

## The Effects of Income Diversification and Non –Performing Assets on Interest Spread among the Kenyan Commercial Banks.

Peter Mwangi Maigua<sup>1\*</sup> Charles Ndegwa Mugendi<sup>2</sup> Stephen Gitahi Njuru<sup>3</sup>

1. School of Economics, Kenyatta University, P.O Box 43844, Nairobi, Kenya
2. School of Economics, Kenyatta University, P.O Box 43844, Nairobi, Kenya
3. School of Economics, Kenyatta University, P.O Box 43844, Nairobi, Kenya

\* E-mail of the corresponding author: pmmaigua@gmail.com

### Abstract

Banking institutions plays a major role in a country's and global economy. An efficient financial intermediation has a direct impact on effectiveness of investable resource mobilization, and thus, economic development. A major indicator of efficiency in banking sector is the interest rate spread which indicates the level of financial sector's development. Therefore, a major goal in financial sector deepening and financial liberalization is the narrowing down of interest spread. In Kenya various structural changes intended to lower interest rate spread were initiated by the Central Bank of Kenya (CBK) since interest rate liberalization in early 1990s, but as documented in various *Monetary Policy Statement* issues and acknowledged by the Industry players and policy makers, interest rate spread remained high. But commercial banks have undergone a lot of changes characterized by new business models anchored on enhanced technologies and innovativeness; income diversification and others, in order to help them in reducing interest rate spread. Therefore this study sought to establish the effect of income diversification and non-performing assets on interest rate spread among Kenyan commercial banks. While few studies had been conducted in this subject, none had captured the post economic crisis period in a broad way. Further, income diversifications, a product of commercial bank evolution in the period under study, received little attention. The study used quarterly bank-specific, industry specific and macroeconomic data between 2004 and 2014. Random effect regression analysis was used to meet the objective. Regression results indicated a 0.11 percent fall in spread following a 1 percent increase in the proportion of non-interest income to total income. No significant relationship was observed between spread and non-performing assets. But market concentration and operation cost had significant positive relationship. On the other hand, increased illiquidity in commercial banks reduced spread. The study recommends focus on operational efficiency, income diversification, market competition, reduced return's appetite and scaled credit information sharing.

**Keywords:** Income Diversification; Nonperforming Assets; Interest rate spread; Banking Institution.

### 1. Introduction

Agents in the financial sector play a critical role in amelioration of difficulties created by information asymmetry in financial markets. Financial intermediation involves savings mobilization, pooling and diversification of risks and provision of loans through allocations to various sectors of an economy. The unsynchronized deposit mobilization and loans provision results to particular costs accruing to intermediary institutions. In this process, they pay interest rate for deposits and charge interest on loans in the uncertain environment. The difference between interest charged on loans and deposits gives the interest rate spread. Interest rate spread can be examined ex-ante or ex-post. Ex-ante approach draws inferences by considering the difference between deposited rate and lending rates as per the contracts. Ex-post uses income statement and balance sheet components to determine the effective rate earned from loans and effective rate paid on deposit. It's a measure of efficiency in intermediation process in the financial sector. A major goal in financial sector deepening and financial liberalization is the narrowing down of interest spread (Folawewo and Tennant, 2008).

The global banking industry has been undergoing tremendous changes characterised by income, regional and counterparties diversifications. This diversification has been spurred by deregulations and sector liberalization observed in the last two decades (Kiweu, 2012). Further, competition pressure has increased, both among the banks and from non-banking institutions. As such, gains from intermediation process have been squeezed and cost efficiency reduced. In effort to overcome competition pressure and dwindling intermediation margins, banks have resulted to income diversification (Kiweu, 2012).

In absence of competitive environment, particularly through control policy regime, the growth of financial assets and diversifications are limited. Consequently, the semi-diversified financial market result to huge idiosyncratic risks for which premium has to be paid over and above systematic risks premiums, thus increasing the interest rate spread. As such, reduction in the levels of risk in the intermediation process catalysis investments and savings. Key to risks and costs in the financial sector arises from information asymmetry. Integral to inefficiency systems arising from information asymmetry is weak legal system that introduces ambiguity in contractual enforcement and rule of law. Major concerns in banking sector involves restriction on diversions of borrowed funds, constitution of enforceable contracts and lack of full disclosures that leads to both adverse selection and moral hazards in banking intermediation processes. To caution against these risks, banks results to high risk premiums that translates to high interest rate spread. High interest rate spread denies savers returns for their savings while leading to high cost of investment through costly borrowed funds (Grenade, 2007).

Anchored on supportive regulatory environment, high profitability in the banking sector and advancement global technological capabilities, Kenya banking sector has been in the forefront of innovative diversifications. These diversification have further been pushed by enhanced competition by indigenous and international banks owing to general stability and Kenyan profile as East and Central Africa's financial hub. Such diversifications are evident from mobile banking, agency banking, trade fiancé and products tailored for various market segments. This diversifies income sources other than intermediation process, effectively stabilizing income growths and associated risks (Alamet al, 2011).

Despite the significance and the dynamic nature of the banking sector, only a few studies captures post 2008-economic crisis data except for such studies as Samahiya andKaakunga (2012) that collected information from 2004 to 2011 and Were and Wambua (2013) 2002 to 2011. Post 2008 represents a more restricted commercial bank's environment on capitalization, liquidity management and prudential practices for banks (In Mendoza, 2015). Further, most studies such as Kiptui (2014) and Were and Wambua (2013) organized determinants of interest rate spread into bank-specific, industry-specific and macroeconomic determinants. However, such variables as degree of risk aversions and income diversification miss in many studies.

## 2.1 *Interest Rate Spread and Economy*

Banking institutions plays a major role in a country's and global economy. An efficient financial intermediation has a direct impact on effectiveness of investable resource mobilization, and thus, economic development. A major indicator of efficiency in banking sector is the interest rate spread (Brock and Rojas-Suárez, 2000). Additionally, interest rate spread indicates the level of financial sector's development.

Interest rate on deposit reflects returns on deposit. Quaden (2004) observed that higher expected returns for on savings acts as incentives for savers with financial surpluses. On the other hand, interest on loans is a cost of investment in an economy. Lower borrowing costs allow external financing for new project. That way, lower interest rate benefits real economy (Quaden, 2004). According to Ndung'u and Ngugi, (2000), higher interest rate spread limits financing for potential investors while discouraging potential borrowers. High interest rate spread reduces confidence on effectiveness of monetary policies through bank-lending channels (Folawewo and Tenant, 2008). This may raise questions on CBK's ability in contingency management in the sector and economy at large. This can lower foreign investment, and also domestic, particularly when investor perceive more uncertainties about the future business environment.

Valverdeet *al.* (2004) elucidated that intermediation costs determines bank's assets profile. A high cost of intermediation suggest a less stable fund for banks given that savers have no incentives to hold their deposit with banks for long. This result to limited stable deposits and hence only a small proportion of the mobilized savings are used for investment. The major reason for this is to avoid liquidity problem arising from liability-asset mismatch under possible stressed scenarios. To bridge the limited investable funds, banks end-up approaching other institutions, mostly internationally, for long term lending. While this may be cheap, it raises concern for a country vulnerability to exchange rate variations. To hedge against this, the swaps, forwards, future and options among other derivative markets must be well developed to reduce the risk premium on cost of capital. For banks that may not access enough funding, they result to short-term financing that's expensive and risky. As such, improving financial intermediation efficiency, particularly for less developed and developed economies, will drive economic growth and development.

Nearly all studies acknowledge the negative and significant relationship between the spread and non-performing loans. However, only a few, such as Perez (2011), have gone further to show the trend of the components of interest rate spread. In the light of continued high interest rate spread, associated economic implications, failure

to consider rising diversification that has characterised the banking sector and the continued justification of non-performing loans (NPL) as a reason for the high spread, thus the objective of this study this study sought to establish the effects of income diversification and non-performing assets on interest rate spread in the Kenya banking sector.

## 2. Theoretical Literature

### 2.1 *The Klein Monti Model of Monopoly*

This model takes profit maximization concept further by considering how the profit maximization condition for a monopoly bank would look like. Profit is given as follows:

$$\pi = r_L L + rM - r_d D - C(D, L) \quad (2.1)$$

$$M = (1 - \alpha)D - L \quad (2.2)$$

Where  $L$  is the amount of loans,  $r_l$  interest on loans,  $D$  amount of deposits,  $r_d D$  interest on deposit  $\alpha$  is the central bank reserve ratio and  $M$  is the amount of reserves with the central bank.

Loans have a downward sloping function  $L(r_l)$  while deposits have an upward sloping function  $D(r_d)$ . The bank decides the amount of loans and deposit to take, and thus the corresponding interest rate. Substituting equation 2.2, profit function becomes;

$$\pi = (r_l(L) - r)l + (r(1 - \alpha) - r_d(D))D - C(D, L) \quad (2.3)$$

The first order conditions

$$\frac{\partial \pi}{\partial L} = r'_L(L)L + r_L - r - C'_L(D, L) = 0 \quad (2.4)$$

$$\frac{\partial \pi}{\partial D} = -r'_d(D)D + r(1 - \alpha) - r_d - C'_d(D, L) = 0 \quad (2.5)$$

Elasticity of loans (demand) and deposits (supply).

$$\varepsilon_L = -\frac{r_L L'(r_L)}{L(r_L)} > 0 \quad \text{and} \quad \varepsilon_d = \frac{r_d D'(r_d)}{D(r_d)} > 0$$

Rearranged elasticity solutions

$$\frac{r_L^* - (r + C'_L)}{r_L^*} = \frac{1}{\varepsilon_L(r_L^*)} \quad (2.6)$$

$$\frac{r(1 - \alpha) - C'_d - r_d^*}{r_d^*} = \frac{1}{\varepsilon_d(r_d^*)} \quad (2.7)$$

Equation 2.6 and 2.7 gives the equality between the inverse elasticity and the learner equations. The greater the market power a bank has, the lower the elasticity and the higher the lerner index denoting higher intermediation margins. Market power in the deposit market would result to lower interest on deposit while market power in the loans market would result to higher interest rate on loans. In this study, market power was pegged on the extent

of market concentration based on asset size of each bank.

## 2.2 Dealership Model of Ho and Saunders

This model was developed by Ho and Saunders in 1981. In the model, banks are considered as risk averse dealers between suppliers and demanders of funds. Intermediation is characterised by two forms of uncertainties; mismatch between loan and deposits and risk of default. The net interest spread is given as follows:

$$S = R_L - R_d = (a + b) \quad (2.8)$$

Where  $R_L$  is interest rate on loans,  $R_d$  interest rate on deposits,  $a$  immediacy of liquidity service fee and  $b$  risk premium.

Ho and Saunders represent the optimal spread as follows:

$$S = (a + b) = \frac{\alpha}{\beta} + \frac{1}{2} R \delta_L^2 Q \quad (2.9)$$

Where  $\alpha$  and  $\beta$  are intercept and slope of symmetric deposit and loan arrival functions respectively,  $\alpha/\beta$  the required net interest spread by a risk-neutral bank,  $R$  management coefficient of risk aversion for a bank,  $\delta_L^2$  variance of loan and deposit interest rates and  $Q$  bank transaction size.

The model suggests that optimal interest rate spread depends on bank risk aversion, interest rate risk, market competition and the average transaction size.

## 2.3 Interest Rate Spread Decomposition Model

This approach was postulated by Randall (1998). The methodology provides an accounting framework that indicates how interest rate spread is distributed among various underlying bank specific factors as contained in commercial banks' balance sheet and income statements. In the model, profit is the sum of interest and non-interest income less interest and non-interest expense and loan loss provisions. Interest rate margin is the difference between interest income and interest expense. Decomposition over time indicates how proportions of components of spread have changed over time. It reflects microeconomic decisions in a bank as management seeks to maximize and diversify bank's income.

## 2.4 Empirical of Related Literature

Demirguc-Kunt and Huizinga (1999) sought evidence on determinants of banks profitability, tying such profitability to interest rate spread. He used panel regression analysis to analyse bank-level data for 80 countries between 1988 and 1995. The authors indicated that profitability is the margin of intermediation and is the difference between costs of deposits and return on bank's assets. To ensure correct definition, banks also incorporate transaction costs and taxation to obtain profit. As such, the authors found interest rate spread as a measure of efficiency on how resources are allocated in a financial system. Specifically, they sought to establish how financial system structures, tax system and financial regulation relate to interest rate spread. Apart from including taxes, the study also incorporated GDP per capita weighted variables to factor in development differentials across countries. The results indicated that banks with small banking income and those dependent on deposit funds maintained higher interest margins because they had to operate many subsidiaries. The findings indicated that foreign banks had higher interest rate margin and profit in developing countries than the domestic ones. Further, there was a positive relationship between interest rate spread and inflation. Such a relationship was observed with respect to foreign ownership and those with higher market concentration.

Demirguc-Kunt *et al.* (2004) sought to establish how market structure, regulatory framework and institution characteristic affect financial intermediation costs. The study used panel regression analysis for bank-level data for 72 countries. Findings indicated that bank-specific factors explained considerable part of cost of intermediation. Large intermediation margins were associated with banks with lower liquidity ratios, banks with low capital levels, low service revenue banks, small banks and those with large market share. While result relating to market share was consistent with Klein Monti model of monopoly, the rest of the findings were

consistent with the efficiency market theory on benefits of economies of scale. This introduced some aspects of inconsistency given that small banks were also expected to charge higher interest rate spread, hence the need for further studies. The author also found that strict regulatory environment results to higher interest margins.

Grenade (2007) conducted a panel data analysis to measure the relevance of macro and micro factors in determining interest rate spread in the Eastern Caribbean Currency Union. The study variables included regulated saving deposit rate, CRR, opportunity cost, operating efficiency, market power and GDP. There was a positive relationship between interest rate spread and liquidity risks. This was consistent with the hypothesis by Ho and Saunders as well as empirical studies by Ghosh (2008) and Ngugi (2001). Additionally, foreign banks maintained higher interest rate spread compared the indigenous ones. The finding was consistent with that by Gelos (2006), who in 14 Latin American Countries, established positive and significant relationship between foreign ownership and interest spread. Positive relationship also existed with respect to regulated saving deposit rates, market concentration, operating costs and non-performing loans. Finding on bank market concentration was similar to that by Martinez Peria and Mody (2004) who observed a positive correlation, but contradicted that by Crowley (2007). Despite the study being not one of the recent, it ignored such macroeconomic variables as inflations and exchange rates that were likely to have had implications on banks' pricing models.

Folawewo and Tennant (2008) used dynamic panel data analysis to establish determinants of interest rate spread in 33 Sub-Saharan Africa. The study included bank and sector specific variables, macroeconomic variables and macro policy variables that incorporated public sector crowding out, broad money growth, money supply activities and deficit financing by government from 1988 to 2005. A negative relationship is established between interest rate spread and inflation, real GDP per capita, population, Treasury bill rate and the ratio of M2 to GDP. On the other hand, banking sector development measures, central bank discounting rates, exchange rate volatility, reserve requirement and crowding out effect of public borrowing was observed to have a positive effect on the spreads. Significant variables in the study findings included government crowding out in each country, inflation, deficit financing by governments, money supply levels, CRR, country's economic growth rate and population. As opposed to some other studies, it used ex-ante interest rate spread by subtracting average deposit rate from average lending rate. However, challenges in obtaining ex-ante data resulted to use of aggregate interest data on deposit and loans. Further, the study did not capture recent developments that have shaped global financial markets following global economic crisis in 2008.

Rebei and International Monetary Fund (2014) conducted a study in Solomon Island to establish the determinants of interest spreads, ratio of net interest income to total assets, for the commercial banks. The study considered data for bank specific, industry specific, macroeconomic variables and legal variables collected between 2000 and 2009. Independent variables included cost of staff, the ratio of salary and wages to total assets; loan growth; cost of capital, ratio of cost occupancy and depreciation to total assets; risk aversion, ratio of equity to total assets; credit risk, ratio of non-performing loans to total loans; concentration, loan based Herfindahl-Hirschman index; inflation, Treasury bill rates and real GDP growth. The study used panel data pooled regression analysis. The first model considered bank-specific variables, the second one included bank-specific and sector specific, the third in included macroeconomic variables while the fourth one added legal and economic environment variables to the third model. A positive relationship was observed between interest rate spread and overhead costs, bank size, market concentration and bank power and central bank lending rate. The finding on overhead costs was consistent with that by Ngugi (2001) and Randall (1998) as a major factor in developing countries. Further, less supportive economic and legal environment also inhibited lower interest margins but the effect was not significant. The author included such variables as risk aversion, growth of loans and cost capital that were ignored in most of other studies. However, the definition of interest rate spread may have been restrictive in the sense that not all assets generate interest rate. An observation of lower spread may not necessarily have meant higher efficiency but rather could have been lack of balance sheet optimization or diversification. To address this, this study limited asset consideration in determination of spread to assets that yield interest rate rather than total assets.

### **3. Research Methodology**

#### **3.1 Introduction**

This section outlines the research design, theoretical framework and empirical model used in the study. It defines the variables used as well as their measurement. The data, data sources and the methods used in analysis are discussed.

### 3.2 Research Design

This study used panel research design. Quantitative approach was used to achieve the study's objective as posed in Chapter 1. The study used panel data for 38 Kenya commercial banks operating between the year 2004 and 2014. Commercial banks' balance sheets and income statements were collected on quarterly basis for bank-specific and industry-specific variables. Additional variables included GDP, foreign exchange volatility, Treasury bill rates and Inflation.

### 3.3 Theoretical Model

The profit maximization theory indicates that firms choose inputs and outputs so as to maximise profits. Profit is represented as the difference between total revenue (TR) and total costs (TC):

$$\pi = TR - TC = PQ - CQ \quad (3.1)$$

The profit equation of the firm can be modified to fit financial intermediation by banks as represented by Shaffer (1993) and later replicated by Barajas *et al.*, (1999). Bank's income is given by the product of interest on loans and loans while bank's cost is divided into financial expense and a net non-financial cost. A net non-financial cost depends on the fixed costs and the volume of loans given.

$$\pi = i * L - r * D - C(L, w) \quad (3.2)$$

Where  $i$  is interest rate on loans,  $r$  interest rate on deposits,  $L$  Loans granted,  $D$  deposits level,  $C$  net non-financial cost and  $w$ - fixed cost.

Taking the first order condition with respect to loans ( $L$ )

$$\frac{\partial \pi}{\partial L} = i + \frac{\partial i}{\partial L} * L - r * \frac{\partial D}{\partial L} - D * \frac{\partial r}{\partial L} - \frac{\partial C}{\partial L} \quad (3.3)$$

Given that banks a required to maintain reserve ratio of a particular level by the regulator, assumption can be made that  $\frac{\partial D}{\partial L}$  tends to unit value. Considering this and re-arranging the above equation;

$$i - r = -\frac{\partial i}{\partial L} L + \frac{\partial r}{\partial L} D + \frac{\partial C}{\partial L} \quad (3.4)$$

Where,  $i - r$  represent financial spread in a financial bank. The econometric form of the above equation may be represented as;

$$\gamma = \beta_0 + \beta_1 L + \beta_2 D + \beta_3 \frac{\partial C}{\partial L} \quad (3.5)$$

Where  $\gamma$  is the interest rate spread.

### 3.4 Specific Empirical Model

Employing the empirical work on determinant of interest rates, the profit equation of financial intermediation by banks as represented by Shaffer (1993) and Barajas *et al.*, (1999) can be improved by incorporating proxies and factors influencing deposit levels, loans granted and fixed costs. The theoretical motivated determinants of interest rate spread include credit risk, operating costs, liquidity risks, managerial risk appetite, bank size, interest rate risk, and market structure. Incorporating these variables in equation 3.5, the empirical model can be represented as follows;

$$\gamma = \beta_0 + \beta_1 L(x_1, x_2, x_3 \dots x_n) + \beta_2 D(y_1, y_2, y_3 \dots y_n) + \beta_3 \frac{\partial C}{\partial L}(z_1, z_2, z_3 \dots z_n) \quad (3.6)$$

Where  $x_i$ ,  $y_i$  and  $z_i$  represents factor affecting intermediation costs and returns for commercial banks. Consideration of internal and external factor affecting supply of deposit demand of loans and internal operation



will help evaluate relationships between bank-specific, industry specific and macro-economic factors and interest rate spread. Equation 3.6 can be summarised as follows:

$$\gamma = \beta_0 + \sum_i \beta_i F(x_i, y_i, z_i) \quad (3.7)$$

Based on literature review, variables  $x_i$ ,  $y_i$  and  $z_i$ , model 3.7 may be captured as,

$$\gamma = \beta_0 + \sum_i \beta_i F(\text{prov}, \text{OC}, \text{Conc}, \text{Liq}, \text{RiskA}, \text{InterM}, \text{ROA}, \text{Div}, \text{I}, \text{GDP}, \text{Tbill}) \quad (3.8)$$

Where  $\gamma$  is the interest rate spread, *Provis* loan loss provisions, *OC* is cost of operations, *Conc* is market concentration, *Liq* is liquidity, *RiskA* is risk aversion, *InterM* is intermediation, *ROA* is return on assets, *Div* diversification of income and funds, *I* is inflation, *GDP* is gross domestic product and *Tbill* is treasury bill rate.

### 3.5 Definition and measurement of the variables

**Interest rate spread:** It is the difference between interest on loans and cost of deposits by commercial banks in Kenya as contained in the balance sheet and income statements. Interest on loans was computed as the ratio of interest income from loans to average loans while cost of deposits was computed as the ratio of interest expense on deposits to average deposits.

**Loan loss provisions:** This is an inverse indicator of the quality of bank's assets. It was obtained from non-performing loans as a ratio of total loans. This captured the credit risks faced by the banks.

**Cost of operation:** This was captured using the ratio of total operating cost to total assets. Administration ease from introduction of Credit Reference Bureau and gradual improvements in security registrations was hypothesized to have contributed to a reduction in the cost of operation.

**Market Concentration:** The study used total assets Herfindal-Hirschman Index (HHI) as a common measure of market concentration. High competition results to competitive pricing hence a positive relationship between market concentration and the spread.

**Illiquidity:** Liquidity reflects the ability of a bank to honour short term liabilities that are falling due. It may be held as per regulation requirement but may also be self-imposed for prudential reasons. Liquidity requirement is a cost to a bank and thus a positive relationship with the spread is expected. Illiquidity was captured as the ratio of Loans (Illiquid assets) to deposits.

**Risk Appetite (RiskA)**—Different options of asset creation presents different risks options. Government securities are the safest and contribute nothing to the risk weighted assets (RWA) of the Kenyan banks. Based on the client risk profile, industry, and securities used, loans have different risk weights. The higher the risk weight, the higher risk premium the banks would demand. Risk appetite was captured by the ration of RWA to total assets.

## 4. Regression Results and Discussion

Regression analysis was used to establish the relationships between interest rate spread and the underlying factors. The analysis was used to find out the effect on income diversification and non-performing loans on interest rate spread.

The study considered both the fixed and random panel regression analysis. To discriminate the models, Hausman test was used. The test basically evaluated correlation between the regressors and the unique errors terms. The Hausman test results indicated that random panel regression analysis was preferred. The study used the panel unit root tests by Levin, Lin and Chu (LLC) to test stationarity of various variables.

Table 1.4: Regression Analysis Results

Dependent Variable: Interest rate spread				
	Estimate	Std. Error	t-value	Pr(> t )
(Intercept)	-4.69E-03	2.68E-03	-1.7504	0.080955 .
Income Diversification	-1.07E-01	1.96E-02	-5.4432	1.009e-07 ***
NPL	6.43E-03	2.10E-02	0.3069	0.759097
Risk Appetite	1.02E-02	1.39E-02	0.7354	0.462581
Intermediation	3.03E-02	3.06E-02	0.9879	0.323902
Funding Diversification	-5.09E-04	3.90E-03	-0.1303	0.896388
ROA	5.05E-01	9.93E-02	5.0802	6.256e-07 ***
Liquidity	-1.14E-01	3.56E-02	-3.203	0.001490 **
Cost of Operation	7.65E-01	1.20E-01	6.3842	5.707e-10 ***
Inflation	5.92E-02	1.44E-01	0.4101	0.681991
Treasury Bills	8.74E-02	9.29E-02	0.9399	0.347926
Real GDP	2.29E-01	1.66E-01	1.3836	0.167396
Exchange rate volatility	7.15E-04	2.09E-03	0.3425	0.732155
Market Concentration	2.45E-04	9.36E-05	2.6231	0.009109 **
Total Sum of Squares:	58%		F-statistic:	7.35155 on 13 and 337 DF
Residual Sum of Squares:	45%		p-value:	1.02E-12
R-Squared:	22%			
Adj. R-Squared:	21%			
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				

The study found that bank and industry-specific factor are the most significant determinants on interest rate spread. Income diversification, return on assets, liquidity, cost of operation and market concentration were the significant determinants of spread. The findings were consistent to that by Demircug-Kuntet *al.* (2004) and Were and Wambua (2013).

A strongly significant negative relationship was found between income diversification and spread. The results suggested that increase of the proportion of non-interest income to total income by 1 percent reduces spread by 0.11 percent. Income diversification indicated the extent to which the bank relied on interest income. As bank diversifies sources of income, earnings become less volatile and create capacity to scale total earnings. Possible bundle products that may be provided together with loan products such as insurance, custodial services and trade finance creates incentives for banks to lower spread. However, there was no evidence from the study that diversification of sources of funds was a significant determinant of spread. This indicated possibility of access to cheap or similar-cost sources of funds by commercial banks and hence defeating source-of-funds based pricing strategies. The findings were consistent to those by Demircug-Kuntet *al.* (2004) for bank-level data for 72 countries.

The coefficient of cost of operation was positive and statistically significant at 0.1 percent. This was as hypothesised by Efficient Market Hypothesis (EMH). A 1 percent increase in the proportion of cost of operation to total assets increased the spread by 0.77 percent. This spoke to the need of enhanced operational efficiencies by commercial banks. A shift towards virtual banking from brick and mortar through use of mobile technology, agency banking and other electronic channels is bound to change the commercial banks cost structures. In addition, the scale of banking business is key in a bank's operational efficiencies. These results were consistent to those by Ndung'u and Ngugi, (2000), Ngugi, (2001) and Kiptui (2014) in Kenya.

Return on asset (ROA) was a major strategic objective by most of the commercial banks. The coefficient of ROA was found to be positive and statistically significant at 0.1 percent significance level. A 1 percent increase in ROA corresponds to a 0.5 percent increase in spread. This was in agreement with the theory of the firm that would look at banks as entity with a sole purpose of maximizing profits. To ensure that a bank maintains high return on assets, banks create assets that yield higher returns. The positive relationship spoke to the inability of the banks to raise non-funded income as well as the convenience that existed in maintaining higher ROA by increasing spreads.



Liquidity attracts a lot of attention in commercial banks asset and liability management due to its potential devastating effects. Buwamia *et al.* (2005) considered liquidity reserve requirement as a form of taxation by generating a carrying cost by banks. To caution against failing to meet the liquidity requirement, banks tend to charge for liquidity risk in loan pricing increasing the spread. As such, a positive relationship between illiquidity and spread was expected. On the contrary, the study projected a negative relationship with spread and coefficient statistically significant at 1 percent significant level. A 1 percent increase in illiquidity reduced spread by 0.11 percent. These results were consistent to findings by Ngugi (2001) and the Dealership Theory of Ho and Saunders. Similar results were observed by Ghosh (2008) in India, Grenade (2007) in Eastern Caribbean and Demirguc-Kuntet *al.* (2004) in 72 countries across the globe. This communicated the need by the bank to optimize their balance sheet. The Kenyan commercial banks thus, appeared not to suffer from liquidity problems, to reduce forgone income they were willing to provide extra loans even at a lower yield.

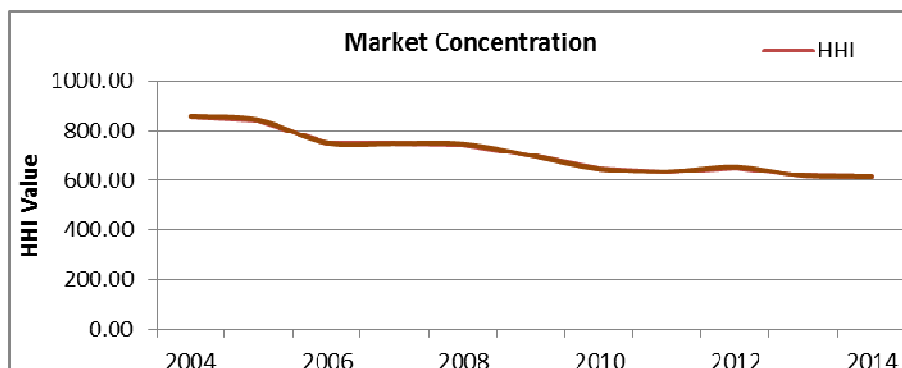


Figure 4.6 HHI for the Kenya Banking industry

The Kenya commercial bank has experienced a gradual fall in market concentration throughout the period covered by the study as indicated in figure 4.6. The study projected a positive relationship between spread and market concentration. The HHI index coefficient was statistically significant at 1 percent significant level. This was not surprising because, as the market became more competitive, banks were expected to lose capacity for charging coordinated higher spreads on loans as stipulated in Klein Monti model of monopoly. This is a departure from insignificant HHI index by Kiptui M. (2014) in Kenya and Sarponget *al.* (2013) in Ghana and a negative relationship observation by Central Bank of Solomon Island in 2007 in Solomon Island.

Results from majority of studies conducted on factors underlying interest rate spread had confirmed the assertions that banks charge higher spread to cover for non-performing loan and advances. This study established a positive relationship between bad loans provisions and spread. This was consistent with the Dealership Theory of Ho and Sauders, Grenade (2007) and Kipkurui (2010). However, consistent with observations by Samahiya and Kaakunga (2012), the findings were insignificant. This observation was consistent to that of risk appetite where the coefficient was positive but insignificant relationship was observed. As such, credit risk arising from market segments served or proportion of risk free assets considerations did not find way into the credit pricing strategy in a significant manner.

There was a positive relationship between spread and macroeconomic factors considered in the study: real GDP, exchange rate volatility, 91 day Treasury bill rates and inflation. A 1 percent increase in real GDP, 91 day Treasury bill rates and inflation would increase spread by 0.23, 0.09 and 0.06 percent respectively. However, these factors had no material effect on spread as opposed to the bank-specific and industry specific factors given that the coefficients were insignificant. This was consistent with the finding by Sarpong *et al.* (2013) in Ghana. It's however a departure from Ngugi, R. (2001) and Kiptui M. (2014) in Kenya who found Treasury bills rates to be significant determinant.

## 5. Summary and Conclusion

The study concludes that income diversification reduces interest rate spread. This underscores the ability of banks to diversify income sources as an enabler to lower spread. As banks diversify sources of income, earnings become less volatile and create capacity to scale total earnings. Possible bundle products that may be provided together with loan products such as insurance, custodial services and trade finance creates incentives for banks to

lower spread.

While risk premium has been blamed for the high interest rate charged on loans and thus spread, the study establishes a positive but insignificant relationship. The risk appetite coefficient was positive but also insignificant. This meant that the observed high spread had little to do with real risk profile of the assets created.

### 5.1 Policy implications

One of the major role of CBK is to ensure a stable market based financial sector. Reforms in the banking industry have allowed improved efficiency and competition. In the recent past, banks have been developing mobile applications and partnering with telecommunication companies to improve access to wide range of banking services. More asset and liability management tools such as inter-bank Repo and longer tenor Repo have been availed by the CBK to the commercial banks. Following the September 2016 approval of a law regulating interest rates, it would be interesting to find out how such regulation would affect spread as well as banking businesses.

The study emphasized on the need for increased efficiency in the banking industry as well as increased competition among the commercial banks. Structural development such as the introduction of credit bureaus, licensing of agency banking, improvement of collateral registration and introduction of cash centers had helped improve efficiency for the industry. Yet, operational cost remained a major driver on interest rate spread. Increased support for automation of banking services would go a long way in ensuring that banks lower operation costs. Of importance would be an adequate legal framework and supportive operational environment for virtual banking. CBK needed to further pursue and operationalize interoperability of banking infrastructure such as automated teller machines (ATMs). This would help optimize on existing infrastructure without the need for additional costs.

Credit risks and associated capital charge has been a factor contributing to overall costs and provisions for non-performing assets. Introduction of credit bureaus and regulatory changes that had improved registration and administration of collaterals had eased facility and obligor risks through reduced adverse selections. However, accurate borrower risk assessment remained an elusive objective due to limited data availability and massive informal sector. Banks had had to contend with inefficient credit scoring and rating system based on the credit rating data available in the market. Such data are highly dependent on historical bank-customer credit relationship, which may never be sufficient or available for every potential client. A possibility of data sharing between government agencies such as the Kenya Revenue Authority (KRA) and commercial banks on the updated client incomes status and would go a long way in clearing uncertainty arising from credit information asymmetry. Further, CBK needed to expand requirement for filing credit information with credit bureaus beyond commercial banks to all players in the financial sectors such as SACCOs, insurance companies and fintech. Recognizing that credit origination would continue to be more and more data driven is of essence. As such, regulatory role in data management in financial sector should go beyond information security, money laundering and business continuity towards high quality customer management information. This would lower the cautionary risk premium charged on loans, which according to the study has been found to be not necessarily justifiable.

Spread differs across banks depending on bank's competitiveness in the deposit market. Big banks are competitive in deposits market and thus are able to raise cheap funds. On the other hand, small banks must be willing to pay more to attract deposit. Innovativeness by CBK is necessary in ensuring that cheap funds are available to all banks. Recent introduction of a 21 day reverse repo by the CBK from the traditional 7-day is one such innovativeness. In addition, CBK needed to develop the repo market further to allow commercial bank comfortably uses their government securities as collateral to raise funds domestically and internationally. While government securities can be used as security against borrowing in the interbank market, ownership doesn't change. As such, the lending bank will have to queue according to the priority of payment during liquidation in case of borrower's failure hence raising credit risk. Addressing this would allow even liquidity distribution in the banking industry.

Diversification has seen the large bank shed-off pressure of increasing spread. The banks management needs to advance their innovativeness in income diversification. Some leading banks have scaled up their businesses into non-banking subsidiaries such as insurance agencies and brokerages. Others have increased the scope of their business that generates non-funded income such as treasury activities and trading finance. Effectively, this has reduced some banks dependency on interest income. For a more stable income, commercial banks' boards must be willing to try new business that reduces income vulnerability. CBK needs to be lenient in approval of

innovative products but be firm on control of inherent risks of new products for stable and resilient sources of non-interest income.

To wrap it, ROA is observed as a major driver for the spread. The public perception that drove the interest rate caps was that banks were making too much profit at the expense of other sectors of the economy. While the increase in spread as banks took more risky assets was insignificant, public perceptions has been that that banks charge higher risk premiums than the risks taken. The study finding supported such sentiments in that ROA was seen as one of the major components of the spread and was also a significant determinant from regression analysis. While this may not justify interest capping, commercial banks may need to price less the perceived risks or accepts less returns. The banks' management need to lower appetites for higher returns and make their projected growth consistent with projected economic cycles that determine credit obligor risks and future collateral values. In the long-run, this will ensure a sustained growth and thus translates into a stable financial sector.

## References

- Alam, H. M., Raza, A., & Akram, M. (2011). Financial Performance of Leasing Sector. The Case of China. *Interdisciplinary Journal of Contemporary Research in Business*, 2 (12), 339-345.
- Beck, T and Hesse, H (2006). Bank Efficiency, Ownership and Market Structure: Why Are Interest Spreads So High in Uganda? World Bank Policy Research Working Paper 4027, October.
- Birchwood, A. (2004). "An Examination of the Macro-economic Influence on Nominal and Real Interest Rate Spreads in the Caribbean" presented at the XXXVIth Annual Monetary Studies Conference, Central Bank of Trinidad & Tobago.
- Brock, P. and Franken, H. (2002). Bank Interest margins Meet Interest Rate Spreads: How Good is Balance Sheet Data for Analyzing the Cost of Financial Intermediation? [http://scid.stanford.edu/people/mckinnon\\_program/BrockV2.pdf](http://scid.stanford.edu/people/mckinnon_program/BrockV2.pdf)
- Brock, P. and Rojas-Suárez, L. (2000). Understanding the Behaviour of Bank Spreads in Latin America, *Journal of Development Economics*, 71(2), pp. 291-299.
- Caprio, G., Jr. (1996). "Banking on financial reform? A case of sensitive dependence on initial conditions". In G. Caprio, Jr., I. Atiyas and W.J. Hanson, eds., *Financial Reform: Theory and Experience*. New York: Cambridge University Press.
- Central Bank of Kenya. *Monetary policy statement: Issued under the Central Bank of Kenya Act*. Nairobi. (Various issues).
- Central Bank of Solomon Islands, (2007). "Understanding the Interest Rate Spread in Solomon Islands," Focus Report.
- Chirwa E. W and Mlachila, M (2004). Financial Reforms and Interest Rate Spreads in the Commercial Banking System in Malawi, IMF Staff Papers Vol. 51, No. 1, pp. 96 – 122.
- Craigwell, R. and Winston M. (2002). "Market Power and Interest Rate Spread in the Caribbean," *International Review of Applied Economics* 16, pp. 391-405.
- Crowley, J. (2007). "Interest Rate Spreads in English-Speaking African Countries," IMF Working Paper No. wp/07/101.
- Demirguc-Kunt, A. and Huizinga, H. (1998). Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence, *World Bank Economic Review*, Vol. 13 No. 2, pp. 379-408.
- Demirguc-Kunt, A., Laeven, L. and Levine, R. (2004). The Impact of Bank Regulations, Concentration, and Institutions on Bank Margins. The World Bank, mimeo.
- Folawewo, A. O. and Tennant D. (2008). Determinants of Interest Rate Spread in Sub-Saharan African Countries: A Dynamic Panel Analysis. A paper prepared for the 13th Annual African Econometrics Society Conference, 9 – 11 July, 2008, Pretoria, Republic of South Africa.
- Georgievska, L., Kabashi, R., Manova-Trajkovska, N., Mitreska, A., & Vaskov, M. (2011). Determinants of Lending Interest Rates and Interest Rate Spreads. Central Bank of Greece, Economic Research Department – Special Studies Division.
- Grenade, K. H. I (2007). Determinants of Commercial Banks Interest Rate Spreads: Some Empirical Evidence

- from the Eastern Caribbean Currency Union. *Eastern Caribbean Central Bank Staff Research Paper* No. WP/07/01.
- Ghosh, S. (2008). "Regulatory Pressure, Market Discipline, and Bank Spreads in India: An Empirical Exploration," *Global Economic Review*, 37(2), pp. 227-247.
- Gelos, R. G. (2006). Banking Spreads in Latin America. IMF Working Paper, WP/06/44.
- Gelos, E. W and Mlachila, M (2004). Financial Reforms and Interest Rate Spreads in the Commercial Banking System in Malawi, *IMF Staff Papers Vol. 51*, No. 1, pp. 96 – 122.
- Ho, T.S.Y. and Saunders A. (1981). "The determinants of bank interest margin: Theory and empirical evidence". *Journal of Financial and Quantitative Analysis*, XVI (4): 581–599.
- Institute of Economic Affairs (IEA) (December, 2000). Moderating Interest Rate Spread. Institute of Economic Affairs Issue No. 42, Nairobi.
- International Accounting Standards Board, & IFRS Foundation. (2013). IFRS 9: Hedge accounting and amendments to IFRS 9, IFRS 7 and IAS 39. London: International Accounting Standards Board
- In Mendoza, C. R. (2015). Bank capital and Basel III regulations: Implementation and effects.
- Kenya. (2015). Eleventh Parliament (Third Session) Proposed Amendment to the Finance Bill Cap. 491, 35A, 2015. Nairobi: Republic of Kenya, National Assembly.
- Kiptui M. (2014). Determinants of interest rate spread: Some Empirical Evidence from Kenya's Banking Sector. *Kenya School of Monetary Studies International Business Research*; Vol. 7, No. 11; 2014.
- Klein, M.A. (1971). "A theory of banking firm". *Money, Credit and Banking*, vol. 3.
- Kiwu, J. (2012). Income Diversification in the Banking Sector and Earnings Volatility: Evidence from Kenyan Commercial Banks. Kenya Bankers Association.
- Lee, D. and P. Schmidt (1996), On the Power of the KPSS Test of Stationarity against Fractionally-integrated Alternatives, *Journal of Econometrics* 73, 285-302.
- Levin, A., Lin, C.-F., & University of California, San Diego. (1992). *Unit root tests in panel data: Asymptotic and finite-sample properties*. La Jolla, Calif.: Department of Economics, University of California.
- Maimbo, S. M., Henriquez, G. C. A., & World Bank Group. (2014). Interest rate caps around the world: Still popular, but a blunt instrument. Washington, D.C.: World Bank.
- Ndung'u, N. and Ngugi, R.W. (2000). Banking Sector Interest Rate Spreads in Kenya, KIPPRA Discussion Paper No. 5. Nairobi: Kenya Institute for Public Policy Research and Analysis (KIPPRA).
- Ngugi, R. (2001). *An empirical analysis of interest rate spread in Kenya*. Nairobi: African Economic Research Consortium.
- Perez, P. (2011). Determinants of Interest Rate Spreads in Belize. Central Bank of Belize Research Department.
- Quaden, G. (2004). Efficiency and stability in an evolving financial system, [www.bnb.be/Sg/En/Contact/pdf/2004/sp040517en.pdf](http://www.bnb.be/Sg/En/Contact/pdf/2004/sp040517en.pdf)
- Rebei, N., & International Monetary Fund. (2014). *Determinants of interest rate spreads in Solomon Islands*. Washington, D.C.: International Monetary Fund.
- Randall R. (1998). "Interest Rate Spreads in the Eastern Caribbean," IMF Working Paper No. wp/98/59.
- Samahiya, M. & Kaakunga, E., (2012). Determinants of Commercial Banks' Interest Rate Spread in Namibia: An Econometric Exploration. *Botswana Journal of Economics*, 11(10), pp. 1123 – 1132.
- Sarpong, D., Winful, E & Ntiamoah, J. (September, 2013). Determinants of wide interest margins in Ghana: panel EGLS analysis. *Africa Journal of Business Management*, Vol.7(35), pp. 3535-3544, 21.
- Tennant, D. (2006). Are Interest Rate Spreads in Jamaica too Large? Views from within the Financial Sector. *Social and Economic Studies*, 55(3), pp. 88-111.
- Valverde, S. C., del Paso, R.L. and Fernandez, F.R. (2004) Banks, Financial Innovations and Regional Growth, [www.ugr.es/~franrod/ingrowth04.pdf](http://www.ugr.es/~franrod/ingrowth04.pdf)
- Varian, H. R. (1992). *Microeconomic analysis*, third edition. New York: Norton.
- Were, M., & Wambua, J. (2013). Assessing the Determinants of Interest Rate spread of Commercial Banks in Kenya. An empirical Investigation: Kenya Bankers Association.