Understanding Interest Rates Structure in Kenya

Rose W. Ngugi
Joseph Wambua

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

KIPPRA Discussion Paper No. 40
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 64 X

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 study looks at the structure of interest rates in the banking sector in Kenya. It covers interest rates in the money market and the banking institutions in the post-reform period. Results show a significant relationship among interest rates, especially in their response to liquidity management efforts by the monetary authority. Except for the inter-bank and Treasury bill rate that are market determined, other money market interest rates are benchmarked to the Treasury bill rate giving it a vital position in liquidity management. There is a deliberate effort to enhance growth of the inter-bank market and the secondary market for government securities especially with the high penalties charged for the discount window and overnight lending facility. A positive and significant relationship is observed between monetary policy instruments, money market interest rate and the inter-bank rate, while causality test confirms unidirectional relationship from monetary policy instruments to the inter-bank rate. Inter-bank rate, however, appears to be more stable compared to other money market interest rates as indicated by lower volatility.

Commercial banks lending rates are much noisier than the deposit rate, while the study confirms the hypothesis that deposit rate changes to maintain the spread; the spread is sustained by low deposit rate. The spread between the lending and deposit rate is composed of 89 per cent credit risk and 11 per cent prime risk. This implies that making the credit market more competitive would reduce the lending rate. There is a consistent downward trend indicated by all interest rates especially from June 2001. However, with inflationary tendency, a major challenge is how to maintain the deposit rates positive in real terms; lending rates are maintaining a positive real value.

The commercial banks deposit and lending maturities indicate higher short-term interest rates compared to longer-term maturities. However, the curvature of the yield spread across the maturities does not show a clear picture of the motivation behind setting of interest rates. For example, short-term deposit rates may be higher to reflect the competition from short-term government securities, while short-term lending rates may be high due to high competition from the overdraft facility whose demand is driven by the minimal requirements in acquiring such loan facilities. There is also notable change in the structure of the maturities over time.

There seems to be a convergence in the institutional interest rates (i.e. the commercial banks and the NBFIs). However, NBFIs have generally higher interest rates compared to the commercial banks. They also have wider interest spread and more so for building societies.

All the money market interest rates are positively related to the commercial banks deposit and lending rates. Further, there is a clear unidirectional relationship from the money market interest rates to the commercial banks' interest rates, which implies that these interest rates respond to monetary policy actions.

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

List of Tables

List of Figures

List of Acronyms

CBK	-	Central Bank of Kenya
FCTB	-	fixed coupon rate Treasury bond
FRTB	-	floating rate Treasury bond
NBFIs	-	non-banking financial institutions
OMO	-	open market operations
OMTO	-	open market type operations
REPOs	-	repurchase agreements

1. Introduction

Financial sector plays a significant role in the development process, especially in mobilising and allocating financial resources. However, for it to play its role effectively, the interest rate structure must capture the diverse investors risk preferences and reflect the true cost of capital. In a substantially diversified financial sector, interest rate structure mirrors the diverse products offered, the financial structure and the level of market competition. Therefore, interest rate structure enhances our understanding of the operations of banking institutions and the market microstructure of banking sector while at the same time giving a clear guide on interest rate management.

In a system where interest rates are administratively set, the structure of interest rates is easily understood. For example, in the pre-reform period, the Government of Kenya fixed minimum savings rates for all the deposit-taking institutions and maximum lending rates for commercial banks, NBFIs and building societies, defining the maximum possible interest spread. Interest rates were adjusted to maintain them positive in real terms so as to encourage savings and allow for more efficient allocation of capital stock, especially by ensuring that funds flowed to the most productive areas. However, the interest structure, defined by the control regime, seemed to restrain the financial sector from achieving its role in development process especially with the experienced slow growth in savings and investment. At the same time, it curtailed creation of a competitive financial market. There was also a feeling that the administratively set interest rates were inefficient and unfair in the conduct of monetary policy. For example, deposit rates were kept low and not negotiable except for favoured customers. Furthermore, with uniform rates fixed administratively, depositors could not benefit from higher rates offered by banks competing for deposits, especially when the deposits are large. As a result there was a growing need to review

the interest rates policy in order to encourage savings through the banks and to create a disincentive to forestall speculation and uneconomic use of savings by borrowers (Government of Kenya, 1974).

In a liberalised era, effective and efficient management of interest rates is important to allow for a desirable interest rates structure. It is also important to realise that when interest rates are defined by market forces, their structure is more complex. However, it is expected that a flexible interest rates policy would allow for genuine competition in the financial sector as savers get the best returns on their savings and borrowers the most appropriate rate to their circumstances. It is also expected that the policy would allow for more diversity in the interest rate structure as banking institutions match their interest rate levels with the risk profiles and enhance competition in the banking sector.

This paper attempts to shed some light on the interest rate structure in a liberalised market and therefore contribute in interest rates management efforts. The paper covers the segment of financial sector under the monetary authority, including the money market interest rates (the discount rates, repurchase agreements – REPOs – and inter-bank rates) and banking institutions lending and deposit rates.

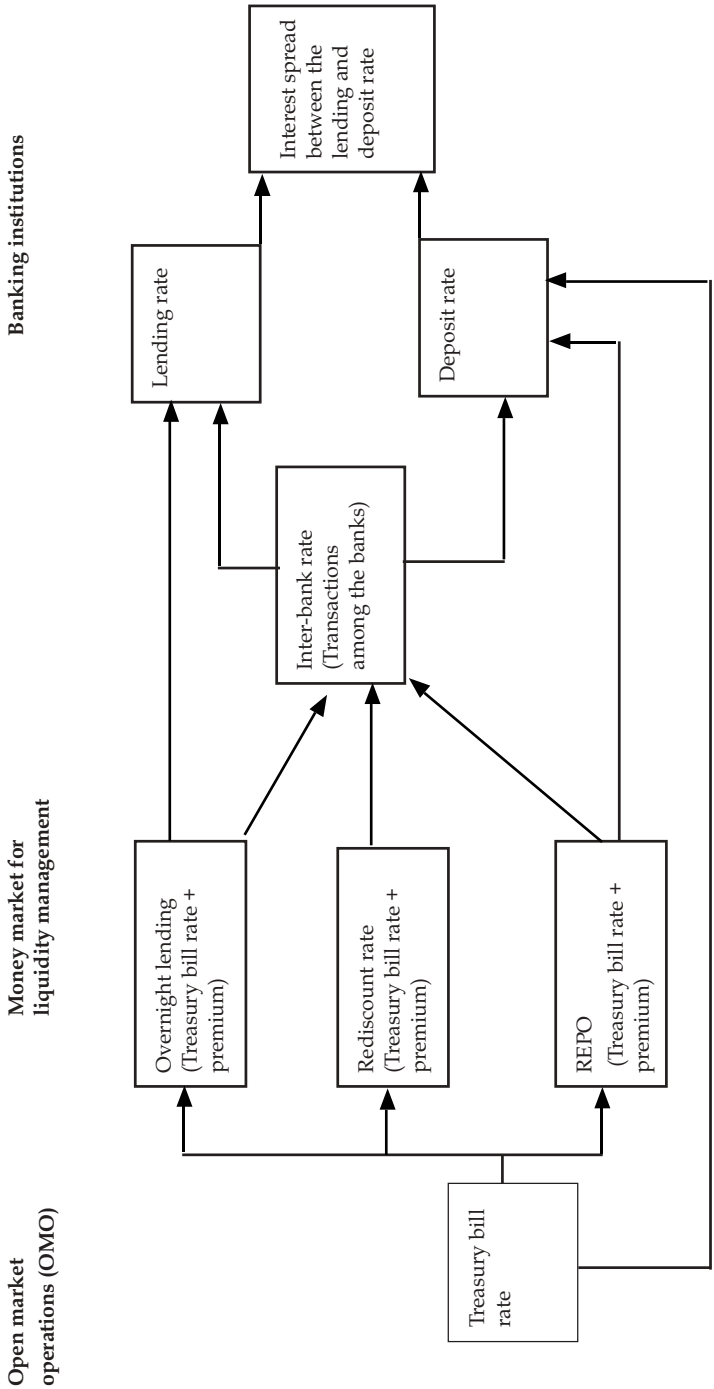
The rest of the paper is organised as follows. Section 2 captures the conceptual framework of interest rate structure, section 3 the methodology, section 4 the analysis, while section 5 concludes the paper.

2. The Conceptual Framework for Interest Rate Structure

The banking sector in Kenya has at its apex the Central Bank of Kenya (CBK), which is the monetary authority with the main responsibility of ensuring the creation of a financial sector that meets the developmental goals of the economy. The Bank also has the responsibility to manage interest rates through its monetary policy operations. In a liberalised market, interest rates are managed using indirect monetary policy tools; the tools of monetary policy depend on the level of development of the market. Among the tools used for management of interest rates include discount rate, overnight lending rate, REPO rate and the bank rate (inter-bank rate). Depending on the monetary policy rule adopted, central banks across various economies exercise different liquidity management styles. Figure 1 summarises the relationship between interest rates.

In the Kenya context, where indirect monetary policy is based on the open-market-type operation, Treasury bill rate has been core in the management of short-term interest rates; it has been used as the benchmark for most of the interest rates, including the discount rate, overnight lending, REPO rate, and Treasury bonds. With the open market operation, CBK engages in buying and selling of government securities to reflect the desired change in liquidity of the banking sector. As long as the operations of the Treasury bill market reflect on the monetary policy objectives, Treasury bill rate to a large extent performs the role of signalling interest rate especially when the money market is at its infant stage. It is therefore expected that changes in the signalling interest rate will result to changes in other wholesale interest rates and banking institutions deposit and lending rates. For example, by making sales or purchases in the open market operations the CBK exerts or eases pressure on the inter-bank market. Similarly, tightening the discount window exerts pressure on the inter-bank market, therefore increasing the interest rate that banks face as they participate in the market. The relationship between the signalling rate and the commercial banks

Figure 1: The interest rate structure



interest rates is defined by the efficiency of the transmission mechanism and competitiveness of the banking sector.

In managing their liquidity, banks have the option to mobilise deposits, use the rediscounting window, overnight lending facility, and the inter-bank market. The choice between the various options depends on the accessibility to the facility, availability of liquidity, and the interest rate charged. A positive relationship is expected between the discount rate and the inter-bank rate. Further, since banks pay an interest rate when they borrow at the inter-bank market, this should see an increase in the lending rate charged to the non-financial sector. Depending on the sensitivity of loans to interest rates, banks shift a proportion of the liquidity management costs to investors and depositors as banks maintain the profit margin. Therefore, a direct relationship is expected between the inter-bank rate and banking institutions interest rates.

Treasury bills form part of the financial asset portfolio for investors; therefore, a direct relationship is expected between deposits and Treasury bill rate. A rise in Treasury bill rate would exert pressure on commercial banks to compete for deposits from the non-financial sector resulting to an increase in deposit rate. And given that the deposit rate forms part of the lending rate then lending rates, will also be pushed upwards.

Commercial banks deposits and lending rates have wide range maturities. The interest rates set for the various maturities could reflect on the liquidity preference of the consumers, risk preferences, competition from other financial assets with similar maturities, or the bank motivation (profit maximisation or cost minimisation). For example, a high preference for short-term maturities may push the short-term interest rate high compared to the long-term interest rates. Similarly, having less competition for specific maturities in the financial asset portfolio implies no pressure on the interest rate levels. For example, banks may be under pressure to keep the short-term maturities deposit

rate high to compete with the short-term government securities. Further, a monopoly bank that is out to maximise its profit will aim to capture the entire consumer surplus.

In the analysis of the interest structure, it is important to note that interest rates are composed of various components including the credit/default risk premium, the interest risk premium, inflation risk premium, implicit and explicit taxes, liquidity risk premium and the interest costs. The macroeconomic environment, the monetary policy operations and the banks operations define these components; they are important in understanding the link between the various interest rates.

3. Methodology

The study borrows heavily from the monetary transmission mechanism framework to understand the structure of interest rate in the banking sector. The study looks at the trends in levels of interest rates, volatility and spreads. It also uses various statistics to test for the relationships including correlation, granger causality test and co-integration test in analysing the interest rate structure. For example, with the indicated links between various interest rates, it is important to find out the direction of relationship, causality and long-run relationship.

Definitions

Real interest rate: Real rate of interest is defined as the difference between the nominal rate of interest and the expected rate of inflation. Using the Fisher equation, real interest rate is defined as:

$$r = \left[\frac{i - \pi}{1 + \pi}\right] \qquad 1$$

where r is real interest rate, i is th nominal interest rate and π is the inflation rate.

Interest rate volatility: To capture interest rate volatility, the study uses the standard deviation and squared standard deviation (variance) as proxies of historical volatility and the GARCH volatility for the ex-ante volatility. The historical volatility is measured as follows:

$$HV = (i_i - \bar{i})^2$$
$$\bar{i} = \sum_{i=1}^{12} (i_i / n) \qquad 2$$

where i is interest rate and i-bar is mean interest rate.

Interest spread: The spread can be decomposed into prime rate spread and the credit risk spread as follows (Brock, 1996).

$$i_l - i_d = (i_l - i_l^{prime}) + (i_l^{prime} - i_d)$$

where the first term on the right-hand side is the credit risk spread and the second term is the prime rate spread. The prime (base) interest rate reflects on the minimum interest charged by the banks without considering the credit risk.

4. What Characterises Interest Rates

4.1 The money market rates

Money market interest rates are in the category of wholesale interest rates. These rates play a major role in liquidity and interest rate management in the banking sector. Among the money market interest rates includes the rediscount rate, overnight borrowing rate (Lombard facility), REPO rate and the inter-bank rate. The first three rates are set by the CBK to reflect the monetary policy stance, while the inter-bank rate is determined by market forces reflecting on the liquidity in the banking sector. It is, however, important to note that in some markets, like the United States, inter-bank rate is used as a monetary policy signalling interest rate. To affect the inter-bank rate, the Federal Reserve Bank participates in the open market operations by selling or buying government securities. To ease pressure on the inter-bank rate, the Federal Bank sells government securities, therefore increasing liquidity in the market.

Figure 2 traces the movement in the money market interest rates. Generally, it shows that all interest rates move together and have taken a consistent downward trend since July 2001, coupled with a rising liquidity in both the commercial banks and the non-bank financial institutions. To a large extent, the trends reflect on the various monetary policy actions undertaken during the period, including tight monetary policy adopted in the early 1990s to ease liquidity in the market.

Table 1 provides summary statistics of the money market interest rates. The normality test results imply that normal distribution cannot be rejected for the various interest rates. Inter-bank rate is lower than the other rates, which allow it to attract the participation of the banking institutions in their liquidity management efforts.

Figure 2: Trends in money market interest rates and liquidity of banking institutions

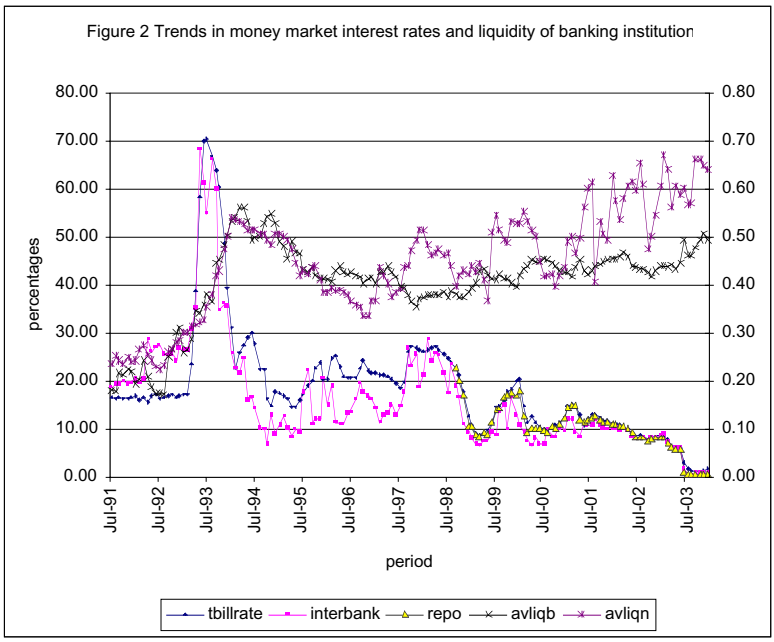


Table 1: Summary statistics of money market interest rates

	Inter	*Repo*	*Tbill*
Mean	9.9186	11.4090	12.6882
Median	9.6432	10.6544	11.2780
Maximum	24.1765	24.5000	26.7350
Minimum	0.4302	0.4710	0.8300
Std. Dev.	4.7254	5.6426	6.3484
Skewness	0.3185	0.2730	0.2690
Kurtosis	3.7105	3.2015	2.5047
Jarque-Bera	2.9212	1.0870	1.7161
Probability	0.2321	0.5807	0.4240

Note: *Inter* = inter-bank rate; *Repo* = Repo rate; *Tbill* = Treasury bill rate

The Treasury bill rate

The Treasury bill rate is the rate at which government securities are traded in the open market operation (primary market). The rediscount rate is the rate at which CBK accepts existing government securities in exchange for cash at the initiative of investors, especially the commercial banks

and NBFIs facing liquidity shortfall; individuals also en-cash their holdings of government securities whenever need arises. The premium on discounting rate is set by the CBK and varied according to the monetary policy stance. The CBK is legally bound to rediscount government securities, but it does so at punitive rates in order to discourage misuse of the facility as a source of reserves for the banking sector; the penalty charged is meant to safeguard against the risk of making CBK a cheap source of liquidity while at the same time retaining its crucial role as a lender of last resort.

The rediscount window was opened in 1988 on demand to allow rediscounting by any holder of Treasury bills and any other government security with three months or less to final maturity.[1] The establishment of the rediscount window was aimed at making the Treasury bill market more liquid and therefore attractive to investors, creating a ready market for government securities. Rediscount rate was fixed at 1.5 per cent points

1. Treasury bills were first issued in 1969. However, it was not until 1990 that the open market operation was introduced. This saw a shift away from the use of quantitative credit controls to the use of more indirect instruments of monetary policy. Treasury bills are issued by the CBK on behalf of the government and constitute a large proportion of the government domestic debt. The bills are purchased by a wide variety of investors including commercial banks, NBFIs, insurance companies, pension schemes, parastatals, corporate entities and individuals. The banking sector dominates in holding the bulk of the bills. Treasury bills are currently sold in maturities of 91 and 182 days through weekly tenders. Treasury bill is a discount instrument where purchasers pay an amount below the face value at the time of issue while at maturity the repayment is made at face value. The difference represents a discount, which is the interest earned. With the applications made, the bank accepts tenders starting with those at the lowest rate until the pre-announced tender amounts are realised. In case there are several bidders at the cut-off rate, CBK has the right to allot the bills on a pro-rata basis. The bills are issued as paperless securities through a book entry central depository system (CDS). Under the CDS, the CBK opens a Treasury bill account for the investor into which the value of the purchased bills is credited. Investors retain a copy of the bank's credit voucher as evidence of payment. They are also required to furnish the CBK with their bank account numbers so that as the bills are due for redemption; the proceeds are credited directly to their account. The CBK acts as an agent in sale of Treasury bills in the primary market with a minimum purchase of one million. Investors not qualifying for the minimum amount in the primary market are expected to purchase securities in the secondary market where minimum investment remains 50,000.

above the latest Treasury bill rate, an increase from the previous 0.125 per cent points. The premium loaded above the Treasury bill was meant to preserve the CBK role as a lender of last resort while at the same time ensuring that banks observe their liquidity and use. For example, the inter-bank market as a priority instead of borrowing from the CBK. It is important to note that during the period, efforts to establish the Treasury bonds market were not bearing fruits and therefore Treasury bills were a major source of budget deficit financing.[2]

Penalty charges were increased by 1.0 per cent in April 1990 so that the rediscount rate of Treasury bills, and other eligible government securities was set at 2.5 per cent above the latest Treasury bill rate while the

2. Treasury bonds (bearer bonds) were first introduced in August 1986 with the aim of lengthening government debt structure and finance the budget deficit. In less than a year of trading the market was inactive and in 1987, CBK resumed trading in Treasury bonds after eight months period of no trading. The first two issues were held in September and December 1987 during which time Treasury bonds of 6 months and 1-year maturities were introduced. During auctioning, sales were concentrated on 1 year and 2 year maturity bonds, and a few on 5-year maturity bonds. The bids rate for the 6 months maturity bonds was about 18 per cent. If the bids were accepted it would have meant a negatively sloped yield curve or anticipated rise in long-term interest rates given that the prevailing Treasury bill rate was low (13 %) together with the average yield on 1-year bonds (14 %). In February 1988, the Government launched a new issue of Treasury bonds with new rates set at 14.5 per cent for the 1 year, 15.5 per cent for 2 year and 16.5 percent for the 5 year bond reflecting a positively sloped yield curve. To enhance the attractiveness of the Treasury bonds, CBK revised the coupon rates in March 1990 so that the rate for 1 year Treasury bond was raised from 14.5 percent to 15 percent while the rates for 2 and 5 year bonds was raised from 15.5 percent and 16.5 per cent to 16.5 per cent and 17 per cent. The Government introduced bearer Treasury bonds in December 1990 to diversify the range of securities available to savers and investors. However, these bearer bonds were not different from registered bonds in terms of coupon rates and maturity. Registered bonds are issued and allocated based on a monthly tender process, while bearer bonds are floated bonds, which remain on tap for unspecified period. Therefore, the remaining time to maturity determines the prices of bearer bonds. The interest paid on floating bonds is tied to the average rate on the 91-day Treasury bills. The Government raised Kshs 1,059 million from the first issue of bearer bonds in December 1990 (CBK, 1991). The second issue/float raised Kshs 645 million in April 1991. In the two issues 97.2 per cent of the issues was accounted for by 1-year bonds while 2-year and 5-year maturity bonds accounted for 2.3 per cent and 0.5 per cent, respectively.

advances against other eligible securities were made at 3.5 per cent above the Treasury bill rate. Treasury bill market was fully liberalised in November 1990 so that bill rates were determined through the auction process.[3] With the CBK utilising the open market type operations (OMTO) framework for monetary policy, Treasury bill rate became an important signalling interest rate for monetary policy action. As long as the open market operation is driven largely by monetary policy objectives, then Treasury bill rate sends the monetary policy stance signal. The discount margin for advances against other eligible securities remained unchanged at 5.5 per cent points above the latest weighted average Treasury bill rate.

As shown in Figure 2, Treasury bill rate gained a significant increase in the 1993/94 periods, as the CBK put effort to mop up excess liquidity in the economy. For instance, the weighted average Treasury bill rate more than tripled within one year, rising from 17.16 per cent in June 1992 to 70.09 per cent in June 1993. By this time the CBK had changed its practice of floating bills of Kshs 2,000 million since 1987, to floating bills of Kshs 5,000 million. It must be understood that with CBK using the government securities in liquidity management, the alternative it had was to attract purchases of the treasury bills by offering high interest rates. However, the high Treasury bill rate made Treasury bonds become unattractive investment, squeezing it out of the preferred financial asset portfolio.

3. The amount issued per auction depends on the financing needs of the government and the objective of monetary policy at the time of the issue. Through auctioning, the CBK allocates the bids competitively based on the discount rates, beginning with the lowest tender. In bidding, investors either make competitive or non-competitive bids. The latter implies that instead of quoting the price, the investor bids for the average rate. However, this option is only open for bids worth Kshs 10 million. There is a withholding tax of 15 percent charged on the interest rate unless one has a tax exemption certificate. The CBK computerised the handling of Treasury bills by introducing the CDS in January 1997. The objective is to facilitate development of a secondary market for Treasury bills, and also to increase efficiency in the government securities market.

The discount window was further tightened in March 1993, with the rediscount rate set at 5 per cent points above the prevailing Treasury bill rate for the first Kshs 50 million. In May 1993, maturity life of securities eligible for rediscounting was reduced to 45 days or less and new penalties for banks failing to observe the mandatory cash ratio announced. Further, the base for determining the discount rate on Treasury bills and rediscount rate on other government securities was changed from the weighted average Treasury bill rate to the highest Treasury bill rate of preceding week's auction for amounts not exceeding Kshs 50 million. This meant that banks had to maintain discipline in their liquidity management or face a high cost, which has implications on the rates they charge themselves. For example, the tightening of the discount window saw lending rates increase from 16.71 per cent in July 1991 to 19.82 per cent in March 1993 and 24.16 per cent in May 1993 while the deposit rate moved from 15.92 per cent in July 1991 to 14.45 per cent in March 1993 and 15.59 per cent in May 1993. As a result, the interest spread gained an accelerated increase from 0.79 to 5.37 and 8.75 in the period, respectively. Further, with the rising Treasury bill rate the banking sector recorded a rise in average liquidity from 18 per cent in July 1991 to 29 per cent and 34 per cent in March and May 1993, respectively, reflecting a shift in the asset composition of the banking institutions from loans to government securities.

In 1994, Treasury bills were diversified to accommodate diverse liquidity preference. This saw the introduction of the 30, 60 and 180-day bills, but in May 1996, the 60 and 270 Treasury bills were discontinued leaving the 28, 91, 182 days Treasury bills. At the same time on 9 August 1994, rediscounting was allowed to Treasury bills half way to maturity and other government securities provided they were 45 days or less to maturity. In August 1995, the rediscount rate was set at 5 per cent points above the prevailing 91 days Treasury bills

average tender rate. At the same time, minimum investment in Treasury bills under OMO was lowered to Kshs 100,000 from Kshs 1,000,000 then to Kshs 50,000 to allow participation of more investors. This saw the deposit rates gain an increasing trend as the banks competed for the deposits in the non-financial sector. Similarly, the lending rates were pushed upwards.

In a effort to create a secondary market for Treasury bills and improve efficiency of CBK in the day-to-day liquidity management, REPOs were introduced in September 1996 . REPO is an agreements made by CBK to buy back in short notice earmarked Treasury bills sold to commercial banks. REPOs supplement primary security issues such as new issues of Treasury bills and security issues through open market operations (OMO).[4] Initially, REPO system was piloted among a few banks and then extended to all banks in November 1996.

A two-way REPO was introduced on 8 April 1997 to smoothen liquidity management. In addition, to allow for market-determined interest rate payable on REPO bills, CBK introduced the bidding system for REPO Treasury bill issues in November 2000. The REPO rate follows closely the Treasury bill rate as indicated in Figure 2. On average the spread between the REPO and the Treasury bill rate is 1.28 although the spread was wider at the initial stage. However, the penalty is lower than that of the rediscount rate, which is 3 per cent

4. When the CBK notices excess liquidity within the banking system, its OMO desk advertises or calls commercial banks to inform them of the mopping up. The CBK and commercial banks then agree on the discounted amount that commercial banks will be debited, the commercial banks obtain in exchange for their funds and an agreed date for the CBK to repurchase the issued security from commercial banks. The Central Depository System (CDS) accounts are adjusted accordingly to reflect REPO transactions by crediting with issued securities commercial banks CDS accounts and debiting the same to CBK CDS account. The reverse takes place when the REPO matures. To correct the excess liquidity, all REPO transactions are valued the same day and tenures trade takes between one and two months.

points above the Treasury bill rate. This encourages banks to use the REPO market for liquidity management, enhancing development of the secondary market.

Further, in July 1997, banking institutions were expected to include Treasury bonds among their liquid assets to increase investment in Treasury bonds and allow a decline in interest rates on lending to customers. Treasury bonds' programme was re-launched in May 2001 with the aim of developing the yield curve and to restructure the government domestic debt.[5]

Overnight lending rate

This is the rate at which the CBK lends money to the commercial banks as a lender of last resort. The loan rate against government securities was set at 1.25 per cent in 1988, doubling to 2.5 per cent in 1990. As the CBK adopted tight monetary policy, in early 1990s, overnight lending was tightened. For example, in June 1993, overnight lending by CBK was limited to realisable value of the security pledged if such security was discounted at the CBK. Eligible securities for overnight loans from the commercial banks were Treasury bills, Treasury bonds and government bearer bonds. On 6 August 1993, the process of making

5. The types of Treasury bonds issued included the floating rate Treasury bonds (FRTB) and the fixed coupon rate Treasury bonds (FCTB). The FRTB are medium-term government securities with a maturity of one, two and three years floated periodically to raise budgetary resources or refinance existing debt. The minimum amount invested is Kshs 50,000 initially; thereafter, one can invest up to any maximum amount in multiples of Kshs 50,000. Interest is paid quarterly and semi-annually and is currently pegged on the moving average rate of the 91 days Treasury bills plus a premium of 0.25 per cent, 0.5 per cent and 0.625 per cent on one, two and three year bonds, respectively. A withholding tax of 15 per cent is charged on the interest payable, unless the investor is exempted or has made arrangements to pay individually to the Kenya Revenue Authority (e.g. banks and insurance companies). Exempted investors must provide copies of the exemption status/certificate. The five-year amortised floating rate Treasury bond interest rate is 0.75 per cent premium above the 91 days Treasury bill average rate at the beginning of each interest period.

overnight advances to banks was streamlined by limiting eligible collateral to Treasury bills and registered bearer Treasury bonds held for at least 10 days from the date of issue, but with only a life of 90 days to maturity. The applicable rate was maintained at the highest accepted Treasury bill rate in the previous week's auction plus 2.5 per cent points for the first Kshs 50 million. During this time, monetary policy was also tightened with increased cash and liquidity ratio and also tightening of the rediscount window.

Further, by 18 April 1994, the maximum duration for overnight loans was limited to four consecutive days and not more than 10 days per month. Bank lending in the inter-bank market did not qualify for borrowing from the CBK on the same day. In July 1995, overnight lending was tightened so that only Treasury bills held at 50 per cent or 75 per cent of life to maturity eligible for overnight loan were allowed on condition that the bill had two clear working days to maturity. At the same time, the rate was increased to 4 per cent above the Treasury bill rate or the inter-bank rate, whichever is the highest, to discourage its use by the banks.

In the process of shifting to the indirect monetary policy, CBK established an alternative window for commercial bank borrowing in July 1996. Borrowing under the Lombard facility was limited to a maximum of 5 per cent of banks paid up share capital at the beginning of each quarter, but at a rate of interest 2 per cent above the highest Treasury bill rate of the previous auctions. Additional financing above the Lombard limit was accommodated in the first window at 3 per cent point above the prevailing Lombard interest rates. The amount borrowed had to be fully secured by government securities.

Overnight lending on window 1 was raised to 4 per cent above Treasury bill rate from 2 per cent effective 19 November while window 1 rate increased to 6 percent. On 3 June 1997, overnight loan rate under Lombard window 1 was reduced from 4 to 3 per cent above the prevailing 91 days

Treasury bill rates, while interest on rediscounting of eligible securities and borrowing under window 2 was reduced from 6 to 5 per cent. Window 2 was discontinued on 25 August 2000 and the window 1 rate has remained constant at 3 per cent above the Treasury bill rate. Comparing this penalty with the REPO market, we see an attempt to discourage the use of overnight lending by placing a heavy penalty. This is also an indication of a deliberate effort by the Government to promote growth of the REPO market.

The inter-bank rate

Inter-bank market provides an avenue through which commercial banks and NBFIs in cash deficit positions can borrow funds overnight from their counterparts with surplus cash. The institutions agree on the amounts and interest rates and instruct the CBK to adjust their accounts accordingly. Instructions pertaining to inter-bank transactions have to be received at CBK by 2.00 p.m. to be reflected in the closing balances of that day's value date. The inter-bank rate reflects the liquidity position in the banking sector and it has always been market determined; we expect, of course, that the rates that the banks are charged will affect the rates that they eventually charge to their clients. It is, therefore, possible that banks with liquidity constraints use the inter-bank market frequently and therefore sustain a high lending rate or very low deposit rate.

The inter-bank rate traces very closely liquidity in the banking sector as indicated in Figure 2. For example, the inter-bank rate takes a downward trend as the liquidity ratio rises and vice versa. In addition, the inter-bank rate shows a clear relationship with the money market interest rates. On average, however, the inter-bank rate is lower than the money market rates to encourage the use of such market for liquidity management by the banks; the spread between the inter-bank rate and rediscount rate is 4 per cent point, while the spread between the REPO and the rediscount is 3 per cent.

The relationship among the money market interest rates

If the open market operation is such that it has a monetary policy objective to mop up excess liquidity, then high Treasury bill rate should put pressure on inter-bank market so that there is a clear positive relationship indicated between the Treasury bill rate and the inter-bank rate. Table 2 provides correlation results, which indicate a positive correlation between the REPO and Treasury bill rate with the inter-bank rate. In addition, the results show the expected negative relationship between the money market interest rates and the liquidity levels in the banking sector. Considering the direction of relationship we find, as expected, a bi-directional link between the Treasury bill rate and the inter-bank rate. Results also show a bi-directional relationship between the REPO and inter-bank rate and also between the liquidity in the banking sector and the inter-bank rate. In addition, there is observed unidirectional relationship between the liquidity level and the REPO and Treasury bill rate. Clearly these results confirm the hypothesis that monetary authority responds to the liquidity levels in the market and it could do so to increase or ease pressure on the inter-bank market. The results also show a clear link between the inter-bank market and the monetary policy actions in addition to the banking sector operations.

Co-integration test results show a long-run relationship between the inter-bank and both the Treasury bill rate and REPO rate. There is also a long-run relationship between the inter-bank rate, Treasury bill rate and REPO rate and the liquidity in the banking sector.

Analysing the volatility of the market interest rates results show a declining level of volatility over time as indicated in Figure 3. However, there is an increasing trend recorded in 2003. Further, the summary statistics show that the inter-bank rate has a lower volatility compared to the other money market interest rate.

Table 2: The relationship among the money market interest rates

Panel 1 Correlation

	Repo	*Tbill*	*Inter*	*Avliqb*
Repo	1			
Tbill	.960(.000)	1		
Inter	.889(.000)	.879(.000)	1	
Avilqb	-.699(.000)	-.704(.000)	-.630(.000)	1

Panel 2 Granger causality

	Inter	*Tbill*	*Repo*	*Avliqb*
Inter		4.601(.000)	3.475(.000)	1.9684(.085)
Tbill	3.6091(.000)			2.676(.0232)
Repo	3.964(.000)			2.4256(.0368)
Avliqb	2.6616 (.0238)	1.397(.2312)	1.676(.1432)	

Panel 3 Cointegration

Inter	*Tbill*	*Repo*	*Avliqb*	*Constant*	*Eigen value*	*LL*
Cointegrating factor					Statistics	
1	-3.0588 (2.0397)			36.8913	.1403	18.1648 (6.4)
1		-3.5304 (4.5615)		40.2322	.1306	7.5734 (6.4)
1			2.3623 (-35.0555)	-11.0459	.1249	7.7390 (6.65)
		.0311 (-0.0445)	1	-.7945	.0944	5.7530 (3.76)
	.2812 (-6.5488)		1	3.9126	.0812	4.9104 (3.76)

Panel 4 Volatility of money market interest rate

	Repov	*Interv*	*Tbillv*
Mean	6.6246	5.5851	6.9784
Median	1.7826	1.4526	1.8778
Maximum	94.1238	56.5066	83.0155
Minimum	0.0002	0.0011	0.0000
Std. Dev.	13.1497	11.3750	14.2829
Skewness	4.6539	3.0824	3.6083
Kurtosis	29.2813	12.2914	17.1956
Jarque-Bera	2299.628	367.8225	750.2166
Probability	0	0	0

Note: *Inter* = inter-bank rate; *Repo* = Repo rate; *Tbill* = Treasury bill rate; *Avilqb* = Average liquidity for commercial banks; *Repov* = volatility for repo rate; *Interv* = inter-bank rate volatility; *Tbillv* = Treasury bill volatility.

Figure 3: Volatility in interbank rate (interv), repo rate (repov) and treasury bill rate (tbillv)

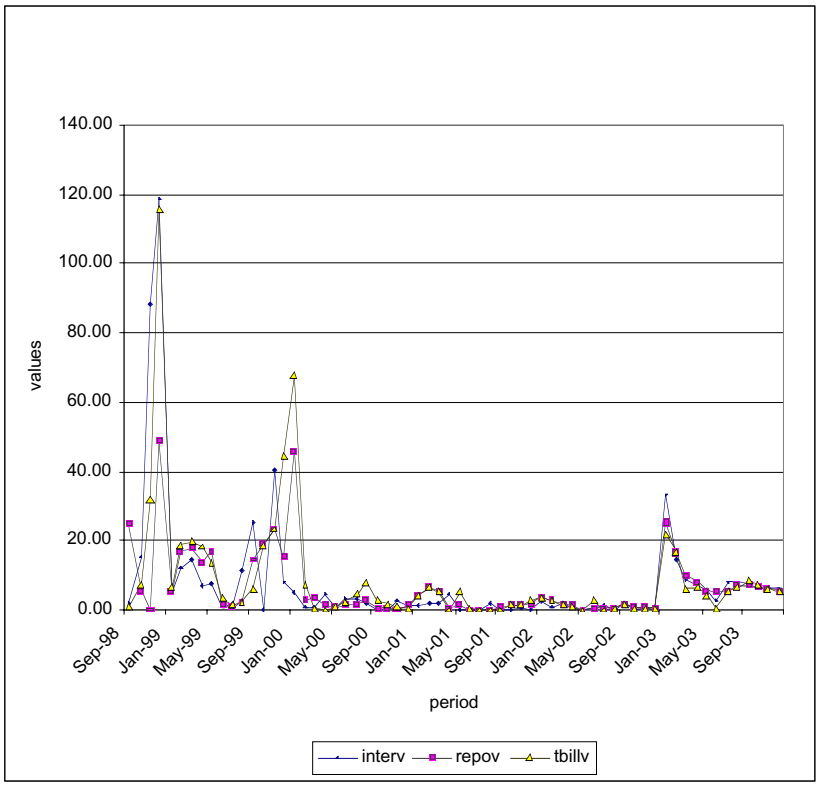


Table 3: Summary statistics of commercial banks interest rates

	Deprate	*Ledrate*	*Spread*
Mean	11.9066	23.8116	11.9050
Median	13.5450	23.3600	13.3700
Maximum	23.4300	32.2800	16.2200
Minimum	3.7083	15.6814	2.8300
Std. Dev.	4.8315	4.7791	3.7010
Skewness	0.1356	0.1782	-1.2857
Kurtosis	2.3636	1.5891	3.1612
Jarque-Bera	2.8717	12.7055	39.8257
Probability	0.2379	0.0017	0.0000

Note: *Deprate* = deposit rate; *ledrate* = lending rate; *Spread* = interest spread

4.2 Interest rates for banking institutions

Commercial banks interest rates

Interest rates for commercial banks include the deposit and lending rates, which show variations across maturities.[6] In Kenya, deposit rates for banking institutions broadly include the saving, call, and time deposit rates. Time deposit rates are defined by maturities that range from 3 months to over 12 months. The lending rate includes the overdraft facility rate and the term loans that range between 1 year and over 3 years. Banks report both the prime rate and the actual/maximum rate; commercial banks started reporting the base lending rates from 1 August 1997, providing investors with a minimum rate that they would be charged in a competitive market with no default risk premium. For the deposit rate, the base rate is reported for deposits worth over Kshs 10 million for one and three month duration.

Interest levels

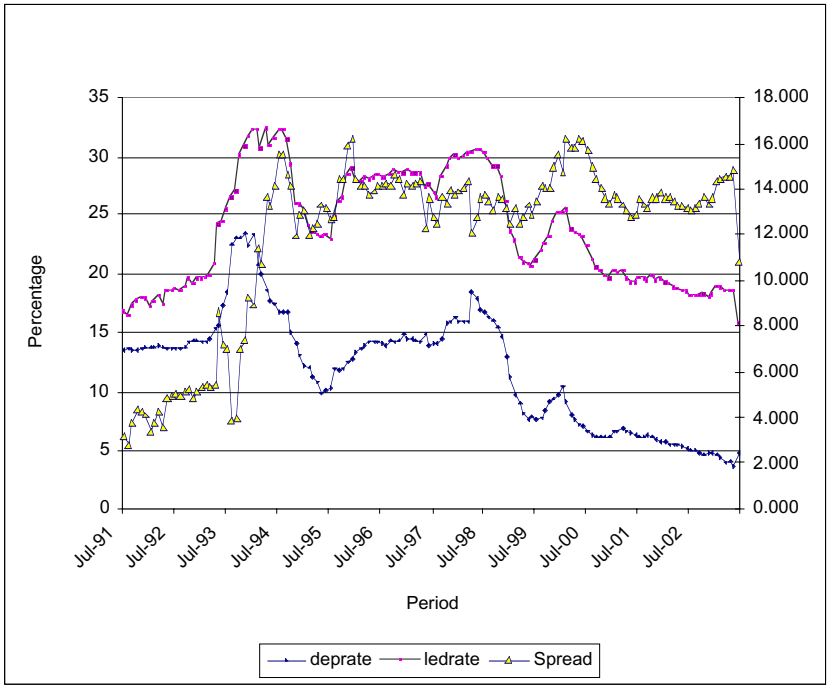
Table 3 provides the summary statistics for the interest rates. Lending rate is twice the deposit rate, but the levels of volatility are the same. The statistics show that while the nominal deposit rate mimics a normal distribution with the skewness equal to zero and the kurtosis equal to three, the nominal lending rate rejects the normal distribution with tails that are thinner than for normal distribution.

Figure 4 traces trends in the average commercial banks nominal fixed deposit rate and lending rate. A gradual increase is noted in interest

6. Before May 1997, the indicative interest rate for all banks was defined as the average maximum and minimum of deposit or loan weighted by each bank's share in total deposit liabilities or credit. However, in May 1997, the average approach was adopted so that the indicative interest rate was defined at the bank level as the sum of interest rate on various transactions weighted by respective shares in the transactions for the category. At the industry level, it is defined as the sum of the average interest at the individual bank level weighted by the share of the bank's volume of transaction for the category in the transaction for industry.

rates in the period following liberalisation. The lending and deposit rates increased from 16.71 and 13.5 per cent in July 1991 to 19.57 per cent and 14.24 per cent in February 1993 as the Treasury bill rate increased from 16.45 to 17.11 per cent in the same period. As a result, the spread widened from 3.21 to 5.45 while the liquidity on the commercial banks rose from 18 per cent to 26 per cent.

Figure 4: Trends in deposit and lending rates and the interest spread



However, interest rates gained a significant rise as CBK implemented stabilisation policies in March 1993. In four months, the Treasury bill rate had risen to 70.34 per cent (July 1993). Lending rates gained a peak in April 1994 of 32.28 per cent, while the deposits picked in November 1993 (23.43%). At the same time the cash ratio increased from 6 per cent to 8 per cent in March 1993, then to 10 per cent in June 1993, 12 per cent in October 1993 and 14 per cent in November 1993. Cash ratio increased to 16 per cent in February 1994 and 20 per cent in March 1994. At the same time the minimum liquidity was increased from to 25 per cent in March 1994.

Therefore, we can attribute the rising lending and deposit rates to the increasing implicit costs that banks were facing with the tightened monetary policy; the peaking of the lending rate in April 1994 followed the rise in both liquidity and cash ratio. With the rising implicit tax, the banks had no option but to share the costs with the investors and this pushed the lending rates very high up. The rising deposit rate could be attributed to the efforts by commercial banks to compete for the deposits from the public as Treasury bills were becoming an attractive alternative asset for them, while at the same time ensuring that they have enough deposits to facilitate investment in the lucrative government securities. The inter-bank rate was very high compared to the deposit rate and therefore did not offer an attractive alternative for mobilising liquidity. The spread widened to reflect the increasing costs facing the banks. While the aim of the CBK was to bring down liquidity levels, commercial banks reported high liquidity ratios increasing from 26 per cent in February 1993 to 56 per cent in March 1994.

When the Treasury bill rate took a downward trend hitting a low of 22.55 per cent in February 1994, 15 per cent in November 1994 and 14.4 in March 1995, the deposit rates declined to 8.81 in May 1995, while the lending rate reached a lowest of 22.95 per cent in July 1995. Similarly, the spread reached 13.28 per cent in May and 12.96 per cent in July 1995 while liquidity levels reduced to 47 per cent and 43 per cent respectively. In August 1995, the CBK revised downward the minimum investment in Treasury bill to enable the non-financial sector participation in the market. This saw the starting point for deposit rates to assume an upward trend as the banks competed for the funds. Similarly, the lending rates took an upward trend. This, together with the rising Treasury bill rate, saw the deposit rates hit a peak in April 1998 of 18.37 per cent while lending rates achieved a peak in May 1998 of 30.54 per cent, with the spread loosing marginally to 12.69 per cent points.

Since early 1999, all interest rates assumed a consistent downward trend where for example the Treasury bill rate declined from 10.70 per cent in January 1999 to 3 per cent in June 2003. Deposit rates declined from 11.25

per cent to 4.84 per cent while lending rates moved from 23.67 per cent to 15.68 per cent in the same period. The spread, however, has not come down significantly; it moved from 12.42 per cent to 10.84 per cent in the period.

Therefore, the trends in the lending and deposit rate seem to reflect the monetary policy actions during the period. This is confirmed by the positive relationship indicated between the commercial bank interest rates and the money market interest rates as shown in Table 4. The Granger causality results show unidirectional relationship from the money market interest rates to the deposit and lending rates. This supports the view that banks' interest rates respond to monetary policy changes. A long-run relationship is indicated between bank lending and deposit rates and the money market interest rates.

With the argument that deposit rates only change to take care of the spread and the fact that the deposit rate is a component of lending rates, the study considered the Granger causality between the nominal lending and deposit rate. We would expect that when the market faces an upward trend in lending rate—reflecting increased demand in credit—the banks respond by increasing the deposit rate to mobilise more resources and meet the demands in the credit market. However, this may depend on the liquidity in the banking sector; the more the liquidity the less the push to raise the deposit rates. It also depends on the diversity of financial asset portfolio for the depositors. The more competitive the returns of other financial assets as compared to the deposits, the more likely it is for the push to raise deposit rates to compete for the deposits. If the rising lending rate indicates rising risk premium, then the deposit rate will not take a significant rise as it would if the rise was due to demand.

Results show a bi-directional relationship with the levels and first difference; deposit rate Granger causes lending rate and lending rate granger causes deposit rate. This implies that, in maintaining their profit margin, banks will always consider a desirable lending rate in setting the deposit rate. It also implies that any policy action aimed at reducing the lending rate, therefore threatening their profit margin, will see banks

Table 4: The relationship among the money market and banks interest rates

Correlation results

	Deprate	*Ledrate*
Repo	.757 (.000)	.764 (.000)
Tbill	.895(.000)	.903(.000)
Inter	.752(.000)	.742(.000)

Granger causality

	Deprate	*Ledrate*	*Inter*	*Tbill*	*Repo*	*Spread*
Inter	.7549 (.6091)	1.3697 (.2491)				
Tbill	.0233 (.9770)	1.7318 (.1584)				
Repo	.6430 (.5297)	1.0183 (.4267)				3.6884 (.0049)
Deprate		2.5007 (.0915)	6.5440 (.0000)	10.8869 (.0001)	5.8551 (.0050)	2.5007 (.0915)
Ledrate	4.0440 (.0231)		3.1772 (.0116)	8.5434 (.000)	5.9440 (.000)	
Spread	2.0299 (.1413)	1.2743 (.2898)				

Cointegration

Ledrate	*Deprate*	*Inter*	*Repo*	*Tbill*	*Constant*	*Eigen value*	*LL*
1		1.2580 (1.6254)			-34.0610	.0877	5.3229 (6.65)
1			2.2579 (5.4120)		-48.1002	.0985	6.0151 (6.65)
1				-22.2098 (421.356)	253.8531	.1074	6.5922 (6.65)
	1			-.6667 (.0696)	.6920	.1451	9.0924 (6.65)
	1		-.6347 (.0569)		-.0725	.1272	7.8918 (6.65)
	1	-1.8020 (.3701)			10.5146	.1833	1.74444 (6.65)
1	-1.1530 (.1170)				12.7382	.1212	7.2379 (6.65)

Note: *Inter* = inter-bank rate; *Repo* = Repo rate; *Tbill* = Treasury bill rate; *Avilqb* = Average liquidity for commercial banks; *Deprate* = deposit rate; *ledrate* = lending rate; *Spread* = interest spread.

maintain very low deposit rates. In addition, the elasticity coefficient between the deposit and lending rate showed a positive and inelastic relationship, which corroborates the indicated lags in response between the two interest rates; a 10 per cent increase in lending rate will see a less than 10 per cent increase in deposit rate while a 10 per cent decline in deposit rate is followed by a less than 10 per cent decline. The size of the coefficient partially reflect the imperfections in the financial market. For example, faced with a high default risk, banks keep higher lending rates.

Figure 5 shows trends in real interest rates especially capturing the period of the 2000s. Results show the lending rate retaining its positive relationship term even when the inflation rate is high. The deposit rates show very huge swings then positive to negative as inflation rate rises and declines. As a result, the Treasury bill rate and deposit rate achieve a negative relation rate, which would discourage mobilisation of resources.

Figure 5: Real interest rate and inflation

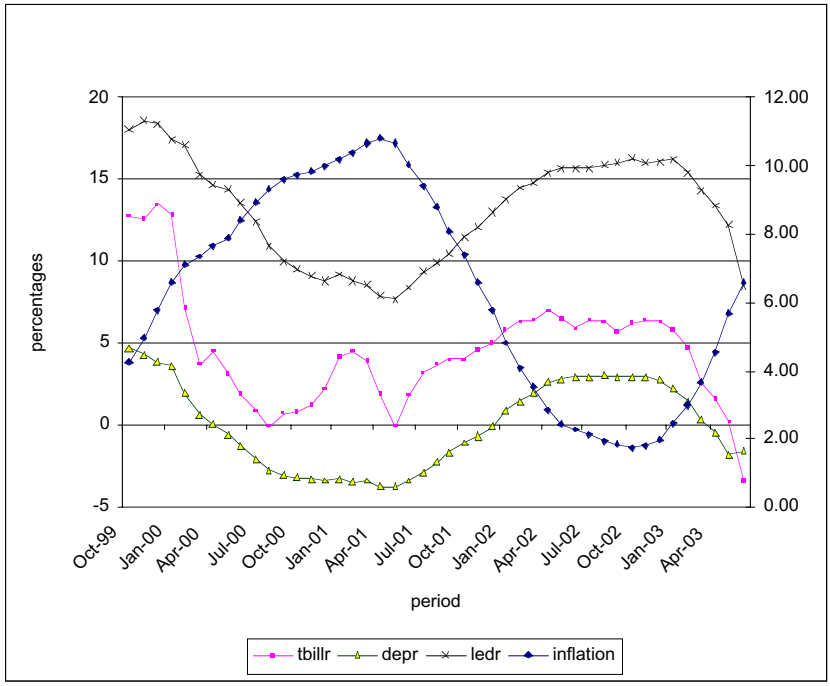


Table 5 relates the interest rates and inflation, both the overall and underlying inflation. A positive relationship is indicated between the nominal interest rates and both the overall and underlying inflation, while real interest rates show a negative relationship. Underlying inflation is the main focus for the CBK in the monetary management. A unidirectional relationship is indicated between the underlying inflation and the real money market interest rates. However, there is significant causality indicated between the banking institutions deposit and lending rates. Similarly, co-integration results show a long-run relationship between the money market interest rates and the underlying inflation.

Table 5: Correlation between the interest rates and the overall (Over) and under (Under) inflation

	Over	*Under*
Nominal interest rate		
Tbill	.390(.008)	.439(.003)
Deprate	.397(.007)	.351(.018)
Ledrate	.318(.033)	.217(.152)
Repo	.392(.008)	.504(.000
Inter	.218(.150)	.449(.002)
Real interest rate		
Tbillr	-.484(.001)	-.266(.077)
Deprater	-.869(.000)	-.677(.000)
Ledrater	-.794(.000)	-.660(.000)
Repor	-.529(.000)	-.248(.101)
Interr	-.757(.000)	-.422(.004)

Note: Inter = inter-bank rate; Repo = Repo rate; Tbill = Treasury bill rate; Deprate = deposit rate; ledrate = lending rate; Tbillr = real treasury bill rate; Deprater = real deposit rate; ledrater = real lending rate; Repor = real repo rate; interr = real inter-bank rate.

A volatile interest rate inclines to increase risk on capital yield. Estimating interest rates volatility using the variance indicates that lending rate has a higher volatility (3.28) compared to deposit rate (2.55). A positive correlation is indicated between interest rates and the measures of volatility, which implies that interest rates reflect on the risk factors in the market.

Interest rate spreads

The spread between the lending and deposit rate captures both costs and profit margin for the banking institution. If the lending rate were to remain unchanged and deposit rates increase, this would squeeze the profit for the bank. Similarly any increase in lending rate would increase profit assuming constant costs. Considering the deposit rate, the study shows a significant difference in the deposit rate where decreases are more pronounced than the increases, which indicates asymmetric response. However, we find no significant difference for the lending rate as the deposit rate swings up and down, which would have implications on the factors influencing the deposit and loans market. This also implies that the widening spread is maintained by the huge downward swings in deposit rate; we do not expect to close the gap if banks respond to increasing risk factor in the loans market rather than the demand and supply.

Figure 6 traces the relationship between the spread and its components (the prime spread and the credit risk spread) and the lending rates,[7] while Table 6 provides the summary statistics. Results show that the credit risk constitutes 89 per cent of the spread, while the prime rate spread is 11 per cent. A positive correlation is indicated between the credit risk factor and the total spread and a negative correlation between the prime spread and the total spread. This implies that reducing the base-lending rate achieves very little in the efforts to narrow the spread as it is dominated by the credit risk component. Actually, there seem to be a substitution effect as banks target to retain their margin, with a

7. It is observed that when there is information asymmetry and imperfect enforcement of contracts, loans become costly to the bank and borrowers are charged higher interest rates or are rationed out of the market. The collateral or the net worthiness of the firm can mitigate these costs as long as the collateral can be legally pledged against the loan. However, negative shocks to the net worthiness restrict the aggregate supply of credit and tend to lower production. Taxes also explain the wedge between the deposit rate and the lending rate.

negative relationship indicated between the prime rate spread and the credit risk factor. Therefore, despite the declining base lending rate, the interest rate spread is maintained because firms facing a high default risk sustain their margin by charging a higher lending interest rate to the non-prime borrowers. Results on relating the spread to the direction of change of the deposit rate show that the spread is generally wider with the declining deposit rate; a negative correlation is indicated between the spread and the deposit rate. This corroborates an earlier finding of this study: that the spread is sustained by low deposit rate. There is a positive, though insignificant, correlation between the lending rate and the credit risk factor and also the total spread, which implies that credit risk premium is just but one of the major factors influencing the lending rate.

Figure 6: The relationship between the spread, the components and the interest rates

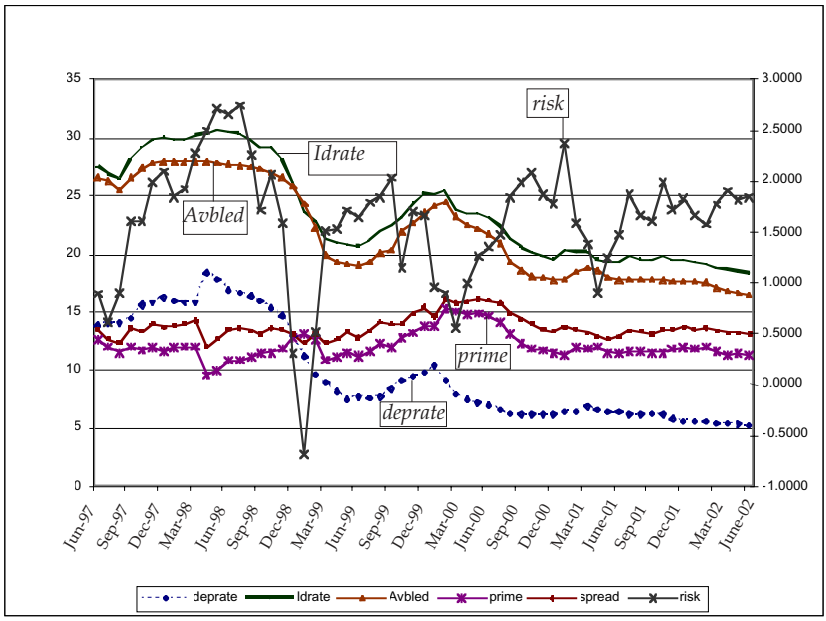


Table 6: Summary statistics of the spread and its components

The summary statistics			
	Credit risk	Prime spread	Spread
Mean	1.4545	12.2990	13.7535
Median	1.6567	11.9125	13.5750
Maximum	2.7129	16.6780	16.2200
Minimum	-2.1802	9.5553	12.0400
Std deviation	1.0408	1.3997	0.9750
Skewness	-1.4250	1.1664	1.0382
Kurtosis	5.0571	3.8513	3.5753
JB	30.8847	15.4166	11.6147
Prob	.0000	.0004	.0030
The correlation between the spread and the interest rates			
Ledrate	.167(.199)	-.048(.712)	.045(.733)
Deprate	.179(.167)	-.245(.057)	-.185(.152)

Note: *Ledrate* – nominal lending rate; *Deprate* – nominal lending rate.

Spreads between interest maturities

Time is an important element in defining the structure of interest rates. For example, if there are expectations for high interest rate in the future, then the short-term interest rates will be higher than the long-term interest rate. If the future is highly risky, banks may impose a higher risk premium on long-term interest rates so that long-term deposit rates are lower than short-term deposit rates or that the long-term lending rates are higher than the short-term lending rates. Banks could also price their product to make them competitive in the market especially if the basket of financial assets is wider. For example, banks could keep the short-term deposits rate in line with the 91 days Treasury bill rate to keep up with the competition.

This section analyses the maturities on deposit (i.e. call, 0-3 months, 3-6 months, 6-9 months, 9-12 months and over 12 months deposits) and lending rates (1 year, 2 years, 3 years and over 3 years).

(a) Spreads between deposit rates by maturities

Table 7 provides summary statistics for the various deposit maturities. The mean values across the maturities indicate a U-shaped curve with the M03 higher than the M36 rate, M69 has the lowest interest rate, while M12v rate is higher than the M69 but lower than M39. Over time, M03 has retained a higher level than other maturities although in some cases M12v seems to have dominated as indicated in Figure 7. This mainly traces the 91 days Treasury bill rate, which competes closely with the M03 so that M03 shoots upwards when the Treasury bill rate is high (Figure 8).

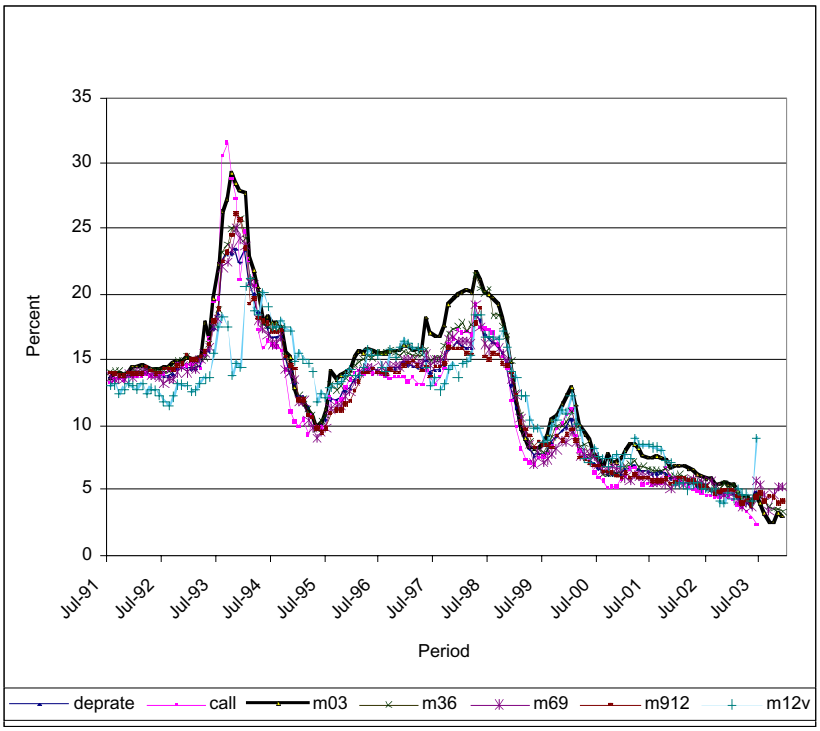
Table 7: Summary statistics of the deposit rates by maturities

	CALL	*M03*	*M36*	*M69*	*M912*	*M12v*
Mean	12.559	14.176	13.371	12.565	12.622	12.792
Median	13.575	14.425	14.150	13.730	13.950	13.105
Maximum	31.560	29.260	25.860	24.970	26.220	21.080
Minimum	4.770	6.060	5.490	5.200	5.230	5.100
Std. Dev.	5.283	5.255	4.884	4.642	4.673	3.704
Skewness	0.868	0.544	0.173	0.188	0.296	-0.258
Kurtosis	4.622	3.149	2.552	2.652	3.022	2.426
Jarque-Bera	31.034	6.630	1.760	1.449	1.926	3.279
Probability	0.000	0.036	0.415	0.485	0.382	0.194

Note: *CALL* – interest rate on call deposits; *M03* – interest rate on deposits 0 – 3 months; *M36* – interest rate on deposits 3 – 6 months; *M69* – interest rate on deposits 6 – 9 months; *M912* – interest rate on deposits 9 – 12 months; *M12v* – interest rate on deposits over 12 months

Considering the mean differences across the various maturities, results show a significant mean difference between the M03 and M36 (mean = .805, t = 9.552(.000)) and also between the M36 and M69 (mean = .806, t = 12.086(.000)). However, there is no significant difference between the M69 and M912 (mean =-.058, t = 1.058(.292) and also between the M912 and M12v (mean = -.170, t = .791(.431), while M03 is significantly higher than the M12v (mean = 1.3842; t = 5.278(.000)). These results imply that

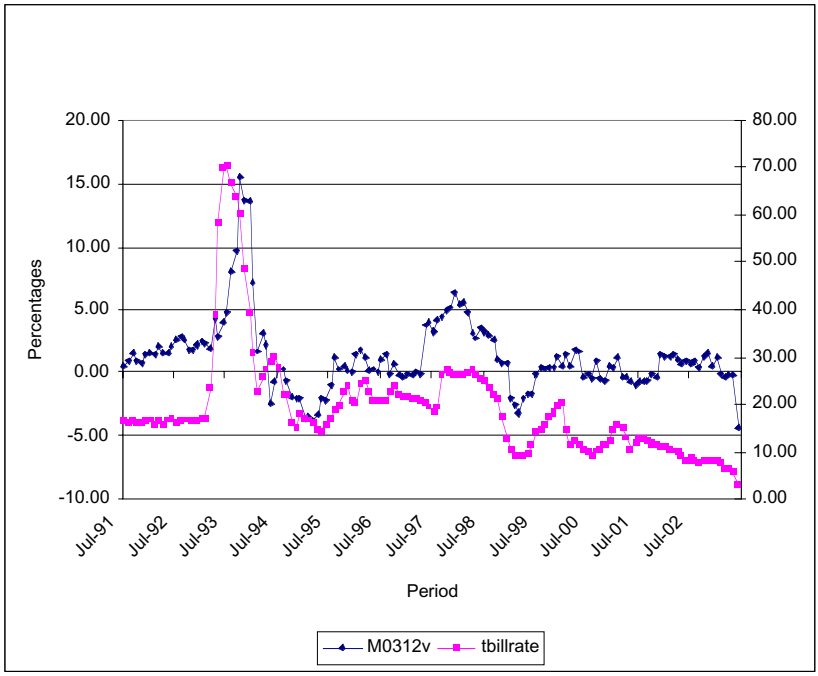
Figure 7: Deposits maturities interest rates



we cannot reject a negatively sloped yield curve for the deposit maturities. It is argued that greater inflation tax is levied on current and short-term time deposits for which there are no close substitutes, while a smaller tax is extracted from deposits for which closer substitutes exist. However, the results in this study do not seem to support this hypothesis. It is possible that the results reflect on the high demand for short-term maturities with their higher liquidity level as compared to the long-term maturities; the long-term maturities do not have a significantly higher compensation to attract their demand.

Summary statistics of the volatilities of the various maturities are reported in Table 8. They show a clearly negatively sloped volatility curve across the various maturities. If there is a risk structure portrayed by interest rates across the maturities, then the maturities should show significant differences. Considering the significant differences across the

Figure 8: Relating the difference between the M03 and M12v with the Treasury bill rate



maturities we find a significant difference in variance between the M03 and M36 (t = 3.683, 0.000) and also between the M36 and M69 (t = 3.264, 001) and M912 and M12v (t = 1.943, .054), but not between the M69 and M912 (t = .741, .460). For the M03 and M12v we find that the M03 has a higher volatility compared to the M12v (mean = 3.8409; t = 3.747(.000)). Therefore, we can attribute the high interest rate in M03 to the high volatility, which could be traced also to the Treasury bill rate, which offers competition to the short-term deposits.

Relating the deposit rates to the money market interest, we find significant positive relationship across all maturities in relation to the various money market interest rates (Table 9). The size of the correlation coefficient is higher with the shorter maturities than with the longer maturities. The coefficient is even higher with the Treasury bill rate across the maturities.

Table 8: Summary statistics of the deposit rates by maturity volatilities

	VCALL	*VM03*	*VM36*	*VM69*	*VM912*	*VM12v*
Mean	6.243	5.384	3.463	2.828	2.691	1.543
Median	0.469	0.739	0.371	0.189	0.154	0.489
Maximum	107.848	78.958	38.803	40.291	42.990	16.558
Minimum	0.000	0.000	0.000	0.000	0.000	0.000
Std. Dev.	16.526	12.495	7.397	6.666	7.022	2.551
Skewness	3.734	3.380	2.916	3.373	3.655	3.128
Kurtosis	18.405	15.227	11.495	15.471	17.107	14.808
Jarque-Bera	1612.130	1073.511	584.024	1105.786	1388.539	982.152
Probability	0	0	0	0	0	0

Note: *VCALL* – variance of call rate; *VM03* – variance of 0 – 3 months deposit rate; *VM36* – variance of 3 – 6 months deposit rate; VM69 – variance of 6 – 9 months deposit rate; VM912 – variance of 9 – 12 months deposit rate; *VM12v* – variance of interest on deposits over 12 months.

Table 9: Correlation between the money market rate and the maturities of deposit rate

	Repo	*Tbill*	*Inter*
CALL	0.8149(.000)	0.9299(.000)	0.8004(.000)
M03	0.7959(.000)	0.9245(.000)	0.7959(.000)
M36	0.7647(.000)	0.8853(.000)	0.7510(.000)
M69	0.6996(.000)	0.8520(.000)	0.7133(.000)
M912	0.7134(.000)	0.8583(.000)	0.7142(.000)
M12v	0.7102(.000)	0.8385(.000)	0.6688(.000)

Note: *CALL* – interest rate on call deposits; *M03* – interest rate on deposits 0 – 3 months; *M36* – interest rate on deposits 3 – 6 months; *M69* – interest rate on deposits 6 – 9 months; *M912* – interest rate on deposits 9 – 12 months; *M12v* – interest rate on deposits over 12 months; *Inter* = inter-bank rate; *Repo* = Repo rate; *Tbill* = Treasury bill rate.

(b) The spreads between lending rates maturities

Table 10 provides summary statistics for the lending rate maturities where the mean values indicate an inverted U-shape curve across the maturities; it increases from YR01 to YR12 and then takes a downward trend to Y3v. A negatively sloped yield curve would reflect the profit maximisation effort by the bank. However, the portrayed structure may be reflecting high preference for short-term loans. Overdraft interest rate is higher than the term loans to a large extent reflecting on the high

demand for the facility to finance both the working capital and new investment (Cotton *et al*, 2004). Overdraft is generally a one-year loan facility, which has a more flexible security structure as compared to the term loans. The low interest rate offered for the long-term maturities may be an effort to attract the investors to longer maturities, but the conditions may be highly prohibitive.

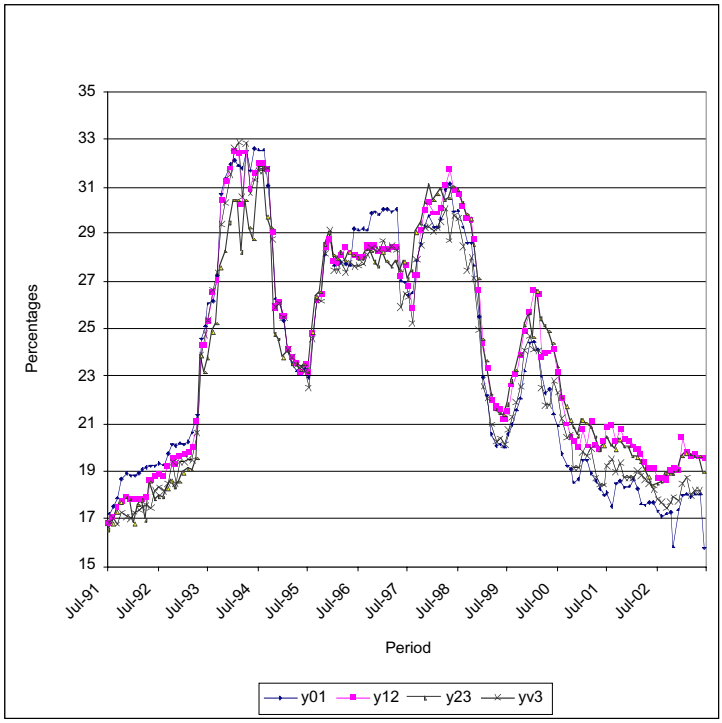
Table 10: Summary statistics of the lending rates by maturities

	DRAFT	*YR01*	*YR12*	*YR23*	*YRV3*	*SFLOAN*
Mean	24.595	24.213	24.611	24.288	23.910	8.733
Median	24.145	23.785	24.310	24.465	23.985	8.935
Maximum	33.500	32.600	32.490	31.810	32.860	10.170
Minimum	13.790	17.210	16.800	16.550	16.740	6.480
Std. Dev.	5.036	4.858	4.517	4.447	4.661	0.965
Skewness	0.038	0.147	0.040	-0.078	0.100	-0.692
Kurtosis	1.806	1.542	1.687	1.667	1.658	2.649
Jarque-Bera	7.878	12.177	9.515	9.904	10.130	11.222
Probability	0.019	0.002	0.009	0.007	0.006	0.004
Observations	132	132	132	132	132	132

Note: *DRAFT* – nominal lending rate on overdraft; *YR01* – nominal lending rate on loans 0 – 1 years; *YR12* – nominal lending rate on loans 1 – 2 years; *YR23* – nominal lending rate on loans 2 – 3 years; *YRV3* – nominal lending rate on loans over 3 years; *SFLOAN* – nominal lending rate on staff loans.

Figure 9 reports trends in lending rate maturities showing a changing structure from the initial period after liberalisation to the recent years. For example, it shows that before March 1993, YR01 was the highest while YR23 was the lowest. However, in the 2000s period YR01 is the lowest while YR12 has been generally the highest. Comparing the maturities with the overdraft, YR12 and overdraft rate trace one another very closely. However, in the recent period, the gap between the YR12 and the overdraft has widened, as the overdraft interest rate take a downward trend almost tracking the Y01; except for the period 1993/94 when the overdraft rate is generally lower than all the maturities; in general the overdraft is higher than the maturities except for the Y12.

Figure 9: Trends in lending maturities interest rate



The base-lending rate is an indicator of the minimal rate that default risk free investors would fetch in the market. Considering the dispersion of the various maturities from the base-lending rate, results show that generally, as expected, base-lending rate is less than the actual lending rates. The dispersions display different levels of credit risk across the maturities where, for example, Y12 and Y23 have higher credit risk compared to Y01 and Y3v. Volatility measure across the various maturities indicates a U-shaped curve across the maturities, which fails to confirm volatility as a risk factor in pricing of loan products (Table 11).

Base lending rate is expected to respond instantaneously to changes in money market interest rate if the transmission channel is efficient. Figure 10 traces the trends in the money market interest rates and the base-lending rate. It shows that the base-lending rate is generally higher than the money market interest rates. A unidirectional relationship is also indicated from all the money market interest rates to the base-lending

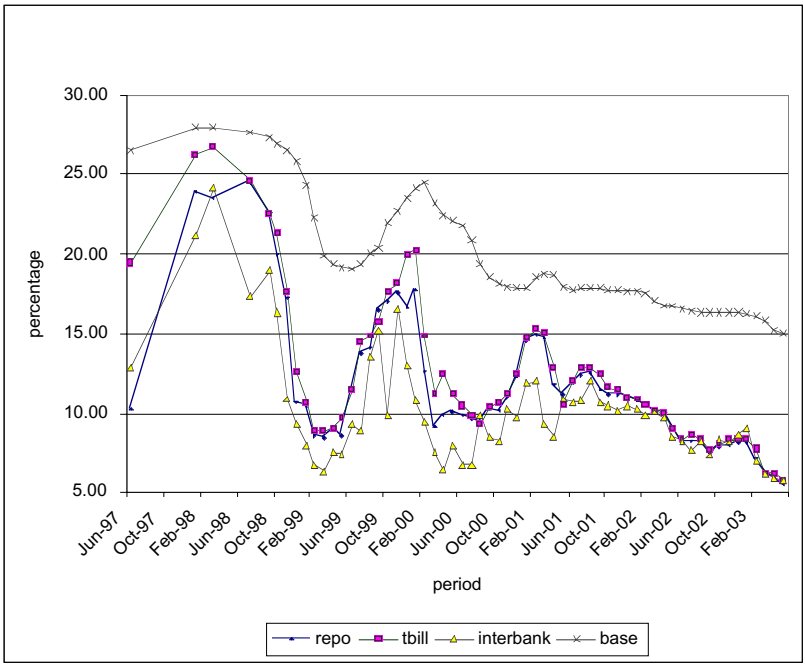
rate. Results also show that when the money market interest rates are declining, the base-lending rate also declines, but at a faster rate than when it takes an upward trend.

Table 11: Summary statistics of the lending rate volatilities by maturities and correlations with interest levels

	VYR01	*VYR12*	*VYR23*	*VYRV3*	*VSLOAN*	*VDRAFT*
Mean	3.444	3.403	2.855	3.264	0.252	4.270
Median	0.905	0.685	0.471	0.562	0.068	0.852
Maximum	42.521	44.001	35.007	44.422	2.031	56.601
Minimum	0.000	0.000	0.000	0.000	0.000	0.000
Std. Dev.	7.165	7.497	5.768	7.161	0.396	9.532
Skewness	3.283	3.286	2.987	3.334	2.302	3.462
Kurtosis	14.000	14.120	12.409	14.672	8.367	15.232
Jarque-Bera	902.624	917.752	683.196	993.834	274.955	1086.575

Note: *VYR01* – variance of nominal lending rate on loans 0 – 1 years; *VYR12* – variance of nominal lending rate on loans 1 – 2 years; *VYR23* – variance of nominal lending rate on loans 2 – 3 years; *VYRV3* – variance of nominal lending rate on loans over 3 years; *VSLOAN* – variance of nominal lending rate on staff loans; *VDRAFT* – variance of nominal lending rate overdraft.

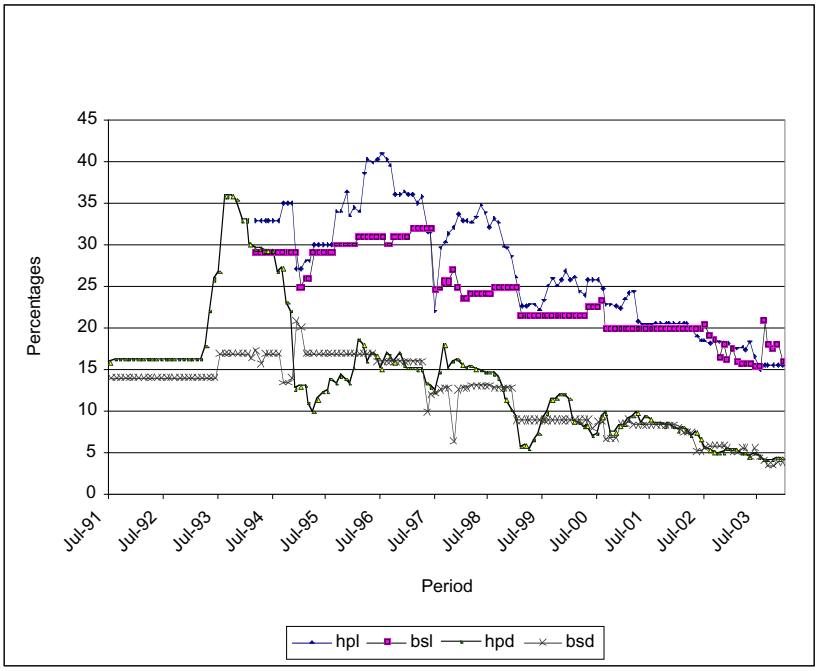
Figure 10: Relationship between money market interest rate and the base lending rate



4.3 Interest rates for non-banking financial institutions

The non-bank financial institutions (NBFIs) include the hire purchase and merchant banks (HP) and the building societies (BS). As indicated in the previous section, efforts have been made to create uniformity on interest rates across the banking institutions and also regulatory conditions streamlined. Figure 11 traces the BS and HP interest rates.

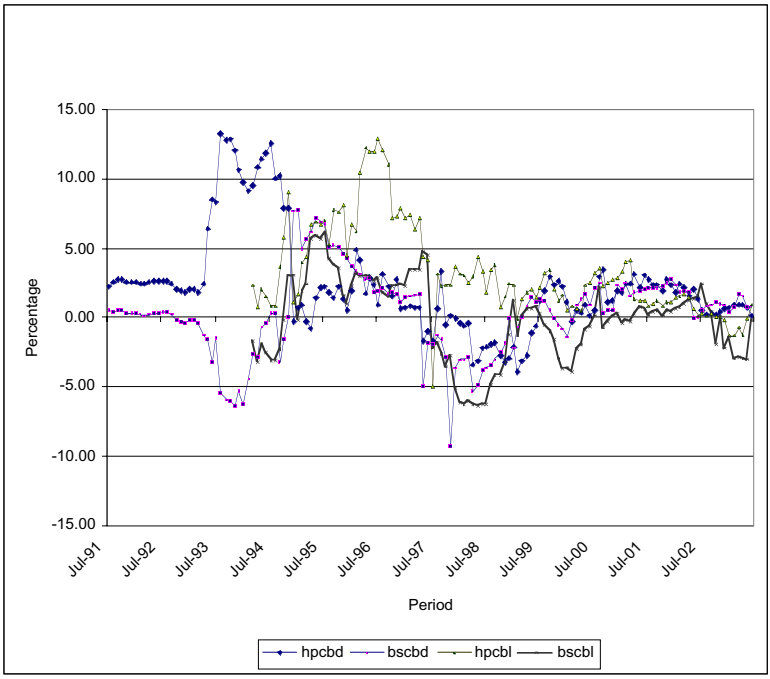
Figure 11: Trends in the hire-purchase (HP) and building societies (BS) lending and deposit rates



Relating the BS, HP and commercial banks interest rates, Figure 12 shows that commercial banks lending rates are generally lower than the hire purchase lending rates, and also the building societies. At the same time, the gap between the hire purchase and building societies' lending rates has narrowed. There is a significant difference between the lending rates of hire purchase and the building societies. However, in relation to the

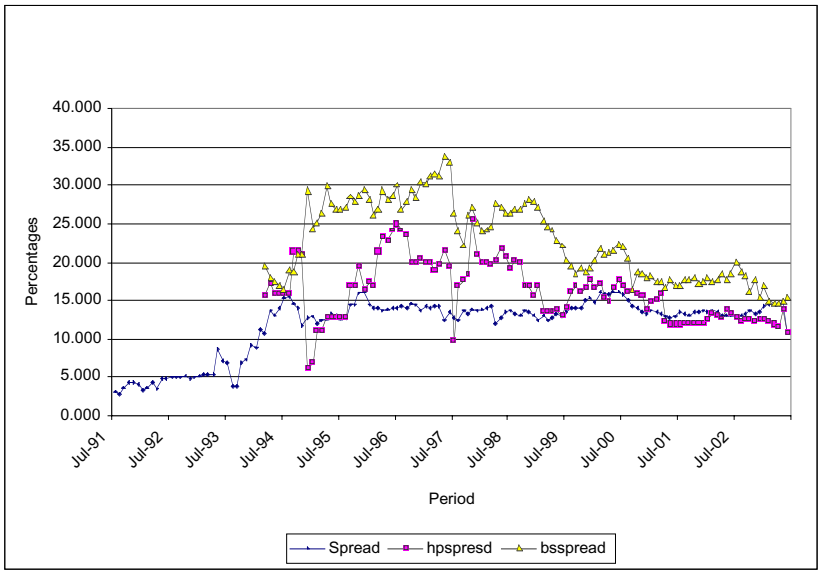
commercial banks interest rates, the results are mixed. The relationship with the hire purchase is significant while the one with the building societies is not significant.

Figure 12: The spread between commercial banks and both building societies and hire-purchase lending and deposit rates



The hire purchase average deposit rate show a declining trend, while the gap between the highest and lowest has narrowed down. Both the HP and BS have generally had lower interest rates compared to the commercial banks, while their interest rates gap is narrowing. The mean differences between the interest rates indicate significant difference between the hire purchase and building societies deposit rates. While there is significant difference between that of commercial banks deposit rate and the hire purchase deposit rates, there is no significant different between the commercial banks and the building societies. Considering the spreads across the institutions, the HP has always had a wider gap between the lending and the deposit rates but this is narrowing (Figure 13).

Figure 13: Relationship between commercial banks interest spread (Spread) and the interest spread for hire-purchase and building societies



Correlation results indicate positive and significant correlation between the deposit and lending rates of the NBFIs deposit rates and the commercial banks deposit rates. The Granger causality between interest rates show that building societies and hire purchase deposit rates Granger cause commercial banks interest rates. However, a bi-directional relationship is indicated between commercial banks and the hire purchase. Similarly, there is bi-directional causality between hire purchase and building societies deposit rates. It is possible that the indicated relationship shows competition among financial institutions for deposits from the public. For the lending rates, it seems that the hire purchase follows the commercial banks lending rates, while the latter follows what is happening with building societies, and this in turn follows the hire purchase. Therefore, any effort made to reduce the commercial banks interest rates would automatically bring down the HP interest rate.

5. Conclusions

This paper analyses the structure of interest rates in the financial sector in Kenya. The analysis includes money market rates (rediscount rate, REPO rate, inter-bank rate), interest rates on government securities (Treasury bill rate) and commercial bank interest rates (lending rates – overdraft, term loans and deposit rates – savings, call deposit, time deposit rates).

(1) Except for the inter-bank and Treasury bill rates which are market determined, other money market interest rates are benchmarked to the Treasury bill rate; they are defined as Treasury bill rate plus a premium which reflect on monetary policy action. For example, with a tight monetary policy, the premium charged is higher aimed at discouraging use of Treasury bills by commercial banks in liquidity management. This exerts pressure on the inter-bank market so that a positive relationship is indicated between the monetary policy signal and the inter-bank rate. A unidirectional causality is observed between the other money market interest rates and the inter-bank rate, which implies that the inter-bank market responds to monetary policy actions. Similarly, a long-run relationship is indicated between the inter-bank rate and Treasury bill rate.

(2) Inter-bank rate is lower than discount window rate but the inter-bank market is more costly compared to the REPO market. This indicates a deliberate effort by the Central Bank of Kenya to maintain its position as a lender of last resort, with the banks choosing the inter-bank market as a priority in their liquidity management. Similarly, the REPO rate encourages growth of the secondary market for government securities, making them more liquid. Further, the inter-bank rate has the lowest level of volatility, which makes it an effective signalling rate.

(3) The average commercial banks nominal fixed deposit rate, lending rates and savings rate trace very closely the monetary policy actions.

For example, all interest rates rise with the tightening of monetary policy and take a general downward trend as the monetary policy is relaxed. A clear unidirectional causality is also obdserved from the money market interest rates those of banking institutions. Similarly, a significant relationship is indicated between the interest rates and the liquidity in the market, which implies that liquidity management has a significant influence on interest rates.

(4) Lending rates are highly volatile compared to deposit rates, while a positive relationship is observed between volatility and the levels of interest rates, which implies that there are interest rates price risk factor(s) in the market. With deposit rate as a component of the lending rate and having a lower volatility, it means then that the other costs that make up the lending rate are highly volatile.

(5) Interest rates spread is composed of a significant proportion (89%) of the credit risk. This implies that imperfections in the credit market contribute significantly to sustaining the spread. Similarly, the movements in deposit rates sustain the spread where deposit rates decline more sharply compared to the increases, while lending rates increases are more pronounced compared to the declines. Furthermore, a bi-directional relationship is indicated between the deposit and lending rate, which would support the objective of the commercial banks to sustain their margin.

(6) Spreads between various deposit maturities portray a U-shaped relationship for interest rates levels but a negatively sloped relationship for the volatilities, which makes it difficult to make conclusions on the risk structure in the market. One explanation for the high short-term deposit rate is the competition that banks face with the Treasury bills. High Treasury bill rates exert pressure on the banks to keep the interest rate high to be able to compete for the funds from the public. Because of the close link between the Treasury

bill rate and the short-term deposits, the short-term deposit rates reflect a higher volatility, which could reflect a higher risk and therefore higher compensation.

(7) Lending rates maturities indicate a shift in the term structure in the period 1995/98. The structure of lending rates reveals an inverted U–shaped relationship across the various maturities, such that it is not possible to make conclusions whether the term structure represents a profit maximisation motive or maturity preferences.

(8) Non-banking financial institutions have generally high lending rates but lower deposit rates compared to commercial bank rates. While deposit rates indicate Granger causality from the NBFIs to commercial banks, a loop is indicated with the lending rates across the institutions. Commercial banks interest rates Granger cause the hire purchase interest rates which in turn Granger cause the building societies rate and in turn the commercial banks.

6. Policy Implications

The results of this study have various policy implications:

- Sustainability of low interest rates depends largely on the developments in the money market. Any increase in domestic financing of government debt will result in rising interest rates as the Treasury bill rates take an upward trend. There are two channels through which this will happen: one is in competition for deposits by the commercial banks resulting from higher results on Treasury bills; and two, through increased pressure on inter-bank market which makes liquidity management more costly.
- Although presently, with the high liquidity in the market, banks have no pressure to increase deposit rates, the inflationary tendency, which seems to keep the interest rates negative in real terms, may constrain mobilisation of resources. Given that with both the underlying and overall inflation the deposit rate is negative in real terms, this raises the question of how low the inflation target for the monetary authority should be in maintaining interest rates positive in real terms, not forgetting that one of the objectives of the current interest rates policy is to maintain interest rates positive in real terms.
- If there is a diversified basket of financial assets, competition for funds from the public may keep the deposit rates high. For some time, Treasury bills have remained a major financial asset and banks have responded positively to raise the deposit rate when the Treasury bill rate is high. Therefore, diversification of financial assets to increase competition could sustain deposit rates positive in real terms.

- The lending rate has a high composition of credit risk. While the current shift to unsecured, but less risky, loans may keep interest rates down, any shifts to heavy productive investment financing may not sustain the trend especially if a competitive credit market is not achieved.
- It is possible to adjust interest rates in the banking institutions with a target to commercial banks.

References

Central Bank of Kenya (2000). *The Practice of Monetary Policy in Kenya*. Nairobi: Central Bank of Kenya.

Central Bank of Kenya (1996). *Interest Rates Ready Reckoner*. Nairobi: Central Bank of Kenya.

Central Bank of Kenya (1991). *Economic Report*. Nairobi: Central Bank of Kenya.

Central Bank of Kenya (various). *Economic Reports*. Nairobi: Central Bank of Kenya.

Central Bank of Kenya (various). *Monthly Economic Review*. Nairobi: Central Bank of Kenya.

Central Bank of Kenya (various). *Statistical bulletin*. Nairobi: Central Bank of Kenya.

Cotton, L., I. Elbadawi, P. Kimuyu, J.M. Marchat, R.W. Ngugi, V. Ramachandran, M.K. Shah (2003). *Enhancing the competitiveness of Kenya's manufacturing sector: The role of the investment climate*, mimeo. Nairobi: Kenya Institute for Public Policy Research and Analysis.

Government of Kenya (1974). *Development Plan 1974-1978*. Nairobi: Government Printer.

Government of Kenya (various). *Economic Surveys*. Nairobi: Government Printer.

Government of Kenya (various). *Budget Speeches*. Nairobi: Government Printer.

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.

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