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Assessing the determinants of interest rate spread of commercial banks in Kenya: An empirical investigation

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Abstract

Despite the liberalization of the financial sector, high interest rate spreads is still an issue of concern in a number of African countries, including Kenya. This paper investigates the determinants of interest rate spreads in Kenya's banking sector based on panel data analysis. The empirical results show that bank-specific factors play a significant role in the determination of interest rate spreads. These include bank size based on bank assets, credit risk as measured by non-performing loans to total loans ratio, liquidity risk, return on average assets and operating costs. The impact of macroeconomic factors such as real economic growth and inflation is not significant. Similarly, the impact of policy rate as an indicator of monetary policy is found to be positive but weak. On average, big banks have higher spreads compared to small banks. There is need for explore policy options meant to enhance competition in the industry and measures to break market dominance will be one such option. Further, the banking sector needs to explore internal as well as industry-driven strategies that counter some of the bank-specific factors associated with higher spreads. These could range from diversification of products to investment in cost-saving and efficient forms of technology.

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1. Introduction

One of the expected benefits of financial liberalization and deepening of the financial sector is the narrowing of the interest rate spreads – the difference between the interest rate charged to borrowers and the rate paid to depositors. This is predicated on the understanding that liberalization enhances competition and efficiency in the financial sector. Thus, a wide deposit-lending interest rate spread could be indicative of banking sector inefficiency or a reflection of the level of financial development (Folawewol and Tennant 2008). Embedded in the spread is the information on the efficiency of financial intermediation, profitability, monetary policy impact, among others.

In Kenya, the banking sector plays a dominant role in the financial sector, particularly with respect to mobilization of savings and provision of credit. An analysis of bank interest rate spreads is therefore central to the understanding of the financial intermediation process and the macroeconomic environment in which banks operate. This paper is motivated by the fact that although Kenya's financial sector was liberalized in the early 1990s to allow for market determination of interest rates, concerns about high interest rate spreads have persisted and attracted a lot of debate in both public and policy forums. However, there has been little empirical research on this issue, particularly with respect to the analysis of interest rate spreads at the micro or bank level. The aim of this study is to empirically investigate factors that determine interest rate spreads in Kenya. Both bank-specific and macroeconomic factors are considered.

The rest of the paper is organized as follows: Section 2 provides a survey of the literature on determination of interest spreads while the empirical methodology and description of the variables is outlined in section 3. Section 4 provides a descriptive analysis followed by empirical analysis and discussion of the empirical results in section 5. Section 6 concludes.

2. A Survey of the Literature

2.1 Credit risk mitigation problem and banking institutions

Studies that examine determination of bank interest rate spreads generally use variables that fall in three categories (1) individual bank-specific factors such as operating or administrative costs, non-performing loans, return on asset, structure of the balance sheet, non-interest income or non-core revenues, bank size, liquidity ratio of a bank, among others; (2) factors specific to the banking industry such as the degree of competition as could, for instance, be indicated by market concentration, regulatory requirements such as minimum core capital requirements, statutory reserve requirements or regulated minimum deposit rates; and, (3) macroeconomic indicators which include growth rate of the real Gross Domestic Product (GDP) growth rate and inflation rate. Some studies focus on one category of factors while others consider two or all the three categories of factors in estimating the interest rate spread.[1] A brief review of some of the previous empirical studies on interest rate spread is given below.

1 There are hardly empirical studies on optimal interest rate spreads since that would arguably depend on several factors and may not be static over time. The few studies available with respect to optimality of spreads focus on theoretical mathematical derivations of the conditions under which an optimal spread is achieved, typically focusing on profit maximization behaviour of commercial banks, based on the relevant variables which include those listed above. The benchmark work in this approach is Ho and Saunders (1981). Others following similar approach include McShane and Sharpe (1984), Zarruk and Madura (1992), Afanasieff et al (2002) and Mannasoo (2012). The focus of this paper is on empirical investigation of the determinants of interest rate spread in Kenya's banking sector based on the standard bank-specific and macroeconomic variables, along similar studies in the literature.

Brock and Franken (2003) studies interest rate spread in Chile, showing that that the influence of industry concentration, business cycle variables, and monetary policy variables on interest rate spreads differs markedly depending on whether the spreads are computed from balance sheet data or from disaggregated loan and deposit data. Gambacorta (2004) studies factors explaining cross-sectional differences in bank interest rates of Italian banks by considering both micro and macroeconomic factors. The variables considered include: (i) loan and deposit demand (ii) operating cost, credit risk and interest rate volatility (iii) impact of monetary policy through changes in policy rates and reserve requirements and (iv) the structure of the industry. Results showed that interest rates on short term lending of liquid and well capitalised banks react less to monetary policy shocks.

In addition, banks that predominantly lend for long term do not change their interest rates more frequently as those whose lending is largely for short term. Bank size was found to be irrelevant in influencing interest rate margins. According to Gambacorta (2004), lending rates have a positive relationship with real GDP and inflation. An increase in real economic activity makes projects that would otherwise appear unfeasible become profitable when discounted to the present. The increase in economic activity therefore increases demand for credit. An increase in real GDP and inflation are negatively related with deposit rates. When the economy is booming, it pushes up demand for deposits and therefore banks have no incentive to increase deposit rates. With respect to operating cost and credit risk, an increase in the cost of financial intermediation leads to higher lending rates as banks attempt to recoup the costs. These include costs incurred in assessing the risk profile of borrowers, monitoring of the various projects for which loans have been advanced and reaching out to as many people and geographical areas as possible through expansion of branch network. On the other hand, an increase in the volatility of the money market interest rate drives up both deposit and lending rates. According to Gambacorta (2004), changes in monetary policy can affect deposit and lending rates through the interest rate, bank lending and bank capital channels. For instance, a monetary tightening that raises policy rate and short term interest rates makes it more costly for banks to get funds and they pass these costs to borrowers through higher lending rates. The bank lending channel works through moral hazard and adverse selection. Following monetary tightening that leads to higher interest rates, banks tend to attract more risky customers and to compensate for the higher risk they increase lending rates.

McShane and Sharpe (1984) postulates a theoretical model of determining bank interest margins based on hedging behaviour of interest margin determination – the dealer model of bank interest margin determination – and applies this model to Australian banks. Their model assumes the following about banks in undertaking intermediation between depositors (suppliers of funds) and borrowers (demanders of funds): (i) maximisation of expected utility (ii) risk aversion in loan and deposit markets.

Loan/deposit interest margins are defined in the study as fees for financial intermediation given the randomness of loan requests and receipt of deposits, and the uncertainty in short term interest rates. However, the study notes the narrowness of this definition of interest rate margin and embeds their model in a more general model of profit maximisation. The a priori expectations are that there is a positive relationship between bank interest margins and market power, the degree of bank risk aversion, interest rate uncertainty and average transaction size.

Demirgüç-Kunt and Huizinga (1999) examines interest spreads in a cross-country set up using data covering commercial banks from 80 countries across the world. The study finds that differences in interest margins and bank profitability are explained by several factors such as bank characteristics, macroeconomic variables, explicit and implicit bank taxation and deposit insurance regulation. After controlling for factors such as differences in bank activity, the extent to which banks are leveraged, and the macroeconomic environment, they show that lower interest margins and lower profits are associated with larger banks asset to GDP ratio and a lower market concentration ratio. Additionally, foreign banks are associated with higher interest margins and higher profits compared to local banks in developing countries while the opposite is true for developed countries.

Mannasoo (2012) investigates the role of the recent global financial crisis on interest spreads in Estonia. The approach follows works of Ho and Saunders (1981) in which the spread is decomposed into a pure spread and the remaining component that is explained by market structure, regulation and idiosyncratic bank factors. The pure spread is explained by the degree of bank risk aversion and the market structure of the banking sector. The volatility of money market interest rates is found to have a long-run impact on the spread. Other factors that drive the interest margins are the regulatory variables, efficiency of banks and bank-portfolio effects. Credit risk was found to play a minimal role while higher bank liquidity was associated with lower interest margin.

Grenade (2007) estimates the determinants of commercial banks interest rate spreads in the Eastern Caribbean Currency Union using annual panel data of commercial banks. The empirical model includes regulatory variables (statutory minimum savings deposit rate) as well as market power, operating costs as a ratio of earning assets, ratio of provisions for loan losses to total earning assets as a measure of credit risk, liquidity risk proxied by the ratio of liquid assets to total assets and real GDP as an indicator of economic activity. Market power is proxied by the HerfindahI-Hirschman index (HHI) computed using the market shares of loans and advances in the banking industry. The spread is found to increase with an increase in market power, the regulated savings deposit rate, real GDP growth, reserve requirements, provision for loan losses and operating costs.

Siddiqui (2012) estimates the interest rate spread in Pakistan based on individual bank specific factors

using annual panel data of 22 banks. The variables include market share measured as a bank's deposits as a percentage of total deposits of the banking sector, liquidity risk variable, administrative expenses as a percentage of total assets, nonperforming loans as a percentage of net advances, net interest income as a percent of total income and return on assets after payment of tax as a percent of average assets. The spread is found to be significantly affected by administrative costs, non-performing loans and return on assets in all the regressions (pooled, fixed and random effects regressions).

Afanasieff et al (2002) applies the two-step approach of Ho and Saunders (1981) to study the interest rate spread in Brazil by estimating an unbalanced panel data model of 142 commercial banks using monthly data from February 1997 to November 2000. In the first step, it estimated a panel model with time dummy coefficients which are the then used in the second step as the dependent variable on which a measure of interest rate risk and selected macroeconomic variables are used as regressors. Unlike most studies that define the interest rate margin based on interest income and interest expense, Afanasieff et al (2002) defines the spread on the basis of lending and deposit rates as posted by banks. They find that the spread is higher the larger a bank is, the larger the operating costs, bank leverage, ratio of service revenues to operational revenues and ratio of non-interest bearing deposits to total operating assets. However, the spread is found to be negatively related to the ratio of interest-bearing funds to earning assets and foreign-ownership of banks.

In a separate study that extends Ho and Saunders (1981) model, Allen (1988) treats banks as passive dealers akin to specialists on securities exchanges and consequently argues that banks change their prices as a way of changing demand for their products – deposits and loans. Lending rates are set by discounting default-risk adjusted true prices of the loan while deposit rates are determined by putting a mark-up on default-risk adjusted true price of the deposit. According to Allen (1988), the spread is therefore influenced by monopoly power and risk premium. In situations of risk neutrality, interest spreads are minimised since there is no need for a risk premium to compensate banks for the uncertainty surrounding the arrival of deposits and request for loans.

Studies on interest rate spread with respect to African countries include those by Folawewol and Tennant (2008), Beck and Hesse (2006), Aboagye et al (2008), Ikhide (2009) and Ndung'u and Ngugi (2000). Using dynamic panel data model, Folawewol and Tennant (2008) study the determinants of interest rate spread in 33 Sub-Saharan African (SSA) countries focusing on macroeconomic variables. Their results show that interest rate spread is influenced by the extent of the crowding out effect of government borrowing, public sector deficits, discount rate, inflation, level of money supply, reserve requirement, level of economic development and population size. A more recent study on determinants of bank interest margins in SSA is by Ahokpossi (2013) using a sample of 456 banks in 41 SSA countries. The results show that bank-specific factors such as credit risk, liquidity risk and bank equity

are important, determinants of interest margins, but such spreads are not sensitive to economic growth.

Aboagye, et al (2008) studies the response of net interest margin of banks to changes in factors that are bank-specific, banking industry specific and Ghanaian economy macroeconomic factors. It finds that an increase in the following factors increases the net interest margin of banks: bank market power (or concentration), bank size, staff costs, administrative costs, extent to which a bank is risk averse and inflation. On the other hand, an increase in excess reserves of banks, central bank lending rate and management efficiency decreases the net interest margin of banks.

Beck and Hesse (2006) uses bank-level dataset on the Ugandan banking system to examine the factors behind the consistently high interest rate spreads and margins. While foreign banks have lower interest rate spreads, there is no robust and economically significant relationship between interest spread and privatization, foreign bank entry, market structure and banking efficiency. Similarly, macroeconomic variables explain little of the over-time variation in bank spreads. Bank-level characteristics, on the other hand, such as bank size, operating costs, and composition of loan portfolio, explain a large proportion of cross-bank, cross-time variation in spreads and margins. However, time-invariant bank-level fixed effects explain the largest part of bank variation in spreads and margins. Further, the study finds evidence that banks targeting the low end of the market incurred higher costs and therefore had higher margins.

Nampewo (2013) studies the determinants of the interest rate spread of the banking sector in Uganda using time series data for the period 1995 – 2010. The study applies the Engle and Granger two-step procedure to test for cointegration between the bank rate, treasury bill rate, exchange rate volatilities, the ratio of money supply to gross domestic product (M2/GDP) and the proportion of non-performing loans to total private sector credit. Results show that the interest rate spread in Uganda is positively affected by the bank rate, the Treasury bill rate and non performing loans. On the other hand, M2/GDP ratio and real GDP have a negative influence on the spread. However the analysis is undertaken at macro level hence concealing micro and bank-specific characteristics.

In Kenya, few studies exist that examine the interest spread determination. Beck et al (2010) examine developments in Kenya's financial sector with a specific focus on stability, efficiency and outreach, and use interest rate spreads as a proxy for the efficiency of financial intermediation. They base their analysis on ex post constructed spreads and decompose the spreads into different components based on a set of factors such as overhead costs, loan loss provisions and taxes.

Among the most cited studies on factors explaining interest rate spread in Kenya are Ndung'u and Ngugi (2000) and Ngugi (2001). Ndung'u and Ngugi (2000) theoretically derived factors likely to explain the interest rate spread and empirically estimated an interest rate spread equation using monthly time series data for the period April 1993 to June 1999,

while Ngugi (2001) extends the monthly time series data to December 1999. The factors considered by the former are deposits, loans, treasury bill rate and interbank rate. They find that the spread are positively related with deposits but negatively related to loans. In addition to the factors above, Ngugi (2000) incorporates excess liquidity and non-performing loans ratio as explanatory variables and finds that a rise in non-performing loans ratio leads to a rise in spreads while excess liquidity is negatively related with spreads. Both studies are undertaken at the macro level, mainly focusing on the macro industry-level variables. Nonetheless, they both ignore macroeconomic indicators such as GDP and inflation.

The current study goes beyond these factors by considering not only macroeconomic variables but also bank-specific variables using panel data for the commercial banks. Additionally, the study covers a more recent period ranging from 2002 to 2011 during which there have been significant changes both in the policy and macroeconomic environment. For instance, this is the period within which the Central Bank of Kenya introduced the policy rate (Central Bank Rate) which the Monetary Policy Committee (MPC) of the Bank currently uses to signal the monetary policy stance.

In summary, there are a number of empirical studies on the determination of interest rate margins and spreads, focusing on different sets of factors (bank-specific, industry-related and/or macroeconomic factors) and methodologies (time series and panel data methods) depending on the type of data, frequency and coverage (panel of banks, countries or country-specific analyses). However, most of the explanatory variables considered are similar or more-or-less related, depending on the type of study and coverage. That notwithstanding, there is still paucity of empirical studies on determination of interest rate spreads with respect to African countries, particularly at the bank-level, given the fact that a number of African countries like Kenya are still grappling with the challenge of higher interest rate spreads.

Due to data constraints most empirical studies generally limit the empirical analyses of interest rate spreads to ex post computation of spreads based on the balance sheets of banks and income statements, typically using net interest margin as a measure of spreads. There are comparatively fewer studies that directly compute the interest rate spreads based on the observed actual interest rates charged on loans vis-a-viz interest rate on deposits as has been undertaken in this study.

3. Methodology and Data

Both descriptive and regression analyses are undertaken. The former is used to show trends and comparative analysis of interest rate spreads and other variables of interest. Regression analysis is undertaken to empirically investigate the determinants of interest rate spreads by employing panel data estimation methodology on a panel of commercial banks using annual data for the period 2002 to 2011. Panel data models provide much more insights than time series models or cross section data models because it is theoretically possible to isolate the effects of specific effects and actions (Hsiao 2003). Ignoring bank specific effects can lead to biased or misleading results.

The basic assumption of the fixed and random effects models is that, conditional on the observed explanatory variables, the effects of omitted (excluded) variables are driven by (1) individual time-invariant factors such as individual-bank management style and ability, efficiency, or other technical differences between banks; (2) period individual-invariant factors —that is, variables that are same for all banks at a given time but vary through time. These are variables that reflect general conditions affecting the operations of all banks but fluctuate over time. As observed by Tarsila and Priscilla (2003), both the time series and the cross section dimensions are important elements to the understanding of bank interest spread. The empirical model is specified as follows:

$$r_{it} = \alpha_i + X_{it}\beta + Z_t\gamma + \varepsilon_{it}$$

Where r_{it} is the interest rate spread for bank i in period t computed as the difference between lending rate and deposit rate, X_{it} is a vector of bank specific variables, α_i is bank-specific fixed effects capturing the impact of unobservable (omitted) effects, Z_t is a vector of time-specific variables and ε_{it} is the statistical disturbance term.

The dependent variable is the annual interest rate spread for commercial banks as defined above. Interest rate spreads are hypothesized to be a function of bank specific and industry specific variables, as well macroeconomic factors, in line with similar studies in the literature (see Chirwa and Mlachila 2004; Entrop et al 2012; Bennaceur and Goaied 2008; Siddiqui 2012; Demirgüç-Knut and Huizinga 1999, among others).

The bank specific variables include bank size, credit risk as measured by non-performing loans to total loans ratio, liquidity risk (ratio of bank's liquid assets to total assets), return on average assets, operating costs as a ratio of total net operating income, and net interest income as a ratio of total income. The macroeconomic variables are real GDP growth rate and inflation rate. The monetary policy variable is the policy rate. Panel data covering the period 2002 to 2011 for all the variables considered was available for 33 banks out of the 44 banks[2] and that is what was used for the empirical analysis. Definition of all the variables and the hypothesized effect are briefly described below.

3.1 Description of variables

Credit risk: Non-performing loans to total loans ratio (NPLR) is used as an indicator of credit risk or quality of loans. An increase in provision for loan losses implies a higher cost of bad debt write offs. Given the risk-averse behaviour, banks facing higher credit risk are likely to pass the risk premium to the borrowers, leading to higher spreads. Hence the higher the risk, the higher the pricing of loans and advances to compensate for likely loss.

Bank size: Bank size is measured as the log of total bank's assets. Ideally one would expect bigger banks to be associated with lower interest rate spreads, arguably because of large economies of scale and ability to invest in technology that would enhance efficiency. However, to the extent that bank size connotes control of the market in the deposit and loan markets, a positive relationship between interest rate spreads and bank size should not be surprising.

Market concentration: Herfindahl-Hirschman Index (HHI) is the commonly used measure of market concentration. HHI is computed on the basis of concentration of loans and advances.[3] Market concentration could measures the degree of competition each bank faces in the market. Theoretically, competitive pressures lead to competitive pricing, thus leading to higher efficiency of intermediation process and lower spreads. On the other hand, higher market concentration implies more market power and less competition and hence is likely to be associated with higher interest rate spreads.

2 This implies that recently or newly established banks are excluded from empirical regression analysis

3 HHI is computed as sum of the squared market shares for firms competing in the same industry, which in this refers to the commercial banks in the banking industry. The range is from close to zero to one. In the literature, most empirical studies use HHI as an indicator of both market power and market concentration since the two are highly correlated and capture more or less the same effect.

Market concentration can also result in oligopolistic market tendencies such as collusion. Studies have shown that market concentration reduces competition (e.g. Sanya and Gaertner 2012, Grenade 2007). Entrop et al., 2012 observes that the industry's competitive structure is determined by the extent to which the demand for loans and deposit supply are inelastic with respect to the intermediation fees charged. However, Gambacorta (2004) notes that the impact of the structure of the banking sector on the spread can be ambiguous. A concentration that makes banks to behave in an oligopolistic manner will lead to higher lending rates and low deposit rates while a concentration that arises because more efficient banks are replacing less efficient banks may lead to lower lending rates and higher deposit rates and hence, lower spreads.

The computed HHI for Kenya's banking sector shows that market concentration has been declining, implying that the banking sector is moving from less to a more competitive market.[4] This variable was however found to be highly correlated with bank size. This is because in principle, the market is controlled by the bigger banks both in terms of share of deposits as well as market share of loans and advances, the latter being the basis upon which HHI was computed. Consequently, the impact of these two variables was analysed separately in the empirical estimations.

Operating costs: computed as operating costs as a ratio of total net operating income (OPERAT). Banks incur costs of financial intermediation such as screening loan applicants to assess the risk profile of borrowers and monitor the projects for which loans are advanced. An increase in operating costs is expected to have positive influence on interest rate spreads. High operating costs are likely to include costs due to inefficiency leading to higher spreads and hence this variable is commonly used as an indicator of operational inefficiency. A higher cost of financial intermediation will drive up interest rates on loans while depressing interest rates on deposits.

Liquidity risk: Computed as the ratio of bank's liquid assets to total assets (LQDR). The degree to which banks are exposed to liquidity risk varies across banks. A bank with higher liquidity faces lower liquidity risk hence is likely to be associated with lower spreads due to a lower liquidity premium charged on loans. Banks with high risk tend to borrow emergency funds at high costs and thus charge liquidity premium leading to higher spreads (Ahokpossi 2013).

Return on average assets: Computed as net income divided by average total assets (ROAVG). This is generally considered as a good indicator to evaluate the profitability of the assets of a firm in comparison to other firms in the same industry. A positive relationship with interest rate spreads is hypothesized.

[4] HHI shows a decline from about 0.107 in 2002 to 0.071 in 2011.

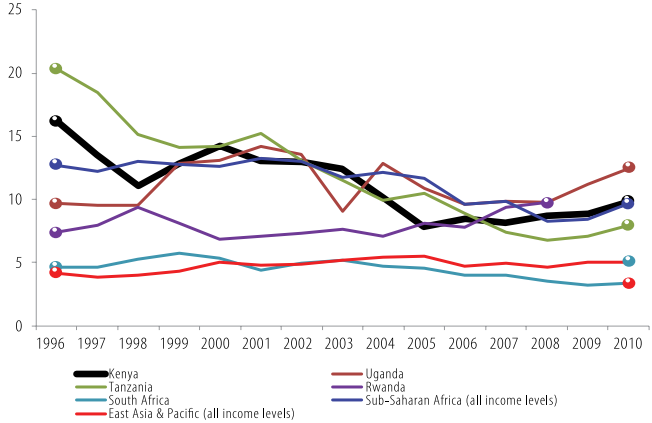
Net interest income as a ratio of total income (INTRCOM)—banks that traditionally rely on interest income from loans and advances relative to non-interest income assets are likely to be associated with higher spreads since they may not be willing to forego interest income traditionally generated from higher spreads.

Macroeconomic variables: The variables used to capture the impact of the macroeconomic factors are real GDP growth and inflation rate. Increased economic activity can heighten demand for loans leading to higher lending rates. On the other hand, increased economic activity can make projects more profitable, reduce defaults, and increase deposits, all of which reduce the spreads. For both variables, negative as well as positive parameters have been observed. Additionally, the policy rate which is the Central Bank rate (CBR) is included as a monetary indicator to capture the effect of monetary policy.

4. Descriptive Analysis

Figure 1 shows a comparison of interest rates spread for selected countries (South Africa and EAC countries including Kenya) and regions (SSA region and East Asia and Pacific region) for the period 1996-2010. Whereas the interest rate spread for Kenya is closely comparable to the SSA average, it is still higher than the average spreads for South Africa and the East Asia and Pacific region. Within the EAC region, Kenya's interest rate spread has been relatively higher than the average for Tanzania but lower than that for Uganda. The issue of relatively high interest rate spreads is, thus not unique to only Kenya. However, when observed over a long period of time starting in the 1990s, it can be noted that there has been a general decline in the spread.

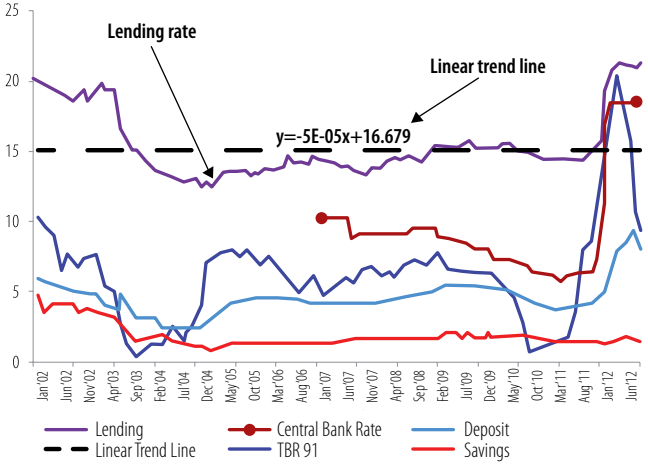
Figure 1: Interest Rate Spreads for Selected Countries and Regions: 1996- 2010



Source: World Development Indicators

Figure 2 shows that there was a general gradual decline in all the different types of interest rates in the 2000s. However, from mid 2000s, the downward movement in the lending rates has been sticky in comparison to other interest rates. This is the case even for period that witnessed monetary easing, with the policy rates having been reduced from 8.5% in January 2009 to 5.75 % in January 2011, complimented by lowering of the cash reserve ratio from 5% to 4.5% in June 2009.

Figure 2: Trends in interest rates, January 2002 to June 2012



Source: CBK

During this period, interest rate on the risk free treasury bills declined from an average of about 8.46% in January 2009 to a low of about 1.63% in July 2010 whereas the average lending rate declined marginally from 14.78% to 14.29% over the same period. On the contrary, the shift to monetary policy tightening that saw CBR increased to 18% in December 2011 was almost instantaneously followed by a corresponding shift in lending rates to an average of about 20%.

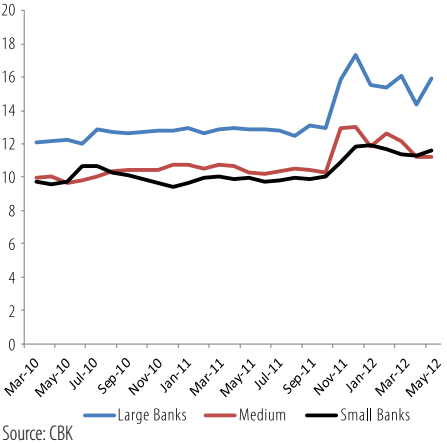
Arguably, the lending rates are relatively more flexible upwards but sticky downwards in response to changes in policy conditions. In general, the rigidity in the lending and deposit rates, particularly the downward inflexibility of the lending rates remains a subject of debate. On the other hand, the saving rate has remained almost flat with an average of 1.62% from 2009 to 2011. The overall deposit rate has more or less remained stable except for temporary declines and upward movements following monetary policy changes.

An examination of interest rate spreads by banks size (figure 3) shows that interest rates spreads are higher for larger banks than for medium and small banks[5]. On average, small banks have lower spreads. This could possibly be due to the fact that small and low-capitalised banks find it relatively difficult to raise funds and have to increase their deposit rates to attract funds and compensate for the perception that they are more risky relative to large, more liquid, well capitalised banks that are perceived to be 'too-big-to-fail'.[6] Trend analysis shows that the overall spread increased slightly from about 9.95% in 2002 to about 10.6% in 2011, rising further to about 12.2% percent in the first half of 2012.

5 The latest classification of banks is based on weighted market size index—large (5% above), medium(1%-5%) and small(below 1%) (see Bank Supervision Annual Report 2011 by Central Bank of Kenya).

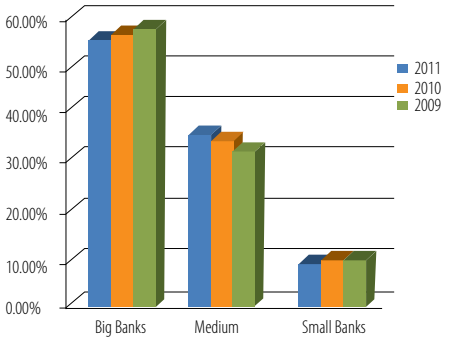
6 The positive relationship between bank size and spreads is examined further under the section on empirical results and discussion.

Figure 3: Interest Rate Spreads Across Categories of Banks: March 2010 to May 2012



Source: CBK

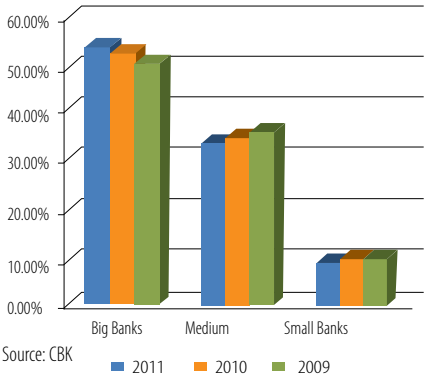
Figure 4: Market Share of Loans and Advances by Bank Categories, 2009 -2011



Source: CBK

In terms of quantities, figure 4 shows that the big banks account for over 50% of the total loans and advances and hence are the dominant players in the market. On the other hand, the medium-sized banks account for slightly over 30% of the loans and advances, while the small banks account for less than 10% of the market share. A similar trend applies with respect to the share of deposits, i.e. the big banks account for over 50% of the deposits while the small banks account for less than 10% (Figure 5). That notwithstanding, these indicators mainly reflect the nature of segmentation that exists in the banking sector, especially the skewed distribution of deposits and loans, and hence the market dominance by a few banks. However, there has been a slight decline in the share of deposits by big banks from about 56.5% in 2009 to 54% in 2011 and a slight increase in the share of deposits by medium-sized banks from about 34.7% to 36.8% over the same period.

Figure 5: Percentage Share of Deposits by Bank Categories, 2009 -2011



Source: CBK

5. Empirical Results and Discussion

Panel data regression results for both fixed and random effects models are reported in Table 1 and 2 respectively. Estimations are undertaken progressively starting with bank-specific variables in column A.[7] The results in columns B and C are obtained by including the policy rate and macroeconomic variables, respectively. For robustness, heteroskedasticity across banks is controlled for by using cross-section weights, thus leading to robust standard errors. The redundant fixed effects test and the Hausman test are used to determine the suitability of fixed effects model over random effects model.

Hausman test is often employed to test the assumption that the random effects are uncorrelated with the explanatory variables against the alternative that the fixed effects are random. The redundant fixed effects test statistic is found to be highly significant at 1% significance level with a t-statistic value of 15.2, hence rejecting the null hypothesis that cross-section effects are redundant. In other words, the fixed effects model is valid. With respect to the Hausman test, the null hypothesis that the random effects model is the correct specification was rejected at 7% significance level, which gives more comfort that the fixed effects model results are valid.[8] This implies that there are some unobserved or excluded factors that are associated with the variation in interest rate spreads across banks. These may be related to quality of management, management style, differences in the skills of the workforce, among others. Nonetheless both models yielded more or less similar results as reported in Tables 1 and 2.

7 Market concentration variable (HHI) is not reflected in the reported results because it was highly correlated with bank size and hence found to be insignificant when included together with bank size. Moreover, the results based on bank size were found to be more robust.

8 Hausman test has a tendency to accept the null hypothesis in small samples.

The empirical results show that bank-specific factors play a significant role in the determination of interest rate spreads in Kenya's banking sector. All the coefficients for bank specific variables have the expected signs and are highly statistically significant at one percent in all the estimated equations except operating costs ratio which is significant at five percent significance level (fixed effects model) and 10 % (random effects model). There is a positive relationship between bank size and interest rate spreads, further confirming the positive relationship observed under the exploratory analysis —that is, the bigger the bank size, the higher the spread. This finding is robust under both fixed and random effects models, yielding the highest t-values. However, the magnitude of the impact is rather small given the size of the coefficient.[9] Nonetheless, it may sound paradoxical particularly given the argument that the reverse should possibly be expected based on the expected benefits of large economies of scale and capacity to invest in efficient technologies.

If the higher spreads are merely interpreted as an indicator of inefficiency, one can thus quickly be tempted to conclude that big banks are less efficient –but this may or may not necessarily be the case and even if true, there could be other factors that may mask the observed spreads. It is also possible that the spreads could be partly explained from the demand side, that is, if there is a high demand for loans particularly for big banks relative to supply. Moreover, there is an oligopolistic structure and market segmentation between the bigger and smaller banks whereby the former control a comparatively bigger share of the market (deposits and loans) particularly due to good reputation and customer loyalty. Big banks are viewed as stable, well managed or 'too big to fail'. Consequently, the big banks are able to mobilize more deposits even at relatively low or near-zero deposit rates while at the same time attracting large loan applications despite charging relatively higher rates, hence leading to higher spreads. This implies that for big banks the demand for loans or deposit mobilisation is more or less inelastic with respect to the respective interest rates charged.

According to Radha (2011), different segments of the banking sector in Kenya face clients of significantly different size and type, and this segmentation affects lending decisions, deposit mobilization and governance of banks. Radha (2011) further observes that the segmentation of banks is based on size but largely shaped by social factors that define the trust between banks and their clients. A study by Mwega (2012) suggests that it is monopolistic competition that best characterizes banks' market behaviour and provides further evidence of banking market segmentation in Kenya. The positive relationship between bank size and the spreads is thus shaped by the nature and structure of Kenya's banking sector.

There is a positive relationship between credit risk associated with non-performing loans ratio and interest rate spreads. Banks are compelled to shift the risk premium associated with non-performing loans to the borrowers, which may be

9 When dependent variable is in levels and the independent variable is in logarithm form (as is the case with bank size), the impact of one percent increase is obtained by dividing the coefficient by 100. Note that for uniformity all the rates (interest rate spread, inflation rate and growth rates) in the empirical equation are divided by 100 and hence presented as ratios for ease of interpretation of results and uniformity with other variables.

coupled with squeezing the rates offered to the depositors. The results are consistent with those found by other studies such as Ngugi (2001) and Beck et al (2010) based on Kenya. Chirwa and Mlachila (2004) and Sidiqqui (2012) also found a positive impact of nonperforming loans ratio on interest spreads of commercial banks for Malawi and Pakistan, respectively. Additionally, there is a positive relationship between return on average assets and interest rate spreads. The positive effect could be interpreted as an indication of profit-maximizing behaviour whereby banks with higher profitability relative to average assets are also inclined to charge higher borrowing rates relative to the deposit rates.

Mwega (2012) provides evidence of profit persistence in Kenya's banking sector. However, the positive relationship can be countered along similar arguments given for bank size if one argues that as an efficiency measure of banks, a higher return on average assets should be associated with lower spreads. Other studies such as Siddiqui (2012) find a positive effect of return on assets on interest spreads. On the other hand, liquidity availability at the bank level is negatively related with interest rate spreads. Banks that are highly liquid are associated with lower spreads as they do not have to incur extra costs of sourcing funds when faced with increased demand for credit.

Other bank-level variables that are found to positively determine the interest rate spreads are net interest income as a ratio of total income and the extent of operating efficiency as proxied by operating costs as a ratio of total net operating income. The higher the bank's income share derived from interest income, the higher the spreads. Higher operating costs are commonly viewed to imply operational inefficiency leading to higher spreads. Column B shows empirical results with the inclusion of the policy rate. A rise in the CBR (monetary policy tightening) is also found to be associated with a rise in spreads but the coefficient is found to be statistically significant only at 10 % significance level in the fixed effects model and insignificant in the random effects model. These results can be interpreted to imply that whereas the lending rates vis-à-vis the deposit rates respond to the monetary policy stance signalled by the Central Bank, the response is weak.

With respect to macroeconomic variables, a rise in economic performance as captured by GDP growth rate has the effect of lowering the spreads but it is not statistically significant in all the equations. Inflation effect is also found to be statistically insignificant. These results are consistent with those of other studies based on African countries. For instance, studies by Bennaceur and Goaied (2008) based on evidence from Tunisia, Chirwa and Mlachila (2004) based on the case of Malawi and Ahokpossi (2013) using a sample of banks in SSA countries find an insignificant impact of economic growth on the level of different measures of spreads. In the case of Tunisia, Ben-Khediri et al (2005) also fails to find a significant influence of inflation and real output growth on bank interest margins and profitability. Beck and Hesse (2006) also find that bank-specific variables explained a larger proportion of cross bank variation in spreads and margins compared to macroeconomic factors. Overall, the results show that bank-specific factors play an important role and are comparatively more significant in influencing the interest rate spreads in Kenya. The results are consistent with those of similar studies, particularly in the context of African countries.

Table 1: Fixed Effects Model Results

Variable	Column A	Column B	Column C
Constant	-0.0214* (-1.90)	-0.031** (-2.09)	-0.030** (-2.09)
Bank size	0.009*** (20.9)	0.010*** (19.0)	0.010*** (21.0)
OPERAT	0.021** (2.02)	0.020** (2.12)	0.019** (2.05)
NPLR	0.043*** (4.85)	0.043*** (5.38)	0.044*** (5.06)
LQDR	-0.028*** (-5.34)	-0.026*** (-5.26)	-0.025*** (-4.47)
ROAVG	0.213*** (2.64)	0.209*** (2.60)	0.213*** (2.58)
INTRCOM	0.031*** (4.59)	0.033*** (4.85)	0.033*** (4.59)
CBR		0.04* (1.68)	0.04* (1.6)
GDP			-0.014 (-0.30)
No. of Obs. **R-squared**	**310** **0.78**	**310** **0.79**	**310** **0.79**

t-statistics in parentheses. *** ** indicates significance at 1% and 5% levels respectively

Table 1: Fixed Effects Model Results

Variable	Column A	Column B	Column C
Constant	-0.011 (-0.79)	-0.018 (-1.17)	-0.016 (-0.97)
Bank size	0.0077*** (7.53)	0.008*** (9.34)	0.008*** (9.66)
OPERAT	0.020* (1.94)	0.020** (1.96)	0.020* (1.87)
NPLR	0.036*** (3.56)	0.036*** (3.96)	0.033*** (4.68)
LQDR	-0.033*** (-4.68)	-0.032*** (-4.90)	-0.033*** (-4.44)
ROAVG	0.210*** (3.36)	0.212*** (3.39)	0.211*** (3.53)
INTRCOM	0.045*** (3.76)	0.046*** (3.86)	0.048*** (3.97)
CBR		0.041 (1.00)	0.035 (1.13)
GDP			-0.047 (-0.95)
No. of Obs. **R-squared**	**310**	**310**	**310**

t-statistics in parentheses. *** ** indicates significance at 1% and 5% levels respectively

6. Conclusion and Policy Implications

Most African countries have been associated with higher interest rate spreads despite the liberalization of the financial sector. Kenya is not an exception. On average, the interest rate spread for Kenya is closely comparable to the average for SSA region, though higher than the average spreads for other regions such as East Asia and Pacific region. Additionally, big banks have comparatively higher spreads than small banks. Whereas the determinants of interest rate spreads are likely to be multifaceted, this paper provides some insights from an empirical viewpoint, based on bank-specific and macroeconomic factors along similar approaches that have been undertaken in the literature.

Using panel data analysis, the empirical results show that bank-specific factors play a significant role in the determination of interest rate spreads in the banking sector in Kenya. These include bank size, credit risk, liquidity risk, return on average assets, net interest income as a ratio of total income and operating costs. The macroeconomic variables, i.e. real GDP growth and inflation rate were not found to be statistically significant in explaining interest rate spreads across banks. The effect of monetary policy as captured by the policy rate was found to be positive but weakly significant, which could arguably imply a weak response by banks to the monetary policy signals.

If the higher spreads are merely interpreted as an indicator of inefficiency, one can easily be tempted to conclude from the positive relationship between bank size and interest rate spreads that big banks are less efficient, which may not necessarily be the case. The results are not surprising given that big banks are associated with market power—they control a bigger share of the market both in terms of deposits and loans and advances. They also enjoy good reputation and trust (perceived to be more stable, reliable, well-managed, among other positive attributes) and hence can easily mobilize deposits even at lower rates and attract higher loan demand even at higher rates. Nonetheless, the higher spreads associated with the big banks could be manifestations

of other dynamics that require further research beyond this study. For instance, do the shareholders expectations play any role? Moreover, efficiency of financial intermediation is a function of many other factors such as technology, innovation, product diversification, among other factors that go beyond those analysed in the paper.

In sum, the relatively high interest rate spreads remains a subject of debate and continue to pose policy challenges. Although competition in the banking sector has increased over time, it still needs to be further enhanced and supported by policies that encourage and foster competition in the financial sector. These should be complemented with measures to promote the growth and image of small and medium –sized banks in a bid to enhance their ability to penetrate the market so as to break market dominance by a few banks. These could include public education about the stability and soundness of small and medium banks and the industry as whole. Such efforts can be undertaken jointly between the regulator, the industry and individual banks. More policy initiatives such as the recent introduction of horizontal REPOs to help address skewed distribution of liquidity in the industry and credit bureaus to address information asymmetries should be exploited and nurtured. Additionally, banks should explore internally and industry-driven strategies that militate against or counter some of the bank-specific factors associated with higher spreads, even as further policies that may be deemed important are explored. These include a mix of strategies that could range from diversification of products to reduce reliance on interest income and the associated risks, to investment in cost-saving and efficient forms of technology.

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