

**EFFECT OF INTEREST RATE RISK ON BOND YIELD IN THE
KENYAN BOND MARKET**

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DECLARATION

This research project is my original work and has not been presented to any other university for examination.

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DEDICATION

This project is dedicated to my late dad, Mr. Geoffrey Ndunda for how he encouraged me to work hard and excel in my studies. I also dedicate this project to future researchers in this field of finance

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ABBREVIATIONS AND ACRONYMS

ANOVA	-	Analysis of Variance
CBK	-	Central Bank of Kenya
CMA	-	Capital Market Authority
CPI	-	Consumer Price Index
IRR	-	Interest Rate Risk
IRRM	-	Interest Rate Risk Management.
OBS	-	Off Balance Sheet
OLS	-	Ordinary Least Square
SPSS	-	Statistical Package for Social Sciences.
VAR	-	Vector Auto Regression
VECR	-	Vector Error Correlation Model
YTM	-	Yield to Maturity

ABSTRACT

Kenya's corporate bond market has been having a low operation compared to treasury bonds. As from inception of the bond market in Kenya only a few organizations are trading in bonds. The development the Kenyan bond market has been slow because of many factors which includes insufficient information and the movement of interest rates up and down. This study investigated rate of interest risk on bond yield in the Kenyan bond market. The study variables under investigation were interest rate risk, Term to maturity of the bond, coupon rate, default risk, firm's profitability position and supply levels. Causal research design was applied. A total number of 15 corporate bonds issued for the period from 2008 to 2014 were studied. The data used was collected from Central Bank of Kenya (CBK) report; Nairobi securities exchange (NSE) website report, Capital market authority (CMA) website, and financial statements of the companies and from published journals. Descriptive statistics and inferential analysis were used for data analysis. This was carried out to establish relationship between interest rate risk and the bond yield. An R-square value of 0.674 was established which depicted that a very strong relationship was existing between the variables. Interest rate risk influences strongly the bond yield. This was found to be more evident for the longer term bonds compared to the short term ones. Bonds with longer years to maturity of the bonds affected bond yield. A positive significant and insignificant relationship was observed among the other variables under study. The study recommended that regulations governing bond market investment should be loosened to encourage more investors, it was also recommended that more awareness to be created among investors in regard to corporate bond investment as many investors traded in the treasury bonds compared to corporate bonds. The Treasury bond market in Kenya is more wide compared to the corporate market, therefore a lot needs to be done to create more development in the bond Market sector Kenya.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Bond market is a way of raising finance for both government and corporations all over the world today (Fabella and Madhur, 2003) in major financial institutions around the world, trading in the bond market has become popular as it earns large amount of profits. Structured bond markets are gaining more importance to raise capital. The term structure of interest is currently a key issue for academics, researchers and investors. The term structure on interest rates started from Fischer and Hicks ideas in the 1930's. Many theories with strong empirical evidence on the term structure behavior exist, which help in conclusion about bond market behavior (San, Yoke and Heng, 2012).

The Relationship between bond yield and interest rates has been analyzed by many economists' theorist and investment analyst all over the world. Despite of this attention directed to this analysis term structure theories remain at a state of confusion among scholars and investors in the bond market (Burton, 1962). This research will analyze term structure theories to explain the impact of rates of interest, its risk and how this affects bond returns. The study will be guided by the liquidity premium, segmented market and the preferred habitat theories.

Investors of bonds usually are faced by several kinds of risks in their investments. One of these risks is the interest rate risk (Rohini and Gigi, 2014). Risk on interest rates can affect economy negatively as well as businesses. Today interest rate risk is evident all over the world. Financial institutions are exposed directly to the risk on interest rate

movement. This is because in their portfolio's they hold bonds which are subject to interest rate risk. Institutional investors, mutual funds as well as corporate sectors are also affected by movement of interest rates. There exist high degree of linkage between financial institutions and other corporate organization with economic growth, due to this there is a great impact between rates of interest and performance of the whole economy, therefore interest rate risk is crucial element for economy today (Shunmugam & Hashim,2009).

1.1.1 Interest Rate Risk

Rate of interest risk is a risk which means organizations and investors will earn losses from their investment as a result of movement of rates of interest up and down (Chorafas,1999).Interest rate risk is an essential element to be to be observed because if it is not well managed may cause huge losses to investors. Investors usually in short and long term securities are affected by interest rate changes at different magnitude. As interest rates change higher amount of interest is paid to the depositors, while amount paid by debtors does not change (Angbazo, 1997).

Cox,Ingersoll and Ross (1985) showed that risk on interest rates arises because of mismatch between the investment horizon by investors and the time to maturity for a bond. When investor in bonds decides to sell a bond before its maturity, the movement in rates of interest can lead to gain or loss and the many years remaining to mature for a security the higher the magnitude of effect and the larger the potential of losses. Basel committee on banking supervision (2004) suggested that rate of interest risk arises from many factors which are reprising risk, risk of basis and optionality.Interest rate movements affects adversely investment and therefore management systems should be

put to ensure that its effects are at minimum levels. These systems should allow proper measurement, timely identification and proper controls against interest risk exposure. According to Macaulay (1938) interest rate risk is measured using the duration concept, this method provides time structure of the bond. It relates the change in price of the bond to change in interest rate yield and shows how change in interest rate affects present value of bond investment. GAP analysis can also be used which analyses interest rate sensitive assets and liabilities hence their ratio is determined.

1.1.2 Bond Yield

One of the benchmark used by investors in the bond market is by observing the bond yield earned from their investment. Investors consider yield as a reference to measure performance of their bond portfolio which they have invested. Bond yield is yearly percentage increase or decrease in the bond value. Yield curve for a bond shows the relationship between rates of interest with time to maturity and this helps the investor to predict the expected return for a bond as its performance. (Sihombing and Jonker, 2013). The value of investment usually moves down and upward depending on changes of factors such as rate of interest prevailing, Exchange rate, inflation rate among other factors in the economy (Leibowitz and Bova, 2014).

Yield is the amount of earning the investor in bond market require from their investment (Ross, Westerfield & Jordan, 2009). Two forms of bond yield which includes the current yield and yield to maturity exist when calculating bonds yield for investor. Current yield is that yield got from dividing its coupon by market price. Current yield is greater than coupon if market price is less than the nominal value and it is lower than coupon if market price is greater than nominal value. Yield to maturity is that amount bondholder

gets from the investment if he holds the bond up to maturity and it represents benefits from bond investment at a higher degree as compared to when using current yield. Therefore these two forms of yield are generally referred to be yield when determining bonds performance, which is also interpreted as the price of money in the bond market investment (Directorate of government debt, 2011).

1.1.3 Effect of Interest Rate Risk on Bond Yield

Over the last years rate of interest have been moving up and down all over the world. The changes and spread in interest rates for bonds with varying maturity levels is well explained by characteristics of the bond. Similar bonds differing in maturity levels also exhibit differences in terms of yield. In respect to this term structure theory which is the market segmentation theory, liquidity premium theory, pure expectation theory and preferred habitat theory explains variations in yield for bonds and the yield curves due to changes in the interest rates. Preferred habitat theory suggest that most of the short term bonds yield higher compared with long term bonds and that investors like short-term investments. According to this theory yield curve is positively sloping. According to market segmented theory yield is explained by the demand and supply forces which are due to price of the bond and interest rates. According to Pure expectation theory interest for bonds with varying maturity is explained in terms of forward rates and spot rates. Hicks in his liquidity premium theory described investors as risk averse and requiring risk premium to invest in long term bonds. This explained why long term bonds yield higher and that they are perfect substitutes (Stafford,Richard,&John ,2006).

The basic principle is that interest rate and prices relate inversely and the bond prices and bond yield also move inversely. While fixed securities are affected by changes of rates of

interests, extend of the risk is determined by the maturity period. The longer the maturity period the adverse the effect on the bond and the shorter the maturity period, the lower the risks of price changes and return. Therefore, bonds with longer maturities are highly risky compared to bonds of shorter maturity. Changes in the interest affect initial earnings and that value of a bond realized by holding the bond up to a given period and is affected due to the changes in interest rates prevailing (Kim, 2011).

1.1.4 The Kenyan Bond Market

In Kenya, bond market mainly trades in treasury bonds and corporate bonds. These trading are governed by various rules and regulations which are laid down by the NSE together with CMA. To list at Nairobi stock Exchange and issue bonds, a corporate organization needs to have five million shillings shares as well as hundred million shillings net assets. The issued bond must be free to transfer from one holder to another. The issuing company must also produce statements to show that it intends to exist under going concern terms. The company must also ensure that it has not breached any loan covenant and should be geared in 4:1 ratio, meaning that it is solvent (Ngugi,Mbewa& Kithinji, 2007).

Bond markets are important part of financial sector locally and globally and it is a backbone of financial markets all over the world. In Kenya bond markets provide government and corporate entities with funds for investment and grow the economy, provide investment vehicles for asset managers and provide a basis for evaluating other market products. Generally, in Kenya it is the market for long term finance. Over the past years, Kenya has witnessed tremendous growth and diversification of the financial systems especially in the fixed income security market which includes the bond market.

This began in the year 2001 when the central bank re-launched the treasury bonds program, at the time when the treasury bonds to bills was heavily skewed in favor treasury bills at the ratio of 1 to 3 (Njuguna, 2014).

1.2 Research Problem

Kenya's corporate bond market has been having a low operation compared to treasury bonds. As from inception of the bond market in Kenya only a few organizations are trading in bonds. The development of bond market seems to be slow due to many reasons which include lack of information and fluctuating interest rate regime. Despite of the many developments that have been made to boost the bond market, lots of efforts should be put in place so that many investors can come in the market (Ngugi,Mbewa&Kithinji, 2007).

Previous studies in Kenya have been carried out concerning interest rate and bonds with none which discussing how interest rate risk affect bond yield. Lucy(2012) studied on how financial performance is affected by interest rates. Nelson(2013) researched on how real estate growth was affected by volatility in rates of interest.Wambua(2013) researched on how financial performance of class. Class "A"road construction companies in Kenya were affected by volatility in interest rates. Salome(2017) studied determinants of government bond yield. Ngabarano (2012) studied what influenced corporate bonds performance and concluded that more research to be carried out to bring forth more knowledge on the relationship between interest rates, inflation and exchange rates concerning bonds, because very little literature was available to explain these variables.

Many other studies have also been done to analyze rates of interest risk in the financial markets. Many of these focused on what determined rates of interest risk (Hutchison and Pennachi, 1996) & (Simonite & Duan, 2002). All these suggested on ways to minimize rate of interest rate risk. Other studies suggested interest rate risk to be integrated together with credit risk and liquidity risks exposure to be managed effectively (Alessandri & Drehmann, 2010) and (Esposito, Nobili & Ropele, 2015). From above studies it suggests that interest rate risk is a major issue even across and that study for interest rate risk is essential.

In Kenya little has been documented concerning Bond yield. Most of the researchers have been heavily concentrating on the common stock while neglecting the bonds and the little which has been carried out did not show how bond yield is affected rates of interest risk, the relationship and the magnitude of the effect. This shows a gap exists and therefore this study will fill this gap by discussing how interest rate risk affects bond yield as well as the relationship between interest rate risk with other variables and the bond yield.

Some researchers believed that risk of interest rates had no impact on performance of bonds. Dore, Makken & Eastman (2013) carried study on relationship between rates of interest and investment and concluded that interest rates had no impact on investment, rather it depended on demand levels in the economy. Hata and Sekine (2006) argued that when investors are making their decision especially under long-term periods, interest rates played a major influence in determining their investment decision and outcome. There this creates a question whether interest rate risk affect bond yield or not. This study will seek to answer this question.

1.3 Research Objective

The objective of the study was to investigate the effects of interest rate risk on bond yield.

1.4 Value of the Study

The research will be of benefit to the bondholders. Bond holders are the people who invest in the bond market. The study will enlighten them on how interest rate risk will affect their returns, and therefore enable them to make informed decisions regarding when to invest in the bonds and what class of bond to invest in so as to maximize their profit and returns.

Secondly the study will be of benefit to the bond markets in Kenya. Bond markets include government organizations, commercial banks, insurance companies and other corporate dealing with bond issues. They will know what public and investors has in regard to knowledge of bonds and thus be able to fill the vacuum available to attract more investors so as to raise their finances and enable smooth flow of their activities.

It will also help government officials, through regulations as well as taxes matters; the government becomes a regulator of the market. When the general public has enough information in regard to bonds, the government will have easy time to sell its bonds (treasury bonds) to the public and be able to generate finances which can be used to finance and infrastructure and government spending.

Lastly the study will be of help to the future researchers in this field of finance. Through this work many researchers will gain more knowledge which will benefit them to carryout similar research. Through the gaps in the study which have been highlighted and

further suggestions which have been pointed out this will form basis of a further research in this field of finance.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This part comprises of theoretical review, determinants of the dependent variable, empirical studies and it will be summed up by the summary on the whole chapter.

2.2 Theoretical Review

Studies at times are informed by the available information in regard to the phenomenon under investigation. The existing studies are matched with the current one and correlation drawn in regard to the two and their relationship indicated. This study will be informed by Liquidity premium theory of interest rates, Market segmentation as well as the preferred habitat theory.

2.2.1 The Liquidity Premium Theory of Interest Rate

The theory was advanced by Hicks, (1946) he asserted that short term and long-term bonds cannot be substituted by each other. According to this theory investors like short-term bonds because they are not adversely affected by interest rate risk and if that the investors must be compensated through liquidity premium for them to hold bonds with longer term maturity. Hicks argued that as a result of these premiums, the curve on yield slopes upward.

Ahimud & Mendelson(1991) established yield changes for both Treasury bills and notes that had same duration to maturity. Krishnamurthy (2002) found price differences of 30 year bond between on the run and off the run of the bonds and argued that this was due to

demand of the liquid asset. Long staff (2004) showed difference in yield for recoup bond and zero coupon bonds was as a result large liquidity premium.

Understanding liquidity in bond market is crucial in today's academics and also in terms of practical importance. Liquidity in market influences the bond returns as a result of liquidity premium which is embedded in the bond prices (Amihud, Menelson & Perden, 2005). The theory explains the yield differences between instruments that are equivalent but at different levels in terms of liquidity. This theory therefore will help to explain why longer maturity bonds will yield higher compared to bonds with shorter maturity it also explains what influences investors decision to go for long-term bonds which are adversely affected by interest rate risk.

2.2.2 Market Segmentation Theory

This theory was advanced by Culbertson (1957) according to Culbertson bond market varies because of differences in maturity period. He argued that bond market is segmented. Segmentation and each segment are unique and separate from the other. The yield in these segments is determined by demand and supply forces existing in the segments. Each segment operates independently and it is not affected by the conditions existing in the other segment. According to Culbertson we have segments divided as for those preferring bonds within short maturation duration, investors for medium bonds and those investing within long duration. The segments are characterized by maturity length and for each segment the interest rate and yield on bond is governed by demand and supply.

For market segmentation to exist investors must confine within certain limited maturities and that these maturities are usually rigid. Segmentation in the market may be weaker or stronger, weaker segmentation exist where investors have potential to substitute between there maturity preferences and they choose not to do so. The motivation for investors to rely on certain maturity preferences is usually to minimize the risks associated with liquidity and prices. However despite of the segmentation investors are likely to move to other maturity preferences of different maturity period in cases where there yields are affected (Kidwell & Koch, 1983).These theory helps my study to have more elaborate explanation on the impact of the different economic forces on bond yield and how they affect return of the bond.

2.2.3 The Preferred Habitat Theory

It was developed by Modigliani and Sutch, (1966) this theory incorporates both expectation theory and market segmentation. They argued that those who borrow and lend have strong preferences for assets or liabilities of a specific date, and they can move away from this maturity, i.e. their preferred habitat, if interest rate incentive is available. The theory implies investors in bond will invest bonds of specific maturity length which lies within their interest. Although investors may invest in a bond outside their maturity preference if premium risk is offered. It stresses that investors mostly like to go for bonds with shorter maturity as compared to bonds with longer maturity.

According to Vayanos&Vila (2009), bond prices are determined by government bonds supply and their demand by preferred habitat investor and arbitrageurs. The effect of preferred habitat is more experienced if the behavior of risk aversion is high among the investors, while their participation in the market is minimal. In this theory, the risk

aversion is central and therefore exist a positive relationship between the bond yield spread and supply of the debts with longer maturity period which usually is determined by risk aversion behavior of the investors. There exists a valuable role played by investors in the preferred habitat theory. This is due to decisive role of risk aversion which is mostly applied by many bond investors (Strohsal, 2013). These theory helps my study in that it helps to understand real world situations that there exist investors with different preferences when it comes to investment. Pension investors and those in the insurance sector who prefer long term bond to match their liabilities as well as short term investors. It also helps my study to understudy the future path interest rates are expected to follow and therefore making informed conclusion and recommendations about my study.

2.3 Determinants of Bond Yield

This includes some of the factors that determine yield for a bond. These are the interest rate, liquidity risk, default risk, the profitability position of the issuing firm, term to maturity, and the coupon rate of the bond.

2.3.1 Interest Rate

Investors in bond market usually view rate of interest as the level of return expected from their investment(Baldacci and Kumar,2010).Interest rates keeps on varying as influenced by the prevailing economic conditions of a given country and these affects bond yields investors expect to earn.

Interest rate has inverse relationship with bond yield. When interest rate goes up the bond prices go up and the bond yield goes down hence a decrease in value of the bond. As

interest rate goes down the price of a bond goes down and the yield for the bond goes up hence value of the security increases. The movements in rates of interest affect the total return from bond investment as well as the re-investment return (Kim, 2011). Interest rate therefore is an important variable for any countries economy.

2.3.2 Default Risk

Default risk is one of the major determinants of corporate bond yield (Merton,1974).The issuing company leverage and profitability position are the key factors indicating the probability of the firms default risk.Nakashima & Saito (2009) suggested that bonds issued by companies that are highly leveraged are more risky as a result of higher interest burden likely to be experienced by the company. Therefore as a firm injects more debts in its firm's capital structure, the firm bear's greater interest obligation, and this leads the firm issuing bonds at a higher yields to offset this risk associated with this burden.

2.3.3 Issuing Firm Profitability Position

Issuing firm profitability position has a direct effect on firm issued bonds.Ugurlu & Aksoy (2006) investigated the ability of the issuing company to generate returns from its assets and concluded that, the firms having sufficient returns were at lower chances of default. Firm's profitability is measured in terms of how much profit it makes. This also indicates the default risk a firm is likely to incur. The default risk of a firm is measured in terms of leverage and the profitability levels. A positive relationship exists between the company's leverage levels with the bond yield as indicated by (Bhojraj & Sengupta, 2003).

Corporate bonds issued by companies that are highly leveraged are at a much higher risk because of the burden of higher rates of interest burden. The more a company injects debt into its financing capital structure, the greater that firm has interest obligation, this leads to much higher bond yields to offset this risk. Firms with higher returns, better stability and profitability are expected to issue bonds at a lower yield (Nakashima & Salto, 2009).

2.3.4 Supply Level

The issued amount of the bonds often is assumed to indicate the level of bonds liquidity. A positive relationship exists between the issued amounts with bond liquidity. As the no. of bonds issued increases, liquidity increases and the yield spread (Fisher,1959).

Larger supply levels lowers information size, this also affects inventory cost. Larger issue size have lower transaction cost as many investors own this bonds and they have fully analyzed the bond features(Crabbe & Turner,1995).Where as if the issued size is small the information may be broadly disseminated by the bond investors. The supplies amount and the outstanding amount usually show a positive effect on liquidity and a negative effect on bond yield.

2.3.5 Term to Maturity for the Bond

Term to maturity is an important issue characteristic that determines yield for a bond among many different bonds. Amihud& Mendelson (1991) suggested that bonds having higher age more than 3yrs and above are highly affected by changes interest rates thus adversely exposed to interest rate risk. According to these studies there exists a positive relationship, the many years remaining for the bond to mature and its yield.

Sariga & Warga (1989) showed as a bond becomes older, some of portion of its issued amount is taken to the investors buy and hold portfolios. Therefore the old the security becomes few exchange activities occur in the bond market and it is therefore less liquid. Therefore performance of a bond increases as its age and maturity increases.

2.3.6 Coupon Rate for the Bond

Coupon rate is another issue characteristic affecting the bond yield. Coupon payment indicates the levels of tax that investors are supposed to pay. Liu & Jiraporn (2010) found that bonds with higher coupon rates resulted to higher bond yields, as these bonds having a higher rate of coupon were subjected to more taxes. Investors therefore are compensated for these by offering higher yield bonds so as to make them more attractive for the investors (Lu,Chen & Liao,2010).The higher the coupon a bond has the higher also the yield for the bond.

2.4 Empirical Evidence

Wuhan&Khursid(2015) studied how investment in China was affected by rates of interest. Their main objective was to test how interest rates affected investment at Jiangsu province of China. The period under study was from 2003 – 2012.Co-integration test was employed for long-run, while for short run,VECM was used.They found out that the association was longterm between the variables and that in the long run the relation was negative and positive in the short run. They concluded that, the bond prices fall when rates of interest moved upward and when the rate of interest fall the bond prices also rose up. Rising interest rate increased cost of investment and therefore demand for investment

reduced which in general also lowered return of the bonds. The study is of relevance as it points out how interest rate affected investment in bonds.

Mahmudul&Gazi (2009) showed how stock and bond price changed in relation to changes in the rates of interest at the Australia financial market. The period under study was from January 1988 – March 2003. A sample of 15 developing and developed countries from this period was used. The data was taken from international financial statistics. Random walk theory was applied in the study. Randomness of market, were tested using market return. Market returns were gotten from monthly price indices. The relationship between the variables was determined by using regression analysis. The results showed that the share prices were affected by change in interest rates and that the relation was a negative relationship. They concluded that share prices moved in opposite direction just as it is evidenced in the bond prices.

Anurag (2015) conducted a study on various factors affecting bond market a case study for India. He wanted to show how various market variables affected bond yield. Bonds of maturities ranging from 1yr to 10yrs were used in the study. Variables under study included interest rate, inflation, spot rate, repo, reverse repo rates and crude oil prices. Correlation and regression analysis was applied. The results showed that bond returns had a positive correlation with all factors except the spot rate and the reverse repo rate. Using correlation table he established that inflation had a higher positive correlation than that of other variables and that economic growth was affected by long-term rates through inflation expectation. He found that inflation had a higher positive correlation with return for short maturity bonds and relationship declined as maturity period increases. He also found that exchange rate has negative correlation on bond return. He concluded that there

was a relation between the variables and bond return of different maturities and that bonds of different maturities moved together with given variable meaning that any variable affected the bond price of a shorter maturity same as that of longer maturity.

Norliza, Ruzita&Rasidah (2016) examined the factors influencing yield on corporate bonds in the Malaysian bond market. The period under study was from 2008 – 2011. The data was collected from the Bond Pricing Agency Malaysia data base. The population under study had 168 issues on corporate bonds for 48 organizations which was equal to 724 trading transactions in the bond market. The sample comprised of all bond issues which were trading in the secondary market, excluding issues in the financial institutions and insurance and private companies listed. The results were presented in form of a table. The results showed that both issuer and issues characteristics had influence on bond returns. Although the issue characteristics which included bond maturity and coupon rate had a great influence on bond returns. They established that the more interest rate fluctuated the higher the chances of losses on the return. The regression results also showed that the issuers' credit rating influenced bond return. They concluded that issuers and issue characteristics in the Malaysian market both determined yields of bonds.

Mouna&Anis(2013) examined the exchange rate volatility together with changes in interest rates and how this effected on banks returns , a case study of Tunisia. The study used OLS and GARCH models of statistics. They established that rates of exchange and market index had an impact in determining the dynamics of the bond returns. Additionally, they found that interest and exchange rate volatility are the major determinant of stocks and bond returns volatility .From the study it was evident that exchange rate and market index played a key role in determining the rate of in return in

bonds just as it determined the stock returns in the market. This also affected the volatility in the bond investment in the market. Therefore interest rates and exchange rate a crucial variables to consider in the bond market investment.

Longei&Abdalla(2017) carried out a study on determinants of bond market index at the Nairobi Securities Exchange in Kenya. Their main objective was to show how interest rate related with the bond market index for the years as from 2006 to 2016.The research used a descriptive research design. The target population comprised 42 investment banks and 21 stock brokers at the NSE.A sample size of 96 staff members were chosen. They adopted regression of the variables against market index of the NSE.Tables, graphs and pie chart presented the data. It was clear that interest rate and market index related to each other inversely and that as bond market index increased, interest rate also increased. Hence interest rate and bond market were relating negatively and significantly. As interest rates fall, bond prices go up and increase in interest rates cause the bond price to go down. They concluded that interest rate risk, inflation and rates of exchange were satisfactory variables in determining bond yield. Interest rates and marker index negatively and significantly related to each other. Inflation and bond market index inversely related. Exchange rates and bond market index were inversely related. Hence interest rates, exchange rate and inflation affected Bond market.

Ngabirano (2016) examined the determinants of corporate bond performance in Kenya. He was analyzing what determined performance of corporate bonds internally and secondly to find out the external determinants of corporate bonds performance and finally he wanted to analyze the ways that enhanced corporate bond performance. He used a causal research design to analyze the variables. The target population was 18 corporate

bond issues which were listed at NSE between the period of June 2010 and June 2015. Secondary data was from NSE website, KNBS and CBK website. The research used correlation and multiple regression, analysis, tables and graphs were used .SPSS was applied to analyze the data. The research established that the internal determinants had a negative insignificant relationship with bond performance but bond issue size and coupon rate had a positive relationship with bond performance. He also pointed a positive insignificant relationship between rates of interest and rates of exchange but inflation rates had a negative relationship with bond performance. The study is of relevance as it shows how various factors affects corporate bond performance among them are the interest rates, exchange rates and credit ratings.

Ochieng&Olweny(2015) studied the effect of interest rates on bond value at NSE. They wanted to establish how interest rates affected gilt-edged bonds at the market. They used quasi experimental study design. They investigated all the fixed guilt-edged bonds that were trading at NSE from the period of 2008-2014. The researchers focused on central bank rates, inter-bank rates and the repo rates. Multi-variant regression was applied in the study. To test significance of the model F-Test was tabulated from statistical table. The results showed that the central bank rates, interbank rates and repo rates affected value of guilt edged bonds. At the confidence level of 95%, it was clear that only the central bank rates affected the nominal value of a bond significantly. There was a positive correlation for the three types of rates and the value of a bond. The study is of relevance to my research as it indicates the forms of interest rates and how they affected the value of a bond return.

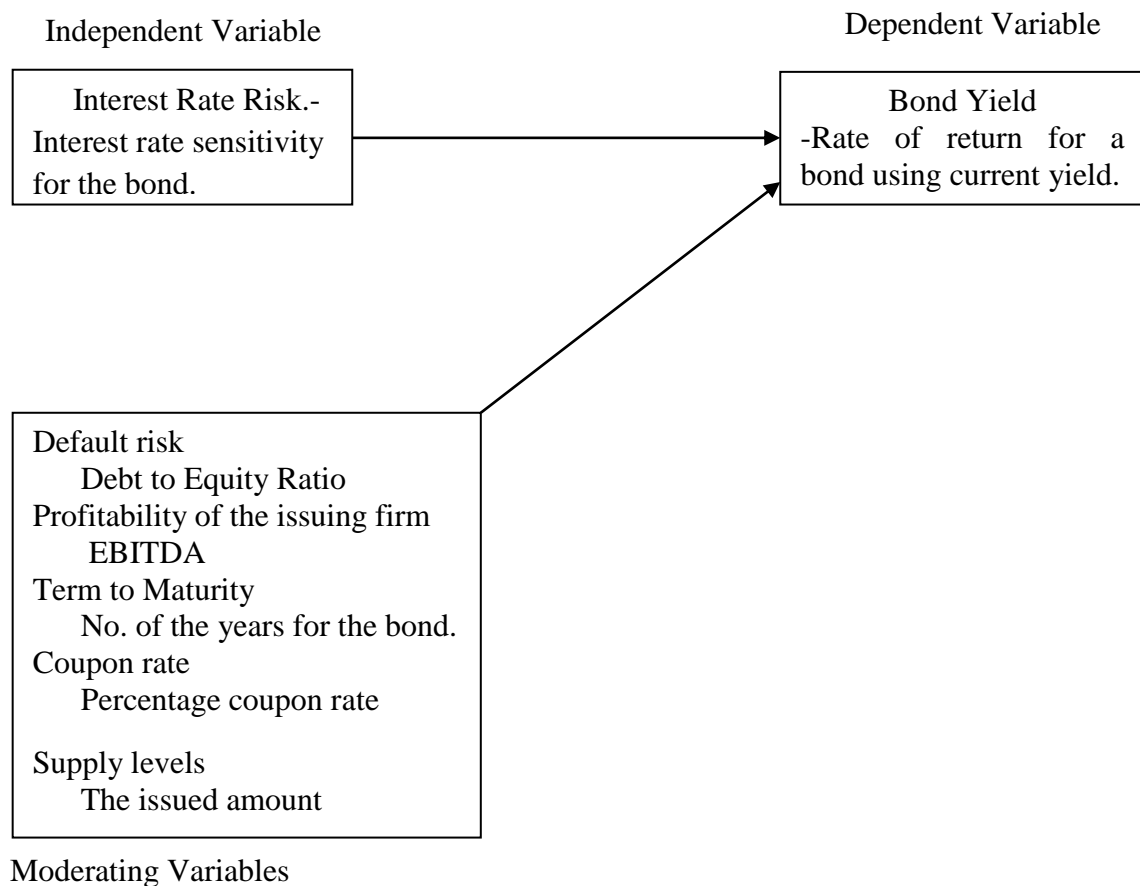
Ngugi & Afande (2015) carried out a study on ways to raise finance in the Kenya. The research was to establish the ability of the bond market in raising finance in Kenya. The main objective was to analyze the challenges that were faced in raising corporate finances in Kenya .Secondly was to find out what measures should be put in place to address the challenges and to develop the bond market in Kenya. A population of 48 firms listed at NSE at the period was used. A case study design was applied taking into consideration a holistic in-depth approach to answer the research objectives. The researchers focused on the 9 corporate bond issues as at 31st, March, 2011.Both primary and secondary data was collected to gather more information concerning the research. Descriptive statistics was used to describe features on the data. Presentation was informed of percentage, frequencies and standard deviation as analyzed from the data. The results showed that variety of benefits are derived from raising finance through bond market. It was also established that with other challenges interest rates, bond life cycle, and credit issuer credibility affected rising of finance through bonds. According to the research, a gap exists in the bond market and that various interventions should be put in place to enhance bond market performance.

Matete, Ndede & Jagongo (2014) researched on the factors affecting pricing of loan able funds by commercial banks in Kenya. They were focused to determine effect of changes in wealth to loanable funds by commercial banks. They also wanted to establish how expected return on bonds, liquidity of bonds, and risk on bonds and inflation influenced pricing on loanable funds. A descriptive cross sectional research design was used to collect the data. A census of 43 commercial banks which operated in the year 2006 was carried out to gather information. Questionnaires were administered as well interviews

conducted. The collected data was analyzed through multiple regressions. Loanable fund models which included the changes in wealth, expected return on bonds, risk of bonds, government short-term borrowing, and liquidity of bonds, expected inflation and pricing of loanable were examined. The results showed that changes on the wealth, government borrowing, and inflation played a key role in determining interest rates. Liquidity of bonds, bonds risks and bond return expected did not determine supply of loanable funds; hence these variables are affected by interest rates.

2.5 Conceptual Framework

Figure 2.1: Conceptual Framework



This conceptual frame work shows the relationship between the variables understudy. The independent variable is the interest rate risk which is shown in terms of interest rate sensitivity for a bond. It shows the extent to which the price of the bond will change due to change in interest rates prevailing. The dependent variable in the study is the bond yield which shows the rate of return expected for the bond in terms of current yield. The moderating variables which refers to those other elements in the study which also affect the dependent variable indirectly or directly includes the default risk, the profitability level of the issuing firm, term to maturity for the bond, the coupon rate of the bond and the supply levels i.e. the amount issued. There exist a positive relationship between the default risk and the bond yield, where as a negative relationship exist between the firms profitability and the bonds yield. The longer the term to maturity the lower will be the bond, while the lower the coupon rate the lower will be the bond yield.

2.6 Summary of Literature Review

The study reviewed the liquidity premium, the market segmentation and the preferred habitat theories. From the liquidity premium theory it was clear that liquidity in a bond is a key indicator of bond's risk and that the liquidity is determined by maturity. It is therefore true to say the longer the maturity of the bond the less liquidity hence premium risk leading to a higher yield. Market segmentation theory advocated that bonds should be viewed differently depending on their term to maturity, and that bond in each term has its different characteristics from the bond in the other term .Preferred habitat theory it was evidenced that investors consider both maturity and yields. Investor can buy a bond outside his maturity preference so long as it has high returns.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter explained the process and the techniques the researcher used in conducting the research. The chapter includes the research design, sample and sampling method, data collection methods, data analysis, the analytical model and the test of significance that was used in regard to this study.

3.2 Research Design

Dullock(1993)viewed research design as the blue print or a plan in a study that is purposed to answer questions concerning the study. Research design answers important issues relating the research under study. Issues regarding the purpose, scope, and extent of researcher's interference, time period under study and the units being analyzed in the study. It is that particular method that a researcher uses when collecting, analyzing and interpreting the data.

Causal research design was applied in the study.Karvanen (2015) defined causal research design as the models used to describe the relation of a given set of variables under study. Causal research design measures the impact a change in one variable had towards the dependent variable. The researcher chose this design because it helps one to understand why different phenomena's work in a different manner. This design also gives a link between the variables under study.

3.3 Population

Population is the whole group under which some information is required for the study. It comprises of the individuals or objects/units of interest. Population should be fully defined so that every member is properly included or excluded. It is a set of members with similar characteristics required under study (Banerjee&Chaudhury, 2010).The target population was the 15 fixed corporate bond issues that were listed at the NSE for the period from 2008 to 2014.

3.4 Sample

Sampling is the process by which the researcher would select individuals from the population. Sampling frame is the list from which sample is drawn and usually representative of the whole population (Hamed,2016).Given that the population under study were the corporate bond issues for the period between 2008 to 2014,the research used census to reach sample size which was the 15 corporate bond issues, from the following:13companies,BarclaysKenya,MabatiRollingmills,ShelterAfrique,CFC Stanbic,Housing finance,Consolidated Bank,Centum,I&M,Britam,UAP Holdings ,NIC and CIC Insurance.

3.5Data Collection

Data collection techniques depend on the researcher. Various collection techniques exist which include surveys, secondary data collection or primary data collection (Zikmund, 2000).Secondary data for the period from 2008 to 2014 was used to get the required information. Secondary data is that already exists and is readily available from other sources. The researcher chose this collection technique because it is cheaper and wide and there is ease availability.

The data was from CBK report, Nairobi securities exchange (NSE) website report, Capital market authority (CMA) website, and financial statements of the companies and from published journals.

3.6 Diagnostic Tests

Financial data is often characterized by errors which may lead biasness in the interpretation of results. In order to evaluate the accuracy of data diagnostic test were conducted; this enhanced the reliability and validity of the data.

According to Leung (2015), validity is the appropriateness in terms of the processes, tools and the data that a researcher applies in the study. Reliability is the exact reliability of the processes and the results that are used in a research study. In order validity to exist, reliability is required and it is impossible to undertake valid test from unreliable data. Reliability is affected by stability, reproducibility and accuracy. Reliability was enhanced through accurate analysis and validity by ensuring correspondence of categories and generalization. Proper coding analysis was also observed to ensure proper classification and the diagnostic tests were carried out.

3.6.1 Normality Test

This is a test to determine if the data is normally distributed. Data may not be normally distributed due to many reasons as extreme values in dataset, if data comes two or more processes, if data is not normally sorted, where many values used are close to zero, and measurement devices with poor resolution all this can lead to non-normal distribution. In descriptive statistics goodness of fit is measured to describe if the data is normally distributed. In this study SPSS statistical package was used to test normality in the data.

Various tests can be applied to test normality which includes chi-square normality, Pearson test i.e. use of skewness and kurtosis, Jarque-Bera test, goodness of fit-test, Lilliefors test and Shapiro-Wilk test.

3.6.2 Heteroscedasticity Test

Heteroscedasticity describes the variance of error in the model under study. Therefore, if heteroscedasticity exists in a data set under study, it means that the variance cannot be relied upon. This leads to inefficient and unstable regression models, hence this leads to inaccurate results and this invalidates the results. Heteroscedasticity can be detected graphically or through statistical tests. Spearman's rank correlation test was used to check the presence of variance in the data.

3.6.3 Autocorrelation Test

Auto-correlation measures the relationship between the current value and its past value. The value usually ranges from 1 to -1. 1 represents a perfect positive correlation between the variables, while -1 represents a negative correlation between the variables. If there exists a positive correlation, it means the errors are biased and too small, with a negative autocorrelation, it means errors are biased and too large. If autocorrelation exists, it means the value of the observation error term gives an opportunity to predict the value of the next. Autocorrelation occurs because of the omission of some variables. When the omitted variable under study has a positive or a negative correlation with the dependent variable, this is an error term that is positively or negatively correlated. Autocorrelation can be tested graphically or using formal tests. In this study, the Durbin-Watson test was used.

3.6.4 Multicollinearity Test

Multicollinearity occurs where a number of independent variables in a multiple regression model are so closely related. A predictor variable tends to be linearly predicted from others at a substantial level of accuracy. It occurs when two or more explanatory variables are highly linearly related. If multicollinearity is present, to estimate of impact of a variable to the dependent variables less precise compared to if the predictors were uncorrelated. This leads to large changes in the model results if small changes are made to the inputs i.e. the standard error of affected co-efficient tends to be large. For better results predictor variables which highly correlate with independent variables should be used. Multicollinearity does not bias results but leads to skew and misleading results. Multicollinearity was detected using the t-tests.

3.7 Data Analysis

This part shows the analytical model and the test of significance which was carried out on the study.

3.7.1 The Analytical Model

A multivariate regression model was used to explain the relationship among the relevant variables. The results were presented using tables and regression model to give the analyzed research results.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e$$

Where y = Bond yield (measured by the current yield i.e. the coupon rate payments divided by price of the bond).

α = is the constant term.

X_1 =interest rate risk (measured by the duration which in no. of years of the bond multiplied by the percentage change in rates of interest.).

X_2 =Default risk (measured by the debt to equity ratio)

X_3 =profitability of the firm (measured using EBITDA i.e. earnings before interest, tax and depreciation).

X_4 =Term to Maturity of the bond (measured in terms of years).

X_5 =Coupon rate of the bond (measured in terms of percentage)

X_6 =Supply levels (measured using No. of bonds issued).

β (1-6) =regression co-efficient i.e. changes in y as a result of change in x.

e=error term.

3.7.2 Test of Significance

The study utilized analysis of variance (ANOVA) to test if there is any significant difference between the variables. To test the significance the F and T-test were used at a certain confidence level statistic determines the statistical significance of regression equation and the T-statistical significance of the study co-efficient.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter analyzes findings on the effects of interest rate risk on bond yield in the Kenyan bond market. The study assessed 15 corporate bond issued for the period 2008 to 2014. The data comprised of 15 corporate bonds issued. The variables assessed include interest rate risk, default risk, profitability, terms to maturity, coupon rate and supply levels.

4.2 Descriptive Statistics

Table 4.1 presents the descriptive statistics and the distribution of the variables considered in this research which are interest rate risk, default risk, profitability, terms to maturity, coupon rate, and supply levels. The descriptive statistics considered were minimum, maximum, mean and standard deviation.

Table 4.1: Descriptive statistics

Variable	Min	Max	Mean	Std. Dev	Skewness		Kurtosis	
					Statistic	Std. Error	Statistic	Std. Error
Interest rate risk	-5.6%	11.69%	2.99%	0.04	-3.13	.637	10.39	1.23
Coupon rate	.15	96.31	12.3786	26.71	3.335	.637	11.35	1.23
Profitability (EBITIDA)	15,870.00	7,257,794.00	2,028,696.75	2,396,389	1.515	.637	1.27	1.23
Default risk	0.15	10.44	4.5582	0.86	0.676	0.54	1.64	1.12
Term to Maturity	5	8	5.67	0.985	.812	.637	-1.65	1.23

Supply levels	196.50	6,000.00	3,475.9	1,871.17	-.119	.637	-.998	1.23
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Table 4.1 shows that the interest rate risk had a mean of 2.998% and standard deviation of 0.03884. This shows that on average interest rate risk gave 2.998% of bond yield which went to as low as -5.6% and high of 11.69%. The default risk had a mean of 12.3 and standard deviation of 26.713. That is, default risk accounts, on average, 4.5582 of the bond yield. However, this goes to as low as 0.15 and high of 10.44.

The mean of profitability was found to be 2,028,696.7500 and a standard deviation of 2,396,389.12737. The minimum and maximum values of profitability were 15,870.00 and 7,257,794.00. This indicated that on average Ksh 2,028,696.7500 is required for a bond yield. On the terms of maturity the mean was 5.67 and a standard deviation of .985. This indicated that on average terms of maturity accounts for 5.6 years were required for bond yield which goes as high as 8 years and low of 5 years. The supply level mean was found to be Ksh 3,475.97 The minimum and maximum values were Ksh 196.50 and Ksh 6,000.00. This indicated that on average the bond yield required a supply level of Ksh 3,475.97.

4.3 Correlation Analysis

The study used correlation analysis to establish the effect of interest rate risk, default risk, profitability, and terms to maturity, coupon rate, and supply levels on bond yield. Two-tailed Pearson correlation (R) was used to establish the same at 95% confidence level.

Table 4.2: Correlations

		Bond yield	Interest rate risk	Profitability	Term to Maturity	Coupon Rate	Default risk	Supply levels
Bond yield	Pearson Correlation	1						
	Sig. (2-tailed)							
Interest rate Risk	Pearson Correlation	.390	1					
	Sig. (2-tailed)	.010						
Profitability (EBITIDA)	Pearson Correlation	.258	-.292	1				
	Sig. (2-tailed)	.019	.358					
Term to Maturity	Pearson Correlation	.153	.340	-.279	1			
	Sig. (2-tailed) N	.035	.279	.379				
Coupon rate	Pearson Correlation	.439	-.975**	.324	-.302	1		
	Sig. (2-tailed) N	.154	.000	.305	.339			
Default risk	Pearson Correlation	.224	.264	-.141	.240	-.281	1	
	Sig. (2-tailed) N	.484	.407	.663	.453	.376		
Supply levels (Bonds Issued)	Pearson Correlation	.232	.089	.340	-.056	-.134	-.302	1
	Sig. (2-tailed) N	.467	.784	.280	.864	.679	.340	

The study established a positive and moderate linear relationship between interest rate risk and bond yield given a r value of .390 and p value of .010. It was established that profitability has a positive significant linear relationship with the bond yield given an R value of .258 and p of .019. The study found that on Term to Maturity, there was a

positive significant relationship on bond yield given the value of $r=.153$ and $p=.035$. The r value of Coupon Rate was found to be 0.439 and p value of $.154$ this indicated that there is a positive insignificant linear relationship on coupon rate and bond yield. On the default risk it was found that there is a positive insignificant linear relationship between default risk and bond yield give the r value of $.224$ and p value of $.484$. The study found that there was a positive insignificant relationship between the supply levels and bond yield given the r value of $.232$ and p value of $.467$.

4.4 Multicollinearity

The study conducted a multicollinearity tests to determine if two or more predictor (independent) variables in the multiple regression model are highly correlated. Tolerance indicates the percent of variance in the independent variable that cannot be accounted for by the other independent variable while variance inflation factor (VIF) is the inverse of tolerance.

Table 4.3: Multicollinearity

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
Interest rate Risk	.041	4.444
Profitability(EBITIDA)	.652	1.535
Default risk	.741	1.349
Term to Maturity	.782	1.279
Coupon rate	.038	6.006
Supply levels (Bonds Issued)	.636	1.572

Table 4.3 shows that tolerance values ranged between 0.038 and 0.782 with corresponding VIF values ranging between 1.279 and 6.006 . Since tolerance values were above 0.1 and VIF below 10 , and then the study concludes there was no multicollinearity in the model.

4.5 Regression Analysis

The study conducted multiple regression analysis of:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \epsilon$$

Table 4. 4: Model Goodness of Fit

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.746	.674	.632	.03832	2.106

a. Predictors: (Constant), Profitability (EBITIDA), Interest rate risk, Default risk, Supply levels (Bonds Issued), Term to Maturity, Coupon Rate (percentage).

b. Dependent Variable: Bond yield

Table above shows the regression model goodness of fit to establish if regression analysis is suited for the data. Pearson Correlation value of 0.746 was established depicting that the independent variable and the control variables (Interest rate risk, default risk, profitability, terms to maturity, coupon rate and supply levels) had a very good linear relationship with the dependent variable (bond yield). An R-square value of 0.674 was established depicting that this relationship was good. Thus, interest rate risk, default risk, profitability, terms to maturity, coupon rate and supply levels influences 67.4% of bond yield. A Durbin Watson test for autocorrelation value of 2.106 was established depicting no (serial) autocorrelation within the regression model residuals. Thus, the random (non-stationary) data was used in the regression analysis.

Table 4. 5: ANOVA

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.005	8	.001	2.597	.003 ^b
	Residual	.007	6	.001		
	Total	.013	14			

a. Dependent Variable: Bond yield

b. Predictors: (Constant), Interest rate risk, Default risk Supply levels (Bonds Issued), Term to Maturity, Coupon Rate(percentage), Profitability(EBITIDA) ,

ANOVA analysis was conducted to determine the significance of the regression model. An F- value of 2.597 at $p = .003$ was established depicting that the regression model had low margin of error p value is less than 0.05 showing that the model is significant at 95% confidence level.

Table4.6: Model of Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.369	.665		-.554	.003
Interest rate risk	.001	.002	.735	.435	.041
Default risk	.021	.002	-.030	-.075	.043
Profitability (EBITDA)	.410	.000	.029	.069	.048
Term to Maturity	.011	.013	.324	.840	.039
Coupon Rate(percentage)	.032	.044	1.280	.736	.025
Supply levels (Bonds Issued)	.615	.000	.337	.788	.046

a. Dependent Variable: Bond yield

The established multiple linear regression equation becomes:

$$Y = 2.369 + 0.001 X_1 + 0.021 X_2 + 0.041 X_3 + 0.011 X_4 + 0.032 X_5 + 0.615 X_6 + \epsilon$$

The study established that when the interest rate risk, profitability, default risk, terms to maturity, coupon rate and supply levels are zero, the bond yield would be 2.369 depicting that bond yield would be positive.

The study found that interest rate risk, default risk, profitability, terms to maturity, coupon rate and supply levels have significant influence on bond yield since interest rate risk $\beta = .001$, default risk $\beta = .021$, profitability $\beta = .410$, terms to maturity $\beta = .011$, coupon rate $\beta = .032$, and Supply levels $\beta = 0.615$. The P-Value of 0.003 indicates that this result is significant at 5% confidence level.

4.6 Normality test

The study conducted normal P-P plot of regression standardized residual to determine if the normality of the model's residuals.

Figure4.1: P-P Plots for Normality of Residuals

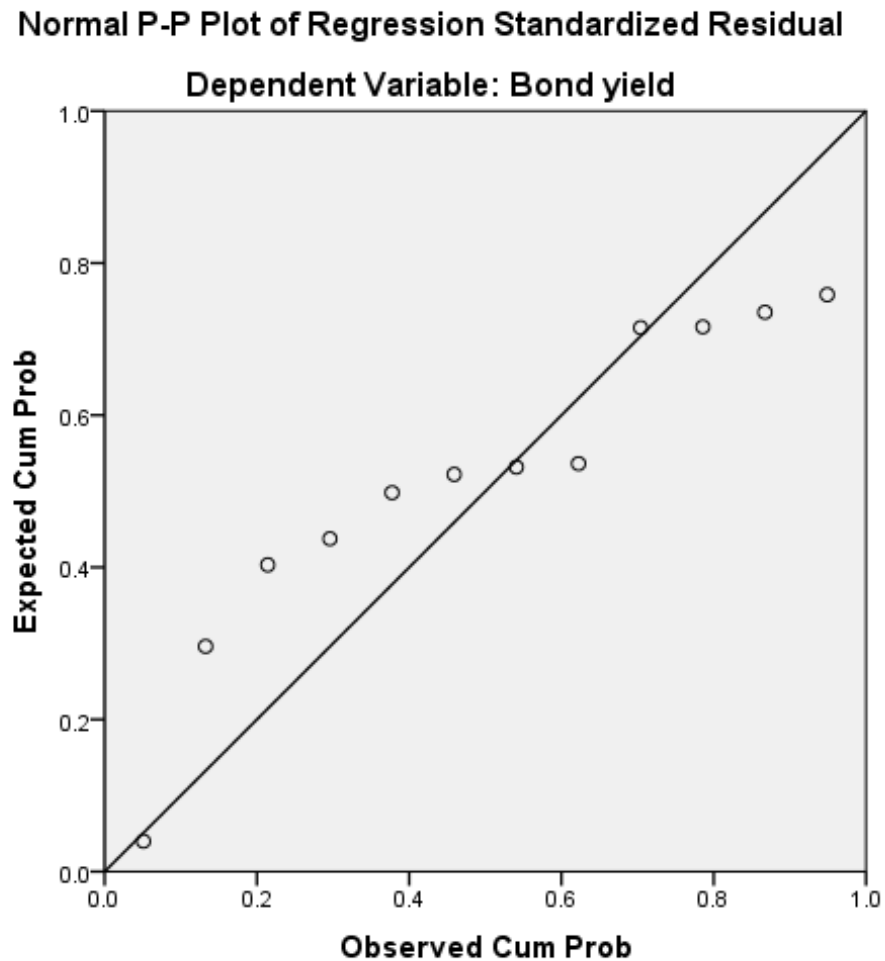


Figure 4.1 indicates that the dependent variable was normally distributed and that the probability of outliers was minimal. The findings imply that the responses were lying close to the line of normality. Furthermore, it implied that the data was ideal for all type of analysis, including parametric and regression analysis.

4.7 Discussion of Findings

The study found that there is a positive relationship between rates of interest risk and bond yield. As the rates increase the interest rate risk increases, the bond prices fall as the bond yield increases. This relationship was also observed by Hicks(1946),in his liquidity premium theory where he argued that because of the illiquidity, risk is usually higher and to compensate investors for this there exist liquidity premium which contributes to higher yields. Bond investors usually have in mind the changes in interest rates as a result of changes in the prevailing economic condition. Treasury bonds are highly demanded by investors because they are considered as risk-free investments. However, when their coupon rate falls below that of corporate bonds, investors prefer the later as it provide them with higher yields or returns (Blanco, Brennan and Marsh, 2005).

The study found a positive relationship between terms of maturity and bond yield. A bond's term to maturity signifies the period when the investor is paid face value for the bond and its maturity. Bonds usually have different maturity levels. Bonds with many years remaining to mature are much more adversely affected by this risk of interest rates compared to those bonds with shorter maturity period.

The study found a positive relationship between coupon rate and bond yield. According to Shimko,Tejima & Van-Deventer (1993)different bonds with varying coupon rates while all of their other characteristics are similar like maturity and credit risk ,the bond having lower coupon rate usually will experience a greater exposure to changes in interest rates hence its value adversely affected compared to bonds whose coupon rates are high.

The study found a positive relationship between default risk and bond yield. These findings relate to those of Nakashima & Saito (2009) who indicated that bonds issued by companies that are highly leveraged are more risky as a result of higher interest burden likely to be experienced by the company. Therefore as a firm injects more debts in its firm's capital structure, the firm bears greater interest obligation, and this leads the firm issuing bonds at a higher yields to offset this risk associated with this burden.

This study found positive relationship existed between supply and bond yield. Supply and demand are also majorly influences prices for corporate bonds and other financial securities. Bond demand rise when supply and demand alternative sources of external financing such as long-term loans fall or become unattractive (Buigut, 2010). A bond's yield, which is the annual return got from the investment, increases as its price goes low and decreases when the price moves high. The factors affecting the demand dynamic of bonds include the direction of interest rates, financial health of company issuing the bond and fiscal policy existing in the country (Dick-Nielsen, Feldhütter and Lando, 2009).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 introduction

This chapter summarizes the study findings and makes conclusion based on the results. The chapter also highlights the limitations of the study and areas for further research are also presented.

5.2 Summary of the Findings

The objective of this study was to establish the effect of interest rate risk on bond yield in the Kenyan bond market. Interest rates movement has been a critical issue for investors especially in the fixed income debt securities. The research methodology used in this study applied secondary data which was collected from central bank of Kenya, Nairobi securities Exchange and from the company's financial statements.

The study found that that the interest rate risk accounted for had a mean of 2.99% of bond yield. The profitability accounted for an average Kshs 2,028,696.75 of bond yield in the corporate bond yield market. Findings indicate that the average years for maturity for bond yield were 5.6 years. The findings indicate that coupon rate accounted for an average of 12.6% of the bond yield. The coupon rate had a mean of 12.6 and standard deviation of 0.343 while the supply levels were found to be an average of Kshs 3,475.97. The findings indicate that bond yield had tolerance values ranging between 0.038 and 0.783 with corresponding VIF values ranging between 1.279 and 6.006. Since tolerance values were above 0.1 and VIF below 10, and then the study concludes there was no multicollinearity in the model.

The study found that the regression analysis was fit for the data. Pearson Correlation value of .746 was established depicting that the independent variables (interest rate risk, profitability, terms to maturity, coupon rate and supply levels) had a very good linear relationship with the dependent variable (bond yield). An R-square value of 0.674 was established depicting that this relationship was good. Thus, interest rate risk, profitability, terms to maturity, coupon rate, and price and supply levels influences 67.4% of bond yield. A Durbin Watson test for autocorrelation value of 2.106 was established depicting no (serial) autocorrelation within the regression model residuals. Thus, the random (non-stationary) data was used in the regression analysis.

The study found that interest rate risk, profitability, terms to maturity, coupon rate and supply levels have significant influence on bond yield since interest rate risk $\beta = .001$, profitability $\beta = .410$, terms to maturity $\beta = .011$, coupon rate $\beta = .032$ and Supply levels $\beta = 0.615$. The P-Value of 0.003 indicates that this result is significant at 5% confidence level.

5.3 Conclusions

The study concludes that there is a positive relationship between interest rate risks and bond yield. All the variables on test had a positive relationship with bond yield, though some were insignificant. It is concluded that the interest rate risk was more determined by the rates of interests and the maturity of the bond. Maturity of the bond and interest rate risk work proportionally. When the maturity is long the risk on interest rates is higher and when the maturity is shorter the risk is lower. It was also concluded that as the leverage level of a firm increased the yield for a bond also increased. As the supply levels

increased this triggered lower yields on the bonds and as the profitability levels increased this lead to lower yield. Interest rate risk is an important factor for all the investors as this it impact on the economy.

5.4 Recommendations

The study recommends that for an increased bond yield, issues of regulations governing the bond market should be addressed. The most important is the regulations on the tenure period which should be short and principle redemption structure to be reduced as this increases the interest generating ability of the bonds making it more attractive thus reducing the effect of interest rate risks.

The study recommends creation of awareness on the role of bond market in the economy. Many investors are investing in the government treasury bonds because of their security perception. Therefore it is duty for the financial market policy makers to create more awareness among the investors by creating conducive environment by loosening the requirements for all investors in bond market. The study also recommends that bond markets should be a vehicle to finance both large businesses and small business.

There are many other factors that affect the bond yield not taken into account, due to its limited scope, the impact of most of the other factors other than the bonds related factors was not critically dealt with, the issue of public perception of treasury bonds was also not dealt with. There is thus need for further studies on the influence of public perception on the uptake of corporate bonds in Kenya.

5.5 Limitations of the Study

This study was faced by various constraints; however efforts were made by the researcher to ensure that the results of the study were not affected by the limitation in the process of undertaking the research.

The data was so voluminous to work with and to be collected from also different files and locations. So the researcher had to analyze code and sort the data as required so as to get the required information and to maintain accuracy as well as the quality. The cost of obtaining some of the data was high with each yearly data set being sold separately.

Some of other variables which could help in the study were left out because of difficulties in measuring the variables. Some other variables was also difficult to access the required information this also lead to some important information been left out which could help to make informed decision. Because of the time factor as the study was been carried out within a limited time period and to work within deadline, this also lead the researcher to work with the easily accessible data.

5.6 Suggestions for Further Research

This study sought to establish the effect of interest rate risk on bond yield. As interest rate risk is a key issue in today's investment environment. The study recommends that future researchers to carry out further research on interest rate risk management in the Kenyan financial sector, so as to highlight various measures to curb the effect of interest rate risk. Additionally, further studies should be done on the effects of bond market determinants such as credit risk and liquidity risk as this are some other risks affecting bond yield.

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APPENDIX I: POPULATION

1. Housing finance medium term note (FXD (HFCK)/2010/7YR).
2. Housing finance medium term note (FXD (HFCK)/2012/7YR).
3. Shelter Afrique medium term note (FXD 1/13/05).
4. Consolidated bank of Kenya sub-ordinate medium term note (SBN/2012/7YR).
5. Consolidated bank of Kenya senior staff medium term note (SN/2012/7YR).
6. Centum senior unsecured fixed note (CTNB.BD.18.09.17/12.75)
7. Centum senior unsecured linked note (CTNB.BD.18.09.17/13.80)
8. I&M medium term note (FXD/I&M.01/13/5.25)
9. Britam medium term note (BRTB.BD.22/07/19-0037-13).
10. UAPholdings medium term note (UAP.BD.22.07.2019).
11. NIC medium term note (NIC.BD.09/19).
12. CICmedium term note (CIC.BD.22.07.2019).
13. Mabati rolling mills (MRM/2008/8YR).
14. Barclays bank medium term note (MTN/2008/7yr).
15. CFC stanbic multi-currency medium term note (CFC STAN BIC 2009/7YR).

APPENDIX II: RAW DATA

Corporate Bond	Year of issue	Bond Yield	Interest rate risk	Coupon rate	Default risk	Profitability (EBITDA) in Millions	Term to Maturity	Supply levels (Bonds Issued)
Housing finance FXD (HFCK) 2010/7Yr	2010	0.0850	-3.01%	8.5%	9.2	561,028	7 yrs	2969.1
Housing finance FXD (HFCK) 02/2012/7Yr <i>2nd Tranche</i>	2012	0.1526	11.69%	13.0%	7	907,631	7 yrs	5864.4
Shelter Afrique FXD 1/13/05Yr	2013	0.1230	2.95%	12.8%	0.94	15,870	5 Yrs	4239.7
Consolidated bank CON.BD-FXD(SN)/2012/7Yr	2012	0.1371	11.69%	13.6%	10.44	176,000	7 yrs	196.5
Consolidated bank CON.BD-FXD(SBN)/2012/7Yr	2012	0.133	11.69%	13.3%	10.44	176,000	7 yrs	1480.6
Centum CTNB.BD.18.09.17/1 2.75 <i>(Senior unsecured equity linked notes)</i>	2012	0.1280	8.35%	12.8%	0.15	1,333,000	5 Yrs	2100.7
Centum CTNB.BD.18.09.17/1 3.50 <i>(Senior unsecured fixed rate notes)</i>	2012	0.1282	8.35%	13.5%	0.15	1,333,000	5 Yrs	2917.1
I&M Bank FXD I&M-01/13/5.25	2014	0.1254	-5.6%	12.8%	4.963	7,257,794	7 Yrs	3429
BRTB.BD.22/07/19-0037-13	2014	0.1372	-4%	13.0%	2.379	3,212,382	5 Yrs	6000
UAP Insurance UAP.BD.22.07.2019	2014	0.1409	-4.8%	13.0%	0.471	2,296,229	6 Yrs	2000
NIC bank NIC.BD.09/09/19-0039-12.5	2014	0.0254	-4%	12.5%	5.24	6,230,650	5 Yrs	5514.5
CIC Insurance CIC.BD.22.07.2019	2014	0.1228	-4%	13.0%	1.8	844,777	5 Yrs	5000
Mabati Roling Mills	2008	0.13	5.44%	13.0%	6.3	1,086,928	8 yrs	1378.5
CFC Stanbic FXD (CFC Stanbic) 2009/7Yr	2009	0.1253	5.46%	12.5%	4.65	2,005,967	7 yrs	2,402.0
Barclays Bank (MTN/2008/7Yr)	2008	0.0988	4.76%	11.5%	4.25	60,777	7 yrs	1007

APPENDIXIII: INTEREST RATES CHANGES FROM 2008 to 2014

Year	Interest rates	%Change
2007	13.34	-
2008	14.02	0.68
2009	14.80	0.78
2010	14.37	-0.43
2011	15.05	0.68
2012	16.72	1.67
2013	17.31	0.59
2014	16.51	-0.8
2015	16.09	-0.42