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**EFFECTS OF FIRM SIZE ON THE RELATIONSHIP BETWEEN
INTEREST RATES AND CAPITAL STRUCTURE OF LISTED
MANUFACTURING AND CONSTRUCTION FIRMS IN KENYA**

LAMECK MURIITHI NYAGA



**A RESEARCH DISSERTATION SUBMITTED TO
THE STRATHMORE BUSINESS SCHOOL IN
PARTIAL FULFILMENT FOR THE AWARD OF
DEGREE OF MASTERS OF BUSINESS
ADMINISTRATION OF STRATHMORE
UNIVERSITY**

JANUARY 2020

DECLARATION

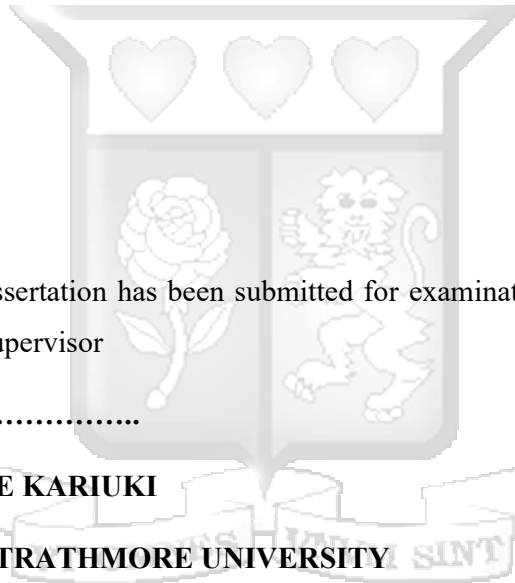
This research dissertation is my original work and has not been presented for a degree at any other university.

LAMECK MURIITHI NYAGA

REG NO: MBA 88535/2017

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This research dissertation has been submitted for examination with my approval as the University Supervisor

.....

DR. CAROLINE KARIUKI

LECTURER, STRATHMORE UNIVERSITY

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ABSTRACT

Manufacturing and construction businesses are capital intensive. Therefore, decisions on how to finance the operations of such businesses in a cost-effective and sustainable way are critical. The debt-equity mix depends on many things, key among them being the interest rates prevailing in the debt markets accessible to the firm. The aim is to find the effect of interest rates on the capital structure of manufacturing and construction firms. Specifically, this study analysed whether the interest rates regime, whether market-determined or capped, influenced the capital structure preference by these capital-intensive sectors. This study further investigated the moderating effect of a firm's size on the relationship between interest rates and capital structure. The research borrowed heavily from the trade-off theory and adopted a descriptive research design. The population used included all the 67 firms listed in the Nairobi Securities Exchange (NSE). 14 firms were used as a sample from all listed companies on the NSE. Data was collected from both financial statements as well as the Central Bank of Kenya website. The research obtained a 95% observation rate and the panel data was used to give a more appropriate understanding of the phenomena being tested. The findings indicate that firms will take up less debt when interest rates are market-determined compared to when interest rates are capped. On a macro level, the research findings recommend that government policy and regulation should be done considering the impacts of regulating interest rates on the performance of private sector firms. On a micro level, boards and management teams should take advantage of low and stable interest rates to increase debt holding in financing their business operations. The results of the research are useful in informing strategic capital structuring decisions by the manufacturing and construction sector players and policy formulation by regulatory bodies.



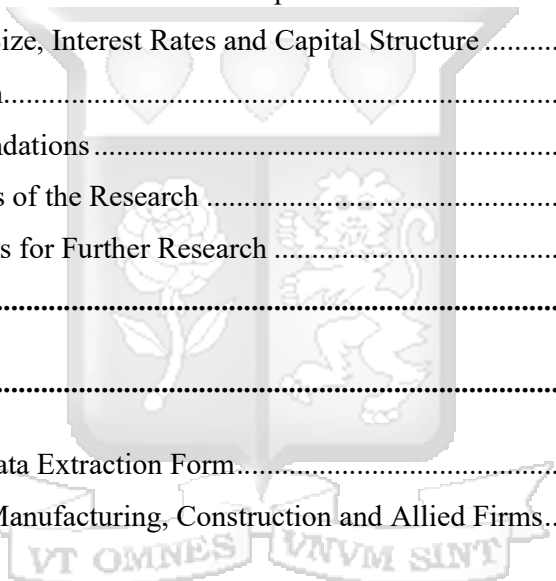
Keywords: Interest rates, Firm Size, Capital Structure, Listed Manufacturing and Construction firms

Table of Contents

DECLARATION	ii
ABSTRACT	iii
LIST OF TABLES	vii
LIST OF FIGURES	viii
ABBREVIATIONS AND ACRONYMS	ix
OPERATIONAL DEFINITION OF TERMS	x
CHAPTER ONE	1
INTRODUCTION TO THE STUDY	1
1.1 Background of the Study.....	1
1.1.1 Capital Structure.....	2
1.1.2 Interest Rates.....	3
1.1.3 Firm Size, Interest rates and Capital Structure.....	5
1.2 Statement of the Problem.....	6
1.3 Research Objective.....	7
1.3.1 Specific Objectives.....	7
1.4 Research Questions	7
1.5 Scope of the Study	7
1.6 Significance of the Study	8
CHAPTER TWO	9
LITERATURE REVIEW	9
2.1 Introduction.....	9
2.2 Theoretical Review	9
2.2.1 Static Trade-Off Theory of Capital Structure.	9
2.3 Empirical Review.....	10
2.3.1 Market-determined Interest and Capital Structure.....	10

2.3.2 Capped Interest Rates and Capital Structure.....	12
2.3.3 Moderating effect of Firm Size on Capital Structure.....	14
2.4 Summary of Literature and Research Gaps	16
2.5 Conceptual Framework.....	18
CHAPTER THREE	19
RESEARCH METHODOLOGY	19
3.1 Introduction.....	19
3.2 Research Design.....	19
3.3 Population of the Study.....	19
3.3.1 Sampling Design	20
3.4 Data Collection Methods.....	21
3.5 Data Analysis	21
3.5.1 Regression Analysis.....	21
3.5.2. Unit root test.....	22
3.5.3. Diagnostic Tests.....	22
3.6 Research Quality	23
3.6.1 Reliability Tests	23
3.6.2 Validity Tests	23
3.7 Ethical Considerations	24
CHAPTER FOUR.....	25
PRESENTATION OF RESEARCH FINDINGS.....	25
4.1 Introduction.....	25
4.2 Data from the listed firms	25
4.3 Stationarity Tests.....	26
4.4 Descriptive Statistics	28
4.4.1 Interest Rates	28
4.4.2 Equity Levels of Listed Firms.....	29
4.4.3 Debt levels of Listed Firms	30
4.4.5 Debt to Equity Ratio	31
4.4.6 Total Assets of the Firm.....	32
4.5 Panel Regression Analysis	33

4.5.1 Hausman Test.....	33
4.5.2 Random effects model.....	34
4.5.3 Diagnostic tests	35
CHAPTER FIVE.....	37
DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS	37
5.1 Introduction.....	37
5.2 Summary	37
5.3 Discussion	37
5.3.1 Market-determined Interest Rates and Capital Structure.....	37
5.3.2 Capped Interest Rates and Capital Structure.....	37
5.3.3 Firm Size, Interest Rates and Capital Structure	38
5.4 Conclusion.....	38
5.5 Recommendations.....	38
5.6 Limitations of the Research	39
5.7 Suggestions for Further Research	39
REFERENCES.....	40
APPENDICES	48
Appendix I: Data Extraction Form.....	48
Appendix II: Manufacturing, Construction and Allied Firms.....	49



LIST OF TABLES

Table 1: Research Gaps.....	16
Table 2: Listed Firms in Kenya.....	20
Table 3: Diagnostic Tests.....	22
Table 4: Stationarity of Capital Structure	26
Table 5: Stationarity of Firm Size.....	26
Table 6: Stationarity of Differenced Firm Size.....	27
Table 7: Stationarity of Interest Rates.....	27
Table 8: Stationarity of Differenced Interest Rates.....	27
Table 9: Market Determined Rates Descriptive.....	28
Table 10: Capped Interest Rates Descriptive	29
Table 11: Equity Levels Descriptive Statistics	29
Table 12: Long Term Debt Descriptive	30
Table 13: Short Term Debt Descriptive.....	31
Table 14: Debt to Equity Ratio Descriptive.....	32
Table 15: Log of Total Assets.....	32
Table 16: Hausman Test Results.....	33
Table 17: Random Effects Model Results	34
Table 18: Normality Test Results	35
Table 19: Breusch-Pagan Lagrangian Multiplier Test Results	35
Table 20: Wooldridge Test For Autocorrelation in Panel Data	36

LIST OF FIGURES

Figure 1: Kenya Interest Rate Spread 2010-2018	4
Figure 2: Conceptual Framework	18
Figure 3: Response Rate.....	25

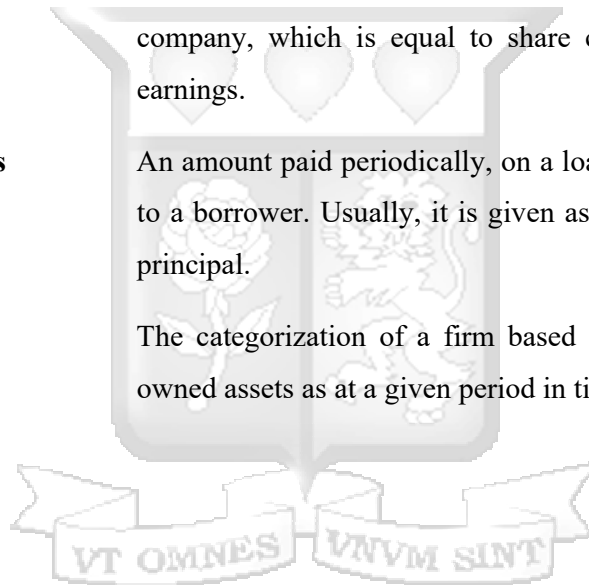


ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
CBK	Central Bank of Kenya
CBR	Central Bank Rate
CMA	Capital Markets Authority
DE	Debt-Equity
DER	Debt Equity Ratio
DR	Debt Ratio
FE	Fixed Effects
GDP	Gross Domestic Product
GVA	Gross Value Added
ICR	Interest Coverage Ratio
KES	Kenya Shilling
MCA	Manufacturing, Construction and Allied
MDIR	Market-determined Interest Rates
NACOSTI	National Commission on Science, Technology and Innovation
NSE	Nairobi Securities Exchange
RE	Random Effects
ROA	Return on Assets
ROE	Return on Equity
ROIC	Return on Invested Capital
SPSS	Statistical Package of Social Sciences

OPERATIONAL DEFINITION OF TERMS

Capital Structure	The amount of debt compared to equity in a firm used to fund company activities.
Debt	Amount borrowed by a firm from a lender to fund its activities.
Equity	Is the amount attributable to the shareholders of a company, which is equal to share capital and retained earnings.
Interest rates	An amount paid periodically, on a loan given by a lender to a borrower. Usually, it is given as a percentage of the principal.
Firm Size	The categorization of a firm based on the value of the owned assets as at a given period in time.



CHAPTER ONE

INTRODUCTION TO THE STUDY

1.1 Background of the Study

Capital structure refers to the means through which a firm finances its operations and growth using different avenues of funding (Abdul, 2015). Decisions regarding how to finance a firm's business operations are critical due to their impact on the minimization of financing costs and hence the maximization of shareholders value (Kartikasari & Merianti, 2016). According to Kabiraj and Joghee (2017), firms would rather finance their businesses by first utilizing funds generated internally, then external borrowings and finally equity which is more expensive since shareholders look for higher returns to cover the risk exposure on their equity investments (Siddiki, Kabiraj & Joghee, 2017). Firms determine their capital structure based on the marginal tax benefits associated with debt financing and the reduction of borrowing costs associated with debt (Pathak, 2010).

For capital-intensive business such as those operating in the manufacturing and construction sectors, capital structure impacts significantly on the businesses' financial performance. These sectors play a critical role in the economic growth and development of an economy. For instance, the manufacturing sector in Kenya grew at 3.5% and 3.2% in 2015 and 2014 respectively, yielding 10.3% per cent of the GDP (KNBS, 2016).

According to the Kenya Economic Survey (2018), the real estate and construction sectors recorded a growth in their contribution to GDP to 14.1% in 2017 up from 13.8% in 2016. According to KNBS 2019, construction experienced a decelerated growth of 6.6% in 2018 compared to 8.5% in 2017. This decline in performance in the construction sector is partly correlated with the muted uptake of credit to the sector which grew by a paltry 1.8 per cent in the 2017. Low private sector credit growth resulted primarily from the interest rates capping law coming into effect in September 2016.

Globalization has brought increased competition as the more competitive global firms expand into emerging markets such as Kenya. Large firms such as those listed in the manufacturing and construction sectors of the NSE face a lot of competitive pressures as these larger multinationals enter the market (Simani, 2017). In order to

cushion themselves from the increasing competition, firms have opted to participate in equity markets like the NSE in order to raise funds for capacity expansion (Kamau & Ali, 2017). If this option is not available, such firms have to resort to borrowings in order to bridge the financing gap.

Manufacturing and construction sectors will play a critical role if the government is to achieve the Big Four Agenda and the longer-term Vision 2030 strategic plan. Paradoxically, the recent legislation in September 2016 that changed the determination of interest rates from market-forces to capped interest rates has led to the dampening of private sector credit growth. Most of the studies on this phenomenon have highlighted how interest rate capping impacts SME's and individuals. A few have explored the effects of the interest rates capping on the financial performance and behaviours of firms listed in the manufacturing and construction sector of the NSE, specifically, on whether the capping led to more debt uptake by these firms or not. The current study seeks to explore this gap.

1.1.1 Capital Structure

Capital structure is the mix of debt and equity that a firm adopts in financing its operations and growth. These funds are committed to meeting either capital or operating expenditures. A firm might prefer debt to equity due to two primary reasons. First, debt allows a firm to retain ownership while taking advantage of a low-interest regime. A decrease in the interest rates reduces the amount to be repaid on a loan thus enabling a company to reign on financing costs and hence safeguarding its profits (Blanchard, Furceri & Pescatori, 2014). Secondly, debt payments are tax deductible, providing a shield on profits attributable to stockholders (Kamau & Ali, 2017).

Equity financing occurs when funds generated by a business through the sale of its stock, either to the existing shareholders or new shareholders. This form of business finance is preferable in that equity does not need to be repaid in the short to medium term (Robb & Robinson, 2014). Since shareholders are compensated last, this form of financing cushions the firm from bankruptcy as the shareholders can choose to forego their dividend payments to support the firm during hard times. However, this form of financing is expensive in that the shareholders require a higher rate of return to cover the risk of residual claim to the business.

Due to the attached interest cost on the debt; the sustainability of debt instruments in the capital mix of the firm should be determined by the earnings capacity and overall stability of the firm financially (Sulieman, 2016). Bengtson and Wagner (2013) state that no specific ratio of debt to equity is better than another; rather, the ratio should vary. Tifow and Sayilir (2015) emphasizes the importance of the debt-equity mix to financial management. An appropriate capital structure weighs heavily on the value of a firm. Bhabra, Lui, and Tirtiroglu (2008) show that the assets, size, profit margins and growth opportunities influence the capital structure of firms.

Abate (2012) while studying the insurance industry in Ethiopia found that size, growth business as well as non-debt tax shield have a significant positive influence on capital structure choice of insurance companies. In a study of Ethiopian small manufacturing cooperatives Kabede (2011) showed size, age, tangibility and growth variables as the most vital variables determining capital structure of these firms. Several factors impact a firm's capital structure.

1.1.2 Interest Rates

Interest rate is the fee paid on borrowed assets (Crowley, 2007). Lenders charge higher interest rates to riskier borrowers who are more likely to default. The lender's overhead costs, taxes, and required reserves are all priced into the interest rates, contributing to higher interest rate spreads (Hamid, 2011).

Mokhova and Zinecker (2014) argued that interest rates serve as an essential tool in an economy's monetary policy and is used to determine outcomes such as inflation control, investment planning and reducing unemployment. A change in interest rate affects prior financial plans and the ability of a borrower to repay loans at agreed periods. When interest rates are market-determined, borrowers face a certain level of uncertainty and are likely to borrow less than when interest rates are stable in the market. (Mokhova & Marek, 2014)

When the economy is growing, also known as economic expansion, there is increased economic activity. This activity is financed by banks, a good number of which are profit oriented. High interest rates encourage banks to lend to financial institutions especially in the private sector. This increases the debt to equity ratio. That is, leverage rises.

Interest rate capping guarantees a level of certainty on the part of the borrower and prevents exploitation by banks. It allows for the interest rates fluctuate but stay below the set interest rate viable for the market (Aramonte, Lee & Stebunovs, 2015).

Maimbo and Gallegos (2014) note that interest rate capping has had detrimental effects on financial markets. The idea of capping was initially brought forward to cater to investors who would otherwise be taken advantage of through high rates on their investments and loans. The customer is meant to be a major beneficiary of the capping of rates. However, this has not necessarily been the case. In fact, the borrowers or customers have increasingly been disadvantaged in various ways.

Over time, the capped rates have led to:

- Withdrawal of financial institutions from entire markets due to the loss of revenue which causes unsustainable conditions.
- Withdrawal of financial services by banks from specific sectors and market segments.
- Increase in the total costs of loans via increased fees and commissions which are not favourable to borrowers, causing decreased financial activity.

These are contrary to the expectations of governments and policy makers.

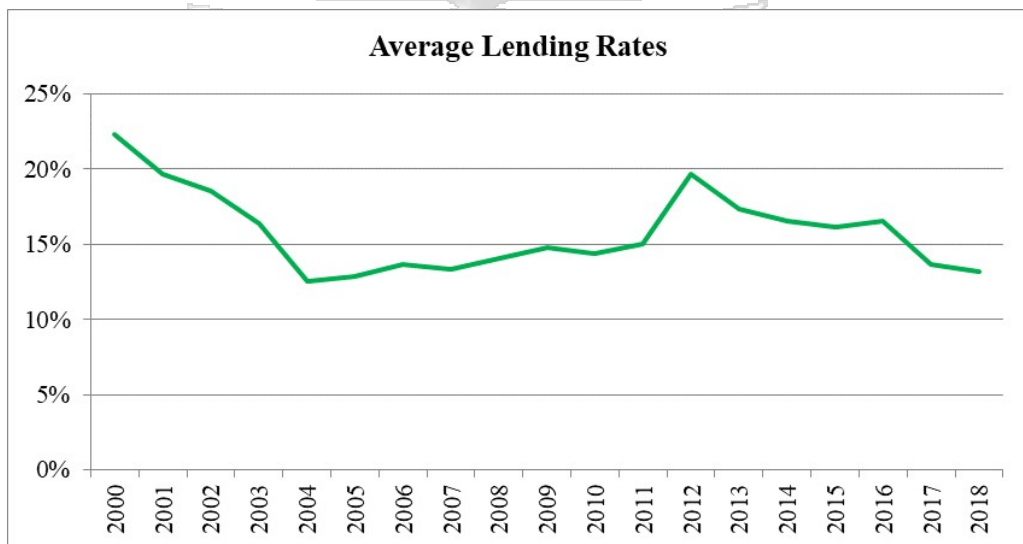


Figure 1: Kenya Interest Rate Spread 2010-2018

Source: Central Bank of Kenya

From the above figure 1 it is evident that prior to the capping, interest rates had been fluctuating due to number of macroeconomic pressures (Were & Wambua, 2014). However, with the enactment of the interest rate capping legislation, there has been stabilization in the interest rate from Q3 2016 (Rachael & Moses, 2017). Notably, the determination of interest rates prevailing in the market under the capping regime is pegged on central bank rate. This implies that much as the rates have a ceiling they also change from time to time. The fluctuations are quite muted when compared to the floating rates regime (Safavian & Zia, 2018).

Post the rate cap, most studies have emphasized on the impacts of the legislation on the small and medium businesses as well as the retail markets (lending to individuals) and specifically in the area of credit growth performance. Few studies have looked at how capping has impacted larger firms, especially those listed the NSE. This requires investigation.

1.1.3 Firm Size, Interest rates and Capital Structure

According to the neoclassical view of a firm, there are several factors which affect the decision making of a firm. Looking at the size of the firm in particular, bigger firms outperform smaller ones when it comes to production due to lower costs attributed to economies of scale as well as better decision making (Merozwa, 2015).

According to Blanchard, Furceri and Pescatori (2014) there is a negative correlation between interest rates and debt uptake. The researchers further note that businesses in such a situation may end up experiencing a strain on the amount of cash available to repay loans as the stock held within the firm takes time to be purchased in the market. Therefore, high-interest rates affect the debt financing of firms leading to little or no borrowing. Fuster and Willen (2017) point out that reduced interest rates entice clients towards credit acquisition which boosts the overall response to sales of a company's stock. According to Holston, Laubach & Williams, (2017), rising interest rates makes borrowers reluctant to take loans due to higher repayment costs.

A large firm would be one with many assets, high sales or many employees (Ali, 2017). This causes advantages in terms of diversification. Such companies can encourage investment in a variety of opportunities. This causes a trickle effect in terms of the performance such that reactions of different investments to economic

phenomena are distinct. Such reactions are enhanced by economies of scale and formalized procedures which cause overall robustness in the business (Panigrahi, 2014).

Ali (2017) indicated that the size of the firm did not moderate the relationship between the dimensions of strategic planning and the performance of Kenyan firms listed in the Nairobi Stock Exchange. Abbasi and Malik (2017) showed that there is a direct relationship between performance and size of firms listed on the NSE.

The hypothesis therefore is that firms will seek more debt in order to fund both their capital and operational capacity expansion. Most of the studies done on these firms did not examine how firm size moderates the strength of a causal relationship between interest rate, both market-determined and capped, and capital structure. This study seeks to explore this area further.

1.2 Statement of the Problem

Manufacturing and construction sectors are key pillars in supporting the economic growth of the country (Kenya Association of Manufacturers, 2016). The Kenya Vision 2030 identifies the manufacturing sector as one of the key drivers of growth under the economic pillar. Further the government in its Big Four Agenda has lauded the manufacturing and construction sectors as key drivers of attaining sustainable economic growth. However, the sectors have experienced fluctuations over the years due to a variety of headwinds. Despite the government's efforts in improving macroeconomic conditions as well as market de-regulation, the manufacturing sector has failed to reach the medium term goals of Vision 2030 (Njoroge, 2016).

According to the Central Bank of Kenya (2018), since the capping of interest rates in Kenya, private sector credit growth has declined from levels of 12% growth per annum to the current range of between 2% and 4%. The tightening of credit to private sector has had a significant impact on the performance of manufacturing and construction sectors.

Despite empirical data showing the causality between interest rates and capital structure, the impact of interest rates on the capital structure of listed manufacturing and construction firms in Kenya has not been explored. This study sought to bridge this gap.

1.3 Research Objective

1.3.1 General Objective

This research seeks to examine the effects of firm size on the relationship between interest rates and capital structure of listed manufacturing and construction firms in Kenya

1.3.2 Specific Objectives

- i. To examine the effect of market-determined interest rates on the capital structure of firms listed in the manufacturing and construction sectors of the Nairobi Securities Exchange.
- ii. To determine the effect of capped interest rates on the capital structure of firms listed in the manufacturing and construction sectors of the Nairobi Securities Exchange.
- iii. To examine the moderating effect of firm size on the relationship between interest rates and the capital structure of manufacturing and construction sectors firms listed at the Nairobi Securities Exchange

1.4 Research Questions

- i. Is there a statistically significant effect of market-determined interest rates on the capital structure of listed manufacturing and construction firms in Kenya?
- ii. Is there a statistically significant effect of capped interest rates on the capital structure of listed manufacturing and construction firms in Kenya?
- iii. Is there is a statistically significant moderating effect of firm size on the relationship between interest rates and the capital structure of listed manufacturing and construction firms in Kenya.

1.5 Scope of the Study

The study was restricted to the firms that are listed in Nairobi Securities Exchange in Kenya. This study considered the manufacturing and construction firms whose development has been identified by successive governments as a key pillar of attaining sustainable economic growth. These sectors are capital intensive and hence capital structuring become even more pronounced.

The contextual scope of the research was restricted to study the effect of the legislative interest rate cap in September 2016, by analysing the periods before and after the cap was put in place. The time scope for this study was focussed on the annual data on the interest rates and the capital structure for the period December 2010 to December 2018. Whereas this study population is all the 67 firms listed in the NSE as at May 2019, the sample scope of this study was all the 14 firms listed under the manufacturing and construction sectors.

1.6 Significance of the Study

This study is expected to give insights that can be relied upon by different stakeholders. First, the management of manufacturing and construction firms listed in the NSE will use the findings of this study to gain a better understanding of the interaction between interest rates and capital structuring. Given that the firm sizes vary considerably, and that firm size has been used to moderate the relationship between the two regimes of interest rates, it will enable managers to make better decisions on the optimal capital structure for a given size of a firm.

Secondly, researchers and policy makers will find this research useful in policy formulation and specifically in assessing the effectiveness of expansionary monetary policy. The Government of Kenya gain from the recommendations of this study in analysing the coherence and effectiveness of policy instruments in achieving objectives of the Big Four agenda; of which the strong performance of the manufacturing and construction sectors are a key pillar.

Lastly, other researchers and academicians will find this study useful in enhancing the available empirical evidence on the effects of interest rates (specifically the capping of interest rates) on the capital structure of firms listed on the NSE.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This Chapter provides a review of the theoretical and empirical literature that is relevant to this study. Theoretical literature review provides the theoretical framework for this study whereas the review of empirical literature underpins the research hypothesis and identifies research gaps. Lastly the chapter provides a conceptual framework that operationalizes this study variables.

2.2 Theoretical Review

A theory is a statement which provides a general explanation to an issue that is applicable to the given area of study (Kebede, 2011). The research was grounded on trade-off theory. Since Modigliani and Miller (1958, 1963) studied the relevance of capital structure, researchers in corporate financial theory have always been interested in the causal effect of the same on financial performance and value of firms. Classical thinking from the theories propounded ever since was premised on causal relationship that capital structure choice determines or affects a firm's financial performance and subsequently its value (Jensen & Meckling, 1979; Myers & Majluf, 1984)

2.2.1 Static Trade-Off Theory of Capital Structure.

One key advantage of debt compared to equity is that debt has tax advantages which are not similarly achieved by equity financing. This advantage encourages use of higher leverage in capital structure. However, this is offset by the fact that debt must be repaid given the provisions given by lenders. These provisions may be out of the control of the borrowers. The idea that there is an optimal proportion of debt which can be used to finance firm activity is the trade-off theory. This can be obtained by balancing personal tax, bankruptcy, or agency costs against tax shield (Myers & Majluf, 1984).

Based on the static trade-off theory, in an environment where interest rates are declining, businesses are expected to take up more debt in financing the acquisition of assets and in financing or expanding operations, up to a level where taking up

more debt will introduce bankruptcy risks. The hypothesized relationships between financial structure and interest rates, based on the static trade of theory are given as follows:

- H_{A1} There is statistically significant effect of market-determined interest rates on the financial structure of listed manufacturing and construction sector businesses in Kenya; and
- H_{A2} There is statistically significant effect of capped interest rates on the financial structure of listed manufacturing and construction sector businesses in Kenya.

According to Çerkezi (2013), financial leverage is the portion of a business's assets financed with debt instead of equity (Çerkezi, 2013). In this study, business size, which is measured in terms of total assets owned by a given business as at a given date, is modelled as a moderating variable. Large businesses benefit largely from tax shields associated with debt financing. High diversification as compared to that in smaller businesses, only exacerbates this phenomenon. The benefits accruing from tax shield will be traded off against bankruptcy and financial distress costs (Myers, 2001). This in turn increases the value of the business, giving it more impetus to borrow more.

- H_{A3} There is statistically significant moderating effect of business size on the relationship between interest rates and financial structure of listed manufacturing and construction sector businesses in Kenya.

2.3 Empirical Review

2.3.1 Market-determined Interest and Capital Structure

Capital structure has been studied and the relationship induced from empirical research done by Graham, Leary, and Roberts (2015) in which the researchers took the United States as their case study. The results were based on the hypothesis that certain factors, in this case government borrowing, macroeconomic uncertainty and financial sector development, influenced the equity mix of the firm. This effect was found to be significant with a positive effect on the debt and equity proportions of the companies in question. They did not stop there. Other factors such as interest rate regimes also had significant influence on the uptake of debt instruments of firms.

Whereas the research above was based on developed first world countries, capital structure has been tested in less developed third world countries as well. This is specifically relevant for this paper as it forms a basis of the research done in Kenya, a third world country. The Karachi Stock Exchange is in Pakistan. Work done on the listed companies in this bourse showed that the debt ratio is positively affected by interest rates, tax breaks and firm size. Data for the empirical tests was organized in a panel manner to find thus effect over a period of 5 years from 2003 to 2007(Ahmed and Wang (2011)).

Bhardwaj (2018) examined financial leverage and firm value. This study employed a descriptive research and sampled a strata of manufacturing firms in India. The findings of this study indicated that with an increased cost of debt across the economy, more and more firms relied on equity financing within the firm capital structure. The current research is focused on listed manufacturing firms within Nairobi Securities Exchange. Robb and Robinson (2014) studied the capital structure of new firms. This study utilized data from the Kauffman Firm Survey. The results of this study showed that most start-up firms highly depended on equity financing however with growth the appetite for debt financing in the firm's capital was heavily dependent on the cost of debt as determined by the interest rates. This study however did not utilize panel data.

Work has been done which attempted to show how capital structure between developed and developing countries differ. In this case, determinants of the debt-equity ratio were tested in both European countries as well as in emerging markets which acted as a representation of third world countries. Macroeconomic factors were used for the sake of interpretation of the study. This research was done based on five years, 2006 to 2010. The advantage of the selected period is that it incorporates the period before, during and after the financial crisis, effectively showing the difference in effects (Mokhova and Zinecker (2014)).

Correlation techniques were used to find the relative effect of each of the factors. That is, where the correlation coefficient is 0.5 or higher, this shows a significant effect of the factor on the dependent variable. Where the effect is lower than 0.5, the effect was deemed to be insignificant given the form in which the regression

equation has been formed. The rate of return and the cost of debt were both found to be significant to the debt ratio in this case.

When companies are looking for financing for their operations, they look for investors that are largely located on the trading floor. This means that where there are efficient bourses and general exchanges, there is larger amounts of trade activity taking place. In the same vein, the availability of such financing encourages uptake of debt by the firms. According to Abdul (2015), the relationship between financial architecture and the Nigerian financial marketplace depends on how often businesses place offers on the Nigerian Stock Exchange as well as the number of equities traded on the exchange. The Nigerian corporate sector is characterized by many firms operating in a largely diversified, competitive and deregulated environment. This study failed to show the causal link between interest rates and debt-equity mix.

Gathogo and Ragui (2014) examined the determinants of financial architecture of Kenyan firms. This study used a descriptive design. 200 firms were selected using a stratified sampling approach. The research utilized secondary data collected for the period 2000-2010. The findings of the correlational analysis showed that firm size and the cost of debt have positive effect on the financial architecture of a firm.

From the above review of empirical evidence, this study hypothesized the following research hypothesis;

H_{A1} There is statistically significant effect of market-determined interest rates on the capital structure of listed manufacturing and construction sector firms in Kenya

2.3.2 Capped Interest Rates and Capital Structure

Capped interest rates have a different effect on capital structure of companies as compared to market-determined rates. This is a part of the basis of this research and was tested by Köksal and Orman (2015) in which they looked at Turkey which is a developing country. The cost of debt was found to have a positive effect on the capital structure employed by large manufacturing firms.

In a World Bank study, Ferrari, Masetti, and Ren (2018) examined the Capping of interest rates and its implications on theory and practice. This study examined six countries with different types of capping of interest rates. Interest rate caps are generally used by policy makers to protect borrowers from extortion by lenders as

well as general protection of consumers from exorbitant prices in financial services. The results showed that capping of interest rates contributed to lower credit supply and there was also low loan approval. This study failed to indicate the side-effect of the capping of interest rates on the capital structure of firms that are listed.

Evans, (2017) conducted a research on how interest rates contribute to financial inclusion in Nigeria. A non-linear threshold model was used to identify this contribution in Nigeria for the period 1981 to 2014. The findings indicated that increase in interest rates above the 16.9% threshold in Nigeria constrained the financial inclusion in terms of debt creation among commercial banks. This study however, failed to examine the capital structure within firms that are listed. Using Kenya as the focus point, this study attempts to address this oversight.

Umoren and Babajide (2017) examined the influence of macroeconomic variables on capital structure of Manufacturing Companies in Nigeria. The research sampled 40-quoted manufacturing firms and utilized research data for the period 1998-2013. This study utilized descriptive and inferential statistics in analysing the research data. The study showed that profit levels, interest rate and inflation did not support capital structure making by manufacturing companies in Nigeria. This study however did not take into consideration firm-level characteristics affect the capital structure.

Safavian and Zia, (2018) studied the impact of capping of interest rates on the financial sector with evidence from commercial banks in Kenya. They utilized panel data from the banks which was divided into two parts, before and after the cap was implemented. There was a significant decline in aggregate lending as well as a sort of avoidance behaviour in which banks overlooked small and medium sized enterprises due to their riskiness perhaps; showing preference to corporate clients. This study did not explicitly indicate whether this skewed lending to large corporate clients affected their capital structure. Further this study focused on commercial banks whereas the current study was concentrated on the manufacturing and construction sector.

From the above review of empirical evidence, this study hypothesized the following research hypothesis;

H_{A2} There is a statistically significant effect of capped interest rates on the capital structure of listed manufacturing and construction sector firms in Kenya.

2.3.3 Moderating effect of Firm Size on Capital Structure

A myriad of work has been done to find the relationship between firm size and leverage of companies. In groundbreaking research, the effect was positive where the fixed cost of financing as well as size of the firm (measured using the natural logarithm of the assets for normality purposes) was found to have a significant impact on the leverage of the company (Kurshev and Strebulaev (2015)). Economic techniques in the form of dynamic capital structure methodology was used to come to this conclusion. Further work was carried out by Alipour, Mohammadi, and Derakhshan (2015) firm size of Iranian companies was found to have a positive and significant effect on the capital structure of the companies. State-owned firms were used, which did not take into account the effect on both private and public businesses.

Bandyopadhyay and Barua (2016) examined determinants of capital structure and corporate performance in India. They used a balanced panel of 1594 Indian corporate firms from 1998 to 2011. The results of this study indicate that the capital structure and financing decisions hinged on macroeconomic cycle and business aspects such as liquidity, size and the profitability. This study was conducted in India whereas the current study was restricted to Kenyan firms listed under manufacturing and construction sectors.

There are many potential determinants of the debt-equity mix in companies. Research work was carried out by Githira and Nasieku (2015) to determine which of these potential factors are significant. Capital structure was tested against profitability, growth, firm size and asset structure. In this particular research, the only factor which showed a positive significant relationship with the dependent variable was asset structure. Interpreting this means that asset structure can be used to predict the proportion of debt and equity which a company will use in the future to finance its activities. This conclusion formed a basis for use of asset structure as an independent variable in this study. The difference comes in the fact that this study is not restricted to a review of listed manufacturing and construction allied firms in Kenya.

Kamau and Kariuki (2015) examined the determinants of capital structure using food and beverage manufacturing firms. The findings of the research indicated that growth opportunities positively influence capital structure; firm size negatively

influences the capital structure while asset intangibility negatively affects capital structure. This was of relevance to this research since the results for assets contradicts that of other research such as that done by Kamau and Kariuki (2015) above. This formed a niche for further study which is looked into in this paper. Further study on firm size and growth is also examined to come up with a more robust conclusion. None of the above studies focussed on listed manufacturing and construction allied firms.

Muigai and Muriithi (2017) also conducted a study on the moderating effect of firm size on debt ratio. This work relied on secondary data for 40 firms listed within the years 2006 and 2015, which was before the capping of interest rates in September 2016. Firm size was measured using the natural logarithm of total assets for the sake of normality, giving a basis for the same technique in this paper, while capital structure was measured by total debt, long term debt and short-term debt. The findings indicated that an increase in firm size led to a positive and significant effect of debt on the financial distress of firms. The results further showed that firm size had a significant effect on the firms leverage level.

From the above review of empirical evidence, this study hypothesized the following research hypothesis.

H_{A3} There is a statistically significant effect of firm size on the relationship between interest rates and the capital structure of listed manufacturing and construction sector firms in Kenya.

2.4 Summary of Literature and Research Gaps

Table 1: Research Gaps

Author	Title	Findings	Research Gap
Bhardwaj (2018)	“Financial leverage and firm's value: a study of capital structure of selected manufacturing sector firms in India”.	The findings of this study indicated that with increased cost of debt across the economy more firms relied on equity financing within the firm capital structure.	The current research focussed on listed manufacturing firms within Nairobi Securities Exchange.
Ferrari, Masetti, and Ren (2018)	“Capping of interest rates: the theory and the practice”.	The results showed that capping of interest rates contributed to lower credit supply and there was also low loan approval.	This study by Ferrari, Masetti, and Ren (2018) failed to indicate the side-effect of the capping of interest rates on the capital structure of firms that are listed.
Kaumbuthu (2011)	“Relationship between capital structure and the return on equity for the industrial and allied sectors for firms listed on the Nairobi	This study findings showed that there was a negative and significant relationship between debt equity ratio and ROA.	Despite this study being undertaken in a similar sector to the current research, it did not examine the link between interest rates and the capital structure

	Securities Exchange”.		of firms that are listed.
Safavian and Zia (2018)	“The impact of capping of interest rates on the financial sector: evidence from commercial banks in Kenya”.	The results of the research indicated that there is significant decline in aggregate lending and concentration on corporate clients.	The study by Safavian and Zia (2018) did not examine how interest rates affect the capital structure.

Source: Research (2019)



2.5 Conceptual Framework

This is developed to provide the link between dependent and independent variables as they relate to each other in this research. The relationship between the independent and the dependent variables is depicted in figure 2.

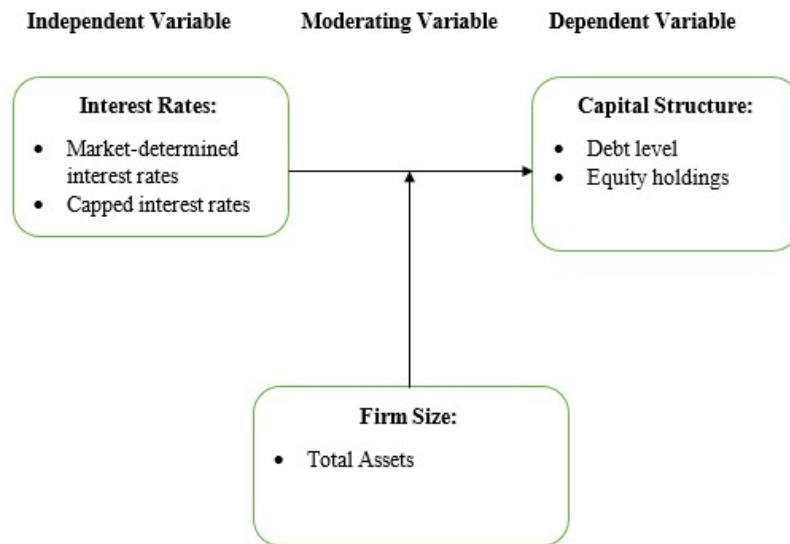


Figure 2: Conceptual Framework

Source: Researcher (2019)

The above conceptual framework depicts the relationship between the interest rates and the capital structure of firms that are listed in the manufacturing and construction sectors of the NSE. Interest rates was conceptualized in terms of floating interest rates and the capped interest rates regimes.

The capital structure was derived from the debt level and equity holding of listed the selected firms. Further, debt was further analysed into short term (12 months) or long term (more than 12 months) in order to determine whether there was inclination towards forms of debt based on time structures. Due to the broad range of the firms listed in the Manufacturing, Construction and allied Sectors of the NSE, instead of considering the absolute number of the total assets held by the firm to denote its size, natural logarithm was applied to the firm's total assets in order to reduce the range. This necessarily yielded a better analysis of this variable. Firm total assets was used as a measure for firm size.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodology that was adopted in this study. The chapter highlights the research design applied, the population, the sampling design, the data collection method used, research procedures undertaken, the data analysis methods that were used in the research as well as the ethical issues.

3.2 Research Design

Describes collection, measurement and analysis of data (Sreevidya, 2011). The better the research design, the better the quality of the work (Kothari, 2004). The research design helped in identifying the causal relationships between variables as it was descriptive in nature (Saunders & Lewis, 2012).

3.3 Population of the Study

This is a group of individuals or entities with characteristics relevant to the objective of the research (Cooper, 2008). Holloway and Wheeler (2010) showed that the target population is the available group of individuals with characteristics which are useful to the study and can be used to obtain concurrent sample populations for study purposes. The population is the 65 companies trading on the Nairobi bourse.

Table 2: Listed Firms in Kenya

Sector	Number of firms
1. Agricultural	7
2. Automobiles & Accessories	1
3. Banking	12
4. Commercial Services	11
5. Construction & Allied	5
6. Energy & Petroleum	5
7. Insurance	6
8. Investment	5
9. Investment Services	1
10. Manufacturing & Allied	9
11. Real Estate & Investment Trust	1
12. Telecommunication & Technology	1
13. Exchange Traded Fund	1
Total	65

Source: NSE (2019)

3.3.1 Sampling Design

According to Blumberg, Cooper, and Schindler, (2014) the sampling frame is a list of elements from which the sample was collected. The sampling technique used in this research is cluster sampling. Cluster-sampling, involves dividing the target demographic into distinct groups (clusters) before taking samples (Barnett 2002). The NSE has divided all the firms that are listed into 13 distinct sectors in which all the firms that are listed belong.

To choose clusters that best answer the research questions, purposive sampling is used to identify the two clusters, namely Manufacturing and Construction and Allied sectors. Selecting all the individual cases within these two clusters yield a sample population of the complete list of 14 firms listed under these two clusters. Since these 14 firms was studied over 9 years, there was a total of 126 possible observations.

3.4 Data Collection Methods

Secondary data is collected from primary sources. That is, from data collected for primary use by other individuals or entities. This was advantageous as it enabled accurate estimations given time and resource restrictions (Johnston, 2014). This study considered annual data for the period 2010-2018. The research data on capital structure and total assets was obtained from public financial statements while that of interest rates was collected from the Central Bank of Kenya annual reports. Given that these observations were derived from 14 firms over time, the resultant observations formed panel data. Measures for each of the research variables was obtained based on the extraction form attached in *Appendix I*.

3.5 Data Analysis

Panel multiple regression model was the most suitable. Field (2009) indicates that multivariate analysis is employed in a study when primary intention is to understand the strength of each predictor variable. The primary aim of using a panel multiple regression model for analysis is to find the best description of the connection amidst capital structure and a set of independent variables (Field, 2009).

3.5.1 Regression Analysis

According to Whisman and McClelland (2005) the test for moderation effect means assessing if the co-efficient of interaction term (Interest rates*Firm size) is statistically significant or to assess whether it is explanatory. If the interaction is not statistically significant ($p > 0.05$) then the independent variable (firm size) is not a moderator but an explanatory variable.

To test whether firm size is an effective moderator, the equation below was adopted

$$CS_{it} = \alpha_0 + \alpha_1 IR_{it} + \alpha_2 FS_{it} + \alpha_3 IR_{it} * FS_{it} + \epsilon_{it} \dots \dots \dots \text{Equation}$$

Variable/Coefficient Denotes

CS_{it}	The dependent variable defined as the Capital Structure of listed MCA firms i at time t
I	Observations (MCA listed firms) $i= 1-----14$
t	Time period $t = 2010-----2018$
α_0	A constant term
α_1	The effect of interest rates on capital structure
α_2	The effect of firm size on capital structure
α_3	The moderation of firm size on the relationship between interest rates and capital structure
IR_{it}	Interest rates
FS_{it}	Firm size measured by natural logarithm of total assets held by firms over the study period.
ϵ_{it}	Error term

3.5.2. Unit root test

Stationarity was tested to identify if the panel data has some underlying stochastic trends. If there is unit root, it indicates a systematic pattern that is unpredictable. The null is non-stationarity meaning there is unit root and the data has a dependent structure. Absence of unit root, or stationarity, serves as the alternative hypothesis. This study applied the Fisher’s test to examine unit root tests. The test examines the stationarity for a significant portion of the panels (H_a) or presence of unit root (H_o) within the data.

3.5.3. Diagnostic Tests

Table 3: Diagnostic Tests

Test	Significance	Test used	Conclusion
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Normality	Indicates whether the error term is normally distributed.	Jarque-Bera Test	If the joint P-value is less than 0.05, reject the null hypothesis of normality.
Heteroskedasticity	Check for the presence of unequal variability among the variables.	Breusch and Pagan Test	If P-value less than 0.05, reject the null of homoskedasticity meaning there is heteroskedasticity.
Serial Correlation	Shows whether there is significant autocorrelation among the variables.	Wooldridge Test	If p value is less than 0.05, reject the null, meaning there is autocorrelation.

3.6 Research Quality

3.6.1 Reliability Tests

Reliability refers to the accuracy with which the information can be replicated in a consistent manner (Saunders et al (2015)). Dochartaigh (2007) and others refer to this as assessing the authority or reputation of the source. The research relied on the individual firm's audited financial statements as the key source of the financial data required to sufficiently respond to the research questions. Saunders et al (2015) considers these sources as both reliable and trustworthy (Saunders, Lewis, & Thornhill, 2015)

3.6.2 Validity Tests

Saunders et al (2015), research validity refers to the appropriateness of the measures used, accuracy of the analysis of the results and generalisability of the findings.

3.6.2.1 Internal validity

Saunders et al (2015) defines internal validity as the accuracy of the causal relationships is critical in enhancing the research quality (Saunders, Lewis, &

Thornhill, 2015). This study examines the extent to which interest rates, whether market-determined or capped, predict the capital structure of the firms being studied. Since quantitative secondary data was used, the regression equation derived can be used to accurately predict the effects of changes in the independent variables on the dependent variable.

3.6.2.2 External validity

External validity is concerned with the generalizability of the research findings to other relevant settings or groups. Whereas the sample selection included all the 14 firms listed in the manufacturing and construction sectors of the NSE, users of the research findings in this research should be careful when generalizing the research findings to firms listed in other sectors of the NSE due to the systemic nuances in the capital structures across sectors. However, the research findings can be extended to firms listed in fundamentally similar sectors in other East African and African equities markets. The research covered a period between 2010 and 2018. During this period, Eveready East Africa and Kenya Orchards delisted from the NSE starting from 2017 whereas Flame Tree Limited listed in 2013. The financial performance of several firms declined significantly during this study period owing to other factors other than those relating to interest rates cap and capital structuring. The decline affected the size of their total assets, which is the reference parameter in deriving the size of a firm as a moderating factor. To ensure enough data remained for the analyses to be undertaken, data was cleaned by including the annual mean of the missing variables.

3.7 Ethical Considerations

Ethics are the standards or norms that are adopted and guide the research (Saunders, Lewis, & Thornhill, 2015). Relevant guidelines have been adhered to throughout the research including initial clearance from the relevant parties including Strathmore University and Nairobi Securities Exchange.

CHAPTER FOUR

PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This chapter shows the results of the stationarity tests for each of the variables as well as the form in which the said variables shall be used to give significant results. A mix of descriptive and inferential statistics is used to further explain the impact of the interest rates, firm size and the interaction of the two, to the capital structure of the given firms. Diagnostic tests are finally carried out to further explain the statistical characteristics of the data.

4.2 Data from the listed firms

This study sought to analyse a total of 126 observations drawn from the 14 firms in the manufacturing and construction sector with over a period 9 years. Research data relating to the financial position of the 14 firms was collected from financial statements published on the Capital Markets Authority whereas data on interest rates was collected from the Central Bank of Kenya. Due to missing data from some of the firms not listed throughout the whole period of 9 years, this study was made 122 observations representing 97% of the targeted observations. Babbie (2010) stated that a response rate of 50% is adequate while Bailey (2007) set an adequate response rate at 75%. This was deemed enough for statistical analysis.

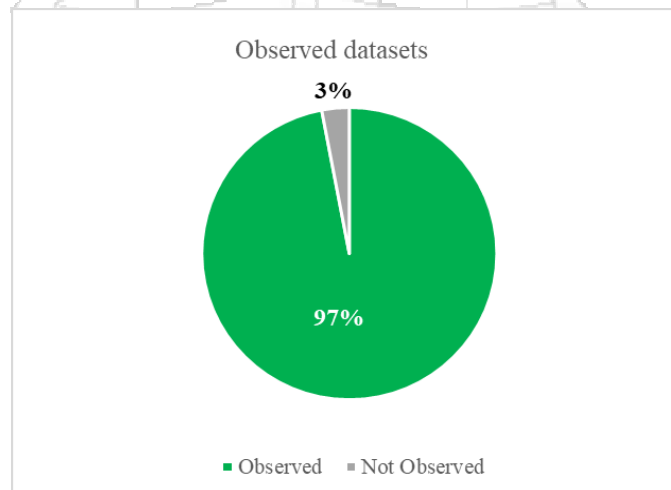


Figure 3: Response Rate

4.3 Stationarity Tests

This study relied on the Fisher's test for stationarity as the panel data was unbalanced. The research applied unit root test on the latent variable interest rates to test for stationarity of the variable. The test based on the null hypothesis that the panels contain unit roots against an alternative that a significant portion of panels are stationary.

4.3.1 Stationarity Test for Capital Structure

The Fisher-type unit root test provided four p-statistics which were less than 0.05, and was significant allowing rejection of the null hypothesis, showing stationarity.

Table 4: Stationarity of Capital Structure

	Statistic	p-value
Inverse Chi-Squared (28)	95.9635	.0000
Inverse Normal	-3.7897	.0001
Inverse Logit	-5.9729	.0000
Modified inverse Chi Squared	9.0820	.0000

4.3.2 Stationarity Test for Firm Size (Log of Total Assets)

The variable firm size was obtained from the natural log of total assets of each of the firms over the years in question. Two Fisher's tests were carried out to determine stationarity. Using the variable as it was (in levels), there was a weak stationarity assumption since only two of the four variables provided p-values less than 0.05.

Table 5: Stationarity of Firm Size

	Statistic	p-value
Inverse Chi-Squared (28)	48.0926	.0105
Inverse Normal	-0.5264	.2993
Inverse Logit	-1.4238	.0794
Modified inverse Chi Squared	2.6850	.0036

This required use of first differences forming the variable “dfirmsize” which provided p-values which were all less than 0.05, meaning the variable is stationary at first difference.

Table 6: Stationarity of Differenced Firm Size

	Statistic	p-value
Inverse Chi-Squared (28)	67.5712	.0000
Inverse Normal	-3.8382	.0001
Inverse Logit	-4.1193	.0000
Modified inverse Chi Squared	5.2879	.0000

Stationarity Test for Interest Rates

The Fisher’s type test was used which provided p-values greater than 0.05 which meant that there is strong unit root in the interest rates variable.

Table 7: Stationarity of Interest Rates

	Statistic	p-value
Inverse Chi-Squared (28)	18.2884	.9188
Inverse Normal	0.1921	.5762
Inverse Logit	0.1702	.5673
Modified inverse Chi Squared	-1.2983	.9029

The first difference of the interest rates was used in order to solve the problem of unit root. This gave p-values which were all lower than 0.05, showing that at the first difference, the interest rates are stationary.

Table 8: Stationarity of Differenced Interest Rates

	Statistic	p-value
Inverse Chi-Squared (28)	68.0427	.0000
Inverse Normal	-5.0624	.0000
Inverse Logit	-4.8563	.0000
Modified inverse Chi Squared	5.3509	.0000

4.4 Descriptive Statistics

This study applied descriptive statistics in the estimation and tabulation of the data. The research applied measures of central tendency such as the maximum, minimum, means and standard deviation

4.4.1 Interest Rates

One of the independent variables used in this research was the interest rates. This was measured using both market-determined interest rates and capped-interest rates.

4.4.1.1 Market-determined Interest Rates

This study measured the market-determined interest rates measured using the Central Bank Rate between the year 2010-Dec 2015. Market-determined interest rates regime came to an end in September 2016 making 2016 a transition period. For the purposes of defining the two regimes, 2016 will be included in the interest capping period.

Table 9: Market Determined Rates Descriptive

	2010	2011	2012	2013	2014	2015
Average	14.36	15.05	19.65	17.31	16.51	16.16
Std. Dev	0.41	2.04	0.88	0.46	0.46	0.90
Max	14.98	20.04	20.34	18.13	17.06	18.3
Min	13.85	13.88	17.78	16.86	15.94	15.26

Source: Researcher (2019)

The average interest rate within this study period averaged between a low of 14.36% in 2010 to a high of 19.65% in 2012. The high interest rates within this study period can be attributed to the political events of 2012-2013 as the country transitioned to a devolved system of government.

4.4.1.2 Capped Interest Rates

This study measured the capped interest rates measured using the Central Bank Rate between the year 2016-Dec 2018 plus a margin, which is also stipulated by the Central Bank of Kenya.

Table 10: Capped Interest Rates Descriptive

	2016	2017	2018
Average	16.58	13.67	13.13
Std. Dev	2.11	0.04	0.39
Max	18.22	13.71	13.68
Min	13.66	13.61	12.61

Source: Researcher (2019)

Since the introduction of the capped interest rates by the CBK, the average lending rates at which firms access debt to finance their operations has declined from a high of 16.58% in 2016 to a low of 13.13% in 2018. Considering that the capping occurred in September of 2016 2017 and 2018 are the two years that the caps have been fully operational. For the purposes of this analysis, 2016 is a transition period. The capping of the interest rates also brought about stability of interest rates when compared to the more volatile market-determined interest rates before the capping.

4.4.2 Equity Levels of Listed Firms

This study measured the equity rates of the listed manufacturing and constructions firms in Kenya for the period 2010-2017.

Table 11: Equity Levels Descriptive Statistics

KES Billion	2010	2011	2012	2013	2014	2014	2016	2017	2018
Total	47.16	56.40	59.29	59.01	59.28	69.75	69.38	78.30	92.55
Average	4.72	4.34	4.23	4.22	4.23	4.98	4.96	5.59	6.61
Std. Dev	-	-	0.54	0.58	0.50	0.53	0.55	0.54	0.54
Maximum	14.67	15.31	15.74	15.38	13.28	15.79	16.72	22.13	23.12
Minimum	-0.00	-0.00	-0.00	-0.00	-0.02	0.01	-0.17	-5.71	0.02

Source: Researcher (2019)

Table 11 above, presents the levels of equity held by the manufacturing and construction sector firms in billions of Kenya Shillings. The above findings show that the listed manufacturing and construction firms increased their capital

investments period considerably within the time period under review, hitting a high of KES 92.55 in 2018. Another inference is the heterogenous nature of equity holdings by firms listed in the sectors under research, with Flame Tree, the smallest listed manufacturing firm holding KES 0.02 Billion in equity in contrast to the KES 23.12 equity holding by East Africa Portland Cement in 2018.

4.4.3 Debt levels of Listed Firms

This study further sought to examine the level of debt within the listed manufacturing and construction sectors. Debt refers to both short-term and long-term types of borrowing available to the manufacturing and construction firms under this study. Thus, the research took into consideration both current and non-current liabilities.

4.4.3.1 Long-Term Debt

For capital structuring decision makers, a regime of capped interest rates brings more certainty when compared to a floating rate regime. Certainty reduces risks because finance managers can correctly predict the impact of interest rates on the performance of a firm. This inclines managers to take up more long-term debt.

Table 12: Long Term Debt Descriptive

KES Billion	2010	2011	2012	2013	2014	2014	2016	2017	2018
Total	11.10	12.16	36.38	36.37	33.19	38.95	39.98	40.54	42.06
Average	0.85	1.11	4.55	2.80	2.77	3.90	3.08	3.12	3.82
Maximum	4.45	4.34	19.47	19.47	21.18	24.47	20.97	26.97	30.34

Source: Researcher (2019)

The findings of the research on Table 12 above examined the level of long-term debt held by the manufacturing and construction firms that are listed in the NSE. The results of the analysis show that the level of long-term debt held in the firm's respective balance sheets have been on an upward trend. In 2018, firms listed in the manufacturing and construction sectors held a total of KES 42.0 Billion in long term debt which represents a sharp increase from the KES 11.10 Billion of long-term debt held in 2010. In 2012, there was a tripling of the total debt held by the sectors from

KES 12.16 Billion in 2011 to KES 36.38 Billion in 2012, driven by a KES 19.47 Billion increase in long-term debt by East African Breweries Limited.

4.4.1.2 Short-Term Debt

The research further examined both short-term debt within the listed manufacturing and construction sector firms.

Table 13: Short Term Debt Descriptive

KES Billion	2010	2011	2012	2013	2014	2014	2016	2017	2018
Total	27.45	29.36	40.51	43.19	62.98	64.91	62.17	62.48	64.07
Average	1.96	2.10	2.89	3.08	4.50	4.64	4.44	4.46	4.58
Std. Dev	0.18	0.20	0.22	0.24	0.24	0.22	0.14	0.07	0.02
Maximum	10.04	10.05	15.09	14.04	19.83	17.16	21.10	13.51	21.49
Minimum	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.00

Source: Researcher (2019)

The findings of the research on Table 13 above examined the level of short-term debt held by the manufacturing and construction firms. The results of the analysis show that firms listed in the manufacturing and construction sectors of the NSE held the lowest level of short-term debt in 2010 at KES 27.45 Billion. The highest level of short-term debts held stood at KES 64.07 held in the 2018. This shows an increasing appetite among firms that are listed for short-term lending that is mainly used for meeting working capital needs.

4.4.5 Debt to Equity Ratio

This study further sought to determine the level of debt/equity ratio (capital structure) of the listed manufacturing and constructions firms in Kenya. A ratio which is greater than 1 shows that a firm or a sector is financing its operations with more debt while a ratio that is lower than 1 implies that a firm or sector is less leveraged. According to the trade-off theory, the benefits accruing from tax shield from debt financing will be traded off against bankruptcy and financial distress costs and hence a balance between the two should be maintained.

The results show that on average, firms listed in the manufacturing and construction sectors relied more on debt financing as opposed to equity financing implying a growing preference of debt over equity and hence a change in the firms' capital structure.

Table 14: Debt to Equity Ratio Descriptive

KES Billion	2010	2011	2012	2013	2014	2014	2016	2017	2018
Total Debt	38.55	41.52	76.89	79.56	96.17	103.86	102.14	103.02	106.14
Total Equity	47.16	56.40	9.29	59.01	59.28	69.75	69.38	78.30	92.55
Ratios									
Total Debt to Equity	0.82	0.74	1.3	1.35	1.62	1.49	1.47	1.32	1.15

4.4.6 Total Assets of the Firm

This study further sought to examine the moderating variable Total assets of the listed manufacturing and construction sector. This was measured using the log of the total assets held by the firms that are listed.

Table 15: Log of Total Assets

	2010	2011	2012	2013	2014	2014	2016	2017	2018
Average	8.90	9.35	9.29	9.62	9.69	9.71	9.71	8.26	8.90
Std. Dev	4.60	1.95	2.66	0.42	0.36	0.32	0.25	0.22	4.60
Max	10.37	10.66	10.63	10.73	10.73	10.76	10.78	10.83	10.37
Min	7.85	5.35	4.05	7.70	7.90	7.95	8.03	8.06	7.85

Source: Researcher (2019)

Table 15 above shows a positive trajectory in the level of total assets held by the manufacturing and construction sector firms. This indicates there is improved investment within the sector firms up until 2017 when the sectors experienced a sharp decline in the value of their total assets due to the poor performance of a number of listed cement manufacturers like Bamburi, Athi River Mining and East African Portland Cement.

4.5 Panel Regression Analysis

This study sought to test the research hypotheses using regression modelling. The Hausman test was used to choose between use of fixed effects and random effects models to test the effect of interest rates, firm size and an interaction term (interest rates*firm size) on the capital structure under both fixed and floating interest rate regimes. The results indicated that the random effects model should be used to estimate the regression.

4.5.1 Hausman Test

In order to carry out the panel regression, a Hausman test was done. This involved testing both fixed and random effects to determine which would be the best model for the data. The results are as shown:

Table 16: Hausman Test Results

Capital Structure	Fixed	Random
dfirm size	9.5742	8.2333
dinterest rates	-2.5964	-2.4938
interaction term	8.5350	8.0211
Prob > chi ² = 0.8502		

The random effects model was chosen since the p-value of 0.8502 was larger than 0.05. This means that we fail to reject the null hypothesis that random effects model is the preferred model for estimation. The following results were obtained using the random effects model.

4.5.2 Random effects model

Table 17: Random Effects Model Results

Capital Structure	Coefficient	Std Error	P-Value	95% Confidence Interval	
dfirm size	8.2333	7.1267	0.248	-5.7349	22.2014
dinterest rates	-2.4938	0.8731	0.004	-4.2052	-0.7825
interaction term	8.0211	6.3374	0.206	-4.4000	20.4422
constant	0.0564	2.2804	0.980	-4.4130	4.5258

Prob > chi² = 0.0412

β_1 (8.2333) indicates the effect of firm size on capital structure. That is, when the firm size increases by 1%, capital structure is predicted to increase by 0.0823%, holding all other factors constant. The p-value is greater than 0.05, showing that this variable is statistically insignificant at the 5% level of significance.

β_2 (-2.4938) indicates that when interest rates increase by 1 percentage point, the capital structure ratio is predicted to decrease by -2.4938 holding all other factors constant. This shows that firms will take up less debt or hold more equity when interest rates are higher holding all else constant. The p-value is less than 0.05, indicating that this variable is statistically significant at the 5% level of significance. In this study, market determined interest rates were higher than the capped interest rates.

β_3 is the interaction term and indicates the moderating effect of firm size on the relationship between interest rates and the capital structure. The moderating effect of firm size is positive, showing that firm size has a positive effect on the relationship between interest rates and capital structure. However, the p-value is greater than 0.05, meaning that this variable is statistically insignificant at the 5% level of significance.

4.5.3 Diagnostic tests

4.5.3.1. Normality

Table 18: Normality Test Results

Variable	Skewness	Kurtosis	P Value (Joint)
residual term	0.6371	0.0039	0.0210

Table 19 above shows that all the error term has a joint p-value lower than 0.05. Therefore, the null hypothesis of normality is rejected. The conclusion is that the residual does not have a normal distribution. However, we continue to obtain unbiased estimates of the parameters (β s) when estimating using the random effects model.

4.5.3.2. Heteroskedasticity

The Breusch-Pagan Lagrangian Multiplier Test was used to test for presence of heteroskedasticity.

Table 19: Breusch-Pagan Lagrangian Multiplier Test Results

	Variance	Standard Deviation
Capstructure	388.162	19.70183
U	359.2133	18.95292
e	20.8335	4.564372
Test: Var (u) = 0		
P -value: 0.3588		

The p-value of 0.3588 is greater than 0.05, which means that we fail to reject the null hypothesis of homoskedasticity. There is no heteroskedasticity hence no need to estimate a robust random effects regression.

4.5.3.3 Serial correlation

The Wooldridge test for autocorrelation was used to test for the presence of autocorrelation. The null hypothesis of the test is no first order autocorrelation. The p-value obtained was 0.0480. Given that the p-value is lower than 0.05, it showed significance meaning that we reject the null. The variables thus have serial correlation although the value is still very close to 0.05 showing that this inference may be weak.

Table 20: Wooldridge Test For Autocorrelation in Panel Data

H_0 : no first-order autocorrelation

$F(1, 13) = 4.765$

Prob > F = 0.0480



CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter outlines the discussion, conclusions and recommendations drawn from the results of the research. It further indicates the limitations and suggestions for further research. The sections were outlined based on the variables of this study.

5.2 Summary

The primary aim of the research work was to examine the effect of both market determined and capped interest rates on the financial architecture of firms in the manufacturing and construction sector. This study further sought to determine the moderating effect of firm size on the relationship between interest rates and finance structure decisions, all which was grounded on the trade-off theory.

A descriptive approach and a quantitative design was used in this research. Public statements are readily available for all 14 companies in the relevant sectors of Manufacturing and construction as all the firms used are listed. The results indicated that the research was able to obtain 97% of the expected observations.

5.3 Discussion

5.3.1 Market-determined Interest Rates and Capital Structure

The research indicated that firms will take up less debt when interest rates are market-determined compared to when interest rates are capped. These results are line with previous studies such as Graham, Leary, and Roberts (2015) who showed how flexible interest rates have a negative connotation on the uptake of debt instruments by firms. Robb and Robinson (2014) also note that there has been a growth in the appetite for debt uptake within firms subject to the cost of the debt financing as predicted by the interest rates. Mokhova and Zinecker (2014) similarly holds that the cost of debt was significant in determining the decisions made regarding the corporate equity structure.

5.3.2 Capped Interest Rates and Capital Structure

The findings of the research showed that firms take up more debt when interest rates are capped compared to when interest rates are market -determined for listed manufacturing and construction firms. The results are in line with Ferrari, Masetti,

and Ren (2018) who noted that controlling interest rates lowered the cost of debt financing for firms. Safavian and Zia, (2018) were of a similar view that control of interests lowered the cost of debt but this contributed to restricted debt financing for risky small enterprises. Muigai and Muriithi (2017) also noted that reducing the cost of debt had a significant, favourable effect on the capital structure of trading companies.

5.3.3 Firm Size, Interest Rates and Capital Structure

The results of this study further show that firm size has an effect on the relationship between interest rates and capital structure. These results correspond with those obtained by Gathogo and Ragui (2014), Mohammadi and Derakhshan (2015) and Githira and Nasieku (2015) .

5.4 Conclusion

Manufacturing, construction and allied sector take on more debt during the period in which the interest rates were capped. This study concludes that the firms should leverage on their internal mechanisms to control adverse effects on their debt/equity ratio under a market-determined interest rate regime.

The research further concludes that the control of the interest rates within the country has affected the financial architecture of the firms listed under manufacturing and construction sector. This study concludes that the certainty and the lower costs associated with capped interest rates has made it easier for firms to enhance their appetite for debt financing within the market.

This study concludes that firms should utilize the assets of the firm as a cushion for any adverse effects in the capital mix, because of the firm size on the same.

5.5 Recommendations

This study provides a basis for enhancing a strong capital structure within companies. The findings of this study may guide the building of financial structure, using the average cost of capital and the size of the company. Firms ought to balance the composition of the sources of finance in a manner that is cost effective and not detrimental to its future growth. Firms should therefore apply the relevant capital structure theorems in making capital financing decisions.

In addition, the firm should adopt an optimal capital structure and effective management team capable of turning around the firm's fortunes by improving the company value while minimizing the firm's risk associated with high leverage.

The trade-off theory uses cost benefit analysis to decipher the correct mix to use in financing activities. These results are expected to foster the policy formulation and implementation within the publicly traded firms. The findings are further anticipated to enhance the available knowledge among regulatory bodies on how best to advise publicly traded firms in making capital structure decisions that can support better returns for the firms.

5.6 Limitations of the Research

The research was restricted to a review of the effect of interest rates on capital structure decisions; however, there are other components not considered in this study such as earnings, liquidity and management. Additionally, the time period used for the fixed interest period was a short time period of only three years which may have caused erroneous measurements especially in terms of stationarity of the variable.

5.7 Suggestions for Further Research

The research suggests that further work should be carried out to examine how firm characteristics such as earnings and liquidity as opposed to interest rates alone. This study further suggest that a more robust study should be undertaken to examine how macroeconomic indicators as influencing factors affecting company equity mixes especially given the role that debt and inflationary pressure has on the current financial environment.

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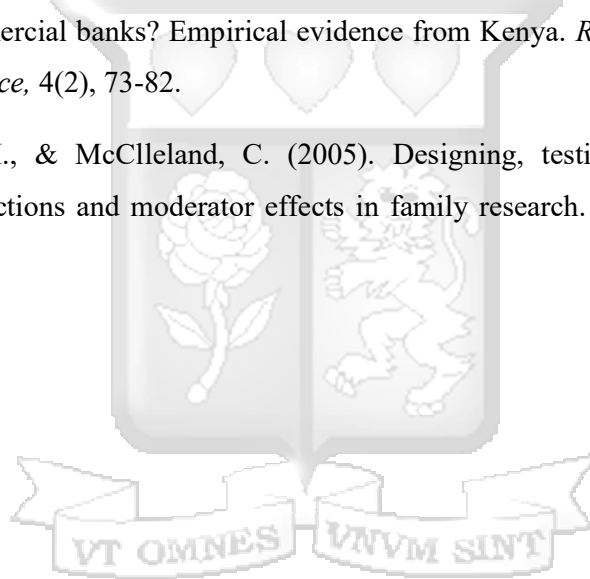
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APPENDICES

Appendix I: Data Extraction Form

Period **2010** **2011** **2012** **2013** **2014** **2015** **2016** **2017** **2018**

Short Term Debt

(KES Million)

Long Term Debt

(KES Million)

***Total Debt (KES
Million)***

*Share Capital
(ordinary,
preferred and
share premium)
KES Million*

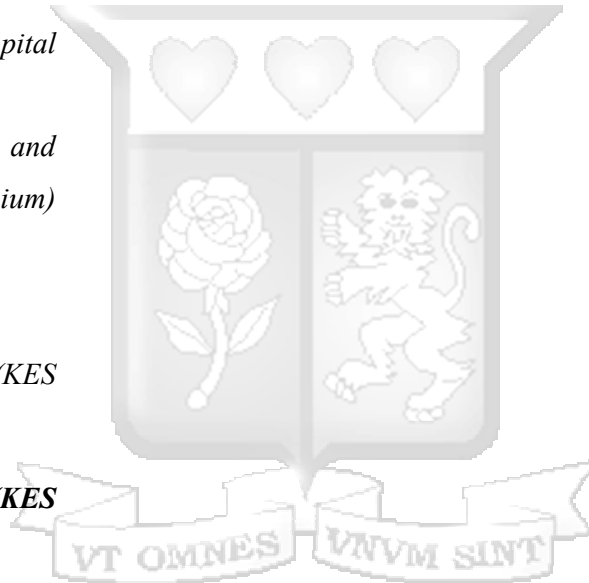
*Retained
Earnings (KES
Million*

***Equity (KES
Million)***

*Total Assets (KES
Million)*

Log Assets

Interest rates (%)



Appendix II: Manufacturing, Construction and Allied Firms

1. <u>B.O.C Kenya Ltd</u>
2. <u>British American Tobacco Kenya Ltd</u>
3. <u>Carbacid Investments Ltd</u>
4. <u>East African Breweries Ltd</u>
5. <u>Mumias Sugar Co. Ltd</u>
6. <u>Unga Group Ltd</u>
7. <u>Eveready East Africa Ltd</u>
8. <u>Kenya Orchards Ltd</u>
9. <u>Flame Tree Group Holdings Ltd</u>
10. <u>Athi River Mining</u>
11. <u>Bamburi Cement Ltd</u>
12. <u>Crown Paints Kenya PLC</u>
13. <u>E.A Cables Ltd</u>
14. <u>E.A Portland Cement Ltd</u>