THE INFLUENCE OF GREEN BONDS ON FINANCIAL PERFORMANCE OF BANKS AND INVESTMENT FIRMS LISTED IN THE NAIROBI SECURITIES EXCHANGE IN KENYA

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DECLARATION

This Thesis is my original work and has not been submitted to any other university for academic credit

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DEDICATION

This thesis is dedicated to all policy makers in the entire Globe who are in the pursuit of greening their economies through green finance. Special Dedication goes to my dear wife Mercy Njeri Mathenge my entire family for their support and understanding during the period of my PhD studies. It is through your patience, understanding, support and encouragement during the entire duration of the course that I made it. Further dedication is to my dear parents Moses Ngunjiri Macheru and Mary Gathoni Ngunjiri for their sacrifice in educating me and for teaching me the discipline and value of hard work . May God forever shower you with his blessings. To my siblings, Ann, Joseph, Paul, Sharon, James and Mercy, I will forever remain grateful for your encouragement during the period of the course.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF ACRONYMS

ABS	Asset based security
ADB	African Development Bank
ADF	Augmented Dickey-Fuller test
AEG	Augmented Engle-Granger
ARDL	Autoregressive Distributed Lag
BOP	Balance of Payments
CBI	Climate Bond Initiative
CBK	Central Bank of Kenya
CDO	Collateralized Debt Obligations
EAC	East African Community
EBs	Energy Bonds EBs
ECM	Error Correction Model
EG	Economic Growth
ESG	Environmental Social and Governance
GDP	Gross Domestic Product
GESIP	Green Economy Strategy and Implementation Plan
GPB	Green Project Bond
GRB	Green Revenue Bond
ICMA	International Capital Markets Association
IDRB	Industrial Development Revenue Bond
IFS	International Financial Statistics
IIF	Institute of International Finance

IISD	International Institute for Sustainable Development
IMF	International Monetary Fund
KNBS	Kenya National Bureau of Statistics
KNPCF	Kenya national policy on climate finance (KNPCF)
MBS	Mortgage-Backed Securities
NSE	Nairobi Securities Exchange
OECD	Organization of Economic Cooperation and Development
OLS	Ordinary Least Square
PBO	Parliamentary Budget Office
RDB	Road Development Bonds
ROA	Return on Asset
SDG	Sustainable development goals
SEC	Securities Exchange Commission
SSA	Sub-Saharan African
U.S.	United States
UNEP	United Nations Environment Programme
UNCTAD	United Nations Conference of Trade and Development
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
WB	World Bank
WDI	World Development Index
WEO	World Economic Outlook
WESP	World Economic Situation and Prospects

SMEs Small and Medium Enterprises

FE Fixed Effect model

RE Fixed Effect model

ABSTRACT

In the recent years, a high number of firms listed within the Nairobi Securities exchange have registered a decline within the firm's financial performance. This has resulted to financial difficulties which is contrary to the shareholders' expectations and adversely affecting the economic process of the Kenyan economy. The selection of a firm's financial structure and its impact on financial performance remains an excellent dilemma to all or any stakeholders. The Nairobi securities exchange stock market has transitioned the investment sector with an aim of "greening" the mainstream financial market using green bonds. This study investigated the influence of green bonds on financial performance of banks and investment firms listed in the NSE in Kenya. Specifically, the study investigated four major components of green bonds namely; Green Revenue Bonds (GRB), Green Project Bonds (GPB), Securitized Bonds (SB) and Proceed Bonds (PB) as per the green bond principles GBP (2016) on firms' financial performance. In addition to this, the study evaluated the moderating role of interest rate on financial performance of banks and investment firms listed in the NSE. The study adopted a positivist research philosophical paradigm, which is epistemological and characterized by a theoretical belief that the independent variable affects the level of the dependent variable, from empirically testable hypotheses. An ex-post facto form design was adopted in this study due to the nature of research problem and the quantitative data available. The target population of comprised of all the 17 firms in the banking and investment sector of the NSE from 2012 to 2019 since the first green bond was issued in Kenya. The study employed both primary and secondary data. A census was conducted on the 17 firms which had issued green bonds either directly or indirectly for the period 2012 – 2019. The study used secondary panel data found in the audited financial reports of the companies. Diagnostic tests carried out included Auto-correlation test, Test for normality, Heteroscedasticity test and Unit Root Test. In order to determine the most appropriate model for the study, a Hausman test was conducted. The study used descriptive statistics to determine the spread of data over time, correlation analysis and panel linear multiple regression analysis. Further, the regression coefficients were used for a significance test using F-statistic at 5% level of significance and conclusions drawn. The probability value of the F-test was employed to examine the null hypothesis Finally, the coefficient of determination (R2) was used to rank independent variables' contribution to the dependent variable. The study found out that green revenue bonds, green proceeds bonds and project had a significant and positive effect on banks and investment firms listed in the NSE in Kenya. Securitized bonds had a negative relationship with banks and investments firm's financial position and the effect was significant. The overall moderating effect of interest rate on firms' financial performance increased by 5% after introducing the moderator which explained 12% of changes in firms financial position compared to 7.7% without the moderator. The study concludes that green revenue bonds, green proceeds bonds and project had a significant and positive effect on banks and investment firms listed in the NSE and that the inclusion of green bonds in the financial structure jointly enhanced the financial structure's power to explain the variations in firms' financial performance. This study recommends that the Capital markets should boost green bonds investments by improving public awareness and by enacting policies that ensures full disclosure of all green bonds invested by adopting Africa's 2063 Agenda eight which requires that all Member States strictly follows the new areas of statistical development such as data revolution, big data, and Statistical Data and Metadata exchange (SDMX).

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The financial performance of companies listed on the Nairobi Securities Exchange has aided the Kenyan economy in a variety of ways. They've encouraged entrepreneurship, which has helped to alleviate unemployment. They have invested in innovative technology that have increased the economy's productivity. They contribute to the government by paying taxes, which are used to provide products and services to the general population. It has also aided in the advancement of developmental research, which has resulted in increased innovation. As a result, a company's financial performance is vital if it is to meet the expectations of its shareholders (Gathara, 2019).

Firms' financial position conveys an understanding of some financial aspects of a firm (Odhiambo, 2018). It refers to the ability that a firm has to generate new resources for operations over a given period of time (Barua & Chiesa, 2019). Ratios are used as a benchmark for evaluating firms' financial performance and help to summarize large quantities of monetary data and to form qualitative judgments about the firm‘s performance (Agliardi & Agliardi, 2019). Among the accounting key performance indicators (KPI), three sub-variables of monetary performance are going to be chosen as, return on equity (ROE), return on assets (ROA), and return on investment (ROI),

as they're the most relevant variables in analyzing firms' financial performance (Dorasamy & Nyamita, 2016).

Financial globalization has opened up the international financial markets to green financing, a key driver of the modern world's economy, which involves financing environmentally friendly projects (Banga, 2019). Green bonds have been reinforced in the scope of G20 by the "Climate Finance Study Group" and Kenya has in effect adopted the green bond policy through the Capital Markets Authority (Green Bond Principals [GBP], 2016).

Under the Kenya Vision 2030 Agenda, which focuses on Sustainable Development Goals (SDGs), green financing has been the driving force behind economic growth by investment firms in the 21st century (Sustainable Development Goals [SDGs], 2020). Green bonds are fixed income instruments whose proceeds are used to finance or refinance new and existing projects that generate environmental benefits that conform to green guidelines and standards (Kenny, 2020). As such, there is a need for their adoption by investment firms in their financial decision making and policy formulation (Nairobi Securities Exchange [NSE], 2019).

Greening the mainstream financial markets is one of the strategic ways that capital markets can effectively influence the global agenda of a green economy and equally contribute to the better performance of investment firms in the organized markets (Maltais & Nykvist, 2020). While the use of green bonds in finance and investment has significantly yielded higher margins in the overall bond market, they have gained a

forefront role and gained momentum as an essential financing mechanism for a diverse range of environmentally friendly projects. The NSE forecasts that the inclusion of green bonds in organization portfolios will spearhead the growth of Kenya's capital markets (NSE, 2019).

The Green Bond market enables businesses, governments, and investors to tap into the opportunities associated with the green economy (Banga, 2019). Kenya is a resource-based economy with great infrastructure and investment needs. As such, the inclusion of green bonds and favorable financial policies are critical to the financial performance of investment firms listed on the Nairobi Securities Exchange. (Capital Markets Authority [CMA], 2019). In June 2016, the Green Bond Principles were released to supply guidelines for the issuance of green bonds, leading to the launch of credible green bonds. This provided the investors with relevant information necessary to determine the environmental impact of green bonds in Kenya, which directly influenced the financial performance of investment firms listed on the NSE (Banga, 2019).

The achievement of Kenya's long term development goals is outlined in the Kenya Vision 2030 key economic pillar on sustainable development, developed by the Green Economy Strategy and Implementation Plan (Government of Kenya [GOK], 2019). The GESIP provides the overall policy framework to facilitate investment firms' transition into a green economy. In line with this, the International Institute for Sustainable Development (IISD) was formed to accelerate solutions that are geared to sustainable development, through policy development on international trade and investment (International Institute for Sustainable Development [ISSD], 2016). These rules are in line with what other countries

do, so they can attract foreign investors who want green investment instruments (Banga, 2019).

All designated green projects are often assessed for inclusion in the investment sector of the NSE (International Capital Markets Association [ICMA], 2017). The NSE recommends that the issuers of green bonds demonstrate that the financing and re-financing of investments or projects conform to the Green Economy Strategy and Implementation Plan (GBP, 2016). To establish the effects of green bonds on the financial performance of investment firms listed on the NSE, four major components of green bonds, namely; green proceeds bonds, green revenue bonds, green project bonds, and sovereign bonds, were applied against the return on assets.

A green revenue bond is a special kind of bond that is guaranteed to be paid back only from the profits made by an entity that is good for the environment and directly related to the bond's purpose (Mitchell, 2016). Revenue bonds can also be issued by a government office, commission, or authority in order to build things like toll bridges, hospitals, university dorms, water, sewer, utility, and electric districts, or ports (ICMA, 2017).

The stagnation in firm's financial performance in the investment sector of the NSE has been caused by improper regulation of the green bond market by the CMA (Scott & Kenny, 2020). Abbas et al. (2007) found that bond market development on green revenue bonds positively affects firm's financial performance developing countries. one among the objectives of the study is to research the consequences of green revenue bonds on financial performance of firms listed within the NSE.

Green Revenue Bonds are primarily issued by the government through the lead investment firms in order to subsidize infrastructure projects, which are key components in economic development (CMA, 2019). The Industrial Development Revenue Bonds (IDRBs), Housing Authority Bonds (HABs), and Lease Rental Bonds (LRBs) form the three pillars of GRBs, which are key determinants of the financial performance of investment firms (Industrial Development Revenue Bond [IDRB], 2017). The proceeds from these bonds are earmarked for green projects featuring long maturities ranging from 20 to 30 years (Ginke, 2018).

Project bonds offer a chance for institutional investors to participate in infrastructure projects through listed, tradable securities, which will offer superior risk-adjusted returns to cushion investment firms listed within the NSE from adverse market effects. (Banga, 2019). The Nairobi Securities Exchange (NSE) categorizes these bonds into three major classes, like Road Development Bonds (RDB), Energy Bonds (EBs) and Water/Irrigation Bonds (WB) (N.S.E, 2019). Project bond issuance levels reached record highs in most regions and sectors in 2017, with global volumes of $64BN as project bonds remained a viable financing source across all industries (GOK, 2019).

Proceed bonds are specific debt instruments where the proceeds are invested in a specific green project, and therefore the investors have direct exposure to the green project itself (Mitchel, 2016). Corporate and municipal bonds are the main pillars of proceeds bonds. Mariz (2020) noted that for proceeds bonds, investors favor long-term offtake

agreements like power purchase agreements or availability-based contracts with investment grade counterparties as their key pillar to strengthen their financial position.

Green securitization involves issuing securities that are backed by a variety of assets that are transformed into securities through a process called securitization (ICMA, 2017). The key element of green securitization is that the requirement of the issuer to repay investors is backed by the worth of a pool of monetary assets or credit support provided by a third party to the transaction (Mussa, & Kihongo, (2017).). The markets for the securities issued through securitization are composed of three main classes, namely Asset Backed Securities (ABS), backed by consumer-backed products; Mortgage-Backed Securities (MBS), backed by mortgages; and Collateralized Debt Obligations (CDO), backed by debt obligations (Alves, 2016).

The interest rate is one of the most important variables that influence green bonds in the determination of a firm's financial position (Agliardi & Agliardi, 2019). It forms the basis rate for all bonds denominated in a certain currency and compensates investors for their baseline economic risks (Haiss, 2016). The central purpose of any government is to formulate sustainable financial policies and frameworks that stimulate the economy (Magale, 2019). Interest rates are usually set by a country's financial institutions and influence the value of borrowing, which later influences firms' financial performance (CMA, 2019).

The best method of understanding the connection between green bonds and a firm's financial performance is to believe interest rates are the value of cash (Haiss, 2016). Essentially, bonds and interest rates have an inverse relationship. When interest rates rise, bond prices fall, and the other way around. When the economy is robust, the demand for money is higher since greater spending activity means there's more of a requirement for cash to finance projects. Higher demand, in turn, drives up costs and, in this case, interest rates. On the other hand, a slower economic process reduces the demand for money since individuals and businesses are less likely to take out loans to finance projects and purchases. Lower demand for loans means prices, and in this case, interest rates fall as well (Kenny, 2020).

Financial performance conveys an understanding of some financial aspects of a firm Nyamita & Dorasamy, (2016). Ratios are used as a benchmark for evaluating firms' financial performance and help to summarize large quantities of monetary data and to form qualitative judgments about the firm's performance (Agliardi & Agliardi, 2019). Among the accounting key performance indicators (KPI), three sub-variables of monetary performance are going to be chosen as: return on equity (ROE), return on assets (ROA), and return on investment (ROI), as they're the most relevant variables in analyzing firms' financial performance. This is often justified by Aloys, et al. (2016), Fatica, et al. (2019), Githaiga, and Kabiru, (2016), and Makanga, (2016) in their empirical studies on the relationship between bond financing and their financial performance.

Globally, green financing has taken center stage and transitioned the economy in an effort to correct global challenges in the areas of climate, biodiversity depletion, energy prices, and water scarcity. (United Nations Environment Programme [UNEP], 2019). The Planet Bank Group has been among the world's leaders and largest issuers of green bonds and has raised over $16 billion in over 200 green bonds globally since 2008 for climate and environment-related investments (Reichelt, 2020).

The World Bank Group, through the World Bank and International Finance Corporation (IFC), has been pioneers in developing the green bond market and formulating sustainable finance policies and frameworks (World Bank, 2020). Countries in East Asia have demonstrated pioneering actions with reference to their sustainable financial policies and frameworks, whereas other countries in Latin America, the Caribbean, and Sub-Saharan Africa are just on the verge of implementation stage (Maltais & Nykvist, 2020). The European Investment Bank issued the primary green bond in the year 2007, followed by the World Bank in 2008. Corporates and municipalities entered the market in 2013 (ISSD, 2016).

Investments in green bonds have placed China, France and the United States of America first in the global first ranking and accounted for fifty-six per cent of green bonds issued globally in 2017. Canada, Germany, Mexico, and the Netherlands are all represented. Spain and Sweden account for the remaining 44% (Agliardi & Agliardi, 2019).Although the global financial crisis has negatively reduced liquidity, there has been an increased

investment appetite in bond financing, which has created an environment for stimulating economic recovery (Pradhan et al., 2019).

In Africa, the emergence of organized capital markets across the region has attracted investors to the green bond market (koka, 2016). Since 2010, the African Development Bank (AFDB) has remained active within the green bond market, with a record high of US $500 million issuance in October 2013 (Deschryver & Mariz, 2020). Other players within the continent are mainly in South Africa and include the IDC (US $700 million) and Nedbank (US $490 million) (Feng & Zhang,(2019). Analysts have also postulated that the green bond market may exhibit stronger resilience to volatility due to its size, novelty, diversified investment focus, and therefore the more likely participation of long-term investors (NSE, 2019).

In Nigeria, financial inclusion within the green sector has become a crucial aspect of the investment sector (Batsukh et al., 2019). Therefore, green bond issuances and investments therefore present a singular opportunity for Nigeria to market the 2030 Agenda and therefore the seventeen sustainable development goals. This is often towards achieving a more sustainable future by providing institutional investors, like insurance companies and pension funds, the chance to extend their investment in sustainable projects in Nigeria (Obine, 2018).

The government of South Africa stated its commitment to sell green bonds to drive private investment in its projects and to change policies in the financial sector to increase firms' financial performance (Makhethakosi, 2017). The City of Johannesburg issued its first

green bond in 2014 worth R1.5 billion (Kapingura, 2016). The bond proceeds will be allocated to finance green projects such as low-carbon transport as well as energy-saving measures for residents like solar water heating.

Kenya has set ambitious plans for change within the green bond market and has developed key policies within the Green Economy Strategy and Implementation Plan (GESIP) of 2016–2030 (Green Economy Strategy and Implementation Plan [GESIP], 2016). A big aspect within the GESIP is identifying green finance mechanisms like green bonds to support the country's green growth path and to support investment firms' financial performance (Kenny, 2020). As a result of this, the Kenyan Green Bonds Program (GBPK) was launched in March 2017 with the aim of supporting the event of a domestic green bond market (UNEP, 2019)

The Kenyan Green Bonds Program is a multi-stakeholder partnership of the financial institutions of Kenya, FSD Africa, the CBI, Nairobi Securities Exchange, Kenyan Bankers Association, Capital Markets Authority, FMO Dutch Development Bank, International Finance Corporation (IFC), and the Kenyan National Treasury (GBP, 2016). The result of this partnership resulted in an advisory committee established by the national treasury and parliament to influence new policy incentives and financial regulations for green bonds within the investment sector to draw in investors. Within the private sector, structures were also implemented by the Kenyan National Treasury and therefore the IFC to create awareness and knowledge with market participants on green bonds to

spice up the financial performance of investment companies listed on the NSE (Gianfrate & Peri, 2019).

The banking sector has also embraced the green agenda by leveraging environmentally friendly projects and has supported "green" agricultural lending across SMEs. According to a report by Barclays Group ESG Report (pages 39 to 43), the banking sector remains optimistic about some of the additional opportunities that will drive the transition to a low carbon economy through green investments. Gradual changes to the structure of our economy are likely to be accelerated by advances in sustainable technologies, which require us to be able to support new industries and help customers in impacted industries adapt. (CMA., 2019).

In Kenya, the first corporate green bond was issued in August 2012, worth 4.26 billion, by Acorn Holdings, which is a real estate development firm. The proceeds of this green bond were allocated to build environmentally friendly student accommodation (Reuters 2019). This green bond issuance demonstrates the effectiveness of multi-stakeholder partnerships in creating platforms to achieve environmental objectives and improve green investments (Kioko & Ochieng, 2020). This is further supported by the Capital Markets Authority, who highlighted how the East African community could leverage from the Kenyan experience on the platforms created to advance an effective green bond market (Kapingura, 2016). Further, the Kenyan government has sought to encourage activities in boosting the green bond market by endorsing tax exceptions for interest

earned and also offering ethical securities to finance environmentally friendly investment opportunities (Sebastiani, 2019).

Fifty percent of Kenya's GDP is either directly or indirectly attributed to sectors that are reliant on natural resources, and as such, it's imperative that the government address the question of green financing (NSE, 2019). This dependence highly exposes investment companies to environmental risks, which impact their financial performance (Sebastian, 2019). This paper focused on the influence of green bonds on the financial performance of banks and investment firms listed on the NSE.

1.2 Statement of the Problem

In Kenya, the Nairobi Securities Exchange stock market has transitioned the investment sector with the aim of "greening" the mainstream financial market using green bonds. The Capital Markets Authority (C.M.A) audited financial reports have reported a decline in performance of banks and investment firms listed in the Nairobi Securities Exchange. It is estimated that 42% of Kenya's GDP is derived from natural resource-related sectors of the economy, making green bonds one of the most efficient financial instruments to mobilize green investments in the stock market (UNEP, 2019). However, Kenya continues to face serious challenges in mobilizing financial investments for a green financial market (NSE, 2019). For investment firms on the Nairobi Securities Exchange to survive in this turbulent and dynamic environment, there is a need for them to develop effective strategies that are geared to leverage the influence of green bonds on a firm's financial

performance in the NSE as well as adopt an appropriate policy on interest rates (Magale, 2019).

Despite the availability of publications and research papers on green bonds, most countries have failed to identify and account for the contribution of green bonds to a firm's financial performance (Nzau et al., 2019). Ndirangu ,(2019) opines that improper management of green bonds decelerates the financial performance of listed firms in the NSE.

Given that the financial sector is a key player in policy formulation, policies that drive towards sustainability through green bonds ought to have an impact on the financial performance of firms listed on the NSE. Aloys & Kungu, (2016). This research focused on the influence of green bonds on the financial performance of banks and investment firms listed on the NSE and the moderating role of interest rates in the relationship between green bonds and the financial performance of listed firms on the NSE.

Several studies have been done on green bonds and the financial performance of firms in the stock market globally. In their study on unbundling the green bond market in the economic hubs of Africa (a case study of Kenya, Nigeria, and South Africa), they found that the potential for green bonds has not been fully tapped in Kenya due to inadequate financial policies on interest rates and green financing. Braga (2020) also studied the green bond market performance and the role of the public sector in Kenya. Reichelt (2020) investigated green bonds as a model for mobilizing private capital to fund climate change mitigation and adaptation projects in Kenya, while Banga (2019) investigated the green bond market as a possible source of climate finance for developing countries. From the

literature reviewed, there is limited attention paid to the influence of green bonds on the financial performance of banks and investment firms listed on the NSE and the moderating role of interest rates on the relationship between green bonds and the financial performance of investment firms listed on the NSE. This study sought to fill in this existing knowledge gap.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this study was to investigate the influence of green bonds on financial performance of banks and investment firms listed in the NSE

1.3.2 Specific Objectives

The specific objectives of this study were:

1. To determine the effects of green revenue bonds on financial performance of banks and investment firms listed in the NSE in Kenya.
2. To establish the effects of green project bonds on financial performance of banks and investment firms listed in the NSE in Kenya.
3. To investigate the effects of securitized bonds on financial performance of banks and investment firms listed in the NSE in Kenya.
4. To analyse the effects of green proceed bonds on financial performance of banks and investment firms listed in the NSE in Kenya.

5. To investigate the moderating effect of interest rate on the influence of green bonds on financial performance of banks and investment firms listed in the NSE

1.4 Research Hypothesis

H_{01}: There is no relationship between Green revenue bonds and financial performance of investment firms listed in the NSE in Kenya.

H_{02}: There is no relationship between Green project bonds and financial performance of investment firms listed in the NSE in Kenya.

H_{03}: There is no relationship between securitized bonds and financial performance of investment firms listed in the NSE in Kenya.

H_{04}: There is no relationship between green proceed bonds and financial performance of investment firms listed in the NSE in Kenya.

H_{05}: Interest rate does not moderate the relationship between green bonds and financial performance of investment firms listed in the NSE in Kenya.

1.5 Justification of the Study

Kenya, like most developing countries, is grappling with an economic growth dilemma fueled by a high demand for infrastructure as well as social, environmental, and climate change-related economic challenges. The 2030 Agenda for Sustainable Development has set out bold development targets for the entire world. In turn, the Paris Agreement called

for immediate climate action to keep global average temperatures stable. Advancing these objectives will necessitate extraordinary financing requirements, as well as the development of new and innovative financing sources (Ginke, 2018).

Most of the research previously done on green bonds has primarily focused on documenting their magnitude and exploring their determinants. Research on the implications of green bonds and the financial performance of investment firms listed on the Nairobi Securities Exchange is at its early stages (Magale, 2019). Deschryver and Mariz (2020) noted that limited attention has been paid to the effect of green bonds on firms' financial performance. This study aims to fill in the research gap by adding the green bond effects on a firm's financial performance to the existing knowledge.

The results of this study aims at benefitinf policy makers by providing them with information to make appropriate policies that encourage green bond investments, improve appropriate interest rate policy selection, and improve the firm's financial performance. This study also aims at benefiting academicians interested in the effect of green bond studies as it aims to shed light on the conclusions earlier drawn on the pertinent problems of green bonds in Kenya. This study also helps policymakers, regulators, and public financial institutions meet their infrastructure investment needs, capital market development aims, and targets for climate action and environmental protection.

1.6 Scope of the Study

The study covered Kenya for a period of 8 years, from 2012 to 2019, since the first green bond was issued in order to evaluate all "labeled green" bonds' effects on economic growth. The contextual scope of this study was limited to the empirical studies of green bonds and interest rates of firms listed on the NSE and their financial performance.

Real interest rates and nominal interest rates were chosen as the sub variables of interest rates as they are the key indicators of the financial policies being implemented by the CMA (Gragau, 2020). This variable has not been tested in this kind of relationship before. The financial performance measure to be used in this study is the return on equity (ROE). This is justified by Magale (2019), who stated that the return on equity incorporates all other forms of measurements.

1.7 Operational Definition of Terms

Bonds: A bond is a fixed-income debt instrument that gives issuers access to funding from the international or domestic bond markets, as an alternative to traditional bank debt. The issuer may be a government, a multilateral entity, or a corporation, who agrees to repay the bond plus an agreed interest rate over a defined term (Carney, 2015).

Coupon Rate: is the rate of interest paid by bond issuers on the bond's face value which is calculated on the bond's face value (or par value), not on the issue price or market value Magale (2019).

Financial Performance: It refers to a method of performing a financial activity in order to achieve financial objectives over a specific period of time. (Makanga, 2016)

Green Bond Framework: This is a physical document that is made publicly available to e market and is considered the centerpiece of the green bond issuing process NSE, (2020).

Green Bond: A green bond is a fixed income instrument whose proceeds are used to finance or refinance new or existing projects that generate climate or other environmental benefit that conforms to the Green Guidelines and Standards listed on the Exchange and is approved by the Authority NSE, (2020).

Green Financing: It involves Financing of investments that provide environmental benefits in the broader context of environmentally sustainable development GESIP,

(2017) Examples include reductions in air, water and land pollution, reductions in greenhouse gas (GHG) emissions, and improved energy efficiency

Green Revenue Bonds: This is a bond that is backed by the revenues generated from a specific project or related revenue source (like the tolls collected from a new highway) (GBP, 2017)

Green Securitized bond: This is a debt instrument where the relevant revenue stream is generated by a group of green projects or assets which includes a group of projects which have been grouped together e.g. solar leases or green mortgages (Adeniran, (2016).

Green Washing: this is often a process of conveying a misunderstanding or providing misleading information about how a company's products are more environmentally sound. it's an unsubstantiated claim to deceive consumers into believing that a company's products are environmentally friendly Ana, B., & Alonso (2020)

Industrial Revenue bonds (IRBs): These are a type of municipal bonds, issued by a state or local government on behalf of a private company for a specific project (IDRB, 2019)

Interest Rate: A rate of interest refers to a percentage that describes what proportion a borrower can pay for a loan. this is often often quoted as an annual rate, but counting on things, interest is often quoted and calculated during a sort of ways (Adeniran, 2016).

Nominal rate of interest: This refers to the advertised or stated interest rate on a loan, without taking under consideration any fees or compounding of interest (Ngugi, 2018).

Project Bonds: These are specific debt instruments where the proceeds are invested during a specific green project and therefore the investors have direct exposure to the green project itself (Gichamo, 2018).

Real Interest Rate: This is often a rate of interest that has been adjusted to get rid of the consequences of inflation to reflect the important cost of funds to the borrower and therefore the real yield to the lender or to an investor (Brigitta, 2015).

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature on green bonds. It discusses the key theories underlying green bonds and therefore the moderating role of interest rates. The chapter further develops a conceptual framework and expounds on the research gaps on green bonds and financial performance of firm's listed within the NSE. Lastly, a critique of the prevailing literature is provided and a summary of the literature reviewed.

2.2 Theoretical Review

A theory is defined as a set of systematic interrelated concepts, definitions and propositions that are advanced to elucidate and predict phenomena (Tolliver & Managi,2019). The theoretical framework of the study may be a structure which holds or support a theory of a search work and explaining why the matter under study exists (Kothari, 2009). Thus, the theoretical framework is group of theories that is a basis for conducting research and it helps the researcher to ascertain clearly the variables of the study also because the general framework for data analysis and research design (Orodho, 2018). This section covers theories that are relevant in explaining the effect of green bonds on economic process, also because the moderating role of interest rates within the relationship between green bonds and financial performance of firm's listed within the NSE.

2.2.1 Preferred Habitat Theory

The preferred habitat theory was developed by Franco Modigliani and Richard Sutch 1966. The theory states that individual investors have a preferred range of bond maturity lengths, and can only go outside of this range if a better yield is promised (Sutch, 1966).

The preferred habitat theory asserts that if there's an imbalance between the availability and demand for funds within a given maturity range, investors and borrowers won't be reluctant to shift their investing and financing activities out of their preferred maturity sector to require advantage of any imbalance (Liaw, 2018). However, to do so, investors must be induced by a yield premium so as to simply accept the risks related to shifting funds out of their preferred sector by a sufficient cost savings to catch up on the corresponding funding risk. Thus, this theory proposes that the yields of an investment are determined by both expectations of future interest rates and a risk premium to induce market participants to shift out of their preferred habitat (Culbertson, 2017).

This theory is vital and important to the present study because it assesses the consequences of revenue bonds on financial performance in additional than a method. Research shows that green bonds affects firm’s financial performance, which offers firms more ownership advantage on economies of scale in production which increases the ROA (Chidi-Okeke, 2020).

The proponents of this theory like Vasicek (2017) poised that the term structure, also referred to as the yield curve when graphed, is that the relationship between the rate of interest of an asset (usually government bonds) and its time to maturity. In his research, he noted that the interest rates and time to maturity are positively correlated. Therefore, interest rates rise with a rise within the time to maturity. It leads to the term structure assuming a positive return in an investment. The yield curve is usually seen as a measure of confidence within the bond market and may either boost or hinder a firm's competitive performance (Vasicek, 2017).

2.2.2 Expectation Theory

Expectation theory was developed in 1961 by, John Maynard Keynes who was a British economist. The theory states that the forward rates in current long-term bonds are closely associated with the bond market's expectation about future short-term interest rates (Keynes, 1961). The expectations theory aims to assist investors make decisions supported forecasting so as to forecast future interest rates (Nwankwo, 2016). Ngugi, (2016) noted that the idea uses long-term rates, typically from government bonds, to forecast the speed for short-term bonds. In theory, long-term rates are often wont to indicate where rates of short-term bonds will trade the longer term (Wang & Ma, 2017).

The proponents of this theory opine that investor have the proper right to select their investments. An investor will make a choice partially based upon where they foresee the longer-term level of interest rates (Wanger, 2016). Sarkisyan et al. (2020) also noted that long-term investors will prefer to purchase or to not purchase debt

instruments supported whether forward interest rates are more or less favorable than current short-term interest rates. This instrument will eventually have a positive or a negative impact on a firm's financial performance (Tronzano, 2018).

Other proponents like Reichelt (2019) and Allini, et al. (2018) noted that expectations theory comes with various variations. the primary variation assumes that the returns on bonds for a given holding period must be identical despite the time to maturity of the bonds. Secondly, the local expectations theory is extremely almost like the globally equal expected-holding period return theory mentioned above. However, the most difference between the 2 is that the local expectations theory is restricted only to the short-term investment horizon (Toliver, 2020). The unbiased expectations theory is that the most ordinarily encountered variation of the pure expectations theory. The unbiased expectations theory assumes that current long-term interest rates are often wont to predict future short-term interest rates (Vasicek, 2017).

This theory thus is beneficial during this study because it demonstrates its importance within the moderating role of interest rates to the connection between green bonds and firms' financial performance. Investors prefers to purchase or not to not purchase debt instruments supported whether forward interest rates are more or less favorable than current short-term interest rates which can eventually affects the firm's financial position either positively or negatively (Matei, 2016).

2.2.3 Trade Off Theory

The Tradeoff theory was developed by Modigliani and Miller within the 1950s. This theory states that the optimal debt ratio of a firm is decided by a trade-off between cost and benefits of borrowing, holding the firm's assets and investment plans constant (Miller MM, 1950). Firms balance debt and equity positions by making trade-off between the worth of interest tax shields and therefore the cost of bankruptcy or financial distress. Provided there are not any adjustments costs attached to capital structure changes, the observed capital structure should be optimal within the sense that it maximizes the firm value (Myers, 1984).

The proponents of this theory opine that Interest being a tax-deductible expense, decreases the liabilities and increases the after-tax cash flows. Culbertson (2018) noted that firms in their plan to increase cash flows and market price will start higher level of debt if the rate is above the debt rate of interest. one among the disadvantages of debt is that the cost of potential financial distress, especially when the firm relies on an excessive amount of debt. This results in a trade-off between the tax break and therefore the disadvantage of upper risk of monetary distress (Huang & Ritter, 2016). Incorporating agency costs into the static trade-off theory means a firm determines its capital structure by trading off the advantage of debt against the agency cost of equity. Hence under trade off theory firms will have a target capital structure determined by the equity and leverage ratios. If the particular leverage ratio deviates from the optimal one, the firm will adapt its

financing behavior during a way that brings the leverage ratio back to the optimal level (Ginke, 2018).

Other proponents like Culberstone, (2017) noted that the firms' management should emphasize on favorable liquidity levels to balance the cost and benefits of money holdings. Further, financial firms must keep liquidity risk premium in consideration to secure a competitive position in market while using external resources. Sebastiani, (2019) noted that there is an evaluation of the cost and benefits of alternative capital structure plans in all theories of trade-off.

This theory thus is beneficial during this study because it highlights the expected relationship between firm's liquidity position and firm's financial performance which is an important factor that firm managers use when making financing decisions. Thus, if a particular leverage ratio deviates from the optimal one, the firm will adapt its financing behavior during a way that brings the leverage ratio back to the optimal level.

2.2.4 Market Timing Theory

In 2002, Baker and Wurgler came up with the market timing theory. This theory shows how companies and businesses in the economy decide whether to invest with equity or debt instruments (Baker, 2002). In their research on determinant of a corporation's capital structure, they said that market timing is the most important factor. The proponents of this theory say that capital structure changes because of the results of past attempts to time the stock market by issuing new shares (Ritter, 2016).

Proponents of this theory say that there are two ways to time the stock market that lead to similar changes in the capital structure (Mailafia, 2017). First, the primary may be a dynamic version of Myers and Majluf's (1984) model with rational managers and investors and adverse selection costs that change between firms or over time. Companies are thought to issue stock right after good news comes out, which reduces the gap between the company's management and its shareholders (Rehman, 2017). When there is less informational inequality, share prices go up. In response, businesses make their own opportunities for timing (Caldeira, 2019).

The second version has irrational investors and mispricing those changes over time (Baker & Wurgler, 2002). Managers give out shares of stock when they think the price is too low and buy back shares when they think the price is too high. Because people act irrationally, the price of a company's stock changes over time. In this version of MTT, it's not necessary for the market to be inefficient for it to work. It doesn't require managers to be able to predict how well stocks will do. The only idea here is that managers think they can time the market (Hassan, 2018). This theory is helpful for this study because it will help NSE-listed financial firms decide whether to invest in debt or equity.

2.2.5 Portfolio Management Theory

Harry Markowitz introduced this finance and investment theory in 1952 by demonstrating that investor’s hedge against financial risk. He emphasized on analyzing individual securities to determine how they contribute to the portfolio’s overall risk (Markowitz, 1952). Investors always have an appetite for less risky investments in their portfolio

balance. Financial globalization offers a pool of investment options that yield a high expected return with low risk levels. This stimulates investors to review their investment portfolio. Often, the investors opt to shift their investments abroad in search of higher profits and minimum risk in foreign assets (Pyun, 2017).

The proponents of this theory opine that investor have the right to choose on where to hold their wealth. The risk-return trade-off influences this choice (Reichelt, 2020). The variances in perceived risk adjusted returns from originating and destination countries accelerate overseas investments . Reichelt and Sebastiani (2020) opine that any change in firms' financial performance, is in response to portfolio choice and risks. The interest rates as well as the rate of return always influence the portfolio choice (Toliver, 2020)

The study is anchored on the Portfolio Management theory and is important in this study as it explains the risk and return relationship on an investor's portfolio. It demonstrates that it is not a securities own risk that is important to an investor, but rather the contribution the security makes to the variance of an investor's entire portfolio, which is a direct reflection of the firm's financial performance (Maltais & Nykvist, 2020). This will provide insight into on the relationship between green bonds and financial performance of banks and investment firms listed in the NSE in Kenya.

2.3 Conceptual Framework

Koehler and Thomson (2020) defined a conceptual framework as a model of presentation in which a researcher thinks about or represents the connections between variables in the

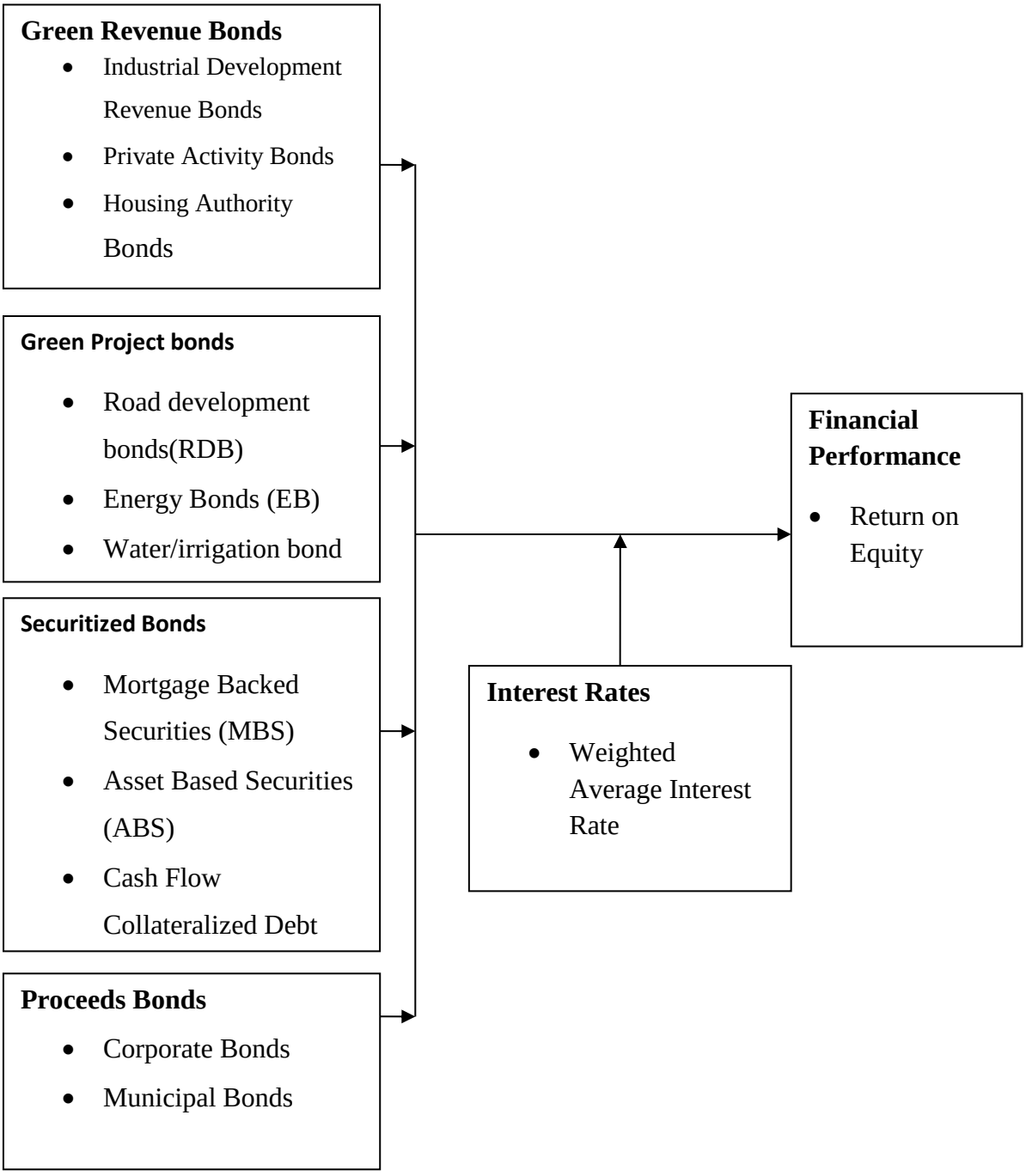
study and shows the relationship graphically or diagrammatically. In this case, Koehler et al. suggest that a conceptual framework could be a model that shows the relationships between the concepts or variables being studied. It's part of the agenda for negotiations and will be looked at, tested, reviewed, and changed as a result of the investigation. It also shows how the variables might be related (Mutinda, 2017).

In this study, important variables were put into three groups: experimental variables, moderators, and variables. Mugenda (2019) says that the independent variables are called predictor variables because they show how much another variable changes, while the dependent variable, also called the criterion variable, is affected by another variable. The variable is what the researcher wants to find out more about. A moderator variable explains the connection between the independent and variable (Huang & Ritter, 2016).

This study analyzed how green revenue bonds, green project bonds, Proceed bonds and securitized bonds influence the financial performance measured by (ROE) of investment firm's listed within the NSE. This relationship is going to be moderated by interest rates. The variables within the conceptual framework are derived from the theories identified during this study also as from studies done by the following subsequent scholars (Agliardi, et al.2019; Aloys, et al. 2016; Fatica, et al. 2019; Githaiga, & Kabiru, 2016;; Makanga, 2016).

Figure 1

Conceptual framework



2.3.1 Green Revenue Bonds and Firms Financial Performance

A green revenue bond is a special kind of bond that is guaranteed to be paid back only from the profits made by an entity that is good for the environment and directly related to the bond's purpose (Mitchell, 2016). Revenue bonds can also be issued by a government office, commission, or authority in order to build things like toll bridges, hospitals, university dorms, water, sewer, utility, and electric districts, or ports (ICMA 2017).

The stagnation in firm's financial performance in the investment sector of the NSE has been caused by improper regulation of the green bond market by the CMA. Afzal and Rehan, (2018) found that bond market development on green revenue bonds positively affects firm's financial performance developing countries. one among the objectives of the study is to research the consequences of green revenue bonds on financial performance of firms listed within the NSE.

Therefore, the following hypothesis was proposed:

> H_{01}: There is no relationship between Green revenue bonds and financial performance of firm's listed in the NSE.

2.3.2 Green Project Bond and Firms Financial Performance

Green project bonds have been getting more and more attention over the past few years. They are a key way to bring together domestic and international funds for investments that are good for the environment (Agliardi & Agliardi, 2019). Green infrastructure

projects in SSA have been successfully financed with these bonds. Even though market volatility is rising, bond markets in Africa are still growing, and it's expected that using green bonds to fund infrastructure projects in Kenya will have a big impact on the capital markets (Beniston & Palutikof, 2017).

Peri (2019) noted that the biggest difference between a green bond and a regular bond is that the issuer of a green bond includes a "use of proceeds" clause that says the money will be used to make green investments. In his paper "Exploring the Convenience of Issuing Green Bonds," he wrote that the issuer commits to using the money raised by the green bond to finance or refinance assets or projects that are considered to be green, instead of using the money as general capital. Still, a typical investor in a green bond won't be exposed to the risks of the assets or projects that the green bond is paying for. Instead, the investor will have recourse to the capital of the issuer (Gianfrate & Peri, 2019).

The revenue lost for not investing in project bonds not only aggravates the shortage of resources for development but also indirectly decreases domestic investments and reduces the govt income through loss of tax receipts (Berensmann et al., 2018). This significantly reduces economic process and causes exchange drain.

The preferred habitat theory says that each investor has a preferred range of bond maturities, and they will only buy a bond outside of this range if it gives them a better return (Asif & Hassan, 2018). Simply put, investors will only consider green project bonds if their returns within the short run are high which can eventually have a positive impact on firm’s financial performance (Caldeira, 2019). This points to the theoretical

relationship between firms' financial performance and green bonds whereby high increased financial performance measured by ROE signifies enhanced investment opportunities within the NSE. As such, a negative relationship is predicted between firms' financial performance and green bonds (Deschryver & Mariz, 2020). Therefore, the subsequent hypothesis was tested:

> H_{02}: There is no relationship between green project bonds and financial performance of firm's listed in the NSE.

2.3.3 Securitized Bonds and Firms Financial Performance

As a means of efficiently channeling financial and economic resources, green securitization in the capital market have supported firm's financial performance and financial stability by enabling issuers and investors diversify their risks. (Clapp & Pillay, 2017). By opening up new ventures for raising capital, securitization can aid in diversifying the funding base of the economy and also help free up bank capital, which in theory allows banks to extend new credit to investors (Chowdhury, 2020).

Securitization involves turning assets that produce predictable cash flows into tradable securities which are then used to back the payments that will be made to investors (Gianfrate & Peri, 2019). Assets like mortgages, bank and auto loans, receivables, royalties, utility payments which are rather illiquid can be converted into tradable securities and issued to investors in a securitization transaction (Beniston et al., 2017).

The Association for Financial Markets (AFM) found that the amount of green securitized assets in Western Europe went from €78.2 billion in 2000 to €753.9 billion in 2008, which is an increase of 864.1%. After 2008, the amount of green securitized assets went down sharply. In 2014, green securitized products worth a total of €199.0 billion were issued in Western Europe, which helped the stock market do well (Alves, 2016).

This point to the theoretical relationship between firm's financial performance and green securitized bonds whereby increased return on assets in investment firms signifies enhanced investment opportunities in the capital markets. As such, a negative relationship is expected between firms' financial performance and green securitized bonds (Carney, 2018). Therefore, the following hypothesis was tested:

> H_{03}: There is no relationship between green securitized bonds and firm's financial performance of firm's listed in the NSE.

2.3.4 Proceed Bonds and Firms Financial Performance

The fast growth of the international green bond market shows how capital market mechanisms can attract private money to invest in companies and use proceeds from bonds to improve companies' financial performance (Ehlers & Packer, 2017). Proceed bonds forms one of the components of green bonds whereby proceeds from these bonds are earmarked for green projects but are backed by the issuer's entire balance sheet (Honcharenco & liakhova, 2018).

The Green Bond Principles report released in January 2018 recognized several broad categories of potential eligible green projects including renewable energy, sustainable waste management, sustainable land use (including sustainable forestry and agriculture), biodiversity conservation, clean transportation and sustainable water management to enhance firms' financial performance within the NSE (Maltais & Nykvist, 2020). While Kenya's economy depends more on natural resources, lack of investing in green proceed bonds may cause a decrease in firms' financial performance. Therefore, the subsequent hypothesis was proposed:

> H_{04}: There is no relationship between proceed bonds and financial performance of firm's listed in the NSE.

2.3.5 Interest Rates and Firms Financial Performance

Green bonds are any type of bond that is used to finance projects that are good for the environment and have positive benefits (Alonso & Rojo , 2020). The expected response to the high cost of global climate change is to issue green bonds. Interest is a key factor in the performance of the green bond market Gichamo, (2018). This rate affects green bonds in different ways depending on how vulnerable each bond is to interest rate risk (Culbertson, 2017). Interest rate risk means that green bond owners' returns will be affected to varying degrees depending on how much interest rates change (Mutinda, 2017). How much risk is added to a bond when the interest rate changes depends on how long it has until it matures and the bond's coupon rate, or annual interest payment (De

Graeve & Iversen, 2017). The interest rate environment is a key factor in figuring out how well a business does financially (Gichamo,2018).

Economists agree that poorly managed interest rate policies are often bad for a company's financial performance (Adeniran, 2016). The capital market authorities want to make sure that there are effective interest rates to manage green bonds, which will eventually improve the financial performance of businesses (Nzau, & Onyuma, 2019). So, the following hypotheses were tested:

> H_{05}: Interest rates do not mediate the relationship between green bonds and financial performance of firm's listed in the NSE.

2.4 Empirical Literature Review

2.4.1 Green Revenue Bond on Firms Financial Performance

Hyun, (2018) conducted a study on exploring the utilization of bond for infrastructure financing in Asia for the period 1990-2006. The study adopted the parametric statistical techniques of the OLS regression model to research bonds for Infrastructure financing. The study found out that local bond markets should play a crucial role in supplementing infrastructure financing to boost firms' financial performance. Further the study suggested that for emerging economies, the utilization of bond with appropriate risk sharing and properly-designed government support policies would boost firms financial performance. Further, the study suggested that non-public participation in revenue bonds can make the simplest use of personal funds to alleviate fiscal burdens with appropriate risk sharing

between the general public and personal sectors. The study recommended that a tentative proposal of a couple of conceivable variations of bond would boost firms' financial performance

Mulcahy, (2017) examined financing of corporate expansion through industrial revenue bonds for the period 2000-2008 in Europe. The study employed a descriptive survey that specialize in all the 40 states to look at financing of corporate expansion through industrial revenue bonds. The study found out that the financial markets should consider inclusion of industrial revenue bonds in their portfolio. The study also acknowledged utilization of commercial revenue bonds as one among the main components of determining business growth since it's flexible enough to accommodate the requirements of big and small corporations. Further, revenue bonds make it uniquely possible for local financial organization and native investors to take a position more and boost firms' financial performance. The findings indicated that corporations seek expansion through issuance of commercial revenue bonds. The study recommended that corporations should consider investments in revenue bonds in order to boost firm's financial position.

Wagner, (2017) conducted a comparative study on the financial performance of revenue bonds and their conventional peers in Viet Nam using the analytic hierarchy model to research the opinions of experts for the period 2000-2019. They acknowledged that the foremost important influencing factors are the legal framework for revenue bonds operations, and the official rate of interest of revenue bonds. In other words, infrastructural and economic factors are the foremost important requirements to

develop the present green bond market in Viet Nam. This implied that interest rate is key in the determination of a firm's financial performance. The study recommended that legal frameworks in the bond markets should be developed in order to boost financial performance.

Barua and Chiesa (2019) did a comparison study of how green bonds are used for sustainable financing in Europe. The study used cross-section OLS regressions on a dataset from all over the world from 2010 to 2017. The study found that a lot of different things have different effects on the size of an issue. But a lot of the effects don't last over time and are different for each rating grade. This study suggests that financial policies, such as interest rates, can help or hurt a company's ability to compete. The study said that more research should be done on green bonds, which are used to pay for or refinance new or existing projects with the money they bring in.

Ngugi,(2016), did a study on how companies listed on the Nairobi Stock Exchange raised finance through the Kenyan bond market from 2000 to 2010. The study used the Ordinary Least Square (OLS) Regression method and multivariate correlation analysis to find out what the benefits of raising corporate finance on the bond market are, what the challenges of raising corporate finance on the bond market are, and what kinds of interventions could be used to deal with those challenges and improve the bond market in Kenya. The study found that the investment and banking industries should make sure that information is shared well and that policies are made and put into place to strengthen the bond market. The study suggested that for the bonds market to make a big difference in the growth of

the investment sector, the capital market authority should make sure there is a good fiscal and monetary policy, as well as a strong legal and regulatory framework. This study is important because it helps the capital markets come up with policies that make the bond market a better place to raise money.

2.4.2 Green Project Bonds and Financial Performance of Investment Firms in the NSE

Vassallo (2020) analyzed the Europe 2020 project bond initiative as an alternative to finance infrastructure in Europe for a 15 years period 2000-2015. The study adopted the parametric statistical techniques of the OLS regression model to analyze the project bond initiative as an alternative to finance infrastructure. This study found out that even though the project bond initiative may improve ROA, there are still more challenges to be addressed for their adoption. The study recommended that the stock market should introduce policies which will govern the issuance of project bonds in order to enable them improve firms' financial performance.

Subacchi (2016) examined Innovative Financing for European Infrastructures. The study used panel data model in addition to cross-country and cross-sectional analyses for the period 2013 to 2020. The study found out that the public sector should go back to taking a leading role on large infrastructure project bonds and that only the public sector can bear the ultimate risk involved in green project bonds. This implies that green bonds could be used as an Innovative Financing method which would boost financial performance. The

study recommended that the European stock market should enact policies which govern issuance of green project bonds.

Kapinguka (2016) used South Africa as a case study to look at the relationship between the growth of bond markets and the performance of non-financial companies in Africa. Between 1995 and 2012, the study used the Engle Granger co-integration method and the pairwise Granger causality test. The study found that there is a link between the size of the bond market and financial activities. This means that African governments should set up policies that encourage the growth of the bond market as one way to raise money from within the country and make the capital markets stronger.

2.4.3 Securitized Bonds and Financial Performance of Investment Firms in the NSE

Makhethakosi (2017) investigated the causal relationship between securitized bonds and the financial performance of a group of South African companies. For the period 1995-2021, the study used the Engle Granger co-integration approach and pairwise granger causality to investigate the association between securitized bonds and financial performance. The data revealed that securitized bonds had a positive substantial link with a company's financial performance. Margareta (2021) an investigation on the impact of asset securitization on banking financial performance. The study used the ordinary least square (OLS) for panel data analysis to capture the effects of asset securitization and banks financial performance of 12 commercial bank for the period 1998-2018. The study found out that the asset backed securities had a positive and significant effect on Return on Assets. Further, the study established that securitization of assets increases the

profitability of bank. The study recommended that the commercial bank should embrace asset securitization to improve the banks financial performance.

Bakri, et al. (2018) studied on the determinant of securitization spread in Malaysia using the Ordinary Least Square method and panel data analysis for the study period (2004-2012). The study found out that securitization has a positive and statistically significant influence on the primary market spread in Malaysia. Further, it established that value to loan, maturity, debt and crisis significantly contributes to the determinant of primary market spread. The study recommended that continued success of the securitization firms depends on their efficiency in using their resources and the competitiveness of the firms.

Alves (2016) investigated securitization economics in European markets. For a sample period of 2000-2011, the study used parametric statistical techniques of the OLS method. Green bond securitization adds value by increasing liquidity, lowering funding costs, allowing originators to diversify funding sources, improving risk management, and allowing originators to profit from regulatory arbitrage and enhance key financial ratios, according to the report. When utilized irresponsibly, however, securitization of green bond transactions is a complex undertaking that is costly to set up and increases the deadweight transaction costs associated with primary agent and asymmetric knowledge problems.

Sarkisyan, et al. (2019) studied on securitization and bank performance in Europe. The study adopted the panel data model for analyses using US commercial banking data for the period 2001 to 2008 and found that securitization does not outperform alternative funding, risk management and profitability improvement techniques in organizations. The study

recommended that banks should provide their motives when increasing securitization activities.

Nwankwo (2016) investigated the financial performance of Nigerian enterprises using securitized bonds. The study used secondary data from 1980 to 2000 to analyze the relationship between securitized bonds and firm financial performance in Nigeria, employing the Generalized Method of Moment (GMM-IV) Instrumental variables estimator and the Granger Causality Test. According to the research, securitized bonds have a beneficial but statistically negligible impact on a company's financial success.**2.4.4 Proceed Bonds and Financial Performance of Investment Firms in the NSE**

Flammer (2018) investigated on how the issuance of green bonds by US corporations affected their financial performance on the stock market from 2010 to 2015. The study used multivariate correlation analysis and the Ordinary Least Square (OLS) Regression method. The study found that when green bond issues are announced, the stock market reacts positively. Also, there is a statistically significant increase in financial performance, which suggests that green bonds work to improve the financial performance of companies. The study says that there needs to be more research on green bonds and how well they do on other stock markets.

Ngug (2018) conducted research on the factors that led to the issuance of proceed bonds by listed companies in Kenya during the years 2002 and 2011. This study used a descriptive survey to focus on all 56 companies that were listed on the Nairobi Stock Exchange as of December 31st, 2011. With the assistance of a semi-structured and

undisguised questionnaire that contained both open ended and closed questions, primary data was obtained from the Heads of Finance of the various companies. According to the findings of the study, two factors—reputation and liquidity incentives—play a role in the issue of proceed bonds. According to the data, corporations issue bonds in order to solve their liquidity issues and obtain cash. In addition, liquidity is contingent upon long-term investments, and high levels of liquidity in the market bring down the cost of finance. Indicators of net worth have a very minimal impact on the issuing of a proceed bond; the majority of respondents believe that the ratio of debt to equity is the most important factor in determining whether or not a bond will be issued. According to the findings of the study, additional research on proceed bonds and their overall financial performance on other stock markets should be conducted.

Obong'o and Rintari (2020) examined the influence of convertible bonds on liquidity growth of commercial banks in Nairobi County Kenya. The Ordinary Least Squares regression model was used in the study to look at how convertible bonds affected the growth of commercial banks' liquid assets in Nairobi County, Kenya, from 2016 to 2018. The results of this study showed that there was a statistically significant link between convertible bonds and the growth of liquidity at commercial banks in Kenya. Based on this, the study suggested that different kinds of customized bonds should be issued and public awareness should be raised to help commercial banks in Kenya do better financially. Also, the study said that the government, through the Capital Markets Authority, should come up with policies that help bond markets to grow commercial banks.

Uche (2016) investigated on why Africa needs green proceed bonds. For the period 2000-2015, the study used a panel data model, as well as cross-country and cross-sectional analyses, and discovered that about US$2.5 billion was mobilized for development in Africa through the issuance of green proceed bonds, causing corporate profit growth rates and the broader economy to realign. As a result, it's a viable alternative for funding climate change mitigation and adaptation efforts.

Akinsokeji (2016) examined the empirical impact of corporate bonds and municipal bonds market on aggregate investment and the Nigerian economy by applying a disaggregated approach for the period 1980 to 2013.The study used the Vector Error Correction Method (VECM) and the Granger Causality test to show the direction of causality between investments in financial instruments (bonds) and the financial performance of a firm. According to the study, progress bonds have a direct effect on macroeconomic variables. Also, the bonds market affects growth by causing people to save, which leads to investment, which leads to an increase in return on assets (ROA).

Onyuma (2019) examined the effects of bond issuance on financial performance of firms listed in the Nairobi Securities Exchange in Kenya. The Ordinary Least Square (OLS) method was used to look at how issuing bonds affected financial performance from 2008 to 2017. The study found that bond proportion and bond yield to maturity have a statistically significant effect on the financial performance of companies listed on the Nairobi Securities Exchange. The study also found that companies listed on the NSE

should think about different parts of bond issues if they want to improve their financial performance.

2.4.5 Interest Rates and Financial Performance of Investment Firms in the NSE

Nkwede (2020) analyzed the macroeconomic determinants of bond market development: evidence from Nigerian. The study used data from time series that were collected over 32 years using multiple regressions and ordinary least square regression. The study found that the exchange rate, interest rate, inflation rate, and development of the banking sector all have negative and significant effects on the capitalization of the Nigerian bond market. This shows that they are strong macroeconomic determinants and drivers of the development of the bond market in Nigeria.

Ndirangu, (2019) investigated the relationship between a company's financial performance and the return on its stock for companies listed on the NSE in Kenya. The study used the Ordinary Least Square (OLS) Regression method and multivariate correlation analysis to find a link between financial performance and stock return from 2011 to 2015. The study found that there is a direct link between financial performance and stock returns. This means that an increase in financial performance of listed firms increases the stock returns of firms listed on the NSE. The study suggested that the managers of NSE-listed companies should try to improve their financial performance and come up with optimal interest rate policies that help their companies make the most money.

Anyango and Obur, (2019) examined the effect of interest rates on the relationship between changes in the foreign exchange rate and the performance of the Nairobi securities exchange market in 2016. The study used both static and dynamic panel analysis and linear and nonlinear regression to look at how interest rates affect the relationship between changes in the foreign exchange rate and the performance of the NSE over a six-year period (2013–2018). The study found that the relationship between changes in the foreign exchange rate and the performance of the Nairobi Securities Exchange is affected positively and significantly by interest rates. The study suggested that the government should set rules for interest rates through the Capital Markets Authority, since it helps to moderate this relationship.

Gathara (2019) conducted a study on financial structure and firms' financial performance of selected firms listed at Nairobi Securities Exchange, in Kenya for the period 2007 to 2015. In his study, a multivariate test using panel data model was conducted to examined the effects of financial structure on firm's financial performance. The study found out that the financial structure had a positive and significant effect on firms' financial performance of selected companies listed at NSE, Kenya. Further, the study acknowledged that the firm size had positive and significant effect on the relationship between financial structure and financial performance. The study recommended that firm managers of the banks and investment firms listed at NSE, Kenya could utilize other sources of finance like bonds since firm's financial structure has a positive effect on the financial performance of the listed firms with leverage making the highest contribution to financial performance.

Muriithi (2018) did a study on how the sources of financing affected the financial performance of Kenya's top 100 mid-sized companies from 1998 to 2013. A descriptive cross-sectional research design was used for the study. The study used the Ordinary Least Square (OLS) Regression method and multivariate correlation analysis to find out how the sources of financing affected the financial performance of the Top 100 Mid-Sized Companies in Kenya. At a 5 percent level of significance, the study found that the sources of financing had a weakly positive effect on the firm's financial performance. The study suggested that companies should use a variety of financing options instead of just one type of financing to improve their financial performance. This study is important because it shows how green bonds can be used as a source of financing to help a company's finances.

Chuc and Sarker (2020) analyzed the factors influencing the green bonds market expansion in Vietnam. The main objective of his study was to figure out what factors affect the growth of green bond markets and put them in order of importance. Using the analytic hierarchy process (AHP) method, the study used a multidimensional analysis to find and rank the factors that affected the growth of green bond markets from 2010 to 2016. The study found that the official interest rates of green bonds, as well as economic and legal requirements, were the main things that directly affected the growth of the green bond market in Vietnam, and that policymakers should do something about it. The study recommended an affordable price of green bonds and improvement of economic and financial stability to accelerate the development of green bond markets.

Alonsoconde and Rojo, (2020) investigated the effect of green bonds on the profitability and credit quality of project financing Europe for the period 2013 to 2019. The study focused on investigating whether there is a direct financial incentive for issuing green bonds in contrast to other types of financing. The study adopted the Panel data model as well as the pooled ordinary least squares (OLS), for the sample period. The study found out that the internal rate of return (IRR) and the return on equity (ROE) for shareholders is higher when green bonds instead of bank loans are issued to finance investments. Further, the study revealed that green bond financing resulted in higher average debt service coverage ratios. The study recommended that since green bond financing constitutes a strong financial incentive for investors, more green investments should be adopted to improve firm's financial performance.

Oello (2016) studied on the performance of corporate bonds,goverment bonds and equities at the nairobi securities exchangeIn kenya. The study adopted a descriptive research design targeting firms which had issued bonds between 2014 and 2016. The study found out that there was a statistically significant difference between risk on equities and risk on bonds at the NSE. The study recommends that investors in the NSE should largely invest in green bonds and equities to achieve maximum returns.

Onkware (2020) analyzed the relationship between cost of capital components and financial performance of firms listed in Nairobi Securities exchange (N.S.E), Kenya. The study adopted the Panel data model as well as the pooled ordinary least squares (OLS) to analyze this relationship for the sample period 2011-2015. The study found out that there

existed a positive and significant relationship between costs of debt and firms' financial performance of manufacturing firms listed in NSE. The study concluded that manufacturing firms listed in NSE should consider using both debt and equity financing in their projects since they both influence financial performance positively.

Nzau, and Onyuma (2019) investigated the effect of issuing bonds on the financial performance of companies that are listed on the NSE in Kenya. The study used the parametric statistical methods of the OLS model, which were based on time series data from all six companies that had issued bonds in tranches or additional bonds from 2008 to 2017. The study found that bond issuance, as shown by bond price, bond coupon rate, bond proportion, and bond yield to maturity, could explain about 75.4% of the difference in financial performance. Bond proportion and bond yield to maturity were found to affect financial performance in a statistically significant way. The study came to the conclusion that bond issues affected how well listed firms did financially. The study found out that that the listed companies should think about all the different parts of bond issues to improve their financial performance.

Ley (2017) investigated the potential contemporaneous relationship between the financial performance of Green bonds and their conventional peers in Europe and Asia based on a dataset of 359 Green Bonds and 1291 conventional bonds. The study used an extended Fama-French model in a Fama-Macbeth regression procedure for the sample period between 2011 and 2017. The study found out that green bonds do outperform conventional ones over the full sample period but with a low significance. Further, In a subsample

period aligned to the "take off" of corporate green bond issuance, the outperformance can still be confirmed but this time with a high significance. This implies that there is a supporting argument for the investment in green bonds which eventually affects financial performance of listed firms in the stock markets.

Magale (2019) analyzed the challenges facing the development of green bonds on the Nairobi Securities Exchange in Kenya. The study employed a purposive sample of experts and through structured interviews, sought to pinpoint challenges to and opportunities for development of a green bond market in Kenya. The study found out that rating of green bonds was important mostly for international investors and does not hinder floating of green bonds. The study recommended that Kenya should consider international experts to assist in verifying, rating and reporting on green bonds since Kenya presents future opportunities in providing digital green bonds being a world leader in mobile money market.

Omollo (2018) analyzed the effect of debt financing options on financial performance of firms listed at the NSE, Kenya for the period 2009 to 2015. The study adopted the Panel data model as well as the pooled ordinary least squares (OLS), for the sample period of 40 non-financial firms listed on the NSE. The study found that the short-term, long-term and total debt have negative and statistically significant effects on returns on assets which implies that green bonds being a fixed income instrument whose proceeds are used to finance or refinance new or existing projects that generate climate or other environmental benefit could have an impact on financial performance of listed firms in the NSE. The

study recommended that financial managers should adjust debt levels to ensure that they operate at the optimum points.

Odongo (2017) analyzed the influence of Capital structure and financial performance of listed companies at the Nairobi Securities exchange market using a case of commercial banks in Kenya. The study adopted the Panel data model as well as the pooled ordinary least squares (OLS), for the sample period 2011-2015. The study found out that increasing unit levels of cost of capital had a positive effect on the financial performance of firms listed at the Nairobi Securities Exchange. The study recommended that the capital markets should enact policies geared to reduce the cost of debts for the firm's financial position to improve.

Githaiga and Kabiru (2016) studied on debt financing and financial performance of small and medium size enterprises in Kenya for the period 2011 to 2013. The study employed a time series analysis and ARDL regression model for a sample period of 3 years to determine the effects of long-term loans and short-term loans on SMEs financial performance. The study found out that debt market have positive impact on financial performance of SMEs and concluded that both long term and short term loans improves financial performance of SMEs which implies that green bonds being a debt instrument could have an impact on financial performance of listed firms in the NSE. This study recommends that SME should utilize loans, diversify for sustainability of revenue and improve on audit to improve the ROA.

Nickel et al. (2016) investigated the impact of interest rates on bond yield spreads relative to US Treasury bonds in the Czech Republic, Hungary, Poland, Russia and Turkey from May 1998 to December 2007. The study adopted the Panel data model as well as the Prais-Winsten regression analysis. The study found that government bond investors in different countries give different amounts of weight to macroeconomic and fiscal variables when making investment decisions. This is a key factor in how well a company does financially.

Saganga and Viscal (2017) investigated on the challenges of corporate bond financing in Tanzania. The study used Time-series data, VAR and the Granger non-causality tests for the period 1999 to 2005. The study found out that a combination of measures is necessary for an effective development of a liquid green bonds market in Tanzania which implies that this development will encourage more companies to issue green bonds.

Bosworth (2019) analyzed the effect of Interest Rates and Economic Growth in the globalized world capital market in Europe. The study used Time-series data, VAR and the Granger non-causality tests for the period 1960 to 2000 to demonstrate the influence of foreign interest rates in an increasingly globalized world capital market. The study found out that capital markets are highly integrated at the global level and that it makes little sense to model, analyze, or forecast interest rates within a closed-economy framework. Furthermore, there is only a weak relationship between real interest rates and economic growth.

Kioko (2020) analyzed the effect of portfolio diversification on the financial performance of investment firms listed in the Nairobi Securities Exchange using the multiple linear

regression model covering 6 years from 2014 to 2019. The study found out that there was a negative and insignificant relationship between bond investments and return on investments for the investments firms at Nairobi Securities Exchange and concluded that concluded that bond investment has negative influence on firms' financial performance of investment companies listed at the NSE. The study recommended that the firms listed in the NSE should consider investing more through equity finance as compared to compared to bond and mutual funds. securities since real estate had higher significant effect on financial performance.

Wuhan (2016) examined the effect of interest rate on green bonds investment in China. The study adopted the nexus Johansen Co-integration test Whereas, vector error correction model (VECM) was used to find the short run association over the period of 2003-2012 to find out the the effect of interest rate on green bonds investment in China. The results indicated that there is a long-term relationship association among variables. The research also produces suggestions that will help in terms of interest rate policy as well as improving financial performance of firm's listed in China bond market.

Akinsokeji (2016) examined the empirical impact of bonds market on aggregate investment and the Nigerian economy the period 1980 to 2013. He used the Vector Error Correction Method (VECM) and the Granger Causality test to show the direction of causality between investments in green bonds and the financial performance of firms in Nigeria. The study found that bonds have a direct effect on ROA. The interest rates on bonds make people more likely to buy them, and ROA also changes based on how many

bonds are issued. Lastly, the bonds market affects growth by causing people to save, which then leads to investment, which in turn leads to real GDP growth.

Figure 2:

Summary of Literature Review

Author	Study Title	Findings	Study Recommendations	Current Study Focus
Gathara, (2019)	Financial structure and financial performance of selected firms listed at Nairobi Securities Exchange, in Kenya	The study found out that the financial structure had a positive and significant effect on firms' financial performance of selected companies listed at NSE, Kenya	The study Focused on only one component of financial structure.	The study focused on green bonds and their relationship with financial performance of banks and investment firms listed in the NSE in Kenya.
Ngugi, S. (2016).	Raising Finance in the Kenyan Bond Market. A Case of Listed Companies on the Nairobi Stock Exchange	The study found out that the investment sector and banking sector should ensure effective information disclosure and formulation and implementation of policies that aims to strengthen the bond market.	The study Focused only on corporate bonds	The study focused on green bonds inclusion and firms' financial performance of selected companies listed at NSE, Kenya
Muriithi (2018)	The Effect of Financing Sources on The Financial Performance of Top 100 Mid-Sized Companies in Kenya	The study found out that the sources of finance had a weak positive effect on the firm's financial performance at a 5% level of significance.	The study recommended that the need for companies to use a mix of financing options to improve firm's financial performance as compared to	The study focused on green bonds inclusion in the mix of financing options to investigate any change in firm's

			relying on one form of financing.	financial position.
Obong'o, E. M., Mutea, F., & Rintari, N. (2020)	The influence of convertible bonds on liquidity growth of commercial banks in Nairobi County Kenya.	The findings of this study indicated statistically significant positive relationship between convertible bonds and liquidity growth of commercial banks in Kenya.	The study recommended that a variety of customized bonds should be issued and public awareness increased in order to improve the financial performance of commercial banks in Kenya.	The study focused on green bonds inclusion and proposing policy recommendations in the Nairobi Securities Exchange
Obur, J., & Anyango, C. (2016)	The moderating effect of interest rates on relationship between foreign exchange rate fluctuation and performance of Nairobi securities exchange market.	The study found out that interest have a have a positive and significant impact on the relationship between foreign exchange rate fluctuation and performance of Nairobi securities exchange	The study recommended that the government through the Capital Markets Authority should formulate policies to govern interest rates since it moderates this relationship.	The study focused on using Interest rate as the moderator
Ngari, B. M. (2018).	The relationship between interest rates spread and the financial performance of commercial banks in Kenya.	The study found out that interest rate had a positive significant impact on the firm's financial position.	The study recommended that the same research should be done in other commercial banks across Africa to check if interest rates will have the same impact.	This study focused on using interest rate as a moderator between green bonds and the financial position of banks and investment companies listed in the NSE

Odalo, K. S., & Achoki, G. (2016)	The influence of interest rate on the financial performance of agricultural firms listed at the Nairobi Securities Exchange	The study found out that there was a positive and significant relationship between interest rate and firms financial performance measured by Return on Equity, Return on Assets and Earnings per share.	The study recommended that the same study should be conducted in other companies in Africa to check if interest rate moderates between green bonds and the financial position of banks and investment companies listed in the NSE.	The study focused on using Interest rate as the moderator
Hussain, S. (2020).	Impact of investment decisions and interest rate on firm's financial performance of Fuel and Energy Sector of Pakistan.	The study found out that there is a positive significance between nvestment decisions and interest rate on firm's financial performance of Fuel and Energy Sector listed on Karachi Stock Exchange of Pakistan.	The study recommended that the Pakistan federal government should enact policies which will aim at establishing interest rate for the listed companies in the stock market.	This study focused on using interest rate as a moderator between green bonds and the financial position of banks and investment companies listed in the NSE
Afzal , A., & Rehan2, R. (2018).	Interest Rate and Financial Performance of Banks in Pakistan	The study found out that interest rate negatively affects the profitability of banks	The study recommended that some further studies on debt capital should be conducted to determine their impact on banks profitability.	The study focused on using Interest rate as the moderator
Hyun, S., Nishizawa, T., &	Exploring the utilization of bond fo r infrastructure financing in Asia	The study found out that local bond markets should play a	The study recommended that a tentative proposal of a	The study focused on green bonds inclusion and

Yoshino, N. (2018)	for the period 1990-2006.	crucial role in supplementing infrastructure financing to boost firms' financial performance.	couple of conceivable variations of bond would boost firms' financial performance	firms' financial performance of selected companies listed at NSE, Kenya
Mulcahy, C. C., & Guszkowski, T. P. (2017)	Financing of corporate expansion through industrial revenue bonds for the period 2000-2008 in Europe.	The study found out that the financial markets should consider inclusion of industrial revenue bonds in their portfolio	The study recommended that corporations should consider investments in revenue bonds in order to boost firm's financial position.	The study focused on green bonds inclusion and firms' financial performance
Kapinguka (2016)	The Europe 2020 project bond initiative as an alternative to finance infrastructure in Europe for a 15 years period 2000-2015.	The study found out that there is a relationship between financial activities and bond market capitalization.	The study recommended that African governments should put in place policies which will promote the development of the bond market as one of the ways to mobilize domestic resources and boost the capital markets.	The study focused on green bonds inclusion and firms' financial performance
Flammer (2018))	corporates proceed bonds and financial performance in the stock market in USA following the issuance of green bonds for the period 2010 to 2015.	The study found out that the stock market responds positively to the announcement of green bond issues.	The study recommends that more research should be done on green bonds and their financial performance on other stock markets.	The study focused on green bonds inclusion and firms' financial performance
Ngugi (2018)	the drivers for Issuance of proceed	The study found out that	The study recommended that	The study introduced

	bonds by Listed Companies in Kenya 2002-2011.	reputation and liquidity incentives influence issuance of proceed bonds.	more research should be done on proceed bonds and their financial performance on other stock markets.	green bonds inclusion
Obong'o, E. M., Mutea, F., & Rintari, N. (2020)	The influence of convertible bonds on liquidity growth of commercial banks in Nairobi County Kenya.	The findings of this study indicated statistically significant positive relationship between convertible bonds and liquidity growth of commercial banks in Kenya.	The study recommended that the government through the Capital Markets Authority should develop policies which promotes markets for bonds in order to boost commercial banks growth.	The study focused on green bonds inclusion and firms' financial performance
Ndirangu (2019)	The causal relationship between firms' financial performance and stock return for firms listed at NSE in Kenya.	The study found out that there is a direct relationship between financial performance and stock returns hence an increase in financial performance of the listed firms increases stock returns of firms listed at the NSE.	The study recommended that the management of firms listed at the NSE should strive to improve the financial performance and develop optimal interest rate policies which maximize the returns of their firms.	The study focused on green bonds inclusion and firms' financial performance
Oello (2016)	the performance of corporate bonds,goverment bonds and equities at the nairobi securities exchangeIn kenya.	The study found out that there was a statistically significant difference	The study recommends that investors in the NSE should largely invest in green bonds and	The study focused on green bonds inclusion and firms' financial performance

		between risk on equities and risk on bonds at the NSE.	equities to achieve maximum returns.	
Nzau. Nzau, Kung'u, & Onyuma (2019)	The effect of bond issuance on financial performance of firms listed on NSE In Kenya.	The study found out that about 75.4 percent of variance in financial performance could be explained by bond issuance as characterized by bond price, bonds coupon rate, bond proportion, and bond yield to maturity.	The study concluded that bond issues affected financial performance of listed firms.	The study recommends that the listed firms ought to take into consideration the various aspects of bond issues in order to enhance their financial performance.
Magale (2019)	Challenges facing the development of green bonds on the Nairobi Securities Exchange in Kenya.	The study found out that rating of green bonds was important mostly for international investors and does not hinder floating of green bonds.	The study recommended that Kenya should consider international experts to assist in verifying, rating and reporting on green bonds since Kenya presents future opportunities in providing digital green bonds being a world leader in mobile money market.	The study focused on green bonds inclusion and firms' financial performance

Source: Research Data (2021)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter described the research design and the methodology that was used in the study. It starts with the research philosophy, followed by research design, population, sample and sampling technique, data collection instruments, data collection procedures, data analysis and presentation, the statistical models, the methods of estimation and hypothesis testing.

3.2 Research Design

The study adopted an ex-post facto research design, a form of descriptive research in which an independent variable has already occurred. The investigator started with the observation of dependent variable then studies the independent variable in retrospect for possible relationship to and effects on the dependent variable over time. This approach is justifiable given that the relationship between green bonds, interest rates and financial performance of firms listed in the Nairobi Securities Exchange is complex (Agliardi & Agliardi, 2019). Vassallo (2020) analyzed the Europe 2020 project bond initiative as an alternative to finance infrastructure in Europe used an ex-post facto research design. Further, Chuc and Rasoulinezhad, (2020) in their study on the most important factors influencing development of the revenue bond market in Viet Nam as well as Nickel and Rülke, (2016) in their analysis impact of interest rates on bond yield spreads relative to

US treasury bonds in the Czech Republic, Hungary, Poland, Russia and Turkey adopted an ex-post facto research design.

Further, this study adopted a positivist research philosophical paradigm, which is epistemological and characterized by a theoretical belief that the independent variable affects the level of the dependent variable, from empirically testable hypotheses (Cooper & Schindler, 2011). Positivists believe that a reality is stable and can be observed and described objectively without interfering with the phenomena being studied (Levin, 1988). This study fits into positivism because a relationship exists between the three variables of green bonds, interest rates and firm's financial performance. Interest rate is a strong determinant to financial performance of firm's listed in the NSE and the effects of this scenario are of great economic concern making the positivism research paradigm the most appropriate approach (Ketterer, 2019).

3.3 Target Population

According to Cooper and Schindler (2008), population is referred to as the collection of elements about which a study referenced. The target population in this study was the 20 banking and investment firms listed in the Nairobi Securities exchange in Kenya which has directly or indirectly issued green bonds to capture their effects on firm's financial performance as well as the moderating effect of interest rate in this relationship. Of these, only 17 companies had issued green bonds during the period of the study and thus the study focused only on the 17 firms. The choice of these firms in the NSE was guided by the fact that they are compliant with the guidelines given by their regulator (CMA)

Another reason is that they issue the bonds on an organized market which follows stringent rules from their regulator the CMA. The intended participants were the chief executive officers, chief finance officer, two financial managers and the credit officer of the respective companies for the purpose of primary data. Selection of the five officers was justified by the fact that they are responsible for running financial matters of their firms. The total respondents were be 85. Further, secondary data was collected from the Audited financial statements of the 17 companies which were available in the company's website, the capital markets authority website and the treasury.

3.4 Sampling Frame

A sampling frame is defined by Mugenda (2008) as a list of the target population from which the sample is drawn, and a sampling frame for descriptive survey designs usually consists of a finite population. The sampling frame for this study consists of the 20 firms listed in the NSE in Kenya.

3.5 Sample Size and Sampling Technique

Mugenda and Mugenda, (2008) described a sample in a survey research context as a subset of subjects drawn from a larger population. As Kenya's labeled green bond market began in 2012, this paper selected the bonds issued both publicly and privately in Kenya during 2012–2019 which meets green bond recognition standards of labeled green bonds as per the GBP standards.

This study employed purposive sampling to select secondary data. In the context of this paper, the sample data covered a period of 8years, from 2012 -2019 since Kenya's labeled green bond market began NSE, (2019). Purposive sampling means judgment is used to select the respondents (Agliardi & Agliardi, 2019). This method was employed because it enables the researcher to select samples that give sufficient information about the dependent and independent variables.

The choice of this period was because the study was intended to evaluate green bonds after the 2008 economic crisis when the Nairobi securities exchange was at its lowest in terms of financial performance. Another reason is that the Kenyan government made significant efforts before 2012 to stimulate the stock market by developing the green bond policies which focused on funding green projects (Gathara, 2019). Further, the choice of the 17 firms in the Nairobi Securities Exchange was because as at the period of the study, only the forementioned firms had issued the green bonds. Banga (2019) studied bonds markets as a potential source of climate finance in Canada, Maltias and Nkyvist (2020) studied on understanding the role of green bonds in advancing sustainability, Ng'ang'a (2017) employed a purposive sample technique to investigate the influence of interest rate capping on the financial performance of Kenyan commercial banks.

Table 3.1

Sample Sizes

Target Population	Frequency	Percent
Investment sector	3	18%
Banking Sector	14	82%
Total	17	100%

Source: Research Data (2021)

3.6 Data Collection Instruments

This study used both primary and secondary data to capture the influence of green bonds and financial performance of firms listed in the Nairobi Securities Exchange in Kenya. Audited and published financial reports were used to collect the secondary data. For the researcher to get the correct information because of the unique feature of the study, Primary data was needed to substantiate how the proceeds of these bonds were used. Ndinda (2016) examined the association between government bond issues and economic growth in Kenya using both primary and secondary data. Banga (2019) in her study on green bonds a potential source of climate finance in Canada used both primary secondary data collection instrument to analyze their data. Maltias and Nkyvist (2020) in their study on understanding the role of green bonds in advancing sustainability in Nigeria used secondary data in their analysis. Ng'ang'a, (2017) studied on the impact of interest rate capping on the financial performance of commercial banks in Kenya used secondary data in their analysis.

3.7 Data Collection Procedures

The researcher collected secondary data from the audited financial reports of the investment firms listed in the NSE to capture all issued bonds during the study period. At this stage, these bonds were unclassified and thus primary data was be used to classify the bonds to green bond as the green bond principles stipulates that any bond can be a green bond if its proceeds were used to finance environmentally friendly projects GBP, (2020). Where necessary, this data was converted it into Kenya Shilling (Ksh) for purpose of uniformity. Where published data fell short of the researcher's requirements, the researcher sought written approval for data collection from the university and the institutions holding the data. Thereafter, the research assistants dispatched the request letters to the institutions and collect the data in form of disks and other agreed electronic means, within the agreed timelines. The total respondents in this research were 85.

3.8 Data Analysis and Processing

This study used panel data Ordinary Least Square method technique for analysis for an eight-years period (2012 to 2019) to examine the influence of green bonds on financial performance of investment firms listed in the NSE as well as the mediation effect of interest rate in this relationship. Using the results from the E-views 17 software, regression analysis was done. So that there are enough degrees of freedom in the models to be estimated, data from every year of the study period were collected.

The secondary data collected may not answer the research questions and hypotheses unless it is analyzed and processed in a coherent and organized manner for inferences and meaning to be derived from it Ogobi et al. (2018). This research used E-Views 17 software to analyze data collected from the five investment firms for a period of 8 years. Data processing entails editing, classification and tabulation of the raw data collected so that they are ready for analysis (Kothari, 2009).

3.8.1 Model Specification

This study used a panel regression model which involves analyzing the independent variables and the moderator in order to analyze the influence of green bonds and financial performance of firms listed in the Nairobi Securities Exchange in Kenya. Panel data (also known as longitudinal or cross-sectional time-series data) is a dataset in which the behavior of entities e.g. states, companies, individuals, countries, among others are observed across time (Reyna, 2017). It has numerous advantages including the fact that it relates to individuals e.g. firms over time, which is bound to have heterogeneity in these units. Panel data regression controls heterogeneity of cross-section units over time by allowing for individual specific variables (Gerhard et al., 2003). Secondly, by combining time series of cross section observations, panel data technique has a better comparison to other models, and gives data that is more informative, more variability, with less collinearity among the variables, more degree of freedom and is more efficient (Baltagi, 2018). Thirdly, by making data available for several units, panel data considers all cross-section units as heterogeneous and gives unbiased estimations of time invariant and state

invariant variables, which we observe, or not. This minimizes biasness that might result if the study aggregate individuals into broad aggregates. These advantages enrich panel data empirical analysis in ways that may not be possible if only cross-section or time series data is used, hence the use of panel data in this study.

According to Vassallo, (2020), a Multiple Regression tests is conducted when there are more than two variables and a linear relationship between the two variables. As such, a multiple regression analysis focusses on predicting the changes in the dependent variable in response to changes in independent variables. As a result, this study used the Ordinary Least Squares (OLS) approach to estimate panel data regression utilizing time series and cross-sectional data that were pooled into a panel data set and estimated using panel data regression. Regression analysis is a statistical method for determining the relationship between two or more variables (Reyna, 2017). In most cases, the investigator is looking for the causal effect of one variable on another. The researcher collects data on the underlying factors of interest and uses regression to determine the causal variables' quantitative effect on the variable they influence. In multiple regression analysis, several predictor variables are combined into a single regression equation (Zhang & Feng, 2019). We can analyze the effects of numerous predictor factors (rather than a single predictor variable) on the dependent measure using multiple regression analysis (Baltagi, 2018). To cope with the problem of huge numbers and eliminate heteroscedasticity, a univariate analysis was performed and the data converted to natural logs.

3.8.2 Descriptive Statistics

Descriptive statistics were essential in determining the statistical properties of the model so as to select the proper functional form of the estimable model. Therefore, the study sought to determine the spread of data which included calculating for the mean, standard deviation, standard errors, maximum and minimum values of the variables overtime. This further involved finding the correlation matrix to check which variables were highly correlated so as to avoid the problem of multi-collinearity which is common in time series data.

3.8.5: Model Selection: Validity Testing of the Fixed Effects Model

Panel data analysis has three approaches that are more or less independent of each other. Pooled panels assume that there are no unique characteristics of people in the measurement set and no effects that are the same over time.

Fixed effects models assume that each person has unique qualities that are not due to random chance and don't change over time. It assumes that intercepts are different between groups or over time.

Random effects models assume that each person has unique, constant traits that come from random variation and don't have anything to do with the individual regressors. This model works if we want to make conclusions about the whole population, not just the sample we looked at.

The goal of the analysis and problems with the exogeneity of the explanatory variables determines which model is best (Reyna, 2017). The pooled regression model assumes that all financial institutions are the same, which is not the case. This analysis looks at the last two models. The Pooled Regression Model assumes that the coefficients (including the intercepts) are the same for all of the financial institutions. The fixed and random effects models account for the fact that each financial institution is different by letting each one has its own intercept value that stays the same over time. The study used the Hausman test to figure out which model between the fixed and random ones is best.

3.8.5.1 Hausman Test

In panel data designs, it's usually assumed that each entity has its own unique traits that may or may not affect the independent variables. There are two regression models that can be used to control for these individual effects (Jaba, & Balan, 2018). The difference between the two models is whether or not the unobserved individual effects are linked to the model's independent variables (Bui & Doan, 2020). Under the Fixed Effect model, it is assumed that the specific effect of each individual is related to the independent variable. This means that the outcome variable (Y) is thought to be affected by explanatory variables that are not observable but are related to the observed explanatory variables (Deschryver & Mariz, 2020)

Under the Fixed Effect model, it is assumed that certain characteristics don't change over time, so the entity's error term and the constant can be used to represent those characteristics (Giesselmann & Schmidt-Catran, 2019). Torres-Reyna (2019) says that the Fixed Effect model is made to take out the effect of these individual characteristics from the predictor (X) variables so that a researcher can figure out the predictors' net effect on the Y variable. On the other hand, RE models assume that characteristics of individual entities, group changes, or changes over time may not be related to the independent variables (Gichamo, 2018). It is assumed that the differences between entities are random and have nothing to do with the independent variables in the model.

Given the two models that can be used to analyze panel data—the Fixed Effect model and the Random Effect model—a researcher has to decide which one is more important and relevant. The best way to decide between FE and RE is to run a Hausman specification test to find out which model is more efficient (Giesselmann & Schmidt, 2019). The procedure involves running both the FE and RE regression models, saving the estimates, and testing whether the error term I is related to the independent variables.

The null hypothesis for the test is that there no significant correlation between the individual effects and the independent variables. If the null hypothesis is not true, it proves that the argument for the FE model over the RE model is correct. Kamwaro, (2018). A Hausman test was done to decide if the FE or RE model should be used to meet the goals of this study.

3.8.6 Research Equation

Panel data regression equation was used to test the study's hypotheses. The equation had Financial Performance measured by (ROE) as the dependent variable and Green Revenue Bonds (GRB), Green Project Bonds (GPB), Securitized Bonds (SB) and Proceed Bonds (PB) as independent variables. Interest Rate (IR) was the moderating variable in the study. In this case, two regression equations were generated; one with interest rate and the other one without. This was used to derive a conclusion on the moderating role of interest rate between green bonds and Firms financial performance.

E-views 17 is the data analysis software that was used to do the regression analysis. The two equations developed to investigate the influence of green bonds on Firms financial performance measured by ROE include:

Equation: multiple linear equations without mediation

$$FP_{\text{it}} = \boldsymbol{\alpha} + \beta_1 GRB_{It} + \beta_2 GPB_{It} + \beta_3 SB_{It} + \beta_4 PB_{It} + \mu_{it} \ldots\ldots\ldots\ldots \text{(Equation 3.1)}$$

Equation: Multiple linear equations with mediation

$$FP_{\text{it}} = \boldsymbol{\alpha} + \beta_1 GRB_{It} + \beta_2 GPB_{It} + \beta_3 SB_{It} + \beta_4 PB_{It} + IR_{It} + \mu_{it} \ldots\ldots\ldots \text{(Equation 3.1)}$$

Where;

FP_{it} = *Financial Position* at time *t*

GRB_{it} =*Green* Revenue Bond at time *t*

GPB_{it} = Green Project Bond at time *T*

SB_{it} = Securitized Bond at time *t*

PB_{It}= Proceed Bond at time *t*

IR_{it} = Real Interest Rate at time t

α = Intercept

β_i= The parameters of the variables that explain GRB, GPB, SB, and PB

μ_i = Disturbance term

Table 3.2:

Operationalization of Study variables

Variable	Indicator	Constructs	Measurement	Empirical Studies
Financial Performance	Annual growth rate	Return on Equity	Annual percentage change in ROE	Gathara, (2019), Muriithi (2018), Ngugi, S. (2016), Mulcahy, C. C., & Guszkowski, T. P. (2017), Ndirangu (2019)
Green Revenue Bonds	Annual green bonds return	Industrial Development Revenue Bonds Private Activity Bonds Housing Authority Bonds	Annual percentage change of Green Revenue Bonds on ROE	Mulcahy, C. C., & Guszkowski, T. P. (2017)
Green Project Bonds	Annual green project bonds return	Road development bonds(RDB) Energy Bonds (EB) Water/irrigation bond	Annual percentage change of Green Project Bonds on ROE	Hyun, S., Nishizawa, T., & Yoshino, N. (2018), Kapinguka (2016)
Securitized Bonds	Annual green bonds return	Mortgage Backed Securities (MBS) Asset Based Securities (ABS) Cash Flow Collateralized Debt	Annual percentage change of Securitized Bonds on ROE	Obong'o, E. M., Mutea, F., & Rintari, N. (2020), Flammer (2018), Obong'o, E. M., Mutea, F., & Rintari, N. (2020) and Oello (2016).
Proceed Bonds	Annual Proceed Bonds returns	Corporate Bonds Municipal Bonds	Annual percentage	Ngugi (2018), Nzau. Nzau, Kung'u, &

			change of Proceed Bonds on ROE	Onyuma (2019), Magale (2019)
Interest Rate	Annual interest rates in KSH	Weighted Average Interest Rate	Annual interest rates in KSH	Obur, J., & Anyango, C. (2016), Ngari, B. M. (2018), Odalo, K. S., & Achoki, G. (2016), Hussain, S. (2020), Afzal , A., & Rehan2, R. (2018) and Hyun, S., Nishizawa, T., & Yoshino, N. (2018)

Source: Research Data (2021)

To avoid inappropriate model specification and increase the confidence of the results, time series properties of the data were investigated. The Augmented Dickey-Fuller (ADF) test was chosen from among the several methods used to check for stationarity and the presence of unit roots in this study. If a series has a constant mean and a constant finite variance, it is said to be stationary. A non-stationary series, on the other hand, has a distinct time trend and a variance that does not remain constant over time. When a series is non-stationary, it usually have a lot of persistence. The first step of proceeding Granger Causality Test is to test for unit root that is the variables must be stationary to avoid possible spurious relationships among the variables. A combination of tests including ADF - Fisher Chi-square, Im, Pesaran and Shin W-stat, PP - Fisher Chi-square, Levin, Lin & Chu t* was be conducted to check for stationarity of the data (Torres-Reyna, 2019). These tests are among the widely used and influential.

Though the Pooled Mean Group Estimation renders (panel) unit-root tests of the variables under study needless as long as they are I(0) and I(1), the study performed these tests to ensure that no variable exceeded the I(1) order of integration, which would result in inconsistent estimations (Giesselmann & Schmidt-Catran, 2019)To do this, three commonly used panel unit root tests was applied. First was Levin et al. (LLC) (1992), the second Im et al. (IPS) (1997), and finally the Fisher-Type Chi-square. These tests are founded on the assumption that all series are non-stationary under the null hypothesis but accounts for heterogeneity in the autoregressive coefficient, which is assumed to change freely among the states under study.

3.9.1 Augmented Dickey-Fuller test

When we use time series, we want to make sure that our process is stationary and weakly dependent. We need to assume that there is some kind of stability over time. Our random process is stationary if, after moving any sequence in the process forward h time periods, the joint probability distribution stays the same. Formally, we say that a process is covariance stationary if its expected value stays the same around its mean, if its variance stays the same, and if, for any t and h 1, cov(yt,yt+h) only depends on h and not on t. So, if the covariance depends only on h, then the correlation between yt and yt+h is also only dependent on h. Neither the expected value nor the variance can change over time, so we have to be extra careful when working with time series that show a trend.

A covariance stationary process is weakly dependent if the correlation moves toward zero as h approaches infinity, (yt,+h) 0 as h. It is important that our time series is stationary and weakly dependent because that basically replaces the law of large numbers and the central limit theorem, without which our OLS regression would be hard to do. If it's not weakly dependent, we call it a strongly dependent or unit root process (Reyna, 2017). In order to test for unit-root, we used the augmented Dickey-Fuller test, as it is reliable and a commonly used test. In the ADF test the null hypothesis is that there is a unit root or the time series is nonstationary, and the alternative hypothesis is that the time-series is stationary and weakly dependent (Wagner, 2017)

3.92 Im, Pesaran and Shin W-stat

To evaluate the probability of panel cointegration, you must first determine whether the data series contains unit roots. The Im, Pesaran, and Shin (IPS) approach, which is based on the well-known Dickey-Fuller process, was chosen for this study. All of the variables are stationary at their initial difference, according to Im, Pesaran, and Shin (1997)'s test results. As a result, the null hypothesis of non-stationarity is rejected at a 1% significance level, while the alternative hypothesis is supported.

Im, Pesaran, and Shin proposed a test for the presence of unit roots in panels that integrates information from the time series and cross section dimensions, allowing the test to be more powerful with fewer time observations. The IPS test was used in this investigation since it has been determined to have greater test power by economists when analyzing long-run connections in panel data (Reyna, 2017). IPS starts by providing a distinct ADF regression with individual effects and no temporal trend for each cross-section.

$$\Delta y_{it} = \alpha_i + \rho_i y_{i,t\ 1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{i,t\ j} + \varepsilon_{it}$$

where $i = 1, \ldots, N$ and $t = 1, \ldots, T$

IPS use separate unit root tests for the N cross-section units. Their test is based on the Augmented Dickey-fuller (ADF) statistics averaged across groups. After estimating the separate ADF regressions, the average of the t-statistics for p_1 from the individual ADF regressions, $t_{iT_i}(p_i) : \bar{t}_{NT} = \frac{1}{N} \sum_{i=1}^{N} t_{iT}(p_i \beta_i)$

The *t*-bar is then standardized and it is shown that the standardized *t-bar* statistic converges to the standard normal distribution as N and $T \to \infty$. IPS (1997) showed that *t-bar* test has better performance when N and T are small. They proposed a cross-sectionally demeaned version of both test to be used in the case where the errors in different regressions contain a common time-specific component. Bangake and Eggohi (2008) used the IPS method to verify that all variables are integrated to the same order. According to the test of Im et al. (1997) that performed the Monte-Carlo simulations to equate the test that they suggested (IPS), and the Levin-Lin test, with the hypothesis of no cross-sectional correlation in panels, they showed that the IPS test is more powerful than the LL test.

3.9.3 PP - Fisher Chi-square

The test proposed non-parametric transformation of t- statistics from original Dickey Fuller regressions. Thus, under null hypothesis unit root, the transformed statistics had DF distribution. The test regression for the PP test was:

$Y_{it} = \alpha_i + \rho \, I \, y \, I_{,t-1} + \varepsilon_{I,t}$ ..... (Equation 3.24)

t = 1, 2,…… T

where $\varepsilon_{I,t}$= 1 or 0 may be heteroscedastic.

One advantage of the PP tests over the ADF tests is that the PP tests are robust to general forms of heteroscedasticity in the error term εI, Also, it does not need to specify a lag length for the test regression. If the individual unit root tests are Augmented Dickey-Fuller tests (ADF) then the combined test performed was referred to as Fisher-ADF test. If

instead the individual tests were Phillips-Perron test of unit root (PP), then the combine test perform is referred to as Fisher-PP test in E-Views (Torres-Reyna, 2019)

Y it = α i + Σ ..... (Equation 3.25)

1 ρ I y I,t-1 + εI,t (3.7)

The advantage of the Fisher-Type unit root test is that it can be applied in almost every set of data (Reyna, 2017).

3.9.4 Levin, Lin and Chu t*

Levin, Lin and Chu assume that the three models below produce the stochastic term Yit

Model 1 Yit = ρ I y I,t-1 + εI,t ..... (Equation 3.17)

Model 2 Yit = αi + ρ I y I,t-1 + εI,t ..... (Equation 3.18)

Model 3 Yit = αi + αit + ρ I y I,t-1 + εI,t ..... (Equation 3.19)

The null and alternative hypothesis for model 1 may be written as H0 ρ1 = 1 and H0 ρ1< 1. The null hypothesis was that the panel data contained a unit root while the alternate hypothesis the panel was stationary. The assumption for model 2 and 3 was that αi= 0, the error term was distributed independently across individuals.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter focuses on the results and discussions of the study by giving a detailed general characteristic of the study sample, descriptive study and the correlation analysis of the dependent and independent variables. This study investigated the relationship between green bonds, interest rates and financial performance of banks and investment firms listed in the Nairobi securities exchange. Specifically, the study investigated the effects that green revenue bonds, green project bonds, securitized bonds and green proceed bonds have on financial performance of banks and investment firms listed in the NSE in Kenya. Further, this study assessed the moderating role of interest rate in the relationship between green bonds and financial performance of banks and investment firms listed in the NSE in Kenya. This chapter contains a comprehensive detail of data collected, presentation of data analysis, interpretation and discussion of findings starting with primary data to secondary data. Data presentation was organized based on the specific objectives of the study. The analyses were conducted using panel data regression. The expectation of this study was to investigate if there was any relationship between green bonds, interest rates and financial performance of banks and investment firms listed in the Nairobi securities exchange.

4.2 Primary Data Analysis

This section contains the results from the survey which was analyzed and interpreted based on the purpose of the study. The data was gathered exclusively from semi structured questionnaires. This instrument was designed in line with the objective of the study Section A of the questionnaire related to broad information on the society. The information included: the name of the company, position held and the gender of the respondent of banks and investment firms listed in the NSE in Kenya. The main purpose for this section was to test if the views of the stakeholders agree with the secondary information and also to help in decision making and investment choices.

4.2.1 Response Rate

The population targeted in this study was all banks and investment firms listed in the NSE in Kenya by 2019. In total, there were 5 investment firms and 12 banks listed in the NSE. A census survey was carried out of all the 17 firms in the banking and the investment sector. The rate of response was enhanced by the electronic technique applied in the administration of the questionaire included using contact persons and making follow up calls. Table 4.1 shows the response rate statistics of the study.

Table 4.1

Response Rate

Response Rate	Frequency	Percent
Responded	56	66%
Not Responded	29	34%
Total	85	100%

Source: Research Data (2021)

Out of the 85 targeted respondents from the survey, structured questionnaires were sent through an electronic configuration due to COVID 19 restrictions and regulations, and only 56 responded to the questionnaires. The response rate was 66%. Gianfrate and Peri, (2019), Kapingura, (2016) and Mailafia, (2017) argued that a response rate of 50% was acceptable to analyze and publish the findings. Further, Mugenda, A. (2008) argued that a response rate of 50% is considered adequate, 60% and above good and over 70% very good.

4.2.2 Reliability Analysis

Omoll (2018) defines reliability as a measure of the stability or consistency of test scores. It is a concept which used to evaluate the quality of research in a study. Pueyo (2018) opines that reliability and validity indicate how well a method, technique or test measure something. In this study, internal consistency method of testing reliability was used using the Cronbach's alpha. It tests the consistency of respondent's responses across the items on a multiple-item measure. The reliability is expressed as a coefficient between 0 and

1.00. The higher the coefficient, the more reliable is the test. Reyna (2017) suggests that Cronbach's alpha scores of 0.7 or 0.6 are acceptable. Cronbach's Alpha was used in the study to make sure that the instruments and the results of the constructs were reliable.

Table 4.2 below shows the reliability results of the study

Table 1.2

Reliability Test

Variable	Cronbach Alpha	Number of items
Green Revenue Bonds	0.702	3
Green Project Bonds	0.602	3
Securitized Bonds	0.701	2
Green Proceed Bonds	0.749	3
Financial Performance	0.801	2

Source: Research Data (2021)

The results in table 2 indicated that green revenue bonds had an alpha coefficient of 0.702; green project bonds had 0.602. Securitized bonds and proceed bonds had an alpha value of 0.701 and 0.749 respectively. Interest rate which was the moderating variable had an alpha value of 0.801. Reyna (2017) recommended that a reliability of 0.70 and above is a sufficient measure of reliability thus the instruments were considered suitable for data collection since they met the 0.7 minimum threshold.

4.2.3 Respondents Gender

Gender was included in the study so that a balance view can be obtained from the survey. Pueyo (2018) noted that views differs according to the contributers gender. If the study has views from both gender, it gives a fair consideration. Table 4.3 below shows responses from gender.

Table 4.3

Respondents Gender

Gender	Frequency	Percent
Male	55	65%
Female	30	35%
Total	85	100%

Source: Research Data (2021)

From the above results, most of the respondents were male which represented 65% whereas female represented 35%. The gender distribution indicated that there was a balance in the distribution of the views collected from both male and female even though the gender rule was not met. The findings confirmed what Scott and Kenny (2020), Tan (2017), and Trompeter (2017) who found out that there is gender imbalance in the board management .

4.2.4 Types of Green Bonds Invested by the Firm

The study sought to identify what types of green bonds that the banks and investment firms invested in in order to determine their impact on firm's financial performance. Table

4.4 below shows the types of green bonds invested by firms in the banking and investment firms listed in the NSE.

Table 4.4

Types of Green Bonds Invested by the Firm

Bonds	Count	Percent
All the above	37	66.07
Green Project Bonds	4	7.14
Green Revenue Bonds	7	12.50
Proceed Bonds	2	3.57
Securitized bonds	6	10.71
Total	56	100.00

Source: Research Data (2021)

The study found out that Majority of the firms (66.07%) acknowledged that they invest in all the four forms of green bonds namely green project bonds, green revenue bonds, proceed bonds and securitized bonds. The green revenue bonds and securitized bonds at 12.50% and 10.71% respectively and only 3.57 percent of the firms invested exclusively on proceed bonds. This demonstrates that firms prefer investments in the three types of bonds in order to diversify risk. This could be attributed to their low-risk exposure because they are collaterized. However, among the three types of bonds, most companies prefer investing in securitized bonds. This study confirmed a study done by Kioko and Ochieng (2020) who analyzed the effect of portfolio diversification on the financial performance of investment firms listed in the Nairobi Securities Exchange who found out that there

was a negative and insignificant relationship between bond investments and return on investments in the NSE. The results of this study are similar to the findings of Hyun, et al. (2018) who conducted a study on Exploring the utilization of bond for infrastructure financing in Asia and found out that a couple of conceivable variations of bond would boost firms' financial performance. Further, the findings confirm the Portfolio Management Theory which depicts that a pool of investment options yields to a higher expected return which stimulates investors to review their investment portfolio. This demonstrated that green bonds are in the verge of gaining recognition and the capital markets should facilitate more sensitization to the investors.

4.2.5 Motivation of Decisions to invest in green bonds

The study sought to seek the respondents view on what motivates their decisions to invest in green bonds. The responses provided were additional financing, environmental impact, higher returns and tax exemption incentives. Table 4.5 below shows the respondents view on what motivated their decision to invest in green bonds?

Table 4.5

Motivation of Decisions to invest in green bonds

	Count	**Percent**
Additional Financing	28	50.00
Environmental impact	5	8.93
Higher returns	17	30.36
Tax exception incentives	6	10.71

Total	56	100.00

Source: Research Data (2021)

This study found out that half of the respondents (50%) of the investment firms in the banking and investment sector in the NSE acknowledged that additional financing motivated these firms decision to invest in green bonds. The core mandate of banks and investment firms is to maximize returns and thus green bonds would help in boosting their financial performance. 30.36% of the respondents viewed higher returns as what motivates them to invest in green bonds. This was followed by tax exemption incentives which stood at 6% and environmental impact. This demonstrated that the motivation to invest in green bonds is highly attached to additional financing. The results of this study are similar to the findings of Subacchi (2016) who examined innovative financing for European Infrastructures. The study found out that green bonds could be used as an innovative motivation financing method which could attract additional finance from green bond initiatives to fund environmentally friendly projects. The findings contradict Kapinguka (2016) study who examined the causal relationship between bond market development and Performance of Non-Financial Companies in Africa. The study found out that motivation to invest in green bonds is dictated by the return of the bond. Therefore, there is need for the adoption of green bonds by banks and investment firms in their financial decision making and policy formulation.

4.2.6 The Criteria of classification

The study sought to identify the criteria that the company uses to classify a bond as "green" from the provided taxonomies as stipulated by the International Capital Markets Association (ICMA) and the Climate Bonds Initiative (CBI). The taxonomies provided were higher returns, process around the evaluation and selection of the assets, reporting and monitoring on a forward-looking basis of the bonds, use of the bond issue proceeds and a combination of the three. Table 4.6 below shows the respondents views on the criteria that banks and investment companies use to classify a bond as "green".

Table 4.6

The Criteria that the Company uses to classify a Bond as "Green"

Criteria	**Count**	**Percent**
A combination of the above three	29	51.79
Higher returns	15	26.79
The process around the evaluation and selection of the assets	7	12.50
The reporting and monitoring on a forward-looking basis of the bonds	2	3.57
The use of the bond issue proceeds.	3	5.36
Total	56	100.00

Source: Research Data (2021)

The results in the table above indicated that majority of the firms (51.79) acknowledged that higher returns, process around the evaluation and selection of the assets, reporting and monitoring on a forward-looking basis of the bonds and use of the bond issue proceeds were the taxonomies which the firms used to classify a Bond as "Green". Specifically, Higher returns and process around the evaluation and selection of the assets stood at 26.79% and 12.50% respectively. Use of the bond issue proceeds and reporting and monitoring on a forward-looking basis of the bonds stood at 5.36% and 3.57% respectively. The results of this study were similar to a study done by Alonso-Conde & Rojo, (2020) who investigated the effect of green bonds on the profitability and credit quality of project financing Europe. The study found out that greenwashing was a major challenge during bonds classifications. This demonstrated that the criterion used by the International Capital Markets Association (ICMA) and the Climate Bonds Initiative (CBI) to classify a Bond as "Green" is standard to all investment firms. Further, this acts as a strong indicator to firms conforming to the laid procedures by the regulation bodies.

4.2.7 Capital Markets Commitment to Green Bonds

The study sought to identify the Capital markets commitment to promote the use of green bonds to finance investments in Kenya based on the respondent's experience. Table 4.7 below shows the respondents views on Capital markets commitment to promote the use of green bonds to finance investments in Kenya**.**

Table 4.7

Capital markets commitment to Green Bonds

	Count	Percent
No	3	5.36
Yes	53	94.64
Total	56	100.00

Source: Research Data (2021)

Results in the above table demonstrated that the majority of the respondents (94.64%) agreed with the Capital Markets Authority's commitment in promoting the use of green bonds to finance investments in Kenya and only 5.36% disagreed with the above statement. This means that the function of the CMA which is to sensitize investors on the products traded in the market is properly managed. This also conforms to the green bond policy of 2016 that reinforced the scope of G20 regarding "Climate Finance Study Group", and Kenya has in effect adopted the policy through the Capital Markets Authority (GBP, 2016). The results to this study is similar to a study done by Hyun, et al. (2018) who explored the utilization of bond for infrastructure financing in Asia capital markets for the period 1990-2006. The study found out that local bond markets plays a crucial role in supplementing infrastructure financing which boost firms' financial performance.

4.2.8 Types of Revenue Bonds Issued by the Company

The study sought to identify the types of Revenue Bonds Issued by banks and investment firms listed in the NSE in Kenya. Table 4.8 below shows the respondents views on the types of revenue bonds Issued by banks and investment firms listed in the NSE.

Table 4.8

Types of Revenue Bonds Issued by the Company

Bonds	**Count**	**Percent**
Housing Authority Bonds	21	37.50
Industrial development revenue bonds	29	51.79
Private Activity Bonds	6	10.71
Total	56	100.00

Source: Research Data (2021)

Results in the above table demonstrated that more than half of the total respondents (51.79) of the investment firms in the banking and investment sector in the NSE acknowledged that industrial development revenue bonds were invested more. This was followed by the housing authority bonds and the private activity bonds which stood at 37.50% and 10.71 respectively. This demonstrated that more investment firms considered the industrial development revenue bonds since they are primarily issued by the government through the lead investment firms in order to subsidize infrastructure projects which are key components in economic development. This also conforms to the Industrial

Development Revenue bond Financing guidelines (IDRBF) that the industrial development revenue bond which is a key pillar of green revenue bonds is a key determinant of financial performance of investment firms. The results to this study were similar to the findings of Mulcahy & Guszkowski, (2017) who examined financing of corporate expansion through industrial revenue bonds for the period 2000-2008 in Europe. The study found out that the financial markets should consider inclusion of industrial revenue bonds in their portfolio in order to improve firms' financial performance.

4.2.9 Green Revenue Bonds Attracting More Investors

The study sought to identify the green revenue bonds attracting more investors in the banking and investment sector of the NSE in Kenya. Table 4.9 below shows the respondents views on green revenue bonds attracting more investors in the banking and investment sector of the NSE in Kenya.

Table 4.9

Green revenue bonds attracting more investors

Bonds	**Count**	**Percent**
All the above	25	44.64
Housing Authority Bonds	6	10.71
Industrial development revenue bonds	12	21.43
Private Activity Bonds	13	23.21
Total	56	100.00

Source: Research Data (2021)

Results in the above table demonstrated that 44.64% of the total respondents of the investment firms in the banking and investment sector of the NSE acknowledged that the housing authority bonds, industrial development revenue bonds and the private activity bonds attracted more investors. Among these, the private activity bonds which stood at 23.21% were considered more by the investors. This was followed by the industrial development revenue bonds and housing authority bonds which stood at 21.43% and 10.71% respectively. These results demonstrated that the three pillars of green revenue bonds are key determinants of financial performance of investment firms. Investing more of green revenue bonds would boost investments firms' financial performance since their proceeds are earmarked for green projects featuring long maturities ranging from 20 to 30 years.

These results agreed with the findings of Vassallo (2020) who analyzed the Europe 2020 project bond initiative as an alternative to finance infrastructure in Europe. The study found out that project bonds improve firm's financial position. Further, Kapinguka (2016) examined the causal relationship between bond market development and Performance of Non-Financial Companies in South Africa and found similar results. Thus, the African governments should put in place policies which promotes the development of the bond market as one of the ways to mobilize domestic resources and boost the capital markets.

4.2.10 Projects Financed through the Green Revenue Bond

The study sought to identify projects financed through the green revenue bond in the banking and investment sector of the NSE in Kenya. Table 4.10 below shows the respondent's views on projects financed through the green revenue bond in the banking and investment sector of the NSE in Kenya.

Table 4.10

Projects Financed through the Green Revenue Bond

Projects	**Count**	**Percent**
All the above	32	57.14
Combined heat and power	2	3.57
efficiency Processes	1	1.79
Energy efficiency Processes	3	5.36
Energy efficient products	5	8.93
Manufacturing	12	21.43
Retail and wholesale	1	1.79
Total	56	100.00

Source: Research Data (2021)

Results in the above table demonstrated that 57.14% of the total respondents of the investment firms in the banking and investment sector of the NSE acknowledged that combined heat and power, efficiency Processes, energy efficiency Processes, energy efficient products, manufacturing, retail and wholesale projects were financed through the

green revenue bond. Among this, projects which gained more recognition in financing included manufacturing which stood at 21.43% of the total respondents. This was followed by energy efficient products, energy efficiency Processes, combined heat and power, efficiency processes and retail and wholesale which stood at 8.93%, 5.36%, 3.57%, 1.79% and 1.79% respectively. This demonstrated that if investment projects designated for green projects are properly assessed, for inclusion in the investment sector in the NSE, firm's financial performance would improve vehemently. This would conform to the Nairobi Securities Exchange recommendation that the issuers of green bonds should demonstrate that the financing and re-financing of investments or projects conforms to the Green Economy Strategy and Implementation Plan.

These results agreed with the findings of Ngugi (2016) who conducted a study on raising finance in the Kenyan bond market a case of listed companies on the Nairobi Stock Exchange. The study found out that bonds market contributes significantly to the development process in the investment sector. Thus, he capital market authority should ensure that there is a sound fiscal and monetary policy, effective legal and regulatory framework regulating the market.

4.2.11: Project Bonds issued by the Company

The study sought to identify the Project bonds issued by the firms in the banking and investment sector of the NSE in Kenya. Table 4.11 below shows the respondent's views on Project bonds issued by firms in the banking and investment sector of the NSE in Kenya.

Table 4.11

Project bonds issued by the company

Project Bond	Count	Percent
All the above	25	44.64
Energy bond	10	17.86
Road development bond	15	26.79
Water/Irrigation bond	6	10.71
Total	56	100.00

Source: Research Data (2021)

In the table above, the results shows that 44.64% of the total respondents of the investment firms in the banking and investment sector of the NSE acknowledged that they invest in Energy bond, Road development bond and Water/Irrigation bond. The most popular project bond that have gained more interest are road development bond with 26.79% popularity. Energy bond and Water/Irrigation bond follow with 17.86% and 10.71% respectively. These findings show that project bonds provide institutional investors with a way to engage in infrastructure projects through listed, tradable securities that can provide superior risk-adjusted returns while also protecting investment businesses listed on the NSE from adverse market impacts. This would in future increase firms' financial returns which would improve financial performance. These results agreed with the findings of Vassallo (2020) who analyzed the Europe 2020 project bond initiative as an alternative to finance infrastructure in Europe. The study found out that project bonds improve firm's financial position.

4.2.12 Project bonds Which Have Attracted More Investors

The study sought to identify the Project bonds issued by the firms in the banking and investment sector of the NSE in Kenya. Table 4.12 below shows the respondent's views on Project bonds issued by firms in the banking and investment sector of the NSE in Kenya.

Table 4.12

Project bonds Which Have Attracted More Investors

Bond	Count	Percent
Energy bond	23	41.07
Road development bond	17	30.36
Water/Irrigation bond	16	28.57
Total	56	100.00

Source: Research Data (2021)

Results in the above table demonstrated that 41.07% of the total respondents of the investment firms in the banking and investment sector of the NSE acknowledged that energy bond attracted more investors. This could be attributed to their tax exception policies in accordance to the green bond policies. Road development bond and Water/Irrigation bond followed with30.36% and 28.57% respectively. This demonstrated that more of energy bonds would in the long run improve firm's financial performance. The study confirmed the findings of Kapinguka (2016) who analyzed the Europe 2020

project bond initiative as an alternative to finance infrastructure in Europe. The study found out that project bonds had a positive significance with firm's financial position. Further, the capital markets authority should sensitize investors to embrace more of energy bonds because of their eco-friendly aspect and also the tax exemption incentives.

4.2.13 Projects Financed Through Green Project Bonds

The study sought to identify the Projects financed through Green Project Bonds in the banking and investment sector of the NSE in Kenya. Table 4.13 below shows the respondent's views on Projects Financed through green project bonds in the banking and investment sector of the NSE in Kenya.

Table 4.13

Projects Financed Through Green Project Bonds

Projects	**Count**	**Percent**
All the above	33	58.93
Alternative fuel infrastructure	2	3.57
Mass Transit	6	10.71
Rail	3	5.36
Vehicles	10	17.86
Water-Bourne transport (Floating bridge)	2	3.57
Total	56	100.00

Source: Research Data (2021)

The results in the table above demonstrated that 58.93% of the total respondents of the investment firms in the banking and investment sector of the NSE acknowledged that Alternative fuel infrastructure, mass transit, rail, vehicles and water-bourne transport (floating bridge) are among the projects financed through green project bonds. Among these, projects which got more priority of being financed through green project bonds were vehicles which had 17.86% followed by Mass Transit and rail which stood at 10.71% and 5.36% respectively. Alternative fuel infrastructure and Water-Bourne transport (Floating bridge) stood at 3.57% respectively. These results demonstrated that investment firms should participate more in investing in green projects bonds. This would help the firms to improve their financial performance in an eco-friendlier way.

The study confirmed the findings of Flammer (2018)) who investigated the influence of corporates proceed bonds and financial performance in the stock market in USA following the issuance of green bonds. The study found out that stock market responds positively to the announcement of projects bond issues and thus investment firms should participate more in investing in green projects bonds. Further, the results confirmed the findings of Onyuma (2019) who examined the effects of project bond issuance on financial performance of firms listed in the Nairobi Securities Exchange in Kenya. The study concluded that project bonds issuance had a statistically significant effect on financial performance of firms listed in the Nairobi Securities and recommended that firms listed in the NSE should take into consideration various aspects of bond issues for them to boost their financial performance.

4.2.14 Securitized bonds issued by the firm

The study sought to identify the types of securitized bonds issued by the firms in the banking and investment sector of the NSE in Kenya. Table 4.14 below shows the respondent's views on securitized bonds issued by the firms in the banking and investment sector of the NSE in Kenya.

Table 4.14

Securitized Bonds issued by the Firms

Securitized Bonds	Count	Percent
All the above	27	48.21
Asset based Securities	11	19.64
Cash flow collaterized debt	2	3.57
Mortgage-backed securities	16	28.57
Total	56	100.00

Source: Research Data (2021)

The results in the table above demonstrated that 48.21% of the total respondents acknowledged the issue of securitized bonds issued by investment firms in the banking and investment firms of the NSE. Among these, Mortgage-backed securities gained more recognition and were invested more with 28.57% of the respondents acknowledging this. This was followed by Asset based Securities and Cash flow collaterized debt with 28.57% and 3.57% respectively. This demonstrated that investment firms consider investing in all the three categories of securitized bonds as stipulated in the green bond principles

guidelines. Among these, the mortgage-backed securities have been invested more in this category. This could be attributed to their reduced risks since their issuance involves issuing securities that are backed by a number of assets that are transformed into securities through a process called securitization. These results contradicted the findings of Nwankwo (2016) who studied the impact of securitized bonds on firms' financial performance. The results demonstrated that securitized bond have a positive but statistically insignificant effect on firm's financial performance which could be attributed to their reduced risks since their issuance involves issuing securities that are backed by a number of assets that are transformed into securities

4.2.15 Securitized Bonds that have Attracted More Investors

The study also sought to identify the types of securitized bonds that have attracted more investors in the banking and investment sector of the NSE in Kenya. Table 4.15 below shows the respondent's views on the securitized bonds that have attracted more investors in the banking and investment sector of the NSE in Kenya.

Table 4.15

Securitized Bonds That Have Attracted More Investors

Bond	Count	Percent
Asset based Securities	21	37.50
Cash flow collaterized debt	14	25.00

Mortgage-backed securities	21	37.50
Total	56	100.00

Source: Research Data (2021)

Results in the above table demonstrated that the mortgage-backed securities and the asset-based securities attracted more investors with a response rate of 37.50% during the period of study. This demonstrated that mortgage-backed securities and the asset-based securities have more preference to investment companies in the banking and investment sector of the NSE. This could be attributed to their ability of being backed by a number of assets that are transformed into securities through a process called securitization. Also, the most important part of green securitization is that the issuer's promise to pay back investors is backed by the value of a pool of financial assets or credit support from a third party

This makes mortgage-backed securities and asset-based securities more appealing. These results agreed with the findings of Makhetha-Kosi (2017) who explored empirically the causal relationship between securitized bonds and financial performance of selected firms. The study established a significant relationship between securitized bonds and firm's financial performance. The study also agreed with the findings of Bakri et al. (2018) who studied on the determinant of securitization spread. The study found out that securitization has a positive and statistically significant influence on the primary market spread. Thus, in this study, mortgage-backed securities and the asset-based securities have more preference to investment companies in the banking and investment sector of the NSE.

4.2.16 Proceed Bonds Issued by the company

The study sought to identify the types of proceed bonds issued by firms in the banking and investment sector of the NSE in Kenya. Table 4.16 below shows the respondent's views on the proceed bonds issued by firms in the banking and investment sector of the NSE in Kenya.

Table 4.16

Proceed Bonds Issued by the company

Proceed Bonds	Count	Percent
All the above	28	50.00
Corporate Bonds	19	33.93
Municipal bonds	7	12.50
N/A	2	3.57
Total	56	100.00

Source: Research Data (2021)

Results in the above table demonstrated that over fifty percent (50%) of the total respondents acknowledged that the corporate bonds and the municipal bonds attracted more investors with a response rate of 33.93% and 12.50% respectively over the period of the study. This demonstrated that the investment firms in the banking and investment firms in the NSE invests both in corporate bonds and the municipal bonds as proceed bonds are specific debt instruments where the proceeds are invested in a specific green

project and the investors have direct exposure to the green project itself. This study confirmed Ngugi (2018) investigations on the drivers for Issuance of proceed bonds by Listed Companies in Kenya 2002-2011. The study found out that reputation and liquidity incentives influence issuance of proceed bonds. Further the study found out that companies float bonds to get cash to solve liquidity problems. Obong'o and Rintari, (2020) also confirmed the findings in his study on the influence of convertible bonds on liquidity growth of commercial banks in Nairobi County Kenya and found out statistically significant positive relationship between convertible bonds and liquidity growth of commercial banks in Kenya. This demonstrated that the investment firms in the banking and investment firms should invest both in the corporate and municipal bonds.

4.2.17 Proceed Bonds Proceed Bonds Which Have Attracted More Investors

The study also sought to identify the types of proceed bonds that have attracted more investors in the banking and investment sector of the NSE in Kenya. Table 4.17 below shows the respondent's views on the proceed bonds that have attracted more investors in the banking and investment sector of the NSE in Kenya.

Table 4.17

Proceed Bonds Issued by the company

Bond	Count	Percent
Corporate Bonds	46	82.14
Municipal bonds	10	17.86
Total	56	100.00

Source: Research Data (2021)

Results in the above table demonstrated that the corporate bonds attracted more investors with a response rate of 82.14% as compared to municipal bonds which had a response rate of 17.86% during the period of the study. This demonstrated that the investment firms in the banking and investment firms in the NSE invests more in corporate bonds as compared to municipal bonds. This could be attributed to Mariz (2020) who study who noted that for corporate bonds, investor's favors long-term offtake agreements such as power purchase agreements or availability-based contracts with investment grade counterparties as their key pillar to strengthen their financial position. The findings of this study agreed with the outcomes of Akinsokeji, et al. (2016) who examined the empirical impact of corporate bonds and municipal bonds market on aggregate investment. The study found out that proceed bonds have a direct impact on macroeconomic variables. Further, the channel through which the bonds market affects growth goes from bonds to savings, then

from savings to investment, and then from investment to an increase on firms' financial position.

4.2.18 Interest Rate Considered by the Firm When Analyzing Bonds

The study also sought to identify the interest rate considered by the firm listed in the NSE when analyzing bonds. Table 4.18 below shows the respondent's views on the interest rate considered by the firms listed in the banking and investment sector of the NSE in Kenya.

Table 4.18

Interest Rate Considered by the Firm When Analyzing Bonds

Interest rate	Count	Percent
Nominal interest rate	11	19.64
Real interest rate	21	37.50
Weighted average interest rate	24	42.86
Total	56	100.00

Source: Research Data (2021)

Results in the above table demonstrated that 42.86% of the total respondents of the investment firms in the banking and investment sector of the NSE acknowledged that the weighted average interest rate was considered more when analyzing the relationship between the green bonds and firm's financial performance. This was followed by real interest rate and nominal interest rate which stood at 37.50% and 19.64% respectively. This demonstrates that the weighted average interest rate is one of the most important variables which influences green bonds in determination of a firms' financial position. Further, the weighted average interest rate forms the base rate for all bonds denominated

in a certain currency and compensates investors for their baseline economic risks. The central purpose of any government is to formulate sustainable finance policies and framework which stimulates the economy. Interest rates are usually set by a country's central bank and influence the cost of borrowing which later influences firms' financial performance. The findings of this study agreed with the findings of Obur (2016) who examined the moderating effect of interest rates on relationship between foreign exchange rate fluctuation and performance of Nairobi securities exchange market. The study found out that interest have a have a positive and significant impact on the relationship between foreign exchange rate fluctuation and performance of Nairobi securities exchange and recommended that the government through the Capital Markets Authority should formulate policies to govern interest rates. Further, Nkwede (2020) analyzed the macroeconomic determinants of bond market development and found out that that exchange rate, interest rate, inflation rate and banking sector development have negative and significant influence on the Nigerian bond market

4.2.19 Financial Performance Indicator Used by the Firm while Analyzing Bonds for Decision Making?

The study sought to identify the most appropriate key performance indicator used by the investment firms while analyzing bonds for decision making. Table 4.19 below shows the respondent's views on the most appropriate key performance indicator used by the firms while analyzing bonds for decision making?

Table 4.19

Financial Performance Indicator Used by the Firm while Analyzing Bonds for Decision Making

KPI	Count	Percent
Return on assets (ROA)	25	44.64
Return on equity (ROE)	28	50.00
Total Return (TR)	3	5.36
Total	56	100.00

Source: Research Data (2021)

Results in the above table demonstrated that 50% of the total respondents of the investment firms in the banking and investment sector of the NSE acknowledged that return on equity was the major key performance indicator used to measure financial performance. This was followed by return on assets which stood at 44.64% and total return at 5.36%. Ratios are used as a benchmark for evaluating firms' financial performance and help to summarize large quantities of financial data and to make qualitative judgments about the firm 's performance This demonstrated that return on equity is the most relevant variables in analyzing firm's financial performance. The findings of this study agreed with the findings of Ndirangu (2019) who investigated the causal relationship between firms' financial performance using ROE and stock return for firms listed at NSE in Kenya. The study found out that there is a direct relationship between financial performance measured by the ROE and stock returns hence an increase in financial performance of the listed

firms increases stock returns of firms listed at the NSE. The findings also agreed with a study done by Odongo (2017) analyzed the influence of Capital structure and financial performance of listed companies at the Nairobi Securities exchange market using a case of commercial banks in Kenya and found out that increasing unit levels of cost of capital had a positive effect on the financial performance of firms listed at the Nairobi Securities Exchange. Further, Obur and Anyango (2016) who examined the moderating effect of interest rates on relationship between foreign exchange rate fluctuation and performance of Nairobi securities exchange market and Alonso-Conde & Rojo (2020) who investigated the effect of green bonds on the profitability and credit quality of project financing used ROE as ameasure for financial performance. Thus, the study used the return on equity as the major key performance indicator used to measure financial performance.

4.3 Secondary Data Analysis

This section presents the results and discussions of the study from the secondary data collected from the audited and published financial reports of the banking and investment firms listed in the NSE. The study used panel data Ordinary Least Square method technique for analysis for an eight-years period (2012 to 2019) to examine the influence of green bonds on financial performance of investment firms listed in the NSE as well as the mediation effect of interest rate in this relationship. Regression analysis was conducted using the E-views 17 software output. To ensure that enough degrees of

freedom in the models to be estimated are available, yearly data covering the entire study period was collected.

4.3.1 Descriptive Statistics of the Study Variables

This section discussed various descriptive characteristics of the study variables Therefore, the study sought to determine the spread of data which included calculating for the mean, standard deviation, standard errors, maximum and minimum values of the variables overtime. The descriptive statistics tested the characteristics of each variable and how they are distributed in all banking and investment companies between 2012-2019. This further involved finding the correlation matrix to check which variables were highly correlated so as to avoid the problem of multi-collinearity which is common in time series data. The data was converted into their natural logs in order to deal with the problem of large values and eliminate heteroscedasticity. Return on Equity (ROE) was the proxy for financial performance of banks and investment firms listed in the NSE in Kenya, green revenue bonds were proxied by GRB, green project bonds were proxied by GPB, securitized bonds were proxied by SB, green proceed bonds were proxied by GPB whereas interest rate by IR. Table 4.20 below shows the descriptive summary statistics for the key variables used in the study.

Table 4.20

Summary Statistics for all Variables

	LN_ROE	LN_GPB	LN_GRB	LN_IR	LN_PB	LN_SB
Mean	1.831742	19.57116	19.75388	-2.247572	19.18805	19.60579
Median	1.658107	19.38133	19.45961	2.212300	19.02773	19.33368
Maximum	-0.977103	23.36158	23.86559	-1.762007	23.02696	23.45109
Minimum	-4.456750	13.30931	13.27937	-4.305066	12.89672	12.73670
Std. Dev.	0.644170	1.907938	1.821109	0.316945	1.839557	1.759312
Skewness	-1.856798	-0.293444	-0.326895	-3.370484	-0.349050	-0.184580
Kurtosis	0.270717	0.046948	0.178275	0.96681	0.229866	1.582848
Jarque-Bera	117.4427	5.281973	6.657837	1485.662	7.333017	9.686188
Probability	0.000000	0.071291	0.035832	0.000000	0.025566	0.007883
Sum	-161.1933	1722.262	1738.341	-197.7863	1688.549	1725.309
Sum Sq. Dev.	36.10109	316.6999	288.5301	8.739535	294.4055	269.2806
Observations	88	88	88	88	88	88

Source: Research Data (2021)

Notations:

LN - represented the Natural Log of:

ROE – Return on Equity

GPB – Green Projects Bonds

GRB – Green Revenue Bonds

Sb – Securitized Bonds

PB – Proceed Bonds

IR – Interest Rates

From the findings, table 4.1 above depicts that the financial performance of banks and investment firms listed in the NSE measured by ROE had an average mean of 1.832 for the period 2012 -2019. This demonstrated that the financial position of firms listed in the NSE during the period of study was positive. The standard deviation for the ROE was 0.64 while the skewness was -1.8 and kurtosis of 0.3 for the same period. This shown that there was a very strong relationship between green bonds and firm's financial position. The maximum value of ROE was observed at -0.978 while the minimum value was observed at -4.457. This indicated that some companies were operating at a negative value on Return on Equity. The difference between the minimum and the maximum values informed the range of the data. The standard deviation for the ROE was 0.644. This demonstrated that the ROE was stable and did not deviate too much from the mean. This means that all variables were normally distributed.

The mean value for green proceeds bonds was 19.57116 for the period 2012 to 2019. The positive value showed that the contribution of green proceeds bonds to firm's financial performance was high. The standard deviation for green proceeds bonds was 1.908. This means that there is a relatively small variability between green proceed bonds and firm's financial performance. The mean value for green revenue bonds stood at 19.753 for the same period. The positive value showed that the contribution of green revenue bonds to firm's financial performance was high. The standard deviation for green revenue bonds was 1.821. This means that there is a relatively small variability between green revenue bonds and firms' financial performance.

The average value for securitized bonds and proceed bonds were 19.118 and 19.606 respectively. Their positive values of mean also showed that securitized bonds and proceed bonds were prevalent in firm's financial performance. The standard deviation for Securitized Bonds and Proceed bonds stood at 1.839 and 1.759 respectively which depicted a relatively small variability between securitized bonds, proceed bonds and firm's financial performance. The interest rate had a mean of -2.247 and a standard deviation of 0.317. This shows that interest rates had an inverse relationship on green bonds and firm's financial position. Further, the standard deviation of 0.317 was stable and did not deviate too much from the mean during the period of the study.

4.3.2 Test of Normality

In multiple regression analysis, it is required that data should be normally distributed. In this study, skewness and kurtosis were used for the test of normality. Baker (2019) described skewness as lack of symmetry in data distribution. Skewness is categorized into both into both negatively and positively skewed distribution. Data which is positively distributed means that the mean is greater than the mode and the median but median lies in between the two. For data which is negatively skewed, mean is less than mode and the median i.e., the median lies between the two parameters. Kurtosis shows the peak of a curve of a frequency. Values which are close to zero indicate that the data shape was close to normal while negative value indicates distributions flatter than the normal. Positive kurtosis values show shapes peaked than normal. Flammer (2016) described kurtosis and

skewness values of 2or -2 to be sufficient for statistical analysis. Table 4.21 below shows the descriptive summary statistics for the test of normality as used in the study.

Table 4.21

Test of Normality

	LN_ROE	LN_GPB	LN_GRB	LN_IR	LN_PB	LN_SB
Skewness	-1.856798	-0.293444	-0.326895	-3.370484	-0.349050	-0.184580
Kurtosis	0.270717	0.046948	0.178275	0.96681	0.229866	1.582848
Jarque-Bera	117.4427	5.281973	6.657837	1485.662	7.333017	9.686188
Probability	0.000000	0.071291	0.035832	0.000000	0.025566	0.007883
Sum	-161.1933	1722.262	1738.341	-197.7863	1688.549	1725.309
Sum Sq. Dev.	36.10109	316.6999	288.5301	8.739535	294.4055	269.2806
Observations	88	88	88	88	88	88

Source: Research Data (2021)

From the above findings, Return on Equity, Green Projects Bonds, Green Revenue Bonds, Securitized Bonds, Proceed Bonds and Interest rates had had probability values of 0.0000, 0.0712, 0.0358, 0.0000, 0.00 and 0.0255 respectively. The jarque-Bera values for ROE, GPB, GRB, PB and SB were 117.4427, 5.281973, 6.657837, 1485.662, 7.333017 and 9.686188. A normally distributed curve is expected to have a probability value of more than 0.1 and a jarque-Bera value that is indifferent to zero or closer to zero. From the data findings, all variables were normally distributed.

4.3. 3 Correlation Analysis of the Study Variables

The study sought to test for highly correlated variables so as to avoid the problem of multi-collinearity in the model. Table 4.22 below shows Correlation Coefficients Results for the period 2012-2019. The data was converted to their natural logs to address the problem of large values and eliminate heteroscedasticity. This was warranted in order to ensure that the data was normally distributed and to ensure that there is no problem of multicollinearity which might lead to serial correlation. The data was then subjected to correlation analysis to test for highly correlated variable. The aim was to avoid the problem of multi-collinearity in the model.

Table 4.22

Correlation Coefficients Results

Correlation	LN_ROE	LN_GPB	LN_GRB	LN_IR	LN_PB	LN_SB
LN_ROE	1.000000					
LN_GPB	0.046582	1.000000				
LN_GRB	0.029665	0.966066	1.000000			
LN_IR	-0.042384	0.017288	0.015962	1.000000		
LN_PB	0.038120	0.981443	0.955959	0.023709	1.000000	
LN_SB	0.029069	0.938499	0.911141	0.005234	0.931473	1.000000

Source: Research Data (2021)

From the findings above, the correlation coefficient of green project bonds was 0.046582. This signified a weak positive correlation between green project bonds and financial performance of banks and investment firms listed in the NSE. Green revenue bonds had

a correlation coefficient of 0.029665. This signified a weak positive correlation between green revenue bonds and financial performance of banks and investment firms listed in the NSE. The proceed bonds had a correlation coefficient of 0.038120. This signified a weak positive correlation between proceed bonds and firms' financial performance. Securitized bonds had a correlation coefficient of 0.029069. Finally, Interest rate had a correlation coefficient of -0.042384 signifying weak negative correlations with firm's financial position measured by ROE. In summary, LN_GPB, LN_GRB, LN_PB and LN_SB had correlation coefficients of 0.05, 0.03, 0.04 and 0.03 respectively signifying weak positive correlations with ROE. IR had a correlation coefficient of -0.04 signifying a weak negative correlation with ROE. There were no highly correlated variables with ROE in the model.

4.3.4 Test for Stationarity -Unit Root Test

The study further sought to test for stationarity to check the problem of having a spurious regression. In econometrics, stationarity test is conducted to ensure that the value of a variable does not change with time. This means that variation over a period of time does not serve as a factor that brings changes in the value of a variable. In order to ensure that the series were stationary and to check the problem of having a spurious regression, a unit root test was conducted. A variable can only be said to be stationary when it has no unit root which is denoted in literature as 1(0). A non-stationary variable can have one or more-unit root and it is denoted by I(d), d is the number of unit root that the variable possesses

and by implication, the number of unit roots that the variable must be differenced to make it stationary Toliver, (2020)

4.3.4.1 Unit Root Tests at Intercept and Level I (0) – Return on Equity

The study sought to conduct a unit root test at Intercept and Level I (0) for Return on Equity. Table 4.23 below shows the results of Unit Root Tests at Intercept and Level I (0)**.**

Table 4.23

Panel Unit Root Tests_ Return on Equity at Intercept and Level I (0)

Panel unit root test: Summary

Sample: 2012 2019

Newey-West automatic bandwidth selection and Bartlett kernel

Method	**Statistic**	**Prob.****	**Cross-sections**	**Obs**
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-8.93338	0.0000	12	75
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.91776	0.0276	12	75
ADF - Fisher Chi-square	38.7316	0.0291	12	75
PP - Fisher Chi-square	39.3507	0.0251	12	78

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Source: Research Data (2021)

From the table above, ROE was found to be stationary at intercept and level I (0) because the Levin, Lin & Chu t* statistic had a probability value of 0.0000 which is significant at 5% level of significance. Therefore, we reject the null hypothesis that ROE has a unit root.

4.3.4.2 Panel Unit Root Test – Green Revenue Bonds - Level I (0)

The study sought to conduct a unit root test at Intercept and Level I (0) for Green Revenue Bonds. Table 4.24 below shows the results of Unit Root Tests at Intercept and Level I (0).

Table 4.24

Panel Unit Root Test – Green Revenue Bonds - Level I (0)

Panel unit root test: Summary

Sample: 2012 2019

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.30153	0.0005	14	83
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.42899	0.3340	13	80
ADF - Fisher Chi-square	41.6902	0.0464	14	83
PP - Fisher Chi-square	53.5831	0.0025	14	86

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Source: Research Data (2021)

From the table above, GRB was found to be stationary at intercept and level I (0) because the Levin, Lin & Chu t* statistic had a probability value of 0.0005 which is significant at 5% level of significance. Therefore, we reject the null hypothesis that ROE has a unit root.

4.3.4.3 Unit Root Test – Green Project Bonds - Level I (0)

The study sought to conduct a unit root test at Intercept and Level I (0) for Green Proceed Bonds. Table 4.25 below shows the results of Unit Root Tests at Intercept and Level I (0)**.**

Table 4.25

Panel Unit Root Test – Green Project Bonds - Level I (0)

Panel unit root test: Summary

Series: LN_GPB

Newey-West automatic bandwidth selection and Bartlett kernel

Method	**Statistic**	**Prob.****	**Cross-sections**	**Obs**
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.61243	0.0002	14	85
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.30736	0.3793	13	82
ADF - Fisher Chi-square	30.8639	0.3232	14	85
PP - Fisher Chi-square	37.9895	0.0986	14	87

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Source: Research Data (2021)

From the above findings, the Levin, Lin & Chu t* statistic for GPB had a probability value of 0.0002 which is significant at 5% level of significance. Therefore, we reject the null hypothesis that GPB has a unit root.

4.3.4.4 Unit Root Test – Securitized Bonds - Level I (0)

The study sought to conduct a unit root test at Intercept and Level I (0) for Securitized bonds. Table 4.26 below shows the results of Unit Root Tests at Intercept and Level I (0)**.**

Table 4.26

Panel Unit Root Test – Securitized Bonds - Level I (0)

Panel unit root test: Summary

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.18637	0.0000	14	81
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.84337	0.0326	13	78
ADF - Fisher Chi-square	47.0739	0.0135	14	81
PP - Fisher Chi-square	77.2833	0.0000	14	86

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Source: Research Data (2021)

From the findings above, the Levin, Lin & Chu t* statistic for Securitized bonds had a probability value of 0.0000 which is significant at 5% level of significance. Therefore, we reject the null hypothesis that GPB has a unit root.

4.3.4.5 Panel Unit Root Test – Proceed Bonds - Level I (0)

The study sought to conduct a unit root test at Intercept and Level I (0) for Proceed bonds. Table 4.27 below shows the results of Unit Root Tests at Intercept and Level I (0)**.**

Table 4.27

Panel Unit Root Test – Proceed Bonds - Level I (0)

Panel unit root test: Summary

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-9.23850	0.0000	14	84
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.41027	0.0080	13	81
ADF - Fisher Chi-square	49.9840	0.0065	14	84
PP - Fisher Chi-square	70.4128	0.0000	14	86

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Source: Research Data (2021)

From the above findings, PB was found to be stationary at intercept and level I (0) because the Levin, Lin & Chu t* statistic had a probability value of 0.0005 which is significant at 5% level of significance. Therefore, we reject the null hypothesis that ROE has a unit root.

4.3.4.6 Panel Unit Root Test – Interest rate - Level I (0)

The study sought to conduct a unit root test at Intercept and Level I (0) for Interest Rate. Table 4.28 below shows the results of Unit Root Tests at Intercept and Level I (0)**.**

Table 4.28

Panel Unit Root Test – Interest rate - Level I (0)

Panel unit root test: Summary

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-11.7026	0.0000	14	86
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.53789	0.0056	14	86
ADF - Fisher Chi-square	54.0364	0.0022	14	86
PP - Fisher Chi-square	51.8743	0.0040	14	89

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Source: Research Data (2021)

The Levin, Lin & Chu t* statistic for IR had a probability value of 0.0000 which is significant at 5% level of significance. Therefore, we reject the null hypothesis that interest rate has a unit root.

4.4 Panel Regression Results and Test for Hypothesis

There are three methods to Panel data, as discussed in Chapter three: Pooled, Fixed and Random effects model. As to these three approaches, the study focused on both the Fixed and Random effects model. The fixed and random effects models cater for heterogeneity or individuality among the financial institutions by allowing each financial institution to have its own intercept value which is time invariant. Pooled regression model assumes that all the financial institutions are the same which is not the case and thus it was not used for this study. Given the two options of models applicable in analyzing panel data a researcher has to choose which model ie Fixed Effect or Random Effect (FE or RE) is more relevant and significant. The appropriate approach of choosing between FE and RE is running a Hausman specification test to determine the more efficient the most suitable model. The Hausman specification test is important since it involves running both the Fixed Effect and the Random Effect regression models, saving the estimates, and testing whether the error term (ε_i) is correlated with the independent variables. Under the test, the null hypothesis is that there is no significant correlation between the individual effects and the independent variables. A rejection of the null hypothesis confirms the argument in favor of the FE against the RE model. This model was justified by Torres-Reyna (2019) in his journal on Panel data analysis fixed and random effects using Stata.

4.4.1 The Hausman Test to Identify the Suitable Model

The results of the Hausman test are shown in Table 4.29. At the 5% level of significance, the Chi-square test statistic was 2.744258, with an insignificant probability value of 0.5826. As a result, the null hypothesis was rejected, and the random effects model was chosen instead. As a result, we accept the random effects model as appropriate for this research.

Table 4.29

Hausman Test – effect of green project bonds on financial performance

Correlated Random Effects - Hausman Test

Equation: EQ01

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.744258	5	0.0739

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LN_GPB	0.249347	0.225173	0.001921	0.0239

Source: Research Data (2021)

4.4.2 Hypotheses Testing of the Study Variables One- Green Revenue Bonds

The first hypothesis of this study **(H_{01})** stated that green revenue bonds have no significant effect on financial performance of banks and investment firms listed in the NSE in Kenya. The implied alternative hypothesis **(H_1)** of this study that green revenue bonds has a significant effect on financial performance of banks and investment firms listed in the NSE in Kenya. To achieve this hypothesis, a regression model was run to give coefficient values, the t- values and p-values, and standard errors as outputs.

Results of table 4.30 show that the green revenue bonds had a coefficient of 0.169759 and a significant probability value of 0.014 which is significant at 5 percent level of significance. This means that green revenue bonds had a significant effect on return on equity during the period of study. This signified that there was a positive relationship between green revenue bonds and financial performance of banks and investment firms listed in the NSE and the effects were significant. Further, the results implies that a unit change in green revenue bonds improves on financial performance by 0.17 or 17% holding all other factors constant. The f-statistic of 2.33 and with probability value of 0.048996 which is less than 5% level of significance indicates that the relationship is significant. We therefore reject the null hypothesis that there was no significant relationship between green proceed bonds and financial performance of investment firms listed in the NSE in Kenya. This meant that during the period of the study, green revenue bonds significantly affected financial performance of banks and investment firms listed in the NSE.

The results of this study are similar to the finding of Ng'ang'a, (2017) who analyzed the financial performance of revenue bonds and their conventional peers in Kenya using the

analytic hierarchy model to analyze the opinions of experts for the period 2000-2019. They found a positive relationship between revenue bonds financial performance over the period of study.

This study also agreed with the findings of Barua and Chiesa (2019) who examined the factors influencing the size of financing though green bond in Kenya. Their study demonstrated that in contrast to the aggregate market trend of green revenue bonds, there is evidence of increases in average issue size in the study period. According to Hyun et al. (2018), local bond markets should play a crucial role in supplementing infrastructure financing to boost firms' financial performance. Further, Mulcahy and Guszkowski, (2017) conducted a study on financing of corporate expansion through industrial revenue bonds for the period 2000-2008 in Europe and found out that financial markets should consider inclusion of industrial revenue bonds in their portfolio.

The study also agreed with the findings of Wagner (2017) who conducted a comparative study on the financial performance of revenue bonds and their conventional peers in Viet Nam using the analytic hierarchy model to research the opinions of experts for the period 2000-2019 and found out a positive significant relationship between of revenue bonds and financial performance. The results of this study are similar to the finding of Ng'ang'a, (2017) who analyzed the financial performance of revenue bonds and their conventional peers in Kenya using the analytic hierarchy model to analyze the opinions of experts for the period 2000-2019. They found a positive relationship between revenue bonds financial performance over the period of study. This study also agreed with the

findings of Barua and Chiesa (2019) who examined the factors influencing the size of financing though green bond in Kenya. Their study demonstrated that in contrast to the aggregate market trend of green revenue bonds, there is evidence of increases in average issue size in the study period.

Finally, these results are in agreement with a report done by the Kenya national policy on climate finance KNPCF (2018) who found that Kenya needs to enhance the capacity of the country in green bonds investments and to encourage private sector participation in environmentally friendly investment financing opportunities. A number of strategic interventions which includes establishment of a national climate finance platform and building capacity to develop bankable projects and effectively manage and implement those projects helps in mobilizing environmentally friendly projects to support sustainable development which will in the long run improve the financial performance of investment firms in the NSE Kenya.

The findings were consistent with the preferred habitat theory which confirms that if there is an imbalance between the supply and demand for funds within a given maturity range, investors and borrowers will not be reluctant to shift their investing and financing activities out of their preferred maturity sector to take advantage of any imbalance. Therefore, green revenue bonds were found to have a positive relationship with firm's financial performance. In the case of our capital markets in Kenya, the positive effect has significantly improved firm's financial performance. However, increased investments in

green revenue bonds may improve on this magnitude and spur firm's financial performance.

4.4.3 Hypotheses Testing of the Study Variables Two- Green Projects Bonds

The second hypothesis of this study **(H_{02})** stated that green projects bonds have no significant effect on financial performance of banks and investment firms listed in the NSE in Kenya. The implied alternative hypothesis **(H_2)** of this study that green revenue bonds has a significant effect on financial performance of banks and investment firms listed in the NSE in Kenya. To achieve this hypothesis, a regression model was run to give coefficient values, the t- values and p-values, and standard errors as outputs.

Results of table 4.30 show that the green project bonds had a coefficient of 0.225173 and a significant probability value of 0.0239 which is significant at 5 percent level of significance. This signified that there was a positive relationship between green revenue bonds and financial performance of banks and investment firms listed in the NSE and the effects were significant during the period of study. Further, the results implies that a unit change in green project bonds will improve on financial performance by 0.23 or 23% holding all other factors constant. The t-statistic of 1.184792and with probability value of 0.0239 which is less than 5% level of significance indicates that the relationship is significant. We therefore reject the null hypothesis that there was no significant relationship between green project bonds and financial performance of banks and investment firms listed in the NSE in Kenya. This meant that during the period of the study, green project bonds significantly affected financial performance of banks and

investment firms listed in the NSE though there was a positive relationship. Thus, the more the green bonds investments, the higher the firm's financial performance.

This study agreed with the findings of Mwega, (2016) who studied on financial regulation in project bonds in Kenya in Kenya for a 15 years period 2000-2015 and found out a positive relationship between project bond initiatives and alternative to finance infrastructure. Vassallo (2020) analyzed the Europe 2020 project bond initiative as an alternative to finance infrastructure in Europe for a 15 years period 2000-2015 and found out that project bond initiative has statistically positive effect on firms' financial infrastructural performance. Subacchi (2016) examined innovative financing for European infrastructures using project bonds for the period 2013 to 2020 and found a statistically significant effect between innovative financing for European infrastructures using project bonds and financial performance.

The study acknowledged that green bonds could be used as an Innovative Financing method which would boost financial performance. Further, the results confirmed the findings of Onyuma (2019) who examined the effects of project bond issuance on financial performance of firms listed in the Nairobi Securities Exchange in Kenya. The study concluded that project bonds issuance had a statistically significant effect on financial performance of firms listed in the Nairobi Securities and recommended that firms listed in the NSE should take into consideration various aspects of bond issues for them to boost their financial performance.

This study also confirmed the findings of Kapinguka (2016) who examined the causal relationship between bond market development and Performance of Non-Financial Companies in Africa with South Africa as a case study and found out a a statistically significant effect between bond market development and Performance of Non-Financial Companies in Africa with South Africa. However, the results contradicted the findings of Flammer (2018) who conducted a study on project bonds and financial performance in the stock market in USA following the issuance of green and found out a statistically insignificant effect between project bonds and financial performance in the stock market in USA.

These findings support the market timing theory which demonstrates how firms and corporations in the economy decide whether to finance their investment with equity or with debt instruments. As such, market timing is the first order determinant of a corporation's capital structure use of debt and equity thus, the assumption that managers believe that they can time when to invest in the market. If proper investment timings are done on green project bonds in the stock market, investment firms will boost their financial position.

4.4.3 Hypotheses Testing of the Study Variables Three - Proceed Bonds

The third hypothesis of this study **(H_{03})** stated that proceed bonds have no significant effect on financial performance of banks and investment firms listed in the NSE in Kenya. The implied alternative hypothesis **(H_3)** of this study that proceed bonds have a significant effect on financial performance of banks and investment firms listed in the NSE in Kenya.

To achieve this hypothesis, a regression model was run to give coefficient values, the t-values and p-values, and standard errors as outputs.

The results in Table 4.30 shows that proceed bonds had a positive coefficient value of 0.06152 and a significant probability value of 0.0189. This means that proceed bonds issued by investment companies had a significant effect on the return on equity during the period of study. They had a positive and significant relationship. We therefore reject the null hypothesis that there was no significant relationship between green proceed bonds and financial performance of banks and investment firms listed in the NSE in Kenya. Further, the results implies that a unit change in proceed bonds will improve on financial performance by 0.6 or 6% holding all other factors constant.

The t-statistic of 0.403302 and with probability value of 0.0189 which is less than 5% level of significance indicates that the relationship is significant. This demonstrated that the more proceeds bonds are invested by investment companies, the better the financial performance of investment firms, and thus, proceed bonds investment spurs the potential for improved financial performance. Thus, if the investment firms listed in the NSE would invest more in green proceed bonds, it could spur firms' financial position and accelerate the achievement of the country's vision 2030 economic pillar of an annual 10% GDP growth.

This study agreed with the findings of Ngugi (2018) who investigated the drivers for issuance of proceed bonds by listed companies in Kenya and found out that reputation and liquidity incentives influence issuance of proceed bonds. This indicated that companies

float bonds to get cash to solve liquidity problems which would boost firm's financial position in the long run. Flammer (2018) also found out that there existed both statistically and economically significant relationship between corporates proceed bonds and financial performance in the stock market in USA following the issuance of green bonds for the period 2010 to 2015. Uche (2016) investigated on why Africa needs green proceed bonds and concluded that investing in these types of bonds are better options for financing developments in climate change mitigation and adaptation. Ngugi (2018) also investigated on the drivers for Issuance of proceed bonds by Listed Companies in Kenya 2002-2011 and found out that reputation and liquidity incentives influence issuance of proceed bonds.

Obong'o et al. (2020) also examined the influence of convertible bonds on liquidity growth of commercial banks in Nairobi County Kenya. The findings of this study indicated statistically significant positive relationship between convertible bonds and liquidity growth of commercial banks in Kenya and recommended that a variety of customized bonds should be issued and public awareness increased in order to improve the financial performance of commercial banks in Kenya. Finally, Akinsokeji and Edafe, (2016) examined the empirical impact of corporate bonds and municipal bonds market on aggregate investment and the Nigerian economy for the period 1980 to 2013. The findings of this study indicated statistically significant positive relationship between of corporate bonds and municipal bonds market on aggregate investment and the Nigerian economy.

The results of this study contradicted with the findings of Akinsokeji et al. (2016) who examined the empirical impact of corporate bonds and municipal bonds market on

aggregate investment and the Nigerian economy by applying a disaggregated approach for the period 1980 to 2013.The results indicated a negative coefficient which was insignificant. This demonstrated that proceed bonds have an indirect impact on macroeconomic variables hence the channel through which the bonds market affects growth goes from bonds to savings, then from savings to investment, and then from investment to an increase on ROA. The study recommended implementation of policies that would increase proceed bonds issuance in the financial markets to boost firm's financial performance.

Emanating from the analyses, proceed bonds had a statistically significant relationship with financial performance of investment firms listed in the NSE in Kenya. This is consistent with the preferred habitat theory which asserts that individual investors have a preferred range of bond maturity lengths, and will only go outside of this range if a higher yield is promised. However, if there is an imbalance between the supply and demand for funds within a given maturity range, investors and borrowers will not be reluctant to shift their investing and financing activities out of their preferred maturity sector to take advantage of any imbalance.

4.4.4 Hypotheses Testing of the Study Variables Four - Securitized Bonds

The fourth hypothesis of this study **(H_{04})** stated that Securitized bonds have no significant effect on financial performance of banks and investment firms listed in the NSE in Kenya. The implied alternative hypothesis **(H_4)** of this study that Securitized bonds have a significant effect on financial performance of banks and investment firms listed in the

NSE in Kenya. To achieve this hypothesis, a regression model was run to give coefficient values, the t- values and p-values, and standard errors as outputs.

Results in Table 4.30 shows that the securitized bonds had a coefficient of -0.189724 and a significant probability value of 0.0295 which is significant at 5 percent level of significance. This signified that there was a negative relationship between securitized bonds and financial performance of investment firms listed in the NSE. This means that when securitized bonds reduced by 0.19 percent per year then ROE increased by 1 percent in the same year. The t-statistic of 2.215599 and with probability value of 0.0295 which is less than 5% level of significance indicates that the relationship is significant

The above results demonstrate that securitized bonds hamper firm's financial performance, and its effect is significant. As demonstrated by the results, the magnitude of this effect is minimal and has the potential to shift the effect from significant to insignificant if uncontrolled. This means that securitized bonds do not yield high returns because they are less risky and thus the lower returns. Further, their exclusion in the portfolio would increase the financial performance of investment firms listed in the NSE. The results of this study agree to the tradeoff theory that the optimal debt ratio of a firm is determined by a trade-off between cost and benefits of borrowing, holding the firm's assets and investment plans constant. As such, the NSE can influence a firm's rate of financial performance by regulating the securitized bonds being invested by the investment firms.

This study was consistent with the findings of Makhetha-Kosi (2017) explored empirically the causal relationship between securitized bonds and financial performance of selected firms in South Africa for a period of 17 years from 1995 to 2012 where Kenya was included in the sample. The results demonstrated that there existed a negative relationship between securitized bonds and firm's financial performance.

The study was also consistent with the findings of Bakri (2018) who studied on the determinant of securitization spread in Malaysia using the Ordinary Least Square method and panel data analysis for the study period (2004-2012). The study found out that securitization has a positive and statistically significant influence on the primary market spread in Malaysia. Further, it established that value to loan, maturity, debt and crisis significantly contributes to the determinant of primary market spread. The study recommended that continued success of the securitization firms depends on their efficiency in using their resources and the competitiveness of the firms. This study was also consistent with the findings of Odongo (2017) who analyzed the influence of capital structure and financial performance of listed companies at the Nairobi Securities exchange market using a case of commercial banks in Kenya. The study found out that increasing unit levels of cost of capital had a positive effect on the financial performance of firms listed at the Nairobi Securities Exchange. The study recommended that the capital markets should enact policies geared to reduce the cost of debts for the firm's financial position to improve.

The study also agreed with the findings of Sarkisian (2019) who studied on securitization and bank performance in Europe using panel data model for analyses for the period 2001 to 2008. The study found that securitization does not outperform alternative funding, risk management and profitability improvement techniques in organizations. Alves (2016) further analyzed the economics of securitization in European markets for a sample period 2000-2011 economic period. The study found out that green securitization of bonds creates value by increasing liquidity, reducing the cost of funding, allowing originators to diversify funding sources, improving originators' risk management, and allowing originators to benefit from regulatory arbitrage and to improve key financial ratios. The study was also consistent with the findings of Nwankwo (2016) who studied the impact of securitized bonds on firms' financial performance in Nigeria for the period 1980 – 2000. The study found out that that securitized bond has positive but statistically insignificant effect on firm's financial performance.

Table 4.30

Panel Estimation Equation- Effects of green bonds on firms' financial performance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_GPB	0.225173	0.190053	1.184792	0.0239
LN_GRB	0.169759	0.116553	1.456493	0.0149
LN_IR	-0.353396	0.175498	-2.013669	0.0473
LN_PB	0.061528	0.152561	0.403302	0.0189
LN_SB	-0.189724	0.085631	2.215599	0.0295
C	1.258557	0.931182	-1.351569	0.0180

Source: Research Data (2021)

4.4.5 Hypotheses Testing of the Moderator – Interest Rate

The fifth hypothesis of this study **(H_{05})** stated that interest rate does not moderate the relationship between green bonds and the financial performance of banks and investment firms listed in the NSE in Kenya. The implied alternative hypothesis **(H_5)** of this study interest rate moderates the relationship between green bonds and the financial performance of banks and investment firms listed in the NSE in Kenya. To achieve this hypothesis, a regression model was run to give coefficient values, the t- values and p-values, and standard errors as outputs.

The moderating role interest rate on the relationship between green bonds and financial performance was tested using two model outputs. The first output tested the effects of green bonds without the control variable and the second equation involve the control variable. The results were then be compared and a conclusion drawn. To determine the right model for this, a Hausman Test was conducted for both outputs. From output 1(See appendix vix), on the Hausman Test -Panel Regression Equation without Interest Rate the Chi-square test statistic was 2.853536 with an insignificant probability value of 0.5826 which was insignificant at 5 percent level of significance. This therefore meant that the null hypothesis was rejected in favor of the random effects model. Therefore, we accept the random effects model as suitable for this study. From Output 2 (see appendix vxi), on the Hausman Test -Panel Regression Equation with Interest Rate the Chi-square test statistic was 2.744258 with an insignificant probability value of 0.7393 which was insignificant at 5 percent level of significance. This therefore meant that the null hypothesis was rejected

in favor of the random effects model. Therefore, we accept the random effects model as suitable for this study. Table 4.31 and 4.32 below shows the Panel Regression Equation without interest rate.

Table 4.31

Panel Regression Equation without Interest Rate

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_GPB	0.261121	0.190481	1.370850	0.0174
LN_GRB	0.182034	0.117741	1.546056	0.0125
LN_PB	0.027471	0.153540	0.178917	0.0858
LN_SB	0.185854	0.086805	2.141051	0.0035
C	0.345951	0.804562	0.429987	0.0668
Effects Specification				
			S.D.	Rho
Cross-section random			0.559495	0.6279
Idiosyncratic random			0.430745	0.3721
Weighted Statistics				
R-squared	0.076366	Mean dependent var		-0.539002
Adjusted R-squared	0.032383	S.D. dependent var		0.465973
S.E. of regression	0.431640	Sum squared resid		15.65032
F-statistic	1.736267	Durbin-Watson stat		1.172047
Prob(F-statistic)	0.149629			

Source: Research Data (2021)

Table 4.32

Panel Regression Equation with Interest Rate

Dependent Variable: LN_ROE

Method: Panel EGLS (Cross-section random effects)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_GPB	0.225173	0.190053	1.184792	0.0295
LN_GRB	0.169759	0.116553	1.456493	0.0149
LN_IR	-0.353396	0.175498	2.013669	0.0473
LN_PB	0.061528	0.152561	0.403302	0.0189
LN_SB	-0.189724	0.085631	-2.215599	0.0295
C	1.258557	0.931182	-1.351569	0.0180

Effects Specification

	S.D.	Rho
Cross-section random	0.580354	0.6526
Idiosyncratic random	0.423475	0.3474

Weighted Statistics

R-squared	0.124756	Mean dependent var	0.515716
Adjusted R-squared	0.071387	S.D. dependent var	0.464823
S.E. of regression	0.422532	Sum squared resid	14.63976
F-statistic	2.337632	Durbin-Watson stat	1.159506
Prob(F-statistic)	0.048996		

Source: Research Data (2021)

The results in Table 4.32 show that Interest rate had a coefficient of -0.353396 and a significant probability value of 0.0473 which is significant at 5 percent level of significance. We therefore reject the null hypothesis that interest rate does not mediate on the relationship between green bonds and financial performance of investment firms listed in the NSE. This means that when interest rates increase by 0.35 percent per year then ROE decreases by 1 percent in the same year. The equation without the interest rate had an R-squared of 7 Percent. When interest rate was introduced into the model the R-squared moved to 12 percent, increasing by 5 percentage points. This means that interest rate moderated the relationship between green bonds and financial performance of banks and investment firms listed in the Nairobi securities exchange in Kenya.

The results of this study are similar to the finding of Nkwede (2020) who analyzed the macroeconomic determinants of bond market development: evidence from Nigerian. The study found out that that exchange rate, interest rate, inflation rate and banking sector development have negative and significant influence on the Nigerian bond market capitalization and as such, they demonstrated strong evidence as robust macroeconomic determinants and drivers of bond market development in Nigeria. This study also agreed with the findings of Chuc and Sarker (2020) analyzed the factors influencing the green bonds market expansion. They concluded that monetary policies and the official interest rate of green bonds are important accelerators the investment firms can utilize to strengthen its green bond market and to boost firms' financial performance.The results of this study also agreed with the study of Obur (2016) who examined the moderating effect of interest rates on relationship between foreign exchange rate fluctuation and

performance of Nairobi securities exchange market and found out that interest rate moderates between foreign exchange rate fluctuation and performance of Nairobi securities exchange market.

Nzau and Onyuma (2019) in their study on the effect of bond issuance on financial performance of firms listed on NSE In Kenya revealed the existence of an inverse relationship between interest and financial performance implying that an increase in bonds issuance would lead to an increase in financial performance of firms listed on NSE In Kenya. They concluded that there was a statistically significant relationship between interest and financial performance during the period of study. This study was also in line with the study done by Nickel et al. (2016) in their investigation on the impact of interest rates on bond yield spreads relative to treasury bonds for the period May 1998 to December 2007. Their research showed that there is a positive link between interest rates and the financial performance of firms. This is because bond investors in different countries give different amounts of weight to macroeconomic and fiscal variables when making investment decisions, which is a key factor in a firm's financial performance. A decrease in the interest rate would mean higher revenue output and hence higher financial performance.

Finally, Onkware (2020) analyzed the relationship between cost of capital components and financial performance of firms listed in Nairobi Securities exchange. The study adopted the Panel data model as well as the pooled ordinary least squares (OLS) to analyze this relationship for the sample period 2011-2015. The study found out that there existed

a positive and significant relationship between costs of debt and firms' financial performance of manufacturing firms listed in NSE. The study concluded that manufacturing firms listed in NSE should consider using both debt and equity financing in their projects since they both influence financial performance positively.

Emanating from the analyses, interest rate had a statistically significant relationship between green bonds and financial performance of investment firms listed in the NSE in Kenya. This is consistent with the tradeoff theory which maintains that the optimal debt ratio of a firm is determined by a trade-off between cost and benefits of borrowing, holding the firm's assets and investment plans constant. Further, interest rate being a tax-deductible expense, decreases the tax liability.

4.4.6 The Effects of Green Bonds on firms' Financial Performance.

This step involved answering the study's general objective which was to investigate the effect the effects of green bonds on financial performance of banks and investment firms listed in the NSE in Kenya. All the proxies of green bonds were aggregated in the constant C. Table 4.33 shows the results for all proxies of green bonds.

Table 4.33

The Effects of Green Bonds on firms' Financial Performance.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_GPB	0.225173	0.190053	1.184792	0.0239
LN_GRB	0.169759	0.116553	1.456493	0.0149
LN_IR	-0.353396	0.175498	-2.013669	0.0473
LN_PB	0.061528	0.152561	0.403302	0.0189
LN_SB	-0.189724	0.085631	2.215599	0.0295
C	1.258557	0.931182	-1.351569	0.0180

From the table above, the constant C had a coefficient of 1.258557 and a significant probability value of 0.0180. This means that jointly these proxies influenced the return on equity during the period of study. Therefore, all the proxies of green bonds in the constant C significantly affected firm's financial performance during the period of study. The model's R-squared was 12.48% which showed that green bonds explained the changes in firm's financial, performance by approximately 12.48% while the adjusted R-Squared was 0.071 which has a difference of 5% with R-Squared which is within the acceptable range for a stable model. The probability F-Statistic had a probability value of 0.048996 which was less than 0.05 and significant at 5% level of significance. This added to the stability of the model. Durbin-Watson Statistic was 0.431195 which were within the acceptable range. This meant that there was no serial correlation in the model.

The results of this study are similar to the finding of Akinsokeji (2016) examined the empirical impact of bonds market on aggregate investment and the Nigerian economy the

period 1980 to 2013 and found out that jointly, bonds have direct impact on ROA and those interest rates stimulates the subscription to government bonds and it also responds to the level of bonds issue. Wuhan (2016) further examined the effect of interest rate on green bonds investment in China and found out that that there is a long-term relationship association among variables. Githaiga and Kabiru (2016) also studied on debt financing and financial performance of small and medium size enterprises in Kenya for the period 2011 to 2013 and found out that jointly, debt financing instruments performance of small and medium size enterprises in Kenya. Bond proportion and bond yield to maturity were found to have a statistically significant effect on financial performance. Oello (2016) studied on the performance of corporate bonds,goverment bonds and equities at the nairobi securities exchangeIn kenya and found out that there was a statistically significant difference between risk on equities and risk on bonds at the NSE.

These results also confirmed the findings of Nzau and Onyuma, (2019) who studied on the effect of bond issuance on financial performance of firms listed on NSE In Kenya. His findings found out that about 75.4 percent of variance in financial performance could be explained by bond issuance as characterized by bond price, bonds coupon rate, bond proportion, and bond yield to maturity. Alonso-Conde and Rojo (2020) further investigated on the effect of green bonds on the profitability and credit quality of project financing Europe for the period 2013 to 2019.. The study found out that the internal rate of return (IRR) and the return on equity (ROE) for shareholders is higher when green bonds instead of bank loans are issued to finance investments.

Magale (2019) also analyzed the challenges facing the development of green bonds on the Nairobi Securities Exchange in Kenya and found out that rating of green bonds was important mostly for international investors and does not hinder floating of green bonds. Finally, Ley (2017) investigated the potential contemporaneous relationship between the financial performance of green bonds and their conventional peers in Europe and Asia. The study found out that green bonds do outperform conventional ones over the full sample period but with a low significance. Muriithi (2018) conducted a study on the effect of financing sources on the financial performance of top 100 mid-sized companies in Kenya for the period 1998-2013. The study found out that the sources of finance had a weak positive effect on the firm's financial performance at a 5% level of significance and recommended that the need for companies to use a mix of financing options to improve firm's financial performance as compared to relying on one form of financing.

The results of this study contradicted the findings of Omollo (2018) who analyzed the effect of debt financing options on financial performance of firms listed at the NSE, Kenya for the period 2009 to 2015. The study found that the short-term, long-term and total debt have negative and statistically significant effects on returns on assets. This finding also contradicted the findings of Kioko (2020) analyzed the effect of portfolio diversification on the financial performance of investment firms listed in the Nairobi Securities Exchange using the multiple linear regression model covering 6 years from 2014 to 2019. In his study, he found out that there was a negative and insignificant relationship between bond investments and return on investments for the investments firms at Nairobi Securities

Exchange and concluded that concluded that bond investment has negative influence on firms' financial performance of investment companies listed at the NSE.

4.5 Panel Estimation Equation- Effects of green bonds on financial performance of banks and investment firms listed in the NSE

The following equation was therefore Proposed

$$FP_{\text{it}} = \boldsymbol{\alpha} + \beta_1 GRB_{It} + \beta_2 GPB_{It} + \beta_3 SB_{It} + \beta_4 PB_{It} + IR_{It} + \mu_{it}$$

To test the moderating role of interest rate between green bonds and firms' financial performance, the following equation was generated

$$FP_{\text{it}} = 1.26 + 0.17GRB_{It} + 0.23GPB_{It} + 0.06PB_{It} - 0.19SB_{It} - 0.35IR_{It} + \mu_{it}$$

Where;

FP_{it} = *Financial Performance* at time *t*

GRB_{it} =*Green* Revenue Bond at time *t*

GPB_{it} = Green Project Bond at time *t*

SB_{it} = Securitized Bond at time *t*

PB_{It}= Proceed Bond at time *t*

IR_{it} = Real Interest Rate at time t

α = Is the intercept

β_i= Is the parameter of GRB, GPB, SB, and PB explanatory variables

μ_i = Is the disturbance term

4.6 Summary of Hypothesis Testing Results

Table 4.35

Summary of the Results After Testing for The Five Hypotheses.

Table 36 below shows a summary of the results after testing for the five hypotheses.

Hypothesis	Coefficient	Probability value	Results	Conclusion
H_{01}: There is no relationship between green revenue bonds and financial performance of investment firms listed in the NSE in Kenya.	0.169759	0.0149	Positive and statistically significant	Reject H_{01}
H_{02}: There is no relationship between green project bonds and financial performance of banks and investment firms listed in the NSE.	0.225173	0.0239	Positive and statistically significant	Reject H_{02}
H_{03}: There is no relationship between securitized bonds and financial	-0.189724	0.0295	Negative and statistically significant	Failed to reject H_{03}

	performance of investment firms listed in the NSE in Kenya.				
H_{04}:	There is no relationship between green proceed bonds and financial performance of investment firms listed in the NSE in Kenya.	0.061528	0.0678	Positive and statistically significant	Reject H_{04}
H_{05}:	Interest rate does not mediate on the relationship between green bonds and financial performance of investment firms listed in the NSE in Kenya.	0.353396	0.0473	Positive and statistically significant	Reject H_{05}

Source: Research Data (2021)

CHAPTER FIVE

SUMMARY, CONCLISIONS AND RECCOMENDATIONS

5.1 Introduction

This chapter presents summary of the findings, conclusions and gives recommendations on areas of further research. It outlines the contributions as well as the areas of further studies. The conclusions of this study are discussed in line with objectives and the corresponding hypotheses. The overall objective of the study was to investigate influence of green bonds on financial performance of banks and investment firms listed in the NSE in Kenya. Specifically, the study sought to determine the effects of green revenue bonds on financial performance of banks and investment firms listed in the NSE, to establish the effects of green project bonds on financial performance of investment firms listed in the NSE, to investigate the effects of securitized bonds on financial performance of banks and investment firms listed in the NSE and to analyze the effects of green proceed bonds on financial performance of banks and investment firms listed in the NSE. The study also sought to establish the moderating effect of interest rate on the relationship between green bonds and financial performance of investment firms listed in the NSE.

5.2 Summary of the Findings

The existing evidence indicates that listed firms at the Nairobi Securities Exchange in Kenya adopts various financing models. These have evidently affected firms' financial performance differently and thus a review of firms' financial structure through inclusion

of green bonds is eminent. Previous studies have shown that debt financing and owners' equity can enhance financial performance of firms. Corporate managers have lacked enough knowledge on the effect of green bonds as sources of finance and the way they affect firms' financial performance. From this background this study sought investigate the influence of green bonds on the banking and investment firms listed in the Nairobi securities exchange. A census of 17 firms from the banking and investment firms listed on NSE was taken. Panel data of companies covering year 2012 to 2019 were utilized in the analysis.

In the study, the proxies of green bonds were green revenue bonds, green project bonds securitized bonds and proceed bonds as independent variables against firms financial performance. Interest rate as a variable was tested to evaluate if it moderates between green bonds and financial performance of banks and investment firms listed in the NSE in Kenya. The findings on green revenue bonds, green project bonds, securitized bonds, proceed bonds as well as the moderating role of interest rate in the relationship between green bonds and financial performance are presented in section 5.2.1to section 5.2.5.

5.2.1 Green Revenue Bonds on Firms Financial Performance

The first objective of the study was to determine the effects of green revenue bonds on financial performance of banks and investment firms listed in the NSE in Kenya. Using the ordinary least square (OLS) estimation technique, this study found out that there was a positive relationship between green revenue bonds and firms financial position and their effects were statistically significant during the period of the study. This signified that

green revenue bonds have improved firm's financial performance of banks and investment firms in the period of the study. As such, investment firms in the NSE are still in the verge of maximizing their investments in green revenue bonds and conforming to the new green bonds policies to improve the return of these investments. However, as much as these firms are determined to boost their financial performance under the Kenya Vision 2030 Agenda for Sustainable Development Goals (SDGs), there is need to sensitize investors on green revenue bonds. This is because an increase in green revenue bonds investment will potentially boost firms' financial performance.

5.2.2 Green Project Bonds on Firms Financial Performance

The second objective of the study was to investigate the effects of green Project bonds on financial performance of banks and investment firms listed in the NSE in Kenya. Using the OLS estimation technique, the study established that green project bonds had a positive and significant relationship with firm's financial performance during the period of study. The results demonstrated that banks and investment firms listed in the NSE would boost their financial performance if green project bonds were on the rise. Thus, this study found out that green project bonds spur the potential for firm's financial performance. The capital markets authority should therefore seek to make Kenya's green investment market robust through implementation of the Sustainable Development Goals as well as Africa's Agenda 2063. This would help in integrating the domestic capital markets with the global capital market and make Kenya edge closer towards the realization of the annual 10%

GDP growth rate as entrenched in the economic pillar of Kenya's Vision 2030 development framework.

5.2.3 Securitized Bonds on Firms Financial Performance

The third objective of the study was to determine the effects of securitized bonds on financial performance of banks and investment firms listed in the NSE in Kenya. Using the OLS estimation technique, the study established that securitized bonds had a negative relationship with firm's financial performance but the effects were significant. This could be attributed to their ability of being backed by a number of assets that are transformed into securities through a process called securitization. This demonstrated that when securitized bonds reduced by 0.19 percent per year the return on equity increases by 1 percent in the same year.

Thus, although securitized bonds had a negative effect on firm's financial position, this effect was significant. If they continue unabated, they have the potential to significantly affect firm's financial performance negatively. The study found the need to reduce the securitized bonds in investment portfolio. Thus, a reduction in securitized bonds will alleviate this risk of decreased financial performance as the investment firm weighs other investment alternatives. Additionally, the obligation of the issuer to repay investors is backed by the value of a pool of financial assets or credit support provided by a third party to the transaction, which makes mortgage-backed securities and asset-based securities more appealing. This is the central component of green securitization, and it is also the most important aspect of green finance.

5.2.4 Proceed Bonds on Firms Financial Performance

The fourth objective of the study was to determine the effects of securitized bonds on financial performance of banks and investment firms listed in the NSE in Kenya. Using the OLS estimation technique, the study established that Proceed bonds had a positive relationship with firms' financial performance of banks and investment firms listed in the NSE and the effects were significant during the period of the study. This means that proceed bonds had significant effect on return on equity during the period of study. The results demonstrated that the investment firms listed in the NSE in Kenya would benefit more if proceed bonds were invested more.

Thus, this study found that proceed bonds spur the potential for investment firms' financial performance. The Capital Market Authority should therefore seek to make Kenya's capital market investments sector robust through implementation of the Sustainable Development Goals as well as Africa's Agenda 2063. This would integrate the domestic capital markets with the global capital market and make Kenya edge closer towards the realization of the annual 10% GDP growth rate as entrenched in the economic pillar of Kenya's Vision 2030 development framework.

5.2.5 Green Bonds on firms Financial Performance

The fifth objective of the study was to determine the effects of securitized bonds on financial performance of banks and investment firms listed in the NSE in Kenya. Using the OLS estimation technique, the study established a positive relationship between

green bonds and financial performance of banks and investment firms listed in the NSE in Kenya, and the effect were significant during the study period. All the proxies of green bonds aggregated in the constant C jointly had a significant effect on firm's financial performance during the period of study. This demonstrated the need for the Capital Markets Authority to take a keen look on green bonds debate in the Nairobi Securities Exchange.

The findings of this study demonstrated that not all green bonds contribute positively to firms' financial position. The results of this study demonstrated that the securitized bonds negatively affected firms' financial position in Kenya during the period of study. However, the green project bonds, green revenue bonds and proceed bonds had a positive relationship that demonstrated a boost in firms' financial performance during the period of study. Therefore, the portfolio managers in the investment firms' and policy makers should be keen to apply the right mix of green bonds proxies that would significantly spur firm's financial positions in Kenya

5.2.6 Moderating Effect of Interest Rate on the Relationship Between Green Bonds and Firms Financial Performance

The study sought to determine the moderating effect of interest rate between green bonds and financial position of banks and investment companies listed in the Nairobi Securities Exchange. The moderating role interest rate on the relationship between green bonds and financial performance was tested using two model outputs. The first output tested the effects of green bonds without the control variable and the second equation involve the

control variable. The study demonstrated that interest rate has an inverse relationship with firm's financial performance of banking and investment firms listed in the NSE. The findings demonstrated that interest rate was a significant factor that affects firm's financial performance of banking and investment firms listed in the NSE as well as the level of green bonds issued by the firms. In essence, when interest rates reduced by 0.35 percent per year then return on equity increased by 1 percent in the same year. Therefore, the Capital Market Authority needs to have a key interest on the interest rates volatilities as interest rate is a key factor that determines the rate of financial firm's performance in the NSE. This means that interest rate was influenced by the volume of green bonds issued by the investment firms. Thus, the level of green bonds issuance would determine the volatility of interest rate in the NSE.

5.3 Conclusions

While there are a considerable number of empirical studies on green bonds and financial performance of firms in developing countries in Sub Saharan Africa, this study sought to explore the relationship between green bonds and financial performance of investment firms listed in the NSE in Kenya. Dynamic panel estimation results demonstrated that all the proxies of green bonds: green revenue bonds, green project bonds securitized bonds and proceed bonds did not significantly affect firm's financial performance as measured by the return on equity during the period of study. However, green project bonds, green revenue bonds and proceed bonds individually had a significant coefficient indicating a positive relationship with firm's financial performance. The conclusions on green revenue

bonds, green project bonds, securitized bonds, proceed bonds as well as the moderating role of interest rate in the relationship between green bonds and financial performance are presented in section 5.3.1 to section 5.3.5.

5.3.1 Effects of Green Revenue Bonds on Firms Financial Performance

The results on the effects of green revenue bonds on financial performance of banks and investment firms listed in the NSE in Kenya demonstrated that green revenue bonds had a positive and significant effect on firms' financial performance. It can be concluded that green revenue bonds contribute positively to the firm's financial performance and that the higher their investments, the higher the firm's financial position. This confirmed the preferred habitat theory which confirms that if there is an imbalance between the supply and demand for funds within a given maturity range, investors and borrowers will not be reluctant to shift their investing and financing activities out of their preferred maturity sector to take advantage of any imbalance. Therefore, green revenue bonds were found to have a positive relationship with firm's financial performance. In the case of our capital markets in Kenya, the positive effect has boosted firm's financial performance.

The findings of this study confirm a report by the Kenya national policy on climate finance KNPCF (2018) who reported that Kenya needs to enhance the capacity of the country in green bonds investments and to encourage private sector participation in environmentally friendly investment financing opportunities. A number of strategic interventions which includes establishment of a national climate finance platform and building capacity to develop bankable projects and effectively manage and implement those projects helped in

mobilizing environmentally friendly projects to support sustainable development which will in the long run improve the financial performance of investment firms in the NSE Kenya.

5.3.2 Effects of Green Project Bonds on Firms Financial Performance

The results on the effects of green project bonds on financial performance of banks and investment firms listed in the NSE in Kenya demonstrated that green project bonds had a positive and significant effect on firms' financial performance. It was concluded that green project bonds contribute positively to the firm's financial performance and that the higher their investments, the higher the firm's financial position. As such, capital markets that support investments in green project bonds are subject to have an improved firm's financial performance. The findings support the market timing theory which demonstrates how firms and corporations in the economy decide whether to finance their investment with equity or with debt instruments. As a result, market timing is the first order determinant of a corporation's capital structure, which includes the usage of debt and equity, as well as the premise that managers can time when to engage in the market. Investment firms will improve their financial position if they invest in green project bonds at the right time in the stock market.

The findings on green project bonds are a clear demonstration if the capital markets improved their investment capacities on green project bonds, this would improve the investment firms' potentials to improve financial performance. It is common for developing countries in sub-Saharan Africa to experience challenges in green financing

as long as their economies are not completely open to global contemporary issues. Kenya could reap more from green investments which would boost investment firm's financial performance. Thus, the government should seek to make the Kenya's capital market investments robust by integrating the capital markets with the global financial market as per Africa's Agenda 2063, and make Kenya edge closer towards realization of the annual 10% GDP growth rate as entrenched in the economic pillar of Kenya's vision 2030 development framework.

5.3.3 Effects of Securitized Bonds on Firms Financial Performance

The results on the effects of securitized bonds on financial performance of banks and investment firms listed in the NSE in Kenya demonstrated that securitized bonds had a negative and significant effect on firms' financial performance. It can be concluded that when securitized bonds reduced by 0.19 percent per year then ROE increased by 1 percent in the same year. The results of this study agree to the tradeoff theory that the optimal debt ratio of a firm is determined by a trade-off between cost and benefits of borrowing, holding the firm's assets and investment plans constant. Under trade off theory firms will have a target capital structure determined by the equity and leverage ratios thus, if the actual leverage ratio deviates from the optimal one, firms revert and adapts to its normal financing behavior in such a way to brings the leverage ratio back to its optimal level.

The findings of this study indicate that securitized bonds hamper firm's financial performance, and its effect is significant. The magnitude of this effect is minimal and has the potential to shift the effect from significant to insignificant if uncontrolled. This means

that securitized bonds do not yield high returns because they are less risky and thus the lower returns. Further, their exclusion in the portfolio would increase the financial performance of investment firms listed in the NSE. The study recommends that the capital market should adopt appropriate policies that seek to balance the securitized bonds invested by companies and to create a good investment portfolio for both domestic and international investors which would improve firms' financial performance.

Currently, Kenya has a generally positive investment climate that has made it attractive to international firms seeking a location for their regional or pan-African operations. Capital Markets are a crucial enabler for driving the growth and development of the Kenyan economy. The World Bank Group's Doing Business 2017 report ranked Kenya as the third most reformed country with the country moving up 21 places to 92 of the 190 economies reviewed on business regulatory reforms. If the capital markets remain committed to streamlining their standards to global standards of best practice and strive to integrate the NSE with global financial markets, the green bond market would receive a tremendous boost and hence the securitized bonds would have a significant effect on firms' financial performance.

5.3.4: Effects of Proceed Bonds on Firms Financial Performance

The results on the influence of Proceed bonds on financial performance of banks and investment firms listed in the NSE in Kenya demonstrated that Proceed bonds had a positive and significant effect on firms' financial performance. It can be concluded that Proceed bonds contribute positively to the firm's financial performance and that the higher

their investments, the higher the firm's financial position. This demonstrates that an increase in proceed bonds investments would spur firms' financial performance of banks and investment firms listed in the NSE in Kenya. This demonstrates that if more proceeds bonds are invested by investment companies, financial performance of investment firms would improve. Thus, proceed bonds investment spurs the potential for improved financial performance.

The findings support the preferred habitat theory which asserts that individual investors have a preferred range of bond maturity lengths, and will only go outside of this range if a higher yield is promised. However, if there is an imbalance between the supply and demand for funds within a given maturity range, investors and borrowers will not be reluctant to shift their investing and financing activities out of their preferred maturity sector to take advantage of any imbalance. If the investment firms listed in the NSE would invest more in proceed bonds, it could spur firms' financial position and accelerate the achievement of the country's vision 2030 economic pillar of an annual 10% GDP growth.

5.3.5 Effects of Green Bonds on Firms Financial Performance

The results on the influence of green bonds on financial performance of banks and investment firms listed in the NSE in Kenya demonstrated that jointly, the proxies of green bonds aggregated in the constant C did not significantly affect firm's financial performance during the period of study. Thus, green bonds were found to have affected firm's financial performance, and the effect were significant. The results of this study

confirm the portfolio management theory which demonstrates that the contribution made by an invested financial security to the entire investment firms' portfolio is a more important consideration in capital markets' decision-making process than the risk thereof, which is a direct reflection of the investment host firms' economic status. When investors earn higher returns, the investment firms equally increase its revenue through taxation, which is a positive contribution to its firms' financial position. This demonstrates that it is not a securities own risk that is important to an investor, but rather the actual contribution that the security makes to the variance of an investment's firm entire investment portfolio. It is for this reason that an equilibrium position needs to be identified on the optimum level of green bonds investment that would yield a positive return which would boost firms' financial performance.

The results of this study demonstrated that securitized bonds negatively affected banks and investment firms in Kenya during the period of study. However, green project bonds, green revenue bonds and proceed bonds had a positive relationship that demonstrated a boost in firms' financial position during the period of study. The identification of the mix of green bonds that would yield higher returns for banks and investment firms return will make Capital markets in Kenya stay on the path to the attainment of its Vision 2030's economic framework and achieve its short-term goals under the Big Four Agenda framework.

5.3.6 Moderating Effects of Interest rate on Firms Financial Performance.

The results on the moderating role of interest rate on financial performance of banks and investment firms listed in the NSE in Kenya demonstrated that interest rate moderated the relationship between green bonds and firms' financial performance of banks and investment firms listed in the NSE in Kenya. The study found out that interest rate is a key element and a determining factor on how green bonds may affect economic growth in Kenya. The findings of this study demonstrate that the investment criteria and selection of investments to be included in the portfolio is important in determining interest rate and ultimately the firm's financial performance.

This demonstrates that interest rate is influenced by the volume of green bonds invested in Kenya and as the purchasing power parity doctrine in respect to disturbances to equilibrium, there exists an automatic self-correcting mechanism that keeps the actual interest rate hovering close to its equilibrium level. Thus, the Capital markets through the national treasury should put more effort in the management of green bonds as it is a significant component in interest rate stability as well as a key component in determining firms' financial position. It is evident that green bonds triggers interest rate volatility and thus, its management needs to take the center stage of the capital markets debate on firms' financial performance.

5.4 Managerial Roles and Policy Recommendations

Financial globalization cannot be avoided by emerging economies. As such, it must be managed so that its harmful side will be minimized and controlled. The major significance of this study is that capital markets, investment firms, governments, other regulatory bodies, agencies, commissions and the public understand the nexus between green bonds and firm's financial performance as well as the role of interest rate in this relationship. Based on the results obtained and the test of the hypotheses, the following recommendations were proposed to address green bonds in Kenya.

5.4.1 Managerial Recommendation

The results demonstrate the need for a green bond policy to be entrenched in the management of investment firm's growth strategy by the capital markets in Kenya. The capital markets should take a deliberate move to ensure that there is adequate internal capacity both in the National Treasury and the Central Bank of Kenya, specifically to manage green bonds investments for an ecofriendly environment. The findings of this study demonstrate that an inclusive selection of green bonds in the investment portfolio and its management is critical in enhancing firm's financial positions in Kenya. The study recommends that green bonds should be carefully managed and evaluation of green bond to be included in the portfolio's investment to be carefully selected for inclusion in the firm's investment plan. This will create an inherent investments appraisal and risk analysis culture where financial firms in the NSE select the debt instruments which yield greater returns.

It was established that the capital markets have the potential of improving the financial performance of investment firms through green project bonds and the proceed bonds. If well regulated, the green projects bonds and proceed bonds have the potential to increase investment firms' performance. As such, there is need for the capital markets and the government to continuously engage their global trade partners for better trade agreements and enhancement of a good investment climate abroad for its local investors.

5.4.2 Policy Recommendations

The results of this study have clear policy implications. It has been established in this study that the green bonds proxies jointly did not significantly affect investment firm's financial position of investment firms listed in the NSE in Kenya during the period of study. Thus, green bonds were found to have affected firm's financial position and the effects were significant. Therefore, there is need for a policy review in the below subsection 5.4.2.1 to 5.4.2.6 to establish independent thresholds that each proxy of green bond should achieve to attain an optimum level.

5.4.2.1 Policy Recommendations on Green Revenue Bonds

The results of this study inform the Capital markets of the need to boost green revenue bonds investments in the banking and investment sector of the NSE by improving public awareness of green revenue bonds. The government through the capital markets Authority should enact policies that give green bonds investor's incentives to encourage them to invest in the offshore market, up to an allowable limit that optimizes the financial

performance. The results further show the need to design and implement green bond policies that will yield long-term benefits to Kenya's capital markets. However, the new policies must be accompanied by measures to prevent a new cycle of green washing that would lead to mislabeling of a bond. This will require substantial reforms on the part of the capital markets National Treasury and the investors to promote environmentally friendly investments.

In their objectives to improve firm's financial position, the Capital Markets Authority should strengthen the existing green bond principles by providing incentives which would boost investor's preference of green bonds. To reap maximum benefits of this policy, it should be designed in line with the Green Bond Standards such as the Climate Bonds Standard, Government policies and guidelines such as the Kenya National Policy on Climate Change and Green Economy Strategy under Africa's Agenda 2063, which seeks to develop policy, legal, regulatory and institutional frameworks for a green economy. This will enable the government to achieve its Big Four Agenda and achieve its Vision 2030 of a green economy Through the capital markets.

For transparency purposes, the government through the capital should enact a strict policy that ensures full disclosure of all green revenue bonds invested by adopting Africa's 2063 Agenda eight which requires that all Member States adhere to new areas of statistical development such as big data, data revolution, and Statistical Data and Metadata eXchange (SDMX). The success of this digital data would help to reduce unsubstantiated

claim to deceive investors into believing that a company's products are environmentally friendly.

5.4.2.2 Policy Recommendations on Green Project Bonds on Firms Financial Performance

The findings of this study imply that the current green bond policy in Kenya is well structured as the capital markets service has not compromised firm's financial position of investment firms in Kenya. This study recommends that the capital markets stick to its current green bond policy on green project bonds and continue to abide by the international standards on green investments and put more efforts to educate investors on green revenue bonds investments. This is a strong assessment of organizations strength and quality of Kenya's green bonds policies in the economy. The study also recommends that there is need to design and implement green bond policies that will yield long-term benefits to Kenya's capital markets.

To achieve this, the policy must well be guided by statistical data. Further, the capital markets should design a policy that will link its financial markets globally to create more low risk investment opportunities and guarantee the safety of investors' funds. The government should therefore seek to make the Kenya's foreign market investments robust by implementing Africa's Agenda 2063 on opening up trade partnerships with the global market through the Sustainable Development Goals. This would integrate the domestic capital markets with the global capital market and make Kenya edge closer towards the realization of the annual 10% GDP growth rate under the Vision 2030 framework.

5.4.2.3 Policy Recommendations on Securitized Bonds on Firms Financial Performance

The findings of this study acknowledge the need for the amendment of the Kenya green bonds Investment Act of 2008 which currently deals with inclusion of environmentally friendly projects. Kenya has not had a policy to govern securitized bonds over the years. The new investment policy drafted in June 2019 largely details securitized bonds as well as all other green investments that has not been enacted into law. This study recommends an enhancement of the Kenya Investment Policy to include strategies that will promote securitized bonds which are missing in the Kenya green bonds Investment Act as well as the new draft report of 2019. The study further recommends an overhaul of the Kenya green bonds Investment Policy, to set parameters that would achieve equilibrium on the volume of securitized bonds inclusion in the investment portfolio to optimize firms' financial performance.

In the same breath, this study recommends that the National Treasury of Kenya, which is mandated to formulate, implement and monitor macro-economic policies, to enact policies that ensures all local investors wishing to or are investing abroad are recognized by being registered members of an accredited centralized investment body (National Council of Law Reporting, 2010, the Public Management Act 2012 and the Executive Order No.2/2013). This investment should be made to strengthen preventive measure of uncontrolled green bonds investments. Keeping accurate digital data for all such outward foreign direct investors through a registered professional governing body would harness

and strengthen the digital technologies for financial inclusion in Kenya, and efficiently regulate the number and levels of outward foreign direct investments in the country.

The creation of green bonds investor's data would also contribute to the realization of Africa 2063 Agenda and the 17th Sustainable Development Goal which seeks to strengthen means of implementation and revitalize the global partnership for sustainable development by creating a sustainable, world-class technology hub to create the foundation for a knowledge-based economy. This is also well reflected in the Big Four Agenda as well as the Kenya Vision 2030 which recognizes the central role played by the global trade to Kenya.

To achieve this, the National Treasury through the Capital markets Authority should also implement Africa's Agenda 8 which requires that all Member States adhere to new areas of statistical development such as big data, data revolution, and Statistical Data and Metadata eXchange (SDMX). The success of this digital data will be key in the implementation of the outward foreign direct investments policy and ensure tight controls by the proposed governing professional body as well as the government in its dual role of regulating outward foreign direct investments as well as effecting knowledge-based policies through these structures. Further, this regulation would ensure that investors adhere to business ethics as those who don't play by the rules would automatically risk de-registration.

5.4.2.4 Policy Recommendations on Proceed Bonds on Firms Financial Performance

The findings of this study inform the Capital markets of the need to invest in proceed in the banking and investment sector. The governments through the capital markets Authority should enact policies that give proceed bonds investor's incentives to encourage them to invest in the offshore international markets up to an allowable limit that optimizes the financial performance.

To achieve this, a data-based plan as envisioned in Africa's 2063 Agenda is imminent in keeping track of the number of investment Multinational Corporations' available in country, their revenue base, source of funds and their audited financial statements. This will help the capital markets to identify the extent to which proceed bonds should be invested to enable firms to improve their financial position. This would go a long way in strengthening policy guidelines and achieve an improved firm's financial performance. This data would also assist the government in making informed policy decisions on how to green the economy and achieve the Vision 2030's economic pillar of a 10% GDP growth.

5.4.2.5 Policy Recommendations on Green bonds on Firms Financial Performance

The study recommends the establishment of a green bond mix policy in Kenya, which clearly shows the acceptable and allowable mix of green bonds proxies: green revenue bonds, green project bonds, securitized bonds, proceed bonds and interest rate that stimulates firms' financial performance in the modern globalized economy. A policy that

demonstrates the optimal mix of green bonds proxies would yield improved firms' financial performance. This will put Kenya on the path to the attainment of its Vision 2030's economic framework. In particular, the proposed green bond mix policy should demonstrate the optimal ratio of green revenue bonds to firms financial performance, the upper and lower limits on green project bonds, securitized bonds and proceed bonds as well as interest rate in relation to return on equity that accelerates firms financial performance.

5.4.2.6 Policy Recommendations on the Moderating Role of Interest Rate

The study recommends the need for policy makers to shift focus from the generic means of boosting firm's financial performance from the equity side only and also consider debt and particularly green bonds. It is evident that green bonds triggers interest rate volatility which plays a key role on the firm's financial performance. Thus, green bonds and interest rates management ought to take the center stage of the capital markets debate to spur firm's financial performance. As such, the design of a new policy that focuses on regulating interest rate, by identifying the optimal mix of the forms of green bonds that would stimulate firm's financial performance is imminent. To achieve this, the adoption of Africa's 2063 Agenda eight on adherence to new guidelines of statistical data revolution is a relevant and key resource to firm's financial performance.

5.5 Contributions of this Study

This study has brought to the fore front the effect of green bonds and their influence on financial performance of banks and investment firms listed in the Nairobi Securities Exchange (NSE) in Kenya, in the era of increased financial globalization. The study established that there was a positive relationship between green bonds and financial performance of banks and investment firms listed in the NSE, and the effects were significant. This study calls for increased attention and deliberate effort by the government through the capital markets to put more effort into enlightening the public on green bonds investments and their environmental impact. Empirically, there are studies done on challenges facing the development of green bonds on the Nairobi Securities Exchange in Kenya and others on effects of bond issuance on financial performance in the Sub-Saharan Africa and the Northern-African region, but there was the need to investigate further on the effect green bonds and financial performance of banks and investment firm's listed in the Nairobi Securities Exchange (NSE) in Kenya, as well as the moderating role of interest rate in this relationship, as Kenya moves towards a more globalized economy.

The distinguishing feature of this study from other literature on the Sub-Saharan Africa region is that the study intensively analyses specific green bonds which are supposed to go exclusively toward funding green activities and projects. Additionally, the empirical literature on Sub Saharan Africa by Nkwede (2020), Oello (2016) and Nzau et al. (2019) concentrated more on challenges facing the development of green bond market and did not concentrate keenly on their effect on financial performance in their respective

countries. This study adds to the finance literature by the adoption of the effect green bonds on financial performance of banks and investment firms listed in the NSE in Kenya, as well as the moderating role of interest rate in this relationship.

This study extends the borderline of existing knowledge in the areas of green finance. It also fills pertinent gaps in existing literature by linking green bonds to firm's financial performance with interest rate moderating this relationship. This study therefore has added value to the body of knowledge by demonstrating that not all green bonds negatively affect firm's financial position. In specific instances green project bonds, green revenue bonds and proceed bonds positively improves firm's financial position.

5.6 Areas for Further Studies

The findings of this study set a ground for further research in several areas. First, the model's R-squared was 12.48% which demonstrated that the four proxies of green bonds explained the changes in firm's financial, performance by approximately 12.48% in Kenya during the period of study. Investments in green bonds are multiple and thus one study is not enough is not enough to capture all green bonds issued in the country. As such, more vigorous academic inquiry is invited to make more informed conclusions on the effect green bonds on financial performance of banks and investment firms listed in the NSE in Kenya. Further, more studies need to be undertaken with researchers extending the scope to more sub-variables to make more informed conclusions.

Secondly, the findings of this study demonstrated that green bonds did not lead to a decrease of firm's financial performance. This demonstrated that at times, higher investments my boost firm's financial performance. The findings of this study invite more academic studies that can contribute to the establishment of an accurate mix of green bonds proxies that are critical to accelerate firm's financial position in Kenya.

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APPENDICES

Appendix 1: Letter of Introduction

To……

Dear Sir/Madam,

RE: COLLECTION OF SECONDARY RESEARCH DATA

I am Philip Mathenge Ngunjiri a PhD student in Finance at Kenya Methodist University. Currently, I' am carrying out a research entitled ***"The relationship between green bonds and the financial performance of investment firm's listed in the NSE"***. I am in the process of gathering relevant data for this study. Your organization has been identified as one of the respondents in this study.

I therefore kindly request you to take some time to assist me with the requisitioned data. I wish to assure you that the data availed through electronic means or otherwise will be treated with confidentiality and will be used solely for academic purpose of this study.

I thank you in advance for your time and responses. It will be appreciated if you can avail the data at the earliest to enable early finalization of the study.

Yours Sincerely,

Philip Ngunjiri

Appendix II: Letter of Authorization

The Manager

……..

NAIROBI

Dear Sir/Madam,

RE: ACADEMIC RESEARCH

I am a student at Kenya Methodist University pursuing PhD in Finance. I am required to undertake a thesis entitled ***"The relationship between green bonds and the financial performance of investment firm's listed in the NSE"*** in partial fulfillment for the award of the doctoral degree. I am kindly requesting for your assistance in making my research a success by granting permission to collect relevant data of your organization from your heads of research, finance and risk departments. I want to assure your office that all the data collected will be treated with utmost confidentiality and will be used exclusively for the purposes of this academic research.

I am looking forward to your kind consideration.

Phillip Ngunjiri

REPUBLIC OF KENYA

Appendix III: Study Work Plan 2017-2018

NATIONAL COMMISSION
SCIENCE,TECHNOLOGY & INNOVATION

FOR

Ref No: 711926

Date of Issue: 11/September/2019

RESEARCH LICENSE

This is to Certify that Mr..Philip Ngunjiri of Kenya Methodist University, has been licensed to conduct research in Baringo, Bomet, Bungoma, Busia, Elgeyo-Marakwet, Embu, Garissa, Homabay, Isiolo, Kajiado, Kakamega, Kericho, Kiambu, Kilifi, Kirinyaga, Kisii, Kisumu, Kitui, Kwale, Laikipia, Lamu, Machakos, Makueni, Mandera, Marsabit, Meru, Migori, Mombasa, Muranga, Nairobi, Nakuru, Nandi, Narok, Nyamira, Nyandarua, Nyeri, Samburu, Siaya, Taita-Taveta, Tanariver, Tharaka-Nithi, Transnzoia, Turkana, Uasin-Gishu, Vihiga, Wajir, Westpokot on the topic: THE INFLUENCE OF GREEN BONDS ON BANKING AND INVESTMENTS FIRMS LISTEDIN THE NAIROBI SECURITIES EXCHANGE IN KENYA for the period ending :11/September/2020.

License No: NACOSTI/P/19/1499

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Director General

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Appendix V: Institutions with the required data

1. Capital Markets Authority (CMA)
2. Central Bank of Kenya
3. Kenya National Bureau of Statistics

Appendix VI: Secondary Data Collection Tools (Unclassified)

1. Financial Performance

DATA COLLECTION TOOL - FINANCIAL PERFORMANCE															
YEAR	ROA_CI	ROE_CI	ROI_CI	ROA_HA	ROE_HA	ROI_HA	ROA_KV	ROE_KV	ROI_KV	ROA_OCH	ROE_OCH	ROI_OCH	ROA_KV	ROE_KV	ROI_KV
2012															
2013															
2014															
2015															
2016															
2017															
2018															
2019															

2. Green Revenue Bonds

DATA COLLECTION TOOL - GREEN REVENUE BONDS															
YEAR	IDRB_CI	PAB_CI	HA_CI	IDRB_HA	PAB_HA	HA_HA	IDRB_KV	PAB_KV	HA_KV	IDRB_OCH	PAB_OCH	HA_OCH	IDRB_KV	PAB_KV	HA_KV
2012															
2013															
2014															
2015															
2016															
2017															
2018															
2019															

3. Green proceed bonds

DATA COLLECTION TOOL - GREEN PROCEED BONDS															
YEAR	RDB_CI	EB_CI	IB_CI	RDB_HA	EB_HA	IB_HA	RDB_KV	EB_KV	IB_KV	RDB_OCH	EB_OCH	IB_OCH	RDB_KV	EB_KV	IB_KV
2012															
2013															
2014															
2015															
2016															
2017															
2018															
2019															

4. Securitized bonds

DATA COLLECTION TOOL - SECURITIZED BONDS															
YEAR	MBS_CI	ABS_CI	CFCD_CI	MBS_HA	ABS_HA	CFCD_HA	MBS_KV	ABS_KV	CFCD_KV	MBS_OCH	ABS_OCH	CFCD_OCH	MBS_KV	ABS_KV	CFCD_KV
2012															
2013															
2014															
2015															
2016															
2017															
2018															
2019															

5. Proceed Bonds

DATA COLLECTION TOOL - PROCEED BONDS										
YEAR	CB_CI	MB_CI	CB_HA	MB_HA	CB_KV	MB_KV	CB_OCH	MB_OCH	CB_KV	MB_KV
2012										
2013										
2014										
2015										
2016										
2017										
2018										
2019										

6. Interest Rate

DATA COLLECTION TOOL - PROCEED BONDS										
YEAR	RIR_CI	NIR_CI	RIR_HA	NIR_HA	RIR_KV	NIR_KV	RIR_OCH	NIR_OCH	RIR _KV	NIR_KV
2012										
2013										
2014										
2015										
2016										
2017										
2018										
2019										

Appendix VI: Primary Data Collection Tool (Questionnaire)

Date…….

The Green Bond market has seen exponential growth over the recent years. However, to date there has been limited research carried out on green bonds and their effect on financial performance of investment firm's listed in the Nairobi Securities Exchange (NSE). This study seeks to identify the effects of green bonds on financial performance of firms listed in the Nairobi Securities Exchange in Kenya. A green bond is a bond whose proceeds are used to fund environmentally friendly projects. These bonds are designed to help the environment by directing portions of the capital raised to projects with environmental benefits.

I have had an in-depth review of your audited financial statements and learnt of the usage of bonds to finance your investment projects. As per the guidelines issued by the CMA, the green bond principles stipulates that any bond can be green if its proceeds are used to finance environmental friendly project, and categorizes green bonds in four major components namely; green proceeds bonds, green revenue bonds, green projects bonds and sovereign bond.

By use of this questionnaire, I request that you take time to fill it in, as you participate in building the knowledge on the effects of green bonds to the financial performance of investment firms listed in the Nairobi Securities Exchange (NSE). I confirm that the information given will be treated with uttermost confidentiality and will only be used for the purpose of this study. I look forward to your responses.

Section A : General information

1. Name of the company

   …….

2. Position held

   ☐ Chief executive Officer

   ☐ Chief finance officer

   ☐ Finance Manager

   ☐ Credit officer

3. Gender of the respondent

   ☐ Male

   ☐ Female

4. What types of green bonds does your company invest in?

   ☐ Green Revenue Bonds

   ☐ Green Project Bonds

   ☐ Securitized bonds

   ☐ Proceed Bonds

5. What informs your decision to invest in green bonds?

   ☐ Environmental impact

   ☐

Higher returns

☐ Tax exception incentives

6. Which criteria does your company use to classify a bond as "green" from the following three taxonomies stipulated by the International Capital Markets Association (ICMA) and the Climate Bonds Initiative (CBI)?

☐ The use of the bond issue proceeds.

☐ The process around the evaluation and selection of the assets

☐ The reporting and monitoring on a forward-looking basis of the bonds

☐ A combination of the above three

7. Based on your experience, is the Capital Markets Authority doing enough to promote the use of Green Bonds to finance investments in Kenya?

☐ Yes

☐ No

Section B: Green Revenue Bonds

8. What types of revenue bonds does your company issue

☐ Industrial development revenue bonds

☐ Private Activity Bonds

☐ Housing Authority Bonds

☐

None

9. Among the following green revenue bonds, kindly tick the one which attracts more investors.

☐ Industrial development revenue bonds

☐ Private Activity Bonds

☐ Housing Authority Bonds

10. Which projects were financed through the green revenue bond? Kindly tick in the boxes given below:

Industrial development revenue bond

☐	Manufacturing	Energy efficiency Processes	☐
☐	Energy efficient products	Retail and wholesale	☐
☐	Combined heat and power	Energy efficient appliances	☐

Private Activity Bond

☐	Resource Efficiency	Teleconferencing	☐
☐	Broadband	Power Management	☐

Housing Authority Bond

☐	Residential	Commercial	☐
☐	Products for building carbon efficiency	Retrofit	☐

Section C: Green Project Bonds

11. What types of project bonds does your company issue

☐ ☐

Road development bond Energy bond

☐ Water/Irrigation bond None ☐

12. Kindly tick the bond which have attracted more investors

☐ Road development bond Energy bond ☐

☐ Water/Irrigation bond None ☐

13. Which projects were financed through the green project bond? Kindly tick in the boxes given below:

Road Development Bond

☐ Mass Transit Vehicles ☐

☐ Rail Bus rapid transport ☐

☐ Alternative fuel infrastructure Water-Bourne transport (Floating bridge) ☐

Energy Bond

☐ Solar Geothermal ☐

☐ Wind Hydropower ☐

☐ Energy Distribution and Management Bio Energy ☐

Water/Irrigation Bond

☐ Built (grey) Infrastructure Dam Construction ☐

☐ Green and Hybrid infrastructure

Section D: Securitized Bonds

14. What types of Securitized bonds does your company issue

☐ ☐

Mortgage backed securities Asset based Securities

☐ Cash flow collaterized debt None ☐

15. Kindly tick the bond which have attracted more investors

☐ Mortgage backed securities Asset based Securities ☐

☐ Cash flow collaterized debt None ☐

Section E: Proceed Bonds

16. What types of Proceed bonds does your company issue

☐ Corporate Bonds Municipal bonds ☐

☐ None

17. Kindly tick the bond which have attracted more investors

☐ Corporate Bonds Municipal bonds ☐

☐ None

18. Does your company follow the green bond policies when issuing the above bonds?

☐ Yes No ☐

Financial Performance

19. Which key performance ratio (KPI) does your firm use in analyzing bonds for decision

making?

☐ Return on equity (ROE) Return on assets (ROA) ☐

☐ Return on Investment Total Return (TR) ☐

Kindly give a reason for the above choice

……

……

……

20. Do the green bonds hit the required rate of return of your company?

☐ Yes No

Appendix VII: Return on Equity Ratios

YEAR	ROE_CI	ROE_HA	ROE_TC	ROE_ABSA	ROE_KCB	ROE_BK	ROE_DTB
2012	0.236	0	0.111	0.189	0.25	0.258	0.3138
2013	0.0961	0.0332	0.081	0.222	0.24	0.244	0.2998
2014	0.133	-0.1018	0.06	0.229	0.237	0.204	0.228
2015	-0.14	-0.824	0.09	0.217	0.216	0.187	0.209
2016	-0.108	0.0454	0.089	0.2	0.244	0.191	0.19
2017	-0.4633	-0.2086	0.084	0.202	0.195	0.144	0.129
2018	-0.329	-0.1723	0.12	0.172	0.195	0.1311	0.139
2019	-0.4579	0.104	0.08	0.18	0.207	0.1206	0.126
YEAR	**ROE_HF**	**ROE_STANBIC**	**ROE_IM**	**ROE_COOP**	**ROE_EQUITY**	**ROE_NBK**	**ROE_NCBA**
2012	0.063	0.1684	0.2792	0.331	0.3764	0.1098	0.1098
2013	0.15	0.2228	0.3232	0.3	0.3597	0.1524	0.1524
2014	0.115	0.2774	0.3174	0.2	0.297	0.1989	0.072
2015	0.063	0.2505	0.3211	0.25	0.255	-0.1482	-0.099
2016	0.0327	0.1996	0.332	0.226	0.237	0.0116	0.017
2017	0.0197	0.1257	0.2866	0.174	0.216	0.1085	0.136
2018	-0.055	0.143	0.172	0.183	0.212	0.12	0.137
2019	-0.008	0.158	0.159	0.181	0.221	0.15	0.153

Source: Audited financial reports (2012-2019)

Appendix VIII: Return on Assets ratios

YEAR	ROA_CI	ROA_HA	ROA_TC	ROA_ABSA	ROA_KCB	ROA_BK
2012	0.0186	0	0	0.0704	0.0468	0.028
2013	0.021	0.0207	0.0003	0.0539	0.0515	0.041
2014	0.026	-0.024	-0.0012	0.039	0.038	0.0431
2015	0.0153	-0.103	-0.0011	0.036	0.037	0.0364
2016	0.0582	-0.043	-0.0046	0.029	0.035	0.0096
2017	0.0551	-0.043	-0.0023	0.027	0.032	-0.0196
2018	-0.012	-0.077	-0.003	0.027	0.036	0.023
2019	0.0257	-0.201	0.001	0.024	0.039	0.024

	ROA_STANBIC	ROA_IM	ROA_COOP	ROA_EQUITY	ROA_NBK	ROA_NCBA
2012	0.032	0.0478	0.0497	0.0716	0.0172	0.0366
2013	0.04	0.0514	0.047	0.0684	0.0196	0.0233
2014	0.0431	0.0466	0.031	0.055	0.0106	0.0186
2015	0.0356	0.053	0.037	0.045	-0.0131	0.0241
2016	0.0295	0.0504	0.034	0.039	0.0007	0.0154
2017	0.0217	0.0412	0.031	0.038	0.0071	0.0153
2018	0.023	0.03	0.032	0.036	0.0107	0.0178
2019	0.024	0.026	0.031	0.037	0.0106	0.022

Source: Audited financial reports (2012-2019)

Appendix VIIX: Interest Rates

YEAR	IR_CI	IR_HA	IR_TC	IR_ABSA	IR_KCB	IR_BK	IR_DTB
2012	0.0135	0	0	0.11	0.097	0.121	0.0928
2013	0.1275	0	0.085	0.106	0.1021	0.061	0.101
2014	0.135	0.14	0.085	0.092	0.1089	0.059	0.1
2015	0.1275	0.17	0.102	0.094	0.1067	0.044	0.15
2016	0.135	0.17	0.08	0.1	0.1292	0.096	0.15
2017	0.135	0.17	0.08	0.0925	0.1717	0.096	0.1
2018	0.102	0.139	0.086	0.106	0.151	0.124	0.11
2019	0.086	0.144	0.09	0.102	0.105	0.072	0.1
YEAR	**IR_HF**	**IR_STANBIC**	**IR_IM**	**IR_COOP**	**IR_EQUITY**	**IR_NBK**	**IR_NCBA**
2012	0	0.1219	0.1469	0.098	0.1109	0	0
2013	0	0.1426	0.1435	0.092	0.12	0	0.089
2014	0.1207	0.1316	0.1089	0.114	0.1109	0.111	0.101
2015	0.1208	0.1231	0.1067	0.114	0.1169	0.102	0.12
2016	0.1165	0.1212	0.127	0.112	0.1312	0.1202	0.111
2017	0.1192	0.1134	0.155	0.116	0.1102	0.1054	0.089
2018	0.1199	0.1245	0.135	0.138	0.0926	0.12	0.098
2019	0.13333	0.1314	0	0.157	0.0989	0.1053	0.067

Source: Audited financial reports (2012-2019)

Appendix VX: Green Revenue Bonds

YEAR	GRB_CI	GRB_HA	GRB_TC	GRB_ABSA	GRB_KCB	GRB_BK	GRB_DTB
2012	108,561,900	-	-	3,642,244,000	1,695,431,360	799,081,000	2,273,760,000
2013	220,650,240	-	81,108,100	192,520,000	5,303,612,000	216,760,000	1,183,909,000
2014	89,234,000	56,031,660	375,093,400	1,618,310,000	7,721,132,972	259,760,000	1,561,779,000
2015	58,138,900	40,142,800	770,910,100	561,430,000	5,107,831,000	408,440,000	2,189,362,000
2016	119,736,400	52,911,900	88,730,000	1,882,610,000	9,028,937,000	556,739,000	85,415,000
2017	27,233,400	48,161,900	177,263,000	3,323,870,000	9,433,618,000	1,937,819,000	585,000
2018	331,157,500	59,046,600	196,135,000	5,184,550,000	12,491,049,000	1,680,043,000	307,491,000
2019	500,321,600	50,858,300	199,706,000	23,157,619,000	10,601,942,000	4,712,185,000	51,711,000
YEAR	**GRB_HF**	**GRB_STANBIC**	**GRB_IM**	**GRB_COOP**	**GRB_EQUITY**	**GRB_NBK**	**GRB_NCBA**
2012	-	121,680,000	169,060,000	1,104,801,000	156,214,000	-	436,395,900
2013	-	106,400,000	129,923,000	1,157,152,000	116,810,000	-	250,710,000
2014	62,900,000	-	86,831,000	1,052,672,000	118,350,800	51,970,000	250,021,000
2015	692,570,000	1,876,000	71,078,000	1,002,669,000	177,619,000	61,910,000	248,220,000
2016	1,759,978,000	-	73,430,000	901,024,000	178,989,000	1,688,513,000	256,510,000
2017	571,831,000	181,510,000	73,117,000	808,234,000	171,921,000	1,271,543,000	383,147,000
2018	1,380,060,000	184,660,000	73,849,000	593,215,000	57,091,000	36,961,000	311,984,000
2019	1,402,100,000	252,676,000	-	622,417,000	65,187,000	24,561,000	325,969,000

Source: Audited financial reports (2012-2019)

Appendix VXI: Green Proceed Bonds

YEAR	GPB_CI	GPB_HA	GPB_TC	GPB_ABS	GPB_KCB	GPB_BK	GPB_DTB
2012	89,770,000	-	-	2,181,550,000	4,904,548,000	362,820,000	1,292,339,0
2013	180,791,200	-	69,748,000	119,519,000	8,532,888,000	155,660,000	1,090,939,0
2014	77,761,300	48,874,350	475,570,000	1,360,460,000	9,458,690,000	228,777,000	1,458,429,0
2015	82,658,600	57,690,000	456,930,000	231,100,000	9,094,526,890	268,870,000	1,504,990,0
2016	125,604,600	51,563,000	90,072,000	1,510,057,000	10,793,718,000	471,020,000	58,091,000
2017	53,566,000	56,890,000	119,384,000	3,619,799,000	10,944,425,000	1,278,592,000	602,784
2018	1,336,889,500	72,420,000	128,896,000	4,633,799,000	13,122,379,120	1,322,651,000	9,670,000
2019	380,096,300	58,040,000	126,037,000	13,989,647,000	8,299,375,890	1,896,641,000	20,079,000
YEAR	**GPB_HF**	**GPB_STANBIC**	**GPB_IM**	**GPB_COOP**	**GPB_EQUITY**	**GPB_NBK**	**GPB_NCB**
2012	-	106,158,000	164,623,000	930,814,000	159,969,000	-	440,800,00
2013	-	102,820,000	125,971,000	1,084,454,000	79,940,000	-	254,020,00
2014	48,841,000	-	85,421,000	1,092,140,000	104,700,000	48,420,000	345,050,00
2015	421,331,000	822,000	72,551,000	777,461,000	188,535,000	63,530,000	336,201,00
2016	877,191,000	-	47,918,000	732,168,000	170,113,000	1,231,128,000	363,108,00
2017	366,758,000	143,992,000	69,400,000	716,966,000	173,431,000	1,322,622,000	312,116,00
2018	907,570,000	182,320,000	68,367,000	606,849,087	62,062,000	26,872,000	328,476,00
2019	931,338,000	156,399,000	156,399,000	557,338,000	59,000,000	34,251,000	894,781,00

Source: Audited financial reports (2012-2019)

Appendix VXII: Securitized Bonds

YEAR	SB_CI	SB_HA	SB_TC	SB_ABS	SB_KCB	SB_BK	SB_DTB
2012	97,340,456	-	-	3,231,650,000	1,008,872,000	118,576,000	1,720,136,000
2013	244,671,065	-	83,698,000	197,730,000	3,938,713,000	228,802,000	1,444,871,000
2014	100,702,817	62,587,000	448,929,000	1,144,738,000	4,537,318,100	247,579,000	1,600,969,000
2015	79,814,713	83,804,456	536,988,000	467,350,270	7,541,338,000	381,730,000	1,828,352,000
2016	217,232,180	82,360,200	102,972,000	1,152,890,000	8,879,303,000	422,202,000	49,381,000
2017	33,690,456	72,471,200	120,789,000	5,448,895,999	12,081,539,000	1,348,109,000	98,999,000
2018	783,952,431	79,283,861	117,338,000	3,869,870,000	13,554,768,000	1,469,961,000	11,133,800
2019	310,253,856	76,464,001	127,886,000	15,299,526,000	8,911,100,000	2,905,980,871	41,660,000
YEAR	**SB_HF**	**SB_STANBIC**	**SB_IM**	**SB_COOP**	**SB_EQUITY**	**SB_NBK**	**SB_NCBA**
2012	-	92,518,000	155,823,000	852,040,000	164,471,000	-	444,690,000
2013	-	105,670,000	91,920,000	1,019,002,000	97,116,000	-	320,090,000
2014	60,660,000	-	82,761,000	1,076,482,000	109,862,000	51,400,000	246,790,000
2015	371,930,000	340,000	62,425,000	552,451,000	178,160,000	63,320,000	250,090,000
2016	454,747,000	-	68,239,000	840,079,000	163,490,000	1,378,532,000	258,867,000
2017	381,330,000	195,850,000	71,534,000	738,350,000	178,362,000	1,202,430,000	301,773,000
2018	377,992,000	153,350,000	76,382,000	518,052,000	58,631,000	22,042,000	302,417,000
2019	812,517,000	172,059,000	-	501,799,000	64,610,000	31,930,000	250,788,000

Source: Audited financial reports (2012-2019)

Appendix VXIII: Proceed Bonds

YEAR	PB_CI	PB_HA	PB_TC	PB_ABS	PB_KCB	PB_BK	PB_DTB
2012	30,440,000	-	-	1,791,591,000	1,681,859,000	175,810,000	1,091,960,000
2013	163,560,000	-	100,535,000	127,832,000	5,111,613,000	108,300,000	645,089,000
2014	40,915,500	32,670,450	452,473,000	798,000,000	4,410,390,000	354,779,000	1,131,085,000
2015	34,793,000	36,540,000	372,240,000	259,300,000	4,351,450,000	367,167,000	1,444,408,000
2016	55,052,800	38,560,000	188,021,000	721,850,000	7,333,810,000	148,280,000	54,062,000
2017	16,147,900	50,790,000	168,076,000	1,973,836,000	6,998,000,000	955,289,000	399,000
2018	265,910,200	40,290,000	110,915,000	2,734,999,000	7,017,700,000	959,980,000	5,349,980
2019	245,226,800	39,800,000	150,924,000	10,011,079,000	6,427,100,000	619,620,000	26,540,000
YEAR	**PB_HF**	**PB_STANBIC**	**PB_IM**	**PB_COOP**	**PB_EQUITY**	**PB_NBK**	**PB_NCBA**
2012	-	58,569,000	110,804,000	555,441,000	97,040,000	-	288,881,000
2013	-	70,529,000	80,320,000	572,622,000	52,620,000	-	180,047,000
2014	40,680,000	-	55,770,000	768,522,000	61,659,000	32,080,000	187,020,000
2015	231,551,000	790,000	42,770,000	825,649,450	100,758,000	36,110,000	179,810,000
2016	331,110,000	-	47,103,000	423,512,000	110,942,000	865,998,000	176,620,000
2017	218,110,000	66,851,000	43,680,000	640,650,000	136,840,000	672,850,000	351,966,800
2018	252,686,000	104,880,000	44,780,650	357,908,000	37,780,000	23,390,000	190,328,000
2019	269,951,000	114,151,000	-	368,433,000	45,329,000	21,420,000	188,970,000

Source: Audited financial reports (2012-2019)

Appendix VXIII: Study Research Gap

Author	Study Title	Findings	Study Recommendations	Current Study Focus
Gathara, (2019)	Financial structure and financial performance of selected firms listed at Nairobi Securities Exchange, in Kenya	The study found out that the financial structure had a positive and significant effect on firms' financial performance of selected companies listed at NSE, Kenya	The study Focused on only one component of financial structure.	The study focused on green bonds and their relationship with financial performance of banks and investment firms listed in the NSE in Kenya.
Ngugi, S. (2016).	Raising Finance in the Kenyan Bond Market. A Case of Listed Companies on the Nairobi Stock Exchange	The study found out that the investment sector and banking sector should ensure effective information disclosure and formulation and implementation of policies that aims to strengthen the bond market.	The study Focused only on corporate bonds	The study focused on green bonds inclusion and firms' financial performance of selected companies listed at NSE, Kenya
Muriithi (2018)	The Effect of Financing Sources on The Financial Performance of Top 100 Mid-Sized Companies in Kenya	The study found out that the sources of finance had a weak positive effect on the firm's financial performance at a 5% level of significance.	The study recommended that the need for companies to use a mix of financing options to improve firm's financial performance as compared to relying on one form of financing.	The study focused on green bonds inclusion in the mix of financing options to investigate any change in firm's financial position.

Obong'o, E. M., Mutea, F., & Rintari, N. (2020)	The influence of convertible bonds on liquidity growth of commercial banks in Nairobi County Kenya.	The findings of this study indicated statistically significant positive relationship between convertible bonds and liquidity growth of commercial banks in Kenya.	The study recommended that a variety of customized bonds should be issued and public awareness increased in order to improve the financial performance of commercial banks in Kenya.	The study focused on green bonds inclusion and proposing policy recommendations in the Nairobi Securities Exchange
Obur, J., & Anyango, C. (2016)	The moderating effect of interest rates on relationship between foreign exchange rate fluctuation and performance of Nairobi securities exchange market.	The study found out that interest have a have a positive and significant impact on the relationship between foreign exchange rate fluctuation and performance of Nairobi securities exchange	The study recommended that the government through the Capital Markets Authority should formulate policies to govern interest rates since it moderates this relationship.	The study focused on using Interest rate as the moderator
Ngari, B. M. (2018).	The relationship between interest rates spread and the financial performance of commercial banks in Kenya.	The study found out that interest rate had a positive significant impact on the firm's financial position.	The study recommended that the same research should be done in other commercial banks across Africa to check if interest rates will have the same impact.	This study focused on using interest rate as a moderator between green bonds and the financial position of banks and investment companies listed in the NSE
Odalo, K. S., &	The influence of interest rate on the financial	The study found out that there was a positive	The study recommended that the same study	The study focused on using Interest

Achoki, G. (2016)	performance of agricultural firms listed at the Nairobi Securities Exchange	and significant relationship between interest rate and firms financial performance measured by Return on Equity, Return on Assets and Earnings per share.	should be conducted in other companies in Africa to check if interest rate moderates between green bonds and the financial position of banks and investment companies listed in the NSE.	rate as the moderator
Hussain, S. (2020).	Impact of investment decisions and interest rate on firm's financial performance of Fuel and Energy Sector of Pakistan.	The study found out that there is a positive significance between nvestment decisions and interest rate on firm's financial performance of Fuel and Energy Sector listed on Karachi Stock Exchange of Pakistan.	The study recommended that the Pakistan federal government should enact policies which will aim at establishing interest rate for the listed companies in the stock market.	This study focused on using interest rate as a moderator between green bonds and the financial position of banks and investment companies listed in the NSE
Afzal , A., & Rehan2, R. (2018).	Interest Rate and Financial Performance of Banks in Pakistan	The study found out that interest rate negatively affects the profitability of banks	The study recommended that some further studies on debt capital should be conducted to determine their impact on banks profitability.	The study focused on using Interest rate as the moderator
Hyun, S., Nishizawa, T., & Yoshino, N. (2018)	Exploring the utilization of bond fo r infrastructure financing in Asia for the period 1990-2006.	The study found out that local bond markets should play a crucial role in supplementing infrastructure	The study recommended that a tentative proposal of a couple of conceivable variations	The study focused on green bonds inclusion and firms' financial performance of selected

		financing to boost firms' financial performance.	of bond would boost firms' financial performance	companies listed at NSE, Kenya
Mulcahy, C. C., & Guszkowski, T. P. (2017)	Financing of corporate expansion through industrial revenue bonds for the period 2000-2008 in Europe.	The study found out that the financial markets should consider inclusion of industrial revenue bonds in their portfolio	The study recommended that corporations should consider investments in revenue bonds in order to boost firm's financial position.	The study focused on green bonds inclusion and firms' financial performance
Kapinguka (2016)	The Europe 2020 project bond initiative as an alternative to finance infrastructure in Europe for a 15 years period 2000-2015.	The study found out that there is a relationship between financial activities and bond market capitalization.	The study recommended that African governments should put in place policies which will promote the development of the bond market as one of the ways to mobilize domestic resources and boost the capital markets.	The study focused on green bonds inclusion and firms' financial performance
Flammer (2018))	corporates proceed bonds and financial performance in the stock market in USA following the issuance of green bonds for the period 2010 to 2015.	The study found out that the stock market responds positively to the announcement of green bond issues.	The study recommends that more research should be done on green bonds and their financial performance on other stock markets.	The study focused on green bonds inclusion and firms' financial performance
Ngugi (2018)	the drivers for Issuance of proceed bonds by Listed Companies in Kenya 2002-2011.	The study found out that reputation and liquidity incentives	The study recommended that more research should be done on proceed bonds and	The study introduced green bonds inclusion

		influence issuance of proceed bonds.	their financial performance on other stock markets.	
Obong'o, E. M., Mutea, F., & Rintari, N. (2020)	The influence of convertible bonds on liquidity growth of commercial banks in Nairobi County Kenya.	The findings of this study indicated statistically significant positive relationship between convertible bonds and liquidity growth of commercial banks in Kenya.	The study recommended that the government through the Capital Markets Authority should develop policies which promotes markets for bonds in order to boost commercial banks growth.	The study focused on green bonds inclusion and firms' financial performance
Ndirangu (2019)	The causal relationship between firms' financial performance and stock return for firms listed at NSE in Kenya.	The study found out that there is a direct relationship between financial performance and stock returns hence an increase in financial performance of the listed firms increases stock returns of firms listed at the NSE.	The study recommended that the management of firms listed at the NSE should strive to improve the financial performance and develop optimal interest rate policies which maximize the returns of their firms.	The study focused on green bonds inclusion and firms' financial performance
Oello (2016)	the performance of corporate bonds,goverment bonds and equities at the nairobi securities exchangeIn kenya.	The study found out that there was a statistically significant difference between risk on equities and risk	The study recommends that investors in the NSE should largely invest in green bonds and equities to achieve maximum returns.	The study focused on green bonds inclusion and firms' financial performance

		on bonds at the NSE.		
Nzau. Nzau, Kung'u, & Onyuma (2019)	The effect of bond issuance on financial performance of firms listed on NSE In Kenya.	The study found out that about 75.4 percent of variance in financial performance could be explained by bond issuance as characterized by bond price, bonds coupon rate, bond proportion, and bond yield to maturity.	The study concluded that bond issues affected financial performance of listed firms.	The study recommends that the listed firms ought to take into consideration the various aspects of bond issues in order to enhance their financial performance.
Magale (2019)	Challenges facing the development of green bonds on the Nairobi Securities Exchange in Kenya.	The study found out that rating of green bonds was important mostly for international investors and does not hinder floating of green bonds.	The study recommended that Kenya should consider international experts to assist in verifying, rating and reporting on green bonds since Kenya presents future opportunities in providing digital green bonds being a world leader in mobile money market.	The study focused on green bonds inclusion and firms' financial performance

Appendix VXIIV: Test of Normality

	LN_ROE	LN_GPB	LN_GRB	LN_IR	LN_PB	LN_SB
Mean	1.831742	19.57116	19.75388	-2.247572	19.18805	19.60579
Median	-1.658107	19.38133	19.45961	-2.212300	19.02773	19.33368
Maximum	-0.977103	23.36158	23.86559	-1.762007	23.02696	23.45109
Minimum	-4.456750	13.30931	13.27937	-4.305066	12.89672	12.73670
Std. Dev.	0.644170	1.907938	1.821109	0.316945	1.839557	1.759312
Skewness	-1.856798	-0.293444	-0.326895	3.370484	-0.349050	-0.184580
Kurtosis	0.270717	0.046948	0.178275	0.96681	0.229866	1.582848
Jarque-Bera	0.4427	0.281973	0.657837	3.662	1.333017	0.686188
Probability	0.000000	0.000001	0.000002	0.000000	0.000001	0.000002

Sum	-161.1933	1722.262	1738.341	-197.7863	1688.549	1725.309
Sum Sq. Dev.	36.10109	316.6999	288.5301	8.739535	294.4055	269.2806
Observations	88	88	88	88	88	88

Source: Research Data (2021)

Appendix: Panel Estimation Equation- Effects of green bonds on firms financial performance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_GPB	0.225173	0.190053	1.184792	0.0239
LN_GRB	0.169759	0.116553	1.456493	0.0149
LN_IR	-0.353396	0.175498	-2.013669	0.0473
LN_PB	0.061528	0.152561	0.403302	0.0189
LN_SB	-0.189724	0.085631	2.215599	0.0295
C	1.258557	0.931182	-1.351569	0.0180

	Effects Specification	
	S.D.	Rho
Cross-section random	0.580354	0.6526
Idiosyncratic random	0.423475	0.3474

	Weighted Statistics		
R-squared	0.124756	Mean dependent var	0.515716
Adjusted R-squared	0.071387	S.D. dependent var	0.464823
S.E. of regression	0.422532	Sum squared resid	14.63976
F-statistic	2.337632	Durbin-Watson stat	0.431195
Prob(F-statistic)	0.048996		

	Unweighted Statistics		
R-squared	0.090469	Mean dependent var	-1.831742
Sum squared resid	39.36711	Durbin-Watson stat	0.431195

Source: Research Data (2021)

Appendix: Operationalization of Study variables

Variable	**Indicator**	Constructs	**Measurement**	**Empirical Studies**
Financial Performance	Annual growth rate	Return on Equity	Annual percentage change in ROE	Gathara, (2019), Muriithi (2018), Ngugi, S. (2016), Mulcahy, C. C., & Guszkowski, T. P. (2017), Ndirangu (2019)
Green Revenue Bonds	Annual green bonds return	Industrial Development Revenue Bonds Private Activity Bonds Housing Authority Bonds	Annual percentage change of Green Revenue Bonds on ROE	Mulcahy, C. C., & Guszkowski, T. P. (2017)
Green Project Bonds	Annual green project bonds return	Road development bonds(RDB) Energy Bonds (EB) Water/irrigation bond	Annual percentage change of Green Project Bonds on ROE	Hyun, S., Nishizawa, T., & Yoshino, N. (2018), Kapinguka (2016)
Securitized Bonds	Annual green bonds return	Mortgage Backed Securities (MBS) Asset Based Securities (ABS) Cash Flow Collateralized Debt	Annual percentage change of Securitized Bonds on ROE	Obong'o, E. M., Mutea, F., & Rintari, N. (2020), Flammer (2018), Obong'o, E. M., Mutea, F., & Rintari, N. (2020) and Oello (2016).
Proceed Bonds	Annual Proceed Bonds returns	Corporate Bonds Municipal Bonds	Annual percentage change of	Ngugi (2018), Nzau. Nzau, Kung'u, &

			Proceed Bonds on ROE	Onyuma (2019), Magale (2019)
Interest Rate	Annual interest rates in KSH	Weighted Average Interest Rate	Annual interest rates in KSH	Obur, J., & Anyango, C. (2016), Ngari, B. M. (2018), Odalo, K. S., & Achoki, G. (2016), Hussain, S. (2020), Afzal , A., & Rehan2, R. (2018) and Hyun, S., Nishizawa, T., & Yoshino, N. (2018)

APPENDIX: Panel Estimation Equation- Effects of green bonds on firms financial performance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_GPB	0.225173	0.190053	1.184792	0.0239
LN_GRB	0.169759	0.116553	1.456493	0.0149
LN_IR	-0.353396	0.175498	-2.013669	0.0473
LN_PB	0.061528	0.152561	0.403302	0.0189
LN_SB	-0.189724	0.085631	2.215599	0.0295
C	1.258557	0.931182	-1.351569	0.0180

	Effects Specification	
	S.D.	Rho
Cross-section random	0.580354	0.6526
Idiosyncratic random	0.423475	0.3474

	Weighted Statistics		
R-squared	0.124756	Mean dependent var	0.515716
Adjusted R-squared	0.071387	S.D. dependent var	0.464823
S.E. of regression	0.422532	Sum squared resid	14.63976
F-statistic	2.337632	Durbin-Watson stat	0.431195
Prob(F-statistic)	0.048996		

	Unweighted Statistics		
R-squared	-0.090469	Mean dependent var	-1.831742
Sum squared resid	39.36711	Durbin-Watson stat	0.431195

Source: Research Data (2021)

Appendix: Operationalization of Study variables

Variable	**Indicator**	Constructs	**Measurement**	**Empirical Studies**
Financial Performance	Annual growth rate	Return on Equity	Annual percentage change in ROE	Gathara, (2019), Muriithi (2018), Ngugi, S. (2016), Mulcahy, C. C., & Guszkowski, T. P. (2017), Ndirangu (2019)
Green Revenue Bonds	Annual green bonds return	Industrial Development Revenue Bonds Private Activity Bonds Housing Authority Bonds	Annual percentage change of Green Revenue Bonds on ROE	Mulcahy, C. C., & Guszkowski, T. P. (2017)
Green Project Bonds	Annual green project bonds return	Road development bonds(RDB) Energy Bonds (EB) Water/irrigation bond	Annual percentage change of Green Project Bonds on ROE	Hyun, S., Nishizawa, T., & Yoshino, N. (2018), Kapinguka (2016)
Securitized Bonds	Annual green bonds return	Mortgage Backed Securities (MBS) Asset Based Securities (ABS) Cash Flow Collateralized Debt	Annual percentage change of Securitized Bonds on ROE	Obong'o, E. M., Mutea, F., & Rintari, N. (2020), Flammer (2018), Obong'o, E. M., Mutea, F., & Rintari, N. (2020) and Oello (2016).
Proceed Bonds	Annual Proceed Bonds returns	Corporate Bonds Municipal Bonds	Annual percentage change of	Ngugi (2018), Nzau. Nzau, Kung'u, &

			Proceed Bonds on ROE	Onyuma (2019), Magale (2019)
Interest Rate	Annual interest rates in KSH	Weighted Average Interest Rate	Annual interest rates in KSH	Obur, J., & Anyango, C. (2016), Ngari, B. M. (2018), Odalo, K. S., & Achoki, G. (2016), Hussain, S. (2020), Afzal , A., & Rehan2, R. (2018) and Hyun, S., Nishizawa, T., & Yoshino, N. (2018)

APPENDIX VIX: Hausman Test - Panel Regression Equation without Interest Rate

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	2.853536	4	0.5826

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LN_GPB	0.289531	0.261121	0.001855	0.0509
LN_GRB	0.203626	-0.182034	0.000596	0.0376
LN_PB	0.022416	0.027471	0.000758	0.0854
LN_SB	-0.208173	-0.185854	0.000227	0.0138

Source: Research Data (2021)

Appendix: Hausman Test -Panel Regression Equation with Interest Rate

Correlated Random Effects - Hausman Test

Equation: EQ01

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.744258	5	0.7393

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LN_GPB	0.249347	0.225173	0.001921	0.0581
LN_GRB	0.187706	0.169759	0.000591	0.0460
LN_IR	0.359952	0.353396	0.002036	0.0884
LN_PB	0.057776	0.061528	0.000746	0.0890
LN_SB	0.209492	-0.189724	0.000211	0.0173

Appendix: Panel Regression Equation with Interest Rate

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_GPB	0.225173	0.190053	1.184792	0.0295
LN_GRB	0.169759	0.116553	1.456493	0.0149
LN_IR	0.353396	0.175498	2.013669	0.0473
LN_PB	0.061528	0.152561	0.403302	0.0189
LN_SB	-0.189724	0.085631	-2.215599	0.0295
C	1.258557	0.931182	-1.351569	0.0180

Effects Specification

	S.D.	Rho
Cross-section random	0.580354	0.6526
Idiosyncratic random	0.423475	0.3474

Weighted Statistics

R-squared	0.124756	Mean dependent var	0.515716
Adjusted R-squared	0.071387	S.D. dependent var	0.464823
S.E. of regression	0.422532	Sum squared resid	14.63976
F-statistic	2.337632	Durbin-Watson stat	1.159506
Prob(F-statistic)	0.048996		

Unweighted Statistics

R-squared	0.090469	Mean dependent var	-1831742
Sum squared resid	39.36711	Durbin-Watson stat	0.431195

Summary of Hypothesis Testing Results