A STUDY ON COMPARISON OF INTEREST RATES BETWEEN SHORT TERM AND LONG TERM FINANCIAL DEBT SECURITIES

By

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DECLARATION

This project is my original work and has not been presented for a degree in any other University.

Signed: _____ Date: 03/09/03

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This project has been submitted for examination with my approval as the University Supervisor

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DEDICATION

To my husband, Wilfred Muriithi and to my son, Kagema Muriithi for all the support they gave me throughout the entire period that I was working on this research project.

ABSTRACT

The subject of interest rates forms an important area of study in macroeconomics. The behaviour of interest rates directly affect ease of access and cost of capital, consumer prices and the general cost of living.

This study aims at comparing interest rates of short-term and long-term financial debt securities issued by the Kenya government through the central bank from the years 1993 to 2002. Secondly, it aims at determining any significant changes in the yield curve for the same period. The period of study i.e. 1993-2002 is a unique one because it was just after the financial liberalization.

The research sample constitutes all short-term and long-term financial debt securities issued by the government during this period. The study shows that the average interest rate on short-term financial debt securities was higher than the average interest rate on long-term financial debt securities. This was at 21.636% and 16.10% for short term and long term financial debt securities respectively.

The research further found a high dispersion on the short term mean rate, at a standard deviation of 13.916 while that on long term mean rate was 3.32. Its not difficult to see why this is so as the highest average interest rate was recorded at 84.67% and was recorded on the 91 days treasury bill in the month of July 1993. The lowest interest rate recorded was a low of 6.97%, recorded on the six-month treasury bill in April 1999. Both high and low were on short term interest rates.

A downward sloping or inverted yield curve was obtained representing periods of very high interest rates. The result findings are consistent with the economic conditions that were prevailing during the period of study. It was a period of high inflation especially the early part of the period under study and a tighter monetary policy was introduced to try and mop-up excess liquidity in the economy.

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CHAPTER 1

1. INTRODUCTION

1.1 Background Information

1.1.1 Financial Decision Making and interest rates

The primary objective of the firm is to maximize its value (Horne 2000). This should be achieved through making optimal investment, financing and dividend decisions. The firm would create value if the realised returns exceed the return required by the financial markets for the risk involved. Thus the concept of return is critical in the making and evaluation of financial decisions.

The solution of the investing, financing and dividend problems requires sound knowledge of the concept of cost of capital that is dependant on what rates of return all investors in the firm demand before availing their funds. Interest rate is such one return and represents the opportunity cost of investment (Weston 1995).

1.1.2 Interest rates in an economy

Interest rates form one of the major macroeconomic indicators. Interest rates determine the ease of access to credit by businesses, individual as well as the government. As a result, the interest rates also determine the type, number and volume of transactions that turn around in the economy.

For example it is generally believed that monetary policy actions are transmitted to the economy through their effect on market interest rates. Thus a restrictive monetary policy is likely to push up both short term and long interest rates, leading to less spending by interest sensitive sectors of the economy such as housing and consumer durable goods. Conversely, an easier policy results in lower interest rates that stimulate economic activity.

Unfortunately, the above description of the monetary policy process is difficult to reconcile with the actual behaviour of interest rates. Although casual observation suggests a close connection between central bank reserves and short-term interest rates, the relationship between policy and long term interest rates appear much loose and more variable, (Cook, Timothy and Hahn, 1989).

The subject of interest rates has over the years formed an interesting research and study area. However a number of questions still remained unanswered. In addition, its difficult to find literature and research works that well interprets what happens at the domestic scene here in Kenya where the financial market is still developing.

Most banks here in Kenya offer interest rates as negotiated between the bank and each individual borrower. Sometimes little consideration is given to the period of borrowing. In addition, the lender adopts a punitive interest rate loading when the borrower falls in arrears such that you may find loans or advances attracting as high as 40%.

The existence and significant contribution of the informal financial sector in Kenya cannot be ignored. The government has recently made a deliberate effort to promote informal financial institutions in recognition of its role in economic development. Interest rates charged by these institutions are lower and serves lower income clientele.

1.1.3 Interest Rates and Capital Structure

A lot of firms have also financed their operations through debentures and preference share capital. These securities have fixed interest charges that are determined from the onset and don't quite compare with the interest rates charged by banks on normal loans and advances. The later attract interest rates that vary at the banks' discretion.

A recent entry to the securities market is commercial paper. However, the financial market in Kenya is still developing and the use of these has been quite limited.

The decision of the firm on whether to finance its operations through own capital or debt depends on the firm's attitude towards risk that is inherent in use of debt, while desiring value maximization that comes with use of debt. It also depends on how much the firm is willing to loose control over its operations through use of equity. Needless to say, the firm's primary objective remains its value maximization. According to Modigliani and Miller (1963), the value of the firm is dependent on its capital structure and higher value of the firm is attained with increased use of debt. With debt being the cheapest means of financing the firm, most firms will try to use as much debt as possible, all other factors remaining the same. Thus by employing more debt that any other form of capital finance, the firm is able to keep its cost of capital at the minimal and its value at the maximum.

According to Weston and Copeland (1986), the capital structure of the firm is influenced by the expected future net cashflows of a firm, industry characterization, asset structure of the firm, management attitudes towards different methods of financing, and the attitudes of lenders towards different firms and industries. The cost of capital (read interest rates on debt etc), the capital structure of the firm, and capital budgeting decisions are all inextricably linked.

1.1.4 Review of interest Rates changes in Kenya over the last one decade

Before interest rates were liberalized, Kenya, like many other developing counties, followed a policy of low interest rates, adjusting for inflation to maintain positive real rates. The main aim of this policy was to keep costs of funds low, with the belief that cheap credit promoted development through increased investments. The use of interest rates to manage monetary conditions and mobilise and allocate financial resources in an efficient manner was neglected, (Ndung'u and Ngugi, 2000).

Interest rates remained under the administration of the government through a regime of fixing minimum savings rates for all deposit taking

institutions and non banking financial institutions and banking societies. Interest rates were calculated on a reducing balance method and levying of extra charges on loans was not allowed. Deposits saving rates were too low compared with the lending rates, widening the spread between the two.

With liberalization, the interest rates policy aimed at harmonizing the competitiveness among the commercial banks and non-bank financial institutions. This was by removing the differential that had existed for maximum lending rates inorder to allow greater flexibility and encourage greater competition in interest rate determination so that the needs of both the borrowers and lenders could be better met through the cooperation of market forces. It would also contribute towards maintaining the general positive level of interest rates in real terms in order to encourage the mobilization of savings and contribute to the maintenance of financial stability, (Ngugi and Kerubo, 1998).

Treasury bills rates were fully liberalised in November 1990. This made it possible for the Central Bank to use the bill rate to influence the level of other short term interest rates, (Oshikoyo 1992). Interest rates were fully liberalised in July 1991. The immediate experience with interest rates was very promising as they recorded positive real rates and the spread between the lending and deposit rates narrowed. This was only short lived as with the inflationary conditions, a tight monetary policy was adopted to mop up excess liquidity. Treasury bills rates increased pushing up interest rates.

The 91 days Treasury Bills are in record as having paid 80%. Naturally, commercial banks lending rates moved in the same direction as the Treasury Bills, with most banks preferring to put their money in the risk free treasury bills. The depreciation of the Kenya shilling and the increasing Treasury bills rate worsened inflationary conditions. The interest rates became negative in real terms and the spread between the lending and the deposit rates widened. The results show a non-achievement of efficiency in banking.

This was followed by a period of tumult in the Kenyan financial markets. This adversely impacted on many businesses as a result of the

raised domestic interest rates, thus depressing the domestic economic activity. The macroeconomic and financial situation became fragile and the high cost of doing business reduced investor confidence. In addition access to credit became increasingly difficult to average investors and generally impacted adversely on the entire economy, with some businesses closing down or relocating to other countries where they could access cheaper credit.

Since mid 1990s the government has made commendable monetary policy efforts to control inflation. This has seen a notable decrease in the long-term yields as well as short-term interest rates. However withholding of donor funding has not done much to help the situation. It has instead led to massive domestic borrowing by the government to finance the budget deficit occasioned by the withheld donor funds. (Ndung'u and Ngugi, 2000).

Economic activities have also subsided and many businesses have had to restructure to reduce costs. Although currently inflation stands at a single digit, it is more or less a consequence of lethargy and the lack of effective demand in the economy. It is a reflection of anemic growth and a weak financial system.

Despite the efforts to introduce competitiveness, the banking sector seemed to gain an oligopolistic structure with only a few institutions controlling the financial sector. With such a structure, it was even difficult for the banking system to respond to changes in other price indicators; e.g. the improved exchange rate conditions. As the country experienced currency appreciation in 1994, banking institutions failed to reflect this in their lending rates. The Central Bank responded by calling upon the banking institutions to reduce lending rates so as to increase demand for import and allow the absorption of available foreign exchange.

The Central Bank felt that it was only logical for the lending rates to come down to reflect changes in inflation and the downward trend in Treasury bills rates. The high lending rates discouraged borrowing from the banking sector and the commercial banks accumulated more than the minimum statutory requirements.

1.2 Statement of the Problem

Term Structure of Interest Rates describes the relationship between interest rates and loan maturity. Ibbotson and Sinquefield (1990) conducted a study on various types of securities covering the time period 1926-1989. They found that rates of return on long term US government bonds were generally higher than returns on short term US Treasury Bills averaging 4.6% and 3.6%, respectively. This is despite having adjusted for inflation. Would a similar study in Kenya yield similar results?

During 1991-92 short term interest rates dropped dramatically in the USA while long term rates experienced only a moderate decline. The yield curve became steeply upward slopping. Most attributed this occurrence to concerted actions by the federal reserve bank to lower interest rates and conducting open market operations in the short area of the yield curve. This noted yield curve is still within the 'normal' shape of a yield curve that is generally upward sloping. There is however the uncommon situation where the yield curve is inverted or downward sloping. Such a situation happens when long term interest rates have lower yield than short-term interest rates. This is often a sign that interest rates are expected to decline (Weston 1986). It is not known if such situation has been observed in Kenya, and possible reasons behind it.

Although the Kenyan financial market is underdeveloped compared to that of the US, some similarities can be identified in the operations of the two central banks. For example, in 1970, the Federal Reserve Bank of San Francisco formally adopted monetary targets in an attempt to use an intermediate nominal objective or anchor to resist slowly rising inflation. Further, when announcing its policy action on March 25, 1997, the Federal Open Market Committee (FOMC) stated that it had "decided today to tighten money market conditions slightly, expecting the federal funds rate to rise ¼ percentage point to around 5-1/2 percent", (FRBSF Economic Letter, 1997). This is similar to the

observed actions of the Central Bank of Kenya to use interest rates as a monetary policy instrument.

In addition, the Federal Reserve Bank directly controls one short term rate (discount rate) and indirectly controls another (the Federal Reserve funds rate). Its control over these two rates strongly influence other short term rates, and the Federal Reserve bank uses this influence as its primary lever for controlling inflation, (Graboyes, 1999). This is similar to the actions of Central Bank of Kenya over interest rates and their influence over inflation.

This study therefore recognizes that the Central Banks in general may use interest rates to meet policy objectives. Based on the observed similarity in the monetary actions of the central banks in the two regions, there is a general expectation that the research findings in this study will not significantly differ from those that have been observed in the US. Any major difference in the results should be explained by unique fundamentals.

Despite financial market liberalization in Kenya, interest rates have impacted negatively on the growth and development of economic activities in the country (Wagacha 2001). Concern has been that it was not proper for the government to fully liberalize the financial markets in Kenya since it is still a developing economy that needs to be protected from unpredictable market forces. It would therefore be worthwhile to study how interest rates on both short and long term financial debt securities have behaved (and compared) during this period.

In the standard view of the transmission mechanism, the relationship between policy actions and long-term rates is assumed to be straightforward. An increase in the desired level of the federal funds rate causes current short-term rates and expected future short-term rates to rise, which pushes up interest rates across all maturities. Similarly, a decrease in the desired funds rate causes current and future expected short-term rates to fall and leads to lower short-term and long-term rates. Monetary policy actions are expected to have a strong, positive effect on short-term rates. In contrast, the actual relationship

between policy actions and long-term rates appears weak (Goodfriend, Marvin 1993).

Usually longer-term interest rates are higher than short-term interest rates. This is called the normal yield curve and is thought to reflect the higher inflation-risk premium that investors demand for longer-term bonds (Weston and Copeland 1986). Economists and academics have developed various theories such as Expectation Theory, Liquidity Preference Theory and Market Segmentation Theory to try and explain the shape of the yield curve. However documented research conducted in other countries as explained later in this paper yield conflicting results. It would be worth finding out what the real relationship might be in Kenya

The shape of the yield curve is not known in the Kenyan situation. Before any studies are conducted to ascertain the explanatory power of each of the typical explainers, it is necessary to determine the nature of the yield curve.

1.3 Objectives of the Study

The objectives of this study are:

(i) To compare interest rates of short term and long term financial debt securities in Kenya.

(ii) To determine any significant changes in the yield curve over the ten years period.

1.4 Importance of the Study

The findings of this study will be of benefit to the following groups of people:

(a) The government through central bank in formulation of appropriate policies.

(b) Business financial consultants who will be able to give the right financial advise to businesses.

(c) Academician who may use this study as the basis for seeking to carry out further research.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Choice between Consumption and Investment

When current income exceeds current consumption desires, people tend to save the excess. One can give up possession of these savings for a larger amount of money that will be available for future consumption. This tradeoff of present consumption for a higher level of future consumption is the reason for saving. What one does with the savings to make them increase overtime is investment. Those who give up immediate possession of savings expect to receive a greater amount than they gave up. Conversely, those who consume more than their current income must be willing to pay back more than they borrowed. The rate of exchange between future consumption and current consumption is the prime rate of interest. Both willingness to pay this difference for borrowed funds and the desire to receive a surplus on savings give rise to an interest rate (pure time value of money).

An investment is current commitment of money for a period of time to derive future payments that will compensate the investor for the time the funds are committed, the expected rate of inflation and the uncertainty of the future payments. People invest to earn a return from savings due to their deferred consumption. They want a rate of return that compensates them for the time, the expected rate of inflation, and the uncertainty of the return. People save to take advantage of opportunities to enhance the overall level of available and consumable wealth – the investment motive. A decision-maker must choose a portfolio, or collection of investment opportunities in which to hold non-consumed wealth. Doing so may allow him to improve his well being beyond that available from a single savings opportunity. In the real world, these investments opportunities include savings accounts, bonds, stocks, and other assets that provide a flow of income or capital gains over time, (Weston and Copeland, 1986).

2.2 Determinants of Market Interest rates

The determinants of or factors that influence market interest rates can be expressed in the following relationship.

$$\text{Market rate} = K = K^* + IP + DRP + LP + MRP$$

or

$$K = K_{RF} + DRP + LP + MRP$$

K = the nominal rate of interest on a given security

K = the real risk-free rate of interest. This risk would exist on a risk less asset or security if zero inflation were expected.*

K_{RF} = the nominal risk-free rate of interest.

IP = Inflation Premium which is equal to the average expected inflation rate over the life of security ($K_{RF} = K^* + IP$).

DRP = Defaults Risk Premium.

LP = Liquidity Premium. This is a premium charged by lenders to reflect the fact that some securities cannot be converted to cash on short notice at a reasonable price.

MRP = Maturity risk premium. Longer-term bonds are exposed to more risk of price declines, and this premium is charged by lenders to reflect this risk.

Real risk free rate of interest, K*, is the interest rate that would exist on riskless security if no inflation were expected and can be thought of as the rate of interest that would exist on short-term treasury securities in an inflation free world. The real risk-free rate is not static, it changes overtime depending on economic conditions such as the rate of return corporations and other borrowers can expect to earn on productive assets and, people's time preferences for current versus future consumption. Borrowers expected returns on real asset investments set an upper limit on how much they can afford to pay for borrowed

funds. On the other hand savers time preferences for consumption establish how much consumption they are willing to defer and hence the amount of funds they will lend at different levels of interest, (Brigham, Capenski, Daves, 1999).

The nominal risk-free rate, K_{RF} is real risk-free rate plus a premium for expected inflation. The inflation premium included is the average expected inflation rate over the life of the security. Generally, the Treasury bill rate is used to approximate the short-term Risk-free rate, and the Treasury bond is used to estimate the long-term risk-free rate.

Inflation has a major impact on interest rates because it erodes the purchasing power of money and lowers the real rate of return on investments. Investors add an inflation premium (IP) equal to the expected inflation over the life of a security to the rate they would have been willing to accept in the absence of inflation. The inflation rate on any security is the average rate of inflation expected over the security's life.

The risk that a borrower will default on a loan, that is, the borrower does not pay the interest or pay off the principal, also affects the market interest rate on a security. Treasury securities have no default risk, and hence they carry the lowest interest rates. The difference between the interest rate on a Treasury Bond and that on a corporate bond with similar maturity, liquidity and other features is the default risk premium (DRP).

A highly liquid asset is one that can be sold at a predictable price and thus be converted to a well-specified amount on short notice. Active markets that provide liquidity exist for government bonds and for stocks and bonds of larger companies. If a security is not liquid, investors will add a liquidity premium (LP) when they establish the market interest rate on the security.

The prices of long-term bonds decline sharply wherever interest rates rise, and since interest rates occasionally rise, all long-term bonds including treasury bonds, have an element of risk called interest rate risk. A maturity risk premium (MRP), which is higher the longer the

years to maturity, must be included in the required interest rate. The effect of maturity risk premiums is to raise interest rates on long-term bonds relative to those on short-term bonds. This premium is difficult to measure but seems to vary overtime, rising when interest rates are more volatile and uncertain and falling when they are more stable. Short-term bonds are heavily exposed to reinvestment rate risk. When short-term bonds mature and the funds are reinvested or rolled over, a decline in interest rates would result in reinvestment at lower rate hence a decline in interest income. Thus, although the principal is preserved, the interest income provided by short-term bonds varies from year to year, depending on reinvestment rates.

In addition to inflationary expectations, liquidity preferences, and normal supply demand fluctuations, other factors also influence the general level of interest rates and the shape of the yield value. First, the money supply has a major effect on both the level of economic activity and the rate of inflation. The money supply of a country is controlled by a central bank hence such an authority's decisions can affect the level of interest rates. If the central bank wants to stimulate the economy, it increases growth in the money supply. The initial effect of such an action is to cause interest rates to decline, but the action may also lead to an increase to the expected rate of inflation which in turn could push interest rates up. The reverse holds if money supply is tightened. Long-term rates are not affected as much by the central bank's action, except to the extent that such intervention affects expectations for long-term inflation, (Brealey, Myers).

Secondly, if the government spends more than it takes from tax revenues (like in Kenya), it runs a deficit, and that deficit must be covered either by borrowing or by printing money. If the government borrows, this added demand for funds pushes up interest rates. If it prints money, this increases expectations for future inflation, which drives up interest rates. Thus, the larger the government budget deficit, other things held constant, the higher the level of interest rates.

Thirdly, if a country imports more than it exports, it runs a foreign trade deficit. This deficit must be financed, with the main source of

financing being debt. The larger the trade deficit, the more a country has to borrow, and as borrowing increases, so does the interest rates.

2.3 Fisher Effect and Expected Inflation

The expectations theory and the liquidity preference theory of term structure assume that future inflation rates are known. Irving Fisher undertook a detailed examination of the effect of inflation on the rate of interest. Fisher begins with the assumption that individuals who lend money realize that what is being lent is not so much money but control of real goods. The rate of return that lenders demand from a loan of capital represents not so much a return on money as it does an increase in their command of real goods. When a sum of money is lent, the lender wishes to receive an increase in purchasing power equal to the equilibrium pure rate. If lenders expect inflation in commodity prices, they will demand a rate of return that provides compensation for both a required real rate of return and the inflation that is expected.

Fisher said that the nominal interest rate should be approximately equal to the real (inflation – adjusted) rate of interest plus a premium to compensate investors for expected inflation. The model expresses this relationship in multiplicative form, but for low inflation rates, the additive form (Rf = a + i) is approximately correct. Formally, the fisher effect is

$$(1 + Rf) = (1 + a)(1 + i)$$

Where, Rf = the (default) risk – free rate of interest

a = the real (inflation adjusted) return required by investors.

i = the rate of inflation expected during the loan period.

Implicit in this model is an assumption that real interest rates should remain fairly steady for extended periods of time, and that most or all of the variation in nominal interest rates should be as a result of changing inflationary expectations. Fama (1975), Nelson & Schwert (1977), Mishkin (1981), and Evans and Lewis (1995) present

evidence suggesting that variations in nominal rates primarily reflect variations in inflation expectations. However Pennach (1991) found that real interest rates are far more volatile than inflationary expectations, and that most fluctuations in nominal yields are therefore caused by fluctuation in real required returns.

2.4 The Concept of interest rates as one of the Macro-Economic indicators

There are several reasons why interest rates are considered as indicators of monetary policy and future economic growth. First they have been used by central Banks as one of the policy instruments. Second, macroeconomic theory suggest it is through interest rates that monetary policy actions are transmitted to the economy, for example when central Bank increase the money supply, short-term rates drop, which stimulate activity in the interest sensitive sectors. Third, studies of the determinants of the output movements have found that when interest rates are considered, the monetary aggregates lose most of their explanatory power, suggesting that interest rates contain important information about future output [Sims-1980].

Econometric studies have revealed a loosening of the long-term relationship between money and income (Friedman and Kuttner, 1992). This is due to deregulation and innovation in the financial markets, prompting policy makers to concentrate on other monetary aggregates in an effort to find a measure that retain a stable relationship with output and prices.

Economists are now looking at alternative indicators such as interest rates spread. The two spreads that have been examined include the paper bill spread and the yield curve. For example the difference between rates on the six-month commercial paper and six-month Treasury bill (the paper bill spread) and as the difference between the yield on 10-year treasury notes and the yield on the 3-month Treasury Bills (the yield curve). (Judd and Trehan, 1992).

Interest rates spread may be helpful for predicting future movement in output for a number of reasons. First the paper-bill spread is affected by the overall level of risk in the economy, which rises and falls with the contractions and expansions in real economic activity. The default risk of Commercial Papers tends to increase when downturn in the economy is eminent, driving its rates up. But since the default rates of the government backed Treasury Bills does not rise, its rate does not go up. Consequently, the difference between the two rates tends to widen before the onset of recession.

Second, the paper bill spread may serve as an indication of the stance of the monetary policy. When there is a monetary policy tightening, bank-lending contracts in response and some firms issue more Commercial Papers to raise funds. The increase in the demand for credit in Commercial Paper market will raise the Commercial Paper rate. This increase raises the paper –bill spread if the Treasury bill rate does not increase proportionately. The Treasury Bills rate could rise, for example, if commercial banks and other investors sell Treasury Bills from their portfolios and substitute them for Commercial Paper to take advantage of their higher rates of return. However, Treasury Bills and the Commercial Papers are not perfect substitutes in the portfolios of investors, because the two types of securities differ substantially in terms of tax treatment, liquidity and regulatory considerations. Thus, it is likely that the contraction of economic activity caused by tightening of the monetary policy would be accompanied by arise in the paper- bill spread, (Esteller, Harouvelis, 1991).

Movements in the paper bill show how monetary policy tightening affects output. The option of borrowing in the private open market that can mitigate cutback in bank lending is not fully available to all firms. Small firms, in particular, have limited access to open financial markets since unlike the large firms, they lack an established name. Thus, when monetary policy is tightened and larger borrowers switch to Commercial Papers, some small firms are denied credit and they must curtail their business activities. This decreases spending thus contributing in a slowdown in the pace of overall economic activity. (Kashyap, Tein & Wilcox).

The third reason why the spreads may be useful is related to the yield curve, which depicts relationship between the yield on securities of comparable risk and terms of maturity. The expectation theory of the term structures, argues that the expected returns from holding a long term security until maturity should equal the return realized from investing in a series of short term securities for the same period. Thus, the difference between, say the yields on three month Treasury Bill and 10 year Treasury notes reflects the path of expected yields for the short term in future.

For example, if the 10-year rate is lower than the short-term rate, it suggests that the investors expect the short-term rate in the future to be lower than it is today. One reason that investors might expect short term rates to fall in the future is that they expect an economic down turn. Thus an inversion of the yield curve often represents a forecast of an economic slow down.

Interest rates spreads cannot remain consistently useful in forecasting future movements and output for an extended period time. First, fluctuations in output are caused by a myriad of factors such as oil prices. These factors may affect the aggregate demand and supply conditions and hence can influence financial market quantity and price variables differently.

Secondly, not only can the key factors behind business cycle vary over time, so can the overall thrust of monetary policy which influences general financial market conditions. Thus, the information context of some long-term rates might shift in future periods due to changes in the expected inflation rates that makes up part of the long term rates, (Huh, 1991).

Thirdly, the introduction of the more sophisticated financial instruments is broadening the spectrum of available asset choices as well as the financing sources, and hence makes substitutions between assets more feasible and desirable and also makes the prices and quantities of these assets adjust more rapidly. This changing environment can make the interest rate spreads less informative over time.

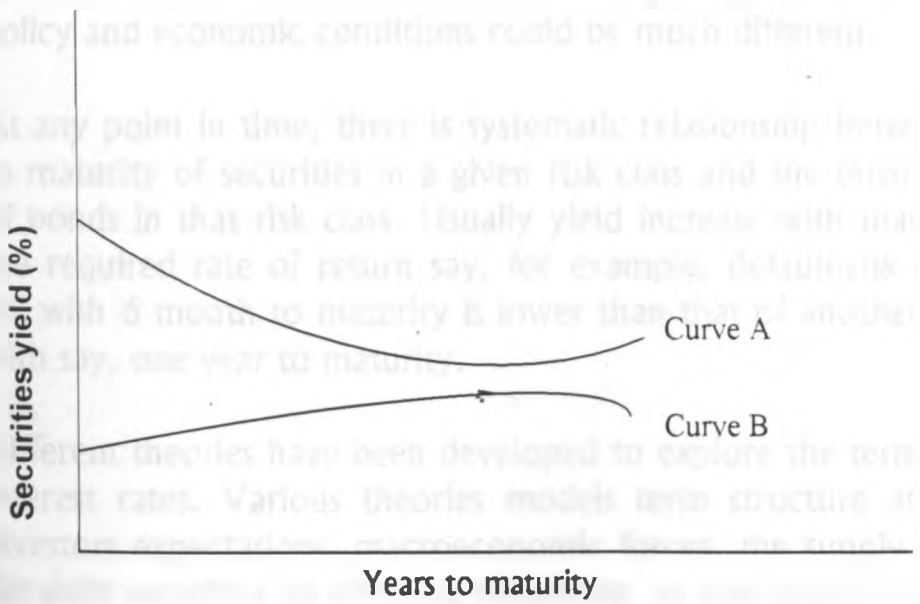
2.5 The Term Structure of Interest Rates and the Yield Curve

The "term structure" of interest rates refers to the relationship between bonds of different terms. When interest rates of bonds are plotted against their term, this is called the "yield curve". Economists and investors believe that the shape of the yield curve reflects the markets future expectation for interest rates and the conditions for monetary policy.

Put in another way, a set of yields to maturity, all observed on the same calendar date may be regarded as function of time to maturity. The actual function (usually fitted simply by plotting the yield on the vertical axis of a graph and the time maturity on the horizontal axis and then fitting a free hard curve) is called the yield curve or the term structure of the interest rate, [Roll-1970].

The yield curve is the graph of yield on similar quality securities plotted against their maturity. In a normal market, short-term securities yield lower returns than investments with longer maturity- to persuade investors to tie up their money for longer period.

Graph 1: Inverted and normal yield curves



Curve A (Downward sloping or inverted curve): This curve represents periods of very high interest rates and is usually observed only during recession. This may be caused by high inflation or a much tighter monetary policy. High short-term rates reflect less available money and higher inflation. Tight monetary policy result is short –term interest being higher than longer-term rates. This occurs as a shortage of money and credit drives up the cost of short-term capital. Longer-term rates stay lower, as investors see an eventual loosening of monetary policy and declining inflation. This increases the demand for longer-term bonds, which lock the higher long-term rates,(Cox, Ingersoll and Ross). This is also called a negative Yield curve as it represents a departure from the normal shape of the yield curve that results from lower short-term rates than the long-term rates

Curve B (Normal Curve): The yield curve documents a much lower overall level of interest rates. This is thought to reflect a loose monetary policy, which means credit, and money is readily available in the economy. This situation usually develops early in the economic cycle when a country's monetary authorities are trying to stimulate the economy after recession or slowdown in economic growth. The low short-term interest rates reflect the easy availability of money and low or declining inflation. Higher longer-term interest rates reflect the investors' fears of future inflation, recognizing the future monetary policy and economic conditions could be much different.

At any point in time, there is systematic relationship between the yield to maturity of securities in a given risk class and the terms to maturity of bonds in that risk class. Usually yield increase with maturity so that the required rate of return say, for example, default-risk free treasury bill with 6 month to maturity is lower than that of another treasury bill with say, one year to maturity.

Different theories have been developed to explore the term structure of interest rates. Various theories models term structure as function of investors expectations, macroeconomic forces, the supply and demand for debt securities of differing maturities, or the relative importance of

liquidity to investors or as a combination of one or more of these factors. Below is a brief discussion of these theories:

2.5.1 The unbiased Expectations Hypothesis

According to the pure or unbiased expectations hypothesis of the term structure, all points on the yield curve reflect the best prediction of the market participants as to what the actual interest rate will be in the future (Fisher-1896; Lutz – 1940). If the yield curve has a normal shape, investors predict that interest rates will rise in the coming periods. If the yield curve is inverted, investors expect rates to fall. A flat yield curve suggests that investors believe interest rates will not change in the foreseeable future. If this theory hold, then there's an entire structure of implied forward rates embodied in any given yield curve. This concept can be illustrated by the equation below;

$$(1 + {}_{o}R_{T})^{T} = (1 + {}_{o}R1)\,(1 + {}_{1}f_{2}) \text{ ----- } (1 + {}_{T-1}f_{T})$$

Where:

- ${}_{1}f_{2}$ is one period rate expected for a bond bought at the end of period one and held to maturity.

- $(1 + {}_{T-1}f_{T})$ is the forward rate on a bond bought at the end of period T – 1 and held for one period.

- ${}_{O}R_{1}$ is the current market rates for one period bond.

Though attractive due to its simplicity and forthrightness, there are a number of problems associated with the pure expectations hypothesis. The model does not account for the greater price risk, but lower reinvestment risk, associated with investing in long-term securities (Fama, 1984). A long-term bond has greater price risk than short-term bond because it will expect larger percentage change in price for any given change in interest rates than will a short-term bond (Copeland and Weston). Reinvestment risk arises when an investor purchases a security with a shorter maturity than he wants, and must then reinvest the proceeds in one or more other short-term securities until the desired maturity date.

2.5.2 The Liquidity Premium Theory

Liquidity preference theory is based on an expectation model of how longer maturity interest rates are set. It assumes investors prefer to invest short-term and must be paid a premium, in the form of progressively higher promised yield as maturities increase, to buy and hold longer-term securities. This preference for liquidity is rational, since investors face less risk with short-term securities, and if held to maturity they also imply lower transactions costs than buying and selling long-term bonds. Braeley and Schafer (1977) derived a term structure model based on uncertain future inflation that is similar to liquidity theory in that the yield curve is upward slopping but this is caused solely by a risk premium for inflation uncertainty and is not related to investors maturity preferences.

2.5.3 The Preferred Habitant Theory (Modigliani & Sutch – 1966)

This model also takes as given that the structure of interest rates is largely determined by expectations. However it assumes that both borrowers and lenders have maturity preferences that they will stay with unless a sufficiently higher (for investors) or lower (for issuers) rate is offered to tempt them into another habitat. This model can explain instances that, for example, the yield on a seven-year bond may be lower than the yield on both five and ten-year bonds. This theory can also explain the tendency for yield curves to continually alter their shape, particularly over the course of a business cycle. This could be caused by changing relative supplies of and demand for securities in the various maturity habitats. The nature of this theory makes it hard to test without detailed knowledge about investors and issuers populating each maturity habitat.

2.5.4 The Market Segmentation Theory (Culbertson – 1957)

This theory is similar to the preferred habitat theory in that both assume that investors and issuers have preferred maturities for their security issuance and investments. However, the segmentation theory suggests

that the different maturity zones are actually distinct segmented markets from which investors and issuers cannot be tempted by the lure of more attractive yields. Such behaviour is difficult to explain with any plausible utility of wealth model, and also ignores the voluminous evidence concerning the willingness and ability of investors to arbitrage gross yield disparities through strategic buying of under-priced (high yield) and short selling overpriced (low yield) bonds.

2.6 A general view of interest rates behaviour

In the simple form of expectation theory, changes in a long-term interest rate can arise from two sources: factors that change the current short-term rate and factors that change market expectations of future short-term rates. To study the reaction of long-term rates to monetary policy actions, measures of both current short-term rates and expected future short-term rates must be obtained. Unfortunately, while current short-term rates are observable, measures of expected future rates are not readily available in a developing country, (Roley and Sellon,Jr 1994).

The direction in which interest rates move when policy is changed depends on investors' views on the likelihood of future policy actions. The magnitude of the response of long-term rates to policy actions depends on the expected persistence of policy actions. If policy actions are seen as relatively permanent, the change in long-term rates may fully reflect or even exceed the current change in the funds rate. Conversely, if a policy action is viewed as only temporary, the response of long-term rates is likely to be muted.

The standard view of the monetary policy transmission suggests a close relationship between Central Bank policy actions and market interest rates. However, while there is considerable evidence that monetary policy has predictable effects on short-term rates, the connection between policy actions and long-term interest rates appear weaker, looser, less reliable and more variable, (Davis, Meulendyke).

In addition, studies that have attempted to measure the impact of policy actions on long-term rates have generally found only a weak relationship. Taken together, the studies and observed behaviour of interest rates appear to challenge the standard view of the monetary transmission mechanism and raise questions about the effectiveness of any monetary policy, (Lindsey).

This standard view of the monetary transmission mechanism relies on a simple version of the expectations theory of the term structure of interest rates. In this theory, long-term interest rates are an average of current short -term rates and expected future short-term rates. Monetary policy affects long-term rates to the extent it influences current and expected short-term rates.

2.7 Financial Liberalization in Kenya

Financial institutions in Kenya have embraced the financial liberalization in Kenya. They argue that in the long- run interest rates will stabilize by themselves to a more economy friendly level. In fact, there have been attempts to force the government through the central bank to regulate the financial market and hence interest rates. For example the Donde bill proposed an Act of parliament to regulate interest rates. The proponents of the bill argued that high interest rates were making it very expensive for business to operate in Kenya. They quoted typical businesses that were driven to bankruptcy by the high and uncontrolled interest rates.

On the other hand the financial institutions, including central bank emphasized on the need to leave the market to the forces of demand and supply. They condemned the bill as proposing to reverse the liberalization that has existence since the early 1990s. In addition the bill was criticized as failing to recognize that it was not just borrowing which made the cost of doing business expensive, but rather, a host of very many other factors including prices of fuel and electricity as well as taxes, taxes etc.

The use of the Treasury Bill rate as a benchmark, in the original form proposed by the Donde Bill, yields paradoxical results asymmetries. The higher the treasury bill rate, the higher the spread. The banking sector would gain by keeping the Treasury Bioll interest rates high since the margins move up with Treasury bill rates. This would negate the purpose of the Legislation in improving savings and improving access to credit (Wagacha, 2001). In addition the bill was also shallow in that it failed to identify the ideal bridge between interest rates on short-term securities and interest on long-term securities. Instead it proposed a bracket-borrowing rate of 4% above the 91 days Treasury Bills. This fails to recognize the different risk premiums that lenders attach to differing maturity periods.

Long-term interest rates have not risen steadily as short-term rates have done over the years. This shows that the central bank's ability to influence interest rates diminishes as the maturity of the security lengthens. The reaction of long-term rates to policy actions can be highly variable depending on changing views of market participants as to the future direction of monetary policy. Yet there exist no satisfactory research work that explains these observations.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 The Population

The population comprises of all financial debt securities issued in Kenya between 1993 and 2002 (both years inclusive).

3.2 The Sample

The sample consists of all financial debt securities issued by the Central Bank of Kenya between 1993 and 2002. The choice of Government debt is intended to ensure increased homogeneity in the elements of the population.

It is true that interest rates on financial debt securities may vary because of both the period the debt will remain outstanding and the risk inherent in the borrower. Some borrowers have to pay a higher rate of interest than others do because interest rates go up when the probability of default increases, (Brealey and Myers 2000). It is therefore important to keep risk factor constant as we examine how maturity periods affect the interest rates on the financial debt securities. It is for this reason that only financial debt securities issued by Central Bank of Kenya were examined. In addition, financial debt securities by the corporate sector tend to have highly volatile interest rates because of the risk.

A spot check of the total financial debt securities issued by the the Nairobi Stock Exchange between January 2000 and December 2002 indicated that Kshs. 82.2 Billion related to government securities while only Kshs. 8.5 Billion related to corporate bonds and medium term notes. This proves that a sample drawn from government financial debt securities is representative enough of the population of the financial

debt securities for the purpose of making a comparison between interest rates between long and short-term financial debt securities.

3.3 Data Collection

This study was based wholly on secondary data available in form of published bulletins and other publications from the Central Bank of Kenya for ten years between 1993 and 2002.The maturity period of each financial debt security issued and the applicable interest rate were obtained. The average annual interest rates as well as the average rates over the ten-year period were computed for both long term and short-term rates. A comparison was then done between long term and the short term interest rates.

3.4 Data Analysis

Data collected within the period of study was analysed using descriptive statistics. The annual mean interest rates for each category of financial debt securities was computed and compared in a trend analysis. In addition the ten-year average interest rate for each maturity category (i.e. one month, two months etc) was also computed and analysed in a yield curve.

Further, the ten-year mean interest rate and standard deviation for both long term and short-term financial debt securities was computed. Using Z-statistics, a significance test was conducted to check whether the difference between mean interest rates on short-term financial debt securities and long term financial debt securities is significant.

CHAPTER 4

4.0 DATA ANALYSIS AND FINDINGS

4.1 Comparison of average interest rates of short term and long term financial debt securities

The long-term securities that have been studied are the five, four, three, two and one year treasury bonds issued in the ten years between 1993 and 2002. The short-term securities studied are the one, two, three and six months treasury bills issued by the Central bank of Kenya for the same period.

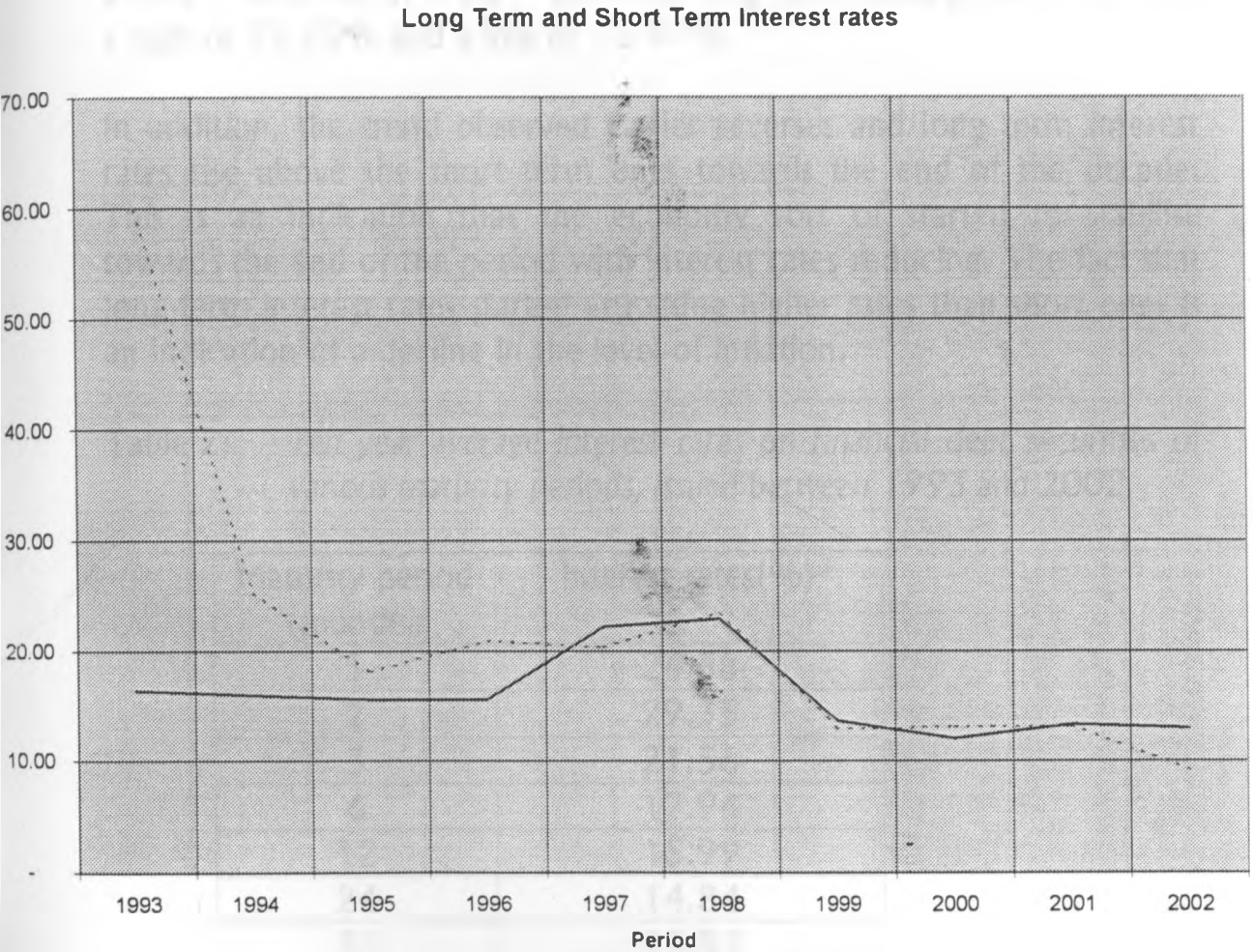
The study findings indicate that short-term interest rates were on average higher than long term interest rates. The ten-year average for the short-term interest rates was 21.636% with a standard deviation of 13.916 while the average for the long-term interest over the same period was 16.00% with a standard deviation of 3.32. Table 1 below shows how the annual average interest rates of the short term and long term debt securities compared over the ten-year period.

Table 1: *Annual average interest rates on short term and long term financial debt securities between 1993 and 2002*

Year	Annual average Interest rates on long term debt securities (%)	Annual average Interest rate on short term debt securities (%)
1993	16.42	59.87
1994	16.00	25.29
1995	15.63	18.13
1996	15.80	20.96
1997	22.18	20.35
1998	22.89	23.46
1999	12.99	12.87
2000	11.70	13.06
2001	13.34	13.15
2002	12.97	9.22
10-year average	**16.00**	**21.636**

The graph below analyses the trend of the two categories of average annual interest rates over the ten-year period.

Graph 2: Annual average interest rates on long term and short term financial debt securities between 1993 and 2002



In six out of the ten years, annual average interest rates on short-term debt securities remained way above those on long term debt securities. Even in the three out of four years that the reverse was true, i.e. in 1997, 1998 and 2001, the difference was very small. This situation where interest rates on short term securities debt are higher that interest rates on long term securities debt can be associated with the economic conditions that prevailed in most of the years under study. It was a

period of high inflation and the government effort was directed towards mopping up excess liquidity by offering high interest rates.

There is a notable change in the interest rates towards the later part of the decade. Both short term and long term interest rates decline towards the end of the period under study. This change is however higher for the short term interest rates which decline from a high of 59.87% to a low of 9.22% while the long term interest rates recorded a high of 22.89% and a low of 12.97%.

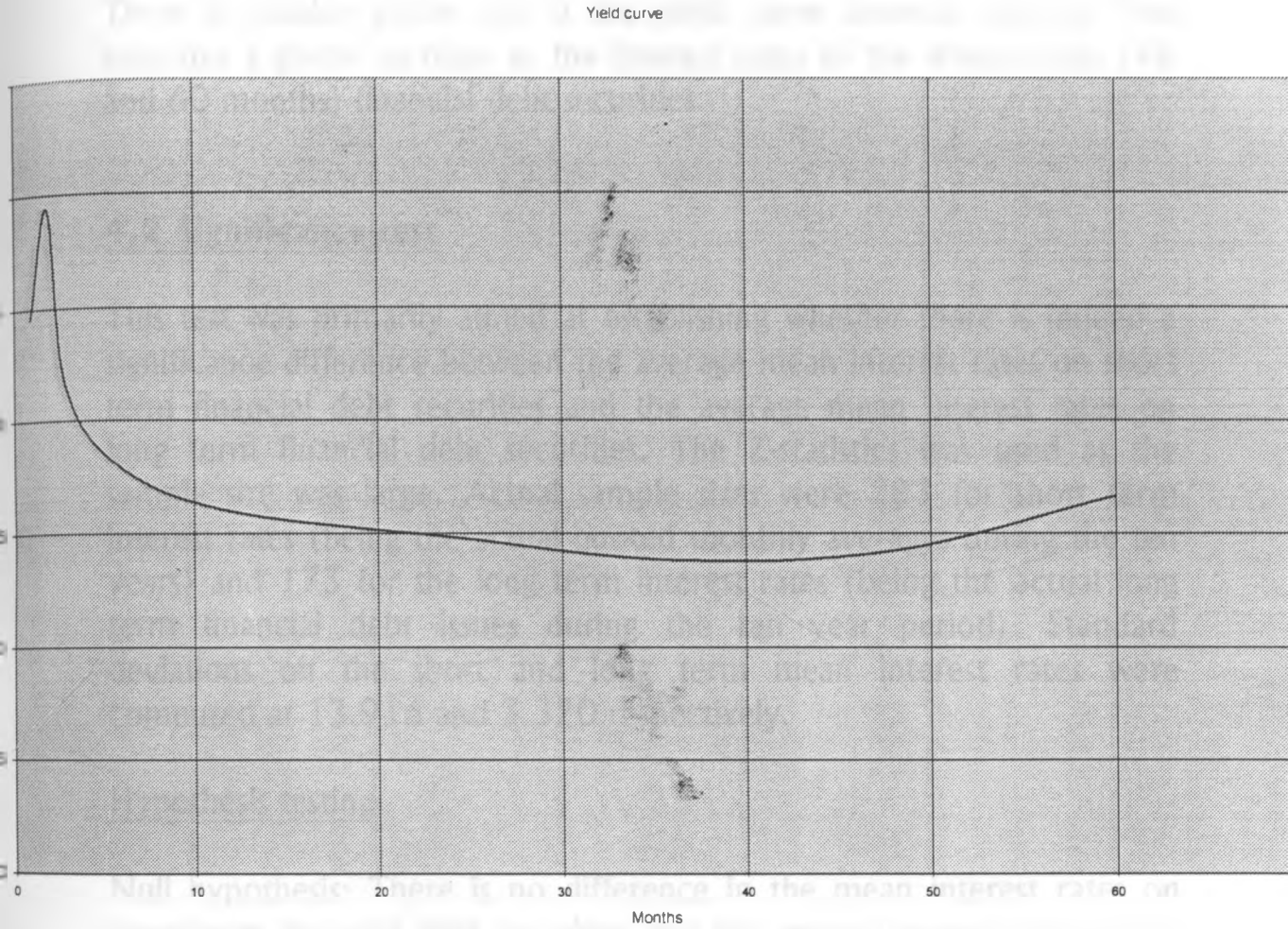
In addition, the trend observed earlier reverses and long term interest rates rise above the short term ones towards the end of the decade. This is an indication that the economy sort of started to stabilise towards the end of the period with interest rates reducing. The fact that long-term interest rates started attracting higher rates than short ones is an indication of a decline in the level of inflation.

Table 2: *Ten year average interest rates on financial debt securities of various maturity periods, issued between 1993 and 2002.*

Maturity period (months)	Interest rates(%)
1	24.58
2	29.35
3	21.56
6	17.94
12	15.99
24	14.84
36	13.83
48	14.25
60	16.65

Table 2 above shows how ten-year average interest rates on financial debt securities varied with maturity periods. Its evident from the data in this table as well as from graph 3 below that average interest rates on financial debt securities of shorter maturity periods was in most cases higher than that on financial debt securities of longer maturity periods.

Graph 3: *Yield curve for various maturities of financial debt securities issued between 1993 and 2002*



The shape of the above yield curve is consistent with the existing literature on Term Structure of interest rates which has been covered earlier in this paper. The downward sloping or inverted curve represents periods of high interest rates caused by high inflation or a much tighter monetary policy. These are the economic conditions that existed in the country in the early and mid 1990s. It was a period just after the general elections and the Goldenburg scandal, events that precipitated

inflation, which the government tried to control by issuing financial debt securities at attractive interest rates. According to Central Bank of Kenya statistics, the government paid a total of Kshs. 223 billion in interest on domestic borrowing between 1991/92 and 1995.

There is notable gentle rise in the yield curve towards the tip. This indicates a gentle increase in the interest rates of the longer-term (48 and 60 months) financial debt securities.

4.2 Significance test

This test was primarily aimed at establishing whether there is indeed a significance difference between the average mean interest rates on short term financial debt securities and the average mean interest rates on long term financial debt securities. The Z-statistics was used as the sample size was large. Actual sample sizes were 283 for short term interest rates (being the actual quoted monthly averages during the ten years) and 173 for the long term interest rates (being the actual long term financial debt issues during the ten year period). Standard deviations on the short and long term mean interest rates were computed at 13.916 and 3.320 respectively.

Hypothesis testing

Null hypothesis: There is no difference in the mean interest rates on short-term financial debt securities and the mean interest rate of long term financial debt securities.

Alternative hypothesis: There is a difference in the mean interest rates of short term financial debt securities and the mean interest rate on long term financial debt securities.

This is a two-tail test and was done at 5% confidence level. Z was computed at a value of -6.452, while the Z value at 5% confidence level is 1.96. The computed Z value thus falls way outside the acceptance zone at 5% confidence level.

Following the above results, we fail to accept the null hypothesis. This implies that there is indeed a significance difference between average interest rate on short-term financial debt securities and average interest rate on long term financial debt securities.

CHAPTER 5

SUMMARY AND CONCLUSIONS

5.1 Introduction

The findings of this study indicate that average annual interest rates on short-term securities remained higher than those on long term financial debt securities in six out of the seven years studied. In addition the ten-year average interest rate on short-term financial debt securities was higher than that on long term financial debt securities. Results further indicate that there was indeed a significance difference in the mean interest rates of short term and long term financial debt securities. This is because the hypothesis test results indicated that we fail to accept the null hypothesis and accept the alternative hypothesis as the latter stated there was a difference in the two means.

Research findings further indicate that there was a big dispersion in the interest rates on short-term financial debt securities. This is demonstrated by the high standard deviation of 13.916 compared to that on the interest rates of long term financial debt securities of 3.32.

The results of this study clearly reflect the economic conditions that existed in the ten-year period studied. The resultant yield curve obtained from the data studied indicate that securities yields for short-term securities was within the range of 29.35% and 17.94% while the yield on long term securities was within the lower range of 13.83% and 16.65. This clearly demonstrates that the short-term rates remained way above the long-term rates.

The sharp slope of the yield curve between the two-month and six-month periods is evidence of the sudden decline in the average interest rates of these maturity periods. This is contrary to the gentler slope of the yield curve after 12-month maturity period where the average rate decline slowly, clearly indicating that although interest rate was falling with increase in maturity period, the decline was slow. After 36-month

maturity period, the average interest rates start to slowly rise with increase in maturity period.

The study maybe an indication that liberalization of interest rates might have been undertaken before the necessary fiscal tools were secured. As the yield curve indicates, a loose monetary policy was adopted to stimulate the economy after recession or slowdown in economic growth. This would indicate that if the trend continues into the future, the curve might become normal whereby low-short-term interest rates reflect the easy availability of credit and low inflation.

5.2 Limitations of the study

(a) The period of study may not have been appropriate to enable the researcher draw generalized conclusions about interest rates behaviour prior to and after the period studied. The study only covers ten years, and in this particular case, there were unique macroeconomic factors affecting interest rates especially between 1993 and 1995. It was just after the first multiparty general election. The period was also preceded by the Goldenburg scandal. These two events were associated with heavy government expenditure and a lot of money in the economy that was not backed by any economic activity. Thus the results of the study may be limited to this extent.

(b) The sample was picked solely from government financial debt securities. For this reason research findings maybe argued that they do not represent the interest rates behaviour in the whole financial debt securities market during the ten years studied.

5.3 Suggestions for future research

A similar kind of study may be carried out in future with the objective of incorporating financial debt securities issued by other institution. Such others may include commercial papers, dividend-paying stocks, debentures etc.

A similar study can be undertaken over a longer period, say thirty to fifty years so that effect of certain events that influence interest rates in one direction can be reduced.

The behaviour of real interest rates can be studied by adjusting the nominal rates with inflation rates that are recorded during the period the particular financial debt was issued or was outstanding. This will also demonstrate the extent to which interest paid to investors is able to compensate them for the inflation. However, inflation figures used must be representative of the whole economy and not just drawn from a few urban centers.

REFERENCES

Brealey R. And S. Myers, **Principles of Corporate Finance**, Irwin/Mcgraw-Hill, 6th Edition, 2000.

Brigham, E.F., C. Gapenski and R. Daves, **Intermediate Financial Management**, The Dryden Press International sixth edition, 1999.

Campell, J.Y. and R.J. Shiller, 1991, **Yield Spreads and Interest Rate Movements: A Birds Eye View**, Review of Economic Studies, 58, May, pp. 495-514.

Cook, Timothy and T. Hahn, 1989, **The Effect of changes in the Federal Funds Target on Market Interest Rates in the 1970s.** Journal of Monetary Economics, 24, pp. 331-351.

Cook, Timothy and T. Hahn, 1990**, Interest Rate Expectations and the Slope of the Money Market Yield Curve**, Federal Reserve Bank of Richmond, Economic Review, 76, Sept/Oct 1990, pp. 3-26.

Cox, J.C., E.J. Ingersoll and S.A. Ross, 1985, **A Theory of the Term Structure of Interest Rates**, Econometrica, 53, March, pp. 385-407.

Culbertson, J., 1957, **The Term Structure of Interest Rates**, Quarterly Journal of Economics, pp. 485-517.

Davis, R., 1990, **Introduction to Intermediate Targets and Indicators for Monetary Policy: A critical Survey**, Federal Reserve Bank of New York, July, pp. 1-19.

Esteller, A. and G. A. Harouvelis, **The Term Structure as a Predictor of Real Economic Activity**, Journal of Finance, 1991, Vol. 46, pp. 555-576.

Fama, E., 1975, **Short Term Interest Rates as Predictors of Inflation**, American Economic Review 65, June, pp. 269-282.

Fisher, I., 1896, **Appreciation and Interests**, Publication of the American Economic Association, pp. 23-29 and 88-92.

Friedman, B and K. Kuttner, **Money, Income, Price and Interest rates**, American Economic Review, 1992, Volume 82, pp. 472-492.

Goodfriend, M., 1993, **Interest rates Policy and the Inflation Scare Problem: 1979-1992**, Federal Reserve Bank of Richmond, Economic Review Quarterly, 79, no. 1, pp 1-24.

Government of Kenya, **Economic Survey**, Various issues.

Graboyes, R.,1999, **Does the Federal Reserve Bank Drive interest Rates?**, Federal Reserve Bank of Richmond working Paper, 1999, pp. 1-3.

Huh, C., **Recession Probability Index, A survey,** Federal Reserve Bank of San Francisco Economic Review, Weekly letter, Fall 1991, pp. 31-40.

Judd, J. and B. Treham, **Money, Credit and M2**, Federal Bank of San Francisco weekly letter, September 1992, pp. 2-3.

Kashyap, A., J. Stein and D. Wilcox, **Monetary policy and Credit conditions: Evidence from the composition of External Finance**, American Economic Review, 1993 Volume 83, pp. 78-98.

Lindsey, D., 1991, **Monetary Targeting: Lessons from the U.S. Experience**, in G. Capri and P. Honohan, eds., Monetary Policy Instruments for Developing Countries, Washington: The World Bank, pp. 67-79.

Lutz, F., 1940, **The Structure of Interest Rates**, Quarterly Journal of Economic, pp. 36-63.

Mankiw, N.G. and H.L. Summers, 1994, **Do Long Term Interest Rates Overreact to Short Term Interest Rates?** Brookings Papers on Economic Activity, No. 1, pp. 223-243.

Mankiw, N.G. and Miron A.J., 1986, **The Changing Behaviour of Term Structure of Interest Rates**, Quarterly Journal of Economics, 101, May, pp. 211-228.

Meulendyke, A., 1990, **A Review of Federal Reserve Policy Targets and Operating Guides in Research Decades**, Federal Reserve Bank of New York, Intermediate targets and Indicators of Monetary Policy, July, pp. 452-473.

Mishkin, F.S., 1981, **The Real Interest Rates: An Empirical Investigation**, Carnegie-Rochester Conference Series on Public Policy 15, pp. 151-200.

Modigliani, F. and M.H. Miller, 1958, **The cost of capital, corporation finance and theory of investment**, American Economic Review, 48, pp. 262-297.

Modigliani, F. and M.H. Miller, 1963, **Corporate Income Taxes and the Cost of Capital, American Economic Review**, 53, pp. 267-297.

Modigliani, F. and R. Sutch, 1966, **Innovations in Interest Rate Policy**, American economic Review, pp. 178-197.

Ndung'u, N.S. and R.W. Ngugi, 2000, **Banking sector interest rate spread in Kenya**, Kenya Institute for Public Policy Research and Analysis, KIPPRA, 2000 pp. 9-13.

Nelson, C. and W. Schwert, 1977, **Short Term Interest Rates as Predictors of Inflation: On Testing the Hypothesis that the Real Rate of Interest is constant**, American economic Review, 67, pp. 478-486.

Ngugi, R.W. and J.W. Kabubo, 1998, **Financial Sector reforms and interest rate liberalization; The Kenya experience**, AERC Research Paper, 72, pp. 12-15.

Ngugi, R.W., 2001, **An Empirical analysis of interest rate spread in Kenya**, AERC Research Paper, 106, pp. 8-10.

Oshikoyo, T.W., 1992, **Interest Rates Liberalization, Savings, Investment and Growth: The Case of Kenya,** Saving and Development, 3, Vol. XVI pp. 5-7.

Rudebusch, G., **Interest Rates and Monetary Policy**, FRBSF Economic Letter, 97-18, June 13, 1997, pp 2-6.

Sellon, G. H. Jr., 1994, **Measuring Monetary Policy**, Federal Reserve Bank of Kansas City, Working Paper 94-12, December, pp.3-5.

Shiller, R.J., J.Y. Campell and K.L. Schoenholtz, 1983, **Forward Rates and Future Policy: Interpreting the Term Structure of Interest Rates**, Brookings Papers on Economic Activity, No. 1, pp. 173-217.

Sims, C., **Comparison of Interwar and Post War Business Cycles, Monetarism Reconsidered**, American Economic Review 1980 Volume 70 pp. 250-257.

Van Horne, J. and J. Wachowich Jr, **Fundamentals of Financial Management** , Prentice-Hall 2001, 11th edition 2001.

Wagacha, M., 2001, **Interest Rates Under a Treasury Bill Regime: Macroeconomic and Financial Implications for Kenya**, IPAR Policy Brief, Macroeconomics, No. 3 2001, pp 8-14.

Weston, F. and T. Copeland, 1986, **Managerial Finance**, International Thomson Publishing, Eighth edition.

Appendix 1

INTEREST RATES ON LONG TERM GOVERNMENT DEBT SECURITIES ISSUED BY CBK BETWEEN 1993 AND 2002

Issue No	Issue Date	Due Date	Interest Rate(%)
5 Year Treasury/ Bearer Bonds			
1/93a	5 Jan. 93	4 Jan. 98	17.00
1/93b	15 Jan. 93	15 Jan. 98	17.00
2/93a	06-Mar-93	05-Mar-98	17.00
2/93b	15-May-93	15-May-98	17.00
3/93a	05-Apr-93	04-Apr-98	17.00
3/93b	15 Sept. 93	15 Sept. 98	17.00
5/93a	04-Jun-93	03-Jun-98	17.00
6/93a	04-Jul-93	03-Jul-98	17.00
7/93a	3 Aug. 93	2 Aug. 98	17.00
8/93a	2 Sept. 93	1 Sept. 98	17.00
9/93a	2 Oct. 93	1 Oct. 98	17.00
10/93a	1 Nov. 93	31 Oct. 98	17.00
11/93a	1 Dec. 93	30 Nov. 98	17.00
Annual average interest rate for 1993			**17.00**
1/94a	15-Jan-94	14 Jan. 99	17.00
2/94a	14 Feb. 94	13 Feb. 99	17.00
3/94a	16-Mar-94	15-Mar-99	17.00
4/94a	15-Apr-94	11-Apr-99	17.00
5/94a	15-May-94	14-May-99	17.00
6/94a	14-Jun-94	13-Jun-99	17.00
8/94a	13 Aug. 94	12 Aug. 99	17.00
11/94a	11 Nov. 94	10 Nov. 99	17.00
12/94a	11 Dec. 94	10 Dec. 99	17.00
Annual average interest rate for 1994			**17.00**
1/95a	10 Jan. 95	9 Jan. 00	17.00
2/95a	9 Feb. 95	8 Feb. 00	17.00
3/95a	11-Mar-95	09-Mar-00	17.00
4/95a	10-Apr-95	08-Apr-00	17.00

5/95a	10-May-95	08-May-00	17.00
6/95a	09-Jun-95	07-Jun-00	17.00
7/95a	09-Jul-95	07-Jul-00	17.00
8/95a	8 Aug. 95	30-Jun-00	17.00
11/95a	6 Nov. 95	4 Nov. 00	17.00
12/95a	6 Dec. 95	4 Dec. 00	17.00
Annual average interest rate for 1995			**17.00**
1/96a	5 Jan. 96	15 Jan. 01	17.00
2/96a	4 Feb. 96	15 Feb. 01	17.00
3/96a	05-Mar-96	30-Jun-01	17.00
4/96a	05-Apr-96	15-Apr-01	17.00
5/96a	06-May-96	15-May-01	17.00
7/96a	07-Jul-96	15-Jul-01	17.00
8/96a	6 Aug. 96	30-Jun-01	17.00
9/96a	5 Sept. 96	15 Sept. 01	17.00
10/96a	5 Oct. 96	15 Oct. 01	17.00
11/96a	5 Nov. 96	15 Nov. 01	17.00
12/96a	6 Dec. 96	15 Dec. 01	17.00
Annual average interest rate for 1996			**17.00**
1/01a	21/05/01	15/05/06	11.75
Annual average interest rate for 2001			**11.75**
1/02a	25/03/02	19/03/07	14.50
2/02a	17/06/02	11/06/07	14.10
3/02b	26/08/02	20/06/07	13.98
3/02a	28/10/02	24/12/07	13.65
Annual average interest rate for 2002			**14.06**
10 yr average interest rate on 5-yr securities			**16.65**

4-Year Treasury Bonds			
11/96a	5 Nov. 96	4 Nov. 00	16.50
Annual average interest rate for 1996			**16.50**
1/01a	30/07/01	25/07/05	13.57
Annual average interest rate for 2001			**13.57**
1/02a	29/04/02	24/04/06	14.00
2/02a	29/07/02	24/07/06	13.88
3/02a	23/12/02	26/12/03	13.32

Annual average interest rate for 2002	**13.73**
10 yr average interest rate on 4-yr securities	**14.25**

3 Year Treasdury Bonds			
12/95a	6 Dec. 95	5 Dec. 98	16.00
Annual average interest rate for 1995			**16.00**
5/96a	06-May-96	06-May-99	16.00
6/96a	06-Jun-96	06-Jun-99	16.00
7/96a	07-Jul-96	07-Jul-99	16.00
8/96a	6 Aug. 96	6 Aug. 99	16.00
11/96a	5 Nov. 96	5 Nov. 99	16.00
Annual average interest rate for 1996			**16.00**
1/99a	01-Mar-99	25 Feb. 02	9.47
2/99a	2 Aug. 99	29-Jul-02	15.49
Annual average interest rate for 1999			**12.48**
1/00a	04/09/00	01-Sep-03	11.01
Annual average interest rate for 2000			**11.01**
1/01a	25/06/01	20-Sep-04	12.70
2/01a	24/09/01	20-Sep-04	13.02
3/01a	03/12/01	29-Nov-04	11.64
Annual average interest rate for 2001			**12.45**
1/02a	21/01/02	17-Jan-05	14.25
2/02a	25/03/02	21-Mar-05	13.75
3/02a	27/05/02	23-May-05	13.29
4/02a	30/09/02	26-Sep-05	12.01
5/02a	25/11/02	27/12/05	12.42
Annual average interest rate for 2002			**13.14**
10 yr average interest rate on 3-yr securities			**13.51**

2-Year Treasury bonds			
1/93a	15 Jan. 93	15 Jan. 95	16.50
2/93a	15-May-93	15-May-93	16.50
3/93a	15 Sept. 93	15 Sept. 95	16.50
Annual average interest rate for 1993			**16.50**
4/94a	15-Apr-94	14-Apr-96	15.00
5/94a	15-May-94	14-May-96	15.00

6/94a	14-Jun-94	13-Jun-96	15.00
8/94a	13 Aug. 94	12 Aug. 96	15.00
11/94a	11 Nov. 94	10 Nov. 96	15.00
12/94a	11 Dec. 94	10 Dec. 96	15.00
Annual average interest rate for 1994			**15.00**
1/95a	10 Jan. 95	9 Jan. 97	15.00
2/95a	9 Feb. 97	8 Feb. 97	15.00
3/95a	11-Mar-95	10-Mar-97	15.00
4/95a	10-Apr-95	09-Apr-97	15.00
5/95a	10-May-95	09-May-97	15.00
6/95a	09-Jun-95	08-Jun-97	15.00
7/95a	09-Jul-95	08-Jul-97	15.00
8/95a	8 Aug. 95	7 Aug. 97	15.00
9/95a	7 Sept. 95	6 Sept. 97	15.00
10/95a	7 Oct. 95	6 Oct. 97	15.00
11/95a	6 Nov. 95	5 Nov. 97	15.00
Annual average interest rate for 1995			**15.00**
1/96a	5 Jan. 96	04-Jan-98	15.00
2/96a	4 Feb. 96	3 Feb. 98	15.00
4/96a	05-Apr-96	05-Apr-98	15.00
6/96a	06-Jun-96	06-Jun-98	15.00
9/96a	5 Sept. 96	5 Sept. 98	15.00
11/96a	5 Nov. 96	5 Nov. 98	15.00
12/96a	6 Dec. 96	6 Dec. 98	15.00
Annual average interest rate for 1996			**15.00**
1/98a	3 Aug. 98	31-Jul-00	24.24
2/98a	7 Sept. 98	4 Sept. 00	22.97
3/98a	28 Sept. 98	25 Sept. 00	22.97
4/98a	2 Nov. 98	30 Oct. 00	18.16
5/98a	7 Dec. 98	4 Dec. 00	13.06
Annual average interest rate for 1998			**20.28**
1/99a	25 Jan. 99	22 Jan. 01	11.20
2/99a	28-Jun-99	25-Jun-01	11.94
3/99a	13 Dec. 99	10 Dec. 01	20.47
Annual average interest rate for 1999			**14.54**
1/00a	27-Mar-00	25-Mar-02	12.94

2/00a	26-Jun-00	24-Jun-02	12.97
3/00a	31-Jul-00	29-Jul-02	10.40
4/00a	4 Sept. 00	2 Sept. 02	10.86
5/00	25 Sept. 00	23 Sept. 02	10.86
6/00	30 Oct. 00	28 Oct. 02	11.15
7/00a	4 Dec. 00	2 Dec. 02	13.40
Annual average interest rate for 2000			**11.80**
3/01a	29/10/01	27/10/03	14.75
4/01a	31/12/01	29/12/03	14.25
Annual average interest rate for 2001			**14.50**
1/02a	29/02/02	23/02/04	13.00
2/02a	29/04/02	26/04/04	13.00
3/02a	26/08/02	23/08/04	11.62
4/02a	28/10/02	28/12/04	11.68
5/02a	23/12/02	28/12/04	11.56
Annual average interest rate for 2002			**12.17**
10 yr average interest rate on 2-yr securities			**14.84**

1-Year Treasury Bonds			
2/93a	15-May-93	15-May-94	15.00
3/93a	15 Sept. 93	15 Sept. 94	16.50
Annual average interest rate for 1993			**15.75**
4/95a	10-Apr-95	10-Apr-96	14.50
5/95a	10-May-98	09-May-96	14.50
6/95a	09-Jun-95	08-Jun-96	14.50
7/95a	09-Jul-95	08-Jul-96	14.50
8/95a	8 Aug. 95	7 Aug. 96	14.50
9/95a	7 Sept. 95	6 Sept. 96	14.50
10/95a	7 Oct. 95	6 Oct. 96	14.50
11/95a	6 Nov. 95	5 Nov. 96	14.50
12/95a	6 Dec. 95	5 Dec. 96	14.50
Annual average interest rate for 1995			**14.50**
2/96a	4 Feb. 96	3 Feb. 97	14.50
3/96a	05-Mar-96	05-Mar-97	14.50
4/96a	05-Apr-96	05-Apr-97	14.50
5/96a	06-May-96	06-May-97	14.50

6/96a	06-Jun-96	06-Jun-97	14.50
7/96a	07-Jul-96	07-Jul-97	14.50
8/96a	6 Aug. 96	6 Aug. 97	14.50
9/96a	5 Sept. 96	5 Sept. 97	14.50
10/96a	5 Oct. 96	5 Oct. 97	14.50
11/96a	5 Nov. 96	5 Nov. 97	14.50
12/96a	6 Dec. 96	6 Dec. 97	14.50
Annual average interest rate for 1996			**14.50**
1/97a	5 Jan. 97	4 Jan. 98	21.86
2/97a	4 Feb. 97	3 Feb. 98	21.69
3/97a	05-Apr-97	04-Apr-98	21.27
3/97b	05-Apr-97	04-Apr-98	21.27
3/97c	05-Apr-97	04-Apr-98	21.27
4/97a	14-Jun-97	13-Jun-98	19.69
4/97b	14-Jun-97	13-Jun-98	19.69
5/97a	2 Sept. 97	29 Sept. 98	26.45
5/97b	2 Sept. 97	29 Sept. 98	26.45
Annual average interest rate for 1997			**22.18**
1/98a	26 Jan. 98	26 Jan. 99	26.53
2/98a	30-Mar-98	29-Mar-99	26.99
3/98a	04-Jun-98	23-Jun-99	25.73
4/98a	28 Sept. 98	27 Sept. 99	22.72
Annual average interest rate for 1998			**25.49**
1/99a	25 Jan. 99	24 Jan. 00	10.95
2/99a	29-Mar-99	27-Mar-00	9.09
3/99a	28-Jun-99	26-Jun-00	11.69
4/99a	27 Sept. 99	28 Sept. 00	16.03
Annual average interest rate for 1999			**11.94**
1/00a	24 Jan. 00	22 Jan. 01	20.55
2/00a	27-Mar-00	26-Mar-01	11.53
3/00a	26-Jun-00	23 Jan. 01	10.72
4/00a	31-Jul-00	30-Jul-01	10.15
5/00a	4 Sept. 00	3 Sept. 01	10.61
6/00a	25 Sept. 00	24 Sept. 01	10.61
7/00a	30 Oct. 00	29 Oct. 01	10.90
8/00a	4 Dec. 00	3 Dec. 01	13.15

Annual average interest rate for 2000			**12.28**
1/01a	22 Jan. 01	21 Jan. 02	15.01
2/01a	26 Feb. 01	25 Feb. 02	15.55
3/01a	26-Mar-01	25-Mar-02	15.22
4/01a	16-Apr-01	15-Apr-02	13.15
Annual average interest rate for 2001			**14.73**
1/02a	21-Jan-02	20-Jan-03	13.00
2/02a	29-Jul-02	28-Jul-03	11.50
3/02a	25/11/02	29/12/03	10.8
Annual average interest rate for 2002			**11.77**
10 yr average interest rate on 1-yr securities			**15.99**

Appendix 2

AVERAGE MONTHLY INTEREST RATES RECORDED ON SHORT TERM DEBT SECURITIES ISSUED BY CBK BETWEEN 1993 AND 2002

Month	Average Monthly Rate(%)
6- Months Treasury Bills	
Feb-94	26.44
Mar-94	29.68
Apr-94	29.24
May-94	32.58
Jun-94	33.98
Jul-94	32.42
Aug-94	25.05
Sep-94	24.32
Oct-94	15.89
Nov-94	16.16
Dec-94	18.22
Average for 1994	**25.82**
Jan-95	18.52
Feb-95	18.46
Mar-95	17.33
Apr-95	15.82
May-95	15.84
Jun-95	17.06
Jul-95	18.61
Aug-95	15.04
Sep-95	15.19
Oct-95	16.61
Nov-95	21.03
Dec-95	18.95
Average for 1995	**17.37**

Jan-96	19.26
Feb-96	22.2
Mar-96	22.21
Apr-96	18.57
May-96	20.27
Jun-96	20.77
Jul-96	20.3
Dec-96	19.49
Average for 1996	**20.38**
Jan-97	20.00
Feb-97	20.00
Jun-97	19.81
Jul-97	19.39
Aug-97	19.31
Sep-97	20.03
Oct-97	26.97
Nov-97	26.74
Dec-97	26.04
Average for 1997	**22.03**
Jan-98	25.97
Feb-98	26.12
Mar-98	26.43
Apr-98	26.63
May-98	26.48
Jun-98	26.23
Jul-98	25.38
Aug-98	24.53
Sep-98	22.67
Oct-98	21.14
Nov-98	18.17
Dec-98	13.32
Average for 1998	**23.59**
Jan-99	10.52
Feb-99	8.34
Mar-99	6.97
Apr-99	9.5

May-99	9.59
Jun-99	10.33
Jul-99	12.35
Aug-99	15.18
Sep-99	15.36
Oct-99	16.13
Nov-99	16.57
Dec-99	18.8
Average for 1999	**12.47**
Jan-00	19.67
Feb-00	15.22
Mar-00	11.61
May-00	11.75
Dec-00	12.1
Average for 2000	**14.07**
Jan.01	14.4
Feb.01	15.36
Mar.01	14.88
Apr.01	12.9
May.01	11.31
Jul.01	12.58
Average for 2001	**13.57**
Feb.02	11.12
Mar.02	10.6
Apr.02	10.47
May.02	9.98
Jun.02	8.8
Jul.02	9.36
Aug.02	9.49
Sept.02	8.62
Oct.02	8.54
Nov.02	8.76
Dec.02	8.79
Average for 2002	**9.50**
10-yr average	**17.94**

3-months Treasury Bills	
Jan. 93	17.87
Feb. 93	17.86
Mar-93	25.07
Apr-93	45.79
May-93	68.04
Jun-93	84.29
Jul-93	84.67
Aug-93	79.51
Sept. 93	75.69
Oct. 93	70.88
Nov. 93	55.26
Dec. 93	43.52
Average for 1993	**55.70**
Jan. 94	33.55
Feb. 94	23.87
Mar-94	27.62
Apr-94	30.85
May-94	31.24
Jun-94	32.38
Jul-94	29.74
Aug. 94	24.13
Sept. 94	17.39
Oct. 94	16.95
Nov. 94	17.22
Dec. 94	17.49
Average for 1994	**25.20**
Jan. 95	16.74
Feb. 95	17.63
Mar-95	16.84
Apr-95	15.16
May-95	15.09
Jun-95	16.39
Jul-95	18.48
Aug. 95	19.65
Sept. 95	21.16

Oct. 95	24.07
Nov. 95	24.07
Dec. 95	21.67
Average for 1995	**18.91**
Jan. 96	21.25
Feb. 96	25.96
Mar-96	26.68
Apr-96	24.16
May-96	21.96
Jun-96	21.85
Jul-96	21.76
Aug. 96	21.63
Sept. 96	23.1
Oct. 96	24.08
Nov. 96	22.09
Dec. 96	21.53
Average for 1996	**23.00**
Jan. 97	21.61
Feb. 97	21.44
Mar-97	21.42
Apr-97	21.02
May-97	20.35
Jun-97	19.44
Jul-97	18.45
Aug. 97	19.69
Sept. 97	26.2
Oct. 97	27.15
Nov. 97	26.78
Dec. 97	26.36
Average for 1997	**22.49**
Jan. 98	26.28
Feb. 98	26.33
Mar-98	26.74
Apr-98	26.98
May-98	26.38
Jun-98	25.48

Jul-98	24.67
Aug. 98	23.74
Sept. 98	22.47
Oct. 98	20.59
Nov. 98	17.66
Dec. 98	12.56
Average for 1998	**23.32**
Jan. 99	10.7
Feb. 99	8.95
Mar-99	8.84
Apr-99	9.03
May-99	9.63
Jun-99	11.44
Jul-99	14.47
Aug. 99	14.48
Sept. 99	15.78
Oct. 99	17.63
Nov. 99	18.14
Dec. 99	19.97
Average for 1999	**13.26**
Jan. 00	20.3
Feb. 00	14.48
Mar-00	11.28
Apr-00	12.44
May-00	11.22
Jun-00	10.47
Jul-00	9.9
Aug. 00	9.25
Sept. 00	10.36
Oct. 00	10.65
Nov. 00	11.17
Dec. 00	12.9
Average for 2000	**12.04**
Jan. 01	14.76
Feb. 01	15.3
Mar.01	14.97

Apr.01	12.9
May.01	10.52
Jun.01	12.07
Jul.01	12.87
Aug. 01	12.84
Sept. 01	12.39
Oct. 01	11.63
Nov. 01	11.5
Dec. 01	11.01
Average for 2001	**12.73**
Jan. 02	10.85
Feb. 02	10.61
Mar.02	10.14
Apr.02	10.01
May.02	9.04
Jun.02	7.34
Jul.02	8.63
Aug.02	8.34
Sept. 02	7.6
Oct. 02	8.07
Nov.02	8.3
Dec.02	8.38
Average for 2002	**8.94**
10-yr average	**21.56**

2-Months Treasury Bills	
Jul-93	80.62
Aug. 93	77.09
Sept. 93	70.11
Oct. 93	65.08
Nov. 93	50.41
Dec. 93	42.1
Average for 1993	**64.24**
Jan. 94	36.56
Feb. 94	22.72
Mar-94	26.18

Apr-94	27.44
May-94	29.89
Jun-94	30.29
Jul-94	29.75
Aug. 94	24.47
Sept. 94	23.85
Oct. 94	17.11
Nov. 94	16.06
Dec. 94	18.4
Average for 1994	**25.23**
Jan. 95	17.66
Feb. 95	16.66
Mar-95	15.56
Apr-95	14.52
May-95	14.72
Jun-95	15.69
Jul-95	17.92
Aug. 95	16.45
Sept. 95	21.86
Oct. 95	22.56
Nov. 95	22.28
Dec. 95	20.63
Average for 1995	**18.04**
Jan. 96	19.93
Feb. 96	25.59
Mar-96	24.87
Apr-96	22.79
Average for 1996	**23.30**
Average	**29.35**

1-Month Treasury Bills	
Jul-93	74.05
Aug. 93	70.69
Sept. 93	65.01
Oct. 93	58.51
Nov. 93	46.11

Dec. 93	43.63
Average for 1993	**59.67**
Jan. 94	36.06
Feb. 94	22.1
Mar-94	25.43
Apr-94	27.64
May-94	28.82
Jun-94	30.35
Jul-94	30.02
Aug. 94	23.62
Sept. 94	23.26
Oct. 94	17.29
Nov. 94	16.01
Dec. 94.	18.09
Average for 1994	**24.89**
Jan. 95	17.11
Feb. 95	15.87
Mar-95	15.3
Apr-95	14.33
May-95	14.49
Jun-95	15.63
Jul-95	17.58
Aug. 95	21.33
Sept. 95	22.98
Oct. 95	21.89
Nov. 95	22.34
Dec. 95	19.35
Average for 1995	**18.18**
Jan. 96	18.78
Feb. 96	22.18
Mar-96	21.61
Apr-96	19.26
May-96	16.6
Jun-96	15.95
Jul-96	15.31
Aug. 96	14.91

Sept. 96	14.95
Oct. 96	15.01
Nov. 96	15.24
Dec. 96	15.98
Average for 1996	**17.15**
Jan. 97	16.47
Feb. 97	16.52
Mar-97	16.75
Apr-97	16.5
May-97	16.5
Jun-97	16.5
Average for 1997	**16.54**
10-yr average	**24.58**

Appendix 3

ANNUAL AND MATURITY TERM AVERAGES

Long Term

	5-year	4-year	3-year	2-year	1-year	Average
1993	17.000			16.500	15.750	**16.417**
1994	17.000			15.000		**16.000**
1995	17.000		16.000	15.000	14.500	**15.625**
1996	17.000	16.500	16.000	15.000	14.500	**15.800**
1997					22.180	**22.180**
1998				20.280	25.490	**22.885**
1999			12.480	14.540	11.940	**12.987**
2000			11.010	11.800	12.280	**11.697**
2001	11.750	13.570	12.450	14.500	14.730	**13.400**
2002	14.060	13.730	13.140	12.170	11.770	**12.974**
Average	**16.650**	**14.250**	**13.510**	**14.840**	**15.990**	

Short Term

	6-month	3-month	2-month	1-month	Average
1993		55.700	64.240	59.670	**59.870**
1994	25.820	25.200	25.230	24.890	**25.285**
1995	17.370	18.910	18.040	18.180	**18.125**
1996	20.380	23.000	23.300	17.150	**20.958**
1997	22.030	22.490		16.540	**20.353**
1998	23.590	23.320			**23.455**
1999	12.470	13.260			**12.865**
2000	14.070	12.040			**13.055**
2001	13.570	12.730			**13.150**
2002	9.500	8.940			**9.220**
Average	**17.940**	**21.560**	**29.350**	**24.580**	