# Joint Effects of Capital Structure, Interest Rate Sensitivity and Market Value of Non-financial Firms Listed at Nairobi Securities Exchange in Kenya

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## Abstract

This study sought to address the three variable research entitled, "Joint effects of Capital structure, interest rate sensitivity and market value of non-financial firms listed at NSE in Kenya. The research was based on quantitative approach applying panel data collected from NSE with a population of 32 firms culminating to 320 observations over ten years from 2012-2021. A quantile regression model was applied to test the hypothesis, which reported a significant joint effect relationship of capital structure and interest rate sensitivity on firms' market value. Further joint analysis equally confirmed that interest rate and debt capital showed a significant inverse relationship, which confirmed that as interest rate increases, so does the reduction of uptake of debt capital. Finally, the findings could authoritatively be recommended for adoption by stakeholders for making financial management decisions like merger and acquisition, balancing of debt and equity in the capital structure taking into consideration interest rate trends, trading off of debts or investing in new ventures. The result equally can be specifically extended further to; government policymakers, scholars and non-financial sector managers who would find the findings applicable in their areas of specialty besides learning from the challenges addressed.

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# 1. Introduction

## 1.1    Background of the Study

Capital structure, interest rate sensitivity and firms' market value possess interrelationships that guide management towards maximizing shareholders' wealth, in this case, working towards increasing firms' market against invested assets in a market environment characterized by volatile interest rate risk. Capital structure is further broken down to include debt capital, equity capital, and, to some extent, shareholder-own savings, a combination determined by firms' managers in varied ratios based on available investment opportunities and underlying financial risk factors (Modigliani & Miller, 1963). However, balancing off of components of capital structure has been tied to the volatility of prevailing market interest rate as such rates lead managers on whether to prefer more debt to equity, short-term borrowing to long-term borrowing, or to invest or disinvest shareholders' wealth in profitable available investment opportunities. Further, it is argued that demand for finances to satisfy the transitionary or precautionary investments varies from firm to firm, as explained by (Keynes, 1960). Keynes further explains the concept of marginal efficiency of capital that looks into the prevailing terms on how finances are sought for the available opportunity against the demand and supply of such resources.

In liberalized markets like the United States of America, studies confirm that firm managers carefully manage agency conflicts by making informed investment decisions by trying to balance off equity and debt in capital structure, considering interest rate dynamics aimed at improving market value performance (Yustisiana, 2020). However, depending on the nature of the industry and management's appetite for leverage, an additional study article proved that an uncontrolled increase in debt capital in the structure of capital considering interest rate volatility at a specific time might trigger a negative change in the firm's value as a result of an increase in expenses associated with the raising of such debts (Staking & Babbel, 1995). Nadeem and Zongjun (2012) study pointed out that financial managers are key and critically informed decision makers in determining cost cost-effective ratio between borrowings to owners' share capital in a corporation's aggregated capital structure that would guarantee firm's positive market value in that any nontactical financial decisions made by the same managers may lead to detrimental performance.

Kenya has not been an exception equally based on firms' value performance and structure of capital in an interest rate volatile environment, a related study which ended up with a non-absolute confirmation that, indeed, firms' performance portrayed a significant relationship across different sectors (Njoroge, 2013). However, in Africa, financial liberalization and interest rate risk management in sub-Saharan Africa equally had remained a non-concluded challenge since not all countries and structured markets were considered (Willem, 1995). Despite several scholars carrying out research on optimum capital structure and market values, financial managers have never absolutely resolved the puzzle of optimality of

capital structure alongside interest rate risk as an intervening variable factor, a justification for further academic exploration as considered in this study (Brealey & Myers, 1988 & Nejadmalayeri, 2000).

Several theories have been brought up by various scholars trying to explain factors that are key to realizing optimal capital structure, which in turn may lead to maximizing firms' value. To begin with, (Modigliani & Miller, 1963) affirms that the capital structure ratio has an effect on the market value of the firm since tax advantage derived from debt capital reflects higher residual income immediately after paying off debt holders as it is adjusted as an expense in arriving at net operating profit which is finally attributable to shareholders. In a different scenario, the trade-off theory (Fama & French, 1998) explains the importance of firms' value and growth through debt management prudence and the risks of its exposure to the firm upon its excessive use in capital structure composition. A prominent feature considered by the theory states that because of the deductibility of interest rate expense, the thirstier the firm is in raising debt capital, the lower the tax expense up to some extent, and the higher the stock market value upon which a further debt absorption leads to firms incurring losses as a result of inability to cover the cost of excess borrowing.

The scholars argued that as long as debt is prioritized over equity, a firm's value would remain favorable. Myers & Majluf (1984), in their view of the pecking order theory, fairly considers optimality about holistic capital structure as a startup stage but rather argues that firms under the going concern concept empirically consider internal reserves before looking into the slots of both equity and debt in the structure of capital. Under normal circumstances, the scholar confirms that firm managers would prefer debt over equity, which is deemed to be cost-effective under the going concern.

Brealey & Myers (1988) Net operating income theory does not fully concur with the traditional theories and argues that because the firm's market value is pegged on its market risks and net operating income associated with it, the firm's value will always remain the same. Finally, the market-timing theory (Ross, 1977) eluded the fact that profitable stock market value would be determined at a time when management monitors the interest rate dynamics within the trading market and takes precautionary measures by investing or disinvesting in profitable stocks within a reasonable time as the interest rate keeps on changing. Jensen and Meckling (1976), on the contrary, confirm that under agency theory, managers stand a better chance to balance off capital ratio by analyzing prevailing risks as they carry out delegated investment roles on behalf of the shareholders and must ensure that such shareholders' funds are invested on profitable ventures otherwise the managers may risk losing their stewardship assignment when shareholders realize that their interests are not served well. However, the agency's role depends on how effectively shareholders supervise managers.

In line with interest rate theories underpinning this research, in the first place (Keynes, 1960), the liquidity preference theory asserts that consideration of interest rate risk becomes critical under the demand and supply of money in the market. He

argues that at equilibrium, lenders and borrowers, who, in this case, willingly present available financial instruments like stock and bonds in the trading market at a time when the interest rate is favorable, and buyers willingly offer to buy them. Other theories include the loanable fund theory of interest (Knut & Wiksell, 1958), which argues that the market interest rate is determined by the demand and supply for funds available in the market and not the available investment opportunity by potential investors.

His arguments equally apply to stocks and bonds tradable in the financial market. Classical theory (Smith, 1776), though much criticized, is appreciated by this research as key. The theory alludes that interest is the reward for the productive use of capital, which is equal to the marginal productivity of physical capital. Further, it states that "the rate of interest is determined by the supply and demand of capital. The supply of capital is governed by time preference and the demand for capital by the expected productivity of capital. Both time preference and productivity of capital depend upon waiting or saving. Merton (1980) risk-return trade-off theory posits that higher risk must be compensated with higher returns. Interest rate changes are a source of systematic risk, impacting firm valuation and the cost of raising capital. Sensitivity measures the extent to which firms bear interest rate risk and how it translates into expected returns and valuation. Finally, it's worth noting that Interest Rate Risk Management Theories emphasize how firms manage their exposure to interest rate fluctuations through hedging, asset-liability matching, or derivative instruments. Interest rate sensitivity measures how exposed a firm is to rate changes and its risk mitigation effectiveness. Firms with higher sensitivity may experience greater volatility in market value due to inadequate risk management or suboptimal debt structuring.

Non-financial firms, which are firms other than the banking sector and insurance sector listed at NSE, have been identified due to a liberalized trading platform that does not warrant the sector to conform to the Central Bank of Kenya's stringent measures This liberty, therefore, exposes these firms to experience dynamic capital structures access as interest rate fluctuates from time to time. In addition, this sector is of great importance in Kenya as it contributes a lot to the economic growth in terms of GDP, especially towards achieving the long-term vision of industrialization set to be realized by the year 2030. Complimentarily, the sector contributes to economic development through the generation of national wealth, sovereign power, economic growth, international trade and job creation. In line with quality and reliable data, NSE facilitates the provision of secondary financial data that clearly addresses interest rate sensitivity, capital structure, and market values of the trading firms.

Similarly, global effects had been witnessed in the United States of America (NYSE, 2017) where it witnessed an alarming rate of drop of firms from 46 in 2014 to 26 in the succeeding year due to capital structure conditions of the US government a characteristic equally witnessed in Indonesia when the bank of Indonesia was forced to issue an order to guarantee banking sector stock market value stability by issuing a seven days' temporary reverse interest rate to reduce the

risk associated with borrowing at unfavorable annual interest rate (Wulandari & Harjito, 2021).

### 1.1.1   Capital Structure

Myers & Majluf (1984) defines a capital structure to be a financial blend comprising equity capital and debts utilized by firms in financing available investment opportunities geared towards maximizing shareholders' wealth. He further considers managers to be critical in determining the balanced capital structure by weighing off the changes in the interest rate and its effect on debt borrowing alongside returns expected from shareholders, which further determines the stability of the firm's structure of capital, shareholders' confidence, and management tenure. In a different definition, (Copeland & Weston, 1988) explain capital structure as "funds for investment provided to the firm by investors who hold various types of claims on the firm's cash flows."

They continue to say that "shareholders with specific consideration to debt holders are guaranteed fixed interest income against their stake holding before their equity holders' counterparts who are considered in residual income for their returns a factor that clearly determines the ratio within the structure of capital. To some extent, equity shareholders may defer current dividends at the expense of available investment opportunities that are believed to boost their returns on investment because of an increase in market value, hence an additional factor that defines the composition.

Titman and Grinblatt (1989), in a different dimension, highlight their definition, which explains that companies categorize sources of capital structure as either internal or external, where internal sources are finances raised from accumulated earnings, whereas external sources are raised from debt and equity financiers, respectively.

However, separate from the definitions highlighted, (Saad, 2010) showed that a well-balanced capital structure enables the financing of investments via debt financing, equity financing, or a combination of the two, which ultimately determines the firm's value. Finally, in determining the clear distinction of a firm's characteristics, a firm that has only "equity capital," which is the only financing avenue, is referred to as an unlevered firm, whereas the one financed by the aggregate of equity and debt capital is referred to as a levered firm. Such choices are unique and vary from one firm to the other, considering their level of growth, size, and available investment opportunities (Ahmadpour & Yahyazadehfar, 2010). As a major variable in line with the adopted definition by (Mayers, 1984), a clear and distinctive approach is necessary to measure the components of sources of financing, which include borrowing and shareholders' contributions. In this case, capital structure will be measured using the ratio of total liability over total assets and total equity over total assets. Staking and Babbel (1995) also applied this measurement method in their previous academic research and proved it useful in their findings besides the formula's ability to consider all the structures of capital parameters.

### 1.1.2   Interest Rate Sensitivity

Interest rate sensitivity has been defined by (Macaulay, 1938) and is considered as the degree to which the price or value of a financial instrument, such as bonds, loans, or stocks, are affected by changes in interest rates based on short-term and long-term nature. Long-term is considered to be the applicable interest rate on long-term financial instruments lasting for more than one year, whereas short-term applies to within one year, which includes short-term debts, long-term debts, and payables with embedded costs adjusted against applicable obligations.   Interest rate risks are further considered to fluctuate steadily over a period of time to justify its effect on bonds that would trigger an informed decision by management whether to sell or buy back the market-traded bonds as the value of the firm changes. Further, its concept in finance, according to (Whittaker, 1987), describes how the value of financial instruments responds to changes in interest rates. It plays a critical role in bond pricing, portfolio management, and risk management. Therefore, critical understandability and correct measurement would enable investors and financial managers to make informed investment decisions and effectively manage the risks associated with interest rate fluctuations when determining a balanced capital structure.

Keynes (1960) views market interest rate in purely monetary terms and explains that "it is determined by demand and supply of money in the market," which, according to him, is referred to as the theory of liquidity preference. Further, he asserts that market interest sensitivity guides money holders on whether to consume today or invest for deferred consumption, which he summarized as "transactionary, precautionary, or speculatory." It implies, therefore, that when money holders realize potential positive returns at a particular time, they will transact, giving an opportunity to the levered firm to borrow.

Samuelson (1945) considers interest rate as a return that institutions like banking sectors charge when they advance money to the borrowing sector. When there is an increase in interest rate, banks always realize higher returns, which in turn results in higher stock market value and vice versa. Copeland & Weston (1988) explains that a firms' present or future value is determined at a prevailing interest rate given that firms' risks shall guide management on whether projected cash flows will be favorable considering management's decision to invest because all stock market players determine the sensitivity of interest rate at some time in the market. In a contrary observation, (Yustisiana, 2020) empirically suggests that the decline in the capped interest rate becomes beneficial to the industrial sector together with the construction sector, whose capital structure is dominated by debt. In return, more potential investors become attracted to investment as a result because the higher the security interest rate sensitivity, the greater the price of stock fluctuations in the trading market and vice versa.

Several approaches have been put forward to measure interest rate sensitivity, which includes "Macaulay Duration," which is a measure of the weighted average of time until cash flows are received from bonds over a period of time considering

changes in interest rates. The model helps in understanding the timing of interest rate risk and the impact of traded bonds alongside a firm's bond value. The second model is the "Modified Duration," which adjusts Macaulay Duration to account for changes in interest rates, giving a more direct measure of price sensitivity. Next is the "Convexity account," which accounts for the curvature in the price-yield relationship of a bond. Whereas duration measures the linear relationship, convexity measures the non-linear relationship, providing a more accurate estimation of price changes for large interest rate movements. "Value at Risk" estimates the potential loss in value of a portfolio over a defined period for a given confidence interval, considering changes in interest rates. Last is the Interest Rate Sensitivity Analysis or Scenario Analysis," which involves stressing the portfolio or financial instrument by changing interest rates and observing the impact on the value.

To justify the effect of interest rate sensitivity on debt and equity alongside firms' market value, variables shall be measured using the Macaulay Duration model, applying the "average effective interest rate" on short and long-term borrowing because the two factors portray negligible variation. This measure was considered important as it would help management accurately mitigate financial risks associated with dynamic interest rates that might end up affecting the firm's value if not taken care of. Further, they have been treated as intervening since the changes in interest rates within a period of time are not consistent. For example, it takes several months or a few years before a change in interest rate takes effect. These measurements had been used in the research carried out by other scholars and proven effective (Babbel, 1983), which also considered the characteristics of this research variables in its model, perfectly both in the short- and long-term periods.

### 1.1.3 Market Value

Leland and Toft (1991) describe a firm's market value as the aggregate of assets' value and tax advantage derived from borrowed debt adjusted against applicable bankruptcy costs at a particular time. They elaborated their scholarly argument to include the price that a company stock would be traded on in a competitive market. Scholarly work, as postulated by (Ehrhardt & Bringham, 2003), defines a firm's market value as the total sum of claimants' claims, that is, debt holders' proportion and equity holders' proportion within the capital structure, respectively. An increase in a firm's market value is crucial since it is followed by motivation to invest or not by potential investors. Over time, various investors scavenge, looking into a firm's financial performance information across the available liberalized markets, where potential investors would always be ready to offload or buy stocks from firms that show indications of better investment returns. In this case, firms characterized by negative stock values tend to have shareholders switching to more prospective firms with the certainty of better positive returns on investment.

Nassar (2016) states that the "measure of a firm's market value can be derived by applying one amongst the stated measurement techniques that include returns on

invested equity, returns on investment, EPS alongside market capitalization." These techniques are very critical, and financial decision-makers should be aware of their individual outcome before making informed investment decisions that would guarantee higher firm value. Specifically, monitoring a firm's value would help managers track the trend of firm performance in line with profitability, growth potential, and risk preparedness. This positions managers early enough to make management strategic decisions, e.g., merger or acquisition decisions, besides working towards shareholders' interests. A good measure will also inform investors in making informed decisions associated with bond pricing, risk mitigation, perception, and assessment of the attractiveness of varied sectors' bond values. This research will, therefore, adopt market capitalization (Current market price per share times total number of outstanding shares) as a measure of firms 'market value.

### 1.1.4   Non-Financial Firms Listed at Nairobi Securities Exchange

Nairobi Securities Exchange has been identified as one of the institutions legally mandated to facilitate stock trading and regulation of the same in Kenya. It was incorporated under the Societies Act in 1954 to mean "Voluntary Association of Stockbrokers" (NSE, 2021). It is currently mandated to facilitate trading platforms dealing with equity, bonds, and quasi-equity with a population of sixty-three listed companies categorized in fourteen sectors. Due to its organization, NSE will make it possible to access data related to interest rates, structure of capital, and identified firms' market values because of guarantees on data validity and reliability. The listed firms meant for this research shall exclude the insurance (6) and banking (12) sectors, leaving this research to focus on the outstanding forty-five, herein referred to as non-financial firms (NSE, 2021). Further breakdown lists these firms into nine sectors, namely: agricultural, automobile and accessories, commercial and services, construction and allied, energy and petroleum, investment services, manufacturing and allied, telecommunications and technology, and real estate

This sector has been identified due to the liberalized trading platform, which means that their capital structure does not need to conform to the Central Bank of Kenya's stringent measures. This liberty, therefore, exposes these firms to experience dynamic capital structures as interest rate fluctuates. In addition, this sector is of great importance in the Kenyan context because it has a lot to contribute to the economy, especially towards achieving the long-term vision of industrialization objectives by the year 2030, facilitates economic development through the generation of national wealth, sovereign power, economic growth, international trade and finally contribution to job creation. The market contributes a lot in educating members of the public on investment considerations, regulating companies, providing market reports, which is very important for this research, and finally, providing financial solutions to common problems through trading in shares and bonds.

Finally, there has been a decline in registered non-financial institutions in NSE due to financial management challenges majorly emanating from mismanagement of

capital structure, poor management of interest rate changes, and unsound financial management that led to insufficient market capitalization and unfavorable business environment, which led to low stock value from 2012 to 2021. As a result, a number of firms faced the CMA axe and became delisted, e.g., Marshals East Africa Limited, A. Baumans, and Hatchings Biemer. In addition, among the list of suspended firms are Uchumi Supermarket Limited, ARM Cement Co. Ltd, and Mumias Sugar Company KQ, among others (CMA, 2020). These scenarios have shown a detrimental performance of the Kenyan economy despite being tagged as the major contributors to the economy, as discussed earlier.

## 1.2    Research Problem

A three-variable perspective (Staking & Babbel, 1995) found that the management of capital structure composition is associated with firms' market value and interest rate risks as a moderator. They found out that as interest rate risks increased, so did the immediate reduction in equity market value. Further (Admati et. al., 2018), the "Leverage ratchet effect" tested the agility and pervasiveness of shareholders' appetite towards balancing debt over equity in the capital structure and found that when leverage was adjusted against interest rate sensitivity, pure recapitalization that involved selling and buying of debt and equity in a liberalized market could guarantee the stability of firms' value. Bhattacharya (1988) explains that inflation, leverage, and stock market variations react in a contrasting manner, in that markets where stocks were traded revealed that defaultless, risk-free debts of a long-term nature were not affected as a result of an increase in interest rates while the same was witnessed in markets with shocks on capital structure as they kept posting average incomes as he reviewed a two variables study, "capital structure and interest rate" of "legacy of Miller and Modigliani." (Yustisiana, 2020) study using two variables as well indicated that, "benchmark interest rate had a negative relationship with the stock market value of the construction listed firms." His article showed that if interest rates become sensitive, for example, increases, then the market stock prices would fall and vice versa, leading to dilution of firms' market value. In (Gordon & Shoven, 1982) looked into unexpected changes in interest rates, where they found that unexpected increases in interest rates could affect bond market prices, specifically bonds of a long-term nature. Additionally, (Ju & Yang, 2006) found that at a constant rate of interest rate, there was an effect on both optimal leverage and optimal debt maturity. Willem (1995) equally, looking into sub-Saharan African financial liberations using interest rate risk as an independent and not intervening variable, reported a positive relationship.

Kenyan perspective has seen several types of research undertaken related to this research, though they may not depict the specific variable as described herein. Ongweso (2003), applying two variables in the banking sector, researched on "interest rate and non-performing loans in Kenya" and found that there existed positive relationships between the two variables. However, addressing the independent variable as depicted by this research, considering two variables in his

study, (Boyani, 2013) looked into the capital structure composition effect on the cost of capital on all firms listed at the Nairobi Securities Exchange, which included the non-financial sector, banking sector, and insurance sector. He, however, found a positive correlation between the study variables. Mwangi et. al. (2014) looked into a similar sector as per this study, with similar variables, except interest rate sensitivity had a negative effect on firms' performance when leverage kept on changing positively. Further, research by (Njoroge, 2013), which looked into two variables as well as the "effect of interest rate on financial performance considering all sectors listed at NSE," found a positive relationship between the variables.

Contextual review shows that several firms have in the recent past bowed out of business, with some facing close-downs, suspension, and, to the extreme, as a result of poor market valuation, got delisted from trading in stock markets across the world. Kenya has not been an exception too in this business distress condition, having witnessed the effect of interest rates on financial performance as a result of unfavorable capital structure, management's inability to control market interest rate risks, and poor market valuation. The theme of this research was destined to look into the Kenyan perspective, specifically on non-financial firms listed at NSE, and gauge the findings against these reviewed scholarly works.

Finally, based on the above-reviewed scholarly works, it is evident that relationships related to leverage, interest rate sensitivity, and firms' market values do exist in various forms. Hardly did the reviews find three exact matching variables as per this research, which considered interest rate sensitivity as an intervening variable. Major gaps also arose where scholarly works have majorly applied two variables in different phenomenon/ interchangeably for example, one of the scholarly variables were "benchmark interest rate and stock market prices", in a different paper, the writer's variables were "interest rate and bond market"; followed by, "interest rate and inflation" which give a justification for this research to address three variables based on non-financial sector.

Additionally, sectoral gaps evidently came out clearly as in all the reviewed journals in this chapter, none of them picked the non-financial sector with the exact number of variables. Further, different scholars addressing different or synonymous variables were unable to arrive at the same result due to the methods of analysis employed in running their research data. That is to say, the underutilization of the advanced econometric model is a methodological gap issue. For example, the use of basic regression can lead to biased estimates due to omitted variable bias, reverse causality, or measurement errors. This study improved on prior studies by employing more advanced econometric models such as GMM to control for possible endogeneity or fixed effect/Random effects model to account for both firm-specific and time-specific variations, quantile regression model to capture the dynamic interactions between capital structure interest rate sensitivity and market value of over time. Further, the quantile regression model is considered superb as it provides a more comprehensive analysis by considering all the variables' distribution despite the smaller or larger the spread may be within the quantile ranges and also robust where data may be skewed highly to the right or the left.

Therefore, failure to reach a convergent outcome reflected a research gap to be addressed by this study if the status quo would suffice. Finally, major reviewed journals depicted international and regional perspectives with no locally related studies covering the three matching variables as stated in this study. Therefore, a key question arises as to what relationships exist amongst capital structure, interest rate sensitivity, and market value of non-financial firms listed at the Nairobi Security Exchange in Kenya?

## 1.3     Research Objectives

This section discusses the general research objective stated as capital structure, interest rate sensitivity, and market value of non-financial firms listed at the Nairobi Securities Exchange in Kenya.

### 1.3.1   General Objective

The general objective of this research was destined to determine the joint effect of capital structure and interest rate sensitivity as an intervening variable on the market value of non-financial firms listed in the Nairobi Securities Exchange in Kenya.

## 1.4     Value of the Study

The study of capital structure, interest rate sensitivity as an intervening variable, and market value of non-financial firms portrayed varied results along the tested hypothesis One of the tests revealed a significant relationship between capital structure and firm market value, which meant that managers' decision in considering a better mix of debt and equity ratio to finance possible investments which would guarantee higher firm value to shareholders. It's important to note that in doing so, the firm manager is in a critical position by pre-considering the best debt-to-equity ratio, financial flexibility by monitoring adverse leverage, debt earnings ratio to cushion against financial distress, prevailing tax rates, and ability to repay the debts/liabilities when they fall due. Further, managers can employ turnaround strategies when cheaper debt capital becomes available over equity and refinance poorly performing functions within the firm, e.g., production, research, and development, or hedge by purchasing raw materials.

Further, the reduced interest rate would trigger a preference for debt capital over equity however, under the state of a higher interest rate, managers would prefer internally generated sources of funding over equity and debt, a decision that would see managers positioning themselves towards higher firms' value through profitability, business growth and lowering the risk of carrying out business. In addition, managers would be guided in making sound strategic firms' capital structure decisions within an environment characterized by favorable interest rate dynamics geared towards mergers, acquisitions, or dissolution should the interest risk worsen towards eroding capital structure. In any case, if managers deviate by mismanaging capital structures, shareholders may employ corporate governance actions by replacing the managers, enhancing supervisory roles to guarantee

confidence level, and disciplining the weaker management by replacement aimed to guarantee valuable agency relationships.

In addition, the stakeholder's main interest is to ever increase stock value by being speculative in both the bond and equity markets. They do keep scanning the market for possible profitable investment opportunities, that is, buying bonds at lower prices and selling them later at a higher value when the market interest rate becomes favorable or trading on bonds now when market prices favor the offloading of shares. It is equally important that potential investors do screen trading platforms like NSE and would be able to identify blue chip firms' stocks, hence switching investments across firms based on profitability indicators, in this case, firms' market value. Further, when the market is not promising better returns on investment, shareholders may wish to reinvest the returns by converting them to more shares, leading to higher firms' value. This may indicate deferred income or strategic refinancing of firms' investments by avoiding dilution of net disposable income. On the contrary, looking at the 10-year downward trend of reduction in interest rate all the way from 18% to 11%, bondholders may desist from trading in bonds or hoards until such a time interest rate returns to a profitable position by withdrawing bond subscriptions.

Key stakeholders, not limited to the government of Kenya and international financial regulators, would find this report's findings important in policy formulation that would facilitate a fair-trading platform advantageous to all players in the economy. As it has been realized from the hypotheses and analyzed data, the government would find it prudent to enhance the interest rate reduction further than it has been observed over the ten years margin to increase borrowings, enhance disposable income, and attract investments, which would in turn, create more job opportunities hence GDP growth. The wider parity between short-term and long-term rates would create a significant effect between capital structure and the value of the firms by allowing investors to take advantage of long-term borrowing, which is cheaper than short-term borrowing. Further, closer monitoring of the effect of interest rate sensitivity and capital structure mix could be achieved by having listed firms' board of directors, Kenya Revenue Authority, Central Bank of Kenya, and NSE equally striking a balance on favorable interest rates capping that would not be costly to the potential shareholders within Kenya and remain competitively across the African region and internationally. If adopted, such efforts will see firms reporting favorable market value, which finally translates to long-term economic development.

Theoretically, findings are anticipated to be of great importance towards complementing the body of knowledge through critiquing the theories underpinning this study, complementing or disputing the published reviewed journals related to these theories, learning from the findings, gaps, and recommendations of this research, and gaining of more academic knowledge in finance discipline in line with the stated variables underlying this study. By extension, academicians who are interested in carrying out further research considering the same or related variables

would continue with the gaps realized in this research, carry out the same research, and academically confirm reaching the same conclusions.

## 2. Literature Review

### 2.1    Modigliani and Miller Theory with Taxes

This theory was developed by (Modigliani & Miller 1963), whose paper has been in the limelight as one the landmark theories that tried to address the puzzle of optimal capital structure and firm value for a long period of time in the field of financial management. It considers relevant some of the decisions made by firm managers in trying to address the value of the firm as a result of financial investments made by shareholders. It further explains that managers in liberal financial markets under agency arrangements with the shareholders would wish to protect their stewardship responsibility by attempting to always go for financing opportunities that possess lower risk and promise high returns. In this case, shareholders would prefer retaining such managers as such an approach to their investments guarantees higher returns in the long run. The theory appreciates the leverage advantage emanating from tax deductibility, a saving that management considers advantageous towards dividend holders with net income after paying dividends eventually land to shareholders either inform of reserves or if not shared may be reinvested in the firms hence increase in stock holding. Further, according to the theory, the higher the firm becomes levered, the higher the market value as a result of tax advantage. This theory, by extension, has two offsetting effects on optimal capital structures: one, the deductibility of corporate interest payments, which pushes firms towards more target leverage, and two, the higher personal tax rate on debt relative to equity, which pushes them towards less leverage.

Miller and Scholes (1978), the personal tax rate implicit in the pricing of a firm's interest payments does not vary with its leverage at all proportions. If the marginal benefit of the corporate tax deduction is also constant at all levels of profit and loss, taxes do not produce an interior optimum for leverage. Whether taxes push a firm towards maximum leverage, no leverage, or indeterminate leverage depends on whether the constant marginal corporate tax saving is greater than, less than, or equal to the constant marginal personal tax cost. However, (Baxter, 1976) did review MM theory by bringing in the concept of "bankruptcy costs" and their effects on highly levered firms. As a result, firms that were highly levered by taking advantage of favorable market interest rates uncontrollably would be characterized by higher costs of bankruptcy, i.e., legal costs associated with default in repaying back advanced financial resources, reorganization of management structure with an attempt to turn around a financially distressed firm to profitable status and liquidation costs associated with closing down over debated firm with no possible of converting liquidity challenges than lowly levered firms which eventually affects firms value. According to (Shuetrim et. al., 1998), they identified challenges with one of the prepositions of MM theory and suggested in their findings that the application of firms' financial resources is always channeled to borrowings,

shareholders' stake, and the government in the form of corporation taxes. To maximize the value of stocks, the management of such firms must reduce cash flows directed to the government, a concept which would see firms' value grow over time.

## 2.2    Pecking Order Theory

The theory was brought up by (Myers & Majluf 1984), who provides a different perspective in addressing capital structure optimality. At the same time, most of the scholars perceive capital structure to comprise only debt and equity. Myers explores additional streams of capital structure to include internally generated finances. He perceives the firm's management to take a totally different approach in an attempt to compose optimal capital structure by giving preference to retained earnings, which is perceived to be interest-free in a risk-averse condition. As a going concern, firm shareholders' agents would prioritize using excess profit in financing its available investment activities and would only resolve to external debt and equity capital as a last resort based on their interest rate risk status should there be a deficit. The theory further argues that risk-averse managers would majorly prefer such type of financing as the cost associated with their raising tends to be very insignificant. Such forgone financial costs end up translating into benefits to the firm, leading to higher firm value. Jensen and Meckling (1976), on the contrary, confirm that under agency theory, managers stand a better chance to balance off the capital structure as they carry out delegated investment roles on behalf of the shareholders. However, the agency role depends on how effective shareholders supervise managers, and as such, agency theory crops in managerial effectiveness and management loyalty to shareholders in which there is a perfect relationship between the two, managers will always invest in a less risky type of capital which can guarantee positive firms value. Preceding Mayer's theory, another scholar argued that costs associated with external borrowing resemble "lemon premium" (Akerlof, 1970). As a result, his study ranks the financing sources of a firm beginning with retained earnings, followed by less risky debt capital, and finally, where necessary, the last preference is given to equity financing, respectively, a perspective geared towards increasing firm value.

A compliment to this preferred theory, potential investors do opt to discount firms' market share prices, especially during the floatation period by managers at the expense of low-interest risk debt capital to attract more investors who would eventually buy more bonds. Such massive attraction of investors leads to the raising of more finances, translating to more funding of productive investments, hence a possible increase in firm market value in the long run (Myers & Majluf, 1984). In mitigating against this perception by potential investors, managers mostly float equity shares for subscription as a last resort. In their scholarly work, in modeling managers' reactions to composing optimum capital structure, they argue that managers adopt the pecking order theory considering interest rate dynamics by preferring internally generated retained earnings against debt and equity capital. In their academic work, (Myers & Majluf, 1984) and (Fama & French, 2000) hinted

that the relationships amongst stock market value, stock book value, and structure of capital remained irreconcilable, especially when the static pecking order model was applied. Using the same model, it was evident that higher debt appetite was instigated by the availability of investment opportunities, although at an appetite tipping point, leverage starts retarding due to a tradeoff level where they level against one another and, to some extent, may lead to a reduction in firms' value.

## 2.3    Liquidity Preference Theory

Keynes (1976), who is the author of the theory, commented on classical theory equally on the basis that it would be impossible to rely on static savings because it varies with the level of income and prevailing interest rates. In his submission, he postulated that interest rates could only be determined at a point when an intersection is reached as a result of the demand and supply of money in the market, which instigates borrowing characters by firms. This state is considered to translate into borrowing at an affordable interest rate to finance profitable investment deemed to increase firm value at long last. Robertson (1937) stated that the rate of interest could be derived in a state where there is prevailing demand for money that the market is willing and able to supply at a particular time, which in their case was determined by investment opportunity available against the level of hoarding of money based on interest rate trends. This scenario automatically instigated the dissaving aspect. The theory, in a broader aspect, justified that the supply side of loanable funds includes savings, dishoarding, disinvestment, and banking of money. Their argument behind the theory was a result of analyzing the classical theory, which considered interest rate to be determined by an intersection of investment and savings schedule, which means that the position of the curve would rely much on the level of income. The argument was emphasized by the fact that the saving curve would shift to the right if income tended to increase and vice versa.

## 2.4    Market Timing Theory

Ross (1977), who is behind the market timing theory, in his scholarly work, explains that firms time floatation of new shares when their prices are highly quoted in the trading markets. On the contrary, firms would repurchase these stocks when market trading is unfavorable, leading to an unfavorable drop in stock market value. He introduced signaling theory to finance, in which he suggested that managers could use capital structure as well as dividends to give some signals about the firm's future proposals. More specifically, increasing the amount of debt in the capital structure mix can be assumed by outsiders to mean a sign of confidence in the market value of the firm. He argues that "management as stewards explicitly understands sharing of firm's income much more than the stockholders by giving priority to bondholders at the expense of shareholders' in that order".

Firms will reap much returns if stock value rises as a result of favorable interest rates in the market, but on the contrary, bankruptcy will penalize management, especially when prevailing market interest rate sensitivity becomes unfavorable.

Baker and Wurgler (2002) argue that as a result of behaving irrationally (agent), the company stock value becomes mispriced. In this scenario, management tends to float stock at a time when their prices are irrationally lower and, at the same time, buy them back at a higher cost. Harvay (1995) found out that firm management appreciated the fact that timing the market interest rate movement in either way, that is, how it affects the pricing of stock market value, is key in making an informed decision whether to float or buy back the stock from the market.

## 2.5    Empirical Evidence

This section provides scholarly empirical evidence associated with this study. It looked into the various academic and research works that had been undertaken before and how they clearly relate to this research. In addition, the subsection broke down the analysis in this pattern: conceptual dimension, contextual consideration, applied methodology by various scholars, data analysis model, research findings, and study gaps.

### 2.5.1    Capital Structure, Interest Rate Sensitivity and Market Value of Non - financial Firms

This section explains the possible relationship that would exist when these independent variables interact jointly against firms' market value. A further breakdown of the capital structure to focus on the debt value of the firms and how interest rate sensitivity affects it and the subsequent possible effect on firms' value over time. In addition, (Staking & Babbel, 1995), in their research carried out in the USA, found that good management of capital structure reflected a positive correlation alongside firms' market value when market interest rate sensitivity was considered under the insurance sector as interest rate risks increase so is the immediate reduction in equity market value of insurance sector a phenomenon this study will look into but in a different economic sector. However, a different study (Wulandari & Harjito, 2021) found a significant positive relationship between interest rates, capital structure, and banking sector profitability. Their assertions on management's role in ensuring interest rates and capital structures are carefully managed played a critical role in determining favorable market returns. Fama & French (1998) analysis of the effect of interest rates on debt capital confirms the existence of interest rate expense advantage. They argued that the bond market would constantly reflect a significant effect on borrowings up to some point, especially when the break-even is reached as a result of borrowing appetite. Even if the firm continues to borrow at a low interest rate, in the long run, the value of the firm will definitely decrease.

Dezele and Korkeamaki (2018) studied firms in the European Union, considering 15 countries with 37,663 firms. Applying Market Model regression, they found out that as a result of regime shift in the European block and subsequent interest rate shocks and financial crisis, there was a positive effect on the corporate bond market, firms' interest rate sensitivity, and firms' issuance of initial public offer (IPO). They

confirmed that the sensitivity of interest rates was firms' industry specific as different industries behaved differently with the volatility of the rate of interest. The paper concluded by asserting that sensitivity management becomes very important, especially when firms decide to publicly trade in bonds. Aloui and Jarboui (2016) investigated sectors dealing in the financial sector, specifically insurance, financial services, and banking, to determine how market, interest rates, and exchange risks affected their stock returns in some sampled countries in Europe and Asia. The period under consideration was characterized by the global financial crisis of the years 2006-2009, with the investigation sampling eight countries in Europe plus China in Asia and the USA. They applied an "econometric framework GARCH-in-Mean model which considered to address cross-market spillovers" whose result showed a significant two-sided effect of positive and negative among the tested independent variables aligned to more so European and USA than in China.　These contextual models, economic crisis status, and variable gaps were comparatively justified by this study.

Sarfraz et. al. (2020), .in their study to find out the moderating role of firm size and interest rate in the capital structure of the firms, selected a sample from the sugar sector of Pakistan over six years (2013–2018) considering 29, employed static panel analysis and dynamic panel analysis on linear and nonlinear regression methods to test the hypotheses. They broke down the capital structure to align to debt to capital ratio, non-current liabilities, plus current liabilities to capital as a dependent variable. Independent variables were considered to be profitability, firm size, tangibility, Non-Debt Tax Shield, and liquidity, and macroeconomic variables were exchange rates and interest rates, which this study concentrated on their interest rate factor and the debt component and their effect on profitability, synonymously considered as firms' value. Their result showed that profitability, firm size, and Non-Debt Tax Shield were significant and negative, while tangibility and interest rates significantly and positively affected debt to capital ratio.
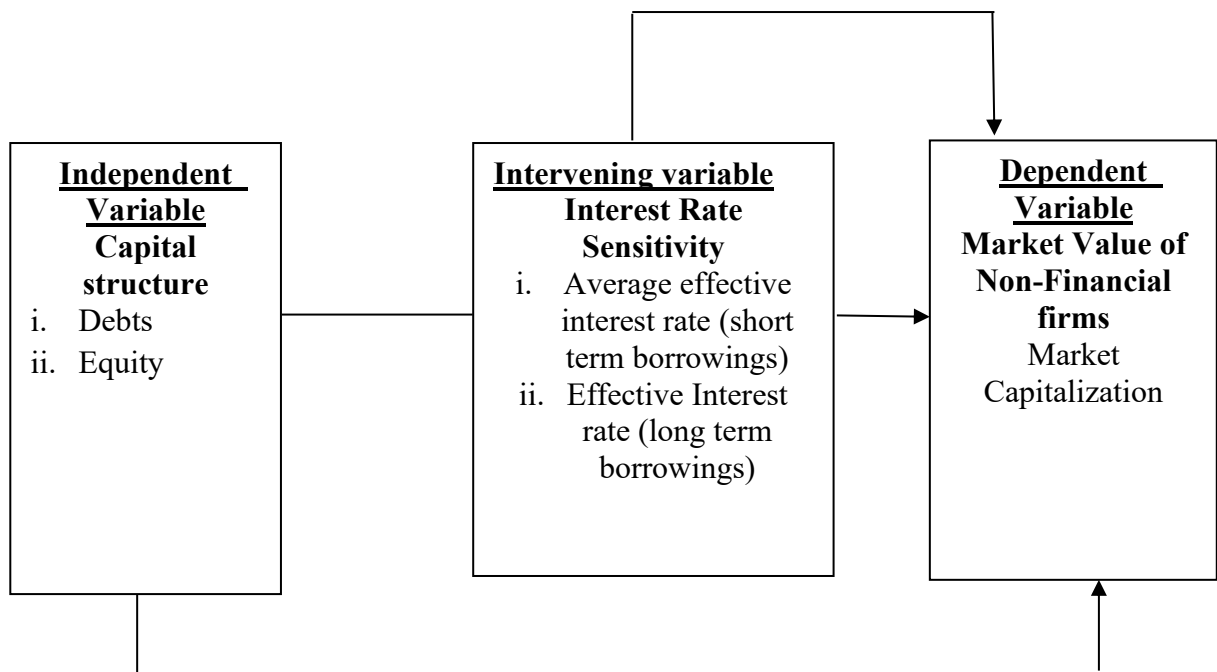
Matos (2018), in his article "Interest Rate's Effect on Capital Structure: Evidence from US Listed Companies," where the study tried to answer the lack of sufficient literature on the interest rate effect on capital structure. The effects of interest rate risk incorporated industry specifics as the major determinants for leverage and not the usual traditional approach of capital as a determinant of companies taking more or less leverage. This is empirically evident in the different debt ratio averages across the industries, where companies in some industries tend to have more leverage than other companies in different industries. Inside the same industry, companies then tend to follow their peers by copying managerial actions, hoping to realize similar outcomes. Additionally, they tend to access more similar lower interest rates across the board. Their analysis was based on all firms' behaviours listed at NYSE, which is a more developed economy than Kenya from 2005 -2016, culminating in 12 years, a period considered higher by this study. However, to consider a sufficient period to gauge interest rate fluctuations pattern, their study applied 12-year period, a gap which this research destined to monitor the same

behaviour for 10 years. A larger disparity was equally witnessed as the targeted population for this reviewed study stood at 3864 firms.

## 2.6     Conceptual Framework

This conceptual framework underscores the interrelationship amongst the research variables namely; capital structure, interest sensitivity, and market value of the firms listed at NSE and the hypotheses formulated for their possible relationship justifications. The framework hypothesis has also been tied with the theories for concurrence and consistency in pursuits toward the study objectives.

The framework aimed at looking into, the significant joint effect of capital structure as an independent variable and interest rate sensitivity as an intervening variable on firms' market value a phenomenon which if could be true would lead to financial policymakers and other stakeholders earmark interest sensitivity as a key factor to consider in making financial decisions before leverage consideration by taking advantage of market timing when the interest rate effect would guarantee growth in firms value. Finally, the framework looked into the relationship between debt and interest rate sensitivity and how such relationships may affect firms' market value. Debt is singularly isolated from the aggregate capital structure and directly tested against the interest rate for the period of 10 years. All these hypotheses have been summarized in the figure 1 "conceptual framework model" with arrows pointing the direction of the effects from different variables.



Source: Author, 2025

**Figure 1: Conceptual Model**

### 2.6.1 Research Hypotheses

The following formulated hypothesis was considered to guide this research study, namely:

$H_01$; There is no significant joint effect relationship between capital structure and interest rate sensitivity as an intervening variable on market value of non-financial firms listed at Nairobi Securities Exchange

## 3. Research Methodology

### 3.1 Research Philosophy

Research philosophy is critical in looking into how a researcher reacts with field data and at the same time determines the end result of the behavior as a result of the interactions that revolve around ontology or epistemology. Ontology is the examination of the nature of reality, which may exist objectively, whereas epistemology deals with how one works around to know reality subjectively, which justifies positivism and phenomenology, respectively (Kothari, 2010). This research employed a positivist philosophy because of the quantitative nature of data touching on the three variables, namely capital structure, interest rate sensitivity, and market value of non-financial firms (Mukherji & Albion, 2010). Furthermore, it considers quantitative design that relies on a scientific approach that uses deductive reasoning. The scientific approaches start with investigative theories, followed by hypothesis formulation, and finally data collection, which are analyzed to deduce the findings of a phenomenon. In addition, the methodology involved hypothesis testing, whose findings of which ended up generalizing the tested phenomenon. A related study (Staking & Babbel, 1995) also applied positivist philosophy in their research on insurance firms when they looked into the relationship that existed amongst capital structure, interest rate sensitivity, and market value. Finally, the philosophy guided the independence and non-influence of secondary data that was collected for the purpose of this study, whose status guaranteed data reliability and authenticity.

### 3.2 Research Design

This research was carried out using a longitudinal research design, employing secondary quantitative data for a period of ten years. Cooper and Schindler (2003) describe a longitudinal study as one that is carried out repeatedly over an extended period of time, e.g., weekly, monthly, or annually, to determine their behaviors based on research objectives. The design was preferred due to its capability of detecting the behavior of the targeted population, guaranteeing accuracy at the group and individual level, besides being suitable for quantile regression analysis model for the published financial data of non-financial firms listed at Nairobi Security Exchange for the period 2012 to 2021. The required data was obtained from the yearly published financial reports under NSE custody.

### 3.3     Population of the Study

The population under this study was considered through a census that involved forty-five (45) firms from different economic sectors herein referred to as non-financial firms, (NSE 2021) from 2012 to 2021 excluding insurance (6) and banking (12) sectors as they refer to a financial sector whose operations are regulated by Central bank of Kenya. Before being published by NSE, all financial reports of listed companies are subjected to external audit after the end of each financial year, a factor that guarantees the reliability and validity of such data. Further, the research findings were equally destined to compare and contrast the reviewed journals and academic works findings vis avis the periods they considered. Additionally, the period was considered to provide sufficient and complete data components meant for analysis, a buildup on one of the landmark journals by (Staking & Babbel, 1995), who carried out a related study (capital structure and interest rate sensitivity on insurance firms' sector) for seven years. However, during the test-retest to determine the reliability of using the entire population, the pretest analysis revealed outliers that would have negatively affected the research objectives should they have been considered for the final analysis stage. To cure these statistical gaps realized at the pretest analysis stage, the outliers' firms were excluded, which left the research to concentrate on 32 firms for final analysis for a period of 10 years meant to test the study hypotheses.

### 3.4     Data Collection

The research used data of a secondary nature, which was obtained from NSE annual published financial reports related to listed non-financial firms through census. The data was populated using a secondary data capture form. Authenticatable relevant data from individual firms was observed and extracted from the published financial statements through a secondary data capture form. Kramer et al. (2009) confirmed that data validity tests how well an instrument is developed on a particular concept of the study, reliability which is determined by how effective the data addresses the pre-determined research objectives and its ability to withstand both internal and external tests when third party tests the same nature of data. In this case, to guarantee validity and reliability, the NSE had been identified as the best national regulator of all firms licensed to trade on its platform.

One of the requirements is always to ensure that member firms publish annual financial reports in a standard format, after which they are reviewed for compliance and finally publicized for stakeholders' consumption (NSE, 2021). Specific variables were obtained through the extraction of key variables information content in the following manner; Capital structure would require a ratio of total assets to debt proportion and equity proportion; interest rate sensitivity would require an average effective interest rate on short-term borrowing and effective interest rate on long term borrowing obtained from NSE through periodical publishing and finally firm market value would need EPS and total number of shares for each firm. Due to the existence of multiple variables over multiple periods, panel data was

considered appropriate to allow for individuality, high-quality results, better control, as well as an increased degree of freedom.

## 3.5　Operationalization of Variables

Bhandari (2020) definition of operationalizing variables means expressing variables into measurable observations in a systematic manner based on the designed data meant to achieve the research objectives. In addition, (Sekaran, 2003) considers operationalization as the act of ascribing meanings to the research variables by applying the correct quantitative measure, which ensures that the outcome becomes reliable and accurate. Well-designed operationalized variables would guarantee the accuracy, validity, objectivity, and consistency of the tested hypotheses

This research study considered three variables namely; capital structure as an independent variable whose indicators were the ratio of debt proportion to equity proportion in capital structure; the market value of non-financial firms listed at the NSE whose indicators were considered to be the total number of outstanding shares and market price per share serving as dependent variable and lastly intervening variable hereby referred to as interest rate sensitivity whose indicators were average effective interest rate on short term and long term borrowing and effective interest rate on long term borrowing as tabulated below;

**Table 1: Details of Operationalization of Variables**

| Variable | Indicators | Measurement source | Data Source | Measurement | Data Type |
|---|---|---|---|---|---|
| Capital Structure (independent variable) | Debt Proportion Equity Proportion (Aggregate of short-term and long-term debt per year) and (no of shares X unit price per share per year) | (Otieno, 2015) | Published financial reports from NSE | TLTA and TETA | Ratio |
| Interest rate sensitivity (Intervening Variable) | Duration Gap Analysis Average Effective interest rate on short-term borrowings Effective interest rate on long-term borrowings | (Staking & Babbel, 1995) | Published financial reports from NSE | $r_{eff}=(1+i/m)^n-1$ | Ratio |
| Market Value (Dependent Variable) | Current Market price per share Total Number of Outstanding Shares | (Staking & Babbel, 1995) | Published financial reports from NSE | Current Market price per share X total number of outstanding shares | Ratio |

Source: Author 2025

**Table 2: Summary of research objectives, hypotheses, analytical methods, and interpretation**

| Objectives | Hypothesis | Analytical Method | Interpretation |
|---|---|---|---|
| To establish the joint effect of capital structure and interest rate sensitivity variable on market value of non-financial firms listed in Nairobi Securities Exchange. | $H_0$ 1; There is no significant joint effect relationship between capital structure and interest rate sensitivity on market value of non-financial firms listed at Nairobi Securities Exchange | **Quantile Regression model** $MV_t = \beta_0 + \beta_1 CS_t + \beta_2 INT_t + \varepsilon_t$ | The combined effect of capital structure and interest rate sensitivity may significantly affect firms' market value when R2 values associated with .75, .50, and .25 $\geq$ 0.5 at a significance level of 0.05. Reject the null hypothesis and accept the alternate hypothesis |

### 3.6     Data Analysis

Data collected from NSE-published reports for the ten years was intended to be analyzed using one of the best models discussed herein, the quantile regression model (Raios-Avila et. al., 2024) and (Tores-Reyna, 2007). Further, Panel data was preferred due to its ability to guarantee quality, better econometric estimation, and better control of possible unobserved variables. Hence, it is guaranteed to determine the nature of relationships existing between capital structure and market value of non-financial firms, interest rate sensitivity, and market value of the firms, the joint effect of interest rate sensitivity and capital structure on firms' market value. Further, the panel data analysis perfectly combines both time series and cross-sectional data, guaranteeing the generalization of study findings.

### 3.6.1   Quantile Regression Model

The Quantile Regression Model provides an examination of the tested variables' relationships across different points, in this case, quantile ratios of Q=25, Q=50, and Q=75 along the distribution of findings, hence a more robust explanatory breakdown of the effects of the tested variables. This limits the generalization of the behaviors of tested variables (Raios-Avila et. al., 2024).

In summary, quantile regression was considered the best applicable model and robust as it captured heterogenous effects across quantiles by analyzing how independent variables affect different parts of dependent variable's distribution. Further, the model dealt with outliers and possible non-normal errors linked with panel data, especially heavy-tailed distributions, hence confirming its usefulness in financial and economic applications. Finally, quantile regression considers non-linear relationships associated with the predictor and predicted variables aligned to firms with distress status or extreme values.

Statistical Package for Social Science (SPSS) software was used in analyzing the panel data which was specifically destined to address descriptive and inferential statistics in determining variables' behavior against Arithmetic Mean, Standard Deviation, and data transformation to address the existence of possible outliers, and further testing of reliability and validity of panel data through diagnostic tests by applying tests such as normality, autocorrelation, stationary, endogeneity, heteroscedasticity and multicollinearity.

### 3.6.2   Analysis Model
### 3.6.2.1 Quantile Regression model

$$MV_t = \beta_0 + \beta_1 CS_t + \beta_2 INT_t + \varepsilon_t + \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots H_0 1$$

$H_0 1$; There is no significant joint effect relationship between capital structure and interest rate sensitivity on market value of non-financial firms listed at Nairobi Securities Exchange.

Where **MV=Market Value; B0=intercept $\beta_1$=Slope, $CS_t$=Capital Structure and $\varepsilon$=Error Term** t=Time (2012-2021), i: is annual nominal rate of interest; m: number of compounding period in a year; n: Total Number of Periods to maturity; *INT= has been considered compositely by averaging both short term and long-term interest rate

# 4.  Data Analysis and Interpretation
### 4.1    Descriptive Statistics

The first step in ensuring that panel data is clean and able to be relied upon in making statistical decisions is to preliminarily carry out test re-tests applying descriptive statistics analysis. This would ensure that the existence of either extreme values, missing data, or possible errors are addressed as early as possible instead of experiencing the gaps at the tail end of the research findings generalization. The analysis of the collected panel data revolved around the detection of the possible existence of the outliers, data transformation, and analysis of central tendency and distribution of variables data.

**Table 3: Descriptive Statistics Summary**

| Stats | | Firms Market Value (000) | Capital Structure | Interest rate sensitivity |
|---|---|---|---|---|
| N | | 320 | 320 | 320 |
| mean | | 279974.35 | .52615 | .97887 |
| p50 | | 151766.00 | .57050 | .99 |
| sd | | 430013.912 | 1.651572 | .0590732 |
| iqr | | 361671 | .560 | .03 |
| range | | 2002879 | 38.241 | 1 |
| p25 | | 16864.50 | .31525 | .97 |
| p75 | | 378535.00 | .87500 | 1 |
| min | | 392 | -23.251 | .94 |
| max | | 2003271 | 14.990 | 1 |
| skewness | | 2.854 | -7.304 | -14.371 |
| kurtosis | | 7.989 | 153.254 | 237.1248 |

Table 3 above provides descriptive statistics for three variables underpinning this research from the years 2012 to 2021. Firms' market value reported a mean average of Ksh. 279974.35 and the median, p50 of Ksh 151,766.00, indicating a positively skewed distribution with a higher concentration of values towards the lower end. The substantial range of Ksh. 2,002,879, from the minimum of Ksh 392 to the maximum of Ksh. 2,003,271, suggests significant variability in market values among the sampled firms, indicating that various firms inherit varied firm values based on the strength of their capital structure and the firms' industry. The skewness of 2.854 and kurtosis of 7.989 highlight the asymmetry and heavy-tailed nature of the distribution, indicating potential outliers or extreme values. This implies that while the average market value is relatively high, there are firms with exceptionally high market values that influence the overall distribution.

Capital Structure reported a mean of .52615 and median of .57050, revealing a positively skewed distribution, emphasizing a concentration of firms with lower capital structures falling in which industry. The interquartile range (IQR) of .560 suggests substantial variability between the 25th and 75th percentiles, additionally, firms with capital structures higher than .87500 are in the upper quartile, suggesting a relatively high reliance on debt in their capital structure, thus levered. The main reason stems from the affordability of debt over equity due to the interest deductibility advantage. The skewness of 2.854 and kurtosis of 7.989 indicate a distribution with a longer and fatter tail, suggesting the presence of extreme values. This implies that a significant portion of the sampled firms tends to have lower value in their capital structures, implying that different firms possess different firm's values in capital structure depending on the nature of the industry and firm size. It is equally evidenced that there are outliers with notably higher capital structures associated with bigger firms in capital structure composition, contributing to the positive skewness and heavy tails.

Finally, exploring Interest Rate Sensitivity as a variable, the mean of 0.9789 and median of 0.99 suggest a distribution skewed towards higher interest rate

sensitivity. The range of 1, from the minimum of 0.94 to the maximum of 1, indicates limited variability in interest rate as applied in short-term and long-term prevailing interest rates that the firms consider on either to borrow or not. However, the skewness of -14.303 and kurtosis of 237.125 signal an extremely negatively skewed and leptokurtic distribution, suggesting a consideration of firms to borrow when interest rates tend to fall or stabilize at a cost-effective rate over a long period of time. Further, the majority of the firms exhibit a strong sensitivity to interest rates, with few outliers having exceptionally low sensitivity. The trend pattern exhibited a higher interest rate of 15.5%, 18.6%, and 15.99% for the years 2012-2014 for both short-term and long-term effective interest rates. 2015 was characterized by a further sharper interest rate increase of 18.3% before a declining trend from 2016 to 2021, closing at 11.45% and 12.16% for short-term borrowing and long-term borrowing, respectively.

The composite interest rate was applied throughout this study since the dispersity between long-term and short-term interest rates showed no significant variation and a separate analysis would bore similar results. For example, for the first five (2012-2016) years the interest rate for both long term and short term stood the same as; 18.5%, 16.99%, 15.99%,18.3%, and 16.69% while the remaining years; 2017-2021 the average variation stood at 0.04% between long term and short term as; (13.54% versus 13.64%, 12.17% versus 12.51%, 11.67% verses12.02%, 11.51% versus 12.02%, and 11.45% versus 12.16% prompting composite values consideration.

## 4.2    Analysis of Correlation

This analysis helps in determining the degree of reliability of the research variables and how they relate with one another, whose relationships are key in ensuring that the research hypotheses withstand quantitative tests geared towards addressing the research objectives.

**Table 4: Analysis of Correlation**

|   |   | lnFirmsval | lnCapStruc | lnInterestS |
|---|---|---|---|---|
| lnFirmsval | | 1.0000 | | |
| lnCapStruc | | 0.2552 | 1.0000 | |
| lnInterestS | | 0.0057 | -0.0336 | 1.000 |

The table presents the correlation coefficients between three variables statistically presented as: "lnFirmsval" (natural logarithm of the firm's market value), "lnCapStruc" (natural logarithm of the capital structure), and "lnInterestS" (natural logarithm of interest rate sensitivity). The correlation coefficient ranges from -1 to 1, where 1 indicates a perfect positive correlation, -1 indicates a perfect negative correlation, and 0 indicates no correlation. Starting with lnFirmsval, the correlation coefficient of 1.0000 itself signifies a perfect positive correlation, as expected. This implies that the natural logarithm of the firm's market value is strongly correlated with itself, suggesting a direct relationship between the firm's market value and its

past values. Similarly, on lnCapStruc, the correlation coefficient of 0.2552 with lnFirmsval suggests a positive but relatively weak correlation between the natural logarithm of the firm's market value and the natural logarithm of the capital structure, implying there is some degree of association between the firm's market value and its capital structure, but the relationship is not as strong. Moreover, the correlation coefficient of 0.0057 between lnFirmsval and lnInterestS and -0.0336 between lnCapStruc and lnInterestS indicates very weak positive and negative correlations, respectively. This suggests a minimal connection between the natural logarithms of the firm's market value, capital structure, and interest rate sensitivity. These weak correlations imply that changes in interest rate sensitivity are not strongly tied to changes in the firm's market value or capital structure.

## 4.3    Diagnostics Test

Diagnostic tests were applied to determine normality, collinearity, homoscedasticity, endogeneity, and Stationarity tests for the variables; capital structure, interest rate sensitivity, and market value of firms representing the variables as independent, intervening, and dependent, respectively. These tests were carried out after a data cleaning exercise occasioned by a lack of complete data for some firms due to late joining of NSE or exited operations from NSE during the period considered by this study, which saw the outliers excluded. The test output eventually considered 32 firms throughout chapter four in making the final analysis decision.
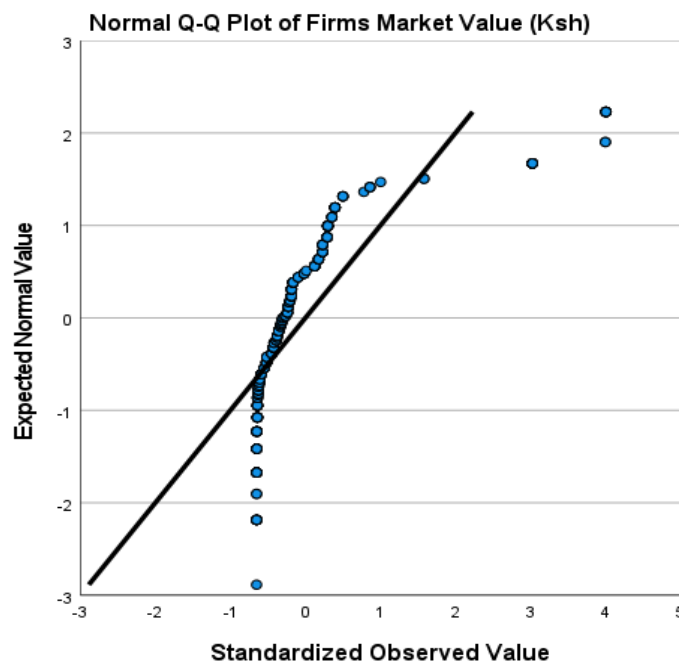
### 4.3.1   Normality Test

To confirm normal data distribution around this study population, the Shapiro-Wilk test was employed as a numerical confirmation. This was a result of test-retest to remove extreme data values and the final log transformation of the final data point of 320. The numerical justification was to be kept at 0.05 and any deviation meant a departure from normality. The table that follows describes factors that were considered in concluding the normality test as detailed below;

**Table 5: Shapiro-Wilk W test for normal data**

|  | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
|  | Statistic | df | Sig. | Statistic | df | Sig. |
| Firms Market Value (Ksh) | .258 | 320 | .000 | .601 | 320 | .000 |
| Capital Structure (Ksh) | .356 | 320 | .000 | .251 | 320 | .000 |
| Interest Rate Sensitivity (i) | .360 | 320 | .000 | .230 | 320 | .000 |

Shapiro-Wilk W test results for normality provide insights into the distribution of the transformed variables under consideration: The W statistic, which considers normally distributed data to be w=0.05 at 95% level of significance with a departure leading to rejection or acceptance of the hypotheses. In the case of lnFirmsval, the W value is >0.05, at 0.601 indicating a departure from normality. Similarly, lnCapStruc and lnInterestS exhibit W values of 0.251 and > 0.230, respectively, further suggesting non-normal distributions for these variables. Similarly, Kolmogorov that tests the null hypothesis that a set of data comes from a normal distribution indicated values of, > 0.01 for all the variables all of which show a departure from normality. Both the tests (Shapiro and Kolmogorov) indicate a rejection of the null hypothesis that the data follows a normal distribution. Consequently, it can be inferred that all three variables deviate insignificantly from a normal distribution except the firm's market value, which posted 0.601 based on the Shapiro-Wilk test.
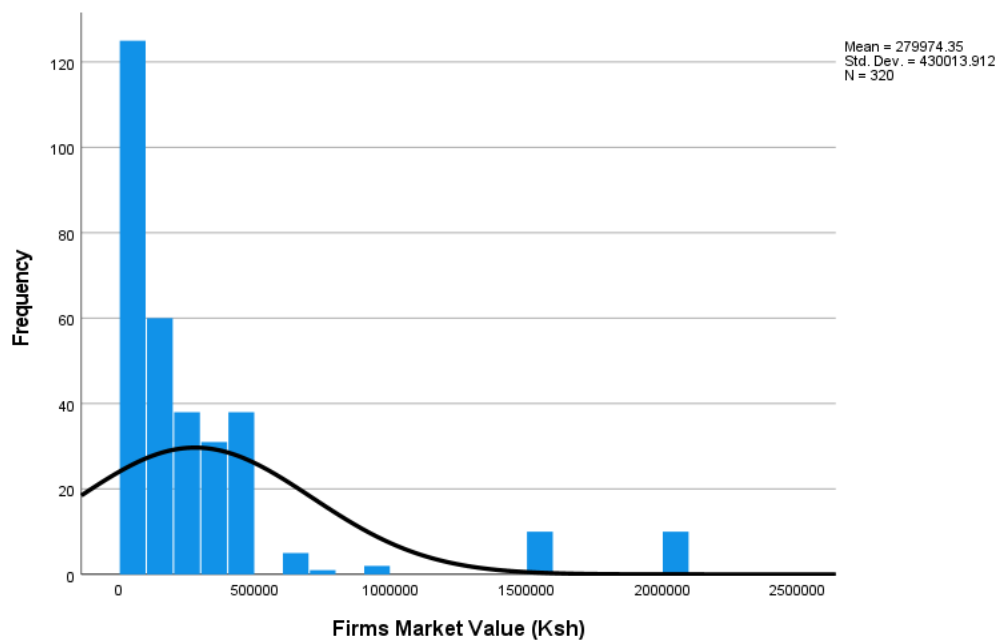


**Figure 2: Firms' value Normality -Normal Q-Q Plot**
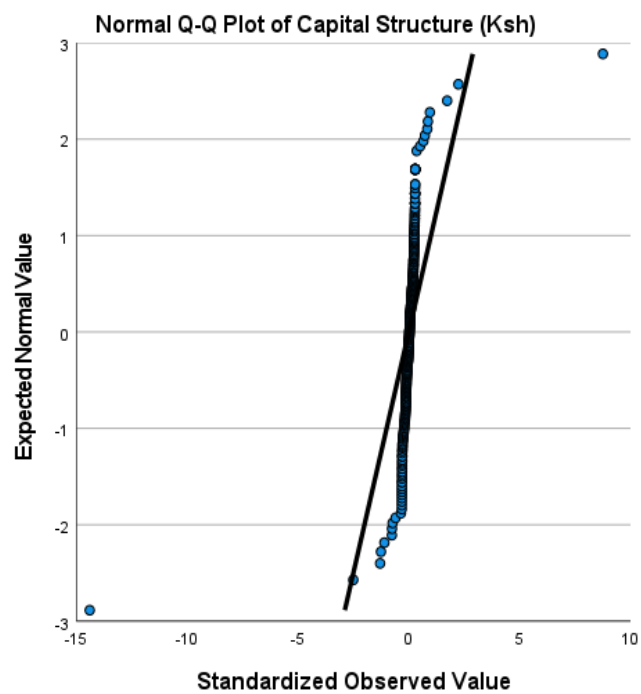
**Figure 3: Firms' value Normality -Histogram**
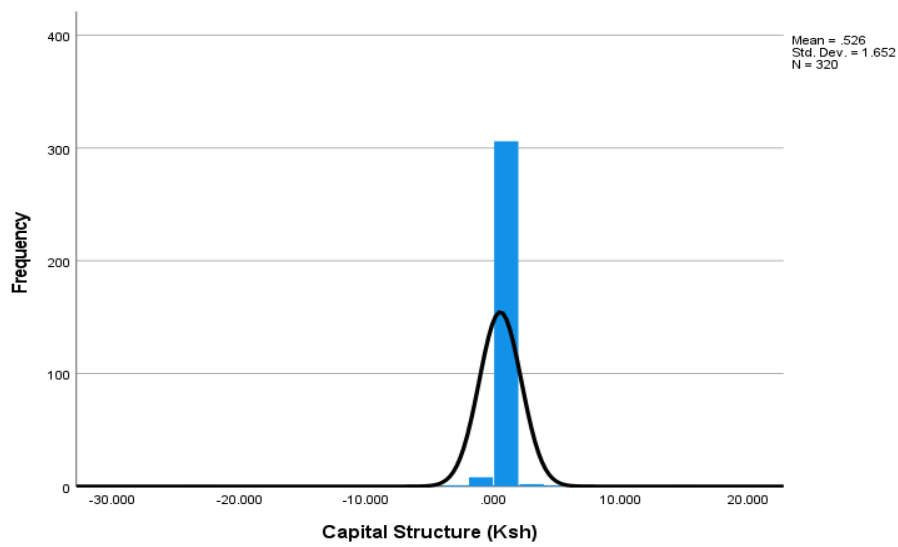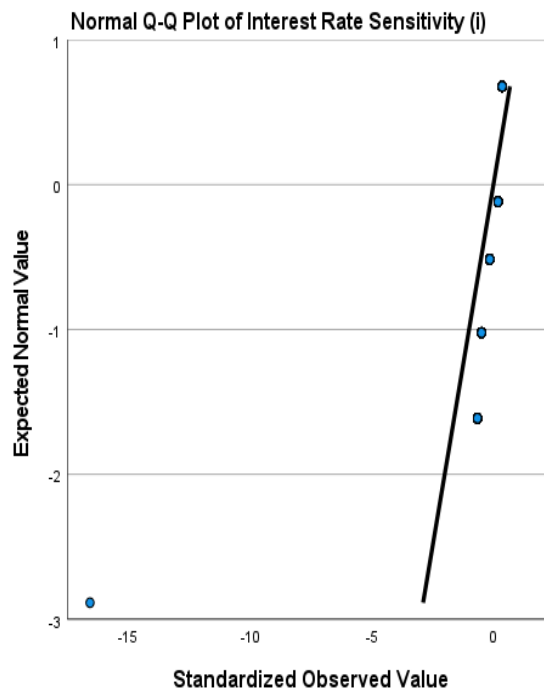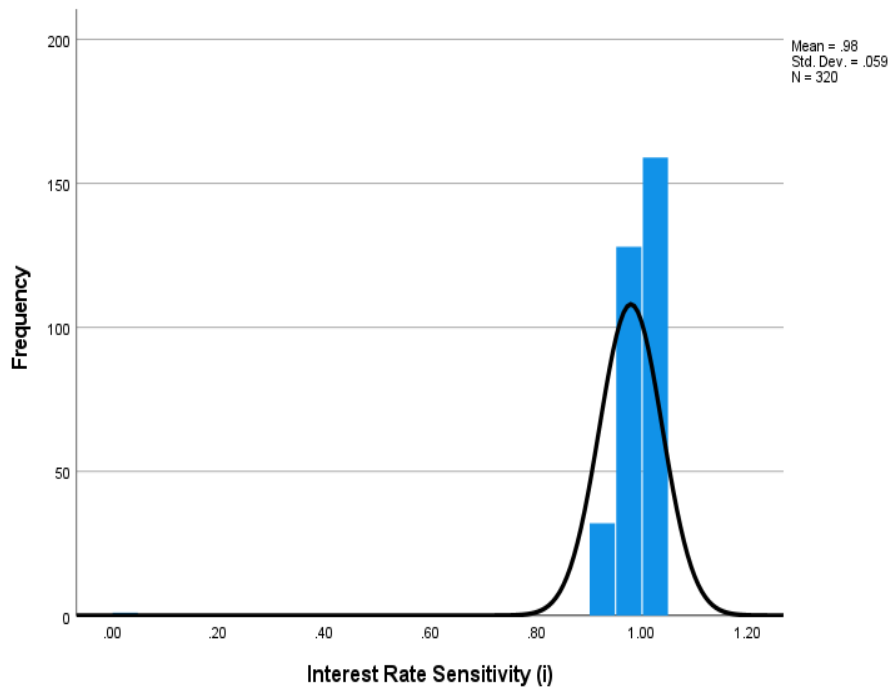


**Figure 4: Capital Structure Normality-Q-Q Plot**

**Figure 5: Capital Structure Normality-Histogram**



**Figure 6: Interest Rate Normality-Q-Q Plot**

**Figure 7: Interest Rate Normality-Q-Q Plot**

### 4.3.1.1 Outliers

Extreme data values do cause data output to be unreliable as a result of false generalization of final research findings, hence the possibility of misleading the consumers, especially when they would rely on the report findings to make informed financial management decisions. Given the existence of outliers detected at the data pretest stage occasioned by missing complete data for ten years, an intervention was initiated to address these data gaps. The detections were substantiated statistically by using box plots to detect extreme data points, which were subsequently isolated from data analysis. The total number of firms isolated was 13 due to a lack of complete data at some point, which led to the final analysis relying on 32 firms, culminating in 320 observations. More specifically, the six firms from the agricultural sector were dropped from the dataset as a result of zero debt, "unlevered" in their capital structure, given that they relied on equity to finance business operations except for the years 2019, 2020, and 2021 where they insignificantly borrowed at an average interest rate of 11% which led to debt to equity ratio attracting less than 3%   whereas three were drawn from commercial and services, one from investment services, two from manufacturing sector and finally one from real estate other which had completely missing data in some years due to going under, or joined NSE later after 2016.

**4.3.1.2 Data Transformation**
In addressing the non-normality in the dataset, a log transformation was employed to meet the assumptions for parametric tests and to ensure that patterns in data output become more interpretable with the afterward results shown below;

**Table 6: Data Transformation**

| Variable | Data transformation |
|---|---|
| Firms market value | Log Firms market value |
| Capital structure | Log Capital structure |
| Interest rate sensitivity | Log Interest rate sensitivity |

The section presents descriptive statistics about this research variable in relation to mean, mode, standard deviation, range, minimum, maximum, skewness, and kurtosis upon 320 observations, (N). Mean measures of central tendency are used to explain the most typical value among the observed frequency. The arithmetic mean is very useful because it represents the values of most observations in the population. The mean, therefore, describes the population quite well in terms of the magnitudes attained by most of the members of the population. The standard deviation reflects an accurate impression of how much the population data varied from the mean, whereas range is defined as the difference between the highest and the smallest values in a frequency distribution. In this case, SD was higher than the mean in firms' value and capital structure variable, which prompted outliers. This was corrected by excluding the outliers before further analysis was carried out. Further, skewness measures the symmetry or asymmetry of the population distribution of a real random value about its mean, meaning when data is dispersed in a balanced way from the left and from the right along the x-axis, it is termed as symmetry while the opposite becomes asymmetric data while kurtosis measures the peakedness or flatness of data distribution from the normal distribution, (Kothari, 2010).

**4.3.2  Multicollinearity**
In regression analysis, multi-collinearity may cause analysis problems if it appears that two or more independent variables in a model become more correlated. The effect may lead to difficulty in knowing how either of the variables affects the dependent variable, hence misleading an unrealistic conclusion (Dawes, 2000). The following table provides a numerical interpretation of the findings.

**Table 7: Multicollinearity Test using VIF**

| Variable | VIF | 1/VIF |
|---|---|---|
| Ln (Capital Structure) | 1.00 | 1.001 |
| Ln (Interest Rate Sensitivity | 1.00 | 1.001 |
| Mean VIF | 1.00 | |

The multicollinearity test results indicate that the variance inflation factor (VIF) for each independent variable, including the natural logarithm of the firm's market value (lnFirmsval), ln(Capital Structure), and ln(Interest Rate Sensitivity), is 1.00, with corresponding values of 1.001 for 1/VIF. The mean VIF is also reported as 1.00. These VIF values are exceptionally low and fall well below the commonly accepted threshold of 10, suggesting a lack of multicollinearity among the independent variables in the regression model. In this context, VIF values close to 1 indicate that there is minimal correlation among the independent variables, and each variable can be considered independently without redundancy. This absence of multicollinearity is crucial for the reliability of regression results, as high multicollinearity can lead to unstable coefficient estimates and decreased precision in predicting the dependent variable. Therefore, the findings from this multicollinearity test provide confidence in the robustness of the model, suggesting that the selected independent variables—the Firm's market value, Capital Structure, and Interest Rate Sensitivity—contribute unique information to the regression model, allowing for more accurate and reliable insights into the factors influencing the natural logarithm of the firm's market value.

**Table 8: Endogeneity Test**

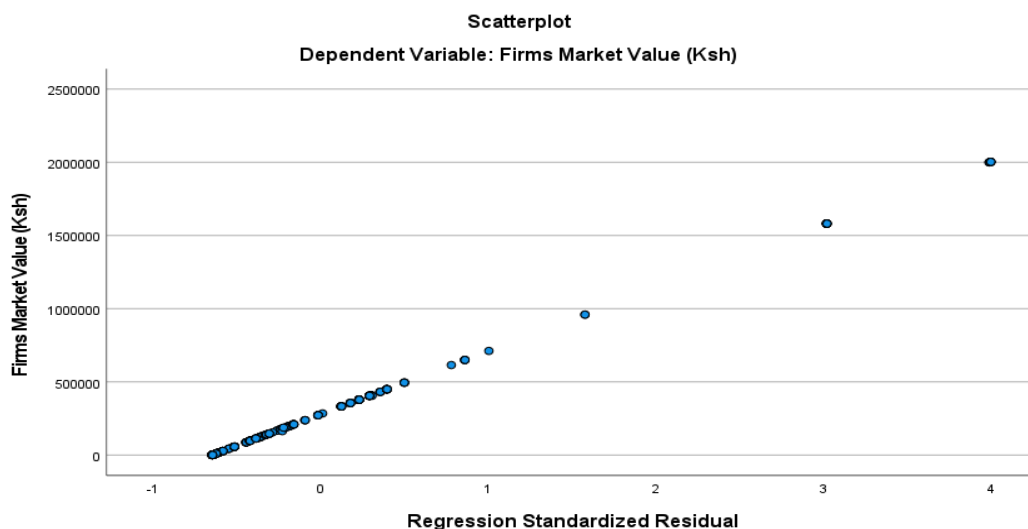| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|---|---|---|---|---|---|
| 1 | .003[a] | .000 | -.006 | 431366.803 | .170 |

In a different test, endogeneity becomes a threat to inferring causal effects in a regression analysis model when the predictor variable, in this case, capital structure and interest rate sensitivity, is significantly correlated with the error term. Further, Durbin-Watson indicates 0.17 and a standard error of 431366.803, which is below the accepted value of 2, indicating a statistically positive autocorrelation between dependent variables against independent variables.

**Table 9: Heteroscedasticity *Test***
***Breusch-Pagan/ Cook-Weisberg test for heteroscedasticity***

| Model | | Sum of Squares | Df | Mean Squares | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 616.696 | 3 | 205.565 | 0.181 | 0.910[b] |
| | Residual | 359680.35 | 316 | 1138.229 | | |
| | Total | 3606297.029 | 319 | | | |

The results of the Breusch-Pagan / Cook-Weisberg test for heteroscedasticity, specifically examining the fitted values of LnFirms Market Value, reveal a significant value of 0.910>0.05 null hypothesis (Ho) posits constant variance, and the relatively high p-value hence fails to reject this hypothesis at conventional significance levels, suggesting the absence of heteroscedasticity in the model for the Firms Market Value variable. The implications of these results are twofold. First, the finding supports the assumption of constant variance in the model, reinforcing the reliability of standard errors and parameter estimates derived from the regression analysis for firm market value. Second, it indicates that there is no significant departure from homoscedasticity, suggesting that the variability of the residuals remains relatively constant across different levels of the independent variable.



**Figure 8: Homoscedasticity Test**

The figure confirms the lack of homoscedasticity as the relationship between firms' market value along the Y axis indicates a smooth correlation with no outliers along the X axis on regression residuals. It is worth noting that homoscedasticity assumes that variances of residuals do appear the same across the dependent variable, which is not the case as depicted by the scatter plot, which shows consistency of regression standardized residuals herein referred to as capital structure and interest rate sensitivity.

### 4.3.3 Stationarity Test

The tables below present the results of the Levin-Lin-Chu unit-root test conducted to assess the stationarity of the Capital Structure, Interest rate sensitivity, and firm market value across the dataset. The null hypothesis (Ho) was that the panels contain unit roots, indicating non-stationarity, while the alternative hypothesis (Ha) suggests that the panels are stationary. The analysis involves 32 panels with a total

of 10 periods between 2012 and 2021, and the test considers common AR parameters and includes panel means as well as a time trend.

**Table 10: Levin -Lin unit-root Test for Capital Structure**

| Levin-Lin-Chu unit-root test for Capital Structure | | |
|---|---|---|
| Ho: Panels contain unit roots | Number of panels =32 | |
| Ha: Panels are stationary | Number of periods =10 | |
| AR parameter: Common | Asymptotics: N/T -> 0 | |
| Panel means: Included | | |
| Time trend: Included | | |
| ADF regressions: 1 lag | | |
| LR variance: Bartlett kernel, 6.00 lags average (chosen by LLC) | | |
| | Statistic | p-value |
| Unadjusted t | -17.1987 | |
| Adjusted t* | -10.8049 | 0.0000 |

According to the table above, the results indicate that the test rejects the null hypothesis of unit roots in the panels. The unadjusted t-statistic is -17.1987, and the adjusted t-statistic, accounting for panel means and a time trend, is -10.8049 with a p-value of 0.0000. These statistics strongly support the rejection of the null hypothesis, suggesting that the Capital Structure variable was stationary. The use of ADF regressions with one lag and LR variance estimation employing a Bartlett kernel with an average of 6.00 lags (chosen by LLC) further supports the conclusion; this implies that the structure of capital remained relatively constant over time, providing a stable foundation for financial planning and forecasting.

**Table 11: Levin -Lin unit-root Test for Interest Rate Sensitivity**

| Levin-Lin-Chu unit-root test for Interest rate sensitivity | | |
|---|---|---|
| Ho: Panels contain unit roots | Number of panels =32 | |
| Ha: Panels are stationary | Number of periods =10 | |
| AR parameter: Common | Asymptotics: N/T -> 0 | |
| Panel means: Included | | |
| Time trend: Included | | |
| ADF regressions: 1 lag | | |
| LR variance: Bartlett kernel, 6.00 lags average (chosen by LLC) | | |
| | Statistic | p-value |
| Unadjusted t | -7.9034 | |
| Adjusted t* | 5.4728 | 0.0000 |

According to the above table, the statistical results indicate a critical unadjusted t-statistic of -7.9034 and an adjusted t-statistic of 5.4728, corresponding to a p-value of 0.0000. These results support rejecting the null hypothesis of unit roots, providing

evidence in favor of stationarity. Thus, interest rate sensitivity within the examined panels was stationary.

**Table 12: Levin -Lin unit-root Test for Firms Market Value**

| Levin-Lin-Chu unit-root test for Interest rate sensitivity | | |
|---|---|---|
| Ho: Panels contain unit roots | Number of panels =32 | |
| Ha: Panels are stationary | Number of periods =10 | |
| AR parameter: Common | Asymptotics: N/T -> 0 | |
| Panel means: Included | | |
| Time trend: Included | | |
| ADF regressions: 1 lag | | |
| LR variance: Bartlett kernel, 6.00 lags average (chosen by LLC) | | |
| | Statistic | p-value |
| Unadjusted t | -7.9034 | |
| Adjusted t* | 10.3656 | 0.0000 |

The statistical results show an unadjusted t-statistic of -7.5426. The adjusted t-statistic, crucial for assessing stationarity, is 10.3656  , with a corresponding p-value of 0.0000. The high adjusted t-statistic suggests that the null hypothesis of unit roots in the panels can be rejected, providing evidence in favor of the alternative hypothesis that the panels are stationary.

## 4.4    Chapter Summary

This chapter envisioned dealing with a population of forty-five firms. However, the entire population would not be able to be analyzed due to the existence of incomplete data from the thirteen firms, as explained in Chapter 4, section 4.1. To cure the outliers, the dataset was transformed through a log, which led to 13 firms out of 45 being excluded from the targeted population, leaving the study to consider 32 firms in the final data analysis. More specifically, seven firms that were dropped from the dataset had zero debt, "unlevered" in their capital structure, given that they relied on equity to finance business operations, whereas six other firms had completely missing data in some years due to going under or joining NSE later after 2016.  Further, descriptive tests were undertaken to verify measures of central tendency targeting mean, median, quantiles, range standard deviation, kurtosis, and skewness. All the diagnostic test was successfully analyzed, warranting the authenticity of the data analyzed through the regression model approach by testing normality tests with histogram display and Q-Q plots for visual justification for all the study variables, stationary test, test for correlation, multicollinearity test, heteroscedasticity test, homoscedasticity test, and independence test. Finally, as a result, the findings formed an integral part of hypothesis testing and interpretation of the findings, as was pronounced in Chapter One under research objectives and Chapter Two under hypotheses testing.

# 5. Hypothesis Testing and Discussion of Findings

## 5.1 Hypotheses Testing

This sub-section was meant to address the three main hypotheses and a further discussion of their results in relation the content of model ranging from Pseudo R2, quantile performance, the number of observations, number of groups, Mean Absolute Error (MAE) and decision on whether to accept or reject Ho as well as report on level of significance. $H_0 1$; there is no significant joint effect relationship between capital structure and interest rate sensitivity as an intervening variable on market value of non-financial firms listed at Nairobi Securities Exchange.

### 5.1.1 Capital Structure, Interest Rate Sensitivity and Market Value of Non-Financial Firms Listed at Nairobi Securities Exchange in Kenya

The study sought to establish the joint effect of capital structure and interest rate sensitivity as an intervening variable on firms' market value of non-financial firms listed at NSE.

**5.2.1.1 $H_0 1$: There is no Significant Joint Effect of Capital Structure and Interest Rate Sensitivity on Market Value of Non-financial Firms Listed at NSE**

The hypothesis sought to address $H_0 1$; "There is no significant joint effect of capital structure and interest rate sensitivity as an intervening variable on the market value of non-financial firms listed at NSE in Nairobi, Kenya," taking into account that the previous hypothesis testing looked into the effects in isolation. The variables were treated as an aggregate of capital structure, which included a sum total of equity and both short-term and long-term debt, whereas interest rate sensitivity was considered as a composite of both short-term and long-term rates as their disparity was evidently negligible over the ten-year period. Hypothesis three, therefore, combined the two variables by testing their joint effects on firms' market values. As evidenced earlier, both hypotheses 1 and 2 previously posted varied relationships with the dependent variable. Further, using the same model to confirm $H_0 1$ findings, the results are as discussed in Table below;

**Table 13: Testing of Hypothesis – $H_0 1$ Joint Effect of Capital Structure and Interest Rate Sensitivity on Market Value**

| | | Number of obs = | 320 |
| | | Number of groups = | 32 |

**Model Quality a,b,c**

| | q=0.25 | q=0.5 | q=0.75 |
|---|---|---|---|
| Pseudo R Squared | .819 | .789 | .862 |
| Mean Absolute Error (MAE) | 49794.6813 | 49176.5438 | 58736.7281 |

a Dependent Variable: Firms Market Value
b Independent Variable: Interest Rate Sensitivity & Capital Structure

c Method: Simplex algorithm

Sensitivity & Capital Structure
c Method: Simplex algorithm

Table 13 on the joint effect of capital structure and interest rate sensitivity on market value depicts strong and statistically significant results. As a result of quantile regression analysis, the model quality that yielded the results had been determined through Pseudo R squared values, the corresponding Mean Absolute Error of firms' value with application of simplex algorithm method. The results indicated that the pseudo-R squared among the quartiles; q=0.25, q=0.5, and q=0.75, yielded 0.819, 0.789, and 0.862, respectively, suggesting that the model explains 78.9% to 86.2% of the variations in market value across the quantiles hence confirmation of strong relationship between joint independent variables and the dependent variable. As a result, capital structure played a dominant role in explaining market value over interest rate sensitivity as an intervening variable. Further, low MAE, ranging from 49,176 to 58,736, suggested the best model fit and explained how close the model was to actual market values. Therefore, the result of the joint effects provides a better fit than treating interest rate in isolation. There were 32 groups and 320 observations over the 10-year period we considered in the analysis. Finally, the null hypothesis is therefore rejected

The study further disintegrated the capital structure by focusing on debts separate from equity value and interest rate sensitivity for possible effects on firms' market value. Interest rate sensitivity was considered as an intervening variable throughout the study, with a trend that kept on changing annually throughout the ten-year period. This further analysis helped in understanding the specific intra-relationships behavior of interest rate and debt and if its explanation why firm preferred debt over equity in the capital structure as opposed to the general approach. This helped in explaining whether interest rate sensitivity drives the uptake of debt capital over equity capital over the ten-year period, as explained in Table 14 that follows;

**Table 14: Analysis of Interest Rate Sensitivity and Debt Value**

| Model Quality[,b,c] | | | |
|---|---|---|---|
| | q=0.25 | q=0.5 | q=0.75 |
| Pseudo R Squared | 0.705 | 0.785 | 0.783 |
| Mean Absolute Error (MAE) | 0.0052 | 0.0045 | 0.0046 |
| a. Dependent Variable: Interest Rate Sensitivity | | | |
| b. Model: (Intercept), Debt | | | |
| c. Method: Simplex algorithm | | | |

From the table above, where the two variables were tested for a possible significant relationship between them and the result showed a significant inverse relationship between debt value and interest rate sensitivity with the ratio spread along the quartiles; q=0.25, q=0.5 and q=0.75 revealed Pseudo R Squared of 0.705, 0.785 and 0.783 respectively with the analyzed data subjected to 95% level of confidence. The quantile regression model considers such outputs as significant since all the quartiles showed values greater than 0 and significantly closer to 1, which is a universally acceptable range. Under such findings, non-financial firms' capital structure implied that as interest rate moves away from high to low, 18.5% down to 11.45% pa under the 10 years period concluding the analysis that interstate has statistical power in driving the uptake of debt capital over equity.

## 5.2    Discussion of the Findings

This subsection provides comprehensive discussions emanating from the hypothesis tests from the succeeding subsection broken down into hypothesis test results and alignment with the possible theoretical foundations. Further, the discussion equally looked at the potential relationships of the findings with the reviewed journals and final managerial discussions as detailed herein.

### 5.3.1 Ho1; Joint Effect of Capital Structure and Interest Rate Sensitivity and Market Value

Results of the Ho1 revealed significant joint effect the structure of capital and interest rate sensitivity had in determining firms value under various levels of quantiles where the regression revealed that   q=.75 explained higher effect of 0.862 followed by q=0.25 with 0.819 and finally the median q=.50 with 0.789 with a mean absolute error of firms value ranging from 58736.7281, 49794.6813 and 49176.5438 respectively based on 32 firms with 320 observation over ten years period. The result rejected the null hypothesis based on the final analysis results
As explained earlier the combined effect does significantly affect the firm's market value, concurring with the Pecking order theory (Myers & Majluf, 1984) that argues that firms that take advantage of tax deductibility in debt capital priority over equity capital, which is perceived to be expensive especially when interest rate become favorable to management would translate to increase in firm's value. The same

complementary research on the review of the pecking order theory (Jensen & Meckline,1977) argued that leverage remains beneficial to firm managers up to some level, after which cost-benefit analysis starts reversing. Additional theory supporting the significant finding is pegged on Market timing theory (Ross, 1976) which confirms that firm management do adjust their capital financing based on bonds and interest rate market status in this case 10 years period as per this study.

Similarly, the findings implied that firms' capital structure and interest rate sensitivity are jointly significant predictors of firms' market value, as it appeared that firm managers might have made capital structure decisions in favor of debt over equity because the interest rate showed a declining trend for both short term and long-term rate over the 10 years period. The evidence showed that leverage decisions were a result of an inverse relationship between debt capital and interest rate risk and, hence, seemed profitable to all the firms that were considered in the study. The same complementary research on the review of the pecking order theory (Jensen & Meckline, 1976) argued that leverage remains beneficial to firm managers up to some level, after which cost-benefit analysis starts reversing.

The study was also in conformity with the findings of (Aloui & Jarboui, 2016), who investigated sectors dealing in financial services, insurance, and banking to determine how market interest rates affected their stock returns in a period that was characterized by the financial crisis as opposed to the normal financial period under. A different foreign study combining capital structure component and interest rate risk also found a significant effect on firms' value concurring with this study's finding despite using different analysis models, namely, "dynamic panel regression considering for 6 years data with a population of 29 firms (Sarfraz et al., 2020). In addition, another international study in the USA found a significant effect of the combination of capital structure and interest rate on firms' performance with further sectoral analysis, which showed an equally significant effect. Although they considered the time period compared to this study, the result showed a similarity in relationship (Matos, 2018). Furthermore, these findings aligned with (Al Harbi, 2019), who found that among other factors that influence profitability, interest rate sensitivity significantly affects non-financial sector leverage level, which further affects firm market value due to the low cost of borrowing. Further, the result concurs with the (Dezele & Korkeamaki, 2018) findings, which found that equity became less sensitive to interest rate sensitivity when compared to debt capital since non-financial firms took advantage of debt equity over additional stock issuance. This confirms why equity capital remains static in the long run compared to debt capital, which remains dynamic based on changes in borrowing interest rates.

In conclusion, the findings implied that firms' capital structure and interest rate sensitivity are jointly significant predictors of firms' market value, as it appeared that firm managers might have made capital structure decisions in favor of debt over equity because the interest rate showed a declining trend for both short term and long-term rate over the 10 years period. The evidence showed that leverage decisions were a result of an inverse relationship between debt capital and interest rate risk and, hence seemed profitable to all the firms that were considered in the

study. In addition, the debt/ bonds appetite become attractive to the firm managers as they became affordable in the bond market with time pushing the firms to borrow more and vice versa. From the field data, it can be deduced that the majority of managers do strategically monitor the interest rate market/trend, which informs speculative motives to increase leverage at any moment the borrowing rates become cost-effective by considering bond maturity, coupon rates, as well as yield to maturity. It's worth noting that when firms borrow cheap loans, chances are that the management would channel the debt finances either towards the expansion of its operations, trade-off expensive debts, or acquire a stake in other blue-chip firms; such speculative moves become critical factors as long as cheaper debts become available in the market. Furthermore, lowered interest rates further inform the government to increase disposable income geared toward increasing purchasing power, which translates into GDP growth.

**Table 15: Summary of hypothesis testing, results, and interpretation**

| Objectives | Hypotheses | Analytical Methods | Result | Interpretation |
|---|---|---|---|---|
| To establish the joint effect of capital structure and interest rate sensitivity on market value of non-financial firms listed in Nairobi Securities Exchange. | $H_0$ 1; There is no significant joint effect relationship between capital structure and interest rate sensitivity on market value of non-financial firms listed at Nairobi Securities Exchange | Quantile Regression model $MVt= \beta 0+ \beta 1CSt + \beta 2INTt+Ɛt$ | The null hypothesis was rejected | The R2 values associated with the quantiles showed .75=0.862, .50=0.789 and .25=0.819 all lying within 0 to1 ≥0.5 at significance level of 0.05 suggesting existence of statistical significance thus reject null hypothesis. |

# 6. Summary, Conclusion and Recommendation

## 6.1 Summary of Findings

This research was based on the three variables, namely capital structure, interest rate sensitivity, which was considered as an intervening variable, and finally market value as the dependent variable. Contextually, Kenya was prioritized based on the academic gaps stated earlier, proximity to the researcher, and limited research financial resources. Further, non-financial sector preference was guided by its major contribution factor to GDP and as well as job opportunity platform for the majority of Kenyan youths. In addition, due to well-organized and regulated institution, NSE was found fit to be the best source of research data since its guaranteed data validity, reliability and accuracy. It's worth noting that the study was driven by one main research objective namely; to establish the joint effect of capital structure and interest rate sensitivity as an intervening variable on market value. The tested hypothesis subjected to diagnostic tests was realized by considering thirty-two firms, culminating into 320 observations for ten years, 2012-2021, applying the quantile regression model.

The main objective, to establish the joint effect of capital structure and interest rate sensitivity on the market value of non-financial firms listed in the Nairobi Securities Exchange, the study found that the R2 values associated with .75=0.862, .50=0.789 and .25=0.819 all lying within 0 to1 and closer to 1 at a significance level of 0.05. The conventional significance level is 0.05, indicating that there is sufficient evidence to accept the alternate hypothesis. The dominant variable between capital structure and interest rate sensitivity in predicting the market value was maintained by the capital structure, signaling its predictive power across all the quantiles. A further analysis anchored on $H_01$ looked into the effects of the intrarelationship between interest rate sensitivity and debt value which was preferred by majority firms and their effect on firms' value posted significant inverse relationships, meaning that as interest rate decreases, more debt appetite increases, leading to an increase in firms value and the opposite was equally true.

In conclusion, theoretically, (Modigliani and Miller, 1963) preposition II, (Myers & Majluf, 1984) "pecking order theory, market timing theory (Ross, 1977) and liquidity preference theory (Keynes, 1976) were all found to support this research findings together with the reviewed journals for example, reviewed journals, however, portrayed varied results as was compared with the findings confirming academically that various researchers may have divergent views despite having similar variables of the study more so based on sectoral factors, regulatory factors, contextual factors as well as conceptual considerations.

## 6.2 Conclusions

This chapter derived its conclusions by looking into the key research objectives where the first objective was intended to establish the effect of capital structure on the market value of non-financial firms listed at the Nairobi Securities Exchange in Kenya, where the result found that there was significant relationship between capital

structure and the market value of non-financial firms listed at the Nairobi Securities Exchange, meaning that despite increasing the leverage as a result of fluctuating interest rate as low as 11% and as high as 18% over the 10 years study period, firms value remained significantly affected. This was verified upon collecting data for a period of 10 years from 2012-2021, looking into all listed firms at NSE except for the banking and insurance sectors. Significantly, all firms showed increasing growth in debt and equity except a few, which were excluded due to missing critical data, with the final data settling on 32 firms instead of 45. Theoretically, (Modigliani and Miller, 1963) preposition II did hold despite having higher leverage as a result of a fall in interest rate in the 10 years' period the null hypothesis was rejected, hence a significant effect on firms' value. (Myers & Majluf, 1984) the pecking order theory also stood the test as it was considered among the theories underpinning this research, with the trend showing firms prioritizing cheaper debt over additional expensive equity both in short-term and long-term status. Equally, the market timing theory (Ross, 1977) played a vital role, as was seen in the sector's financial performance and uptake of varied capital structures. It was clear that firm managers kept watching the prevailing interest rate pattern and swiftly took advantage based on varied sector-specific factors.

Empirical evidence reviewed supported this study's findings, ranging from (Admati et al., 2018), with their findings showing similar results but going further and confirmed that shareholders are keen to ensure leverage appetite is allowed to an acceptable level. A Tehran study was equally in agreement with these research findings (Fumani & Moghadam, 2015). The final similarity in findings under the foreign context, in Turkey, confirmed a significant negative relationship with a confirmation that reduction in debt proportion in the structure of capital reduces a firm's value. In locally regulated sectors other than internationally regulated security exchange markets, the Microfinance sector posted the same significant relationship (Chikeya, 2018), not forgetting the Kenyan context majorly on unpublished research articles ended up posting similar findings as evidenced by scholarly works of (Tonui, 2018) and (Mugeti, 2018).

In addition, effect of interest rate sensitivity on the firms' market value of non-financial firms listed at Nairobi Securities Exchange found out that there was no significant relationship between interest rate sensitivity on the market value of the firms considering the duration of the research. Having consistently been pre-evaluated even with the excluded firms, a change in interest rate would not salvage their value performances, and even further, no firms' market value significantly realized value growth. From the data, the parity hardly went beyond 1:1 between short-term borrowing and long-term borrowing rates, with a likelihood of indifference between managers taking advantage of general debt over equity or vice versa.

Liquidity preference (Keynes, 1976) theory remains strong to support the variable throughout the interest rate sensitivity period,10 years on both short-term and long-term basis. In addition, the market timing theory (Ross, 1977) also holds since a significant number of firms monitored the interest rate trend over ten years, leading

to firm managers opting for both short-term and long-term bonds in different proportions.

Empirical evidence by (Al Harbi, 2019) confirmed that there was the existence of an inverse relationship in the non-financial sector, which showed a significant negative relationship between interest rate and performance of firms' value as opposed to financial sectors.    In addition, in support of these findings, (Asseffa et. al., 2016) applied the dynamic panel regression method and found that different margins in interest risk significantly affected the stock returns of countries that were fully developed, which agrees with sectoral analysis, more specifically, the agricultural sector. Kenyan context based on the reviewed studies concurred with the results of this study as evidenced by (Waitherero, 2021).

Having looked at these variables independently in the earlier analysis, the joint effect equally portrayed significant correlations. Jointly, capital structure and interest rate sensitivity do appear to be statistically significant in influencing the performance of the market value of the firms. Therefore, the joint effect of capital structure and interest rate sensitivity does appear to be statistically significant in influencing the market value of the firms in the study having the R2 values associated with .75=0.862, .50=0.789, and .25=0.819 all lying within 0 to1 and closer to 1 at a significance level of 0.05 indicating that there is sufficient evidence, implying that firms' capital structure and interest rate sensitivity jointly are significant predictors of firms' market value concurring with (Modigliani & Miller, 1963) preposition II that argues that firms that take advantage of tax deductibility in debt capital composition.

The study was also in conformity with the findings of (Aloui & Jarboui, 2016), who investigated sectors dealing in financial services, insurance, and banking to determine how market interest rates affected their stock returns. A different foreign study combining capital structure component and interest rate risk also found a significant effect on firms' value, concurring with this study's finding despite using different analysis models (Sarfraz et al., 2020). In addition, another international study in the USA found a significant effect of the combination of capital structure and interest rate on firms' performance with further sectoral analysis, which showed an equally significant effect.

Finally, a further breakdown of disintegrated capital structure, which looked into the relationship between interest rate sensitivity and debt value and the possible effect on firms' value, a scenario that resulted in a significant inverse relationship between the two additional analysis tests. This result was equally found to affect firms' value based on the nature of interest rate volatility. It was confirmed that as interest rates decrease, firm managers increase leverage by taking more debt capital as opposed to equity, as it appeared that the cost of raising debts became cheaper over equity. The ratio spread along the quartiles bored the results as q=0.25, q=0.5, and q=0.75, revealing pseudo-R-squared of 0.705, 0.785, and 0.783, respectively, which was subjected to a 95% level of confidence. In addition, theoretical conformity is aligned with market timing, pecking order, and Keynesian theory, as was explained earlier in this section.

## 6.3    Recommendations

This section discusses the key sectoral, academics, management, and policy recommendations aligned to this research findings as described in the document and as envisioned in chapter one. These practical recommendations are vital to whoever will find this study valuable.

### 6.3.1    Contribution to the Body of Knowledge

Theoretically, findings are anticipated to be of great importance in complementing the body of knowledge through critiques, learning, and gaining more academic knowledge in finance discipline, which would be in line with the stated variables, namely, capital structure, interest rate sensitivity, and market value. The liquidity preference theory (Keynes, 1976), which considered an equilibrium of demand and supply to determine interest rates, concurred with the research findings partially. This is because despite showing the aggregate insignificant effect on firms' value, a further analysis resulted in sector-specific significance, as was seen in the agriculture and telecommunication sectors analysis result. A confirmation that as interest rate decreases, demand for money for investment opportunity yields varies perceptions by firms' managers.

Further, the interest rate sensitivity for the entire study period of the research showed no evidence of being determined in the free market by demand and supply of money but rather controlled by CBK as a benchmark rate, which further is relied upon by different sectors to set varied prevailing bond market interest rates which negate the assumption of (Keynes, 1976).   Market timing theory (Ross, 1977) stood the test as a result of this study's findings, as it was evidenced that firms traded on bonds at different periods as a result of favorable interest rates. Collected data indicated clearly that several firms offloaded bonds that were perceived to be expensive and traded them off with cheaper bonds as the interest rate persistently showed a declining trend from 18.15% down to 11.45% on long term debt and from 18.15% to12.16% on short term debt for the 10 years, while other firm managers invested in new bonds as a result of speculative factors based on the interest rates movement trends coupled with the possibility of excess funds available for additional investment. It was deemed that market timing would, at a future date, see the rate of interest increase immediately after it reached the tipping point, which would trigger better bond income, hence higher speculative firms' market value. Such moves will see reversed changes in the debt-to-equity ratio, bond maturity, interest rate sensitivity, inverse relationship between interest rate and debt capital, as well as market capitalization. This research can, therefore, conclude that the market timing theory has stood the test of time as a theory and can be relied upon in making academic decisions.

Additionally, the pecking order theory (Myers & Majluf, 1984) vividly stood the test of academic conformity. Based on this research model, firms indicated a similar pattern of giving priority to cheaper debt over expensive equity up to a certain point to avoid dilution of shareholders' stakes, as too much debt may lead to financial

distress, especially when firms are not able to settle the loan obligations when they fall due. It was equally observed that the priority of both short-term debt and long-term debt relied on the interest rate risk factor. An additional theory that stood the test was (Modigliani & Miller, 1963), which saw managers of firms taking consideration of trading in shares and bonds in equal proportion to ensure firm value remains stable or increases by balancing the ratio between debt and equity by considering the driving factor, "interest rate sensitivity." Such moves are geared towards minimizing agency conflicts, sustaining shareholders, attracting potential investors, managing restrictive covenants, expanding business through possible mergers and acquisitions, and guaranteeing return on investments.

A quantile regression model would be appreciated as modern, robust, and able to deal with minor variations, which guarantees the reliability of analysis output. I would recommend this model, "Quantile Regression," for further application by students who would wish to carry out similar or related studies. Further, the model can give results broken down into quartiles, which gives a further range of variables relationships leading to robust informed decision-making by firm managers. Further, as for the Kenyan context characterized by a change of political regime, a ten-year period or above would be worth considering as this would help scholars willing to carry out similar tests in the future to observe regime change management of interest rate risk and how such economic decisions impact on investment opportunity in terms of capital structure mix and firms' stability.

By extension, academicians who are interested in carrying out further research considering the same or related variables would continue with the gaps realized in this research or consider the content among their reviewed journals under contextual and or conceptual considerations. Commercial authors under the finance discipline, via the consent decree, would equally find this content very useful and complement the findings in their publications equally. Academically, I would wish to encourage academicians and commercial researchers to look further into additional variables other than these three, other conceptual considerations within Kenya, increasing research period, and change of economic sector for a more robust finding that would allow the government to specifically address the real problem that would guarantee positive firms market values.

### 6.3.2   Contribution to Management

I would wish to recommend these research findings to non-financial firms' decision makers who would find it necessary and consider the variables in decision-making. In a different dimension, the relationship findings would explain how better non-financial firms' management would be able to position themselves in matters related to enhancing firms' market values in regulated security exchange markets in Kenya with the tested hypotheses findings. In the first step, a significant relationship between capital structure and firm market value provides significant leverage to firm managers who are entrusted with shareholders' finances to invest wisely. A ten-year period proved that as average interest rates declined steadily from 18.15%

to 11.15%, there was evidence of switching to both short-term and long-term bonds by firms led by blue chip firms in the telecommunication sector, a move that could be adopted by other firms' managers by taking advantage of monitoring market information and making an informed investment decision. A proactive manager can take the opportunity to trade off an expensive debt against cheaper debts as interest rates continue to fall, which would see a valued, cost-effective capital structure translating into releasing more finances for profitable investment opportunities. Such profitable moves allow significant trust between shareholders and bondholders, shareholders and management, create trust and creditworthiness standards, attract incentives towards firm managers, and reduce agency costs, besides attracting other potential investors.

In the event that managers burst investment margin as a result of stable capital structure choice and stable firms' value, an expansion of business can be sought through the acquisition of other poorly managed firms that would be turned around, further increasing merger value in the long run. Besides acquisition, prospective managers, upon realizing potential economic synergy, may take advantage of a merger, a situation that may be reached as a result of a party having a strong capital structure and another one with a stable market value. The merger would likely create a strong brand and profitable products, thereby increasing the new formation value. Objective two looked into the effect of interest rate sensitivity and firms' market value. Managers would be able to take note of market timing in a very tactical manner as in the first step, it was realized that aggregately, there was an insignificant effect of interest rate on firms' value. This general assumption might lead to firm managers making wrong financial management decisions and would be required to further scan the interest markets keenly by looking into sector-specific factors. Therefore, a continuous decrease trend in interest rate reduction may not outrightly instigate absorption of much cheaper debt in the capital structure; further effort should be put into research and development to ascertain the possible availability of investment opportunities, availability of clientele, loan restrictive covenants, availability of market, shareholders' interests as any wrong financial moves may lead management in incurring unnecessary expenses which may further dilute firms value. For example, too much debt means dilution of net operating income as bondholders have to be given priority of sharing profit before shareholders, a scenario that may leave them with minimal returns on shares, hence discouragement that may see them switch to better alternative firms or take disciplinary actions against nonperforming managers. In addition, firm managers can get the interest rate factors, which are very important to aid in trading off high-interest rate bonds with low-interest bonds, hence saving on the cost of servicing such loans. Such savings may be reinvested elsewhere, for example, on short-term government bonds, mutual funds, or trust funds, thereby increasing external additional investment income, which translates into higher firms' value.

The joint effects of capital structure and interest rate sensitivity posted a significant effect on firms' market value. These results can help management to scan the market environment jointly as well and make informed financial management decisions as

described in the results of objectives one and two. A test-retest may be applied by management where singular consideration might not lead to a profitable outcome. In any event, joint consideration may be adopted by management; it's highly recommended that the earlier discussion and recommendations be applied.

Finally, management may wish to consider further the relationship between interest rate sensitivity and debt capital, which the result found to be inversely related, and take such measures as monitoring the debt/ bonds appetite within the capital structure and the subsequent effects on bond maturity, coupon rates; shareholders return on investment as well as yield to maturity. Monitoring the inverse relationship remains a critical consideration to firm managers since monetary policies, political instabilities, global economic factors, credit demand and supply, inflation, real economic activity, and bond maturity period may reverse the interest rate to increase, which will have a direct inverse effect against debt appetite. So, management needs to take advantage of cheaper bonds within a reasonable time, lest the rates be affected by the stated matters. At the time of higher borrowing rates, management may resolve into equity capital at a rate lower than expensive bonds. Such moves attract additional shareholders who would wish to switch to a well-rewarding firm.

### 6.3.3    Contribution to Policy Formulation

Apart from management, policymakers like government agencies, KRA, CBK, NSE, Chamber of Commerce, etc. Would factor in incentives other than interest rate and capital structure regulations to incentivize firms that would see them grow in market value since nonperforming firms may opt out of the country and relocate to other countries with better financial and economic terms or shut down completely as had been seen from the collected data. Such moves would affect GDP through loss of job opportunities, low tax revenue, loss of transfer of expatriate labor capital, discourage potential investors as well as poor global country ranking based on inefficiency to operate a business in Kenya. CBK may consider prevailing interest rates in a manner that would have a significant effect on borrowings. The ten-year interest rate analysis showed an insignificant effect on non-financial firms' performance despite having the parity between short-term and long-term interest rates at almost 1:1. Why not increase the parity for a significantly longer period? NSE should consider creating a favorable business environment platform that guarantees entrants to the market and not moving earnestly to deregister existing firms or regularly change compliance conditions as economic performance changes as a result of legislative changes since Kenya is characterized by legislative, economic changes after every five years which have ended up affecting capital structure of some sectors, e.g., agricultural and manufacturing and allied. The Chamber of Commerce should look into security market indicators other than capital structure, which should be introduced to promote positive firm value. Such moves would form an economic appetite and woe global and regional investors with a guaranteed return on the firm's value.

Further, key stakeholders not limited to the government and international financial regulators would find this report important in policy formulation through the publication of financial journals whose content would be read by interested individuals or stakeholders for informed decision-making.

## 6.4    Limitations of the Study

This research study blueprint ended up with some limitations, though not adverse, that affected the realization of the stated objectives. At the proposal stage, the anticipated population was considered to be forty-five non-financial firms listed at NSE in Kenya. However, during field data collection, there was an emergence of firms with incomplete data within the data set, which was realized and transformed accordingly since their inclusion would have led to misleading generalization of the research findings. To guarantee data validity and reliability, 13 firms out of 45 had to be excluded from the dataset before further analysis was carried out.   Seven firms that were dropped from the dataset had zero debt in their capital structure, given that they relied on equity to finance their business operations, whereas five other firms had completely missing data in some years.   Further, financial constraints during the research period became much of a challenge, especially during data gathering. In addition, some data components would show incomplete information, which called for the researcher to explore other skills to gather the missing information elsewhere. These scenarios led to delays in completing fieldwork on time.

## 6.5    Suggestions for Further Research

As for this research, which explored the existence of relationships between capital structure, interest rate sensitivity, and market value of non-financial firms listed at the Nairobi Security Exchange in Kenya, further research would be recommended to test the same variables by considering firms not listed or the entire firms listed at NSE or completely looking into other variables other than these but retaining firms value or alternatively retaining the same variables with another measure of financial performance other than firms value. Contextual consideration may also be explored by considering carrying out the same research outside Kenya, more specifically, in the least developed countries, which are majorly occasioned by economic incentives or a combination of East African Community member states since they possess varied interest rates on borrowings.

The research period may be extended beyond 10 years, tracing backward and targeting three political regimes as there may be financial legislative uptakes related to interest rates and their effects on the firm's market value. Finally, one may explore financial firms and the insurance sector by maintaining the same variables and testing the hypotheses as have been tested herein. This will provide proof of whether sectors are significantly affected by interest rate dynamics or changes in capital structure are induced positively by favorable interest rates, which in turn increases firms' market value.

**REFERENCES**
[1] Admati, A. R., Demarzo, P.M., Hellwig, M. F. & Pfleiderer, P. (2018). The Leverage Ratchet Effect. *Journal of Finance, 63* (1)*,* 145-198.
[2] Ahmadpour, A., & Yahyazadehfar, M. (2010). Financial Management Leverage. *Mazandaran University, 7th edition.*
[3] Akerlof, G. A. (1970). The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *Quarterly Journal of Economics, 84* (3), 488-500.
[4] Al Harbi, A. (2019). The determinants of conventional banks' profitability in developing and underdeveloped OIC countries. *Journal of Economics, Finance and Administrative Science*, *24* (47), 4–28.
[5] Aloui, M. & Jarboui A. (2016). Market, interest rate, and exchange rate risk effects on financial stock returns during the financial crisis; AGARCH-M approach. *Cogent Economics & Finance, 4* (1), 1-17.
[6] Assefa, T., Esquede, O. & Mollick, A.V (2016). Stock Returns and Interest Rates around the World: A Panel Data Approach. *Journal of Economics and Business, (89),* 20-35.
[7] Babbel, D. F. (1983). Duration and term structure of interest rate volatility. *New York Press,* (5), 239-265.
[8] Baker, M. & Wurgler, R. (2002). Market Timing and Capital Structure. *Journal of Finance, (57),* 1-32.
[9] Baxter, N. (1976). Leverage, risk of ruin, and the cost of capital. *Journal of Finance, 22,* 395-403.
[10] Bhandari P. (2020). What is quantitative research? Methods and examples. https://www.scribbr.com/methodology/quantitative-research.
[11] Bhattacharya S. (1988). Corporate finance and the legacy of Miller and Modigliani. *Journal of economic perspective, 2*(4), 135-147.
[12] Boyani, O. R. (2013). The effect of capital structure on the Cost of Capital of firms listed at Nairobi securities exchange, *unpublished.*
[13] Brealey, R. & Myers, C. (1988). Principles of Corporate Finance (3rd Ed) *New York, McGraw-Hill.*
[14] Capital Market Authority. (2020). *hppt://www.cma.or.ke*
[15] Chikeya, R. (2019). Effects of Capital Structure on Company Performance, A Perspective of Small Cap Companies In South Africa., *Faculty of Commerce, Graduate School of Business (GSB).*
[16] Cooper, D.R. & Schindler, P.S. (2003). Business Research Methods. *New Delhi Tata McGraw-Hill.*
[17] Copeland, T.E. & Weston, F.J. (1988). Financial Theory and Corporate Policy. *(3rd Ed), Addison-Wesley Publishing Company.*

[18] Dezele, F. & Korkeamaki, T. (2018). Interest rate risk management with debt issues: Evidence from Europe. *Journal of Financial Stability,* (36), 1–11.

[19] Ehrhardt, M. & Brigham E. (2003). Corporate Finance, a Focused Approach. *(1st Ed), Mason, Thomson.*

[20] Fama, E. F. & French K. R. (2000). Forecasting profitability and earnings. *Journal of Business,* (73), 161–175.

[21] Fama, E. F. & French, K.R. (1998). Taxes, financing decisions, and firm value. *Journal of Finance,* (53), 819-843.

[22] Fumani, M. A. (2015). The effect of capital structure on firm value, the rate of return on equity, and earnings per share. *Research journal of finance and accounting, 6,* (15), 50-57.

[23] Gordon, R.H., and Shoven, J.B. (1982). Interest rates, Inflation and Corporate Financial Policy, *Brookings Paper on Economic Activity*, 2, 461-491.

[24] Harvey, C. (1995). Predictable risks and returns in emerging markets. *The review of financial studies, 8,* (3), 773-816.

[25] Jensen, M. & Meckling, W. (1976). Theory of the firm: managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics, 3,* 305-60.

[26] Ju, N. & Yang, H. O. (2006). Capital structure, Debt Maturity and Stochastic Interest Rates. *Journal of Business, 79,* (5), 2469-2502.

[27] Keynes, J. M. (1960). The general theory of employment, interest and money. *New York, Harcourt, Brace.*

[28] Keynes, J.M. (1976). The general theory of employment, Interest and money. *London Macmillan.*

[29] Kramer, G. P., Bernstein, D. A. & Frontmatter, V. A. (2009). Introduction to clinical psychology. *(7th Ed) Pearson Prentice Hall.*

[30] Kuria R.W. (2010) the Determinants of Capital Structure of Companies quoted at Nairobi Securities Exchange, *Unpublished Research, University of Nairobi*

[31] Leland, H. E. & Toft, K. (1991). Optimal Capital structure, Endogenous Bankruptcy, and the Term Structure of credit spreads. *Journal of finance, 51,* 987-1019.

[32] Macaulay, F. R. (1938). The movement of interest rate, bond yields, and stock prices in the United States. *National Bureau of Economic Research, 240,* 16.

[33] Miller, M. & Scholes, M. (1978). Dividends and Taxes. *Journal of Financial Economics*, *6,* 333-364

[34] Modigliani, F. & Miller, M. H. (1963). Corporate Income Taxes and the Cost of Capital: A Correction. *The American Economic Review, 53,* 433-443.

[35] Mutegi. L. M. (2018). Effect of capital structure on financial performance of firms listed at     NSE, *unpublished research*

[36] Mwangi, L.W., Makau, S. M. & Kosimbei, G. (2014). Relationship between capital structure and performance of non-financial companies. *Global journal of contemporary research in accounting, Auditing and business ethics,* 72-90.

[37] Myers, S. C. & Majluf, N. S. (1984). Corporate Financing and Investment Decision when Firms have Information that Investors do not have. *Journal of Financial Economics, 13,* 187 – 221.

[38] Nadeem, A. H. & Zongjun, W. (2012). The impact of capital structure on performance. *International Journal of Commerce and Management, 23,* (4), 354-368.

[39] Nairobi Securities Exchange, (2021). *hppt://www.nse.or.ke)*

[40] New York Securities Exchange, (2017). *hppt://www.nyse.com*

[41] Nassar J. (2016). The impact of capital Structure on financial performance of firms. *Journal of business and financial affairs 5(2).*

[42] Nejadmalayeri, A. (2000). Internationalization, capital structure and cost of capital: evidence from French corporations. *Journal of Multinational Financial Management,1,* 153-169.

[43] Njoroge, F.K. (2013). The relationship between interest rates and financial Performance of firms listed at the Nairobi securities Exchange, *(unpublished), 1-57*

[44] Ongweso, A. B (2006). The relationship between interest rate and non-performing loans in commercial banks in Kenya. *(unpublished).*

[45] Otieno, L. (2015). The Relationship between Capital Structure, Performance and Replacement of CEO in Firms Listed on the Nairobi Securities Exchange. *University of South Africa, Pretoria.*

[46] Pedro M. G. M. (2018). Interest Rate's Effect on Capital Structure: Evidence from US Listed Companies, *Unpublished*

[47] Rios-Avila F., Siles L. & Canavire-Bakarreza G. (2024). Estimating Quantile Regression with Multiple Fixed Effects, *IZA Institute of Labor Economics, 17262,* 1-36.

[48] Robertson, D. H. (1937). Rejoinder to alternative theories of the rate of interest. *Economic Journal 47*, 428-436.

[49] Ross S. (1977). The Determination of Financial Structure: The Incentive Signaling Approach. *Bell Journal of Economics, 8,* 23-40.

[50] Saad N.M. (2010). Corporate Governance Compliance and the effect of capital structure, *International Journal of Finance and Economics* 2(1), 105-114.

[51] Samuelson, P. (1945). The Effect of Interest Rate Increases on the Banking System. *American Economic Review*, *35,* 16-27.

[52] Sarfraz, H., Abdul, Q., Pham, P. T., Muhammad, R. & Drahomíra, P. (2020). The moderating role of firm size and interest rate in capital structure of the firms: selected sample from sugar sector of Pakistan. *Investment Management and Financial Innovations, 17(4),* 341-355.

[53] Sekaran, U. (2003). Research Methods for business, a skill building approach, *(4th Ed), Hermitage Publishing Services.*

[54] Shuetrim, G., Lowe, P. & Moring, S. (1998). The determinants of Corporate Leverage, A panel data analysis. *RBA Research Discussion papers, Reserve bank of Australia.*

[55] Smith, A. (1976). An Inquiry into the Nature and Causes of the Wealth of Nations

[56] Staking, K & Babbel, D. (1995). The relationship between capital structure, interest rate sensitivity and market value in the property liability insurance industry. *The journal of risk and insurance, 62,* (4), 690-718

[57] Titman, S. & Grinblatt, M., (1989). Performance evaluation: old issues and new insights *the review of financial studies,2,* (3) 393-421

[58] Tonui, F.C. (2018). The effect of capital structure on value of the firms listed at NSE, *Unpublished research.*

[59] Tores-Reyna, O. (2007). Panel Data Analysis Fixed and Random Effects Using Data. *Otorres Princeton, 6,* 1-52.

[60] Waitherero, K. F. (2021).   Interest rate risk and value of the firm among private equity firms in frontier markets: insights from deposit taking savings and credit cooperatives in Kenya.   *International Academic Journal of Economics and Finance 3, 6,* 388-404

[61] Whittaker, G. J. (1987). Interest rate swaps: Risk and Regulations. *Journal of economic review, 3-13*

[62] Wicksell K. (1958). Marginal Productivity as the Basis of Distribution in Economics in Selected Papers on Economic Theory. *London: George Allen & Unwin.*

[63] Willem, N. (1995). Financial liberalization and interest rate risk management in sub-Saharan Africa. *Oxford Centre for the study of African economies, institute of economics and statistics, University of Oxford.*

[64] Wulandari, D. & Harjito, A. (2021). The effect of interest rates, exchange rates and capital structure. *International journal of research in business and social science,10, (3),* 338-351

[65] Yustisiana, R. (2020). The influence of interest rate, investor expectations and capital structure on the stock price. *Journal of business and management, 22, (3),* 27-35.