

**DETERMINANTS OF BOND PRICES: A CASE STUDY OF NAIROBI STOCK  
EXCHANGE**

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**DECLARATION AND APPROVAL**

**DECLARATION**

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

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**APPROVAL**

This M.B.A project has been submitted with our approval as university supervisors.

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## **DEDICATION**

This research paper is dedicated to my husband, Emmanuel Kingi, who has supported me all through this work and encouraged me to accomplish all that I put my mind and heart to.

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## ABSTRACT

Over time, the bond market has become increasingly important as an aid to foster economic growth in any country. This study therefore, concentrated on the factors that influence bond prices so as to encourage investment in this sector. The factors studied were both macroeconomic such as change in future interest rates and non-macroeconomic such as liquidity of the issuer. Lack of available information to investors so as to be able to have predictable bond prices has contributed to an inactive bond market in Kenya. The study therefore was intended to restore investor confidence by identifying the types of bonds traded on the Nairobi Stock Exchange (NSE), identifying the factors that influence bond prices on the NSE, and establishing the extent of the relationship between these factors and bond prices. Secondary data from the NSE and the Central bank of Kenya was used. State and Corporate bonds and their performance over a 5 year span were considered. The population of the study included listed bonds on the NSE. A data collection schedule was used for data collection while regression analysis and time series were used in the data analysis. Macroeconomic variables were found to significantly influence the bond price. To promote the bond market, governments should formulate policies that pursue a low interest rate regime, ensure that inflation is controlled and that the exchange rate is stable. The non-macroeconomic variables such as liquidity and profitability did not significantly influence the bond price, however their importance in promoting investor confidence cannot be underscored.

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## **ABBREVIATIONS AND ACRONYMS**

|             |   |                               |
|-------------|---|-------------------------------|
| <b>NSE</b>  | - | Nairobi Stock Exchange        |
| <b>CMA</b>  | - | Capital Markets Authority     |
| <b>NARC</b> | - | National Rainbow Coalition    |
| <b>KANU</b> | - | Kenya African National Union  |
| <b>CBK</b>  | - | Central Bank of Kenya         |
| <b>EPS</b>  | - | Earnings Per Share            |
| <b>EADB</b> | - | East African Development Bank |

## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background Information**

The origin of stock dealing in Kenya can be traced back as early as 1920. It was not until 1954 that a formal market with rules and regulations to govern the stock broking activities referred to as the Nairobi Stock Exchange (NSE) came into existence. Since then, the exchange has witnessed several ups and downs in terms of trading. In 1980, the government realized that to foster sustainable economic development, it needed an efficient and stable financial system. This could be accomplished by enhancing capital market development. Thus, in 1985, the capital gains tax of 35% introduced in 1975 was suspended and in 1989, the Capital Markets Authority (CMA) was established to assist in the creation of a conducive environment for growth and development of the country's capital markets.

The CMA in Kenya has the following as its goals; to achieve a large and efficient capital market, allowing for wider diversification of risks and greater and more efficient allocation of resources. To aim at developing adequate regulations that provide the market with freedom for development and help protect investors and markets from financial fraud and crimes. To realize that a deep and vibrant capital market cannot be achieved without an educated and well-informed investor, and therefore helps protect investors by raising their own knowledge of current issues and their skill in dealing with them. In addition, it stresses on good corporate governance to influence the entry of investors into the capital markets as this gives them confidence.

There have been successful privatizations through the NSE for instance, Kenya Commercial Bank, Kenya Airways, National Bank, and KenGen. In 1995, to encourage foreign portfolio investments, the government relaxed exchange in locally controlled companies that are currently 40% for foreign companies and 5% for individuals. Commission rates are as low as 2% to 1% for equities and 0.05% for all fixed interest securities for every shilling.

Kenya's stock markets are divided into four independent market segments namely; the Main Investment Market Segment (MIMS) which is the main quotation market with stringent listing requirements, the Alternative Investment Market Segment for small and medium sized companies with high growth potential that cannot meet the more stringent requirements of the MIMS, the Fixed Income Securities Market Segment that includes securities such as treasury bonds, corporate bonds, preference shares, debenture stocks, treasury bills, and commercial paper, and lastly the Futures and Options Market Segment that will provide a mechanism to market participants to hedge against the risk associated with market volatility when formed (NSE handbook 2004-2005). This study dealt with the Fixed Income Securities Market Segment and specifically on bonds.

The bond market in Kenya dates way back in 1986 with the listing of government of Kenya treasury bonds. This was later followed with the development of the primary bond market on 8th November 1996 when the first corporate bond was issued by the East African Development Bank. Initially, only floating rate bonds were issued, but later, there was a shift to fixed rate bonds (medium and long term bonds). The bond

market has grown over the years with the inclusion of fixed interest bonds and special issues by the government, corporate bond issues from Shelter Afrique, Safaricom in June 2001, Mabati Rolling Mills in 2002), Faulu Kenya, Athi River Mining, and Celtel all in 2005.

According to the CMA annual reports and accounts for 2003, corporate bonds are becoming the preferred method of raising long-term finance by corporations in Kenya. In line with the government restructuring of its domestic debt into longer dated securities, the maturity period has increased to up to 10 years in treasury bond issues. Lengthening the maturity profile of government debt generates both a stable yield curve and further development of the capital market. A yield curve shows the price or value normally expressed as interest of a government debt security such as treasury bills and bonds at any given time. Using the yield curve for example, one can be able to determine the current value of a 10 year bond which was bought by a bank one year ago. Yield curves are used for pricing of new and existing treasury instruments, valuation of fixed income securities, and deriving implied forward rates.

Recently though, there has been a lot of concern from the NSE that rising interest rates are affecting investment in bonds. This is because they are inversely related. This has resulted in an unpredictable yield curve due to erratic and sudden shifts in interest rates resulting in lack of confidence in the bond market thus leading to an exit in this market altogether.

Banks are also major investors in the market and given the new regulation that they

mark the bonds to market, that is, using the day's closing price instead of the original purchase price has negatively affected the uncertainty in the money market. This has led investors to prefer short-term instruments such as treasury bills, repurchasing agreements (repos) and inter-bank trading. Irungu (2004) stated that analysts were worried that should the bond market collapse, this would greatly affect mortgage and term loans.

Moreover, research has also been done on how governments within the Eastern Africa region can finance their budget deficits using bonds. Kibua et al (2005) found that for a long time, governments of Eastern Africa have depended on donor aid to finance their long-term projects but this can be achieved with the mobilization of domestic resources as an alternative source. Also, increased government borrowing using short-term debt instruments is expensive and hinders the development of private sector investment through competition in the domestic money market and the increase in interest rates on treasury bills.

However, Kibua et al concluded that the bond market in Kenya and Tanzania had a prospect for developing into an active and liquid market as these countries were in the process of converting existing domestic debt into tradable long-term bonds. Debt markets in the other Eastern Africa countries remained substantially underdeveloped. On the other hand, the US market is the most developed and the largest in the world holding 44% of global bond issues followed by Japan (15.2%), the United Kingdom (4%), and other emerging markets (2%).

Developing domestic and financial regional capital markets and improving regulation so as to promote capital flows that will assist in development of local financial markets is one of NEPAD's (New Partnership for Africa's Development) top priorities. Mr. Paul Harris, chairman of Rand Merchant Bank, in a workshop on capital markets development held in Johannesburg in October 2003 stated that the African Renaissance would not happen unless the continent developed its soft infrastructure i.e. sound, well regulated financial markets. This involved the creation of a sound legal and regulatory framework free from political interferences and thus one in which investors could have confidence & contracts could be enforced.

In moving forward in the capital markets, there needed to be a merging of regional capital markets and pooled market infrastructure so as to minimize the costs associated with small local markets. The African Stock Exchanges Association (ASEA) which was founded in 1993 has promoted both the development of stock exchanges and cooperation among them. One of the goals of the CMA's strategic plan (2002 – 2005) was to establish an integrated East African capital market. The re-establishment of the East African Community and current negotiations for the creation of a monetary union was a good starting point towards this.

African stock market advocates desired that exchanges mobilize their resources for development through the issuance of bonds to fund specific industrial and social projects. The West African Development Bank (BOAD) for example helped finance

regional development projects and had four separate bond issues on the Abidjan market. Also, the Securities & Exchange Commission (SEC) in Nigeria was promoting the bond market to state and local governments as a means of raising funds for development projects. For example, Edo state government issued a 500 million naira revenue bond to fund low-income housing construction as reported by a General Mallam, a SEC director. Since the bond market was crucial to the growth of an economy, this study aimed at finding out the factors that influenced bond prices.

## **1.2 Statement of the Problem**

Despite government incentives like abolishment of the capital gains tax, the bond market has remained inactive. According to the Nairobi Stock Exchange Handbook 2004 – 2005, there has been much concern that the market is underutilized, yet it could provide a good investment area for individuals, companies, and the government. There has been lack of confidence in the market by investors due to their inability to predict bond prices.

The problem therefore has been lack of information related to returns and thus factors that influence bond prices.

The general objective of the study was to identify bond types, factors influencing bond prices, and effects of macroeconomic and non-macroeconomic factors on bond prices.



### **1.3 Specific Objectives**

The specific objectives of the study were to;

1. Identify the types of bonds listed on the Nairobi Stock Exchange
2. Identify factors influencing bond prices on the Nairobi Stock Exchange
3. Establish the effect of macroeconomic factors on bond prices
4. Establish the effect of non-macroeconomic factors on bond prices

### **1.4 Hypotheses**

1. Macroeconomic factors such as interest rates, inflation, and exchange rates had no effect on bond prices
2. Non-macroeconomic factors such as company rating and political status had no effect on bond prices

### **1.5 Justification of the Study**

Many people in Kenya, including the educated know about shares but little about bonds. Consequently, the major players in this market have been the government and corporations. This study was to bring out more knowledge on bonds and also enable investors know when best to invest in bonds.

It is also of interest to the government who can source for funds from the bond market and thus place less reliance on foreign aid. Lastly, academicians wishing to do further research on bonds could find this study useful.

## 1.6 Scope and Limitation of the Study

This study was limited to the bond market in Kenya and specifically on actively trading state and corporate bonds on the Nairobi Stock Exchange. It considered a time frame of five years. Financial resources were also a constraint since most information was to be found in Nairobi and this required a lot of traveling.

## 1.7 Definition of Terms

**Bonds** – These are loans usually made to corporate organizations, governments, and municipalities and are repaid with interest at a certain date in the future. Interest is usually payable quarterly or semi-annually with the initial money invested being repaid at some date in the future.

**Shares** – They represent ownership claim in publicly held companies.

**Bondholder** – This is one who is a lender to a company, expects a profit in the form of interest at a specified date in future, does not vote or participate in the management of the company and invests to earn a reasonable return at a low risk.

**Shareholder** – This is one who is both a lender & owner of a company, expects a profit in the form of a dividend, gain in share price, bonuses, cheaper shares in case of a rights issue and attends Annual General Meetings. He/she also influences the company's performance.

**Capital Markets** – These are long term & relatively risky debts or loan instruments. They can be divided into: Longer term fixed income markets e.g. treasury & corporate bonds, equity markets e.g. ordinary & preferred shares, and derivative markets for options and futures.

**Stock Market** – It is a financial institution where securities are bought and sold.

**Money Markets** – These are short term, highly liquid and relatively low risk debts or loan instruments. Examples include treasury bills, certificate of deposit & bankers acceptances.

**Treasury Bonds** – They are debt obligations of governments that make semi-annual payments of interest thereon. They are usually sold at or near par value.

**Corporate Bonds** – They are long term debts issued by private corporations and usually pay semi-annual interest and return the face value of the bond at maturity.

**Fixed Rate Bonds** – They are bonds that mature after a fixed term or have a fixed maturity date. They can be sold at their face value, discount or at a premium.

**Floating Rate Bonds** – They are bonds that do not have a fixed rate of interest. Interest is variable and is determined by some underlying security e.g. the 91 day treasury bill in Kenya.

**Zero-coupon bonds** – These are bonds where no periodic interest payment is made. The investor receives one payment, which includes principal and interest upon redemption.

**Coupon bonds** – These are bonds issued at an interest rate based on their face value. The interest is payable to anybody holding the bond at the time of interest payment.

**Registered bonds** – They have the name of the owner on the face and interest is paid directly to the person whose name it bears.

**Convertible bonds** – These are bonds that may be exchanged by the holder for other securities of the company at a later date.

**Callable bonds** – These are bonds that may be reacquired or repurchased by the issuing company prior to the maturity date.

**Term bonds** – These are the most common type of bonds which mature after a fixed term or which have a fixed maturity date. Bonds can be sold at their face value, discount, or premium.

**Puttable bonds** – These give the bondholder the right but not obligation to retire the bonds before the expiry date. Thus if the bond's coupon rate is lower than the market rate, the bondholder can retire the bond early and buy a new bond with a higher coupon rate.

**Yield Curve** – This is when the interest rates of bonds are plotted against their terms. The shape of the yield curve reflects the market's future expectations for the interest rates and conditions for monetary policy.

**Yield to Maturity** – It equates the price of a bond with the present value of its expected future cash flows.

**Interest rate** – This is a return earned on amounts invested by a lender.

**Inflation** – It is the persistent increase in general prices.

**Exchange rate** – It is the rate at which one country's currency can be traded in exchange for another country's currency.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 The Nairobi Stock Exchange

The NSE handbook (2004) defines a stock market as a financial institution where securities are bought and sold. The stock exchange provides a market for portfolio investors who invest in tradable equity shares and bonds. It has been of growing importance because of increasing globalization of the capital markets and liberalization of cross-border financial transactions.

Basweti (2002) stated that reduced supply of foreign funds from previous sources like commercial banks had compelled governments of developing countries to pay greater attention to the development of the stock market as a way of improving domestic resources, mobilization, enhancing the supply of long term capital and encouraging efficient use of existing assets.

Basweti (2002) continues to point out that as a capital market institution, the stock exchange plays an important role in economic development. The basic function of a stock exchange is the raising of funds for investment in long-term assets. It helps mobilize domestic savings by bringing about the re-allocation of financial resources from dormant to active agents. Investors can consume less and save more with the savings being allocated to productive enterprises. It assists in the rational and efficient allocation of capital so as to realize maximum output at least cost. It promotes higher standards of accounting, resource management and transparency in the management of business. Owners of a business may not have the expertise to

manage a business yet agents (those given the responsibility to manage these funds) may have the best ideas, different users of capital are able to raise capital in ways that are suited to meeting their specific needs e.g. governments can raise funds by floating various types of bonds as an alternative to foreign borrowing, investors can buy and sell securities at their convenience. This guarantees mobility of capital in the purchase of assets. An exchange also encourages local participation by giving residents a chance to own shares in companies. Companies can also raise extra finance essential for expansion and development. In addition, a stock market does enhance the inflow of international capital and can be a useful tool for privatization programmes. The establishment of an efficient stock market is therefore necessary for any economy that desires to use scarce capital resources to achieve economic growth.

Kibuthu (2005) in her work, *Capital Markets in Emerging Economies: A case study of the NSE*, points out that in 1994, the NSE was rated by the International Finance Corporation (IFC) as one of the best performing emerging markets in the world. Even though it is considered a more liquid and active market than its East African counterparts (Uganda and Tanzania), it is small, illiquid, and volatile in regard to price and returns judging by international standards.

According to Basweti (2002) market capitalization ratio and the number of listed companies was used to measure the size to the stock market. Market capitalization = value of listed shares / Gross Domestic Product. It measured the ability of the market to mobilize capital, diversify risk, and also contribution of the stock market towards the Gross Domestic Product. He also stated that liquidity is the ability to easily buy

and sell securities and was measured by the total value of stock traded to Gross Domestic Product and turnover ratios. Value of stock traded ratio measured the market value of stocks traded as a proportion of the national output while turnover ratio captured trading relative to the size of the stock market, that is, turnover ratio = value of total securities traded for a given period divided by market capitalization. High turnover often indicated low transaction costs. A small but active market will had low market capitalization but high turnover ratio. In summary therefore, market capitalization was the stock market price per share x the number of shares outstanding. Turnover showed the cash inflows and outflows in the stock market and was based on actively trading shares and changes that occurred due to fluctuation in share prices or number of shares traded in a given period.

## **2.2 Recent Developments In The Bond Market**

In their article, Prospects for Developing a Regional Bond Market in Eastern Africa, Kibua et al (2005) found out that the instability in interest rates, the slow pace of the implementation of the Central Depository System (CDS), stringent legal, regulatory, and bureaucratic procedures relating to listing of bonds, competition from government bonds, and high cost of issuance (taxation and listing fees) were some of the constraints inhibiting the development of the Kenyan bond market. Also, that a credit listing was important so as to promote confidence in capital markets. This study also looked at company rating and how this affected listing on the stock exchange. It concentrated on bond pricing and how this affected the growth of the bond market unlike Kibua et al who looked at factors hindering the development of

the bond market in general. In addition, they were of the view that high interest rates on short term assets such as treasury bills and lack of disclosure of the financial status of the companies had made investors to prefer short term debt instruments. Market participants were not motivated to raise bonds because an active and vibrant secondary market was lacking. Consequently, investors were denied accessibility to liquidity whenever need arose. Lastly, the unstable money market had also been a key impediment towards raising bonds on the NSE.

Kluza and Slawinski (2002) did an empirical analysis on the impact exerted on bond prices by the expected interest rates, volatility of the zloty (polish currency) and the credit risk related to the changing volumes of the budget deficit. They found out that there was a relationship between the expected interest rates and the bond prices, and that the exchange rate volatility and the fluctuations of market sentiment affected bond pricing. They however did not do a study of the effects of non-macroeconomic factors on bond prices. This study concentrated on both macroeconomic factors as well as non-macroeconomic factors. Also, such a study has not been done in Kenya.

Sill (1996), stated that investors' expectations of future real income growth and inflation were the primary determinants of current bond prices and interest rates.

The Bank for International Settlements (1996) in a research paper entitled, *The Economics of Recent Bond Yield Volatility* argued that an economy's inflation record and expectations increase bond volatility over long periods and across



countries. Volatile money markets in general make for more volatile bond markets.

Gugiatti and Richards (2003) were concerned whether Collective Action Clauses (CACs) influenced bond yields and concluded that the inclusion or absence of CACs had no economically or statistically significant impact on yields as of early 2003. They concluded that investors either still had not focused on which bonds had CACs or that they believed the inclusion of collective action CACs was not relevant to the pricing of debt. As a result, they saw no reason why there cannot be greater use of CACs when issuing bonds. Collective Action Clauses arise when borrowers place clauses in their debt contracts that would have various procedures that might be followed in the event that debt servicing problems occur. This includes procedures for qualified majorities of bondholders to change the payment terms of bonds in their collective interest.

McGuire and Schrijvers (2003) assessed the common forces that bring about the variation in daily spread changes in bonds using a sample of 15 countries. They found out that only a third of the total variation in spreads is driven by common forces such as the global macroeconomic environment and investors risk attitudes.

### **2.3 Types Of Bonds**

Bonds are debt securities that a corporation or government issues when it wishes to borrow money from the public on a long-term basis. The stated interest payments made on a bond are referred to as coupons. The principal amount of a bond that is

repaid at the end of the term is the face value or par value. The coupon rate is the annual coupon divided by the face value of a bond. The specified date on which the principal amount of a bond is paid is called its maturity and the yield to maturity is the rate required in the market on a bond (Ross et al, 2000).

Bond issues are considered fixed-income securities because they impose fixed financial obligations on the issuers who have to pay a fixed amount of interest periodically, usually semi-annually and a fixed amount of principal at the date of maturity.

Fabozzi (2000) stated that the first type of bond is the government bond. Under this we have treasury and municipal bonds. Treasury bonds are debt obligations made by the government and interest is normally payable semi-annually. They are usually sold at or near par value. There is a difference between treasury bills, notes and bonds. Treasury bills are short-term issues with maturities of 1 year or less and the market for these instruments is commonly known as the money market. Treasury notes are intermediate term issues with maturities in excess of 1 year but less than 10 years. Treasury bonds are long-term obligations with maturities in excess of 10 years. They can be issued as fixed rate, floating rate or zero coupon bonds. Municipal Bonds are bonds that are issued for the development of municipalities and interest earned is tax-free. These are not available in Kenya.

The second type of bond is the corporate bond. This is a long-term debt issue by

private corporations and usually pays semi-annual interest. It returns the face value of the bond at maturity. There are various types of corporate bonds; secured bonds which are issued with collateral and unsecured bonds (debentures) where no security is required. Corporate bonds take on different forms and these are: coupon bonds, registered bonds, convertible bonds, callable bonds, term bonds, zero-coupon bonds, and puttable bonds.

## **2.4 Valuation Of Bonds**

A bond is said to be a discount bond when it sells for less than face value. This normally happens when market interest rates rise above the coupon rate. The reverse is true for premium bonds (Ross et al, 200).

Bond value = Present value of the coupons + Present value of the face amount.

Ross et al (2000) in their book, Fundamentals of Corporate Finance explains that bond prices and interest rates always move in opposite directions. When interest rates rise, a bond's value, like any other present value, will decline. Also, when interest rates fall, bond values rise. Even in considering a bond that is riskless in the sense that the borrower is certain to make all the payments, there is still a risk in owning a bond. Interest rate risk is the risk that arises for bond owners from fluctuating interest rates. How much interest rate risk a bond has depends on how sensitive its price is to interest rate changes. This sensitivity depends on: The time to maturity and the coupon rate. All other things being equal, the longer the time to maturity, the greater the interest rate risk. All other things being equal, the lower the coupon rate, the

greater the interest rate risk. The value of a bond depends on the present value of the coupons and the present value of the face amount. If two bonds with different coupon rates have the same maturity, then the value of the one with the lower coupon is proportionately more dependent on the face amount to be received at maturity. As a result, all other things being equal, its value will fluctuate more as interest rates change i.e. the bond with the higher coupon has a larger cash flow early in its life, so its value is less sensitive to changes in the discount rate. The market value of the bond is less than the par value if the investors required rate of return is above the coupon rate and vice versa. Also, as the maturity date approaches, the market value of the bond approaches its par value.

Ross et al (2000) also stated that, long-term bonds have greater interest rate risk than short-term bonds. Interest rate risk can be measured using the interest elasticity coefficient (E). This is an absolute value. It measures the absolute percentage change in bond price relative to the percentage change in its yield to maturity.

The sensitivity of a bond's value to changing interest rates depends on the length of time to maturity and patterns of cash flows provided by the bond. As interest rates fall, the value of the bond that has a shorter time to maturity is not adversely affected as the one with a longer time to maturity. If graphed, the bond with 20 years to maturity will have a steeper curve than the bond with 5 years to maturity, indicating the sensitivity to the changing rates of the two bonds.

## **2.5 Bond Trading**

Ross et al (2000) explained that most trading in bonds takes place Over The Counter (OTC), i.e. there is no particular place where buying and selling occur. Various dealers are connected electronically. Since trading is almost entirely OTC, transactions are privately negotiated between parties and there is little or no centralized reporting of transactions. This means that getting up-to-date prices on individual bonds is often difficult and instead a variety of sources of estimated prices exist and are very commonly used. In Kenya, bond price reporting is reported by Suntra Investment Bank every Tuesday in the Daily Nation and weekly in the East African Newspapers.

## **2.6 Bond Ratings**

Ross et al (2000) in their book, Fundamentals of Corporate Finance suggested that bonds are often rated as an assessment of the credit worthiness of the corporate issuer. The two leading bond rating firms are Moody's and Standard and Poor's (S&P). Bond ratings do not discuss interest rate risk hence the price of a highly rated bond can still be volatile.

The highest rating a firm's debt can have is AAA or Aaa which is of the best quality and lowest degree of risk. The lowest rating is D for debt that is in default. Here, payment of interest and/or repayment of principal is in arrears. AA or Aa is debt that has strong capacity to pay interest and repay principal. A is for debt that has strong capacity to pay interest and repay principal although it is susceptible to adverse

effects of changes in circumstances and economic conditions than debt in high-rated categories. BBB or Baa has adequate capacity to pay interest and repay principal. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity to pay interest and repay principal for debt in this category than in higher rated categories. Ba, B, or BB, B, Caa, or CCC, Ca or CC are bonds rated as predominantly speculative with respect to capacity to pay interest and repay principal in accordance with the terms of the obligation. The difference is that BB or Ba have a lower degree of speculation whereas CC or Ca have a higher degree of speculation. C rating is reserved for income bonds on which no interest is being paid. Lastly, junk bonds are low grade bonds and are rated below investment grade i.e. BBB or Baa by major rating agencies, if rated at all.

## **2.7 Risks Associated With Investing In Bonds**

According to Fabozzi (2000), there are several risks associated with investing in bonds and investors therefore need to be compensated for them. First is the interest rate risk which is the sensitivity of a bond's value to changing interest rates. Next is reinvestment or income risk. The yield on a bond assumes that the cash flows received are reinvested. Reinvestment risk is the variability in the reinvestment rate of a given strategy because of changes in market interest rates. It's the risk that interest rates at which interim cash flows can be reinvested will fall. It's greater for longer holding periods and also for bonds with large, early cash flows such as high-coupon bonds.

Third is call risk which is the risk to refinance the bond if market interest rates drop below the coupon rate. Default / credit risk is the risk that the issuer of a bond will be unable to make timely principal and interest payments on the issue. Inflation / purchasing – power risk is caused by the variation in the value of cash flows from a security due to inflation, as measured in terms of purchasing power. Floating rate bonds have a lower level of inflation risk to the extent that interest rates reflect the expected inflation rate. Exchange rate / currency risk affects a bond whose payments occur in a foreign currency and therefore has unknown cash flows. These cash flows are dependent on the exchange rate at the time the payments are received. Liquidity / marketability risk depends on the ease with which an issue can be sold at or near its value. For an investor who plans to hold the bond until the maturity date, liquidity risk is less important. Volatility risk is the risk that a change in volatility will affect the price of a bond adversely for example due to interest rates and callable bonds. Lastly Fabozzi (2000) identified the risk-risk that is defined as not knowing what the risk of a security is.

## **2.8 The Term Structure Of Interest Rates**

Reilly and Brown (2000) examined the term structure of interest rates or the yield curve as a static function that relates the term to maturity to the yield to maturity for a sample of bonds at a given point in time. When long-term rates are higher than short-term rates, the term structure is upward sloping and when short term rates are higher than long term rates, it is said to be downward sloping. It is “humped” when at first rates increase, then decrease as we look at longer and longer term rates.

The shape of the term structure is determined by; the real rate of interest, inflation rate, and interest rate risk premium. The inflation premium is the portion of a nominal interest rate that represents compensation for expected future inflation. Interest rate risk premium is the compensation investors demand for bearing interest rate risk. It increases with maturity. It however increases in value at a decreasing rate. If investors believe that the rate of inflation will be higher in future, then the long term nominal interest rates will tend to be higher than short-term rates and vice-versa (Reilly and Brown, 2000).

The treasury yield curve is a plot of the yields on treasury notes and bonds relative to maturity. The treasury yield curve and the term structure of interest rates are almost the same thing. The only difference is that the term structure is based on pure discount bonds whereas the yield curve is based on coupon bond yields. Thus treasury yields also depend on the real rate, expected future inflation, and the interest rate risk premium.

In addition, Reilly and Brown (2000) in their book, *Investment Analysis and Portfolio Management* stated that treasury notes and bonds have three important features i.e. they are default-free, they are taxable, and highly liquid. Default risk premium is the portion of a nominal interest rate or bond yield that represents compensation for the possibility of default. Taxability premium is the portion of a nominal interest rate or bond yield that represents compensation for unfavourable tax status. Liquidity



premium is the portion of a nominal interest rate or bond yield that represents compensation for lack of liquidity.

## **2.9 Inflation**

Kibicho (1998) argued that the origin of inflation in Kenya began with the oil shock in 1973. Overtime, it had been explained by increased money supply in the economy mainly through government financing of its budget deficit through expansionary money supply. Also, the 1970s saw the civil service expanded leading to considerable strain on the fiscal budget. Liberalization of the economy, upward pressure on previously suppressed prices to go up to market levels further caused inflation. The 1992 elections led to expansionary monetary policies while the 1993 inflation was caused by suspension of disbursement of finance to Kenya by donors.

Muriithi (2000) in his work, was of the view that as interest rates go up, there was an expected loss of purchasing power over the period on investment. He stated that research had shown a negative relationship between returns and the rates of inflation i.e. stocks and bonds did not always provide a hedge against inflation. That an increase in inflation, whether or not it was caused by an increase in money supply would if interest rates remain at the controlled nominal level, have the effect of reducing the real rate of investment. Savers would be discouraged from holding money balances when faced with a low or often negative real rate of interest. They would invest in inflation hedges e.g. gold, jewelry, real estate, and other non-productive commodities.

## **2.10 Exchange Rates**

According to Kibicho (1998), Kenya had developed different exchange rate policies since independence. In 1966, the Kenya shilling was pegged to the sterling pound. In 1971, it was pegged to the dollar while in 1975, it was pegged to the Special Drawing Right (SDR). In 1982, it adopted the Crawling Peg System before changing to a standard basket of currencies. The devaluations between 1982 and 1993 saw foreign exchange controls lifted. Currently, the Central Bank of Kenya intervenes to correct short-term fluctuations that may cause the exchange rate to divert away from the long-term trend.

## **2.11 Theoretical And Conceptual Framework**

### **2.11.1 Theoretical Framework**

This study was based on the price theory that price is affected by both external and internal factors. Brassington and Pettitt (2003) defined price as the value that is placed on something. According to Kotler and Armstrong (2001), external factors include the nature of the market and demand. The relationship between the price charged and the resulting demand level is shown in the demand curve. This is a curve that shows the number of units the market will buy in a given time period at different prices that might be charged. In normal cases, demand and price are inversely related that is the higher the price, the lower the demand unless for prestige goods where consumers think that higher prices mean more quality. Competitors' costs, prices, and offers also affect the company's own pricing of products / services. Other

external factors for example boom or recession, inflation, and interest rates affect pricing decisions because they affect both the costs of producing a product and consumer perceptions for the product's price and value. The government also is another important external influence on pricing decisions.

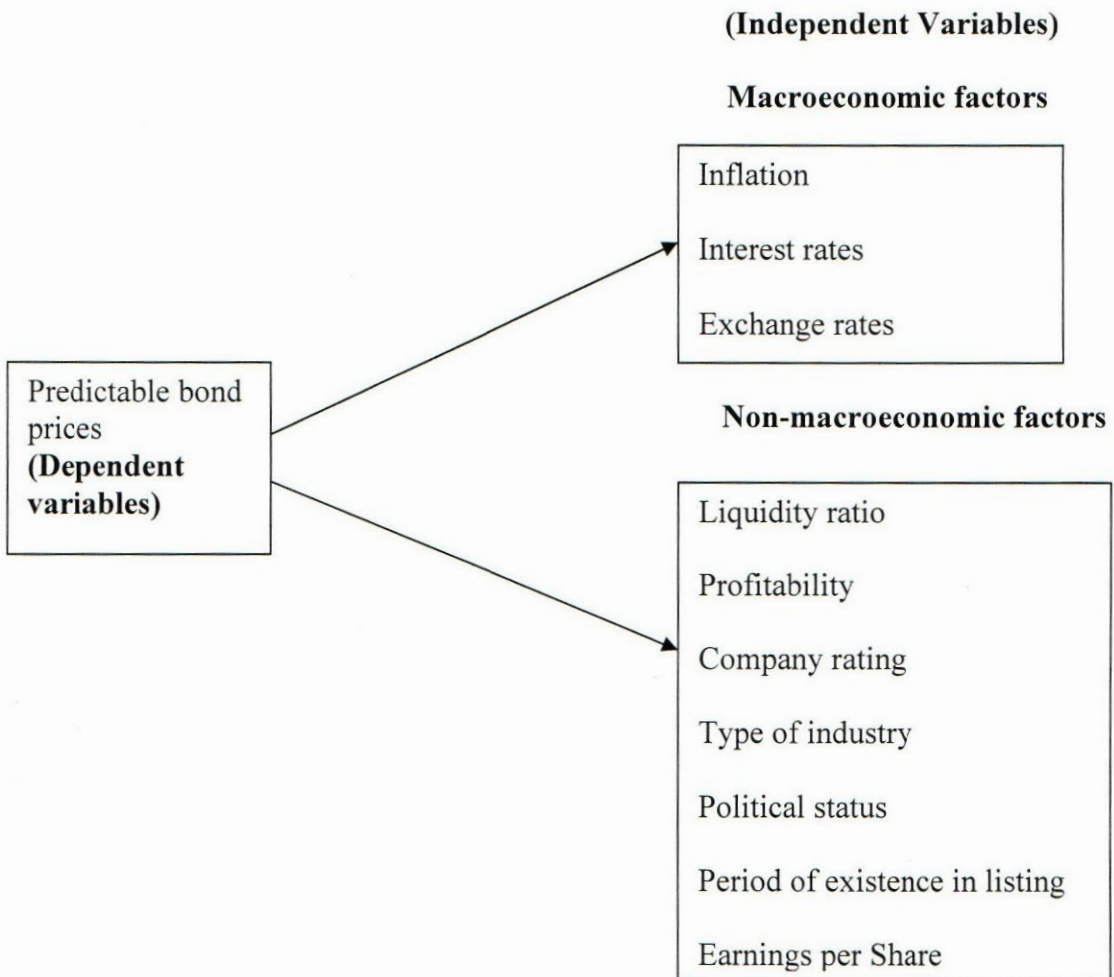
Apart from the external factors mentioned above, Brassington and Pettitt (2003) also added legal and regulatory framework for example government interference especially where a near-monopoly is operating and channels of distribution where each member of the distribution chain will have a desired level of profit margin and a requirement to cover the costs associated with handling and reselling the product for instance transport, warehousing and insurance. The feelings and sensitivities of customers also need to be considered in determining price.

Internal factors that affect pricing decisions are marketing objectives like high price / low price strategy. Objectives of the firm could be survival, profit maximization market share leadership, and product quality leadership. Another internal factor could be the marketing mix of the firm that is price, product, promotion and place. These must be coordinated to form a consistent and effective marketing program. Decisions made for other marketing mix variables may affect pricing decisions. Costs are another factor. These set the floor for the price that the company can charge for its product(s). Organizational considerations must also be considered. Management must decide who within the organization should set prices for example top management, marketing or sales department, and divisional or product line

managers.

Leader and Kyritsis (1995) added resources and the attitude of senior management towards pricing as internal factors. Price set by the company is not always solely based on the product itself. It can be on the level of after sales services provided by the company. On the other hand, senior management attitude such as the Managing Director and Chairman may be inconsistent with that of the marketing director.

### 2.11.2 Conceptual Framework



Source: own concept

The study conceptualized that macro / non-macroeconomic factors had a direct influence on the stability of bond prices. By stabilizing these factors then bond prices can become predictable.

## CHAPTER THREE: RESEARCH METHODOLOGY

### 3.1 The Population

The bonds included Government of Kenya fixed, floating rate and zero coupon treasury bonds, and corporate bonds listed at the NSE. The period of study was from January 2000 to December 2004. This was because this period was a balance between the two political regimes i.e. the NARC (National Rainbow Coalition) and KANU (Kenya African National Union) regimes especially as political status was one of the variables in the model. The total number of bonds, both active and inactive, for years 2000 to 2004 on average were 47, 102, 142, 170, and 180 respectively.

### 3.2 Sampling and sample design

The data collected on bonds was entirely from the Nairobi Stock Exchange. Only active bonds traded on the NSE were considered. Therefore, all the zero-coupon government bonds, the corporate bonds, fixed rate and floating rate government bonds issued since year 2000 to 2004 were included in the study as their population was small. These were a total of 44, 70, 77, 65, and, 73 respectively for years 2000 to 2004. The table below gives a summary of the total bonds:

**Table 1:**

| Year | CB | FRGB | ZCGB | FXGB | TOTAL |
|------|----|------|------|------|-------|
| 2000 | 1  | 43   | 0    | 0    | 44    |
| 2001 | 4  | 63   | 0    | 3    | 70    |
| 2002 | 5  | 49   | 0    | 23   | 77    |
| 2003 | 3  | 13   | 3    | 46   | 65    |
| 2004 | 4  | 10   | 6    | 53   | 73    |

CB – Corporate Bonds

ZCGB – Zero Coupon Government  
Bonds

FRGB – Floating Rate Government Bonds

FXGB – Fixed Rate Government Bonds

### **3.3 The Data**

The study used secondary data obtained from the NSE, and the Central Bank of Kenya. A questionnaire was also included to get information on company management synergistic effects but this did not take place as most companies felt that the information asked for was highly sensitive. Data obtained from the NSE was on the types of bonds and their prices. Credit ratings of companies that had issued corporate bonds could not be obtained as this is not a requirement by the CMA for bond issues.

The data obtained from the Central Bank of Kenya was on macroeconomic variables which are inflation, interest rate levels and exchange rates over the 5 year period. The currencies under investigation were the US dollar, the sterling pound, the Euro, and the Japanese Yen. However, only the US dollar was used in the analysis. This was because including the other currencies would have been cumbersome in the analysis of  $Y$ (bond prices). Lastly, no data was obtained from the Kenya National Chamber of Commerce as they do not do any surveys on the market share of companies. Therefore an index for each company was used to represent the type of industry the company is in.

### **3.4 Data Analysis**

This study was a correlational research design because of the attempt to determine factors influencing bond prices and the extent of these factors on bond prices.

Given the variables under consideration, an ordinary least squares simple regression analysis was used with the dependent variable being bond prices and the independent variables being the macroeconomic and non-macroeconomic variables as shown in table 2.

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + \varepsilon$$

Where Y = bond prices,

$X_1 - X_{10}$  = as shown in table 2

$b_1 - b_{10}$  = coefficients

a = intercept

$\varepsilon$  = error

**Table 2: Hypothesized variables**

| Variables                                      | Measurement                           | Hypothesized effect |
|--|---------------------------------------|---------------------|
| $X_1$ = Interest rate                          | Time                                  | +ve                 |
| $X_2$ = Inflation rate                         | Time                                  | +ve                 |
| $X_3$ = Exchange rate                          | Time                                  | +ve                 |
| $X_4$ = Liquidity ratio                        | Current ratio                         | +ve                 |
| $X_5$ = Profitability                          | Profit before tax                     | +ve                 |
| $X_6$ = Company rating                         | Credit worthiness                     | +ve                 |
| $X_7$ = Company management synergistic effects | No. of qualified managers e.g. skills | -ve or +ve          |
| $X_8$ = Political Status                       | Last regime / current regime          | -ve or +ve          |
| $X_9$ = Period of existence in listing         | No. of years                          | -ve or +ve          |
| $X_{10}$ = Type of industry - manufacturing,   | Market Share                          | -ve or +ve          |
| - communication                                | Market Share                          | -ve or +ve          |
| - housing                                      | Market Share                          | -ve or +ve          |
| - banking                                      | Market Share                          | -ve or +ve          |



## CHAPTER FOUR: RESULTS AND DISCUSSIONS

### 4.1 Bond Issues on the Nairobi Stock Exchange

Results indicate that there exists a primary and secondary bond market at the Nairobi Stock Exchange. The primary bond market involves the initial issue of government treasury bonds and corporate bonds whilst the secondary bond market involves the trading of bonds that have already been issued. This market is not so active in Kenya because most investors adopt a buy and hold strategy for bond securities.

The types of bonds traded on the NSE are government bonds and include zero coupon, floating rate, and fixed rate bonds. Floating rate bonds are currently being phased out and are being replaced by fixed rate bonds. So far, only two floating rate bonds are remaining one of which is maturing in 2006 and the other in 2007. Corporate bonds traded as of year 2004 included Mabati Rolling Mills, Safaricom, East African Development Bank, and Shelter Afrique. In 2005, Athi River Mining, Preferential Trade Area (PTA) bank, Celtel, Shelter Afrique, and Faulu also issued bonds on the NSE. While writing this report, the National Housing Corporation issued a 100 million shilling corporate bond through the bourse. Corporate bonds are becoming the preferred method for corporations to raise capital partly because they are less costly than the issue of shares. Also, a share issue involves more requirements as compared to a bond issue. The Capital Markets Authority requires audited financial statements for three preceding years to be availed for a bond issuer whereas audited financial statements are to be availed by a share issuer for five preceding years. A track record is not a requirement for a bond issuer but a share

issuer must declare positive profits after tax attributable to shareholders in at least three years within five years prior to application. Likewise, it is not a requirement for a bond issuer to be solvent and have adequate working capital while on the other hand, this is an obligation for a share issuer. It is also a requirement for a share issuer to have at least 25% of the shares held by a thousand or more shareholders excluding employees but not so for a bond issuer. Lastly, a share issuer needs to have a clear future dividend policy which is not the case for a bond issuer.

The reason why individuals are not investing in bonds is because it involves huge sums of money and stringent requirements which are mostly met by only corporations as bonds are in issue lots of 100,000 shillings. Total indebtedness including the new issue is to be not more than 400% of the company's net worth as at the latest balance sheet. Also, the funds from operations to total debt for the three trading periods preceding the issue is to be kept at a weighted average of at least 40%. Lastly, a range of other ratios is to be certified by the issuer's external auditors.

Fabozzi (2000) pointed out that the bond market is more advanced in developed countries for instance, the US bond market is the largest in the world and is divided into six sectors namely; US Treasury sector that includes treasury bills, notes, and bonds. Agency sector that includes securities issued by federally related institutions and government sponsored enterprises. In the Municipal sector, state and local governments and their authorities raise funds while in the Corporate sector, the US and non-US corporations issue bonds in the United States. Asset-backed Securities

are an alternative to the corporate sector where the issuer pools loans or receivables and uses the pool of assets as collateral for the issuance of a security. Lastly, the Mortgage Sector has securities that are backed by mortgage loans. As can be concluded, the bond Market in Kenya is still underdeveloped since it only has the treasury and corporate sector. To begin with, the municipal sector could be encouraged which is already evident in the desire by the National Housing Corporation to issue a bond to be used towards the development of improved housing in the country.

The variables in the research were ten (10), but some were not included in the study for various reasons. The first was company rating which could not be obtained because credit rating is not a requirement for issuing a bond in Kenya. Company rating is encouraged but the rating does not in any way influence the CMA's decision as to whether to approve a bond issue or not. It is however an important decision making tool for the investors/lenders because they have a third party's opinion as to the credit worthiness or not of the said issuer.

The CMA always makes a disclaimer that by approving a bond issue, they are not attesting to the credit worthiness of the issuer. In the event of default for instance, the CMA deems itself above reproach because it expects the lenders to make their own decisions. An investor however, can claim that they invested based on the credit rating given to an issuer. The CMA has indicated that until there are more rating agencies, it will not want to make credit ratings mandatory as it will seemingly favour

the one licensed player currently in the market which is Global Rating Company based in South Africa. The fact that obtaining a credit rating is not a requirement for debt instrument issuance explains the absence of other rating agencies in Kenya.

The study found out that the only company in Kenya closest to a credit agency is Credit Reference Bureau which deals with past payment performance to check on any default by a company. It however does not deal with rating. It considers the type of industry the company is in and the payment obligations. It then develops a scorecard for each company and gives recommendations as to whether the company is credit worthy or not.

However, some Kenyan companies like Mabati Rolling Mills have obtained a credit rating by a foreign rating agency. Shelter Afrique is also striving for the same. Thus company rating appears to remain an important tool for positioning a company towards excellence and accessing sustainable funds from the global capital market

The other variable was company management synergistic effects. Despite repeated efforts to get in touch with the companies, they were hesitant as they considered the required information as highly confidential.

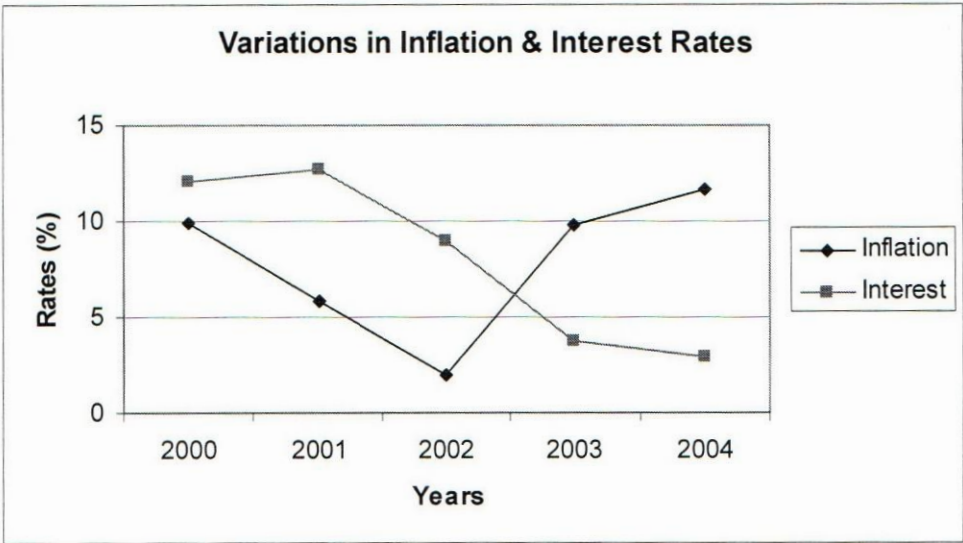
Lastly, the variable signifying the type of industry was omitted as using an index by numbering the companies according to industry proved to be fruitless since the regression model failed to run.

The study however included Earning Per Share (EPS) as one of the variables in the regression model so as to come up with a stronger observation of whether or not non-macroeconomic factors did in fact influence bond prices. There were different types of interest rates provided by the Central Bank of Kenya for example the inter bank and overdraft rates. The 91 day treasury bill rate was used as bond pricing is pegged on it.

#### 4.2 Variations in Inflation and Interest Rates over Time

Following the data analysis, several graphical observations were made:

**Figure 1: Variations in Inflation and Interest Rates**



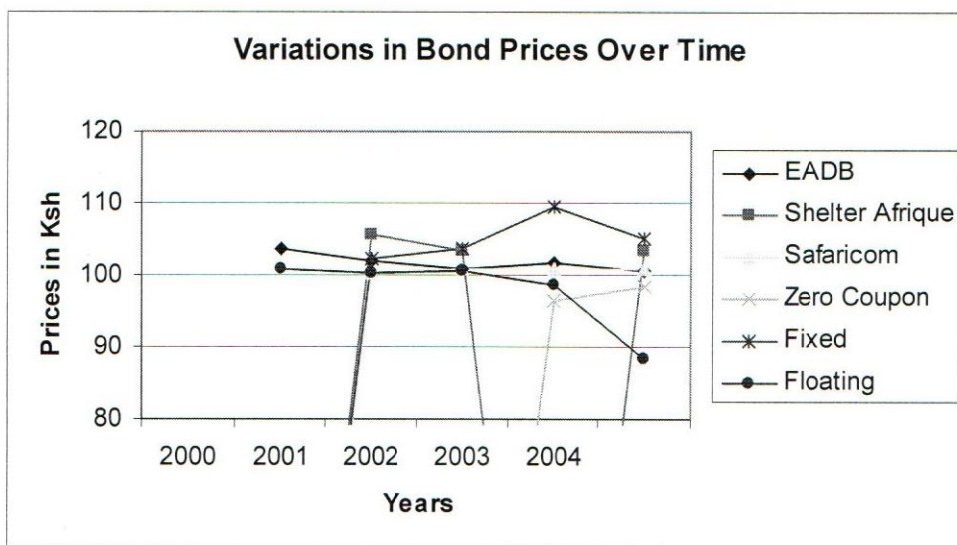
Interest and inflation rates were on the decrease until year 2002 when interest rate continued to decrease and inflation rate sharply increased in between years 2002 and 2003 followed by a moderate increase between years 2003 and 2004. The notable change in inflation and interest rates in year 2002 could be attributed to the fact that it

was an election year and so a lot of money was pumped into the economy leading to an increase in money supply hence the accelerated inflation rates. There was also uncertainty hence people were neither investing the surplus funds nor borrowing hence the continued reduction in interest rates. From 2003, it could also be that it was the new government's (NARC) policy to pursue low interest rates to encourage growth in the private sector through accessing bank loans at cheaper interest rates. Hence, it could be concluded that the variations in interest and inflation rates were more of political than economic effects. It should also be noted that sometimes there is a time lag in that when trends change, the effects are not felt immediately and could take a longer period of time.

In 2001, interest rates were at the highest over the 5 year period at 12.07%. Apparently, it was during this time when floating rate government bonds were preferred to fixed rate bonds as an investment. The stock exchange also reported improved trading of bonds between 2001 and 2002 as compared to years 2000, 2003, and 2004 (NSE handbook, 2004). Inflation rate was at the lowest in 2002 over this period. It rose to a high of 11.67% at which time investors had more confidence in fixed rate government bonds probably due to decreasing interest rates.

### 4.3 Changes in Bond Prices over Time

Figure 2: Variations in Bond Prices over Time



The sudden fluctuations in corporate and zero coupon bonds were due to the fact that there was no trading thus the value zero. For example, the Shelter Afrique bond did not trade in year 2003.

On the overall, the floating rate bonds were higher in year 2000 reducing over time to below ksh90 in year 2004. On the other hand, the fixed rate bonds were lower in year 2000 and rising to above ksh105 in year 2004. This showed a preference of fixed rate bonds to floating rate bonds over the years probably due to the rise in interest rates at the time.

Zero coupon bonds were introduced in year 2003 and had maintained a stable price of about ksh97 on average. The corporate bonds had also maintained a stable price over

the years probably due to the fact that companies engaged in aggressive marketing techniques and the fact that these were well established companies in their field of specialization.

The East African Development Bank (EADB) is a large bank with branches in Kenya, Uganda, and Tanzania. The 2004 annual accounts showed that it is a bank currently on the recovery process having made huge losses especially in year 2002 and 2003 of USD 9.95 and 2.62 million respectively. A notable profit of USD 0.177 million in 2004 showed an improvement from past losses but this was attributed to reduction in expenditure and provisions charged for bad and doubtful accounts.

The integration of the East African Community beginning with the establishment of the EAC customs union in March 2004 was bound to lead towards a common market, monetary union and political federation. A common market was of importance to EADB as it would result in mutually beneficial trade arrangements, promotion of production efficiency and enhancement of domestic, cross border, and foreign investment (EADB Annual Reports, 2004).

The bank has also contributed towards the region's capital markets development by issuing a bond on the NSE. Kenya Airways shares were cross-listed in the three EAC states following the 2003 cross listing approval by the Tanzania capital markets and Securities Authority. The shares commenced trading on the NSE in June 1996, on the Uganda Securities Exchange in March 2002, and lastly on the Dar es Salaam Stock



Exchange in October 2004.

Shelter Afrique is an equally large company in the housing industry making huge profits. The 2004 annual reports stated that the company's mission is to provide housing for all through identifying, financing, and implementing housing projects in Africa. It operates in forty one (41) African countries and works in conjunction with three institutions namely: African Development Bank, Africa Reinsurance Corporation, and Actis.

The Shelter Afrique Annual Reports (2004) describe the demand for housing as being especially high in the upper and middle-income categories. With improvement in economic performance and availability of affordable mortgages, this demand is expected to be even higher in the future. Governments are now working with local authorities, the private sector and civil society as partners in sustainable urban development, unlike in the past when they were the direct providers of housing.

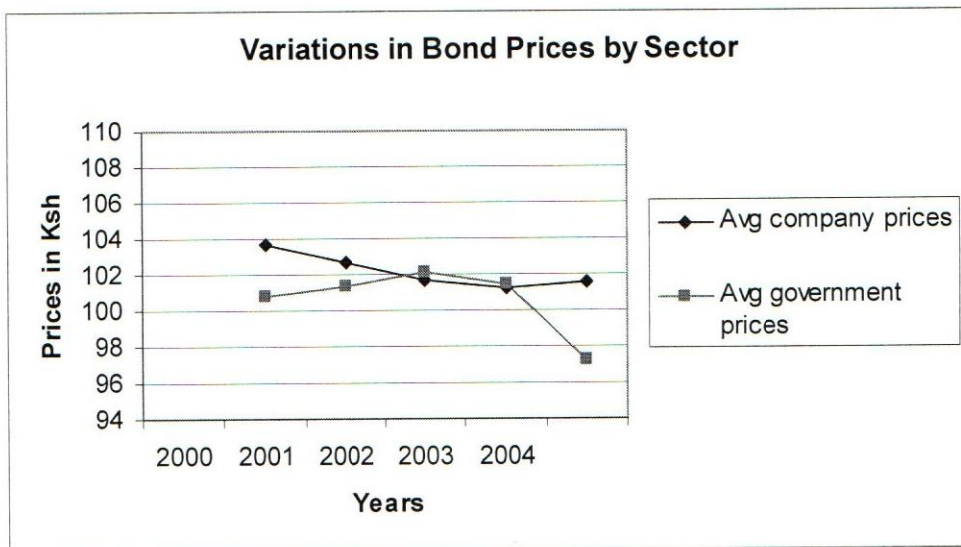
The Safaricom website points out that Safaricom is one of the fastest growing and most profitable Kenyan companies. It is Kenya's leading mobile telephone operator obtaining a turnover of kshs18 billion, after tax profit of kshs3.4billion and a growth in subscriber base of 77%. It was established on 1st April 1999 and started operations on July 1st 1999 after being licensed to provide and operate telecommunication facilities and services by the Communication Commission of Kenya (CCK). Telkom owns 60% of the company with the remaining 40% being owned by the Vodafone

Group PLC, the largest telecommunications company and fourth largest company in the world. Vodafone has more than 54 million subscribers in twenty five (25) countries.

The website goes on to say that the aim of Safaricom is to be a world-class telecommunications operator providing efficient, affordable, sustainable, and cost effective modern services of the highest level of quality and reliability. In 2004, it won the Company of the Year Award (COYA).

#### 4.4 Changes in Bond Prices by Sector

Figure3: Variations in Bond Prices by Sector



There was an inverse relationship between the average company bond prices and the average government bond prices. The variations in inflation and interest rates showed that as interest rates increased, the average government bond prices increased

to kshs102.09 and the average company bond prices reduced to kshs101.21. As interest rates reduced, the average company bond prices increased slightly to kshs101.60 whereas the average government bond prices witnessed a sudden drop in prices to kshs97.20. This was reflected in the sudden fall in floating rate government bond prices. Inflation had the opposite effect in that as ii reduced, average company bond prices reduced while average government bond prices increased until 2002 when an increase in inflation witnessed a notable fall in average government bond prices and slight decrease then increase in average company bond prices.

## 4.5 Correlation Analysis

A correlation analysis for key independent variables was performed. Below is a table of results after running the data using SPSS software.

**Table 3: Correlation Analysis**

|             |   | INFL. | INT.  | US EX. | LIQ.  | PAT   | EPS   | REG.  | EXIST. |
|-------------|---|-------|-------|--------|-------|-------|-------|-------|--------|
| EADB        | a | 0.232 | 0.642 | 0.776  | 0.073 | 0.219 | 0.071 | -0.47 | 0      |
|             | b | 0.406 | 0.01  | 0.001  | 0.797 | 0.433 | 0.803 | 0.077 | 1      |
| SHELTER AF. | a | -0.11 | 0.795 | 0.683  | 0.064 | 0.104 | -0.04 | -0.5  | 0      |
|             | b | 0.779 | 0.01  | 0.043  | 0.87  | 0.79  | 0.918 | 0.17  | 1      |
| SAFCOM      | a | 0.291 | 0.856 | 0.245  | 0.026 | 0.029 | 0.038 | 0.642 | 0      |
|             | b | 0.358 | 0     | 0.443  | 0.937 | 0.929 | 0.908 | 0.024 | 1      |
| Z/COUPON    | a | 0.356 | 0.627 | 0.478  | 0.043 | 0.072 | 0.033 | 0.706 | 0      |
|             | b | 0.193 | 0.012 | 0.072  | 0.88  | 0.798 | 0.907 | 0.003 | 1      |
| FIXED RATE  | a | 0.574 | 0.769 | 0.814  | 0.032 | 0.15  | 0.026 | 0.804 | 0      |
|             | b | 0.051 | 0.003 | 0.001  | 0.921 | 0.642 | 0.935 | 0.002 | 1      |
| FL. RATE    | a | 0.07  | 0.601 | 0.733  | 0.102 | 0.153 | 0.055 | 0.375 | 0      |
|             | b | 0.804 | 0.018 | 0.002  | 0.717 | 0.586 | 0.845 | 0.169 | 1      |
| AVG. GOVT   | a | 0.444 | -0.51 | 0.679  | 0.056 | 0.131 | 0.017 | 0.618 | 0      |
|             | b | 0.097 | 0.052 | 0.005  | 0.842 | 0.642 | 0.953 | 0.014 | 1      |
| AVG. COM.   | a | 0.074 | 0.813 | 0.378  | 0.032 | 0.174 | 0.072 | 0.688 | 0      |
|             | b | 0.794 | 0     | 0.165  | 0.909 | 0.536 | 0.798 | 0.005 | 1      |

Note: a – Pearson Correlation

b – Sig. (2-tailed)

The EADB bond price showed a weak positive correlation between the bond price and inflation that is, 23.2%, a relatively strong positive correlation of 64.2% between the bond price and interest rate, a strong negative correlation of 77.6% between the bond price and exchange rate, very weak negative correlations of 7.3% and 7.1% between the bond price and liquidity and EPS respectively, a weak positive relationship of 21.9% between the bond price and profitability and relatively weak negative correlation between the bond price and political regime of 47% whereas no relationship between the bond price and period of existence of the bond. On the overall, only interest and exchange rate had a strong relationship with the bond price implying that a change in the interest and/or exchange rates significantly influenced the bond price.

When the Shelter Afrique bond price was run against the independent variables, inflation, liquidity, and EPS showed very weak negative correlation, political regime revealed a relatively weak negative correlation, whereas interest and exchange rate revealed a relatively strong positive and negative correlation respectively. Profitability showed signs of very weak positive correlation with period of existence showing no correlation. Only interest and exchange rate appeared to have a strong relationship with the bond price.

The independent variables that seemed to have a strong relationship with the Safaricom bond price were interest rate (-85.6%) and political regime (64.2%).

Interest rate had a relatively strong negative relationship of 62.7% whereas political regime had a relatively strong positive relationship of 70.6% with the zero coupon bond price. Inflation, exchange rate, liquidity, profitability, and earnings per share did not appear to have much correlation with the bond price.

As for the fixed rate government bond price, interest and exchange rate seemed to have strong positive and negative correlation of 76.9% and 81.4% respectively. In addition, political regime had a strong positive correlation of 80.4%.

Only interest rate and exchange rate showed a relatively strong positive and negative correlation of 60.1% and 73.3% respectively with the floating rate government bond price.

On average, the government bond price showed that interest rate had a weak negative correlation of 51% with the exchange rate showing a relatively strong negative correlation of 67.9% and political regime manifesting a relatively strong positive correlation of 61.8%.

Finally, when all the company bond prices were averaged, interest rate had a strong positive correlation of 81.3% and regime had a relatively strong negative correlation of 68.8%.

Following the correlation analysis, it can be concluded that the change in political regimes from KANU to NARC seemed to give investors a fresh level of confidence in the bond market and in the country in general. This did not however mean that the change in political regime in any way influenced the bond prices as correlation does not imply a cause and effect relationship. It only measures the degree of relationship between variables.

The exchange rate also seemed to suggest some relationship among some prices especially the government bonds and the EADB and Shelter Afrique bond probably because they are foreign companies operating in Kenya and transacting their businesses mainly with the US dollar as the major currency. It can be noted that the period of existence of a bond did not appear to have any relationship to the bond price.

Of all the independent variables, interest rates appeared to have the strongest influence on all the bond prices. This is similar to a study done by Budina and Mantchev (2000) in which they analyzed the main determinants of secondary market prices of Bulgarian brady bonds and found out that the exchange rate had a negative effect on the bond prices whereas the change in political regime had a positive effect.

#### **4.6 Testing for Multicollinearity**

In a multiple regression model, apart from testing for serial correlation, it is also important to test the data for multicollinearity. It exists when there is lack of

independent movement of the explanatory variables in the sample that is being used to estimate regression coefficients. It's important to estimate the separate influence(s) of one or more variables on the dependent variable. For example, by holding the effects of interest rate, exchange rate, profitability, EPS, liquidity and period of existence of bond constant, one can estimate the effect on inflation rate (the independent variable) on the bond price (the dependent variable).

Multicollinearity can be detected in the presence of large standard errors of the regression coefficients thus leading to instability of the regression estimates. Following the regression results as shown in the appendix, there are no large standard errors hence the degree of multicollinearity is minimal.



#### 4.7 Model Results

Using SPSS software, when each corporate and government bond are regressed on the independent variables, the following results were obtained as shown in the table below:

**Table 4: Regression Results**

| Beta                      |   |   |   |   |   |   |   |  |
|---------------------------|---|---|---|---|---|---|---|--|
| t value is in parenthesis |   |   |   |   |   |   |   |  |
| VAR                       | EADB  | SHELTER AFRIQUE                               | SAFARICOM                                     | ZERO COUPON                                 | FIXED RATE                                    | FLOATING                                    | AVG. GOVT                                   | AVG. CO.                                     |
| Inf.                      | 0.399<br>(6.225)                              | 1.221<br>(3.80E+07)                           | -0.772<br>(-4.9E+07)                          | -0.191<br>(-0.667)                          | 0.011<br>(-2020806)                           | 0.251<br>(0.895)                            | -0.101<br>(-0.451)                          | 0.528<br>(3.344)                             |
| Int.                      | 0.746<br>(14.713)                             |   | -1.424<br>(-1.1E + 08)                        | -0.81<br>(-3.575)                           | -0.593<br>(-1.3E+08)                          | 0.646<br>(2.909)                            | -0.675<br>(-3.812)                          | 1.051<br>(8.408)                             |
| Exch.                     | -0.54<br>(-11.219)                            | -1.661<br>(-6.6E+07)                          | -0.025<br>(-2368423)                          | -0.618<br>(-2.878)                          | -0.661<br>(-1.8E+08)                          | -0.502<br>(-2.385)                          | -0.78<br>(-4.64)                            | -0.067<br>(-0.563)                           |
| Liq.                      | 0.215<br>(0.914)                              | 0<br>0  | 0<br>0  | -0.958<br>(-0.914)                          | 0<br>0  | -0.94<br>(-0.914)                           | -0.749<br>(-0.914)                          | 0.529<br>(0.914)                             |
| PAT                       | 0.01<br>(0.09)                                | 0<br>0  | 0<br>0  | -0.002<br>(-0.009)                          | 0<br>0  | -0.002<br>(-0.009)                          | -0.002<br>(-0.009)                          | 0.001<br>(0.009)                             |
| Exist.                    | -0.019<br>(-0.375)                            | 0<br>0  | 0<br>0  | 0.083<br>(0.375)                            | 0<br>0  | 0.081<br>(0.375)                            | 0.065<br>(0.375)                            | -0.046<br>(-0.375)                           |
| EPS                       | -0.221<br>(-0.89)                             | 0<br>0  | 0<br>0  | 0.989<br>(0.89)                             | 0<br>0  | 0.969<br>(0.89)                             | 0.773<br>(0.89)                             | -0.546<br>(-0.89)                            |
|                           | R <sup>2</sup> =0.990<br>F=103.485<br>DW=1.17 | R <sup>2</sup> =1.00<br>F=7.9E+14<br>DW=0.302 | R <sup>2</sup> =1.00<br>F=2.0E+15<br>DW=0.357 | R <sup>2</sup> =0.809<br>F=4.238<br>DW=1.17 | R <sup>2</sup> =1.00<br>F=1.6E+16<br>DW=0.286 | R <sup>2</sup> =0.816<br>F=4.447<br>DW=1.17 | R <sup>2</sup> =0.883<br>F=7.565<br>DW=1.17 | R <sup>2</sup> =0.942<br>F=16.193<br>DW=1.17 |

#### 4.7.1 Model Results for the EADB Bond Price

The R square was 0.989 indicating that inflation, interest rate, exchange rate, liquidity, profitability, Earnings per Share, and period of existence of bond explained 98.9% of the changes in the bond price. Using the 95% confidence level, the calculated F-value of 103.49 was significant at 99% meaning that the variables were significant explanatory factors for the bond price. When the independent variables are considered individually, their extent on the bond price had varying effects. A unit change in inflation led to 0.40 units significant increase in the bond price implying that inflation had a strong positive effect on the bond price. A unit change in interest rate led to a 0.76 unit significant increase in the bond price. A unit change in exchange rate led to a 0.54 units significant decrease in the bond price whereas insignificant effects on the bond price were noticeable in liquidity, profitability, period of existence of bond, and earnings per share. Of all the variables under consideration, interest rate appeared to have the strongest effect on the bond price.

The acceptance region was  $-2.179(0, 2.179)$  thus inflation, interest rate and exchange rate values led to rejection of null hypothesis, indicating that these macroeconomic factors significantly influenced EADB bond prices. On the other hand, the liquidity, profitability, EPS, and period of existence t-values were within the acceptance region of the null hypothesis indicating that these non-macroeconomic variables did not significantly influence the bond price.

#### **4.7.2 Model Results for the Shelter Afrique Bond Price**

The R square was 0.99 thus inflation, interest rate, exchange rate, liquidity, profitability, EPS, and period of existence of bond explained almost 100% of the bond price. A unit change in inflation led to a 1.22 significant increase in the bond price whereas a unit change in the exchange rate led to a 1.66 significant decrease in the bond price. Liquidity, profitability, EPS, and period of existence of the bond had insignificant effects on the bond price. The t-value was 2.447 i.e.  $t_{0.05/2}(8-2)$ . The calculated t for inflation and exchange rate were greater than the t-value thus the null hypothesis was rejected meaning that inflation and exchange rate did significantly affect the bond price.

#### **4.7.3 Model Results for the Safaricom Bond Price**

The R square showed that almost 0.99 of the independent variables explained the bond price. A unit change in inflation, interest rate, and exchange rate led to a 0.72, 1.42, and 0.03 significant decrease in the bond price respectively. A unit change in liquidity, profitability, period of existence of the bond, and EPS led to no significant change in the bond price. This could probably suggest that non-macroeconomic factors appeared to have no significant effect on the bond price.  $t_{0.05/2}(11-2) = 2.262$  revealed that inflation, interest, and exchange rate had calculated t values that were within the rejection region hence rejecting the null hypothesis that they did significantly affect the bond price.

#### **4.7.4 Model Results for the Zero Coupon Bond Price**

The independent variables explained 80.9% of the bond price. Coefficients indicated that inflation, exchange rate, liquidity, and EPS had significant effects on the bond price with inflation, exchange rate, and liquidity significantly reducing the bond price and EPS significantly increasing it. The t-value, that is,  $t_{0.05/2} (14-2) = 2.179$  showed that interest and exchange rate had calculated t-values that were in the rejection region of the null hypothesis. Inflation, liquidity, profitability, EPS, and period of existence of the bond were in the acceptance region and therefore true of the null hypothesis that they did not significantly affect the bond price.

#### **4.7.5 Model Results of the Fixed Rate Bond Price**

The independent variables explained almost 0.99 of the bond price. A unit change in liquidity, profitability, period of existence of the bond, and EPS had no significant effect on the bond price. A unit change in interest and exchange rate led to a 0.59 and 0.66 significant decrease in the bond price respectively. A unit change in inflation led to an insignificant change in the bond price of 0.01 units.  $t_{0.05/2} (11-2) = 2.262$  revealed that inflation, interest, and exchange rate had calculated t-values that were within the rejection region of the null hypothesis hence they did significantly affect the bond price.

#### **4.7.6 Model Results of the Floating Rate Bond Price**

The independent variables explained 81.6% of the bond price as per the R square. Liquidity and EPS had significant effects on the bond price with liquidity leading to a

0.94 significant decrease and EPS leading to a 0.97 significant increase in the bond price. Inflation had a very weak positive significant change on the bond price of 0.25 units. Interest rate had a relatively strong positive significant effect of 0.65 units change in the bond price whereas the exchange rate had a 0.50 units significant decrease on the bond price. Profitability and period of existence of the bond had insignificant effects on the bond price with profitability showing a negative change of 0.002 units and period of existence a very weak positive change of 0.081 units.  $t_{0.05/2} (14-2) = 2.179$  showed that interest and exchange rate had calculated t-values that were in the rejection region of the null hypothesis and so they did significantly affect the bond price. Inflation, liquidity, profitability, EPS, and period of existence of the bond were in the acceptance region and therefore true of the null hypothesis that they did not significantly affect the bond price.

#### **4.7.7 Model Results of the Average Government Bond Price**

Considering the average price of all the government bonds, the R square was 0.88 meaning that the independent variables explained 88.3% of the bond price. Only the exchange rate, interest rate, liquidity, and EPS had significant effects on the bond price with exchange rate, interest rate, and liquidity having a negative significant effect and EPS a positive significant effect. Period of existence, inflation and profitability had insignificant effects on the bond price.  $t_{0.05/2} (14-2) = 2.179$  showed that interest and exchange rate had calculated t-values that were in the rejection region of the null hypothesis hence they did affect the bond price. Inflation, liquidity, profitability, EPS, and period of existence of the bond were in the

acceptance region and therefore true of the null hypothesis that they did not affect the bond price.

#### **4.7.8 Model Results of the Average Company Bond Price**

When the EADB, Shelter Afrique, and Safaricom bond prices are averaged, the R square was 0.94 indicating that the independent variables i.e. inflation, interest rate, exchange rate, liquidity, profitability, EPS, and period of existence of the bonds explained 94.2% of the bond price. A unit change in interest rate had a very significant increase in the bond price of 1.05 units. Inflation and liquidity revealed some significant increases in the bond price of 0.528 and 0.529 units respectively whereas the EPS had a 0.546units significant decrease in the bond price. Exchange rate, profitability, and period of existence of the bond had insignificant effects on the bond price.  $t_{0.05/2} (14-2) = 2.179$  revealed that inflation and interest rate had calculated t-values that were in the rejection region of the null hypothesis meaning that they did affect the bond price. Exchange rate, liquidity, profitability, EPS, and period of existence of the bond were in the acceptance region and therefore did not affect the bond price.

## **CHAPTER 5: CONCLUSION AND RECOMMENDATIONS**

### **5.1 Conclusions and Recommendations**

The study clearly pointed out that macroeconomic variables such as inflation, interest rates, and exchange rates are significant factors that influence bond prices. Non macroeconomic variables like liquidity, profitability, and EPS on the other hand did not have a significant influence on the bond price.

Interest rates affect whether or not investors will consider investing in bonds depending on their risk preferences. A risk taker prefers higher risk for higher returns while on the other hand, a risk averse investor will settle for lower risk hence lower returns. Policy formulators need to take into consideration individuals who invest in the bond market as alternative income like the employed and those who solely rely on income from bonds like retirees. In the case of the latter, there is no steady stream of income and so they require a less volatile investment portfolio. Companies also need to pay attention to interest rate volatility and investment portfolio.

Due to the inverse relationship between interest rates and bond prices, governments seeking to promote the bond market could pursue a low interest rate regime thus increasing bond prices and thereby making the market more attractive to investors.

Government dependence on short term borrowing is expensive as this leads to increased treasury bill rates which eventually make it expensive for the private sector to borrow funds. This is especially evident in Kenya as can be observed when the

NARC regime came to power. There was decreased short term government borrowing that led to a decrease in the treasury bill rate and so banks had to turn to the private sector to issue loans.

Governments can therefore source for finance from domestic resources such as the bond market instead of relying heavily on donor aid to finance long term project. They could also borrow from the bond market to meet budget deficits and finance essential services like hospitals and education.

If inflation is expected to rise, bond prices fall because investors expect to buy less when prices rise. To be compensated for the loss in purchasing power, investors must get a higher return on their investment thus higher interest rates. For long term interest rates, a risk premium is added so as to account for variations over time in income growth, inflation and other variables that could influence the level of interest rates.

Inflation is determined by monetary policy. Persistent inflation has its root cause in monetary policy. In general, if growth in money supply is excessive, inflation is likely to increase and an increase in inflation leads to a less active bond market as bond prices will decrease resulting to investors shying away from the market altogether. Since the government is a policy formulator, its role is very important in ensuring that inflation is controlled if it indeed wants to promote an active bond market.



The study showed that the exchange rate and bond price were inversely related. An increase in the exchange rate negatively influenced a company's bond price as can be seen for the Shelter Afrique and the East African Development bond that are foreign companies based in Kenya. If governments want to encourage foreign investment, they ought to consider the effect of the exchange rate on foreign companies that have issued bonds on the stock exchange. To encourage investment in these bonds, their prices will have to be attractive on the stock exchange and this can be made possible by the lowering of the exchange rate.

Since non macroeconomic variables such as liquidity, profitability, and earnings per share had no effect on the bond price, this does not mean that they should be ignored. Companies should always strive to maintain a good balance sheet and profit and loss account so that investors have confidence in them as this will give them certainty of recouping their investments.

It should be noted that the political stability of a country also promotes investment both foreign and local and that the change in political regimes can also bring about uncertainties in the economy. However, if the new regime is viewed positively, bond prices will increase and vice versa if viewed negatively.

## **5.2 Suggestions for Further Research**

Further research can be done on the non macroeconomic variables since many companies have now issued bonds on the stock exchange. The period of study can also be extended to 10 years, that is, 1997 to 2002 for the KANU regime and 2002 to 2007 for the NARC regime so as to establish stronger trends and relationships in the variables. It was not possible to undertake a ten year study because there needed to be a balance between the two political regimes.

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## APPENDIX

### EADB Avg. Bond Price

**Model Summary<sup>b</sup>**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|---------------|
| 1     | .995 <sup>a</sup> | .990     | .981              | .15171                     | 1.170         |

a.

Predictors: (Constant), existence, US EXCH

, INTEREST

, liquidity, INFLATION

, pat, Earnings Per Share

b. Dependent Variable: EADB average price

**ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F       | Sig.              |
|-------|------------|----------------|----|-------------|---------|-------------------|
| 1     | Regression | 16.673         | 7  | 2.382       | 103.485 | .000 <sup>a</sup> |
|       | Residual   | .161           | 7  | .023        |         |                   |
|       | Total      | 16.834         | 14 |             |         |                   |

a.

Predictors: (Constant), existence, US EXCH

, INTEREST

, liquidity, INFLATION

, pat, Earnings Per Share

b. Dependent Variable: EADB average price

### Coefficients<sup>a</sup>

| Model |                    | Unstandardized Coefficients |            | Standardized Coefficients | t       | Sig. |
|-------|--------------------|-----------------------------|------------|---------------------------|---------|------|
|       |                    | B                           | Std. Error | Beta                      |         |      |
| 1     | (Constant)         | 134.518                     | 3.286      |                           | 40.932  | .000 |
|       | INFLATION          | .120                        | .019       | .399                      | 6.225   | .000 |
|       | INTEREST           | .194                        | .013       | .746                      | 14.713  | .000 |
|       | US EXCH            | -.453                       | .040       | -.540                     | -11.219 | .000 |
|       | liquidity          | .023                        | .025       | .215                      | .914    | .391 |
|       | pat                | 3.590E-12                   | .000       | .001                      | .009    | .993 |
|       | Earnings Per Share | -.009                       | .011       | -.221                     | -.890   | .403 |
|       | existence          | -.008                       | .022       | -.019                     | -.375   | .719 |

a. Dependent Variable: EADB average price

### Shelter Afrique Avg. Bond Price

#### Model Summary<sup>b</sup>

| Model | R                  | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|--------------------|----------|-------------------|----------------------------|---------------|
| 1     | 1.000 <sup>a</sup> | 1.000    | 1.000             | .00000                     | .302          |

a.

Predictors: (Constant), existence, US EXCH

, liquidity, pat, INFLATION

, Earnings Per Share

b. Dependent Variable: Shelter afric average bond price

#### ANOVA<sup>b</sup>

| Model |            | Sum of Squares | df | Mean Square | F       | Sig.              |
|-------|------------|----------------|----|-------------|---------|-------------------|
| 1     | Regression | 9.245          | 6  | 1.541       | 7.9E+14 | .000 <sup>a</sup> |
|       | Residual   | .000           | 2  | .000        |         |                   |
|       | Total      | 9.245          | 8  |             |         |                   |

a.

Predictors: (Constant), existence, US EXCH

, liquidity, pat, INFLATION

, Earnings Per Share

b. Dependent Variable: Shelter afric average bond price

**Coefficients<sup>a</sup>**

| Model |                    | Unstandardized Coefficients |            | Standardized Coefficients | t        | Sig.  |
|-------|--------------------|-----------------------------|------------|---------------------------|----------|-------|
|       |                    | B                           | Std. Error | Beta                      |          |       |
| 1     | (Constant)         | 534.171                     | .000       |                           | 8.2E+07  | .000  |
|       | INFLATION          | .310                        | .000       | 1.221                     | 3.8E+07  | .000  |
|       | US EXCH            | -5.479                      | .000       | -1.661                    | -6.6E+07 | .000  |
|       | liquidity          | 5.300E-15                   | .000       | .000                      | .000     | 1.000 |
|       | pat                | -6.27E-23                   | .000       | .000                      | .000     | 1.000 |
|       | Earnings Per Share | -2.26E-15                   | .000       | .000                      | .000     | 1.000 |
|       | existence          | -5.31E-15                   | .000       | .000                      | .000     | 1.000 |

a. Dependent Variable: Shelter afric average bond price

**Excluded Variables<sup>b</sup>**

| Model |          | Beta In | t | Sig. | Partial Correlation | Collinearity Statistics |
|-------|----------|---------|---|------|---------------------|-------------------------|
|       |          |         |   |      |                     | Tolerance               |
| 1     | INTEREST | a       | . | .    | .                   | .000                    |

a.

Predictors in the Model: (Constant), existence, US EXCH

, liquidity, pat, INFLATION

, Earnings Per Share

b. Dependent Variable: Shelter afric average bond price

**Safaricom Avg. Bond Price**

**Model Summary<sup>b</sup>**

| Model | R                  | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|--------------------|----------|-------------------|----------------------------|---------------|
| 1     | 1.000 <sup>a</sup> | 1.000    | 1.000             | .00000                     | .357          |

a.

Predictors: (Constant), existence, US EXCH

, INFLATION

, liquidity, INTEREST

, pat, Earnings Per Share

b. Dependent Variable: safaricom average bond price



**ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F       | Sig.              |
|-------|------------|----------------|----|-------------|---------|-------------------|
| 1     | Regression | .352           | 7  | .050        | 2.0E+15 | .000 <sup>a</sup> |
|       | Residual   | .000           | 4  | .000        |         |                   |
|       | Total      | .352           | 11 |             |         |                   |

a.

Predictors: (Constant), existence, US EXCH

, INFLATION

, liquidity, INTEREST

, pat, Earnings Per Share

b. Dependent Variable: safaricom average bond price

**Coefficients<sup>a</sup>**

| Model |                    | Unstandardized Coefficients |            | Standardized Coefficients | t        | Sig.  |
|-------|--------------------|-----------------------------|------------|---------------------------|----------|-------|
|       |                    | B                           | Std. Error | Beta                      |          |       |
| 1     | (Constant)         | 101.686                     | .000       |                           | 7.5E+08  | .000  |
|       | INFLATION          | -.035                       | .000       | -.772                     | -4.9E+07 | .000  |
|       | INTEREST           | -.061                       | .000       | -1.424                    | -1.1E+08 | .000  |
|       | US EXCH            | -.004                       | .000       | -.025                     | -2368423 | .000  |
|       | liquidity          | -1.80E-15                   | .000       | .000                      | .000     | 1.000 |
|       | pat                | -7.20E-25                   | .000       | .000                      | .000     | 1.000 |
|       | Earnings Per Share | 7.198E-16                   | .000       | .000                      | .000     | 1.000 |
|       | existence          | 5.898E-16                   | .000       | .000                      | .000     | 1.000 |

a. Dependent Variable: safaricom average bond price

**Zero Coupon Avg. Bond Price**

**Model Summary<sup>b</sup>**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|---------------|
| 1     | .899 <sup>a</sup> | .809     | .618              | 95.35651                   | 1.170         |

a.

Predictors: (Constant), existence, US EXCH

, INTEREST

, liquidity, INFLATION

, pat, Earnings Per Share

b. Dependent Variable: zerocoupon average price

**ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F     | Sig.              |
|-------|------------|----------------|----|-------------|-------|-------------------|
| 1     | Regression | 269723.4       | 7  | 38531.912   | 4.238 | .038 <sup>a</sup> |
|       | Residual   | 63650.051      | 7  | 9092.864    |       |                   |
|       | Total      | 333373.4       | 14 |             |       |                   |

a.

Predictors: (Constant), existence, US EXCH

, INTEREST

, liquidity, INFLATION

, pat, Earnings Per Share

b. Dependent Variable: zerocon average price

**Coefficients<sup>a</sup>**

| Model |                    | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|--------------------|-----------------------------|------------|---------------------------|--------|------|
|       |                    | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant)         | 6349.716                    | 2065.618   |                           | 3.074  | .018 |
|       | INFLATION          | -8.119                      | 12.165     | -.191                     | -.667  | .526 |
|       | INTEREST           | -29.563                     | 8.268      | -.810                     | -3.575 | .009 |
|       | US EXCH            | -73.044                     | 25.379     | -.618                     | -2.878 | .024 |
|       | liquidity          | -14.404                     | 15.762     | -.958                     | -.914  | .391 |
|       | pat                | -2.26E-09                   | .000       | -.002                     | -.009  | .993 |
|       | Earnings Per Share | 5.877                       | 6.601      | .989                      | .890   | .403 |
|       | existence          | 5.231                       | 13.951     | .083                      | .375   | .719 |

a. Dependent Variable: zerocon average price

**Fixed Rate Avg. Bond Price**

**Model Summary<sup>b</sup>**

| Model | R                  | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|--------------------|----------|-------------------|----------------------------|---------------|
| 1     | 1.000 <sup>a</sup> | 1.000    | 1.000             | .00000                     | .286          |

a.

Predictors: (Constant), existence, US EXCH

, INFLATION

, liquidity, INTEREST

, pat, Earnings Per Share

b. Dependent Variable: fixed rate average price

**ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F       | Sig.              |
|-------|------------|----------------|----|-------------|---------|-------------------|
| 1     | Regression | 87.446         | 7  | 12.492      | 1.6E+16 | .000 <sup>a</sup> |
|       | Residual   | .000           | 4  | .000        |         |                   |
|       | Total      | 87.446         | 11 |             |         |                   |

a.

Predictors: (Constant), existence, US EXCH

, INFLATION

, liquidity, INTEREST

, pat, Earnings Per Share

b. Dependent Variable: fixed rate average peice

**Coefficients<sup>a</sup>**

| Model |                    | Unstandardized Coefficients |            | Standardized Coefficients | t        | Sig.  |
|-------|--------------------|-----------------------------|------------|---------------------------|----------|-------|
|       |                    | B                           | Std. Error | Beta                      |          |       |
| 1     | (Constant)         | 239.719                     | .000       |                           | 3.2E+08  | .000  |
|       | INFLATION          | .008                        | .000       | .011                      | 2020806  | .000  |
|       | INTEREST           | -.401                       | .000       | -.593                     | -1.3E+08 | .000  |
|       | US EXCH            | -1.685                      | .000       | -.661                     | -1.8E+08 | .000  |
|       | liquidity          | -5.26E-16                   | .000       | .000                      | .000     | 1.000 |
|       | pat                | -8.02E-24                   | .000       | .000                      | .000     | 1.000 |
|       | Earnings Per Share | 2.463E-16                   | .000       | .000                      | .000     | 1.000 |
|       | existence          | 7.863E-18                   | .000       | .000                      | .000     | 1.000 |

a. Dependent Variable: fixed rate average peice

**Floating Rate Avg. Bond Price**

**Model Summary<sup>b</sup>**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|---------------|
| 1     | .904 <sup>a</sup> | .816     | .633              | 3.23738                    | 1.170         |

a.

Predictors: (Constant), existence, US EXCH

, INTEREST

, liquidity, INFLATION

, pat, Earnings Per Share

b. Dependent Variable: floating rate average price

**ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F     | Sig.              |
|-------|------------|----------------|----|-------------|-------|-------------------|
| 1     | Regression | 326.255        | 7  | 46.608      | 4.447 | .034 <sup>a</sup> |
|       | Residual   | 73.364         | 7  | 10.481      |       |                   |
|       | Total      | 399.620        | 14 |             |       |                   |

a.

Predictors: (Constant), existence, US EXCH

, INTEREST

, liquidity, INFLATION

, pat, Earnings Per Share

b. Dependent Variable: floating rate average price

**Coefficients<sup>a</sup>**

| Model |                    | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|--------------------|-----------------------------|------------|---------------------------|--------|------|
|       |                    | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant)         | 245.873                     | 70.128     |                           | 3.506  | .010 |
|       | INFLATION          | .370                        | .413       | .251                      | .895   | .400 |
|       | INTEREST           | .816                        | .281       | .646                      | 2.909  | .023 |
|       | US EXCH            | -2.055                      | .862       | -.502                     | -2.385 | .049 |
|       | liquidity          | -.489                       | .535       | -.940                     | -.914  | .391 |
|       | pat                | -7.66E-11                   | .000       | -.002                     | -.009  | .993 |
|       | Earnings Per Share | .200                        | .224       | .969                      | .890   | .403 |
|       | existence          | .178                        | .474       | .081                      | .375   | .719 |

a. Dependent Variable: floating rate average price

**Avg. Government Bond Price**

**Model Summary<sup>b</sup>**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|---------------|
| 1     | .940 <sup>a</sup> | .883     | .767              | 24.49730                   | 1.170         |

a.

Predictors: (Constant), existence, US EXCH

, INTEREST

, liquidity, INFLATION

, pat, Earnings Per Share

b. Dependent Variable: average govt bond price

**ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F     | Sig.              |
|-------|------------|----------------|----|-------------|-------|-------------------|
| 1     | Regression | 31781.190      | 7  | 4540.170    | 7.565 | .008 <sup>a</sup> |
|       | Residual   | 4200.824       | 7  | 600.118     |       |                   |
|       | Total      | 35982.014      | 14 |             |       |                   |

a.

Predictors: (Constant), existence, US EXCH

, INTEREST

, liquidity, INFLATION

, pat, Earnings Per Share

b. Dependent Variable: average govt bond price

**Coefficients<sup>a</sup>**

| Model |                    | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|--------------------|-----------------------------|------------|---------------------------|--------|------|
|       |                    | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant)         | 2625.698                    | 530.662    |                           | 4.948  | .002 |
|       | INFLATION          | -1.409                      | 3.125      | -.101                     | -.451  | .666 |
|       | INTEREST           | -8.098                      | 2.124      | -.675                     | -3.812 | .007 |
|       | US EXCH            | -30.255                     | 6.520      | -.780                     | -4.640 | .002 |
|       | liquidity          | -3.700                      | 4.049      | -.749                     | -.914  | .391 |
|       | pat                | -5.80E-10                   | .000       | -.002                     | -.009  | .993 |
|       | Earnings Per Share | 1.510                       | 1.696      | .773                      | .890   | .403 |
|       | existence          | 1.344                       | 3.584      | .065                      | .375   | .719 |

a. Dependent Variable: average govt bond price

**Avg. Company Bond Price**

**Model Summary<sup>b</sup>**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|---------------|
| 1     | .970 <sup>a</sup> | .942     | .884              | .31042                     | 1.170         |

a.

Predictors: (Constant), existence, US EXCH

, INTEREST

, liquidity, INFLATION

, pat, Earnings Per Share

b. Dependent Variable: average company bond price

ANOVA<sup>b</sup>

| Model |            | Sum of Squares | df | Mean Square | F      | Sig.              |
|-------|------------|----------------|----|-------------|--------|-------------------|
| 1     | Regression | 10.922         | 7  | 1.560       | 16.193 | .001 <sup>a</sup> |
|       | Residual   | .675           | 7  | .096        |        |                   |
|       | Total      | 11.597         | 14 |             |        |                   |

a.

Predictors: (Constant), existence, US EXCH

, INTEREST

, liquidity, INFLATION

, pat, Earnings Per Share

b. Dependent Variable: average company bond price

Coefficients<sup>a</sup>

| Model |                    | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|--------------------|-----------------------------|------------|---------------------------|--------|------|
|       |                    | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant)         | 102.935                     | 6.724      |                           | 15.308 | .000 |
|       | INFLATION          | .132                        | .040       | .528                      | 3.344  | .012 |
|       | INTEREST           | .226                        | .027       | 1.051                     | 8.408  | .000 |
|       | US EXCH            | -.047                       | .083       | -.067                     | -.563  | .591 |
|       | liquidity          | .047                        | .051       | .529                      | .914   | .391 |
|       | pat                | 7.345E-12                   | .000       | .001                      | .009   | .993 |
|       | Earnings Per Share | -.019                       | .021       | -.546                     | -.890  | .403 |
|       | existence          | -.017                       | .045       | -.046                     | -.375  | .719 |

a. Dependent Variable: average company bond price