

**IMPACT OF COMPETITION ON RISK TAKING BEHAVIOUR OF COMMERCIAL
BANKS IN KENYA**

BY

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DECLARATION

This research project is my original work and has not been presented to any other university for the award of any degree.

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

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DEDICATION

I dedicate this project to my mum Charity Kaigongi, my wife Teresia Wanja, daughter Lyn Kaigongi and my sister Teresia Karegi for the support and encouragement. I will forever remain indebted to you.

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ACRONYMS

AR(1):	First order Auto correlation
AR(2):	second order Auto correlation
CBK:	Central Bank of Kenya
DFI:	Deposit taking Financial Institutions
GDP:	Gross Domestic Product
GFC:	Global Financial Crisis
GMM:	Generalized Method of Moments
HHI:	Herfindahl Hirschman Index
	Independent and Identically
IID:	distributed
IMF:	International Monetary Fund
IT :	Information Technology
KNBS:	Kenya National Bureau of Statistics
MPRATIO:	Market power Ratio
NBFI:	Non-Bank financial Institutions
NPL:	Non-performing Loans
OLS:	Ordinary Least Squares
PEV:	Post-Election Violence
ROA:	Return On assets
TBTF:	Too-Big-To-Fail
TC:	Total cost
TR:	Total Revenue
US:	United states
WDI:	World Development Indicators

ABSTRACT

A strong financial system is key for efficient performance of an economy. Banks are the dominant institution in a financial system and their health reflects the wellbeing of the entire economy. They however face a variety of risks that hamper their operations. Amongst the risks credit risk is the most important. This study uses the ratio of gross non-performing loans to gross loans in a bank's asset portfolio as a proxy for credit risk. The study assumes a competition-risk relationship and seeks to explain the nature of the relationship using an unbalanced panel data of the Kenyan commercial banks for the period from 2008 to 2015. Two measures of competition the HHI and market power ratio were used to measure competition and the system Generalised Method of Moments (GMM) estimation techniques are employed. Estimation results show that the HHI is positive and significant in both model specifications. This implies that an increase in bank competition lowers the credit risk as proxied by non-performing loans. The estimation results therefore supports the risk-shifting paradigm which suggests that when competition in the banking industry increases, fewer losses are likely to arise through non-performing loans.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Financial services sector is identified by the Kenya Vision 2030 as a key driver of the economy among other sectors such as agriculture and livestock, trade both wholesale and retail, manufacturing, tourism; business process outsourcing and other IT enabled services (Mwega, 2014). A sound financial sector in an economy takes a central place in the growth and development of the economy (Simbanegavi et al., 2014). Levine (1997) discusses five functions of financial systems which enhance economic growth. They include, risk reduction, resource allocation, exerting corporate controls, mobilizing savings and facilitating exchange of goods and services. Efficient financial systems widen access to finances and as a result lead to growth of economies.

In Kenya commercial banks are the majority institutions in the financial sector and are controlled by the Central Bank of Kenya (CBK 2015). Being the dominant institutions in the sector their efficient performance reflects the overall financial sector stability. Their efficiency in operations is however impaired by a wide array of risks that they face. Among the risks are: credit risk, market risk, liquidity risk, operational risk and compliance risk (Greuning and Brajovic-Bratanovic, 2009). While market risk, is brought about by the possibility of variations in market prices, liquidity risk comes as a result of the inability of a financial institutions to meet their obligations when due. This type of risk is measured as liquid assets over total assets, with higher ratios indicating lower risk (Greuning and Brajovic-Bratanovic, 2009). Operational risk on the other hand refers to possible losses occurring to institutions from inadequate processes and systems or due to human error or external incidents. Finally compliance risk is the risk that an institution will breach legal enactments, statutory regulations, or other relevant official provisions and internal regulations which involve the threat of financial and reputation loss (Greuning and Brajovic-Bratanovic, 2009).

Credit risk is the risk of loss arising when borrowers/customers cannot meet their payment obligations. It is measured by the ratio of impaired loans to gross loans. Higher ratio of impaired

loans over gross loans indicates that the bank in question has higher credit risk. A larger fraction of revenue for commercial banks comes from interest income making lending a major role of banks. As a result credit risk which arises from the lending activities is the most important of all banking risks (Jiménez et al., 2013).

This study will specifically focus on credit risk. Effective credit management minimizes credit losses and reduces the chances of a banking crisis. However, it is quite difficult for banks to tell precisely a particular borrower who will fail to honour their obligation to repay timely. The bank credit teams therefore ought to be aware of the various causes of credit risk to be able to formulate water tight policies in curbing the incidence of NPLs. Gitonga(2014),found that several Macro economic factors including GDP, Domestic credit, inflation rate and lending interest rate influence the credit risk in the banking sector. Moreover, Hunter and Storz (2006:124–126) notes that in the post liberalization period fierce competition for lending brought about by over capacity of banks compels banks to compete for borrowers even when knowing loosening their credit standards. As a result the banks end up into venturing in more riskier policies which according to Keeley(1990),increase the probability of NPL insinuating therefore that Bank competition is a factor in determining the bank’s risk taking behaviour. This study intends to use Kenya’s data to empirically investigate this relationship.

Whether competition is related to risk taking among banks is a widely debated topic in the banking literature. Theory holds that excessive competition threatens the solvency level of particular institutions by increasing their affinity to excessive risk taking with the effect of weakening the banking system (Keeley, 1990).No study carried out in Kenya relates competition to risk taking behaviour of commercial banks to the best of our knowledge. However, there exist several studies relating credit risk to other macroeconomic variables. For example Gitonga(2014) studied the effect of macroeconomic variables on credit risk using OLS regression and found that in the short-run only the GDP per capita growth rate was significantly related to credit risk. The study concluded however that in the long run other factors like exchange rates, inflation rate and credit growth rate impacts on credit risk.

1.1.1 An Overview of Kenya's banking sector

Ngugi and Kabubo (1998) documented that after independence Kenya inherited from the colonial government a financial system made up of the Currency Board of East Africa as a regulator, commercial banks mainly composed of foreign banks, and a few specialized financial institutions. The regulator however lacked independence. To enhance efficient operation of the monetary system, the central bank of Kenya was founded in 1966. At the time the banking sector composed of 9 commercial banks all of them foreign owned.

Various policies were implemented to ease the entry of new players in the sector and encourage local participation. This saw the number of banks and NBFIs increase steadily hitting 15 in 1980 and 23 in 1985. During this period the sector was not liberalized (Ngugi and Kabubo 1998). According to Mackton et al., (2014), between in 1974-1985 the government controlled most of the bank's operations. It directed the banks on where to open new branches and where to direct their lending without due consideration to commercial risk and return. The government also directed the bank lending to specific entities without considering their credit worthiness. Similarly, they determined the interest rates to be charged on loans. As a result, the rate of economic growth declined from 5.2% in 1973 to 1.3% in 1984.

The financial reforms process in Kenya set off in 1989. They aimed at fully liberalizing the interest rates which was achieved in 1991. Other reform policies included the abolition of credit guidelines, setting up a capital market Authority and improving the operations of DFIs and their finances. These reforms saw the banking sector grow steadily and with significant contribution to the wellbeing of the economy. The sector later followed a low interest rates policy, with adjustment for low inflation in order to maintain positive real rates, World Bank (1992).

Banking sector liberalisation saw an increase in the overall competitiveness. There was entry of new banks in the market that changed the structures of the banking market and as a result the sector saw an upward growth trajectory with unprecedented growth in all dimensions (Kamau and Were, 2013). For the period from 1998 to 2014, the industry total profits grew by over 400% to about 89.2 billion while the assets to GDP ratio grew to about 67% in 2011. Secondly bank branches grew from about 670 in 1997 to about 1664 by the end of 2014 CBK (2014). There was

also advancement of technology which enabled the banks to process data faster and also share information especially on the credit rating of the customers (Kamau and Were, 2013).According to CBK (2013) the banking sector was the fastest growing in the economy, with the rate of growth higher than that of the general economy. In 2015 the IMF sited Kenya's financial system as a case that all other Sub-Saharan African countries ought to emulate in terms of enhancing Pan African banking. In their report, Kenya and Angola were applauded for increasing banking competition and reducing transaction costs.

In terms of stability the CBK (2014) data showed that there was a rise in the levels of NPLs following the increase in interest rates in 2011 and again in 2014 following the economic slowdown. By December 2014 the level of NPL had risen to 107.1B. However the gross NPLs to gross loans fell marginally to 5.4% from 5.7% over the same period indicating a reduction in credit risks. Lately the attention in the banking sector has been on the increased levels of NPL.A number of banks have declared losses in their end of year 2015 results. However, banks especially those that possess larger market shares have continued to record huge and increasing profitability. The institutions indicated a higher strength in terms of capital adequacy. In 2014 they maintained a ratio of core capital to total deposits of 18.1%.This level was higher than the regulatory requirements. All banks met the minimum capital requirement of Kes1billion an indicator of reduced capital risk in the banking system. (CBK 2015)

Today the central bank of Kenya regulates a banking sector with a total of 43 commercial banks. Two of these are under statutory management and one is in the liquidation process. The Central Bank categorizes the banks into one of the classes either tier 1, tier 2, tier 3 or tier 4 depending on the size of their balance sheet. Tier 1 banks have a balance sheet of more than Kes.100 B, tier 2 below 100 billion but greater than 30billion, tier 3 below 30billion but higher than 5 billion. The last category is tier 4 which includes banks with a balance sheet of below 5 billion but above 1 billion (Kamau and Were, 2013)

1.2. Statement of the problem

In Kenya commercial banks have been largely faced by the problem of bad loans as indicated by non-performing to gross loans ratio. Non-performing loans eats up on the profitability of the

financial institutions. According to (Laeven and Valencia, 2008) profitability of US banks declined by about 83.5 percent during the 2007 Global financial crisis. In the past, poor credit management policies and weak corporate governance structures have been blamed for increased levels of NPLs in the financial institutions' balance sheets.

Studies carried out in various part of the world have linked competition to the risk appetite of commercial banks. Their findings are however inconclusive. While some studies such as (Caprio and Klingebiel, 1996) and (Kaminsky and Reinhart 1999) link increased competition to a surge in risk taking and hence unstable financial system and Banking crisis others such as (Boy'd et al., 2006) link increased competition to reduced risk appetite for banks. The findings of these studies cannot be generalised in the case of Kenya because they were carried out in developed economies such as the US. Kenya being an emerging economy has specific characteristics such as Weak bank supervision, political interference to the lending and credit management of banks and relatively shorter banking history. It is therefore prudent to carry out such a study with the Kenyan data.

Given the key role that banks play in an economy a banking crisis that may result from unmanaged credit risks has the potential of adversely affecting an economy restricting credit and causing very costly wide ups. Demirgüç-Kunt and Kane, (2002) noted that bank crisis are most costly for developing countries and mainly results to unemployment and output losses. Such events retard the economic growth of the country. Given the costs of bank crisis therefore and the trend of competition in the banking sector in Kenya following liberalisation, an investigation of the role of competition on risk taking behaviour and policy recommendation on the same is of primary important.

Previous studies carried out in the banking sector in Kenya, have not specifically investigated the nexus between competition and risk taking in commercial banks to the best of our knowledge. Studies in the structure of banking sector such as (Kamau and Were, 2013) indicate that the performance of the sector has been overwhelming and the contribution towards the growth of the economy impressive. However, data that is more recent indicates an increased drop in the

profitability due to increasing NPL. Consistent with the research problem, this study raises the following research questions:

- How does bank competition affect the risk taking behavior of commercial banks?
- How does other control variables such as profitability, and level of capitalization, bank size, economic growth and inflation impact on the behavior of risk taking in commercial banks?
- What policy recommendations can be made from the study?

1.3 Objective of the study

The main objective of the study is to investigate the link between competition and risk taking behaviour of commercial banks. Specifically the study will seek to:

- Examine the link between competition and credit risk in commercial banks.
- Investigate the effect of Bank specific factors such as bank size, profitability level and level of capitalization on credit risk.
- Investigate the effect of economic growth and inflation as macroeconomic conditions on credit risk.
- Draw conclusions and policy recommendations based on the study.

1.4 Significance of the study

The importance of this study lies in its attempt to unveil the factors and their magnitude that influence the behaviour of risk taking in commercial banks and more specifically, on whether competition is such an important factor to bear in mind in developing policies to govern the banks and guide credit management policies among individual banks.

The findings of the study will shed light on which of the theories: The charter value hypothesis which propounds that increased competition harms the banking sector or the risk shifting paradigm that favours increased competition best explains the relationship in question.

The study will also fill an information gap that exist by the fact that such a study has not been carried out in Kenya in the past. The findings are also likely to trigger further research on this topic.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents the theoretical literature, empirical literature and an overview of the literature of the study.

2.1 Theoretical Literature

There exist three theories that explain the link between competition and risk taking. The Charter value Paradigm, Risk shifting paradigm and a non-linear relationship, which is an attempt to reconcile the first two theories.

2.1.1. Charter/Franchise value paradigm

Charter value of a bank according to Guttentag et al., (1983) refers to a bank's net income current value on new business assuming that its office, employees, and customers does not change. This value is determined by a financial institutions authorized powers, the market structure in the area and the expertise of its employees. Charter value hypothesis is widely supported by scholars and was propounded by (Keeley, 1990).

According to the hypothesis banks with increased market power limit their levels of risks and hence able to sustain their quasi monopoly rent granted by government charters. A rise in competition (causing a reduction in their market power) would reduce the value of the charters motivating the banks to pursue more risky projects, which increases the NPLs and risks in general. Also known as, Franchise Value paradigm or competition-Fragility hypothesis in the banking literature the theory argues that smaller banks in more competitive environments are more likely to take excessive risks and therefore have a high risk of failure. In modelling the Franchise/charter value (Keeley, 1990) suggests that banks whose charter values are high arising from higher market power are able to deter excessive risk taking behaviour by banks management.

2.1.2. Risk Shifting Paradigm

Contrary to the charter Value hypothesis is the risk-shifting paradigm. This theory deviates from the past studies by introducing competition in the loan market as opposed to the deposit market. The theory propounds that when the market power of banks increases they end up charging higher rates to borrowers who then have trouble in repaying. The entrepreneurs facing higher interest rates end up increasing the risk of their investments projects a practice that leads to more problematic loans. This theory was propounded by (Boyd and De Nicolo, 2005). In the banking literature it is also called competition-stability hypothesis and considers more competitive banking systems more stable than less competitive ones.

This proposition is however highly criticized because of its inapplicability in the loan and deposit market. In a later work (Boyd and De Nicolo, 2006) assume that banks holds risk free assets other than giving loans. In the model unlike the previous one the relationship between competition and bank risk does not confirm previous findings. It finds that increased competition will only affect the ratio of the loans to deposit.

To reconcile the conflicting paradigms Martínez-Miera and Repullo, (2007) Proposed a model that argued that the monotonic relationship between competition and market power becomes U-shaped. The model argues that the increase in risk because of lower market power due to increased interest rate balances against the higher margins from firms which are able to repay even after increase in interest rates. Therefore there is a possibility of an initial decline in risk with increase in competition and an eventual increase in risk levels as competition continues to increase.

2.2 Empirical Literature

Various studies have been carried out to investigate the trade-off between competition/Market power and bank risk taking. The studies have yielded Contrasting results.

Keeley, (1990) used the Tobin's q computed as the bank equity market valuation divided by its book value to proxy for the degree of bank competition in the U.S banking market. The study showed that liberalization eroded the Tobin's q with higher market power resulting to higher

solvency coefficients and lower market power means increased risk of bankruptcy. His findings support the franchise value paradigm.

Beck et al., (2006) found evidence to support the franchise value paradigm. This study used concentration measures as proxy for competition and on a cross-country approach; using data from 69 countries and covering a period of 20 years found that more concentrated banking sectors are less likely to fail as a result of risk taking. In the study, they used the market share of the 3 largest banks as a proxy for competition. This measure however is inappropriate proxy for competition since competition and concentration do not mean the same thing.

Fernández et al., (2015) studying the Mexican Banking sector used Lerner index and HHI as measures of competition. In the study z-index was used to measure bank stability while NPL measured the portfolio risk. Using one step GMM to estimate their models the study found that competition is positively related to financial stability. The study however ignored the effect of Business cycle or the macroeconomic conditions on the stability and the level of portfolio risk among the banking institutions.

Berger et al., (2009) regressed measures of loan risk, bank risk and bank equity on several measures of market power including the Lerner Index and HHI and indicators of business environment to test for competition-stability and competition-Fragility hypotheses. The study used a cross-country approach, and sampled 8235 bank in 23 developed nations, and found evidence in favour of the traditional competition-stability hypothesis that market power increases loan portfolio risks. The study however focussed on developed countries only.

Cihák et al., (2006) conducted a cross-country study of 38 countries, using the Panzaar and Rose H-statistics as a proxy for banking sector competition and provided evidence in support of risk shifting paradigm. The study used duration analysis and showed that more competitive banking systems are less prone to crisis and also that time to crisis is longer in competitive banking systems.

Boyd et al., (2009) used several measures of risks such as the standard deviation of ROA and of competition such as HHI and provided support for risk shifting paradigm. The study examined

two different data samples; a cross section of 2500 small rural banks and operating in one rural area and a panel data of about 2700 banks from 134 countries. In both cases the study confirms existence of significance negative trade-off between bank concentration index and Z-score.

Jiménez et al., (2013) using the Lerner index as a proxy for competition and NPL for the level of risk taking and controlling for the macroeconomic conditions and specific bank characteristics found evidence in favour of Franchise value paradigm. The study too used HHI index as an alternative measure of competition to take care of biases that may arise in estimating the Lerner index especially in identify the cost items and pricing for banks.

Yaldiz and Bazzana, (2010) investigated the effect of market power on bank risk taking for Turkish banks during the period 2001-2009 used both the Lerner index and the difference between total revenue and total cost over total revenue as proxy for market power to over-come the biases that may arise from misspecification of the Lerner index. The study employed both static and dynamic panel data and found evidence supporting the competition stability hypothesis.

Beck et al., (2011) attempted to reconcile the conflicting evidence on the phenomenon argued that regulation and supervision together with other institutional factors are likely to make the data to favour the Franchise value paradigm over the risk-shifting paradigm. The study employs a cross-country approach of 62 countries and holds the measure of competition constant to test the behaviour across countries. The study documents that the support for either the theories will vary across countries over time. The cross-country approach however requires availability of huge array of data which is difficult task given the scope and time of this study.

Kick and Prieto (2013) investigated the bank competition-stability nexus using data from Deutsche Bundes bank for the period 1994 to 2010. The study used bank defaults as the proxy for bank risk taking while controlling for some time varying characteristics of banks likely to influence competition and Lerner index to proxy for competition. The results of the study supports Franchise value paradigm. However, the results are in support of the risk-shifting

paradigm when Boone Indicator and regional Branch share are used as a proxy for Risk taking and competition respectively.

2.3. Overview of Literature review

In the theoretical literature section, there are the two main theories that explain the link between the bank competition and risk taking; franchise value paradigm and risk-shifting paradigm. A further section of the theory incorporates both the negative and positive relationship at different ranges of competition.

In the empirical literature, studies carried out at different parts of the world in both developed and emerging economies yield conflicting results. Employing different techniques in analysing data and measuring variables also leads to varying results making it difficult to draw clear conclusion on the exact nature of the relation. This study will therefore use data from Kenya to investigate the impact of competition on the risk taking behaviour of commercial banks.

CHAPTER THREE

METHODOLOGY

Introduction

This chapter describes the methodology adopted in carrying out the study. It includes the theoretical framework, the empirical model, definition and measurement of variables, the econometric approach and sources of data.

3.1 Theoretical Framework

The banking literature groups the measures of competition into two major categories; the structural and non-structural measures. The structural measures give an indication of a bank's market power on top of describing the market structure. They include measures of concentration and are able to capture the structural features of a market and also reflect changes in market concentration when a new player enters the market. In a number of previous studies in the banking literature, competition is considered a structural phenomenon and as such studies employs structural measures to measure competition. Fungáčová and Weill, (2013) argued that greater concentration is associated with less competition.

This study used a concentration measure called Herfindahl Hirschman Index (HHI) which (Bikker and Haaf, 2002) defined as the sum of squares of bank sizes measured as market shares and computed as:

$$HHI = \sum_{i=1}^n S^2$$

Where S=Total assets of bank i and n is the number of banks.

This measure is very useful especially in the US in the enforcement of antitrust laws in banking where an application for a merger is evaluated on the resulting value of the HHI index capped at 0.18. (Bikker and Haaf, 2002) however noted that competition is not the same concentration since even at high levels of concentration banks can exhibit competitive behaviours. This indicates a possible weakness of HHI as a measure of competition. To overcome this problem we employed

a second measure of competition called market power ratio (MP ratio) computed as the ratio of the difference between total revenue and total cost to total revenue.

Thus:

$$MP\ Ratio = \frac{TR - TC}{TR}$$

Where TR=Total Revenue and TC is Total Cost.

The ratio simply evaluates the market power of banks as their ability to increase output without increasing their costs. It does not specify any factor prices as is the case for Lerner index and therefore does not suffer any factor misspecification biases.

The major assumption in this study is that competition impacts on the risk taking behaviour of banks either positively or negatively according to the franchise value and risk shifting hypothesis respectively or the two produces a U-shaped relationship implying that at some range an increase in competition will decrease the appetite of taking risks amongst commercial banks beyond which the relationship levels off and soon start rising. It is further assumed that bank risks are severe at times of economic depression and therefore related with macro-economic variables. At such times borrowers experience difficulties in meeting their obligations to pay off their loans leading to a surge in problematic loans. The study also assumes that the behaviour of risk taking among banks depends on other characteristics specific to banks such as the size of a bank, level of capitalization and profitability.

Basically the study relates the bank risk variables with various factors broadly classified as market power, bank specific and macroeconomic variables. The market power variables are our major explanatory variable, while the bank-specific and macroeconomic factors are the control variables.

The study assumes the following relationship.

$$Risk = F(\text{Market power, Bank Specific variables, Macroeconomic variables})$$

3.2 Empirical Framework

We specified a benchmark model as;

$$R_{it} = \alpha + \delta R_{it-1} + \sum_{k=1}^K \beta_k X_{it}^k + \sum_{l=1}^L \beta_l X_{it}^l + \sum_{m=1}^M \beta_m X_t^m + \varepsilon_{it} \dots \dots \dots (3.1)$$

With $\varepsilon_{it} = \tilde{v}_i + \mu_i$

Where R_{it} is the credit risk level of bank i at time t .

α is a constant of regression

R_{it-1} is the one-period lagged level of credit risk.

δ is the speed of adjustment.

v_{it} is the idiosyncratic error and

μ_i is the unobserved bank effect where $V_{it} \approx IID(0, \delta_v^2)$, and $\mu_i \approx IID(0, \delta_\mu^2)$.

X^K, X^L & X^M Represent a vector of market power variables, bank specific and macroeconomic factors respectively while β_k, β_l & β_m are the slope coefficients. The equation is augmented with a one year lagged dependent variable to control for the tendency of credit risk to persist over time reflecting the existence of intense competition or the pro-cyclical risk taking behaviour in line with the macro-economic conditions (Ramayandi et al., 2014)

The estimation model therefore becomes;

$$NPL_{it} = \alpha + \delta NPL_{it-1} + \beta_1 Comp_{it} + \beta_2 BS_{it} + \beta_3 NPA_{it} + \beta_4 Ea_{it} + \beta_5 GDP_t + \beta_6 CPI_t + \eta_i + \varepsilon_{it} \dots \dots \dots (3.2)$$

Where NPL_{it} denotes the ratio of non-performing loans to total loans representing the credit risk of bank i at time t .

NPL_{it-1} is a one year lag of the non-performing loans,

$Comp_{it}$ represents the two measures of competition/Market power of banks i at time t .

BS_{it} , NPA_{it} and Ea_{it} are bank specific time variant variables proxies for bank Size, profitability, and capitalization respectively.

GDP - Gross Domestic Product growth rate of the current and one year used proxy for the state of business cycle.

η_i - Unobservable Bank fixed effects constant over time.

ε_{it} -Random error term with a normal distribution

3.4 Definition and measurement of Variables

The response variable in the study was the level of banks credit risk proxied by NPL and computed as the value of non-performing loans over the totals loans of the banks. On the other hand the explanatory variables are the level of competition/Market power, and bank size, the level of profitability, level of a banks capitalisation and finally the level of GDP growth rate and the CPI. As stated earlier the study will incorporate a one year lagged dependent variable as a regressor to control for the fact that the NPL in a particular year influences NPLs in the subsequent years. We analysed how each of these factors influenced Bank risk taking behaviour.

3.4.1. Competition index

This was our major explanatory variable. The study used the Herfindahl Hirschman Index as a proxy for competition/Market power. The index captures the market structure and also changes in market concentration in the event of a new entrant in the market. A second variable denoted by MP ratio, computed as the ratio of the difference between a banks' total revenue and total expenditure to total revenue was also used. Higher market power indicates lower competition and as a result significant negative values of coefficient of HHI and MP ratio would be evidence for the Franchise Value. On the other hand significant positive values would be evidence for the risk shifting paradigm. Before the study was done the sign of the coefficient of this variable was indeterminate.

3.4.2. Bank Specific Variables

Bank size

The link between the bank size and risk may not be clear before the study is done. Saunders et al., (1990) explain that larger banks are less risky since they are more diversified and have better risk screening models. Such Banks however enjoy the TBTF status which may attract them to greater risks. The sign of the coefficients of this variable could either be positive or negative.

In this study the variable was represented by the ratio of a bank's asset to the total assets in the banking sector. Denoted by BS the variable was used to control for the effect the size of a banking institution has on its risk taking appetite.

$$\text{Thus BS} = \frac{\text{Bank Assets}}{\text{Total Assets in the sector}}$$

Capitalization Level

This variable was used in our study to control for the level of capitalization of a banking institution. Denoted by EA the proxy for capitalisation was computed by dividing the total shareholders' equity by the total assets of the bank. According to (Bremus and Buch, 2016) banks that have riskier loan portfolio may need higher capital buffers to insure against the resulting credit risk. As a result the co-efficient of EA is expected to be positive. It reflects the level of financial leverage degree of a bank.

$$\text{Thus } EA = \frac{\text{Shareholders Equity}}{\text{Total Assets}}$$

Profitability

This variable was used to control for the level of performance in each bank. It is computed as the Net Profits/Losses over total Assets .The variables controls for the effects of profitability on the risk variables. This proxy for profitability was used to capture the trade-off that banks face between risk and return, following (Buch and Lipponer, 2007).Love and Pería, (2015), noted that the profitability of a bank increases their charter value and therefore higher profitability reduces bank risk-taking. The coefficient of the variable therefore was expected to have a negative sign. Denoted by NPA the variable is computed as:

$$NPA = \frac{\text{Net Profits(Losses)}}{\text{Total Assets}}$$

3.4.6. Macro-Economic Conditions

Gross Domestic Product Real growth rate.

In controlling for the Macro-economic conditions the model will use the current GDP growth rate. In times of depression when the GDP real growth rate is expected to be low there is expected to be huge defaults in loan repayments.

Level of inflation.

We use the variable CPI to control for the level of inflation. According to Gitonga (2014) the level of inflation is a significant determinant of Credit risk. Increased level of inflation impacts

on the household and firms' budget and hence hampers their ability to repay banks loans hence increased levels of NPLs. Bohachova et al , (2008)noted that with high rates of inflation earnings of existing borrowers are negatively impacted and therefore the quality of previously extended loans is impaired.

Table 3.1:Summary of variables and measurements

Variable	Measure	Expected sign effect	Source
NPL	Non-Performing loan ratio/Total loans(%)		WDI/CBK
Bank size BS	Percentage asset share in the sector	Indeterminate	CBK
Capitalisation level EA	Ratio of total equity to total assets	Positive	CBK
Profitability level NPA	Net Profit (losses)/Total Assets (%)	Positive	CBK
Herfindahl Hirschman Index	HHI(Squared-bank size/total assets)	Indeterminate	CBK,
Mp Ratio	Total Revenue-Total expenses/Total revenue	Indeterminate	CBK
Gross Domestic Product (GDP)	Annual GDP growth	Positive	WDI
Inflation (CPI)	Growth in consumer price index	Negative	KNBS

3.5. Econometric Approach

This study employed an unbalanced panel data of the Kenyan commercial banks for the period 2009-2015. Panel data reveals a wide range of information necessary in investigating any particular phenomenon since it incorporates both the time series and the cross-section

dimensions. Panel data models are either Static or dynamic. While Dynamic models include lags of the dependent variables among the regressors static models does not.

In banking institutions NPLs have a tendency to persist along the business cycle implying that the level of a current year's NPL influences the succeeding period's NPLs. For that reason we adopted the dynamic panel data model. The inclusion of dynamics in our models brings complications that would lead to biased and inconsistent estimates by OLS. If we Omitted the dynamics our study would have suffered worse problems of misspecifications while just a within transformation would still have brought a downward bias a problem called the Nickel Bias (Nickel 1981). This is because the lag is related to the dependent variable making the error term not independently distributed. As a result we diverted from using the OLS either in fixed effects or random effects to estimate the model since the estimators obtained would be biased and inconsistent.

We employed the Generalised Method of Moments (GMM) technique as proposed by Arellano and Bond, (1991). However due to the small size of T in our study we took the criticism by Arellano and Bover, (1995) and Blundell and Bond, (1998) that the estimator is inefficient if the instruments used are weak and adopted the System GMM proposed by (Blundell and Bond, 1998). This estimator also controls for unobserved heterogeneity. We derive it by estimating a system of two equations, one in levels using lagged first differences as instruments and the second in first difference and using lagged levels as instruments. We also chose to use the two step system GMM estimator since the one step estimation assumes homoscedastic errors implying that it's less efficient than the two step estimation.

Secondly the error component in our study was likely to include some unobservable time effects especially due to changes in regulation and other development in Kenya's Banking sector so that it takes the form:

$$\varepsilon_{it} = \delta_i + \gamma_t + \mu_{it}$$

Where γ_t is unobservable time effects.

We tested the joint significance of the unobservable time effects by the Null Hypothesis:

$$H_0: \gamma_2 = \gamma_3 = \dots \gamma_t = 0$$

Secondly we run a LM test and if we happen to reject the hypothesis we include a year dummy variables to account for γ_t . We experiment this with many year dummies and include only those with significant coefficients.

To confirm the validity of instruments used, we conducted a Sargan-Hansen test of over identifying restrictions. In this test the Null Hypothesis of instruments validity which is asymptotically distributed as $\chi^2(k)$ with degrees of freedom equal to the number of instruments minus the number of parameters estimated.

Lastly we run a test for serial correlation among residuals to confirm that the orthogonality conditions of Arrelano and Bond are satisfied. Baltagi, (2008) notes that absence of autocorrelation in the levels equation means presence of a negative first order autocorrelation in error terms in first difference equations and zero second order auto correlation in first difference equations. In this test we will set a Null hypothesis that there is a zero second order autocorrelation in the residuals of the first differences equations and rejecting it will mean we also reject the hypothesis that error terms in the levels equation are not auto correlated.

Data Sources

This study draws data from the Kenyan annual Bank's statement of financial position and income statements as reported to the Central bank of Kenya. We include data for the seven years period 2009 to 2015 with the aim of focusing on the post Global financial crisis (GFC) and Post-Election Violence (PEV) crisis that caused huge economic shocks in Kenya. Additional Data for GDP and CPI will be obtained from the World Bank and IMF development indicators database.

CHAPTER FOUR

EMPIRICAL RESULTS AND DISCUSSION

4.0 Introduction

In this chapter we present empirical findings of the Study. This includes descriptive statistics, correlation matrix, data trends, and the regression results.

4.1. Descriptive Statistics

In Table 2 we discuss the summary statistics for the variables in the study. The non-performing loans for the period averaged 6.1% with about 8.5% standard deviations reflecting a considerably high variability in credit risk amongst the individual banks. A median of 5.5% implies that few observations fell above the average and a majority were clustered below the mean. It is also interesting to note the minimum NPL of zero indicating high quality assets portfolio by some institutions and a maximum of 65%. This exhibits different efficiencies individual banks credit management policies.

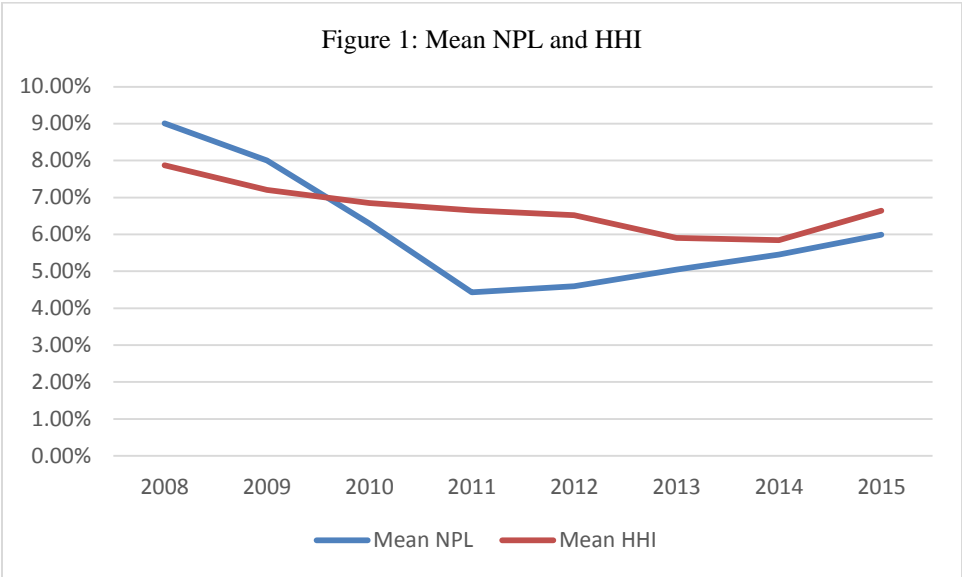
Table 4.1: Summary Statistics

VARIABLES	N	Mean	SD	Min	Max	Median
NPL	330	0.0612	0.0853	0	0.658	0.0552
MP Ratio	283	0.206	0.873	-13.55	0.783	0.295
Bank Size	332	0.0279	0.0371	0	0.162	0.0104
capitalisation	332	0.172	0.108	0.0271	1.124	0.152
profitability	331	0.0231	0.0244	-0.107	0.117	0.0242
GDP Growth Rate	336	0.049	0.0223	0.002	0.084	0.0545
Inflation	336	0.103	0.0667	0.04	0.262	0.0805
HHI	336	0.0669	0.00619	0.0585	0.0787	0.0665

The mean of our independent variables of interest including MP ratio and Herfindahl Hirschman Index are 21% and 6.69% both consistently indicating a fairly competitive market since a lower HHI denotes increased level of competition. These findings confirm (Gaertner and Sanya, 2012) who showed that Kenya had a more competitive banking sector that could be compared with that of South Africa and Nigeria. The huge standard deviation of MP ratio indicates the

greater variability in individual bank's market power while, a low standard deviation by the HHI indicates a little variability in levels of competition from 2008-2015.

Figure 1 shows that the average level of HHI took a steady fall from 2008-2015 indicating an increasing competition trend following the regulations enhancing a competitive environment and entry of new firms in the market.



Similarly, the non-performing loans took a declining trend after it had risen to about 8% in the period of PEV (Post-Election Violence) .During the period after Kenya held the 2007 December general election, the outcome of the process was disputed which erupted civil unrests that disrupted the economic activity and led to massive loss of properties slowing down the economic activities with a negative impact on investment and employment. At exactly the same period the world was experiencing the Global Financial Crisis (GFC) that(Were et al., 2012) described as the worst since the Great Crash of 1929 and the great Depression. The GFC was associated with massive banks failure.

Later in 2014 the trend of mean NPL took an upward trend mainly triggered by Central Bank of Kenya's Regulation on what was to be categorised as non-performing assets.

4.2 Correlation Analysis

We run a pair wise correlation test and provide the results in Table 4.2. Gujarati (2004) noted that if the regressors are highly correlated there is a risk of obtaining inaccurate estimates since multi-collinearity inflates the coefficient of standard errors hence affecting the predictors. To affirm the absence of multi-collinearity the coefficient of correlation should be less than 0.8. Table 4.2 shows that the level of inflation and GDP growth rate are almost negatively perfectly correlated with a correlation co-efficient of -0.8253. To remedy this we avoid including the two variables in the same estimation. We proceed with our subsequent estimations first with inflation as the only macro-economic variable and repeat the second with GDP growth rate to remedy this problem of collinearity.

Table 4.2: Pair wise Correlation Matrix

Variable	NPL	MP-RATIO	BS	EA	NPA	GDP	CPI	HHI
NPL	1							
MP ratio	0.018900	1						
BS	-0.1946*	0.1379*	1					
EA	0.1947*	-0.1365*	0.1550*	1				
NPA	-0.1970*	0.2320*	0.3316*	-0.0517	1			
GDP	-0.026800	0.1537*	-0.0089	-0.0622	0.001	1		
CPI	0.002900	-0.1570*	0.0174	0.0249	-0.0241	-0.8253*	1	
HHI	0.026000	-0.1590*	0.0067	0.039	0.1102*	-0.6183*	0.7253*	1

*significant at 0.05 level (2-tailed)

We further observe that correlations between other regressors are not perfect though significant. MP ratio is found to be significantly correlated with all the other regressors. Bank size is significantly correlated with both the level of capitalisation which implies that the institutions with more assets in the sector are better capitalised and are also likely to report higher profits. A significant negative correlation between HHI and NPA implies the possibility of a decline in profitability in the event of a decrease in competition (HHI rise). Finally we find that bank size, level of capitalisation and profitability are all significantly correlated with our measure of credit risk implying that smaller banks that are better capitalised and reports small profits are likely to have poorer quality of assets in their portfolio.

4.3. Estimation results and discussion

The F test indicates the goodness of fit of our model. In this test the null hypothesis is that the coefficients in our regression equation are all zero. A value lower than 5% indicates null hypothesis rejection implying that our coefficients as a group are significantly different from zero a clear indicator that our model is fine. We also present the Hansen J test, a test for over-identifying restrictions. Basically this test has a null hypothesis of ‘the instruments as a group are exogenous’. A p-value higher than 0.05 implies failure to reject the hypothesis therefore validating the choice of our Instruments. Although we have included both AR (1) and AR (2) our major interest is in AR (2) since it detects autocorrelation in levels. This is a test to confirm if the Arrelano and Bond orthogonality conditions are met. The null hypothesis is “No autocorrelation”, and a p-value greater than 0.05 implies failure to reject the hypothesis. Our study exhibits a p-value of above 5% in both estimations and therefore confirming the Arrelano and Bond orthogonality conditions.

Table 4.3: Two-step system GMM estimation results (dependent variable: NPL)

Variable	Notation	Variant of model specifications	
		1	2
Lagged NPL	NPL_{t-1}	0.180*** (32.18)	0.189*** (20.02)
Bank Size	BS	-0.647*** (-18.13)	-0.707*** (-27.49)
Capitalisation	EA	0.0838*** (13.45)	0.0811*** (10.69)
Profitability	NPA	-0.420*** (-11.16)	-0.406*** (-14.18)
Herfindahl Hirschman Index	HHI	1.575*** (52.90)	0.936*** (43.29)
Market power Ratio	MP RATIO	-0.003 (-0.88)	-0.003 (-0.80)
Gross Domestic Product growth Rate	GDP		0.358*** (17.86)
Inflation	CPI	-0.267*** (-20.46)	
F-test		F(7,41)= 48085.56 Prob(F)=0.000	F(7,41)= 263994 Prob (F)=0.000
Hansen J		$\chi^2(38) = 37.40$ Prob>chi2=0.497	$\chi^2(38) = 36.99$ Prob>chi2=0.516
AR(1)		z = -1.41 p-value = 0.158	z = -1.40 p-value = 0.161
AR(2)		z = 1.01 P-value = 0.497	z = 1.03 P-value = 0.301

This Table presents estimations using System GMM estimation. We present T-Statistics in parentheses. Significance levels at the 10%, 5%, and 1% level is denoted by *, ** and *** respectively.

The results of both of our estimations indicate a significant coefficient of the lagged dependent variable. This confirms the findings of Jimenez (2013) that credit risk tends to persist reflecting pro-cyclical risk taking behaviour in line with business cycle dynamics (Kingori, 2015). It denotes the speed of adjustment to equilibrium. A small value close to zero but significant denotes a high speed of adjustment whereas a value close to one indicates a slow adjustment process. In our study the coefficient is about 0.18 implying that the speed of NPL adjustment to its mean is relatively high. As expected the lagged variable has a positive sign implying that its overall effect on the dependent variable is positive.

Our variable of interest is the Herfindahl Hirschman Index (HHI) whose coefficient is positive and significant in both model specifications. We however did not find the coefficient Mp -ratio our second measure of competition to be statistically different from zero. The positive and significant coefficients of HHI in both estimations imply that an increase in HHI causes an increase in NPL. But since an increase in HHI implies a decrease in competition our estimation results suggest that a decrease in competition raises the level of NPL. These findings support the risk shifting paradigm and consistent with Cihák et al., (2006) and Boyd and De Nicolo, (2009)

With regard to bank specific factors, this study finds the coefficients of bank size to be negative and significant confirming the findings of (Saunders et al., 1990) that larger banks have better credit screening models and are thus less likely to experience huge NPL build-up. Making similar conclusions after studying the Spanish banks, Jimenez et al (2013) associated this with the ability of larger banks to diversify their portfolio and their ability to hire better management who are able to cushion the banks against increasing credit risk.

In our regressions we used the level of profitability to capture the trade-off faced by banks between risk and return. In both estimations the coefficient of profitability was found to be negative and significant which supports Love and Pería, (2015) findings who noted that when the profitability of a bank increases, their Franchise value increases too reducing their risk taking appetite. The results imply that banks that are more profitable have a lesser affinity to risk taking than those that are less profitable.

We also found the coefficient of capitalisation to be positive and statistically different from zero. This implies that banks which are better capitalized are more likely to take more risk. The

findings are in line with a recent study (Bremus and Buch, 2016) that banks which have enough capital buffer are likely to take more risks. It shows the tendency of banks to be attracted to more risks as their shareholder equity to total assets grows. This could be explained by the tendency of banks to offset risks by higher capitalisation levels.

Turning to macroeconomic conditions the study findings indicate that the level of inflation is significant and negative. This implies that when inflation is high banks shy off from lending, or become selective in their lending by tightening their lending policies. Banks lend only to some specific sectors that they consider less risky. The findings however contradicts Gitonga (2014) which concluded that inflation impacts on credit risk positively thus during high inflation firms are negatively affected and their ability to repay their loans impaired. The coefficient of GDP growth in the second regression is found to be significant and positive implying, that banks increase their loans portfolio and consequently their credit risk as Gross Domestic Product increases.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.0 Introduction

The main objectives of this study was to seek to understand the influence that competition has on the bank's risk taking behaviour. We specifically drew our attention to credit risk being the major risk among commercial banks. We employed Non-performing loans to proxy for credit risk and on the other hand used two variables to proxy for bank competition. The first variable is a measure of concentration called HHI while the second one denoted by MP-ratio, is computed as the total revenue minus total expenditure over total revenue. According to (Yaldiz and Bazzana, 2010) this measure does not restrict any input or output or specify factor input like other conventional measures of competition such as Lerner index or HHI and is therefore free from any misspecification bias in measuring the bank's market power.

5.1 Summary of the findings

Using a dynamic panel data of the Kenyan banking sector for the period 2008-2015 our results supports the risk-shifting paradigm. This suggests that when competition in the banking industry increases, fewer losses are likely to arise through non-performing loans. We also found capitalisation to have a significant positive influence on the risk taking behaviour. This could probably be because banks try to offset risk by higher capitalisation levels. The size of the bank was also found to be significant in determining the level of credit risks in banks. The study found that large banks are less likely to build up NPLs. Profitability was also found to significantly impact the credit risk levels. Banks that are more profitable were found to have a tendency of keeping their credit risks low. Economic growth is also found to be an important factor in influencing the credit risk levels among banks with higher risks being incurred during times of increasing Gross Domestic Product Growth. It was further found that less credit risk could be witnessed when inflation rates were high. This suggested that banks, as a strategy to strengthen their credit management policies shy off from giving credit to a number of sectors during times of inflation which could bring down the Non-Performing loans.

Lastly the Non-performing loans were found to persist along the business cycle with a relatively faster rate of adjustment in Kenya. Persistence of NPLs implies that in the event of a shock in the banking sector that could either increase or decrease the level of NPL the process of adjustment to the average levels takes some time. The effect of such a shock is felt in subsequent years.

5.2 Conclusion

This study used a robust approach to investigate the nexus between competition and risk taking. The result of the study support the risk shifting paradigm that propounds that competition is negatively related to risk levels in commercial banks. This implies that when competition is enhanced in the banking sector less of Non-performing loans will be reported by banks. The results also confirm tests confirm negative relationship between profitability and credit risk, implying that more profitable banks have less credit risk. The study also confirms that larger banks have lesser credit risks than small ones while better capitalized banks are more attracted to credit risks than less capitalised ones. The study also found that banks are likely to accrue less credit risks during times of higher GDP growth rate and less at times of inflation.

5.3 Policy Implication

As a policy suggestions therefore, competition should be fostered in the banking sector. Policies such as free entry into the market, uncapped interest rates and lower capital requirements which enhance entry of new firms in the market should be adopted. The Central Bank of Kenya should also consider lifting the moratorium on banks to enable new banks to be incorporated. This will stiffen competition and as a result reduce credit risks. As a result the sector will avoid the build-up of non-performing loans that could lead to severe financial crisis and also the emergence of Too-Big-To-Fail (TBTF) financial institutions.

5.4 Areas for further research

This study could be extended by investigating how competition impacts on risks in banks with different ownership structures. A different study could also be carried out to investigate the effect of competition on different types of risks including market risk, operational risks, security risks and all other types of risks earlier mentioned. Other measures of competition such as Lerner index could also be incorporated in further studies in this area.

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