Determinants of Interest Spread in Kenya

Rose W. Ngugi

Private Sector Development Division
Kenya Institute for Public Policy
Research and Analysis

KIPPRA Discussion Paper No. 41
June 2004

KIPPRA IN BRIEF

The Kenya Institute for Public Policy Research and Analysis (KIPPRA) is an autonomous institute whose primary mission is to conduct public policy research, leading to policy advice. KIPPRA's mission is to produce consistently high-quality analysis of key issues of public policy and to contribute to the achievement of national long-term development objectives by positively influencing the decision-making process. These goals are met through effective dissemination of recommendations resulting from analysis and by training policy analysts in the public sector. KIPPRA therefore produces a body of well-researched and documented information on public policy, and in the process assists in formulating long-term strategic perspectives. KIPPRA serves as a centralized source from which the government and the private sector may obtain information and advice on public policy issues.

Published 2004

Bishops Garden Towers, Bishops Road
PO Box 56445, Nairobi, Kenya
tel: +254 20 2719933/4; fax: +254 20 2719951
email: **admin@kippra.or.ke**
website: http://www.kippra.org
ISBN 9966 949 65 8

The Discussion Paper Series disseminates results and reflections from ongoing research activities of the institute's programmes. The papers are internally refereed and are disseminated to inform and invoke debate on policy issues. Opinions expressed in the papers are entirely those of the authors and do not necessarily reflect the views of the Institute.

KIPPRA acknowledges generous support from the European Union (EU), the African Capacity Building Foundation (ACBF), the United States Agency for International Development (USAID), the Department for International Development of the United Kingdom (DfID) and the Government of Kenya (GoK).

Abstract

This paper examines the determinants of interest spread in Kenya using micro level data. Panel data analysis is used with a sample of 36 banks covering the period 1998-2002. Results show that wide interest spreads are explained by an imperfect credit market that is characterized by credit, interest rate, and liquidity risk. Other factors include capital costs, operational costs, costs of financial innovation, limited diversity of banks' asset portfolio, weak management, and failure to maintain price stability. Therefore, to narrow the interest rate margins, efforts must be made to deal with the problem of non-performing loans and to make the credit market more competitive. Efforts to resolve the problem of a large stock of non-performing loans would complement the policy action of reducing implicit tax in narrowing the interest spread. Current efforts by individual banks to rationalize operational costs also need to be encouraged. The study shows that cost-inefficiency is a major factor explaining the high interest rates despite the policy action to reduce the cost of implicit tax. Banks also need to invest in quality management, which has implications on quality of bank assets. Reduced government borrowing in the domestic market through Treasury bills is paramount, but it should be accompanied by an enhanced competitive credit market and diversification of financial assets to curtail bank instability. Promotion of personal loans by banking institutions is a way forward in enhancing the intermediation role of the banking sector. Above all, monetary authority must achieve the objective of maintaining low and stable prices to ensure that the desired interest structure is achieved.

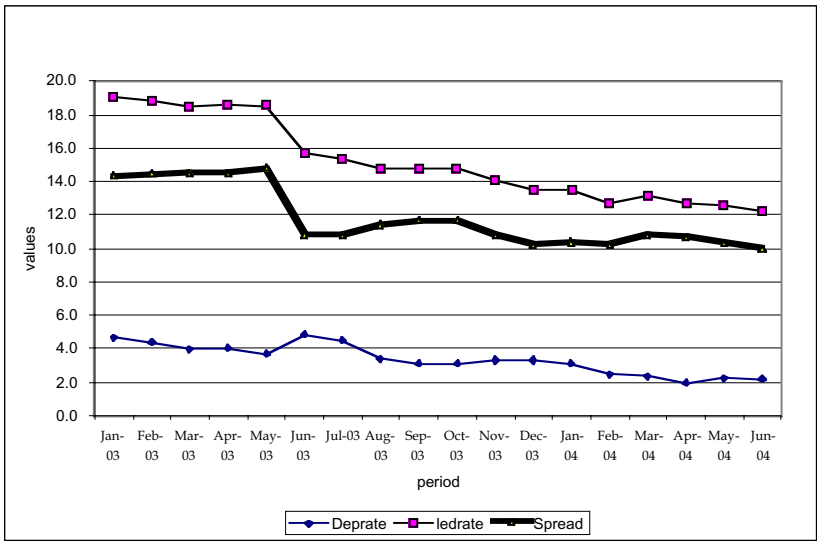
This Discussion Paper is produced under the Umbrella Project for *Improving the Enabling Environment for Businesses in Kenya*. The aim of the Project is to improve the policy, legal, and regulatory environment for businesses. The Project has three components. The **Simplifying the Regulatory Environment for Business (SREB)** component involves research on constraints to operation of business by the private sector in Kenya. The **Private Sector Advocacy** component assists the private sector in advocating for reforms that create a favourable environment for business and investment. The **Capacity Building** component aims to build capacity in line ministries and regulatory agencies to respond to reform proposals made by the private sector and other stakeholders. KIPPRA implements the first and third components while the Kenya Private Sector Alliance implements the advocacy component. The Project is funded by the British Department for International Development (DfID).

Contents

1. Introduction

The Economic Recovery Strategy (2003) of the Government of Kenya stresses on the need to maintain an interest rate structure that promotes financial savings and ensures efficient allocations of the same. Further, in the Budget Speech (2003/04), the Minister of Finance proposes various measures aimed at encouraging banks to lower lending rates to the private sector and narrow the wide interest spread. This proposal saw attempts by the Minister to reduce the implicit taxes that banks face, and which they factor in the lending rates. For example, the mandatory cash ratio requirement was reduced from 10% to 6%. This policy action corroborated the findings and policy recommendations in studies by Njuguna and Ngugi (2000) and Ngugi (2001), which indicate that implicit tax is a major factor that sustains wide interest spread. The Minister also reduced the minimum core capital requirements for banks and non-bank financial institutions (NBFIs) in order to relax the entry barriers and allow for more participation in the market.

Figure 1: Trends in deposit and lending rates and the interest spread



The results of the implemented changes were impressive to a large extent. Figure 1 shows a significant drop in the level of interest rates, which is characterized by almost a kink in June 2003. Lending rates declined from 18.3% in May 2003 to 15.7% in June 2003, while deposit rates showed an increasing tendency, though this was not sustained. In a period of one year, the deposit rate had declined to 2.2% while the lending rate was 12.2%. The interest rate margin also showed a decline from 14.8% in May 2003 to 10.8% in June 2003 and about 9.9% in June 2004. This, however, did not remove Kenya from among the economies with wide interest spreads, as indicated in Table 1, implying that more policy action is required to manage interest rates.

Table 1: Interest spreads for selected economies

	Kenya	Tanzania	Botswana	Nigeria	South Africa	Chile	Argentina	Malaysia
1991	4.90		0.43	5.13	3.01	6.23		2.24
1992	4.90		1.50	6.72	5.13	5.68		2.23
1993	6.10		1.43	8.41	4.65	6.11		3.00
1994	22.30		3.49	7.39	4.47	5.22	1.98	3.87
1995	15.20	18.21	4.31	6.70	4.35	4.43	5.94	2.80
1996	16.20	20.37	4.07	6.78	4.61	3.89	3.15	2.86
1997	13.52	18.44	4.83	10.63	4.63	3.65	2.28	2.85
1998	11.09	15.14	4.81	8.08	5.30	5.25	3.07	3.62
1999	12.83	14.14	5.17	7.48	5.76	4.06	2.99	4.44
2000	14.24	14.19	5.24	9.58	5.30	5.64	2.75	4.31
2001	13.03	15.45	5.60	8.18	4.40	5.70	11.54	3.75
2002	12.97	13.14	5.66	8.10	4.98	3.96	12.43	3.32
2003	12.44	11.44	6.10	6.50	5.20	3.45	8.99	3.23

Source: Calculated using IFC data

Although it was desirable to see lending rates decline, the resulting decline in deposit rates rendered them negative in real terms as inflationary pressure ensued. Real deposit rate worsened from –1.84% in May 2003 to –5.53% in June 2004 (Table 2). Lending rates also declined in real terms from 12.2% in May 2003 to 8.6% in June 2003 and 3.7% in June 2004. This has implications on the desired interest rate structure and the ability of the financial sector to play a significant role in the

development process. For example, while low lending rates are desirable for investment financing, low deposit rates can discourage the mobilization of resources by the banking sector, especially if there are other financial assets offering competitive returns.

Table 2: Trends in nominal and real interest rates, inflation and average liquidity

Period	Inflation	Average liquidity ratio	Deposit rate	Lending rate	Spread	Real deposit rate	Real lending rate
Jan-03	2.45	0.44	4.7	19.0	14.34	2.18	16.17
Feb-03	2.97	0.44	4.4	18.8	14.43	1.39	15.41
Mar-03	3.64	0.44	4.0	18.5	14.50	0.34	14.33
Apr-03	4.54	0.43	4.1	18.6	14.51	-0.45	13.43
May-03	5.65	0.45	3.7	18.5	14.81	-1.84	12.19
Jun-03	6.57	0.49	4.8	15.7	10.84	-1.63	8.55
Jul-03	7.31	0.46	4.5	15.3	10.80	-2.62	7.45
Aug-03	7.85	0.46	3.4	14.8	11.40	-4.12	6.45
Sep-03	8.35	0.48	3.1	14.8	11.70	-4.85	5.95
Oct-03	8.95	0.49	3.1	14.8	11.70	-5.37	5.37
Nov-03	9.47	0.51	3.3	14.1	10.80	-5.64	4.23
Dec-03	9.82	0.49	3.3	13.5	10.20	-5.93	3.35
Jan-04	10.04	0.48	3.12	13.48	10.36	-6.29	3.13
Feb-04	10.23	0.47	2.47	12.69	10.22	-7.04	2.23
Mar-04	10.07	0.48	2.32	13.12	10.80	-7.04	2.77
Apr-04	9.72	0.47	1.98	12.67	10.69	-7.05	2.69
May-04	8.84	0.50	2.22	12.55	10.33	-6.08	3.41
Jun-04	8.18		2.20	12.17	9.97	-5.53	3.69

Source: Central Bank of Kenya, statistical bulletin

Table 3: Trends in non-performing loans

		1993	1994	1995	1996	1997	1998	1999
Commercial banks	NPLs (millions)		15,785	20,731	27,254	39,111	71,289	90,281
	LLP (millions)		7,985	10,793	11,486	16,260	22,526	40,702
	NPLs/LLP (%)		18	16	16	18	30	35
NBFIs	NPLs (millions)		11,209	11,071	10,647	12,751	14,770	13,208
	LLP (millions)		5,263	5,104	5,950	8,840	7,725	5,222
	NPLs/LLP(%)		28	23	27	40	48	47
Total (Commercial banks+NBFIs)	NPLs (millions)	21,946	26,994	31,802	37,901	69,001	86,059	103,489
	LLP (millions)	7,031	13,248	15,897	17,436	25,100	30,251	45,924

Note: NPL—Non-performing loan; LLP—Loan loss provisions; NBFI—Non-bank financial institution

Source: Central Bank of Kenya, Supervision Department Annual Report

At the micro-level, Table 3 shows a strained quality of the banking sector assets with the rising levels of non-performing loans, which increased from 30% in 1998 to 35% in 1999. In the 2001/02 period, efforts were being made to resolve the problem of the large stock of non-performing loans, including the development of legislation that would facilitate passage of information on loan defaulters to credit reference bureaus. It was expected that sharing of information on creditors would help to improve credit assessments by banking institutions and therefore minimize loan defaulting. The recent Central Bank Monthly Economic Review (June 2004) reports a decline in the non-performing loans to 30% in May 2003 and 25% in May 2004. We would expect that banks, faced with rising non-performing loans, compensate themselves by charging high lending rates to the performing loans such that the interest spread widens. Figure 2, however, does not seem to portray this type of relationship. It shows an increase in the provision of bad and doubtful loans while the Central Bank of Kenya continued with its requirement for more prudent provisioning for bad and doubtful loans. While this is good for the quality of bank assets, it is a cost that reduces the banks' profitability and would sustain the high level of spread as banks sustain high lending rates to cover the costs. It may be that when banks cushion their exposure to default risk with adequate provisions, this counteracts the bad loan effect. The liquidity ratio also indicates a high level of liquidity held by the banking sector, which could be attributed to the low demand for the loans.

The level of profitability indicates an upward trend during the period, which may imply that even as the banks faced a tight loans market, they were able to sustain profits by keeping the interest spread wide. Table 4 shows that banks' total income is high when the interest spread is wide.

Figure 2: Trends in the interest spread, non-performing loans and bad loan provisons

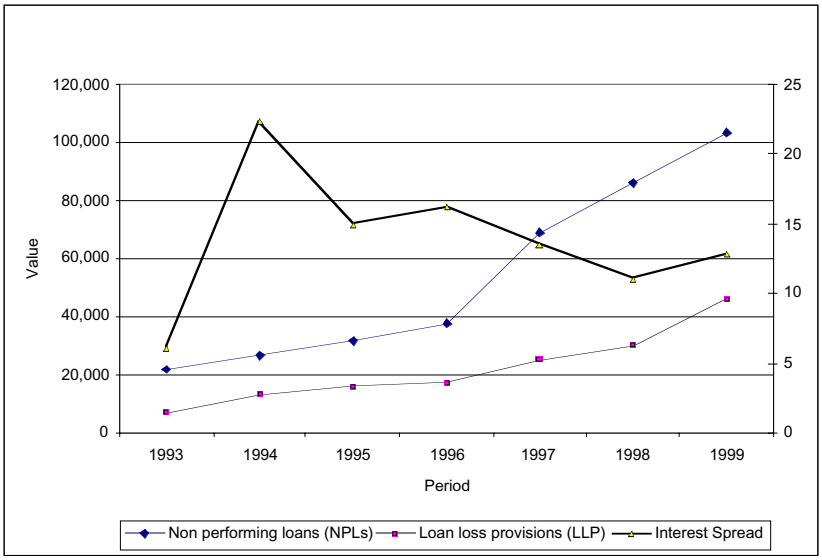


Table 4: Profitability of banks

	Jun-00	Jun-01	Jun-02	Jun-03
	6 months	6 months	12 months	12 months
Total income	36,465	33,077	29,610	30,255
Expenses before provisions	28,039	24,251	21,798	20,636
Profit before provisions	8,426	8,826	7,814	9,619
Provisions for bad debts	4,215	3,791	4,530	3,155
Profit before tax	4,211	5,035	3,284	6,464
Spread	16.10	12.90	13.17	10.84

Source: Central bank of Kenya monthly bulletins

The main aim of this paper is to investigate the factors that explain interest spreads using micro data to capture the microstructure/ institutional elements. In an earlier paper (Njuguna and Ngugi, 2000), macro data was used for analysis. However, this limited capturing some of the variables indicated to influence interest rates spread.

The rest of the paper is organized as follows: Section 2 reviews literature on the determinants of interest margins, while Section 3 provides the empirical framework. Section 4 reports the empirical results and Section 5 concludes the paper.

2. Determinants of Interest Margins

Theoretical models and empirical studies point to various determinants of interest spread. These include market structure, risk factors (capital, liquidity, interest rate and credit), management quality and risk preferencing, operational costs and macroeconomic policy variables. In addition, Ho and Saunders (1981) distinguish factors that determine the pure spread and those that explain spread over and above the pure spread. To capture the determinants of bank interest margins, two frameworks are used: the dealership approach (DA) and the micro-model of the banking firm approach (MBFA). Ho and Saunders (1981) modeled interest spread integrating the hedging and expected utility approach (later referred to as HS). The model abstracts from institutional constraints, financial management problem and credit risk. It defines pure spread as a function of the degree of managerial risk aversion, the size of transactions undertaken by the bank, market structure and the variance of interest rates. The model was modified by McShane and Sharpe (1985) and Allen (1988) relaxing some of the assumptions. For example, unlike Ho and Saunders (1981), McShane and Sharpe (1985) assume that a bank is a risk-averse dealer in the credit market while Allen (1988) assumes loan heterogenity, arguing that pure spread can be reduced when cross-elasticities of demand between bank products are considered. The MBFA follows the works of Zarruk (1989) and Wong (1997). The model assumes that loan demands and deposits' supplies clear the markets simultaneously. There are differences, however, in the models developed in this framework, especially in the assumptions of risk preferencing and the balance sheet. There are also similarities between this model and HS. For example, Zarruk (1989) assumes a bank holding three types of claims: deposits, borrowing from the federal fund market and equity capital. $L+B=D^*+E$, where L is loans, B is a composite variable representing the bank's net position in the money market. D* is the amount of ex-ante deposits, and E is equity. Like the HS, Zarruk

(1989) model abstracts from legal reserve requirements and equity capital. The model assumes the bank is a rate setter with the loan demand negatively related to the loan rate. However, the bank is assumed to face uncertainty in supply of deposits, which is an increasing function of the rate of interest on deposits. As is the case for HS, the model assumes that the bank's objective is to maximize the expected utility of profits subject to the balance sheet constraint. Elkayam (1994) and Gheva *et al* (1992) balance sheets do not consider equity capital; instead, the studies the amounts borrowed from the market and the discount window as a source of funds for the bank. In addition, instead of assuming expected utility function, the model assumes that a bank is risk neutral, and aims to maximize the expected profits. The models then derive interest spread as a function of price of funds borrowed in the secondary market, reserve requirement ratio and the demand and supply of funds interest elasticities. Paroush (1994) in addition considers the credit risk explicitly in the model.

Wong (1997), like Zarruk (1989), assumes a bank balance sheet with capital element, $L+A=D+K$ where L is loans, A is other investments, D is deposits, and K is capital. The capital K is assumed to be fixed over the planning horizon but it has to satisfy the following: $K \geq kD$ where k is the required minimum capital-to-deposit ratio. Credit risk is modeled as a random variable z with a range (0, 1) to denote the proportion of non-performing loans at the end of the period. The bank is a quantity setter in the deposit market where the supply of deposit is perfectly elastic. Deposits are rolled over and therefore have a shorter maturity than the loans. The model assumes maximization of expected utility and derives interest spread as a function of credit risk premium, elasticities in demand and supply of funds and capital ratio.

Empirical studies on interest spread are few. Some of them are comparative studies covering both developed and developing markets (Demirguc-Kunt and Huizinga, 1996), developing countries (Brock and

Suarez, 2000) and developed markets (Saunders and Schumacher, 2000). Others, such as Angbazo (1997), Barajas *et al* (1998) and Ho and Saunders (1981) cover individual countries.

There are two main approaches used in empirical analysis. Some studies use two step method of analysis (see for example, Ho and Saunders, 1981 and Saunders and Schumacher, 2000) while others assume a single model incorporating both the pure and actual spread (Barajas *et al*, 1998; Angbazo, 1997; Brock and Suarez, 2000; Demirguc-Kunt and Huizinga, 1996). Studies using the two-step method adopt the Ho and Saunders (1981) theoretical framework. In the first step, these studies estimate the interest spread with institutional/market imperfection factors assumed to explain the actual interest spread over and above the pure spread. In the second step, the constant in the first step is treated as pure spread and regressed on factors assumed to explain the interest spread that exists even in a competitive market.

The main variables used in the estimation include imperfection market variables such as capital ratio, operational costs, implicit interest rate, liquidity ratio and credit risk. Other variables that explain the pure spread include factors proxying for market structure, management risk preferencing and interest rate risk. Table 5 summarizes the results for some selected studies. Market structure variables indicate that non-competitive systems have higher spread. Interest risk, implicit interest rate, capital ratio and opportunity cost impact positively on interest spread.

Table 5: Empirical results for the determinants of interest spread

	Saunders & Schumacher (2000)	Angbazo (1997)	Brock & Suarez (2000)	Demirguc-Kunt & Huizinga (1996)	Barajas *et al* (1998)	Ho and Saunders (1981)
Countries covered	Developed markets	US	Latin American countries	Developed & developing economies	Columbia	US
Market structure	+ve				+ve	
Managerial efficiency		+ve			+ve	
Non-interest earning ratio		+ve		-ve		
Transaction size				+ve	-ve	
Interest risk	+ve	+ve	+ve		+ve	+ve
Implicit interest	+ve	-ve				+ve
Opportunity costs	+ve					+ve
Capital ratio	+ve	+ve	+ve	+ve		
Default risk		+ve	-ve		+ve	+ve
Liquidity risk		-ve	+ve			
Cost ratio			+ve	+ve		
Inflation rate			-ve	+ve		
GDP rate			-ve	+ve		
Real interest				+ve		

Note: +ve implies positive relationship and –ve implies negative relationship.

3. Analytical Framework

The study borrows from Ngugi (2001) and Njuguna and Ngugi (2000) framework for analysis, which assumes a simple intermediation model for the banking sector given by the following balance sheet identity.

$$L + B + R = D + M + ONL \quad (1)$$

Where

L	=	Total loans
B	=	Investment in government securities
R	=	Reserve requirements
D	=	Total deposits
M	=	Short term borrowings at the discount window and the interbank market
ONL	=	Other net liabilities

Interest rate spread (*SP*) is defined by the difference between the lending and deposit rate $r_L - r_d$

$$SP = \frac{C_{L0}}{(1-w)\phi} - \frac{C_{d0}}{(1-\rho)\sigma} + \frac{C_{l1}}{(1-w)\phi} L^* - \frac{C_{d1}}{(1-\rho)\sigma} D^* + r_m\psi(1+\frac{1}{\sigma}) + r_b(\frac{1}{(1-w)\phi} + \frac{1-\psi}{\sigma}) \quad (2)$$

Assuming an implicit function for equation 2, the empirical model is defined as follows:

$$SP = f(MP, MQ, IRR, IM, MAC) \quad (3)$$

where *SP* is the interest spread, *MP* is market power which is estimated by the size of transactions (*LLOAN, LASS*) and also the level of competition in the credit market (*HHL*). IRR is interest rate risk, which is proxied by volatility in deposit rate (*VOLD*), lending rate (*VOLL*) and the Treasury bill rate (*VOLT*). MQ is management quality proxied by the ratio of non-interest earning assets to total assets (*MNG*). IM is a vector of market imperfection variables including the minimum capital

requirement (*CAP*), implicit interest rate (*IMP*), opportunity cost of reserves (*OPP*), liquidity risk (*LIQ*), operational costs (*COST*), size of the bank (*SIZE*). MAC is a vector of macroeconomic policy variables considering real Treasury bill rate (*RTB*), real inter-bank rate (*RINTER*) and inflation rate (*INF*).

The model is estimated using balanced panel data estimation. If we assume that a composite variable *X* represents the regressors in the equation, then we can express equation 3 in a linear function form as follows:

$$SP_{it}=\alpha+\beta' X_{it}+\varepsilon_{it} \quad (4)$$

i = 1,2,…..N; t = 1,2,…….T; X_{it} = vector of the regressors

We adopt the following component structure for the disturbances:

$$\varepsilon_{it} = \alpha_i+\alpha_t+v_{it} \quad (5)$$

where α_i is company specific effects and α_t is time specific effects, while v_{it} is idiosyncratic shock. Substituting equation 5 into equation 4 we get the following model.

$$SP_{it}=\alpha+\alpha_i+\alpha_t+\beta' X_{it}+v_{it} \quad (6)$$

Next, we need to assess the appropriate stochastic assumptions of the regressors on the components of the error term. This is very crucial for the estimation of the parameter β. If the regressors are correlated with the firm-specific effects and not with the shock, then the within group (LSDV) estimator would be the appropriate procedure. Therefore, we would have to fit a fixed effect model where differences between units are viewed as parametric shift of the regression function. The specific model for such estimation is expressed as follows:

$$SP_{it}= \alpha_i+\alpha_t+\beta' X_{it}+v_{it} \quad (7)$$

If the regressors are uncorrelated with the firm-specific effects and the idiosyncratic shock, then the standard variance component of GLS estimator is the most appropriate procedure. This means fitting a

random effect model where firm-specific terms are randomly distributed across cross-sectional units. However, this is only appropriate if we believe that the sampled cross-sectional units were drawn from a large population and therefore the LSDV estimator becomes inconsistent. The model for the random effects is specified as follows:

$$SP_{it}=\alpha_i+\alpha_t+\beta' X_{it}+\mu_i+v_{it} \quad (8)$$

3.2 Data and sample

A sample of 36 banks was selected from a pool of 51 banks covering the period 1998-2002. The main consideration was availability of relevant data. Data for analysis was collected mainly from the press releases of financial statements by individual banks. Variables of interest are defined as follows:

Interest margin

Demirguc-Kunt and Huizinga (1996) note that the efficiency of the intermediation process can be measured by both *ex ante* and *ex post* interest spreads. While the *ex ante* interest spreads are calculated from the contractual rates charged on loans and rates paid on deposits, the *ex post* interest spreads are measured as the difference between actual banks interest revenues and actual interest expenses. However, one problem in using the *ex ante* spread is that data is generally not available at individual bank level. Therefore, empirical works generally rely on *ex post* interest spread. Brock and Saurez (2000) summarize four varieties in which empirical works compute the interest spread.

SP1 = (Interest received/loans - Interest paid/deposits)

SP2 = (Interest received/All interest bearing assets - Interest paid/All interest bearing liabilities

SP3 = (Interest received on loans only/Loans - Interest paid on deposit only/Deposits

SP4 = (Interest received - Interest paid)/Total assets

The study calculated all the alternatives and analyzed their correlation as reported in Table 6. The mean values indicate differences across the various measures. The mean difference test for the various measures indicates that they are significantly different and therefore the need to have estimations for the individual proxies. Similarly, the correlation coefficients are very small.

Table 6: Relationship between the various proxies of interest spread

	SP1	*SP2*	*SP3*	*SP4*
		Mean values		
	0.1898	0.0573	0.1061	0.0633
		Correlation		
SP1	1			
SP2	0.493 (*0.000*)	1		
SP3	0.679 (*0.000*)	0.634 (*0.000*)	1	
SP4	0.451 (*0.000*)	0.812 (*0.000*)	0.617 (*0.000*)	1

Independent variables

Default risk

This is proxied by the ratio of gross non-performing loans (NPL) to the total loans. A positive relationship is expected between *NPL* and *SP*. Banks faced with risky loans require a higher net interest margin to compensate for the default risk. It is however possible that banks with a high proportion of non-performing loans can lower the spread in order to grow out of their troubles, assuming that banking authorities are reluctant to close banks in trouble and may encourage high-risk high-growth strategies. Ho and Saunders (1981) and Angbazo (1997) define default risk as the ratio of the net loan charge-off to total earning assets. Loan portfolio risk is measured by the provision for loan losses (*RISK*). A high correlation is indicated between the *NPL* and loan provisions (*RISK*) excluding the interest in suspense (.891(*.000*)) which implies good provision for loan losses. A negative correlation is indicated between

the credit risk and profit (-.233 (*.001*))[1] which supports the argument that banks' profitability is threatened by credit risk. Brock and Suarez (2000) find a negative relationship and conclude that it is possible for non-performing loans to be associated with smaller spread especially if there is low provision for loan losses. It could also imply that banks with a higher proportion of bad loans may lower spread as a way of trying to grow out of their troubles, which could also imply that monetary authority is reluctant to close banks in trouble and may encourage high-risk, high-growth strategies.

Capital ratio

This is a measure of insolvency, defined as the ratio of equity (capital base) to total assets (*CAP*). Banks with higher capital ratios tend to face lower cost of funding due to lower prospective bankruptcy costs. Such banks also need to borrow less to support a given level of assets. Saunders and Schumacher (2000) observe that banks hold capital to insulate them against both the expected and unexpected credit risk. However, holding equity capital is relatively costly as compared to debt because of tax and dilution of control. Therefore, banks that have relatively high capital ratios for regulatory or credit reasons seek to cover some of this cost by imposing an extra spread. A positive relationship evidenced between bank profitability and capitalization implies that well-capitalized firms face lower expected bankruptcy costs for themselves and customers, therefore reducing their cost of funding (Berger, 1995).

Liquidity risk

Liquidity risk is the risk of not having sufficient cash or borrowing capacity to meet deposit withdrawals or new loan demands therefore forcing banks to borrow emergency funds at excessive costs. This is

[1] These correlations are based on calculations by the author.

measured as the ratio of short-term assets to the total deposits (*LIQ*). The higher the *LIQ* the lower the liquidity risk and therefore the lower the spread.

Ownership

Demirguc-Kunt and Huizinga (1996) find that foreign-controlled banks have higher interest margins and profits compared to domestic banks especially in developing countries. This is attributed to the fact that foreign bank technology edge is relatively stronger to overcome any informational disadvantages. This study has four variables for ownership; OWN1 = foreign-owned and incorporated; OWN2 = foreign-owned and locally-incorporated; OWN3 = locally-incorporated and with government control; OWN4 = locally-incorporate and privately-owned. The characteristics by ownership indicate that local banks have higher non-performing loans compared to foreign-controlled banks. Local banks with government control have a higher credit risk (0.891) as compared to the local privately-owned (0.414). In addition, foreign-owned banks have generally higher spreads compared to the locally-controlled banks (Table 7).

Bank size

Ho and Saunders (1981) argue that larger banks tend to be more competitive and therefore have narrower margins. The study measures the size of the bank by the ratio of total fixed assets to total assets (*SIZE*).

Cost ratio

This is measured as the ratio of administrative and other operational costs to the performing loans (*COST*).

Implicit interest rate

This is defined as the ratio of the difference between non-interest expenses and operating income to the total assets (*IMP*). It is argued that banks may consider competing for implicit interest payments as

Table 7: Mean values by ownership

The variables are defined as follows: *NPL* is non-performing to loans ratio; *CAP* is equity to total assets ratio; *LIQ* is the ratio of short-term assets to total deposits; *COST* is the operating costs to total loans ratio; *IMP* is the ratio of the difference between non-interest expenses and operating income to total assets; *OPP* is the ratio of non-interest earning assets to total assets; *RISK* is the loan provisions to total loans ratio; *SIZE* is the ratio of fixed assets to total assets; MNG is a proxy for management quality; *HHL* is market concentration in loans market; *HHD* is market concentration in deposit market; *OWN1* is foreign-owned and incorporated; *OWN2* is foreign-owned and locally-incoporated; *OWN3* is is locally-incorporated and with government control; *OWN4* is locally-incorporated and privately-owned; *SPi* are the measures of interest spread.

	OWN1	*OWN2*	*OWN3*	*OWN4*
SP1	0.275	0.177	-0.034	0.168
SP2	0.059	0.050	0.049	0.053
SP3	0.110	0.119	0.074	0.101
SP4	0.411	0.480	0.342	0.313
NPL	0.162	0.303	0.891	0.414
CAP	0.166	0.200	0.239	0.161
LIQ	0.128	0.136	0.132	0.135
COST	0.567	0.640	0.670	0.490
IMP	0.036	0.049	0.055	0.047
OPP	0.014	0.013	0.013	0.015
SIZE	0.030	0.052	0.104	0.032
HHL	0.015	0.056	0.062	0.011
HHD	0.019	0.066	0.049	0.011
RISK	0.069	0.064	0.247	0.126
MNG	0.084	0.112	0.191	0.068

well as explicit interest payments. Ho and Saunders (1981) measure implicit interest rate as the ratio of the difference between the total non-interest expense and total non-interest revenue to total earning assets. Saunders and Schumacher (2000) measure it as the service charge remissions and other types of depositor subsidy due to regulatory restrictions on explicit interest payments.

Opportunity cost of holding reserve at the Central Bank

Saunders and Schumacher (2000) argue that the existence of non-interest bearing reserve requirements increases the economic cost of funds over and above the published interest expenses. Ho and Saunders (1981) and Saunders and Schumacher (2000) define this as the ratio of the non-

interest bearing reserve assets to the total earning assets multiplied by the average Treasury bill rate. In this study, the opportunity cost is proxied by the ratio of non-interest-earning assets to interest earning assets multiplied by the Treasury bill rate (*OPP*).

Interest volatility

The variance, standard deviation and the mean absolute error can measure interest rate variability. Angbazo (1997) captures interest-rate risk by the net position in short term assets. This study uses the variance as the measure of volatility. It considers volatility of lending, deposit and Treasury bill rate. A positive and significant correlation is indicated between lending rate and deposit rate volatility (0.809(0.000)), and between the deposit and Treasury bill rate (0.837 (0.000)) but a lower coefficient between Treasury bill and the lending rate (0.471(.000)).[2]

Management quality

Management quality is measured by the ratio of non-interest earning assets to total assets (*MNG*). Management decisions affect the composition of assets and is reflected in the *NIM*. It is argued that non-performing loans also reflect on the management quality, as shown by a positive correlation indicated between *MNG* and *NPL* (0.497(0.000)).[3]

Market power

This is measured by the ratio of loans (*LASS*) and deposits (*DASS*) to the total assets. Market power is also proxied by the level of competition in the credit (*HHL*) and deposit market (*HHD*), which is measured by market concentration ratios. Volumes of loans (*LLOAN*) and deposit (*LDEP*) were also used. A high correlation is indicated between the HHL and HHD which would imply that both the deposit and loans market have similar characteristics in terms of competition levels.

[2] These correlations are based on calculations by the author.
[3] These correlations are based on calculations by the author.

4. Empirical Results

Summary statistics

Table 8 provides summary statistics for the variables. It shows a declining trend in interest spread and NPL. There is also a general improvement in management quality over time. Correlation results are reported in Table 9. A positive correlation is indicated between the interest spread and various measures of risk (credit risk, liquidity risk and interest risk). *COST* is also positively correlated with interest spread. There are mixed signs across the various measures of interest spread for *IMP, CAP, SIZE, MNG* and concentration measures.

Test and estimation results

Tables 10-13 provide regression results for the various proxies of interest margin. Equation 1 reports estimation results with what Ho and Saunders (1981) consider as market imperfection variables. The credit risk variable (*NPL*) is positive and significant, implying that when the banking sector is characterized by high levels of non-performing loans, banks tend to keep their profit margin by maintaining a wide spread. These results are supported by a negative correlation indicated between the *NPL* and profit and a positive correlation between the SP and profit. These results are therefore consistent with the hypothesis that banks with more risky loans select higher net interest margins.

Table 8: Summary statistics

The variables are defined as follows: *NPL* is non-performing to loans ratio; *CAP* is equity to total assets ratio; *LIQ* is the ratio of short-term assets to total deposits; *COST* is the operating costs to total loans ratio; *IMP* is the ratio of the difference between non-interest expenses and operating income to total assets; *OPP* is the ratio of non-interest earning assets to total assets; *RISK* is the loan provisions to total loans ratio; *SIZE* is the ratio of fixed assets to total assets; *VOLD* is volatility of deposit rate; *VOLL* is volatility of lending rate; *VOLT* is volatility of Treasury bill rate; MNG is a proxy for management quality; *HHL* is market concentration in loans market; *HHD* is market concentration in deposit market; *LASS* is the ratio of loans to total assets; *DASS* is the ratio of deposits to total assets; *PROFIT* is profit before tax. Note: LLOAN is logarithm of total loan; LDEP is a logarithm of total deposits.

	Mean (Whole period)	1998	1999	2000	2001	2002
SP1	0.1898	0.2165	0.1812	0.2056	0.1825	0.1619
SP2	0.0528	0.0557	0.0616	0.0619	0.0551	0.0516
SP3	0.1011	0.1082	0.1130	0.1194	0.0945	0.0948
SP4	0.0633	0.0694	0.0654	0.0648	0.0605	0.0562
NPL	0.4292	0.2776	0.3437	0.5305	0.4182	0.2719
CAP	0.1757	0.1506	0.1592	0.1730	0.1648	0.1847
COST	0.1585	0.6650	0.0957	0.3570	-0.0074	0.2561
IMP	0.0467	0.0436	0.0394	0.0509	0.0468	0.0386
OPP	0.0145	0.0261	0.0144	0.0116	0.0121	0.0105
LIQ	0.1339	0.1562	0.0430	0.0479	0.0402	0.0310
RISK	0.2453	0.0817	0.0924	0.1883	0.1256	0.1258
DASS	0.7230	0.6728	0.5069	0.4870	.4874	0.4744
LLOAN	7.6470	7.5532	7.6270	7.5907	7.6667	7.8061
LDEP	8.0550	7.8536	8.0183	8.0331	8.1246	8.2520
VOLL	1.5130	1.4700	2.0600	3.7500	0.1200	0.0700
VOLD	0.9560	1.7900	1.1300	1.6500	0.1000	0.0700
VOLT	8.9050	17.900	14.780	8.2100	2.2400	0.1.19
HHL	0.0231	0.0249	0.0249	0.0242	0.0243	0.0266
HHD	0.0231	0.0254	0.0254	0.0247	0.0247	0.0269
MNG	0.0897	0.0947	0.0966	0.0895	0.0778	0.0768
SIZE	0.0405	0.0399	0.0430	0.0479	0.0402	0.0310
LASS	0.4937	0.5121	0.5069	0.4870	0.4874	0.4744
PROFIT	1.3502	1.6538	1.4144	1.3728	1.2169	1.0820

The bank capital ratio, which is held to insulate banks from expected and unexpected credit risk is positive and significant. It shows that high capital ratio held against credit risk tend to erode bank profits. As a result, banks seek to cover part of the cost of holding high capital ratios by imposing an extra spread.

Liquidity risk factor shows similar results as Angbazo (1997) where banks with a greater proportion of funds in liquid assets have lower margins to reflect reduced liquidity risk premium. However, the opportunity cost of reserves is positive and significant just like in Saunders and Schumacher (2000). This implies that banks holding idle reserves loose a source of income and therefore keep wide margins.

Table 9: Correlation between the interest spread measures and independent variables

The variables are defined as follows: *NPL* is non-performing to loans ratio; *CAP* is equity to total assets ratio; *LIQ* is the ratio of short-term assets to total deposits; *COST* is the operating costs to total loans ratio; *IMP* is the ratio of the difference between non-interest expenses and operating income to total assets; *OPP* is the ratio of non-interest earning assets to total assets; *RISK* is the loan provisions to total loans ratio; *SIZE* is the ratio of fixed assets to total assets; *VOLD* is volatility of deposit rate; *VOLL* is volatility of lending rate; *VOLT* is volatility of Treasury bill rate; MNG is a proxy for management quality; *HHL* is market concentration in loans market; *HHD* is market concentration in deposit market; *LASS* is the ratio of loans to total assets; *DASS* is the ratio of deposits to total assets; *PROFIT* is profit before tax.

	SP1	*SP2*	*SP3*	*SP4*
NPL	0.083(.248)	0.138(.055)	0.288(.000)	-0.076(.292)
CAP	-0.047(.513)	0.087(.226)	0.152(.033)	0.221(.002)
LIQ	0.123(.087)	0.009(.902)	0.099(.170)	0.041(.571)
COST	0.063(.381)	0.089(.216)	-0.003(.964)	0.014(.850)
IMP	-0.087(.228)	0.162(.023)	0.064(.373)	0.172(.016)
OPP	0.182(.011)	0.050(.484)	0.095(.187)	0.154(.031)
RISK	0.241(.001)	0.282(.000)	0.472(.000)	0.090(.209)
SIZE	-0.010(.894)	0.137(.057)	0.075(.300)	-0.078(.280)
VOLD	0.147(.040)	0.099(.169)	0.165(.021)	0.191(.007)
VOLL	0.101(.161)	0.136(.058)	0.183(.010)	0.125(.083)
VOLT	0.115(.111)	0.075(.297)	0.122(.090)	0.196(.006)
MNG	-0.057(.429)	0.222(.002)	0.094(.193)	-0.137(.055)
HHL	-0.165(.021)	0.258(.000)	-0.075(.297)	0.103(.152)
HHD	-0.056(.440)	0.307(.000)	-0.032(.654)	0.126(.080)
LASS	-0.755(.000)	-0.206(.004)	-0.334(.000)	-0.045(.532)
DASS	0.142(.047)	0.077(.283)	0.052(.472)	-0.028(.702)
PROFIT	0.268(.000)	0.123(.087)	0.164(.022)	0.286(.000)
LLOAN	-0.348 (0.000)	0.147 (0.041)	-0.244 (0.001)	0.187 (0.009)

Implicit interest may affect banks' margins by increasing non-interest expenses such as no-fee checking convenience banking through Automatic Teller Machines (ATMs) and others. Results show positive and significant results for all the proxies except the SP1. Saunders and Schumacher (2000) and Ho and Saunder (1981) also find a positive relationship, implying that banks increase their actual or explicit spread.

The size of the bank is negative for all the dependent variables but the level of significance varies. Large banks face economies of scale and therefore tend to have lower costs and narrower margins. Operation costs have a positive and significant impact on SP1. Demirguc-Kunt and Huizinga (1996) found similar results.

The other factors considered were the ownership of the bank, where foreign-owned banks showed a higher interest margin as compared to locally-controlled banks while banks with ATMs showed a lower but insignificant level of spread.

Competition measures (HHL) is only significant with SP1 but has the expected sign for the rest. This implies that the more uncompetitive the loans market, the lower are the chances of reducing interest margin. *LLOAN* indicates a negative and significant relationship with *SP1,* which would mean that when the loans market is very active the interest spread goes down. There are mixed findings with the *LASS*. We would expect that the higher the proportion of loans in assets the higher the earnings especially when the proportion of non-performing loans is minimal. The correlation between the *NPL* and *LASS* is however positive, implying that banks with a proportionately higher level of loans in the asset portfolio face higher credit risk, resulting in higher interest margin. The correlation between the *LASS* and *PROFIT* is negative, implying that more loans in the asset portfolio threaten profitability. The activities in the Treasury bill market are insignificant but with a negative relationship, which implies that when banks have other sources of earning their income then they can still reduce the interest margin.

Volatility in the interest rates gives different results. For example, volatility in deposit rates shows a negative relationship with the spread while the Treasury bill rate and lending rate reflect a positive relationship. The negative relationship may imply lower interest risk exposure while the positive implies higher exposure to interest risk.

MNG indicates a negative and significant relationship implying that management quality worsens with allocation of smaller proportion of interest earning assets in the portfolio. It means that non-interest bearing assets do not impose a positive reserve burden.

The results of other macro/policy variables show that a rise in the Treasury bill rate reduces the interest margin as it serves as a diversifying asset for the banks. Interbank rate has a negative and significant impact, which implies that banks which borrow or are in inadequate liquidity situations always loose. The inflation factor indicates a widening interest margin when the inflation rate goes up. Therefore, if the Central Bank of Kenya fails to maintain price stability then this distorts the operations of the banks, which consequently charge a higher interest margin.

Table 10: Regression results for SP1

The variables are defined as follows: *NPL* is non-performing to loans ratio; *CAP* is equity to total assets ratio; *LIQ* is the ratio of short-term assets to total deposits; *COST* is the operating costs to total loans ratio; *IMP* is the ratio of the difference between non-interest expenses and operating income to total assets; *OPP* is the ratio of non-interest earning assets to total assets; *SIZE* is the ratio of fixed assets to total assets; *HHL* is market concentration in loans market; *LASS* is the ratio of loans to total assets; *RTB* is real Treasury bill rate; *RINTER* is real inter-bank rate; *INF* is inflation. Note: LLOAN is logarithm of total loans. The t-ratios are in parenthesis.

	Equation 1	Equation 2	Equation 3	Equation 4	Equation 5
NPL	.1269(11.437)	.0988(9.543)	.0977(9.514)	.0978(9.498)	.0989(9.628)
CAP	.0938(1.723)	.0654(1.408)	.0721(1.563)	.0725(1.572)	.0685(1.485)
LIQ	-.4924(3.670)	-.6356(5.435)	-.7233(5.805)	-.7363(5.787)	-.6776(5.714)
COST	.0047(1.831)	.0043(1.978)	.0043(1.985)	.0043(1.999)	.0042(1.962)
SIZE	-.4106(1.855)	-.3772(1.951)	-.4373(2.254)	-.4268(2.209)	-.4425(2.262)
OPP	4.0756(5.917)	4.5550(7.156)	5.7581(6.460)	5.9256(6.207)	5.0953(7.229)
HHL		.5274(1.680)	.5759(1.846)	.5843(1.871)	.5431(1.742)
LLOAN		-.0513(2.862)	-.0529(2.978)	-.0544(3.049)	.0482(2.696)
LASS		-.2508(4.194)	-.2650(4.440)	-.2623(4.407)	-.2708(4.478)
RTB			-.1057(1.909)		
RINTER				-.1428(1.912)	
INF					.1219(1.730)
R^2	.85893	.90061	.90324	.90325	.90278
ADJ-R^2	.81568	.86822	.87075	.87076	.87013
F	19.86(.0000)	27.80(.0000)	27.80(.0000)	27.80(.0000)	27.65(.0000)

Table 11: Regression results for SP2

The variables are defined as follows: *NPL* is non-performing to loans ratio; *CAP* is equity to total assets ratio; *LIQ* is the ratio of short-term assets to total deposits; *COST* is the operating costs to total loans ratio; *IMP* is the ratio of the difference between non-interest expenses and operating income to total assets; *OPP* is the ratio of non-interest earning assets to total assets; *SIZE* is the ratio of fixed assets to total assets; *VOLD* is volatility of deposit rate; *VOLL* is volatility of lending rate; *VOLT* is volatility of Treasury bill rate; MNG is a proxy for management quality; *HHL* is market concentration in loans market; *LASS* is the ratio of loans to total assets; ; *RTB* is real Treasury bill rate; *RINTER* is real inter-bank rate; *INF* is inflation. Note: LLOAN is logarithm of total loans. The t-ratios are in parenthesis.

	Equation 1	Equation 2	Equation 3	Equation 4	Equation 5
NPL	.0201(5.258)	.0198(4.825)	.0198(4.995)	.0197(4.996)	.0204(5.068)
CAP	.0466(2.322)	.0506(2.642)	.0454(2.355)	.0464(2.424)	.0426(2.181)
LIQ	-.1283(2.783)	-.1628(3.227)	-.1256(2.601)	.1396(2.849)	-.0948(2.036)
COST	.0012(1.338)	.0014(1.746)	.0012(1.491)	.0013(1.516)	.0012(1.463)
SIZE	.0087(.113)	-.0953(1.232)	-.1036(1.337)	-.1010(1.318)	-.0959(1.213)
IMP	.1584(3.401)	.1232(2.557)	.1212(2.508)	.1222(2.547)	.1194(2.430)
OPP	.6176(2.608)	1.277(2.967)	.8027(2.270)	.9873(2.629)	.3671(1.283)
HHL		.0540(.453)	.0275(.230)	.0355(.298)	.0085(.070)
LLOAN		-.0160(2.012)	-.0128(1.733)	-.0137(1.867)	-.0110(1.456)
LASS		.0904(3.551)	.0865(3.514)	.0868(3.562)	.0875(3.453)
VOLD		-.0246(3.501)			
VOLL		.0087(3.291)			
VOLT		.0008(1.943)			
MNG		.0466(1.486)	.0475(1.507)	.0463(1.481)	.0488(1.525)
RTB			-.0541(2.535)		
RINTER				-.0830(2.905)	
INF					
R^2	.67362	.73585	.72410	.72805	.71556
ADJ-R^2	.57356	.63628	.62586	.63122	.61428
F	6.73(.000)	7.39(.000)	7.37(.000)	7.52(.000)	7.07(.000)

Table 12: Regression results for SP3

The variables are defined as follows: *NPL* is non-performing to loans ratio; *CAP* is equity to total assets ratio; *LIQ* is the ratio of short-term assets to total deposits; *COST* is the operating costs to total loans ratio; *IMP* is the ratio of the difference between non-interest expenses and operating income to total assets; *OPP* is the ratio of non-interest earning assets to total assets; *SIZE* is the ratio of fixed assets to total assets; *VOLD* is volatility of deposit rate; *VOLL* is volatility of lending rate; *VOLT* is volatility of Treasury bill rate; MNG is a proxy for management quality; *HHL* is market concentration in loans market; *LASS* is the ratio of loans to total assets; ; *RTB* is real Treasury bill rate; *RINTER* is real inter-bank rate; *INF* is inflation. Note: LLOAN is logarithm of total loans. The t-ratios are in parenthesis.

	Equation 1	Equation 2	Equation 3	Equation 4	Equation 5
NPL	.0848(10.251)	.0763(8.524)	.0741(8.758)	.0738(8.778)	.0766(8.866)
CAP	.1119(2.570)	.1350(3.231)	.1260(3.066)	.1280(3.133)	.1188(2.833)
LIQ	-.4451(4.449)	-.6601(5.995)	-.6461(6.272)	-.6811(6.516)	-.5486(5.488)
COST	.0013(.664)	.0012(.688)	.0009(.482)	.0009(.516)	.0008(.431)
SIZE	-.1735(1.041)	-.3131(1.855)	-.2988(1.808)	-.2797(1.711)	-.3022(1.781)
IMP	.0910(.901)	.0817(.777)	.0692(.671)	.0701(.685)	.0719(.682)
OPP	2.6432(5.146)	5.0778(5.404)	5.0235(6.659)	5.479(6.838)	3.6179(5.888)
HHL		.1764(.678)	.1699(.664)	.1908(.750)	.1012(.388)
LLOAN		-.0313(1.805)	-.0336(2.133)	-.0367(2.346)	-.0242(1.494)
LASS		-.0525(.944)	-.0438(.834)	-.0397(.763)	-.0538(.989)
VOLD		-.0631(4.114)	-.2149(4.722)		
VOLL		.0252(4.368)			
VOLT		.0025(2.873)			
MNG		-.0528(.772)	-.0490(.728)	-.0516(.773)	-.0499(.712)
RTB				-.3017(4.946)	
RINTER					.2341(3.954)
INF					
R^2	.70407	.75756	.75815	.76150	.74723
ADJ-R^2	.61335	.66618	.67203	.67658	.65722
F	7.76(.000)	8.29(.000)	8.80(.000)	8.97(.000)	8.30(.000)

Table 13: Regression results for SP4

The variables are defined as follows: *NPL* is non-performing to loans ratio; *CAP* is equity to total assets ratio; *LIQ* is the ratio of short-term assets to total deposits; *COST* is the operating costs to total loans ratio; *IMP* is the ratio of the difference between non-interest expenses and operating income to total assets; *OPP* is the ratio of non-interest earning assets to total assets; *RISK* is the loan

provisions to total loans ratio; *SIZE* is the ratio of fixed assets to total assets; *VOLD* is volatility of deposit rate; *VOLL* is volatility of lending rate; *VOLT* is volatility of treasury bill rate; MNG is a proxy for management quality; *HHL* is market concentration in loans market; *LASS* is the ratio of loans to total assets; ; *RTB* is real Treasury bill rate; *RINTER* is real inter-bank rate; *INF* is inflation. Note: LLOAN is logarithm of total loans. The t-ratios are in parenthesis.

	Equation 1	Equation 2	Equation 3	Equation 4	Equation 5
NPL	.0111(3.436)	.0138(4.081)	.0124(3.846)	.0124(3.836)	.0127(3.952)
CAP	.0621(3.652)	.0694(4.398)	.0675(4.309)	.0676(4.315)	.0669(4.286)
LIQ	-.1106(2.833)	-.0945(2.271)	-.0988(2.517)	-.1021(2.545)	-.0891(2.393)
COST	.0004(.569)	.0003(.477)	.0002(.365)	.0003(.375)	.0002(.344)
SIZE	-.0527(.810)	-.0846(1.328)	-.0796(1.265)	-.0769(1.226)	-.0829(1.312)
IMP	.1613(4.090)	.0896(2.255)	.0814(2.072)	.0813(2.071)	.0825(2.100)
OPP	1.0288(5.133)	.8518(2.400)	.9931(3.455)	1.0350(3.367)	.8501(3.714)
HHL		.0761(.774)	-.0200(3.330)	.0881(.903)	.0783(.806)
LLOAN		-.0169(2.587)	.0922(4.605)	-.0203(3.384)	-.0187(3.092)
LASS		.0840(3.999)		.0928(4.651)	.0898(4.431)
VOLD		-.0827(1.428)			
VOLL		.0028(1.281)			
VOLT		.0006(1.854)			
MNG		-.0669(2.588)	-.0625(2.439)		
RTB			-.0260(1.502)		
RINTER				-.0352(1.504)	
INF					.0342(1.549)
R^2	.70831	.77610		.77272	.77295
ADJ-R^2	.61888	.69171		.69180	.69211
F	7.92(.000)	9.20(.000)		9.55(.000)	9.56(.000)

5. Conclusions and Policy Implications

This paper analyzes the determinants of interest spread using individual bank data. The research question is motivated by the persistent wide interest spread despite various policy actions implemented to reduce the costs of implicit tax. Results show that interest spread reflects on both policy and market microstructure factors, which imply that banking institutions and policy makers would complement each other in efforts to narrow the interest spread. The findings are as follows:

First, wide interest spread is sustained by inefficiency in the credit market. For example, high non-performing loans signal high credit risk to which the banks respond by charging a premium, and this keeps the lending rates high. In addition, a rising volume of loans may not translate into earnings if the market faces financial distress. Banks may respond by sustaining wide interest spread to maintain their profit levels. Further, if capital ratio is endogenously determined to protect against credit risk, this results in high interest spread as the cost of holding such capital is borne by the customers. It is therefore important to keep the credit market competitive in order to narrow the interest spread. Dealing with the problem of non-performing loans will reduce the credit risk premium and allow for the resources to be put into productive use. This can be achieved by ensuring enforcement of financial contracts and also by individual banks building information capital and enhancing management quality. Further, the on-going efforts to resolve the problem of a large stock of non-performing loans would complement the policy action of reducing implicit tax in narrowing the interest spread.

Second, the burden of operational costs is shared with bank customers. The present effort to rationalize operational costs by individual banks is a step forward in narrowing the spread. It is also true that efforts being made by banks to improve customer services will keep the interest

spread high in the short run. However, technological development, for example the introduction of ATM services, tends to reduce the operational costs and therefore the spread.

Third, interest risk contributes significantly to explaining widening interest spread. For sometime, the market has used the Treasury bill rate as a signaling interest rate for monetary policy actions. Further, Treasury bills have been used as a source of earning income by the banking sector because of their attractive interest rates. However, because the interest rate is generally influenced by policy actions, then banks expose themselves to interest risk.

Fourth, liquidity risk proxy has a positive and significant impact on interest spread, which implies that the higher the liquidity, the higher the spread. It is argued that when banks hold liquid assets, this reduces the liquidity risk premium. However, if the opportunity cost of holding idle reserves is high, banks tend to maintain wide spreads.

Fifth, banks diversify their asset portfolio in an attempt to maintain their profit margins. Therefore, *flight for capital* as banks invest in government securities is a rational decision especially when banks are faced with a highly risky credit market. However, this reduces the intermediation role of banks and therefore the flow of funds to the private sector. Presently, the government is making the Treasury bill market unattractive to the banks by keeping very low interest rates. While this is appropriate in promoting financial intermediation, banks profitability is threatened in the short run, given the limited diversity of sources of income. Such a move therefore should be accompanied by actions aimed at ensuring a competitive credit market and diversification of financial assets and credit products. The recent trend by banks to promote personal loans is a way forward in enhancing intermediation but the focus on financing durable goods may lead to negligible capital formation.

Sixth, monetary policy has a major role in the efforts to narrow the interest spread by maintaining low and stable inflation. This will reduce the expected inflation and allow banks to respond appropriately to the policy actions.

References

Allen, L. (1988). "The determinants of bank interest margins: A note." *Journal of Financial and Quantitative Analysis*, 23, 231-235.

Angbazo, L. (1997). "Commercial bank interest margins, default risk, interest rate risk and off-balance sheet banking." *Journal of Banking and Finance*, 21, 55-87.

Barajas, A., R. Steiner and N. Salazar (1998). *Interest spreads in banking: costs, financial taxation, market power, and loan quality in the Columbian case, 1974-96*. IMF Working Paper No. 110.

Berger, A. N. (1995). "The relationship between capital and earnibgs in banking." *Journal of Money, Credit and Banking*, 27, 432-56.

Brock, P.L. and L. R Suarez (2000). "Understanding the behavior of bank spreads in Latin America." *Journal of Development Economics*, 63, 113-134.

Demirguc-Kunt, A. and H. Huizinga (1996). "Determinants of commercial bank interest margins and profitability: Some international evidence." World Bank Mimeo.

Elkayama, D. (1994). "The effect of monetary policy on the interest rate spread in the un-indexed local currency segment in Israel, 1986-90." Bank of Israel Research Department, *Economic Review* No. 68.

Gheva, D., Z. Samet and D. Ruthenberg (1992). The determinants of interest spread: The Israeli experience. *Bank of Israel Banking Review*, 3, 61-74.

Ho, T. and A. Saunders (1981). The determinants of bank interest margins: Theory and empirical evidence. *Journal of Financial and Quantitative Analysis*, 16, 581-600.

Mcshane, R.W. and I. G. Sharpe (1985). "A time series-cross section analysis of the determinants of Australian trading bank loan-deposit interest margins: 19962-1981." *Journal of Banking and Finance*, 9, 115-136.

Ngugi, Rose W. (2001). *An empirical analysis of interest rate spread in Kenya*. AERC Research Paper No. 106.

Njuguna S. Ndung'u and Rose W. Ngugi (2000). *Banking sector interest rate spread in Kenya*. KIPPRA Discussion Paper No. 5. Nairobi: Kenya Institute for Public Policy Research and Analysis.

Paroush, J. (1994). "The effect of uncertainty, market structure and collateral policy on interest-rate spread." *Bank of Israel Banking Review*, 10, 79-94.

Saunders, A. and L. Schumacher (2000). The determinants of bank interest rate margins: an international study. *Journal of International Money and Finance*, 813-832.

Wong, K.P. (1997). On the determinants of bank interest margins under credit and interest rate risks. *Journal of Banking and Finance*, 21, 251-271

Zarruk, E.R. (1989). Bank margin with uncertain deposit level and risk aversion. *Journal of Banking and Finance*, 13, 797-810.

KIPPRA PUBLICATIONS

Conference Proceedings

Report of the proceedings of the AERC-KIPPRA World Trade Organization (WTO) Workshop, 2000

Report of the proceedings of the International Conference on Finance and Development: Evidence and Policy Issues, 2001

Discussion Papers

Njuguna S. Ndung'u (2000). *The exchange rate and the interest rate differential in Kenya: a monetary and fiscal policy dilemma*. KIPPRA DP No. 1

Karingi, S. N. and Njuguna S. Ndung'u (2000). *Macro models of the Kenyan economy: a review*. KIPPRA DP No. 2

Ronge, E. E. and H.O. Nyangito (2000). *A review of Kenya's current industrialization policy*. KIPPRA DP No. 3

Nyangito, H.O. (2001). *Delivery of services to smallholder coffee farmers and impacts on production under liberalization in Kenya*. KIPPRA DP No. 4

Njuguna S. Ndungu and R. W. Ngugi (2000). *Banking sector interest rate spread in Kenya*. KIPPRA DP No. 5

Karingi, S.N., M.S. Kimenyi and Njuguna S. Ndung'u (2001). *Beer taxation in Kenya: an assessment*. KIPPRA DP No. 6

Ikiara, M.M. (2001).*Vision and long term development strategy for Kenya's tourism industry*. KIPPRA DP No. 7

Geda, A. and Njuguna S. Ndung'u (2001). *Specifying and estimating partial equilibrium models for use in macro models: a road map for the KIPPRA-Treasury Macro Model*. KIPPRA DP No. 8

Geda, A., Niek de Jong, G. Mwabu and M.S. Kimenyi (2001). *Determinants of poverty in Kenya: household-level analysis*. KIPPRA DP No. 9

Were, M., A. Geda, S.N. Karingi and Njuguna S. Ndungu (2001). *Kenya's exchange rate movement in a liberalized environment: an empirical analysis*. KIPPRA DP No. 10

Huizinga, F., A. Geda, Njuguna S. Ndung'u and S.N. Karingi (2001).*Theoretical base for the Kenya macro model: the KIPPRA-Treasury macro model*. KIPPRA DP No. 11

Mwabu, G., M. S. Kimenyi, P. Kimalu, N. Nafula and D. K. Manda (2002). *Predicting household poverty: a methodological note with a Kenyan example*. KIPPRA DP No. 12

Manda, D.K., G. Mwabu, M. S. Kimenyi (2002). *Human capital externalities and returns to education in Kenya*. KIPPRA DP No. 13

Bedi, A., P.K. Kimalu, D.K. Manda, N.N. Nafula (2002).*The decline in primary school enrolment in Kenya*. KIPPRA DP No. 14

Odhiambo, W. and H. Nyangito (2002). *Land laws and land use in Kenya: implications for agricultural development*. DP No. 15

Were, M. and S. Karingi (2002). *Better understanding of the Kenyan economy: simulations from the KIPPRA-Treasury Macro Model*. KIPPRA DP No. 16

Nyangito, H., M. Ikiara and E. Ronge (2002). *Performance of Kenya's wheat industry and prospects for regional trade in wheat products*. DP No. 17

Nyangito, H. and L. Ndirangu (2002). *Impact of institutional and regulatory framework on the food crops subsector in Kenya: 1990-1999*. KIPPRA DP No. 18

Ikiara, M. (2002). *Impact of tourism on environment in Kenya: status and policy*. KIPPRA DP No. 19

Ronge, E., L. Ndirangu and H. Nyangito (2002). *Review of government policies for the promotion of micro and smallscale enterprises in Kenya*. KIPPRA DP. No. 20

Kiringai, J., Njuguna S. Ndung'u, and S.N. Karingi (2002).*Tobacco excise tax in Kenya: an appraisal*. KIPPRA DP No. 21

Were, M., Njuguna S. Ndung'u, A. Geda and S.N. Karingi (2002). *Analysis of Kenya's export performance: an empirical evaluation*. KIPPRA DP No. 22

Mwangi S. Kimenyi (2002). *Ethnicity, institutions og governance and conflict avoidance*. KIPPRA DP No. 23

Ikiara, M.M., L. Ndirangu (2003).*Prospects of Kenya's clothing exports under AGOA after 2004*. KIPPRA DP No. 24

Nyangito, H. (2003). *Agricultural trade reforms in Kenya under the WTO framework*. KIPPRA DP No. 25

Odhiambo, W. and H. Nyangito (2003). *Measuring agricultural productivity in Kenya: a review of approaches*. KIPPRA DP No. 26

Ngugi, R.W. (2003). *Development of the Nairobi Stock Exchange: a historical perspective*. KIPPRA DP No. 27

Njuguna, A. E., S.N. Karingi and M.S. Kimenyi (2003). *Alternative methodologies for measuring Kenya's potential output and output gap*. KIPPRA DP No. 28

Ngugi, R. W. (2003). *What defines liquidity of the stock market? The case of the Nairobi Stock Exchange*. KIPPRA DP. No. 29

Nafula, N.N. (2003). *Bank portfolios and bank earnings in Kenya: an econometric analysis*. KIPPRA DP No. 30

Manda, D.K. (2004). *Globalisation and the labour market in Kenya*. KIPPRA DP. No. 31

Bedi, A., P. Kimalu, M.S. Kimenyi, D.K. Manda, G. Mwabu and N. Nafula (2004). *User charges and utilisation of health services in Kenya*. KIPPRA DP. No. 32

Oiro, M. W., G. Mwabu and D.K. Manda (2004). *Poverty and employment in Kenya*. KIPPRA DP No. 33

Odhiambo, W., H. O. Nyangito and J. Nzuma (2004). *Sources and determinants of agricultural productivity in Kenya*. KIPPRA DP No. 34

Muthaka, David I, Diana N. Kimani, Stephen Mwaura, Damiano K. Manda (2004). *A review of the regulatory framework for private healthcare services in Kenya*. KIPPRA DP No. 35

Kamau, A., S. Karingi, Njuguna S. Ndung'u, S. Mwaura. *Capital requirements and bank behaviour in Kenya: Empiical evidence*. KIPPRA DP No. 36

Nafula, N. N., P. K. Kimalu, J. Kiringai, R. Owino, D. K. Manda, S. Karingi. *Budget mechanisms and public expenditure tracking in Kenya*. KIPPRA DP No. 37

Nyaga, R.K., D.N. Kimani, G. Mwabu, M.S. Kimenyi. *HIV/AIDS in Kenya: A review of research and policy issues*. KIPPRA DP No. 38

Nyangito, H.O., J. Nzuma, H. Ommeh. M. Mbithi. *Impact of agricultural trade and related policy reforms on food security in Kenya*. KIPPRA DP No. 39

Ngugi, R. W. and J. Wambua (2004). *Understanding interest rates structure in Kenya*. KIPPRA DP No. 40

Occassional Papers

Gitu, K. W. (2001). *Strengthening the link between policy research and implementation*. KIPPRA OP No. 1

Kimenyi, M.S. (2001). *Effective private sector representation in policy formulation and implementation*. KIPPRA OP No. 2

Kimenyi, M.S. (2002). *Agriculture, economic growth and poverty reduction*. KIPPRA OP No. 3

Nyangito, H. (2002). *Post-Doha African challenges in the sanitary and phytosanitary and trade related intellectual property rights agreement*. KIPPRA OP No. 4

Mwabu, G. (2004). Principles of research. KIPPRA OP No. 5

Policy Papers

Nyangito, H.O. (2001). *Policy and legal framework for the tea subsector and the impact of liberalization in Kenya*. KIPPRA PP No. 1

Nyangito, H.O. (2001). *Policy and legal framework for the coffee subsector and the impact of liberalization in Kenya*. KIPPRA PP No. 2

Ikiara, M.M. and H. Nyangito (2001). *Effects of visa waiver and increase in airport tax on Kenya's tourism industry*. KIPPRA PP No. 3

Special Reports

Legal and other constraints on access to financial services in Kenya: survey results. KIPPRA Private Sector Development Division. SR No. 1, 2001

Thinking about regulating? The better regulation guide. KIPPRA Private Sector Development Division. SR No. 2, 2002

Policy timeline and time series data for Kenya: an analytical data compendium. KIPPRA Macroeconomics Division, SR No. 3, 2002

Tax analysis and revenue forecasting in Kenya. KIPPRA Macroeconomics Division, SR No. 4, 2003

Data compendium for Kenya's agricultural sector. KIPPRA Productive Sector Division, SR No. 5, 2003

Working Papers

Wasike, W.S.K. (2001). *Road infrastructure policies in Kenya: historical trends and current challenges*. KIPPRA WP No. 1

Ikiara, M.M. (2001). *Policy framework of Kenya's tourism sector since independence and emerging policy concerns*. KIPPRA WP No. 2

Manda, D.K., M.S. Kimenyi and G. Mwabu. *A review of poverty and antipoverty initiatives in Kenya*. KIPPRA WP No. 3

Kimalu, P.K., N. Nafula, D.K. Manda, G. Mwabu and M.S. Kimenyi (2001). *Education indicators in Kenya*. KIPPRA WP No. 4

Geda, A., S.N. Karingi, Njuguna S. Ndung'u, M. van Schaaijk, M. Were, W. Wassala and J. Obere (2001). *Estimation procedure and estimated results of the KIPPRA-Treasury macro model*. KIPPRA WP No. 5

Kimalu, P., N. Nafula, D.K. Manda, G. Mwabu and M.S. Kimenyi (2002). *A situational analysis of poverty in Kenya*. KIPPRA WP No. 6

Kiringai, J. and G. West (2002). *Budget reforms and the Medium-Term Expenditure Framework in Kenya*. KIPPRA WP No. 7

Ikiara, M. and L. Ndirangu (2003). *Developing a revival strategy for Kenya's cotton-textile industry: a value chain approach*. KIPPRA WP No. 8

Ng'eno, N.K., H.O. Nyangito, M.M. Ikiara, E.E. Ronge, J. Nyamunga (2003). *Regional integration study of East Africa: the case of Kenya*. KIPPRA WP No. 9

Manda, D. K., P.K. Kimalu, N. Nafula, Diana K. Kimani, R. K. Nyaga, J.M. Mutua, G. Mwabu, M.S. Kimenyi (2003). *Cost and benefits of eliminating child labour in Kenya*. KIPPRA Working Paper No. 10

Kimalu, P.K., N.N. Nafula, D.K. Manda, A. Bedi, G. Mwabu, M.S. Kimenyi (2004). *A review of the health sector in Kenya*. KIPPRA Working Paper No. 11