to drop by 0.4 percent for the tier one banks. Equally a one percent change of GDP causes a fall on profitability by 0.4 percent and 1.9 percent for tier two banks and 3.6 percent, 5.3 percent for tier three banks measured as ROA and ROE respectively. This result shows a relatively strong inverse relationship to the tier three banks and in support of the view that improved economic growth enhances business environment and lowers on barriers to entry. The resultant increased competition, reduces bank's profitability, Tan Floros (2012).

A positive relationship on inflation was found out on tier one banks. Since high inflation threatens the household liquidity affecting the capability to pay loans, the observations depict the capability of the tier one banks to hedge on the effects of inflation by advancing of foreign currency denominated loans, with low inflationary risks. It also depicts the adverse selection behavior by the six big banks to heavily invest on government instruments at the expense of lending to private investors. According to CBK (2018), there was an increased investment on treasury bill and bonds by commercial banks. However, inflation showed a negative effect on both tier two and tier three banks. According to the study coefficients, a one percent change on the inflation increases the bank's profitability by 0.07 and 0.05 to tier one banks as measured on ROA and ROE respectively. The coefficients also depict a weak positive relationship given their low value. However, the results show that a one percent increase on the inflation rates will decrease the bank's profitability by 0.2 and 0.1 measured on ROA and ROE respectively. Our study findings on the inverse relationship for the tier two and three banks are consistent with Kosmidou (2008).

The results on real interest rates established positive coefficients but not statistically significant, across all the tier banks. Aburime (2008), established a positive and strong link on real interest rate and return on assets. Staikouras (2004) also reviewed the banks performance industry in Europe for years 1994-1998 and revealed on its positive bearing on interest rate. The study results show that a one percent increase on the real interest rates causes a 0.08 percent, 0.05 percent to tier one banks as measured on ROA and ROE respectively. It also shows a weak relationship attributed by low value coefficients on real interest rate for the tier two banks. If real interest rates rise by one percent the bank's profitability on tier two banks increases by 0.05 percent and 0.01 percent measured on ROA and ROE respectively. The value coefficients to the tier three banks depicts stronger link than tier two banks on inflation. It shows that a one percent increase on interest rates causes a 0.17 percent and 0.2 percent on tier three banks profits as measured on both ROA and ROE respectively.

Money supply had a positive effect on profitability to all the tier banks. Mamatzakis et al (2003), used supply of money as a measure of banks market size and established its great influence on bank profitability. Our study findings are in line with the theory on Market Power which states that increased outside market forces results into profit thus, the importance of money supply in the study. The coefficient of money supply as measured on ROE was statistically significant at 5 percent level of significance to the tier two banks. One percent increase in money supply, increases the profitability by 0.9 percent, holding all other factors constant. The findings also show a positive and a strong relationship on tier three banks implying a one percent increase on money supply increases the bank's profitability by 0.7 percent, and 1.3 percent as measured as ROA and ROE respectively. On the tier one banks value coefficients are lowest depicting a less impact on profitability by the money supply. It shows that a one percent increase in money supply increases the bank's profitability by 0.1 percent and 0.2 percent as measured on ROA and ROE respectively.

The results further reveal that the regression performed well in terms significance and the overall fitness of the model is good. This is illustrated by a highly significant F statistic value (Prob > chi2=0.0000) across all the tier banks. This shows that all the independent variables considered in the study are important in influencing the profitability of banks in Kenya.

# CHAPTER FIVE
# CONCLUSIONS AND POLICY IMPLICATIONS

## 5.1 Introduction

This chapter presents a summary on study findings and conclusions, policy recommendations based on the findings of the study, limitations of the study and proposes further areas of research.

## 5.2 Summary and conclusion

Majority of studies have identified existence of a strong relationship between various components of internal and external factors on banks profitability. This study sought to explain the relationship on commercial banks profitability, IRS and macroeconomic determinants as control variables in Kenya, using the panel data from 2004 to 2018. Using GMM estimation model, the study results proved the persistence on profits, where a bank's current profitability is highly influenced by previous period profits. The results gave high positive coefficients and statistically significant across all the tier banks at 1% level of significance. When all factors are held constant, a one percent increase on previous year profits, increases profitability by 0.5 percent, 0.7 percent and 0.4 percent as measured on ROE on tier one, tier two and tier three banks respectively.

The purpose of the study was to estimate the effect of IRS on commercial banks' profits in Kenya. The results established that interest rate spread has a positive and statistically significant on tier one and tier two banks profitability at 99 percent and 95 percent confidence levels. The results showed a one percent increase on the interest rate spread increases the bank profitability by a 0.6 percent and 0.6 percent on tier one banks measured on both ROA and ROE respectively. It also shows that, if IRS increases by one percent the bank profitability increases by 0.7 percent and 0.8 on tier two banks profitability as measured ROA and ROE respectively.

The other objective was to estimate the effect of macroeconomic variables. The GMM estimation model showed that real GDP positively affects profits on tier one banks. However, GDP have negative relationship on profitability to both tier two and tier three banks. However, the coefficients were statistically significant at ten percent level of significance to tier two banks as measured on ROE. Inflation was found to positively influence profitability on tier one banks but negative effect was found on the profitability for tier toe and tier three banks. A

positive relationship was found out on tier one banks and negative effect on both tier two and tier three banks. The study established positive effect by real interest across all the tier banks performances. Money supply positively affect the profitability to all the tier banks but only statistically significant at 95 percent confidence level to the tier two banks as measured on ROE.

### 5.3 Policy implications

Interest rate spread has been seen a significant variable and with a big bearing on determination of banks' profits. The government through the banks regulatory authority, should work on an efficient monetary policy to ensure the Central Bank Rate, which is a component of interest charged by commercial banks is always at its lowest. This is to ensure reasonable commercial banks' lending rates after consideration of their risk and profit margins. Banks should look for more avenues on diversifying their revenues, reduce on their operational costs instead of being skewed more to increasing their lending rates margins to earn profits. This will go long way in guarding the consumers from exploitation against the high charges that could be levied on loans.

The regime of interest capping came to an end after the parliament lifted the cap following the amendment of Finance Bill 2019. This follows therefore that determination of lending interest rates is left to the market forces. This amendment has been informed by the unintended effects felt across the economy especially by private sector access to credit. Banks should therefore accept the risk profile of SMEs, while government compliments by reducing their appetite for internal borrowing to avoid crowding out lending to private sector. Since banks have lived up to the conditions of this regime, they must have discovered a business model that will allow the industry to adjust to an equilibrium. This will therefore allow a gradual repricing on loans but not a sudden increase on interest rates. This study proposes some strategies for adoption not limited to heavy investment on technology for more efficiency, diversification to other product offerings to avoid over reliance on loans for interest income.

The study also revealed less competition among the tier three banks. This informs bank managers and potential investors on the most suitable entry level to invest.

## 5.4 Limitations of the study

During the period under study three banks were put under receivership and thirteen banks opened on the same period. This made it difficult to obtain data for these banks, as such the study settled for only 30 banks. A bigger sample would have been preferable to give more reliable results. Additionally, this study covered only 15years from 2004 to 2018 due to limitations of data availability.

It was noted that few studies have been conducted specifically on the relationship between profitability and IRS in Kenya. As such there was scarcity of literature to make reference to for this study.

## 5.5 Further areas of Research

This study considered only 30 banks for a period of 15 years. Further studies should be conducted to consider a bigger coverage of banks and a longer time span. This will provide scholars with enough literature to refer for future research. Similarly, policy makers and bank managers will have additional research information to make better business decisions.

The findings of the study on the relationship of GDP and profitability is inconsistent with other studies. Further studies should be conducted in the bank industry to establish this relationship.

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