EFFECT OF COUNTRY RISK ON YIELD SPREADS IN KENYAN EUROBONDS

BY

CHARLES MUGWANJA

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DECLARATION

This Research Project is my original work and has not been submitted for award of a degree at the University of Nairobi or any other University.

Charles Mugwanja

D63/5131/2017

Signed: …… Date: 11 November 2021

This research project has been submitted for examination with my approval as the University supervisor.

Signed: …… Date: 11 November 2021

Prof. Cyrus Iraya

University Supervisor

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DEDICATION

I dedicate this research to my family who provided an enabling environment and supported my journey. Mum and Fridah for giving me the much-needed push when I needed it; Bianca, Peter and Jazmine for giving me the resolve to see it through.

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LIST OF ABBREVIATIONS

CBK Central Bank of Kenya

NSE Nairobi Securities Exchange

OLS Ordinary Least Square

GDP Gross Domestic Product

S&P Standard & Poor's

EMH Efficient Market Hypothesis

CAPM Capital Asset Pricing Model

APT Arbitrage Pricing Theory

GMM Generalized Method of Moments

OIR Over-identifying restrictions

SPSS Statistical Package for the Social Sciences

KNBS Kenya National Bureau of Statistics

USD US Dollar

FX Foreign Exchange

ABSTRACT

This study aimed at examining the effect of country risk on yield spreads in Kenyan Eurobonds. The spreads in this case represented a premium paid on the Eurobonds in comparison to yields on similar bonds in the international markets. The Modern Portfolio Theory, the Efficient Market Hypothesis theory and the Arbitrage Pricing Theory were adopted as the key theories for the study. The study carried out a census of the six outstanding sovereign Eurobonds issued by Kenya since 2014 and collected and analyzed data for a period of 7 years since 2014. The key economic fundamentals used to determine Country Risk were also examined to determine their individual effect on yield spread. These are the Debt-to-GDP ratio, Foreign Exchange Reserves, Inflation rate, GDP growth rate and Exchange rate volatility. Analysis of data was carried out through descriptive statistical techniques, correlation analysis and the multiple linear regressions. The study found a strong negative relationship between yield spread and GDP growth and a positive relationship between Exchange rate volatility and yield spread. Overall Country Risk, level of Foreign Exchange Reserves, Inflation Rate and Debt-to-GDP ratio however didn't have a significant relationship with yield spread suggesting the premium paid on Kenyan Eurobonds was not in line with underlying economic fundamentals and the overall country's risk profile. The study therefore recommends that the Kenyan government ensure that the yield charged on its external borrowing is quantified against the country's overall risk profile and is not based on investor bias. This is expected to result in savings which could better be used on development projects, benefitting Kenyans at large.

CHAPTER ONE: INTRODUCTION

1.1 Background of The Study

African countries have long been turning to international markets to finance their budget requirements. This has been driven by many factors including swings in commodity markets which traditionally have been a good source of foreign revenue, poor governance and poor fiscal management which has resulted in ballooning budget deficits necessitating the need for external borrowing. Kenya has been no exception and issued has issued several Eurobonds to this effect. These Eurobonds are actively traded in international exchanges at market determined yields. Amira (2004) determined that maturity, gross fees and issue size led to a rise in bond yields while increase in the number of managers and a rise in country's credit rating led to reduced yields. Credit rating, in this regard is a measure of risk, and we aim to study this relationship between Country risk and Eurobond yields.

This research is based on the risk and return theories which were initially proposed by Markowitz (1952) in the Modern portfolio theory (MPT). Generally, investors are risk averse and investments with greater risk must promise higher expected returns. The Arbitrage Pricing Theory by Ross (1976) built on the above to determine that several risk factors contributed to the overall asset return. This research aims to further explore these theories in relation to Eurobond yields and country risk.

There's a lot of literature on the relationship between yield spreads and risk. This research is however motivated by the lack of comparative evidence from emerging and frontier countries on the relationship between their country's risk and their external borrowing cost. African countries, including Kenya have long been criticized for going

for this mode of financing, which is considered expensive, but consideration needs to be given to the risk premium that they have to pay because of the country's riskiness. Is the supposed premium correlated with the country's risk and if so, should we say this commercial borrowing is justified?

1.1.1 Country Risk

This was defined by Özden and Kubilay (2012) as the risk that's brought about by factors or events that reduce a country's capacity or inclination to pay interest and principal on their external debt obligations as and when they fall due. Alam (2016) defined Country risk as the probability that may occur due to adverse situation of the buyer's country for the inability of the import payment resulting in financial loss. Meldrum (2000) defines this risk as a variety of national differences in policies, economic structures, currencies, geography and socio-political institutions. Country risk therefore in essence is credit risk viewed from a specific country perspective. Risk essentially relates to the probability of losing your investment and in a country perspective, it encompasses factors that may cause a government, willingly or unwillingly default on payment of its debt.

These factors may cause a rise in a country's borrowing costs, denoted as yields. Stein (2015) notes that frontier and developing markets have broad macroeconomic fundamental uncertainties, which causes investors to demand a higher risk premium than that asked of the more advanced markets. He suggests that due to this, it is imperative that policy makers keep a tight leash on factors that influence the overall country's risk and determine their relation with their external borrowing costs. This is among the objectives of this research.

Özden and Kubilay (2012) notes that country risk can be measured through several agencies that provide credit ratings. The main three are Moody's, Standard & Poor's (S&P) and Fitch. They can also be measured through Euromoney, Economist Intelligence Unit, Political Risk Services, Institutional Investor, Control Risks Information Services, Business Environmental Risk Intelligence, international banks and other institutions. These models are based on a country's fundamentals, case in point the Thomson Reuters StarMine Sovereign Risk model which uses the following fundamentals to come up with an overall country risk score: the level and change in the amount of government debt relative to GDP, the size of the country's economy (GDP) and economic growth (GDP growth), the level of credit provided by private sector banks, the level and variability of foreign reserves, the level of government consumption relative to private consumption, imports of goods and services relative to GDP, inflation rate and purchasing power of the currency, the annual change in the exchange rate, reserves relative to imports, GDP per capita, the level of unemployment, integrated political risk as measured by Thomson Reuters World-Check and the reserve currency indicator.

1.1.2 Yield Spreads

Elton, Gruber, Agrawal & Mann (1999) define yield spread as the difference between the yield of a coupon-paying bond and the yield of an alternative bond of the same maturity. Hilscher and Nosbusch (2010) defined the sovereign risk premium (also referred to as the sovereign spread) as the variance of the interest rate on a sovereign bond compared with the interest rate of a U.S. Treasury bond of similar maturity. He considers the U.S. Treasury bond 'risk-free'. The sovereign bond spread in Tkalec, Vizek, & Verbič (2014) is defined as the additional return that investors demand due to

‘default risk’ whenever the actual loss from default is more than the expected loss. The yield spread, in our case is therefore the difference of a country’s bond yield with a yield of a U.S. bond with similar maturity.

U.S. bonds are often used as the benchmark due to their presumed risk-free status and the U.S. safe haven status. Yield spreads are sometimes also referred to as credit spreads since they denote the default risk premium of a bond, relative to a similar risk-free bond with a similar maturity. This research is being done to prove this relationship in Kenyan Eurobonds. Why use yield spreads and not the traded yields themselves? A simple argument would be to use the traded yields and compare with country risk in this research. This however would present a distortion since the change in yields of similar risk free bonds (in this case U.S. Treasuries) would bring a resultant change in yields of similar ‘risky’ bonds (in this case Kenyan Eurobonds) and these changes may be misconstrued to have been caused by country risk, which is our independent variable in this research therefore distorting our findings. Case in point the economy support measures that have seen central banks lower their base rates this year (2020) due to effects of the COVID-19 pandemic leading to a sharp drop in U.S. Treasury bond rates. This has had a cascading effect of bringing down yields on USD denominated securities including the Kenyan Eurobonds. Thus, while this international event doesn’t necessarily relate to Kenya’s country risk, it has had an effect on traded yields in the Eurobond market and therefore, instead of using actual traded yields, it would be more accurate to use yield spreads, with risk-free bonds to remove the effect of extraneous factors such as the above.

Hilscher & Nosbusch (2010) and Tkalec et. al. (2014) both measure yield spread by calculating the difference of the reference bond's yield and the yield of a risk-free U.S. bond of comparable maturity. This will also be the methodology used in this study.

1.1.3 Relationship Between Country Risk and Yield Spreads

Barbosa, Luciana & Costa (2010) in an empirical analysis concluded that increasing spreads in the euro zone was caused by increasing significance of factors related to euro zone countries, especially a rise in the probability of debt default.

Theoretically, as a core concept in finance, yields are directly correlated with default risk and increase with increased risk and vice versa as evidenced in the original risk and reward concepts from Markowitz (1952). Several studies have been done on yield spreads in different countries/economies with a general conclusion that risk factors affect yields.

However, with regards to African yield spreads, there have been questions on whether African economists pay more than what can be justifiably explained by country risk. Olabisi and Stein (2015) question whether these higher than normal yields can be explained by actual risk factors like changes in debt relative to GDP and changes in credit agency ratings. Their research was however conducted on a broad list of African countries, which may differ with Kenya due to macroeconomic fundamental factors, and the overreliance of a lot of African economies on commodity markets for their foreign exchange flows. Kenya's economy on the other hand is highly diversified.

1.1.4 Kenyan Eurobonds

Kenya issued its first Eurobonds (Eurobond I) in June, 2014 which consisted of two bonds; Bond A which amounted to $0.5B @ 5.875% coupon with a 5-year tenure and

Bond B which amounted to $1.5B @ 6.875% coupon with a 10-year tenure. It subsequently issued a Tap sale in December, 2014 for the same bonds which amounted to $0.75B. Eurobond II was Issued in March 2018 and consisted of two notes; Bond A which amounted to $1.0B @ 7.25% coupon with a 10-year tenure and Bond B which amounted to $1.0B @ 8.25% coupon with a 30-year tenure. Bids received amounted to US$ 14B meaning it was oversubscribed seven times over. Eurobond III was Issued in May 2019 and consisted of two notes; Bond A which amounted to $0.9B @ 7.00% coupon with an 8-year tenure and Bond B which amounted to $1.2B @ 8.00% coupon with a 13-year tenure.

As at now, only $0.75B of these Eurobonds has matured leaving an outstanding amount of $6.1B with varying remaining terms to maturity of between 3 to 27 years. These bonds are actively traded in the London and Irish stock exchanges with the current yield being reported every working day. The traded yields and their relative spreads to similar U.S. treasuries are being related to Kenya's country risk profile that is dynamic and changes each day according to the country's fundamentals as described earlier. As at now, no study exists to relate country risk and yield spreads of Kenyan Eurobonds.

Kenyan Eurobonds are traded in the secondary markets of major international exchanges and the traded yield changes every working day. The traded yield on these bonds is available on Reuters, Bloomberg, and other major data platforms. This also applies to U.S. Treasuries and the yield spread that's the subject of our research will be determined by getting the difference between the traded yields on Kenyan Eurobonds and the traded yields of similar U.S. Treasuries.

1.2 Research Problem

In recent years, African countries specifically Kenya has come under fire due to their preference to fund their deficits through these commercial financial debt instruments. As detailed in Olabisi and Stein (2015), it is a belief that African countries pay a premium in external debt financing which cannot be explained by risk factors like changes in debt relative to GDP and changes in credit agency ratings. This necessitates the need for further study of yields paid on these Eurobonds and their correlation with country risk to determine whether indeed the country pays a premium over and beyond the risk premium.

Kenya has specifically come under increased pressure to justify the issuance of these bonds with treasury having to give several press releases regarding the purpose and usage of these Eurobond proceeds. However, the yields on these bonds should be viewed/studied against Kenya's overall country risk to determine whether the premium charged (if any) was justifiable in accordance with Kenya's risk profile. With respect to Kenyan Eurobonds, the concerns regarding yield spreads relates to the supposed premium Kenya is paying compared with similar bonds in international markets. Indeed, according to Olabisi and Stein (2015), this premium paid which cannot be attributed to the fundamental risk factors is a penalty which may be brought about by investor prejudice against African economies. In our case, this premium could be used on development projects, benefitting Kenyans at large.

This study aims to address whether the yield spread is directly attributable to Kenya's risk profile. Previous studies including e.g. Olabisi and Stein (2015) have conducted research on multiple African countries which have varied characteristics with regards to their economic, fiscal management and governance situations. This research is

focused on Kenya which, unlike a lot of other countries which have issued similar bonds is not commodity reliant and has a well-diversified economy.

The question this research is attempting to answer therefore is if the yield spreads on Kenya's external debt (Eurobonds) is directly correlated with the country's dynamic risk profile or is there additional premium that Kenya pays to acquire external debt?

1.3 Research Objective

The objective of this research is to determine the effect of country risk on yield spreads in Kenyan Eurobonds.

1.4 Value of the Study

While a lot of literature exists on the relation between yield spreads and risk, this paper is motivated by the lack of comparative evidence from emerging and frontier countries. This will be a good contribution to theory and to confirm whether it indeed also applies to frontier markets like our own. Also, a lot of the research uses ratings by international agencies e.g. S&P, Moody's, and Fitch which have been found to be mostly static in that they do not change for considerable periods of time despite continuous changes in the underlying fundamentals.

There have been a lot of questions and speculation on whether some of these frontier markets pay a premium on their external borrowing above and beyond their risk profile and whether the external debt incurred is value-for-money. This will help allay those fears if it's found that the spread is a direct factor of the risk profile or help additional analysis and audit if found that indeed, there is a premium being paid on our external debt. This might lead to better debt and fiscal management policies by the government.

If indeed a premium is paid on this debt, this represents a penalty which may be brought about by investor prejudice and could be used on development projects, benefitting Kenyans at large.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter looks at the theories developed to explain the relationship between risk and bond yield spreads. It examines this on a broader perspective in terms of the general risk return theories and then explores deeper into country risk and bond yield spreads. Remember, wider yield spreads denote a greater return for investors. Further, it discusses the conceptual framework that diagrammatically depicts the connection between the variables, independent and dependent, of the study. In conclusion, this chapter criticizes available literature related to the study and identifies existing research gaps on the same.

2.2 Theoretical Review

This review is intended to go through theoretical assumptions that will permit us to evaluate the relationship between country risk and Eurobond spreads critically. It aims to connects the research to existing theories that support this relationship, which will give a basis for our hypotheses and choice of research methods.

2.2.1 Modern Portfolio Theory

One of the basic concepts in finance is the relationship between risk and return. It's widely expected that an investor taking on more risk will expect to earn a higher return and vice versa. Since the 1950s, a lot of theoretical and empirical research has been done to characterize this relationship between risk and return.

Modern Portfolio theory was the most significant theoretical attempt to relate risk and return, and was developed by Harry M. Markowitz in Markowitz (1952). This theory

uses standard statistical measures to quantify this relationship, key among them the variance and the standard deviation.

These measures are calculated on assets actual and expected returns in order to quantify risk. Generally, investors are risk averse and investments with greater risk must promise higher expected returns. Modern portfolio theory (MPT), or mean-variance analysis, tries to assemble assets whereby the expected return is maximized for a given level of risk and was the first concrete theory that crystallized the relationship between risk and return.

Criticisms to this theory include the fact that risk and return measure used are based on 'expected values' which are predictions about the future that may differ materially from actual results. This can give rise to an inflated growth of return. Investors mostly derive the projections from historical returns and many a times do not factor in new conditions which didn't exist at the time the data was generated.

In relation to this study, this theory simply implies that risk would have a positive correlation with return. The risk we're looking at here is country risk and the return is reflected in the yield of Kenyan Eurobonds. The higher the yield of the Eurobonds, the higher the yield spreads with similar risk-free bonds. This spread would denote the country risk above and beyond relatively lower risk countries like the U.S. and would lead to higher spreads between Kenyan Eurobonds and U.S. treasuries of similar maturities.

2.2.2 Efficient Market Hypothesis

Wanjiku (2014) notes the bond market is part of the larger capital market whereby Efficient Market Hypothesis applies. EMH is closely associated with Eugene Fama

due to his research in Fama (1970). Efficient Market Hypothesis states that asset prices reflect all available information about the asset's value. Reilly and Brown (2006) noted that in an efficient market, current asset prices reflect all available information on the security. In an efficient market, one cannot derive excess return on a risk adjusted basis because any information used would already be reflected in the securities price at the time of purchase.

Deviations from informational efficiency would result in a cost that would be borne by all citizens, in the form of inefficient resource allocation. Securities would be mis priced meaning that for companies whose securities are overpriced, capital would be acquired from the markets cheaper than dictated by their fundamental value. For those whose securities are underpriced, acquiring capital from the markets would be unfairly expensive. This overall would weaken the capital markets and the economy at large.

Criticisms to this theory from researchers and investors have disputed it both theoretically and empirically. One school of thought is that from behavioral economists who characterize these market inefficiencies as a factor of several cognitive biases. These include anchoring, overreaction, information bias, overconfidence, representative bias and human errors.

EMH is applicable in our research in that risk factors in Kenya's fundamentals that determine the country's risk would continuously reflect in the price of Kenyan Eurobonds, basing our research on market efficiency and that changes in macroeconomic fundamentals which constitute country risk will flow into asset prices in our case Eurobond yields.

2.2.3 Arbitrage Pricing Theory

It derives from CAPM which was a model that built on the original Markowitz framework. CAPM despite being grounded on good logic, contained assumptions that rendered the model impractical. Some models were later created that addressed some of these assumptions for example Black (1972). Ross (1976a, 1976b), rather than following a similar methodology came up with a new framework: The Arbitrage Pricing Theory (APT). APT assumed that efficient markets shouldn't be able to generate risk free profit through arbitrage. The model assumed several factors that would cause a variance between actual asset returns and expected returns. These factors collectively contributed to the variance. Ross's model proposed that these factors created a linear function that determined the expected return from the asset.

In our research, country risk is determined by several macroeconomic fundamental factors which collectively determine Eurobond yields. For this reason, APT is applied in our research since we use a similar model to relate returns (measured in terms of Eurobond yields) and several risk factors which are the determinants of country risk. Unlike CAPM, APT allows us to analyze yields (return) first on an overall country risk perspective but also allows us to analyze return as a factor of several underlying macroeconomic fundamental risk factors as we'll do in this research.

2.3 Determinants of Yield Spreads of Eurobonds

Sy (2002) found that emerging market bonds spreads over U.S. Treasuries are an indicator of sovereign risk. Sovereign yield spreads are a function of credit risk (in our case country default risk). They are used to determine the risk premium charged when accessing debt in the capital markets. He also found that these spreads are also

dependent on currency risk, interest rates and technical aspects including liquidity and the constitution of investors in a country's debt securities.

Costantini, Fragetta & Melina (2013) found that yield spreads are largely determined by expected fiscal imbalances including changes in the debt to GDP ratios and liquidity risk. Mpapalika and Malikane (2019) also attributed debt-GDP, economic growth (GDP), level of foreign exchange reserves, prices of commodities, rate of inflation and sentiment in the market as the major factors contributing to yield spreads and the premium paid on bond securities.

2.3.1 Liquidity Risk

Hund and Lesmond (2008) found that liquidity risk was an important factor in the yields of both rated and unrated bonds in the sovereign and corporate bond markets. In their empirical analysis, they used several measures of liquidity and data from emerging market bonds in sixteen countries collected over 8 years and found that liquidity was a factor in determination of bond yields.

This risk is however minimized in Kenyan Eurobonds since they're freely traded in the London and Irish stock exchanges with the banks who served as underwriters providing sufficient liquidity to allay this risk.

2.3.2 Fiscal Imbalances (Debt-to-GDP Differentials)

Debt to GDP ratio is the measure of a country's absolute debt level measured in its own currency against its GDP at a particular moment in time. A low debt-to-GDP figure boosts investors' confidence on the ability of a country to pay its debts. Increase in GDP shows an increase in a country's productivity and better ability to settle its debt obligations.

Costantini, Fragetta & Melina (2013) and Mpapalika & Malikane (2019) found that debt-to-GDP ratios, in the long run, were significant factors influencing bond yields. Increasing debt-to-GDP ratio was corelated with widening spreads while a decreasing ratio was correlated to decreased spreads in the countries under study.

2.3.3 Interest Rate Risk

This is the risk to existing bond holders that's brought about by fluctuation in market interest rates. A bonds value or price is inversely proportional to interest rates (also yield) and an increase in market interest rates leads to a reduction of a bond's value hence a loss to bond investors.

The higher a country's interest rate risk, the higher the return/yield expected by investors investing in its bonds and the higher the yield spread against bonds issued by countries with lower risk.

2.3.4 Foreign Exchange Reserves

These are a country's holdings of foreign currency usually by its central bank or other monetary authority. FX reserves are held for several reasons including management of a country's balance of payments, payment of external debt and ensuring stability of the country's foreign exchange rate.

Higher reserves imply that a country is capable of meeting its debt obligations and therefore lower the yield/return earned on its bonds. In the case of Eurobonds, FX reserves are significant in that Eurobonds are denominated in a currency other than that of the issuing country and therefore a high level of foreign exchange reserves would allay fears of defaults, bringing the yields and the yield spreads lower.

2.4 Empirical Studies

A study by Barbosa and Costa (2010) concluded that increasing spreads in sovereign bonds in the eurozone in 2009 was as a result of a rising probability of debt default by several countries in that area. Though the theoretical concepts implicitly apply to our research, these economies are notably different to Kenya and our research is still needed to determine whether these factors apply to Kenyan Eurobonds.

Olabisi and Stein (2015) found that developing countries due to their macroeconomic uncertainties have a higher sovereign risk premium than the more advanced countries. Governments therefore needed to keep track of factors that affect their sovereign risk since it directly influences their borrowing costs. Their research was geared towards a broader population of African markets, which have markedly different characteristics in terms of economic fundamentals hence the need to carry our research with a Kenyan perspective.

Amira (2004) did an empirical analysis on sovereign spreads on Eurobonds issues in the period between 1991-2000. She found that the yield spreads on these bonds were related with the number of managers, gross fees, maturity, issue size and the countries' credit ratings. This was consistent with the overall risk and return theories where countries who are rated lower pay a higher rate on their external debt. Higher rated countries on the other hand pay very low rates on their debt, with some even having negative rates in international markets.

As per the findings of Sy (2002), Emerging market bonds spreads over U.S. Treasuries are an indicator of sovereign risk. Sovereign yield spreads are a function of credit risk (in our case country default risk). They are used to determine the risk premium charged when accessing debt in the capital markets. He also found that these spreads are also

dependent on currency risk, interest rates and technical aspects including liquidity and the constitution of investors in a country's debt securities.

Costantini, Fragetta & Melina (2013) found that yield spreads are largely determined by expected fiscal imbalances including changes in the debt to GDP ratios and liquidity risk. Debt-to-GDP ratios, in the long run, were significant factors influencing bond yields. Increasing debt-to-GDP ratio was corelated with widening spreads while a decreasing ratio was correlated to decreased spreads in the countries under study.

Mpapalika and Malikane (2019) did a research on the factors contributing to the risk premium paid by African countries. They used a fixed effects model in an empirical analysis to determining the major factors contributing to the risk premium. This included fixing some country specific factors, the inclusion of dummy variables, using the Bai–Perron multiple structural break test and a GMM for testing the null hypothesis. The conclusion was first that the money supply to GDP ratio and exchange rate were not significant. At 5% and 10% confidence level, the significant factors were the growth in GDP, level of foreign exchange reserves, prices of commodities, sentiment in the market and the debt-GDP ratio.

Munene (2015), in his research on the determinants of treasury bonds uptake in Kenya did an empirical study and found that the country's credit rating had a mean of 0.6307; indicating that the country's credit rating explained 63.07% of the uptake of treasury bonds in Kenya. The study showed that the rate of interest accounted, on average,22.5% of the uptake of treasury bonds. However, the value went as high as 73% and as low as 1%. Liquidity explained 46.24% of the uptake of treasury bonds in Kenya. The value was noted to fluctuate from a high of 48% and as low as 45%. The country's gearing ratio explained 77.07% of the changes in treasury bonds uptake in

the country. These were however local currency denominated bonds and our research is still relevant for foreign currency denominated Eurobonds.

Mata (2007) did a research on the exposure of commercial banks listed at the Nairobi Securities Exchange to interest rate risk. His findings found a correlation between banks' returns in terms of the stock price and fluctuations in interest rates and was tested at a 95% confidence level. In our research, interest rate risk is one of the determinants of country risk and in Mata's research, though applied on a smaller perspective of commercial banks, this risk affected the returns on the bank securities as reflected in the stock price and can still be viewed on a broader perspective where country risk would affect returns (in our case yield spreads) on bond securities.

Nyambedha (2016) found that the relative value of bonds can best be derived by comparing bond yields in the various tenors. She further notes that yields of Bonds issued by the government usually help investors understand and determine risk. She also noted that bonds denominated in foreign currency and longer dated bonds posed additional risk and therefore investors were bound to ask for a higher return in form of higher yields. She also notes that for corporate bonds, the implied higher risk causes these bonds to have higher coupon payments (return) cementing the risk return narrative in our own research. Despite the similar risk return theory implication, the bonds she looks at are a different security from the Eurobonds we're examining in this research thereby necessitating the need for our research.

Wanjiku (2014) did a research on the impact of bond issuance on stock prices of listed firms at the NSE. The bond market, she stated, was part of the overall capital markets where the EMH theory on market efficiency applied. In the ensuing research, she found that bond issues reflected in the prices of underlying share prices, denoting market

efficiency. In our own research, it can be implied that risk factors in Kenya's fundamentals that determine the country's risk would continuously reflect in the price of Kenyan Eurobonds, denoting market efficiency and information flow into asset prices.

Luketero (2008) in his research on the long run returns of shares and bonds in the Kenyan securities markets, was seeking to investigate and compare real returns of these products in the capital markets. An empirical analysis found that returns on shares was higher than returns on equivalent bond portfolios in the long run. He also investigated the 'risk of default' whereby an investor who purchases a bond faces the risk that the issuer will default or fail to make the interest and principal payments as and when they fall due. The conclusion here was that the higher the risk, the higher the interest rates required to compensate investors for holding such a security. This is implicitly implied in our research. However, the securities that Stephen tested, despite having similar theoretical principles are different from those in our research.

From the empirical evidence above, there has been no research done to effectively conclude that country risk affects yield spreads of Kenyan Eurobonds.

2.5 Conceptual Framework

It depicts a researcher's understanding of literature on how to analyze the variables of the study. It diagrammatically demonstrates the connection between all the variables under study. This study seeks to investigate the relationship between the variables as presented schematically in the conceptual framework below.

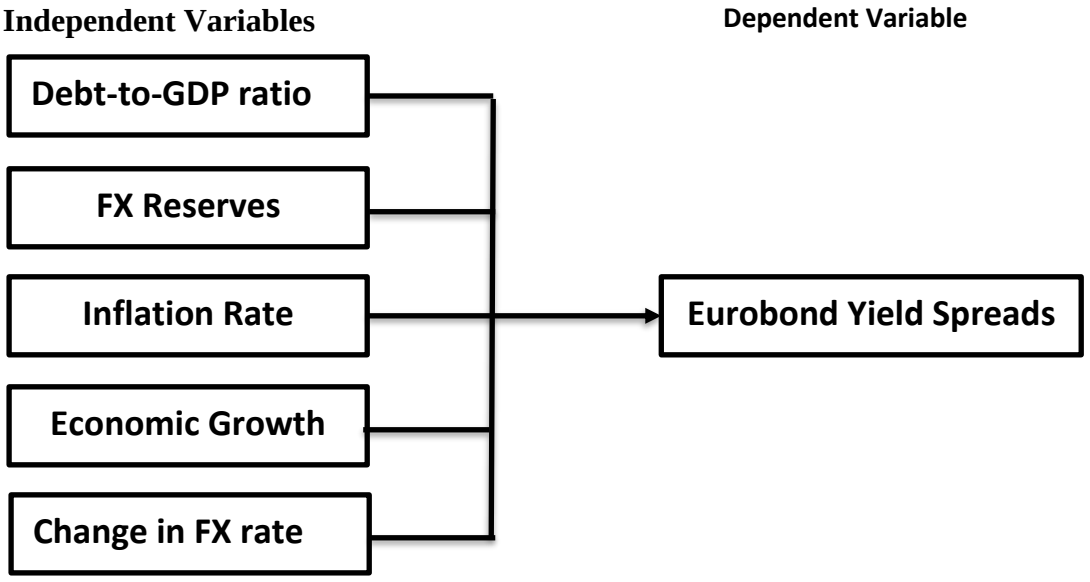
The conceptual model of our study consists of country risk and its effect on Eurobonds yield spreads as illustrated below.

Figure 1: Conceptual Framework

Source: Author (2019)

In addition, the model examines the key drivers of country risk and the effect of each of these elements on the dependent variable. These are the level and change in the amount of government debt relative to GDP (Debt-to-GDP ratio), the level and variability of foreign reserves, Inflation rate, the growth of the country's economy (GDP growth) and the annual change in the exchange rate (FX rate volatility). This is illustrated below.

Figure 2: Conceptual Framework



Source: Author (2019)

2.6 Summary of Literature Review

In this review, we've noted that most of the research done on the relationship between country risk and yield spreads has been done on advanced economies that have little correlation with Kenya and Kenyan macroeconomic fundamentals. Also, a lot of the research uses sovereign credit ratings from institutions like Moody's and fitch. These ratings are mostly static and do not change over long periods while underlying fundamentals are changing consistently unlike the risk model used in our research that changes consistently with changing macroeconomic fundamentals. We've also found very little research on this analysis done on a local (Kenyan) perspective. Some of the research found has been done on generalized African countries but none has been done on a purely Kenyan perspective. These factors present gaps which our model aims to fill.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, all the procedures that were used to carry out the research are discussed. It covers the design of the research proposal, the study population, sample design, and techniques that were involved to collect and analyze the collected data.

3.2 Research Design

It is a description of the systematic plan that was used to carry out a research. Kothari (2004) defined research design as a blueprint for collecting data, measurement and data analysis. It is basically a conceptual structure of carrying out a research. This study used a descriptive research design. Data was gathered without controlling any variables as is the case in experimental research design. Quantitative methods were used and data will be collected from both primary and secondary sources i.e. Thomson Reuters to collect data on both Kenyan country risk as determined by the Starmine model and also data on Yield spreads on Kenyan Eurobond which change every working day. Data for all the other variables was quantitative and was gathered from both primary and secondary sources.

3.3 Population

This is the sum total of institutions, individuals, groups or objects on which the research was based. Ngechu (2004) defined it as a distinct group of objects, individuals, households, et al that constitute the subject of the research. The population in our case involved all the sovereign Eurobonds issues by Kenya since 2014. Only six notes/bonds have been issued in this period and therefore a census approach to the study was found appropriate. Mugenda (2003) argued that in case of a small population, the most preferred method is a census. In this case, the population was small and data for the six

Eurobond notes was easily available and manageable. This study used actual traded yields of all Kenyan Eurobonds from 2014 to date.

3.4 Data Collection

Primary and secondary data was collected for both the dependent and independent variables. The Thomson Reuters Eikon information platform was used to collect data for the Starmine Country risk, the Eurobonds yield spreads, the ratio of debt-to-GDP and the annual change in exchange rate. The Kenya National Bureau of Statistics was the source of data on the inflation rate and GDP growth. The Central Bank of Kenya was the source of data on the level of FX reserves in the period. Secondary data was suitable for this study with its main advantage being availability, hence was fast and easy to collect. Primary data was also be used for some of the variables. The study covered a period of 7 years from 2014 to 2021 as Kenyan Eurobonds were actively issued in the primary market and traded in the secondary market.

3.5 Data Analysis

3.5.1 Diagnostic Tests

This study incorporated a unit root test so as to verify if the study variables are stationary. Stationarity test enabled us to check if the mean and the variance of the time series were time invariant.

This study also incorporated a test of multicollinearity. Multicollinearity test tested for the presence of linear relationship among independent variables. Presence of multicollinearity in a time series can prevent the analysis from coming up with reliable estimates of individual coefficients of independent variables. Correlation study and the t test was done to find out any significant relationship between the variables, plus to

test whether there is any relationship amongst the independent variables. The Pearson correlation coefficient measured the linear correlation, that is the power and direction of correlation between the independent and dependent variables.

3.5.2 Analytical Model

Data analysis was carried out in the following steps. The data was initially be entered and cleaned for analysis and interpretation. The variables used in the study consisted of a dependent variable and six independent variables. SPSS software was used to analyze the gathered primary and secondary data. Descriptive statistics were first be used to show the characteristics and also summarize data sets as follows. For each variable of the study, values for its mean, the standard deviation, median, the minimum and maximum values, the skewness, kurtosis and Jarque-Bera were determined. Regression analysis was then be performed on the set of data. Secondly, the Pearson correlation coefficient was used to measure the linear correlation, that is the power and direction of correlation between the independent and dependent variables. Finally, findings from the analysis were organized, summarized and presented using tables. The model of regression below was used in the analysis of data:

Based on theoretical and empirical review above and the conceptual framework formed, the study first estimated the following model using regression analysis:

$EYSt = \alpha + \beta 1CR + \varepsilon$ ……..... (1)

Where;

EYSt = Eurobond Yield Spreads for time period t

α = constant term or y intercept

$\beta 1\ldots$ = Regression model coefficients (parameters)

CR = Country risk

ε = Is the Error Term

This was the first test to determine the relationship between overall country risk and Eurobond yield spreads.

In addition, the model examined the key drivers of country risk and determined the effect of each element on the Eurobond yield spread. Here, multiple regression was used to come up with the analytical model below:

$$EYSt = \alpha + \beta 1DGDt + \beta 2FXRt + \beta 3IRt + \beta 4GGDt + \beta 5VFXt + \varepsilon \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..... (2)$$

Where;

EYSt = Eurobond Yield Spreads for time period t

α = constant term or y intercept

$\beta 1\ldots\beta 5$ = Regression model coefficients (parameters)

ε = Is the Error Term

DGDt = Debt-to-GDP ratio for time period t

FXRt = level of Foreign Exchange Reserves for time period t

IRt = Inflation Rate for time period t

GGDt = GDP growth for time period t

VFXt = Exchange rate volatility (annualized change) for time period t

3.5.3 Significance Tests

The research used the correlation coefficient (r) to determine the strength and direction of the relationship between the Eurobond Yield Spreads and all other independent variables. R, which is the coefficient of determination was used to ascertain the proportion of change in the yield spreads that can be attributed to each of the independent variables. Additionally, the F-test was used to determine statistical significance of these relationships between yield spread and the independent variables at 1%, 5% and 10% confidence levels.

CHAPTER FOUR: DATA ANALYSIS, FINDINGS, AND INTERPRETATIONS

4.1 Introduction

This section provides output of the analysis of data collected, the interpretation and discussion of the findings. The population in our case was the sovereign outstanding Eurobonds issued by Kenya since 2014, excluding one Eurobond issued in June 2021 which could not be included as there are not enough data points to do analysis on the bond.

4.2 Diagnostic Tests

A test of normality, multicollinearity and autocorrelation was undertaken.

4.2.1 Normality Tests

Table 4.2.1: Tests of Normality

	EYSt	CR	DGDt	FXRt	IRt	GGDt	VFXt
Valid	86	86	86	86	86	86	86
Skewness	2.434	0.406	0.222	0.322	1.341	-2.153	2.185
Std. Error of Skewness	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Kurtosis	7.107	-0.826	-1.014	-0.505	3.023	4.58	5.843
Std. Error of Kurtosis	0.514	0.514	0.514	0.514	0.514	0.514	0.514

Source: Research Findings (2021)

The test for normality was conducted using the skewness and kurtosis statistics. Some of the data (EYSt, IRt, GGDt and VFXt) in the series does not exhibit a normal distribution because a normal distribution has skewness in the range of -1.0 to +1.0, and a kurtosis within the range of -3 to +3. CR, DGDt and FXRt are however normally distributed.

4.2.2 Multicollinearity Tests

Table 4.2.2: Test of Multicollinearity

Dependent Variable		Collinearity Statistics	
		Tolerance	VIF
DGDt	FXRt	0.78	1.283
	IRt	0.857	1.167
	GGDt	0.923	1.084
	VFXt	0.956	1.047
FXRt	IRt	0.861	1.162
	GGDt	0.637	1.569
	VFXt	0.997	1.003
	DGDt	0.566	1.766
Irt	GGDt	0.609	1.641
	VFXt	0.938	1.066
	DGDt	0.334	2.995
	FXRt	0.462	2.164
GGDt	VFXt	0.934	1.071
	DGDt	0.497	2.012
	FXRt	0.473	2.116
	IRt	0.842	1.187
VFXt	DGDt	0.335	2.987
	FXRt	0.481	2.079
	IRt	0.843	1.186
	GGDt	0.607	1.646

Source: Research Findings (2021)

Table 4.2.2 exhibits the multicollinearity results. The results show that the variance inflation factor is less than 10 for all independent variables, which signify no multicollinearity existing between the independent variables. Tolerance is the reciprocal of VIF and also signifies the same therefore no multicollinearity problem exists in the independent variables.

4.2.3 Autocorrelation

Autocorrelation is tested to detect any similarity between time series at a given time interval which is carried out using Durbin-Watson. This test depicts a test statistic with a value of 0 to 4 where 2 no autocorrelation exists, where the statistic is less than two a positive autocorrelation exists and where greater than two, negative autocorrelation exists.

Table 4.2.3: Test of Autocorrelation

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.632[a]	.400	.362	62.40694831	.681

a. Predictors: (Constant), VFXt, DGDt, IRt, GGDt, FXRt

b. Dependent Variable: EYSt

Source: Research Findings (2021)

In this case it is 0.681, meaning a positive autocorrelation exists.

4.3 Descriptive Statistics

Table 4.3: Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
EYSt	86	413.91	868.70	518.23	78.15
CR	86	3.49	6.59	4.60	0.82
DGDt	86	45.25	74.79	57.71	8.21
IRt	86	3.73	11.70	6.09	1.52
GGDt	86	-1.83	2.40	1.47	0.91
VFXt	86	-	48.00	9.03	8.76
FXRt	86	6,094,000,000	10,062,000,000	7,806,976,744	897,207,418

Source: Research Findings (2021)

The output indicates the minimum, maximum, mean, and standard deviation of all our variables. The Yield Spread on the analyzed Eurobonds (EYSt) has a mean 518.23 with a standard deviation of 78.15. The maximum and minimum spreads are 413 and 868 basis points respectively. Descriptive statistics for all the other variables are as above.

4.4 Correlation Analysis

Pearson correlation varies from -1.00 to +1.00 with positive values indicating positive relations while negative values suggest negative relations among study variables. The study employed a confidence interval of 95% and 99%. A two tailed test was utilized

Table 4.4: Correlation Analysis

Correlations								
		EYSt	CR	DGDt	FXRt	IRt	GGDt	VFXt
EYSt	Pearson Correlation	1	-0.103	0.157	0.147	-0.152	-.502**	0.208
	Sig. (2-tailed)		0.343	0.15	0.175	0.163	0	0.055
CR	Pearson Correlation	-0.103	1	.313**	0.062	-.360**	-0.024	0.136
	Sig. (2-tailed)	0.343		0.003	0.569	0.001	0.824	0.212
DGDt	Pearson Correlation	0.157	.313**	1	.692**	-.350**	-.593**	0.005
	Sig. (2-tailed)	0.15	0.003		0	0.001	0	0.967
FXRt	Pearson Correlation	0.147	0.062	.692**	1	-.361**	-.275*	-0.17
	Sig. (2-tailed)	0.175	0.569	0		0.001	0.01	0.12
	N	86	86	86	86	86	86	86
IRt	Pearson Correlation	-0.152	-.360**	-.350**	-.361**	1	0.111	-0.05
	Sig. (2-tailed)	0.163	0.001	0.001	0.001		0.31	0.646
GGDt	Pearson Correlation	-.502**	-0.024	-.593**	-.275*	0.111	1	0.006
	Sig. (2-tailed)	0	0.824	0	0.01	0.31		0.953
VFXt	Pearson Correlation	0.208	0.136	0.005	-0.169	-0.05	0.006	1
	Sig. (2-tailed)	0.055	0.212	0.967	0.12	0.646	0.953	
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed). **Source: Research Findings (2021)**								

The result in the above table shows a strong negative correlation between yield spread and GDP growth meaning that there is a statistically significant relationship between

the two variables at the 0.01 significance level. Various correlations between the variables are also depicted in the table with varying strengths and various levels of significance.

4.5 Regression Analysis

The study employed the multivariate regression model that was used to examine the relevance of the predictor variables under study in respect to the Eurobond Yield Spreads.

4.5.1 Model Summary

Table 4.5.1: Model Summary

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.632[a]	.400	.362	62.40694831	.681
a. Predictors: (Constant), VFXt, DGDt, IRt, GGDt, FXRt					
b. Dependent Variable: EYSt					

Source: Research Findings (2021)

The average R^2 of the model was 0.400 showcasing that 40.0% of the changes in Eurobond Yield Spread are explained by the five variables in the model. 60.0% of the change in yield spread remains unexplained by the factors considered in the study.

Table 4.5.2: Model Summary

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.103[a]	.011	-.001	78.18843951	.349
a. Predictors: (Constant), CR					
b. Dependent Variable: EYSt					

Source: Research Findings (2021)

Country risk by itself has a lesser relationship with only 0.011% of the changes in Eurobond Yield Spread being influenced by country risk.

4.5.2 Analysis of Variance

Table 4.5.2.1: Analysis of Variance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	207511.396	5	41502.279	10.656	.000[b]
	Residual	311570.176	80	3894.627		
	Total	519081.572	85			

a. Dependent Variable: EYSt

b. Predictors: (Constant), VFXt, DGDt, IRt, GGDt, FXRt

Source: Research Findings (2021)

The analysis of variance is used to test the statistical significance of the R-square value in the Model Summary table. The null hypothesis is that the population R-square is zero. Here, the ANOVA results indicate statistical significance [F(5,80 df)=10.656, p<.001], suggesting that the population R-square is significantly greater than zero and is therefore statistically significant at less than p<.001.

Table 4.5.2.2: Analysis of Variance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5553.278	1	5553.278	.908	.343[b]
	Residual	513528.294	84	6113.432		
	Total	519081.572	85			

a. Dependent Variable: EYSt

b. Predictors: (Constant), CR

Source: Research Findings (2021)

However, The F value of 0.908 in the Country risk only model is not significant as the P value results in 0.343.

4.5.3 Distribution of Coefficients

Table 4.5.3.1: Distribution of Coefficients

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	709.161	94.854		7.476	.000
	DGDt	-5.151	1.445	-.541	-3.564	.001
	FXRt	0.00000002787	.000	.320	2.475	.015
	IRt	-6.778	4.856	-.132	-1.396	.167
	GGDt	-62.126	9.582	-.722	-6.484	.000
	VFXt	2.344	.801	.263	2.925	.004

Source: Research Findings (2021)

The resulting regression model is:

EYSt = 709.161 - 5.151DGDt + 0.00000002787FXRt - 6.778IRt - 62.126GGDt + 2.344VFXt

Where,

EYSt = Eurobond Yield Spreads for time period t

DGDt = Debt-to-GDP ratio for time period t

FXRt = level of Foreign Exchange Reserves for time period t

IRt = Inflation Rate for time period t

GGDt = GDP growth for time period t

VFXt = Exchange rate volatility (annualized change) for time period t

The estimated regression model above shows that if all other variables were held at zero, Eurobond Yield Spreads would be equal to 709.161. In our correlation matrix earlier analyzed, the GDP growth and Exchange rate volatility had the most correlation with yield spread. The regression model above shows a significant negative relationship between GDP growth and yield spread and a significant positive relationship between Exchange rate volatility and yield spread. The level of Foreign Exchange Reserves is also positively correlated with yield spread. Inflation Rate and Debt-to-GDP ratio are however negatively correlated with yield spread.

Table 4.5.3.2: Distribution of Coefficients

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	563.445	48.188		11.693	.000
	CR	-9.835	10.319	-.103	-.953	.343

Source: Research Findings (2021)

In the Country Risk only model, the resulting regression model is:

EYSt = 563.445 - 9.835CR

Where,

EYSt = Eurobond Yield Spreads for time period t

CR = Country risk

The estimated regression model above shows that with country risk held at zero, yield spread would be equal to 563.445. It however resulted in a negative relationship between country risk and yield spread.

4.6 Discussion of Research Findings

The objective of this research was to determine the effect of country risk on yield spreads in Kenyan Eurobonds. The study went further and examined the key drivers of country risk and the effect of each of these factors on yield spread. These factors are the level and change in the amount of government debt relative to GDP (Debt-to-GDP ratio), the level and variability of foreign reserves, Inflation rate, the growth of the country's economy (GDP growth) and the annual change in the exchange rate (FX rate volatility).

The study established a strong negative relationship between yield spread and GDP growth. This was in line with Costantini, Fragetta & Melina (2013) and Mpapalika & Malikane (2019) who found GDP, in the long run, was a significant factor in influencing bond yields. Increasing GDP growth was corelated with narrowing yield spreads while a reduction in growth rate was correlated to widening spreads in the case of Kenyan Eurobonds.

The study also established a positive relationship between Exchange rate volatility and yield spread. This is in line with Modern Portfolio theory by Harry M. Markowitz in Markowitz (1952) where an investor taking on more risk is expected to earn a higher return and therefore a higher yield.

The study however established a weak positive relationship between level of Foreign Exchange Reserves and yield spread (Pearson Correlation = 0.147) which however was not significant below the 0.05 accepted level (Sig. (2-tailed) = 0.175). Inflation Rate and Debt-to-GDP ratio had a weak negative correlation with yield spread and were also not significant as denoted by their p levels of 0.163 and .150 respectively.

The Country Risk only model also didn't establish a strong relationship between overall country risk and yield spread (Pearson Correlation = -0.103) and was not significant at below the 0.05 accepted p level (Sig. (2-tailed) = 0.343).

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

Chapter five summarizes the findings of the previous chapter, conclusion and limitations encountered during the study. In addition, the chapter documents recommendations which policy makers can apply to lower the premium paid on their external borrowing. Lastly this chapter advances suggestions for further research that can be important to future researchers.

5.2 Summary of the Findings

This study aimed at examining the factors that affected the premium (yield spread) paid on external borrowings in our case the Kenyan Eurobonds. The Modern Portfolio Theory, the Efficient Market Hypothesis theory and the Arbitrage Pricing Theory were adopted as the key theories for the study.

The study carried out a census of the six outstanding sovereign Eurobonds issued by Kenya since 2014 and collected and collected and analyzed data for a period of 7 years since 2014.

The descriptive results found that the Yield Spread on the analyzed Eurobonds (EYSt) has a mean 518.23 and the research was able to collect valid data for all the variables in question for the period.

The correlation findings found a strong negative relationship between yield spread and GDP growth and a positive relationship between Exchange rate volatility and yield spread.

The level of Foreign Exchange Reserves, Inflation Rate, Debt-to-GDP ratio and overall Country Risk however didn’t establish a strong relationship with yield spread and the correlation was not significant at below the 0.05 accepted p level.

5.3 Conclusion

This study concludes that GDP growth has a significant inverse relationship on the yield spread of Kenyan sovereign Eurobonds. Exchange rate volatility also has a significant positive relationship with yield spread. On the other hand, the level of Foreign Exchange Reserves, Inflation Rate, Debt-to-GDP ratio and overall Country Risk were found not to have a significant effect on yield spread.

5.4 Policy Recommendations

From this research, it's recommended that the Kenyan government keep a tight leash over the broad macroeconomic fundamentals that would influence the overall country's risk profile and thus affect its external borrowing costs. This included the GDP and exchange rate volatility which have been found to have a significant relationship with yield spreads.

It is however not justifiable that the premium paid on Kenyan Eurobonds in comparison with similar bonds in international markets (in this research expressed as the yield spread) is not truly a reflection of the overall country's risk profile and the generally accepted macroeconomic factors that should be the major determinants.

This amounts to a penalty which may be brought about by investor prejudice against African economies as denoted by previous researchers Olabisi and Stein (2015) and this extra cost incurred could better be used on development projects, benefitting Kenyans at large.

The Kenyan government should therefore ensure that the yield charged on our external borrowing is quantified against the country’s overall risk profile and not on the whims of external investors.

5.5 Limitations of the Study

The main limitation encountered was in finding an appropriate measure of credit risk. The basic measure of this risk would have been through sovereign ratings, which are produced by the major credit rating agencies—Standard & Poor's (S&P), Moody's, and Fitch. These ratings, though used widely have a notable disadvantage of being static and sometimes remaining unchanged for years on end, despite continuous changes in underlying fundamentals. It was therefore decided to use the Thomson Reuters StarMine Sovereign Risk models which are based on using a country's fundamentals to come up with an overall country risk score. However, some of these fundamentals in Kenya are not updated frequently unlike in the developed countries. The overall measure is therefore still somehow static due to this reason and a more accurate representation needs to be developed in future.

Another limitation was on calculation of yield spread which involves comparison of Kenyan Eurobond yields against yields of comparable risk-free bonds of a similar period. American US Treasuries were chosen and Thomson Reuters Eikon was able to compare the two and come up with a spread figure. However, selection of the comparable bond is still a subjective process as an exact match is not possible. Also, the US Treasuries are not exactly 'risk-free' as assumed.

The study also went further and analyzed some of the economic fundamentals that make up credit risk against yield spread. Five fundamentals were analyzed in this regard. However, the number of fundamentals utilized to measure credit risk are a lot more even in the Thomson Reuters Starmine model which uses a total of thirteen fundamentals to determine credit risk. These could not all be studied in this research.

Lastly, Eurobonds in Kenya are relatively new with the earliest being issued in 2014. We used a census approach to carry out the research since there was a limited number

of Eurobonds issued since then. Data for a longer period and a larger number of bonds would have given a better analysis for this research

5.6 Suggestions for Further Research

This study only analyzed five of the fundamentals making up credit risk against yield spread. Future research could dwell on the other variables including qualitative factors such as political risk as the other factors also contribute to a country's risk in the eyes of investors.

Future research could also incorporate more Eurobonds the analysis done for a longer period. For example, there was a Eurobond recently issued in mid-2021 which has not been included in this research. This is because there are not enough available traded yield data points on this particular bond to conduct a proper research. Enough data points will however be available in due time, further enriching the research.

Further research also needs to be undertaken on other determinants of yield spreads of Eurobonds other than credit risk. These include fiscal imbalances, interest rate risk and liquidity risk which could have a significant influence over yield spread.

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APPENDICES

APPENDIX I: KENYAN EUROBOND LIST

Issuer	ISIN	Coupon	Coupon Frequency	Issue Date	Maturity	Tenor	Amount Issued (USD)	Amount Outstanding (USD)	Next Coupon Payment Date	Principal Currency	Country of Issue	Exchange Name
Kenya, Republic of (Government)	XS1028952403	6.88	Semiannually	24/06/2014	24/06/2024	10 Years	2,000,000,000.00	2,000,000,000.00	24/12/2020	US Dollar	Eurobond Market	LONDON STOCK EXCHANGE PLC, MARKETAXESS, STUTTGART STOCK EXCHANGE, FRANKFURT STOCK EXCHANGE, BERLIN STOCK EXCHANGE, TRADEGATE EXCHANGE, MTS BONDVISION, IRISH STOCK EXCHANGE
Kenya, Republic of (Government)	XS1843435840	7.00	Semiannually	22/05/2019	22/05/2027	8 Years	900,000,000.00	900,000,000.00	22/11/2020	US Dollar	Eurobond Market	STUTTGART STOCK EXCHANGE, IRISH STOCK EXCHANGE
Kenya, Republic of (Government)	XS1781710543	7.25	Semiannually	28/02/2018	28/02/2028	10 Years	1,000,000,000.00	1,000,000,000.00	28/08/2020	US Dollar	Eurobond Market	BERLIN STOCK EXCHANGE, LONDON STOCK EXCHANGE PLC, STUTTGART STOCK EXCHANGE, MTS BONDVISION, FRANKFURT STOCK EXCHANGE, IRISH STOCK EXCHANGE
Kenya, Republic of (Government)	XS1843435766	8.00	Semiannually	22/05/2019	22/05/2032	13 Years	1,200,000,000.00	1,200,000,000.00	22/11/2020	US Dollar	Eurobond Market	IRISH STOCK EXCHANGE, STUTTGART STOCK EXCHANGE
Kenya, Republic of (Government)	XS1781710626	8.25	Semiannually	28/02/2018	28/02/2048	30 Years	1,000,000,000.00	1,000,000,000.00	28/08/2020	US Dollar	Eurobond Market	IRISH STOCK EXCHANGE, STUTTGART STOCK EXCHANGE, LONDON STOCK EXCHANGE PLC, DUSSELDORF STOCK EXCHANGE, MTS BONDVISION, FRANKFURT STOCK EXCHANGE, BERLIN STOCK EXCHANGE
Kenya, Republic of (Government)	XS1028951850	5.88	Semiannually	24/06/2014	24/06/2019	5 Years	750,000,000.00	0		US Dollar	Eurobond Market	IRISH STOCK EXCHANGE, STUTTGART STOCK EXCHANGE

APPENDIX II: DATA COLLECTION

Variable	Source	Value Type
Country Risk	Thomson Reuters Starmine Country risk	Number (0-100)
Debt-to-GDP ratio	Thomson Reuters Eikon	Number (0-1)
FX Reserves	Central Bank of Kenya	Amount in USD
Inflation Rate	Kenya National Bureau of Statistics	Percentage
Economic Growth	Kenya National Bureau of Statistics	Percentage
Change in FX rate	Thomson Reuters Eikon	Percentage

APPENDIX III: DATA

EYSt = Eurobond Yield Spreads for time period t

CR = Country risk for time period t

DGDt = Debt-to-GDP ratio for time period t

FXRt = level of Foreign Exchange Reserves for time period t

IRt = Inflation Rate for time period t

GGDt = GDP growth for time period t

VFXt = Exchange rate volatility (annualized change) for time period t

Date	EYSt	CR	DGDt	FXRt	IRt	GGDt	VFXt
31-Jul-2021	434.49	4.92	74.79	9,241,000,000.00	6.44	0.38	8.40
30-Jun-2021	421.85	5.58	73.82	9,494,000,000.00	6.32	0.38	2.40
31-May-2021	413.91	5.74	72.87	7,510,000,000.00	5.87	0.38	1.80
30-Apr-2021	432.93	5.64	71.94	7,664,000,000.00	5.76	0.38	18.00
31-Mar-2021	467.25	5.33	71.01	7,343,000,000.00	5.90	0.38	5.40
28-Feb-2021	420.08	5.39	70.10	7,605,000,000.00	5.78	0.38	4.20
31-Jan-2021	447.40	5.14	69.19	7,663,000,000.00	5.69	0.38	11.40

31-Dec-2020	459.84	5.04	68.79	7,750,000,000.00	5.62	0.17	10.80
30-Nov-2020	498.83	5.00	68.73	7,954,000,000.00	5.33	0.17	15.60
31-Oct-2020	584.22	4.99	68.52	8,121,000,000.00	4.84	0.17	3.60
30-Sep-2020	700.66	4.29	68.42	8,541,000,000.00	4.20	-0.37	3.60
31-Aug-2020	651.35	4.29	68.30	8,865,000,000.00	4.36	-0.37	5.40
31-Jul-2020	704.24	4.16	67.94	9,336,000,000.00	4.36	-0.37	14.40
30-Jun-2020	692.83	4.12	67.44	9,717,000,000.00	4.59	-1.83	3.00
31-May-2020	770.42	4.49	67.34	8,331,000,000.00	5.33	-1.83	5.40
30-Apr-2020	868.70	4.49	66.86	7,744,000,000.00	6.01	-1.83	24.60
31-Mar-2020	805.30	5.57	66.50	7,874,000,000.00	5.84	1.73	48.00
29-Feb-2020	518.67	5.61	66.22	8,409,000,000.00	7.17	1.73	9.60
31-Jan-2020	461.27	5.17	66.12	8,500,000,000.00	5.78	1.73	11.40

31-Dec-2019	426.55	5.06	65.97	8,758,000,000.00	5.82	1.80	15.00
30-Nov-2019	485.35	5.07	65.82	8,748,000,000.00	5.56	1.80	8.40
31-Oct-2019	487.41	5.06	65.76	8,961,000,000.00	4.95	1.80	6.60
30-Sep-2019	510.05	4.45	65.22	8,935,000,000.00	3.83	1.93	4.20
31-Aug-2019	505.55	4.45	65.62	9,252,000,000.00	5.00	1.93	7.80
31-Jul-2019	442.68	3.49	65.57	9,490,000,000.00	6.27	1.93	21.00
30-Jun-2019	476.42	3.49	63.86	9,131,000,000.00	5.70	1.70	13.20
31-May-2019	553.51	3.49	62.10	10,062,000,000.00	5.49	1.70	1.20
30-Apr-2019	514.58	3.49	61.89	8,010,000,000.00	6.58	1.70	4.80
31-Mar-2019	507.48	3.49	60.50	8,254,000,000.00	4.35	1.73	10.20
28-Feb-2019	490.93	3.49	60.27	8,196,000,000.00	4.14	1.73	10.20
31-Jan-2019	526.15	3.58	59.71	8,136,000,000.00	4.70	1.73	13.20

31-Dec-2018	601.86	5.73	59.17	8,019,000,000.00	5.71	2.10	8.40
30-Nov-2018	582.38	5.06	59.17	8,039,000,000.00	5.58	2.10	6.00
31-Oct-2018	530.80	5.29	58.79	8,221,000,000.00	5.53	2.10	15.60
30-Sep-2018	504.37	5.58	58.58	8,436,000,000.00	5.70	2.17	1.20
31-Aug-2018	536.55	5.57	58.39	8,577,000,000.00	4.04	2.17	2.40
31-Jul-2018	483.97	5.80	58.43	8,761,000,000.00	4.35	2.17	4.80
30-Jun-2018	532.83	5.63	58.08	8,668,000,000.00	4.28	2.03	4.80
31-May-2018	496.32	5.63	57.99	8,955,000,000.00	3.95	2.03	12.00
30-Apr-2018	466.21	5.63	57.79	9,142,000,000.00	3.73	2.03	8.40
31-Mar-2018	466.39	5.83	57.35	8,848,000,000.00	4.18	2.10	4.80
28-Feb-2018	476.04	6.58	57.43	7,154,000,000.00	4.46	2.10	8.40
31-Jan-2018	470.43	6.59	56.14	7,108,000,000.00	4.83	2.10	13.20

31-Dec-2017	473.14	6.35	55.88	7,063,000,000.00	4.50	1.73	1.80
30-Nov-2017	477.44	5.79	55.91	7,099,000,000.00	4.73	1.73	9.00
31-Oct-2017	484.63	5.19	55.82	7,143,000,000.00	5.72	1.73	7.20
30-Sep-2017	492.41	4.04	55.70	7,482,000,000.00	7.06	1.47	3.60
31-Aug-2017	487.53	3.98	55.63	7,487,000,000.00	8.04	1.47	13.20
31-Jul-2017	495.40	3.97	55.59	7,524,000,000.00	7.47	1.47	3.60
30-Jun-2017	494.05	3.96	55.55	7,964,000,000.00	9.21	1.47	3.60
31-May-2017	494.28	3.83	55.19	8,259,000,000.00	11.70	1.47	2.40
30-Apr-2017	497.77	3.84	55.02	8,309,000,000.00	11.48	1.47	-
31-Mar-2017	503.00	3.79	54.93	7,731,000,000.00	10.28	1.73	3.60
28-Feb-2017	506.30	3.81	54.50	6,994,000,000.00	9.04	1.73	10.80
31-Jan-2017	512.70	3.78	54.49	6,947,000,000.00	6.99	1.73	15.96

31-Dec-2016	517.83	3.70	54.36	6,971,000,000.00	6.35	2.40	8.04
30-Nov-2016	517.10	3.66	53.89	7,289,000,000.00	6.68	2.40	2.40
31-Oct-2016	513.17	3.68	53.66	7,628,000,000.00	6.47	2.40	3.60
30-Sep-2016	522.84	3.90	53.57	7,782,000,000.00	6.34	1.73	0.60
31-Aug-2016	523.42	3.96	53.03	7,688,000,000.00	6.26	1.73	1.80
31-Jul-2016	535.62	3.54	52.95	7,782,000,000.00	6.39	1.73	3.60
30-Jun-2016	543.98	3.56	53.03	7,237,000,000.00	5.80	2.03	3.60
31-May-2016	539.09	3.71	51.83	7,668,000,000.00	5.00	2.03	2.40
30-Apr-2016	532.25	3.73	51.46	7,618,000,000.00	5.27	2.03	6.00
31-Mar-2016	529.99	4.61	51.07	7,377,000,000.00	6.45	1.67	4.80
29-Feb-2016	541.08	4.68	50.68	7,214,000,000.00	7.09	1.67	6.00
31-Jan-2016	541.92	5.05	50.20	6,976,000,000.00	7.78	1.67	1.20

31-Dec-2015	541.30	5.03	50.06	7,072,000,000.00	8.01	1.83	1.20
30-Nov-2015	530.97	5.03	49.57	6,979,000,000.00	7.32	1.83	2.40
31-Oct-2015	524.87	5.18	48.72	6,563,000,000.00	6.72	1.83	32.40
30-Sep-2015	535.95	4.69	48.68	6,112,000,000.00	5.97	2.03	10.20
31-Aug-2015	510.80	4.71	48.65	6,392,000,000.00	5.84	2.03	17.40
31-Jul-2015	505.68	4.69	48.38	6,434,000,000.00	6.62	2.03	36.96
30-Jun-2015	494.30	4.81	47.98	6,658,000,000.00	7.03	1.87	18.84
31-May-2015	488.30	4.59	47.72	6,770,000,000.00	6.87	1.87	37.80
30-Apr-2015	487.24	4.59	47.42	6,855,000,000.00	7.08	1.87	26.40
31-Mar-2015	493.39	4.25	47.00	7,071,000,000.00	6.31	1.90	12.00
28-Feb-2015	488.88	4.25	46.83	7,206,000,000.00	5.61	1.90	2.40
31-Jan-2015	499.69	4.07	45.86	7,189,000,000.00	5.53	1.90	13.80

31-Dec-2014	485.75	3.85	45.74	7,425,000,000.00	6.02	1.87	4.20
30-Nov-2014	480.46	3.84	45.42	6,901,000,000.00	6.09	1.87	7.20
31-Oct-2014	479.92	3.85	45.25	7,089,000,000.00	6.43	1.87	3.60
30-Sep-2014	478.32	3.99	45.27	7,160,000,000.00	6.60	1.53	9.60
31-Aug-2014	475.15	3.84	45.35	6,257,000,000.00	8.36	1.53	7.20
31-Jul-2014	477.18	3.87	45.40	6,418,000,000.00	7.67	1.53	1.20
30-Jun-2014	483.35	3.70	45.34	6,094,000,000.00	7.39	2.00	-