EFFECT OF FUNDING STRUCTURE AND LIQUIDITY ON THE FINANCIAL PERFORMANCE OF SUGAR MANUFACTURING FIRMS IN KENYA

BY

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DECLARATION

By student:

This is my original work and has not been presented at any university for examination.

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DEDICATION

This work is dedicated to everyone who has helped me get this far, in whatever manner. However, I would especially like to thank my mother, wife, and children for their moral support.

ABSTRACT

The sugar industry is critical, supporting over 100 million people globally by providing fuel and food. In Kenya, approximately 8 million individuals depend on the sugar firms for their livelihoods, whether directly or indirectly. This industry significantly contributes to the national economy, representing 15% of the agricultural Gross Domestic Product (GDP) as of 2022, while its contribution to GDP in 2023 was 0.5%. The substantial role of the sugar firms highlights their importance in promoting economic sustainability and generating employment within the agricultural sector. However, sugar manufacturing firms face challenges such as unstable finances, inefficient manufacturing methods, and competition from cheaper imported sugar. Despite government efforts to improve the firm's performance by providing additional funding, many firms continue to experience declines in profit, attributed to insufficient working capital and liquidity to sustain their operations. This has led to a situation where most firms are burdened with substantial debts amounting to Kshs 58 billion as of December 31, 2018. The primary objective of this research was to determine the effect of funding structure and liquidity on the financial performance of Kenya's sugar manufacturing firms. The specific objectives of this study were to determine the effect of funding structure on the financial performance of sugar manufacturing firms in Kenya, establish the effect of liquidity on the financial performance of sugar manufacturing firms in Kenya, and evaluate the moderating effect of liquidity on the relationship between funding structure and financial performance of sugar manufacturing firms in Kenya. This study was anchored on the trade-off theory. The interrelationship among variables, funding structure, liquidity, and financial performance is illustrated in a conceptual framework. A correlational research design was used, and nine sugar manufacturing firms were selected through a census sampling technique. A total of 324 secondary data points were collected from 2014 to 2022. The analysis of data was conducted using the ARDL model, which considers the short- and long-term impacts of liquidity and funding structure on financial performance. The results showed a significant positive relationship between the funding structure and Economic Value Added (coeff = 0.863, p = 0.000), meaning that the EVA is expected to increase by 86% for every 1% increase in the funding structure. a positive and significant relationship between liquidity and Economic value added (coeff=0.940, p=0.000), meaning that for every 1% increase in liquidity, the EVA is expected to increase by 94%. and that liquidity moderates the relationship between funding structure and Economic Value Added (coeff = 2.760, p = 0.001). This reveals that Companies that excel in liquidity management and maintain an appropriate funding structure are more likely to achieve higher Economic Value Added (EVA) over the long run. Given the positive long-term contribution of liquidity and EVA, it can be inferred that Kenyan sugar manufacturing firms should prioritize maintaining robust liquidity levels to strengthen their funding structure and ultimately create long-term value. The study concludes that funding structure and liquidity have significant relationships with economic value added and that liquidity moderates the relationship between funding structure and economic value added. The study recommends that firm managers and policymakers design more effective interventions and support mechanisms to maintain a proper balance between the components of funding structures and ensure a healthy level of liquidity within the sugar manufacturing firms. The findings are relevant for investors, firm managers, and policymakers as they can develop frameworks and guidelines that encourage better liquidity management practices within the industry.

TABLE OF CONTENTS

DECLARATION ii
ACKNOWLEDGEMENT iii
DEDICATION iv
ABSTRACT v
TABLE OF CONTENTS vi
LIST OF ABBREVIATIONS & ACRONYMS viii
OPERATIONAL DEFINITION OF TERMS ix
LIST OF TABLES x
LIST OF FIGURES xi
CHAPTER ONE: INTRODUCTION 1
1.1 Background to the Study 1
1.2 Statement of the Problem 13
1.3 Objectives of the Study 14
1.3.1 Specific Objectives 14
1.4 Hypotheses of the Study 14
1.5 Justification of the Study 15
1.6 Scope of the Study 15
1.7 Conceptual Framework 16
CHAPTER TWO: LITERATURE REVIEW 18
2.1 Theoretical Review 18
2.1.1 Trade-off Theory 18
2.1.2 Stockholder Theory 20
2.1.3 Pecking Order Theory 21
2.1.4 Liquidity Preference Theory 21
2.2 Empirical Literature Review 22
2.2.1 Effect of Funding structure on the financial performance of sugar manufacturing firms in Kenya 22
2.2.2 Effect of Liquidity on the Financial Performance of Sugar Manufacturing Firms in Kenya 30
2.2.3 Moderating Effect of Liquidity on the funding structure and financial performance of sugar manufacturing firms in Kenya 36

CHAPTER THREE: RESEARCH METHODOLOGY 41
3.1 Introduction 41
3.2 Research Philosophy 41
3.3 Research Design 41
3.4 Study Area 42
3.5 Target Population 42
3.6 Sample and Sampling Procedure 43
3.7 Data Type 43
3.7.1 Data Analysis and Presentation 44
3.8 Model Specification 44
3.9 Research Ethics 46
CHAPTER FOUR: RESULTS AND DISCUSSIONS 47
4.1 Introduction 47
4.2 Descriptive Statistics 47
4.3 Correlation Analysis 49
4.4 Unit Root Test 51
4.5 Pedroni Residual Cointegration Test 53
4.6 Hausman Test 55
4.7 Study Findings 56
4.7.1 Long and Short-run relationship analysis 57
CHAPTER FIVE: SUMMARY, CONCLUSION, AND RECOMMENDATION 80
5.1 Introduction 80
5.2 Summary of the Findings 80
5.3 Conclusion 81
5.4 Recommendation 83
5.5 Limitations of the Study 83
5.6 Suggestions for further studies 83
REFERENCES 85
APPENDICES 98

LIST OF ABBREVIATIONS & ACRONYMS

ARDL	Autoregressive Distributed Lag
DF	Development Financial Institution.
ECT	Error Correction Term
EPS	Earnings Per Share
EVA	Economic value added
GDP	Gross Domestic Product.
IFIs	International Financial Institutions.
ILO	International Lab our organization.
OECD	Organization for Economic Co-operation & Development.
ROA	Return on Assets
ROCE	Return on capital employed
ROE	Return on Equity.

OPERATIONAL DEFINITION OF TERMS

A short-term loan-	Banks grant loans to help meet businesses' working capital needs. Working capital needs refer to financial needs for purposes including electricity bills, wages, taxes, and the purchase of raw materials. Banks grant such loans to their borrowers to be repaid within one year.
Accounts payable	Accounts payable are suppliers whose invoices for goods or services have been processed but have not been paid.
Economic value added	It is an estimate of actual economic profit or the amount by which earnings surpass or fall short of the minimum rate of return that shareholders and lenders could earn by investing in other securities with similar risk.
Financial performance	is defined as the capacity of firms to strategically utilize their resources to generate profits, ensure operational stability, and create value for stakeholders. Financial performance can be measured using various metrics, including return on assets, return on equity, sales growth, and Economic value added, all of which can be obtained from financial statements and reports.
Funding Structure	Refers to the array of financial sources that sugar firms utilize to support their operational activities, facilitate long-term investments, and implement strategic expansion initiatives.
Liquidity	It is defined as an organization's ability to fulfill both short-term and long-term financial obligations as they become due.
Return on assets (ROA)	Measures how efficiently a company uses the firm's assets to generate operating profits. ROA also measures the total return to all capital providers (debt and equity). If a company carries no debt, its ROE and ROA would be the same.
Return on capital employed (ROCE)	Measures the efficiency and profitability of capital investments by the firms. Its ratio points out the relation between the volume of capital invested and the amount of profits earned on such capital
Return on equity (ROE)	This is a measure of the net income earned as a percentage of shareholders' equity, indicating the profit an organization has generated with the amount invested.
Sugar firms	Refers to the registered and licensed firms engaged in the processing of sugarcane into sugar and its associated by-products.

LIST OF TABLES

Table 3.1: List of sugar factories, year of establishment, county of location, and status…….42
Table 4.1: Descriptive Statistics……...……47
Table 4.2: Correlation Analysis (log-transformed variables)……...……50
Table 4.3: Unit Root Test…….52
Table 4.4: Pedroni Residual Cointegration Test……...……...53
Table 4.5. Hausman MG, DFE Test…….55
Table 4.6: Hausman MG, PMG Test……....56
Table 4.7: Debt, Equity, Retained earnings, and financial performance……..58
Table 4.8: Funding structure and financial performance…….63
Table 4.9: Current ratio, Acid test ratio, and financial performance……...…….66
Table 4.10: Liquidity and Financial Performance……70
Table 4.11: Funding structure, Liquidity, and financial performance……...……...74
Table 4.12: Scaled Coefficients for Funding Structure and Liquidity……...……..78

LIST OF FIGURES

Figure 1.1: Funding structure, liquidity, and Financial Performance Relationship…….16

CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

This chapter outlines the background information, articulates the problem statement, delineates the objectives, presents the hypotheses, defines the scope, highlights the significance, and establishes the study's conceptual framework.

The evolution of Kenya's sugar manufacturing firms' performance has been influenced by a myriad of structural, policy, and economic factors. Historically, this industry has played a pivotal role in sustaining livelihoods and promoting rural development as an integral component of the nation's agricultural sector. Nevertheless, it has grappled with impediments such as low-cost import competition, outdated infrastructure, inefficiencies, and elevated production costs. (Kenya Anti-Corruption Commission Report, 2010).

Performance is measured using a range of financial and non-financial metrics that reveal how well the goals and outcomes have been attained (Lebans & Euske, 2006). As a result, performance and behavior are the sum of one's actions and outcomes; actions result from one's mental and physical exertion throughout an activity and can be observed independently of the task's outcome (Brumback 1998). According to this concept, performance management should consider inputs (behavior) and outputs (results). Therefore, organizational performance is a key concept in modern business management, encompassing financial, social, and environmental outcomes. Thus, it is assessed under two categories, financial and non-financial.

According to Erasmus (2008), financial performance measurement involves evaluating a company's policies and operations in terms of monetary value. A company's ability to generate income and effectively utilize its assets within its core operations is what Mishra, Wilson, and Williams (2009) define as financial performance, which is a subjective assessment. Similarly, Teherani et al. (2012) emphasize that financial performance is a crucial metric for assessing a company's effectiveness in generating revenue from its available resources. This assessment informs current operational efficiency and provides critical insights for strategic decision-making related to asset acquisition, business expansion, and implementing managerial controls. This illustrates the various viewpoints regarding the definition of financial performance. These variations demonstrate the financial success of

management over a given period and can be used to compare similar businesses within the same industry (Teherani et al., 2012).

The financial performance of the sugar manufacturing firms can be evaluated using various key metrics and indicators. These metrics provide information on the sector's effectiveness, profitability, liquidity, solvency, and general financial health. The cost structure, profitability ratios, revenue and sales, debt and liquidity, investment and capital expenditure, government policies and subsidies, market trends, and competitive landscape are all important factors to consider when assessing the financial performance of the sugar manufacturing firms (Sugar Industry Stakeholders Task Force Report, 2019).

A company's capital structure is the framework through which it finances its assets. This comprises the various forms of debt, equity, and other securities that are outstanding within the firm (Berk & Demarzo, 2007). While Damodaran (2001) defines capital structure as the proportionate mix of debt and equity capital employed to conduct business operations. Primis and Whitehurst (2010) present an alternative perspective that challenges this definition. Notably, a lower weighted average cost of capital is indicative of a more favorable capital structure, as articulated by Primis and Whitehurst (2010). This highlights the significance of strategic capital management in optimizing financial performance. Therefore, to benefit the company's owners, it is the managers' responsibility to select the capital structure that they feel will raise the company's worth. The best capital structure is one that maximizes a company's worth by maintaining an ideal balance between income and risk. According to Huang and Thi (2002), companies can finance new investment opportunities through three primary sources: retained earnings, equity financing via new stock issues, and debt capital obtained through issuing additional shares. These funding sources are integral to a company's capital structure and represent its ownership distribution. A specific debt-to-equity ratio can indicate the optimal capital structure, as it is associated with minimizing the weighted average cost of capital (Primis & Whitehurst, 2010).

The theoretical framework for corporate capital structure, developed by Modigliani and Miller (1958), represents a pivotal advancement in modern corporate finance. This foundational theory outlines the determinants of a firm's capital structure within an idealized capital market, free from transaction costs, taxes, and other frictions. As noted by Denis and Sibilkov (2010), equity financing enables businesses to secure necessary capital without incurring debt, thereby maintaining operational flexibility. Shareholders, by purchasing equity stakes in a company, anticipate recovering their investments through anticipated future

profits. Furthermore, the structure of equity ownership provides significant advantages: shareholders benefit from limited liability, which restricts their potential losses to the extent of their initial investment, while simultaneously having a claim to a portion of the company's earnings, manifested either as dividends or capital gains accruing from future increases in share value.

According to Watson and Wilson (2002), debt capital is money that a company raises through borrowing. On the other hand, Pandey (2005) characterizes financial leverage as the utilization of debt within a business's financial framework to increase profits. However, according to Mwangi, Makau, and Kossimbei (2014), financial leverage is the extent of debt within the capital structure. Three types of debt capital are long-term, medium-term, and short-term. Each type has a particular application for various institutions. In contrast to equity or share capital, debt capital subscribers retain their status as creditors rather than as owners of the business. Typically, providers of debt capital receive a predetermined annual percentage return on their investment, ensuring a consistent income stream while avoiding the risks associated with ownership (Pandey,2005). O'Brien and David (2009) state that debt financing offers benefits and drawbacks for corporate expansion and strategic expenditures. Debt financing provides two significant advantages: it mitigates issues related to free cash flow and enables the deduction of interest payments from taxable income (Fama & French, 2002). Conversely, the potential costs associated with bankruptcy and the agency conflicts that may arise between shareholders and debt holders represent significant drawbacks (Fama & French, 2002). Collateral, capital base, and imputed cost are examples of loan components that are often used to analyze credit procedures while issuing loans to limit the overload cost of debt financing. Managers thus attempt to strike a balance when deciding how to finance debt: the benefits of debt financing for corporations' taxes, and the expenses of financial hardship brought on by the possibility of bankruptcy (Kraus & Litzenberger, 1976).

Funding is defined by the (Committee on the Global Financial System, 2010) as the source of liabilities. It also states that the funding strategy lays out how businesses plan to continue being fully funded at the lowest possible cost while maintaining their risk appetite. The sugar firms obtain money from a variety of sources, including banks and trade credit, as well as internal sources like retained revenues (Carnllo, Guzman, & Palaciou, 2016).

Liquidity is defined as an organization's ability to fulfill both short-term and long-term financial obligations as they become due (Akenga, 2017). This capacity is crucial for maintaining financial stability and ensuring the organization's ongoing operational effectiveness. (International Accounting Standards Board [IASB], 2006) defines liquidity as the amount of cash on hand for the foreseeable future, less the related financial obligations. Operating liquidity is the equilibrium between current assets and current liabilities (Goel & Sharma, 2015). If assets can be easily and quickly converted into cash with little to no loss of value, they are considered high-quality liquid, according to (Basel Committee on Banking Supervision, 2013). It goes on to say that markets are deemed liquid when sellers of holdings can get the money they need to meet other obligations by selling their assets at levels that do not entail significant losses. Bhunia and Uddin (2011) assert that a company's liquidity is essential for fulfilling its short-term obligations. It is therefore imperative to maintain an optimal level of liquidity that avoids both excess and deficiency, ensuring the organization's financial stability and operational effectiveness. He further argues that poor liquidity leads to negative credit ratings, which can ultimately cause a company to close. However, excessive liquidity is also detrimental because idle assets generate no income. A buildup of idle money due to excess liquidity might result in lower market performance and profitability for securities. On the other hand, insufficient liquidity could cause business operations to stop (Ngira, Oluoch & Kalui 2014). However, according to Waswa, Mukras, and Oima (2018), maximizing revenue and improving a company's financial performance are two of working capital management's main objectives. Liquidity is one of these objectives. Therefore, a healthy balance between these two extremes needs to be achieved for the firm to operate effectively and efficiently.

The concept of moderation pertains to the role of a moderator variable in influencing the relationship between an independent variable and a dependent variable. This interaction highlights how the effect of the independent variable on the dependent variable may vary depending on the level or presence of the moderator, thereby elucidating the complexities inherent in such relationships within empirical research (Dawson, 2014). It speaks about the impact of a third variable on the direction or intensity of a relationship between two other variables (Andersson, Cuervo, & Nielsen, 2014). If two variables are to be evaluated for consistency across groups, moderating variables are necessary (Memon, Ramayah, Cheah, Ting, Chuah, & Cham, 2019). Baron and Kenny (1986) define a moderator as a variable that

affects the nature or strength of the relationship between an independent variable and a dependent variable.

Corporate finance and financial economics theories often serve as the foundation for the theory that liquidity acts as a moderator variable between a firm's funding structure and its financial performance (Myers & Majluf, 1984). This relationship can be understood through the trade-off theory and the pecking order theory. According to the pecking order theory proposed by Myers and Majluf (1984), businesses prioritize their sources of funding in a specific order: internal financing is preferred first, followed by debt, and finally equity. This hierarchy arises from issues related to signaling and information asymmetry. This notion is influenced by liquidity, as it affects a company's ability to generate internal funds. A company with high liquidity can rely less on outside finance or equity by using more internal funding. Since market variations frequently cause cash flow unpredictability in the sugar industry, liquidity as a moderator can affect how businesses prioritize their funding sources and handle their financial performance.

Trade-off theory argues that businesses should aim to balance the costs and advantages of each capital structure component by determining the best possible ratio of debt to equity. While the stock is less hazardous and dilutes ownership, debt offers tax protections, but also costs associated with the financial crisis. According to this hypothesis, liquidity has an impact on one's capacity to meet financial obligations. Rich liquidity can act as a buffer against economic downturn, enabling businesses to take on additional debt without materially raising the risk of default. Liquidity, as a moderator, can therefore affect how businesses balance their funding sources to optimize financial performance in the sugar industry.

Daraban (2017) defines Economic Value Added (EVA) as the economic profit of a company, indicating the excess value generated above the anticipated return demanded by its shareholders. EVA is determined by subtracting the opportunity cost of the capital used from the organization's net profit. While Stern, Stewart, and Chew (1993) argue that the economic value-added model accounts for research and development expenses in addition to the cost of capital, equity, and debt. Damodaran (2002) states that Economic Value Added (EVA) exhibits a direct relationship with the creation of shareholder wealth by signifying surplus returns above
the required rate of return. Metrics such as Return on Investment (ROI), Return on Assets (ROA), and Return on Equity (ROE) can be utilized to demonstrate profitability. On the other hand, Jansen (2002) argues that Economic Value Added (EVA) provides a more

comprehensive evaluation of a company's capital structure management compared to other metrics like net income, which may not accurately reflect the firm's overall performance. EVA offers a broader perspective by considering both financing decisions and operational effectiveness. Furthermore, EVA accounts for the cost of capital when assessing a company's true economic profit. The cost of capital is a key factor in determining whether a business is effectively generating value for its shareholders. In contrast, traditional measures such as net income or EBIT overlook this crucial element and focus solely on accounting profits.

The fact that sugar cane can be used as fuel and food at the same time is a noteworthy feature, according to global trends. It reveals that 100 million people worldwide earn a living through the production and processing of sugar cane, which is then supplied to retail or industrial consumers (Global Market Report Sugar, 2019). Over a million people are employed in the sugar business in Brazil, whereas 1.5 million people work in the sugar supply chain in Thailand. (Global Market Report Sugar, 2019). Production is primarily focused on the top 10 producers, which are Brazil, India, Thailand, China, the United States (US), Pakistan, Russia, Mexico, and Australia, although there are over 120 producers worldwide. 76% of global production in 2016 came from the top 10 generating nations (Graude & Gaylor, 2019). 33 of the 55 countries in Africa are involved in the production of sugar, with 40% of the continent's total production coming from Egypt and South Africa (Kenya Association of Manufacturers, sub-sector profile, 2020).

Kenya began producing sugar cane in 1902; the first facility was erected at Miwani in Kisumu County in 1922, and the second factory was built at Ramisi in Kwale County in 1927 (Sugar Industry Stakeholders Task Force Report, 2019). Kenya's counties are home to sugar cane plantations: Kakamega, Kisumu, Nandi, Migori, Kwale, Bungoma, Busia, Kericho, Homa Bay, Narok, and Siaya. The Western, Nyanza, Rift Valley, and Coastal areas are home to these counties. Kenya started to export sugar by the middle of the 1970s, but starting in the 1980s, the industry saw a decline in profitability and production, which made Kenya a net importer of sugar by the middle of 1980. The livelihoods of around 8 million Kenyans are reliant on the sugar manufacturing firms, either directly or indirectly, and it plays a substantial role in the country's economy, accounting for 15% of the agricultural GDP. (Kenya National Bureau of Statistics Economic Survey, 2022). Despite its importance, the sector has been plagued by unstable finances, inefficient manufacturing methods, and increased competition from cheaper imported sugar (Kenya Sugar Directorate, 2021). Koskei (2013) argues that the main challenge facing Kenya's sugar manufacturing firms is the

continuous decrease in profitability, attributed to insufficient working capital and liquidity to sustain their operations. This has led to a situation where most factories are burdened with substantial debts amounting to Kshs—58 billion as of December 31, 2018 (Kenya Sugar Board, 2019). Consequently, approximately 50% of sugar firms in Kenya experience financial hardship annually, ultimately leading to their closure (Imbambi, Oloko, & Rambo, 2017). A report from the Kenya Sugar Directorate (2021) indicated that numerous sugar firms are burdened with substantial debt, resulting in elevated financial expenses that diminish profitability. Moreover, the industry frequently experiences operational disruptions due to liquidity issues, exacerbating the impact on productivity and financial results. Table 1.1 below shows the performance of firms in terms of Area under cane, Area harvested, Total production in tonnes, Average yield per Ha, and Average yield in Ksh from 2014 to 0221.

Table 1.1: Showing the performance of sugar firms from 2014 to 2021

	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Area under cane (000Ha)	211.3	223.6	220.8	191.2	202.4	197.3	200.5	223.0
Area harvested (000Ha)	72.2	77.8	85.8	67.7	73.1	71.9	89.8	92.4
Total production (000) tonnes	6409.9	7164.8	7151.7	4751.	5262.2	4606.1	6799.9	7783.3
Average yield (tonnes/Ha)	61.4	66.4	62.2	55.3	55.1	51.0	61.6	72.0
Average yield (Ksh000)	6,385	6,905	6,468	5,751	5,730	5,304	6,406	7,488

Source: KNBS Economic Survey (2019-2022).

The sugar subsector plays a crucial role within the agricultural sector and the broader Kenyan economy. It contributes to employment creation, fosters regional development, enhances food security, and plays a significant role in the manufacturing industry. It is also essential to the achievement of the government's Big 4 Agenda and the Vision 2030 goals. According to the Kenya National Assembly Eleventh Parliament Third Session (2015), the sugar industry contributed 7.5% of the nation's GDP in 2015, while according to the Kenya National Bureau of Statistics (2023), the contribution to the nation's GDP was 0.5%. The sugar business is experiencing a drop in production due to poor financial performance and an expanding debt portfolio, despite government efforts to improve performance by injecting additional capital. Population growth has led to an increase in sugar consumption, but this has not been accompanied by a corresponding rise in output. For example, Kenya's annual need for refined

sugar is 160,000 metric tonnes, a quantity that is now fulfilled by imports. This is ascribed, among other things, to the high cost of manufacturing, poor management, a large debt load, diminishing yields, aging machinery, corruption, and antiquated technology (Kenya Association of Manufacturers Sugar Sub Sector profile, 2020).

From the above literature, it is evident that sugar firms are strategic for Kenyans' economic growth but are financially distressed, with a number of them in receivership. Those still in operation are showing a profitability decline and operational inefficiencies. This study sought to find out how the government can bridge these gaps in financial performance and also address operational inefficiencies.

Numerous research projects have been undertaken to ascertain the connection between funding structure and financial performance in various local and global economic sectors and locations. A summary of a few of the empirical investigations may be found below.

Salim and Yadav (2012) conducted an empirical investigation into the relationship between capital structure and firm performance, utilizing a comprehensive dataset comprising 237 publicly traded companies in Malaysia. This study spanned the period from 1995 to 2011, focusing on firms listed on the Bursa Malaysia stock exchange across various sectors, including construction, plantations, consumer goods, transportation, and real estate. The analysis employed multiple performance proxies, notably return on equity, earnings per share, return on assets, and Tobin's Q, to evaluate firm performance. The capital structure was characterized by examining the ratios of short-term and long-term debt, total debt, and growth, while firm size served as a control variable in the analysis. The study's findings revealed a negative correlation between total debt, short-term debt, and long-term debt and the performance of the business, as indicated by return on equity (ROE), return on assets (ROA), and earnings per share (EPS). However, a notable positive correlation was found between short-term and long-term debt as measured by Tobin's Q. Cole, Ying, and Hemley (2015) explored the relationship between capital structure and firm performance by analyzing secondary data collected from 30 research firms between 2004 and 2013. The study primarily focused on the industries of energy and healthcare. The performance metrics used in the analysis included market value per share, return on assets, operating return, and profit margin. The independent variable examined was the ratio of long-term liabilities to total assets. Simple regression analysis was employed to evaluate the data. The findings indicated a negative relationship between capital structure and operating return across all industries. Additionally, it was determined that capital structure has no bearing on stock prices in any of

the three industries. However, capital structure has an impact on profit margins in the energy and industrial sectors, but not on the healthcare industry. Ali (2014) conducted a study on listed chemical companies in Pakistan to explore the relationship between financial leverage and financial performance.

This research, which took place from 2006 to 2013, focused on twenty chemical companies listed on the Karachi Stock Exchange. The study measured financial performance using four indicators: return on equity (ROE), return on capital employed (ROCE), net profit margin, and return on assets (ROA). Meanwhile, the debt-to-equity ratio was used as a proxy for financial leverage. The data was analyzed using regression and correlation analysis. The findings revealed a positive relationship between ROA, net profit margin, and ROCE with the debt-to-equity ratio. In contrast, there was a negative correlation between ROE and the debt-to-equity ratio. Overall, the study indicates a positive correlation between financial performance and financial leverage. Sultan and Mohammad (2015) conducted an empirical examination of listed enterprises on the Iraqi stock exchange to examine the impact of capital structure on profitability. For 10 years, from 2004 to 2013, four companies were chosen for the study.

Profit margin, return on equity, and return on assets were the financial performance proxies, whereas the debt-to-equity ratio and firm size were the indicators of the capital structure. For data analysis, multiple regression models were employed. The outcome demonstrated that the listed enterprises' profitability is highly and favorably impacted by their capital structure. To examine the influence of capital structure on firm performance, Dang, Hong Bui, Dao, and Nguyen (2019) conducted an empirical analysis utilizing data from the food and beverage industries listed on Vietnam's stock exchange. The study encompassed 61 firms selected through a panel dataset spanning 18 years, from 2000 to 2017. Capital structure was operationalized through several components, including the ratios of total debt to total assets, short-term debt to total assets, and long-term debt to total assets. The dependent variables analyzed were return on equity (ROE), return on assets (ROA), and earnings per share (EPS). Additionally, the cash flow ratio and liquidity were included as control variables in the analysis. The findings revealed that debt ratios were positively and significantly correlated with both ROE and EPS, whereas they exhibited a negative impact on ROA.

Shubita and Alsawalhah (2012) investigated the relationship between capital structure and profitability among industrial firms listed on the Amman Stock Exchange in Jordan. The

research utilized a sample of 39 companies over six years, spanning from 2004 to 2009. Profitability was assessed through the metric of return on equity, while capital structure was evaluated using various ratios, including short-term debt to total assets, long-term debt to total assets, and total debt to total assets. The results indicated a significant negative correlation between long-term, total, and short-term debt and profitability, suggesting that an increase in debt levels is associated with a decline in profitability. These findings contribute to the understanding of the financial dynamics within the context of Jordanian industrial firms. Waseemullah, Mehmood, Javeed, Kaleem, and Ahmad (2020), in the investigation of business profitability and capital structure, -a focus on family-run textile companies that are registered on the Pakistan Stock Exchange. The study was carried out between 2004 and 2012, a span of nine years. Firm profitability was measured by return on assets, while capital structure proxies were the debt to equity, debt to total debt assets, and long-term debt to long-term debt ratios. The results showed that while the debt to total assets ratio showed a negative relationship with firm profitability, the long-term debt to long-term fund ratio and the debt to long-term ratio showed positive relationships with firm profitability. Seid (2017) investigated the impact of capital structure on firm performance using empirical data from private manufacturing enterprises in Ethiopia's Amhara region.

The study utilized panel data from sixteen manufacturing companies over five years, from 2010 to 2014. Financial performance was assessed using return on equity (ROE) and return on assets (ROA), while company size was included as a control variable. The capital structure indicators analyzed were the debt-to-equity ratio, as well as short-term, long-term, and total debt ratios. A regression model was employed for data analysis. The findings revealed a strong positive correlation between short-term debt and both ROE and ROA. Conversely, there was a negative correlation between ROA and the debt-to-equity ratio, total debt, and long-term debt. The study concluded that leverage has a significant negative impact on the financial performance of firms. Leon (2013) looked into how capital structure affected the listed manufacturing companies in Sri Lanka's financial performance between 2008 and 2012. Return on equity and return on assets were the financial performance metrics, while the leverage ratio was a component of the capital structure. Thirty listed manufacturing companies were chosen for the research. The outcome demonstrated that, in addition to showing a significant negative association between leverage and return on equity, there was no significant relationship between leverage and return on assets.

Subsequently, Mwangi and Birundu (2015) investigated how capital structure affected the SMEs' financial performance in Kenya's Thika Sub-County. For five years, from 2009 to 2013, forty SMEs were chosen. The capital structure was based on debt ratio, assets turnover, and assets tangibility, with return on assets serving as a gauge of financial performance. A descriptive study design was used, along with the correlation and regression analysis methods. The results indicated that the financial performance of SMEs was not significantly impacted by capital structure, asset turnover, or asset tangibility. Ogutu, Riro, and Ofunya (2015) carried out a study to examine the relationship between capital characteristics and the financial performance of companies listed on the Nairobi Securities Exchange that provide goods and services. They focused on a selection of nine companies over 11 years, from 2003 to 2013. The independent variables in the study included the ratios of total current liabilities to total assets and total current assets to total liabilities, while the performance metrics assessed were return on equity (ROE) and return on assets (ROA). The researchers employed various data analysis methods, including correlation and panel multiple regressions. The findings revealed that the return on equity (ROE) for commercial and service companies listed on the Nairobi Securities Exchange is negatively affected by increased financial leverage. Additionally, it suggests that raising the current asset percentage relative to total assets has a positive effect on a firm's performance as determined by ROE and ROA. Kimathi (2015) conducted a study on the influence of leverage on the performance of non-financial firms listed on the Nairobi Securities Exchange. The research revealed a statistically insignificant financial performance difference between highly and lowly leveraged firms. Furthermore, the findings indicated a negative correlation between leverage and overall firm performance, suggesting that increased leverage may detrimentally affect financial outcomes.

Divergent opinions were obtained from the following research that looked into the relationship between a firm's financial performance and liquidity. Manyo and Ogakwu (2013) examined the impact of liquidity on a firm's return on assets using Nigerian evidence. According to the study, return on assets is significantly positively impacted by liquidity. Lartey, Antwi, and Boadi (2013) investigated the connection between Ghanaian-listed banks' profitability and liquidity. The study used panel data and a descriptive research approach, with data analysis performed using regression and correlation models. Seven banks were chosen for the study, which ran from 2005 to 2010 over six years. The metrics for profitability and liquidity were the return on assets and the temporary investment ratio,

respectively. The outcome demonstrated a very weak positive correlation between Ghana's listed banks' profitability and liquidity. Malik and Aqeel (2017) examined the relationship between liquidity management and profitability in Pakistani commercial banks. The study included three banks with regional branches and was conducted over ten years, from 2004 to 2013. Profitability was assessed using return on equity and return on assets, while liquidity was measured by the investment ratio, current ratio, capital ratio, credit facilities, and liquidity assets ratio. Regression and correlation analysis techniques were employed to analyze the data. The findings indicated that an increase in the current ratio and the investment ratio of available funds positively impacted profitability. In contrast, the capital ratio and the ratio of liquid assets had a negative effect on profitability. Akenga (2017) investigated the impact of liquidity on the financial performance of firms listed on the Nairobi Securities Exchange in Kenya. The research primarily focused on key liquidity indicators, including the current ratio, debt ratio, and cash reserves, while utilizing return on assets (ROA) as the principal measure of profitability. Employing a causal research design, the study surveyed a purposively selected sample of thirty organizations listed on the NSE. Data analysis was performed using both inferential and descriptive statistical methods. The findings indicate that cash reserves and the current ratio significantly influence ROA, whereas the debt ratio did not significantly affect profitability measures.

Waswa, Mukras, and Oima (2018) investigated how liquidity affected the Kenyan sugar industry's financial performance. The study used a random effects regression model for data analysis and a cross-sectional retrospective research methodology with purposive sampling to choose five sugar companies for 12 years from 2005 to 2016. The study took into account the return on assets as a metric of company performance, the current liabilities coverage ratio, and firm size as a measure of liquidity. The results showed that the financial performance of the company and liquidity management are negatively correlated.

It is clear from the literature review above that the majority of studies have used ROA, ROE, and EPS as financial performance indicators, with total debt, long-term debt, and short-term debt serving as stand-ins for capital structure. According to Obeidat and Darkal (2018), these conventional performance metrics are criticized because they fail to account for changes in share value caused by risk, inflation, and the cost of new capital invested. In contrast, Economic Value Added (EVA) offers a more holistic view by assessing financial success through the costs of equity, debt, and retained earnings. Since EVA represents the difference between return on assets (ROA) and the cost of capital multiplied by the capital invested in

the company, it is regarded as a superior metric. (ROA - WACC) x invested capital equals EVA. It encapsulates the notion that when shareholders receive returns that exceed their required rate of return, true value is created. Unlike ROA or ROE, which might not fully represent changes in shareholder wealth, EVA provides deeper insight into value creation. This is because it accounts for the cost of all capital employed, thereby offering a clearer picture of managerial impact on shareholder value. Thus, EVA serves as a strategic tool for managers to make informed decisions that enhance shareholder wealth by emphasizing efficient capital use and maximizing economic profit.

The data above largely support the idea that funding arrangement affects a company's financial success in one of two ways: either positively or negatively. However, there is an absence of data regarding the financial performance and funding structure of the sugar business using economic value added as a performance indicator. Additionally, research indicates that funding arrangements can improve corporate performance in general and the sugar industry in particular. Consequently, it is imperative to ascertain the extent to which the financial structure influences the financial performance of the sugar business.

The information that is currently available also shows contradictory findings about how liquidity affects the sugar industry's financial performance. Research indicates that liquidity can impact the sugar industry's financial performance favorably or negatively. Determining the impact of liquidity on the financial performance of the sugar business is crucial, as liquidity is a metric that indicates a company's capacity to satisfy short-term and immediate obligations using its cash. It is important to test these relationships on the sugar industry as a unit, which broadly absorbs labor force participation as employment agents and significantly contributes, on average, 7.5% of Kenya's GDP. This is because there is a conflict between the funding structure and performance, despite the general principles of applying the funding structure to improve performance. There is also an inconsistency in the literature about the relationship between liquidity and performance.

1.2 Statement of the Problem

The financial performance of Kenya’s sugar industry has been on a persistent decline, threatening its sustainability and long-term viability. This sector is vital, supporting the livelihoods of over 8 million Kenyans and contributing 15% to the agricultural gross domestic product (GDP). Yet, many sugar firms remain financially distressed due to inadequate working capital, weak liquidity management, and poorly structured financing. As

a result, most operate under heavy debt burdens—estimated at Kshs 58 billion by December 2018—and nearly half face recurring financial difficulties that often lead to closures.

These challenges are compounded by high financial costs and frequent operational disruptions arising from liquidity shortages, which erode profitability. Liquidity—the ability to meet short-term obligations—and funding structure—the balance between debt and equity—are critical to financial health, yet many firms fail to maintain an effective balance. Despite the importance of these factors, limited empirical research has examined how funding structure and liquidity jointly influence the financial performance of Kenya's sugar firms.

This knowledge gap restricts the implementation of evidence-based strategies that could restore financial stability and competitiveness in the sector. Therefore, this study seeks to investigate the interplay between funding structure, liquidity, and financial performance, with the aim of generating insights to guide policy and managerial interventions that can safeguard the future of the sugar industry.

1.3 Objectives of the Study

The study's primary objective was to determine the effect of funding structure and liquidity on the financial performance of Sugar Manufacturing firms in Kenya.

1.3.1 Specific Objectives

The following specific objectives guided the study:

i. To determine the effect of funding structure on the financial performance of sugar manufacturing firms in Kenya.
ii. To establish the effect of liquidity on the financial performance of sugar manufacturing firms in Kenya.
iii. To evaluate the moderating effect of liquidity on the relationship between funding structure and the financial performance of sugar manufacturing firms in Kenya.

1.4 Hypotheses of the Study

H_{01}: The Funding structure has no significant effect on the financial performance of sugar manufacturing firms in Kenya

H_{02}: Liquidity has no significant effect on the financial performance of Sugar manufacturing firms in Kenya.

H_{03}: Liquidity has no significant moderating effect on the relationship between funding structure and the financial performance of Sugar manufacturing firms in Kenya.

1.5 Justification of the Study

The sugar sector is crucial to Kenya's economic growth, particularly under the manufacturing pillar of the Vision 2030 goals, and is one of the key factors enabling the government's Big 4 Agenda, which encompasses the manufacturing and food security pillars (Kenya Association of Manufacturers, Sugar Sub-Sector Profile, 2020). The study was designed to help sugar manufacturing firms evaluate their current debt-to-equity ratios and consider adjusting their funding structures to align with the findings. In this case, firms should aim to optimize their debt-to-equity financing options while focusing on improving their liquidity management practices. These will make it possible for firm managers and authorities overseeing the sugar business to determine the appropriate level of financial leverage in their capital structure. Policymakers can use the research findings to create policies that support healthier financial practices within the sugar manufacturing firms by introducing regulations that encourage sustainable debt levels, such as setting industry-specific debt ratio guidelines and providing incentives for firms to maintain higher liquidity levels, possibly through tax benefits or subsidies for those adhering to best practices in liquidity management. Academic and research institutions can use the findings as a basis for further research to explore additional factors influencing financial performance by investigating the role of other variables, such as operational efficiency, market conditions, and technological advancements, in conjunction with funding and liquidity. Finally, investors and financial institutions can use the research to make informed decisions about which sugar firms to invest in based on their funding structures and liquidity positions.

1.6 Scope of the Study

The scope is outlined from three perspectives in this study: area perspective, subject perspective, and time of the study perspective. Kenya is an African nation in the continent's east, where the study was carried out. Five nations around the nation are: Tanzania, Somalia, Uganda, South Sudan, and Ethiopia. Kenya is located between 41/20 N and 41/20 S latitudes. Eastern Longitudes: 340 and 420. With a total size of 580,367 square kilometers, the nation comprises 11,227 square kilometers of water and 569,140 square kilometers of land. The study's subject scope is related to corporate finance in particular, as well as the larger discipline of finance. The data set encompasses nine years of statistics, spanning from 2014 to 2022. This time frame was deliberately selected to provide a comprehensive analysis of the industry's financial trends and to evaluate progress toward the goal of achieving self-

sufficiency in sugar production by 2021, as delineated by the Sugar Industry Stakeholders Task Force

1.7 Conceptual Framework

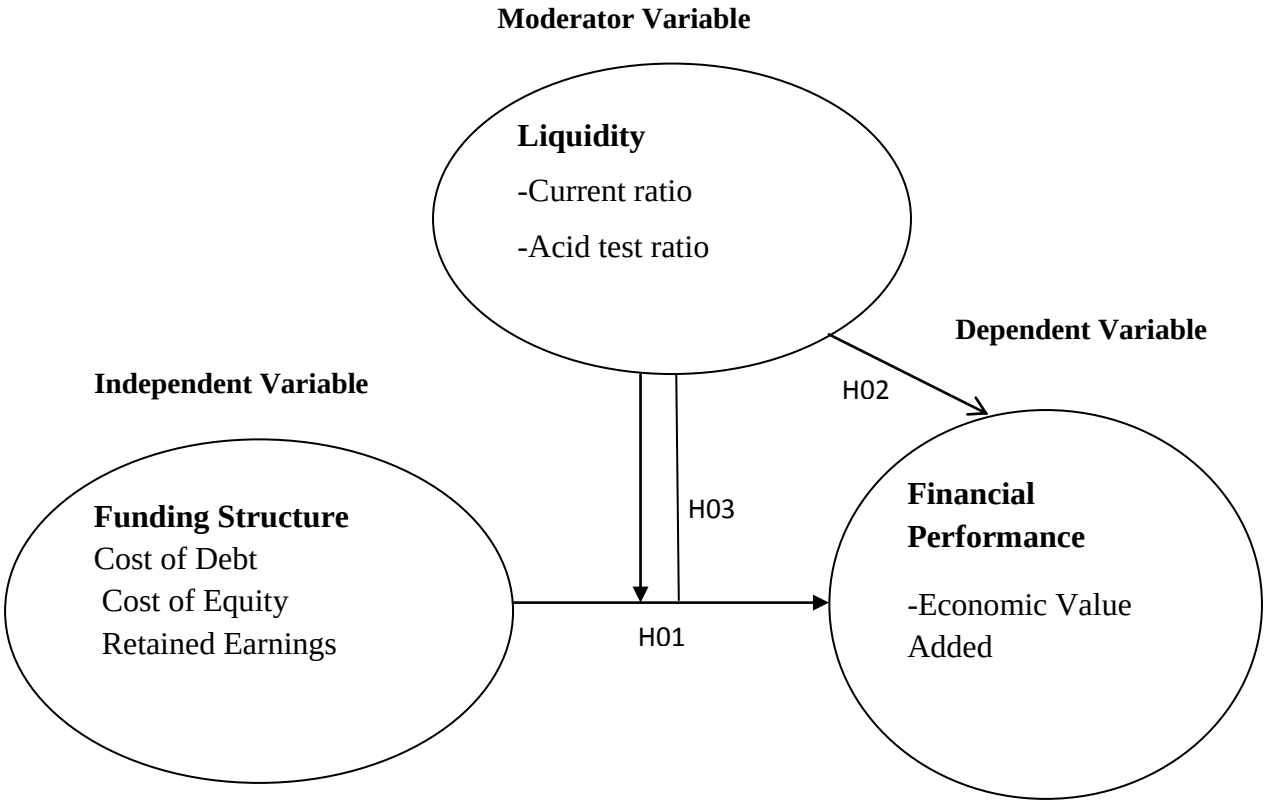


Figure 1.1: Funding structure, liquidity, and Financial Performance Relationship

Source: Adapted from Sulaiman & Khalid, 2023

The divergence of the current study from Sulaiman and Khalid is that they used short-term debt and long-term debt as components of capital structure, with Return on Assets as a measure of financial performance. The current study employs economic value added as an element of financial performance, with cost of debt, cost of equity, and retained earnings as indicators of funding structure.

The conceptual framework comprises three sets of hypothesized relationships. Financial performance and funding structure are directly correlated, according to the first hypothesis. Additionally, liquidity and financial performance are directly correlated, as stated in the second set of hypotheses. Furthermore, liquidity is believed to moderate the relationship between funding structure and financial performance. It also illustrates the relationship among funding structure, liquidity, and financial performance. Drawing on the

aforementioned conceptual framework, the study posits that the liquidity level moderates the relationship between funding structure and financial performance, rather than investigating a straightforward correlation. Performance can be enhanced when important indicators and variables are effectively aligned (Chenhall, Hall, & Smith, 2013). The rationale behind selecting liquidity as a moderating variable is its capacity to indicate the company's ability to meet its debt obligations when they come due. It affects the cost of capital, investment decisions, risk management, operational efficiency, and financial structure flexibility. A methodical strategy for handling liquidity guarantees that companies can optimize their financial performance while maintaining stability and growth prospects (Bhunia & Uddin, 2011). A company's liquidity condition is evaluated using the current ratio, which is current assets divided by current liabilities, and the acid test ratio, sometimes referred to as the quick ratio, which is current assets less inventories divided by current liabilities (Pandey, 2005). While Bhunia (2011) contends that low liquidity results in bad credit ratings and may ultimately lead to a firm's closure. According to Garcia, Padron, Ceceres, Maroto, Verona, and Jordan (2005), businesses with liquid assets are more likely to succeed because they can quickly use cash to pay their debts, reducing the risk of liquidity issues. However, excessive liquidity is also detrimental because idle assets generate no income. A buildup of idle money due to excess liquidity could result in lower market performance and profitability for securities.

The researcher employed the cost of debt and equity because they comprise the cost of variables, while debt and equity capital comprise the capital amount. Therefore, the cost of capital provides a risk-adjusted view of financing, and this aligns clearly with the objective of this study or firm valuation theory. Capital amount, on the other hand, ignores cost efficiency.

CHAPTER TWO
LITERATURE REVIEW

2.1 Theoretical Review

This chapter presents a detailed examination of the existing literature that underpins the interpretation of the study's findings while also addressing its limitations. It begins with an analysis of the theoretical foundations of the relevant concepts, followed by a critical evaluation of the empirical research on the topics discussed. Furthermore, the chapter articulates critiques of the prevailing literature and identifies significant research gaps that warrant further investigation.

2.1.1 Trade-off Theory

The Trade-Off Theory of capital structure, initially posited by Modigliani and Miller (1958) under conditions of no taxes, and later extended in a tax-inclusive framework, offers a foundational perspective on how firms determine their optimal capital mix. This theory contends that companies weigh the tax benefits of debt against the costs associated with financial distress and bankruptcy when choosing between debt and equity financing (Kraus & Litzenberger, 1973). The tax shield arising from interest deductibility incentivizes debt financing up to a point, beyond which the marginal cost of financial distress, agency conflicts, and loss of financial flexibility begin to outweigh the benefits. In its static form, the Trade-Off Theory assumes that firms aim to reach an equilibrium capital structure that minimizes the weighted average cost of capital (WACC) and thereby maximizes firm value. This theoretical framework integrates both market imperfections and real-world constraints, allowing for a more realistic understanding of capital structure decisions compared to the traditional Modigliani-Miller irrelevance proposition.

From a sectoral and contextual perspective, the Trade-Off Theory provides a relevant analytical lens for investigating capital structure decisions in the sugar manufacturing industry in Kenya; therefore, it anchors this study. Firms in this industry typically operate in a capital-intensive environment characterized by long production cycles, exposure to commodity price volatility, and regulatory intervention. These characteristics increase the sensitivity of firm performance to financing decisions. The study’s focus on funding structure, specifically the use of debt, equity, and retained earnings, aligns directly with the core principles of the Trade-Off Theory, which presumes a rational firm will choose a combination of financing instruments that balances costs and benefits under prevailing constraints. In Kenya’s sugar sector, access to long-term capital is limited, and high debt levels may exacerbate default risk due to macroeconomic instability, weak credit

enforcement, and underdeveloped financial markets (Booth et al., 2001). Thus, analyzing how different funding sources affect Economic Value Added (EVA) offers empirical validation of the theory in a developing country context.

Crucially, this study enhances the Trade-Off Theory by introducing liquidity operationalized through current ratio and acid-test ratio as a moderating variable. While the traditional theory emphasizes long-term solvency and capital structure optimization, it largely omits the role of short-term financial health in influencing financing decisions. Liquidity reflects a firm's ability to meet immediate obligations and serves as a buffer against unforeseen cash flow shocks (Opler et al., 1999). In resource-constrained environments like Kenya, liquidity can significantly affect the firm's leverage capacity and its associated costs. A highly liquid firm may have better access to credit or negotiate more favorable borrowing terms, thereby altering the risk-return calculus assumed in the trade-off framework. By incorporating liquidity as a moderating factor in the relationship between funding structure and financial performance, this study contributes to the development of a more dynamic and context-sensitive interpretation of the Trade-Off Theory, recognizing that short-term financial constraints can influence long-term capital structure decisions.

Finally, this study addresses several critiques of the Trade-Off Theory and proposes a pathway to refine its empirical and theoretical scope. Critics argue that the theory's predictive power is weak in emerging markets due to institutional voids, limited capital market depth, and heterogeneous firm behavior (Frank & Goyal, 2009). Moreover, the static nature of the model fails to account for the evolutionary adjustments firms make in response to liquidity shocks, policy changes, or macroeconomic shifts. This research responds to these limitations by testing the theory in an underexplored sector and geographical context while simultaneously broadening its conceptual boundaries. The inclusion of EVA as the measure of performance also improves upon traditional accounting-based metrics, offering a valuation-oriented approach that is consistent with the theory's focus on maximizing firm value. Consequently, the findings of this study have the potential to inform both scholarly debate and managerial practice by validating or recalibrating the Trade-Off Theory within the realities of the Kenyan manufacturing sector, thus extending its relevance beyond developed capital markets.

2.1.2 Stockholder Theory

The theory of corporate social responsibility focuses on the moral obligations and goals of corporations. Milton Friedman (1962) is the primary proponent of this theory. The stockholder theory defines enterprises as agreements in which investors provide management with funds for day-to-day operations in exchange for an ownership stake in the company. Stockholders and executives have separate relationships. Both willingly signed a contract. Each partner's duties and obligations are specified in the agreement. When acting as the stockholders' agents, the executives are required to handle the funds that the stockholders have advanced in line with their stockholders ' principal goals.

While a company may pursue other objectives in addition to profit, the stockholder theory primarily focuses on the subset of companies and enterprises whose primary objective is to maximize profits. The key idea is that, notwithstanding potential benefits to society, Chief executive officers are bound by the fiduciary responsibility to refrain from using company resources in ways that the investors have not approved. Executives, managers, and workers are required under their employment contracts to further the goals stated in the contract as well as the interests of their employer and stockholders. Friedman asserts that businesses have a singular, unwavering social responsibility to utilize their resources and partake in profitable endeavors, provided they adhere to the rules of the game, i.e., participate in honest and transparent competition devoid of dishonesty or fraud. He argues that a company's primary social responsibility is to maximize profits and that an executive would violate their fiduciary duties by taking on social responsibilities.

The Stockholder Theory emphasizes that a company's main goal is to increase shareholder value. Value creation for shareholders is clearly shown through financial performance indicators such as profitability, return on equity, and return on assets. By analyzing how funding structures and liquidity management impact financial performance, the study aligns with the theory's focus on financial metrics as primary indicators of a company's success. Different funding structures affect the cost of capital, which in turn influences profitability. For example, debt financing can be cheaper than equity due to tax shields, but it also introduces financial risk. The theory supports the evaluation of how leveraging (using debt) affects the return on equity. Higher leverage can increase returns to shareholders if the return on investments exceeds the cost of debt, but it can also amplify losses. Effective liquidity management ensures that the company can meet its short-term obligations, maintain operational efficiency, and avoid financial distress. Having sufficient liquidity allows a

company to take advantage of investment opportunities that can enhance shareholder value. The theory underscores the importance of maintaining sufficient liquidity to mitigate risks that could threaten the financial stability of the company, thereby protecting shareholder interests.

2.1.3 Pecking Order Theory

In its most basic form, the pecking order, also known as adverse selection or the finance pyramid, is a preference theory that gradually takes advantage of funding options ranging from the least to the most expensive. Myers and Majluf (1984) have been the primary sources of association for the pecking order idea. The pecking order theory states that management would like to finance their company with retained earnings first, then debt, then hybrid financing options like convertible loans, and finally with equity that has been offered externally. Seventy-five percent of SMEs appear to make financial structure decisions within a pecking order framework (Norton, 1991). This is consistent with the small and micro-enterprise sectors, as these businesses are run by owners who do not wish to dilute their ownership. Owner-managed businesses often favor the retention of profits as a strategy for maintaining control over their assets. The pecking order theory posits that financing through retained earnings mitigates information asymmetry, as this funding originates directly from the enterprise. Internal financing is considered the most cost-effective and efficient form of capital acquisition, particularly when compared to external financing options such as debt or equity. External funding typically entails additional fees and costs, rendering it less advantageous for businesses focused on maintaining ownership and minimizing financial burdens.

The theory proposes that a company may not achieve its intended capital structure. The capital structure is usually the result of multiple short-term financing decisions rather than long-term ones. It also suggests that highly profitable businesses typically need less outside funding. The study shows that Kenya's sugar manufacturing firms do not follow the pecking order theory in making financial decisions.

2.1.4 Liquidity Preference Theory

According to John Maynard Keynes's (1936) liquidity preference hypothesis, the desire to maintain liquidity rather than borrow money drives demand for money. According to him, the interest rate represents the cost of Money. The hypothesis demonstrates the relationship between the interest rate and the amount of money that the public wants to hold. Keynes

contends that people's preference for liquidity affects their saving and spending decisions and that the three factors that drive the need for liquidity are transactional, precautionary, and speculative. According to the hypothesis, cash is the most widely recognized liquid asset; more liquid investments may be quickly redeemed for their entire value, and investors give up liquidity in favor of greater interest rates when provided. Along with aiding in the understanding of the current ratio and acid test ratio, this theory directs the study's analysis of the sugar firms' financial systems. The acid test ratio, also known as the quick ratio, is calculated by dividing the current assets minus the inventories by the current liabilities. The current ratio is calculated as current assets divided by current obligations. Thus, the price of money, or interest rate, as proposed by Keynes in 1936, is connected to the ratios of the acid test and current. The examination of the impact of funding structure and liquidity on financial performance employs the Liquidity Preference Theory to evaluate the influence of funding selection on liquidity and, consequently, the financial health of sugar firms, provide valuable insights into the optimal combination of debt and equity that strikes a balance between liquidity requirements and profitability objectives, and develop strategies for enhanced liquidity management to improve financial performance, particularly when addressing industry-specific challenges.

2.2 Empirical Literature Review

A literature review serves as a foundational element in scholarly research, providing an in-depth understanding of a specific topic through the examination of existing work by other scholars. By engaging in a thorough literature review, researchers familiarize themselves with key concepts and traditional methodologies within their discipline. This process not only enhances their knowledge but also equips them with the necessary techniques to conduct their study effectively. A well-executed literature review can significantly contribute to producing high-quality, reputable, and rigorous scientific research papers. Conversely, a weak literature review can undermine the validity of otherwise sound results, diminishing the impact of important recommendations presented to stakeholders or the research community.

2.2.1 Effect of Funding structure on the financial performance of sugar manufacturing firms in Kenya

Samiloglu, Polat, and Bagci (2014) investigated the impact of capital structure on the profitability of Turkish industrial companies listed on the Istanbul Stock Exchange. The study involved 120 Turkish companies in a sample across ten years from 2003 to 2012. Profitability was measured using economic value added, while invested capital was employed as the

control variable. The factors that determined the capital structure were long-term obligations, total resources, total liabilities to total resources, and current liabilities to total resources. The data analysis techniques employed were panel data and multiple regression analysis. The results showed that while long-term liabilities, total liabilities, and invested capital had positive and significant relationships with economic value added, current liabilities and total resources had significant negative relationships with economic value added. This study primarily focused on the ratios of liabilities; however, the current analysis will incorporate both equity and debt.

The study conducted by Suresh and Sengottaiyan (2015) examined financial performance and value generation for shareholders of eight automobile businesses in India between 2003 and 2013. The study used a stratified sampling technique. Measures of financial performance included market value added and economic value added. The findings indicated a positive and significant fluctuation trend in both market and economic value added. The current study employed funding structure and Liquidity as independent variables with a census sampling technique.

Abeywardhana (2015) examined the effects of capital structure on business performance using data from non-financial SMEs in the UK manufacturing sector between 1998 and 2008. The study utilized various proxies for capital structure, including long-term debt to total assets, short-term debt to total assets, the debt-to-equity ratio, and total debt to total assets. To measure business performance, the study focused on return on assets (ROA) and return on capital employed (ROCE) as dependent variables. The findings indicated that well-performing organizations tend to finance their operations through retained earnings rather than through debt capital. This conclusion is supported by a significant negative relationship between leverage and company performance, as assessed by ROA and ROCE. While the study primarily used ROA as a performance metric and concentrated on the debt components, the current analysis incorporates retained earnings, debt, and equity, utilizing economic value added (EVA) as a measure of financial performance.

The examination of the impact of capital structure on profitability was conducted by Biger and Mathur (2011), utilizing data sourced from the United States. The study encompassed a sample of 272 publicly traded companies listed on the New York Stock Exchange over three years, specifically from 2005 to 2007. Three key metrics were selected to represent capital structure: long-term debt to total assets, short-term debt to total assets, and total debt to total

assets. Return on Equity (ROE) was employed as the primary indicator of financial performance. For data analysis, regression analysis and correlation techniques were applied. The findings revealed a positive correlation between the profitability of firms within the manufacturing industry and the ratios of short-term, long-term, and total debt to total assets. It is noteworthy that the study did not incorporate panel data in its analysis. Overall, the use of ROE as a measure of financial performance provided significant insights into the relationship between capital structure and profitability within the studied context.

The relationship between capital structure and business performance was examined by Tedy, Achsani, and Anggraeni (2015) using data from the financial sector in Indonesia. The study utilized Return on Assets (ROA) and Return on Equity (ROE) as measures of financial success, along with company size and various debt ratios: short-term debt to total assets, long-term debt to total assets, total debt to total assets, and total debt to total equity, all of which are components of capital structure. A panel data analysis was conducted to evaluate the information. The findings indicated that a company's performance, as measured by return on assets, was negatively affected by its capital structure. In this study, Economic Value Added (EVA) will be used as a substitute for financial performance.

Khanam, Nasreen, and Pirzada (2014) conducted a comprehensive investigation into the relationship between capital structure and financial performance within the context of Pakistan's food industry. The study focused on a sample of 49 food-related companies listed on the Karachi Stock Exchange, covering six years from 2007 to 2012. To analyze capital structure, the researchers identified several key metrics: the debt-equity ratio, the debt-to-total assets ratio, the short-term debt-to-total assets ratio, and the long-term debt-to-total assets ratio. Financial performance was assessed through various proxies, including Return on Assets (ROA), Return on Capital Employed (ROCE), Return on Equity (ROE), Earnings Per Share (EPS), and net profit margin. Utilizing a linear regression model for data analysis, the findings revealed a significant inverse relationship between capital structure and the financial performance of entities within the Pakistani food industry. The current study intends to adopt a broader perspective on capital structure by employing the additive of debt, equity, and retained earnings as a proxy, contrasting with the previous study’s reliance on debt ratios. This methodological shift aims to enhance the understanding of how different components of capital structure influence financial outcomes in this sector.

Singh, Misra, Kumar, and Tiwari (2019) used the panel regression technique of analysis to examine the factors that affected the financial performance of 37 agro-cooperatives in the United States between 2009 and 2017. The dependent variable was ROA, while the independent variables were size, growth, leverage, and capital intensity. The findings indicated a negative correlation between profitability and size.

A study conducted by Pokharel, Regmi, Featherstone, and Archer (2019), on the financial performance of agricultural cooperatives in the United States of America revealed that cooperatives that were not under financial stress had lower interest rates and lower leverage ratios, but they also had higher rates of return on assets and equity. Furthermore, it was shown that, in comparison to stressed cooperatives, non-stressed cooperatives had larger overall assets and sales.

Li, Niskanen, and Mervi (2019) examined how credit risk influences the relationship between capital structure and firm performance in European small and medium-sized enterprises (SMEs). Their study utilized the book-debt ratio as one component of capital structure, along with age, size, and credit risk as control variables. The evaluation of performance was based on the ratio of profit before taxes to total assets. According to their findings, the credit risk status of SMEs significantly affects the relationship between capital structure and performance. Specifically, SMEs with low credit risk exhibited a negative correlation between leverage and business performance.

Ali (2014) conducted an empirical analysis focusing on Pakistani chemical companies listed on the Karachi Stock Exchange to explore the relationship between financial leverage and financial performance. The study encompassed twenty publicly traded firms within the chemical sector, covering a time frame from 2006 to 2013. Financial performance was assessed through various metrics, including return on assets (ROA), net profit margin, return on equity (ROE), and return on capital employed (ROCE). Financial leverage was represented by the debt-to-equity ratio, serving as a key indicator in the analysis. For data analysis, both correlation and regression methodologies were employed, yielding significant insights. The findings revealed a positive correlation between the debt-to-equity ratio and the financial performance indicators of ROA, net profit margin, and ROCE. Conversely, a negative correlation was identified between the debt-to-equity ratio and ROE. These results suggest a nuanced relationship wherein financial performance and financial leverage exhibit a generally positive association, with specific variables reflecting differing dynamics. Notably,

whereas Ali's study primarily utilized leverage as a standalone measure, the current investigation enriches the discourse by employing a more comprehensive framework that incorporates a combination of debt, equity, and retained earnings, thus providing a broader context for understanding financial performance within chemical firms.

Murtala, Lawal, Ibrahim, and Abdullahi (2018) examined the capital structure and return on capital used by Nigerian construction companies. Five construction companies took part in the study, which used panel data analysis and an ex-post factor research design. The debt-to-equity ratio, firm size, and firm age were used as capital structure components, and the return on capital employed was used as a gauge of financial performance. The results showed that capital structure had a negative impact on construction companies' return on capital. While the current study will use a correlational research design, this study used an ex-post facto research design.

Abor (2007) looked into how SMEs' performance was affected by debt policy. Proof from South African and Ghanaian businesses. Panel data analysis was used in the study from 1998 to 2003, a period of six years. Gross profit margin, return on assets, and Tobin's Q were regarded as performance proxies, while the long-term debt ratio, short-term debt ratio, trade credit, and total debt ratio were considered capital structure measures. The results showed that, for both Ghana and South Africa, short-term and total debt have a significant negative relationship with gross profit margin. It also showed that, for both countries, long-term debt has a statistically significant positive relationship with gross profit. Additionally, it was shown that the relationship between the total debt ratio and return on assets and long-term, short-term, and total debt is significantly negative. Unlike the current study, which aims to use the funding structure as its independent variable, this study examined debt policy.

Badar and Saeed (2013) examined empirical data from Pakistan's sugar industry to examine the effect of capital structure on performance. Regression analysis and correlational design were used. The study was conducted for a period of five years from 2007 to 2011. Ten companies listed on the Karachi Stock Exchange were chosen using a simple random sample technique. Asset turnover ratio and return on assets were used as financial performance indicators, and current liabilities to total assets, long-term debt to total assets, and debt-to-equity ratio were components of the capital structure. The results show that, as measured by return on assets, long-term debt significantly contributes to firm performance, while short-term debt significantly detracts from that performance. Additionally, it revealed that the

performance of the firm and its leverage were negatively correlated. While the current study adopted a census sampling technique with retained earnings, equity, and debt as proxies for capital structure, the previous study used a simple random sampling technique and the components of debt as the measure of capital structure.

Leon (2013) examined the effect of capital structure and the financial performance of the listed manufacturing companies in Sri Lanka. The research was conducted between 2008 and 2012, with a sample of thirty listed manufacturing firms. Leverage ratios were used as components of the capital structure, and return on equity and return on assets served as performance measures. The results showed that leverage and return on equity had a significant negative relationship. However, there was no significant relationship between leverage and return on assets. In this study, return on equity and return on assets were used as measures of financial performance, while leverage ratios were used as measures of capital structure. The current study employed debt, equity, and retained earnings as measures of capital structure, while economic value added was used as an indicator of financial performance.

Ruri and Omagwa (2018) examined the financial performance and capital structure of SMEs in Kenya's Embu County. Using a stratified random sampling technique and a descriptive research design. 29 SMEs were chosen for the study over five years, from 2012 to 2016. Measures of capital structure included retained earnings, debt capital, and equity capital. The multiple regression method was used in the study to analyze the data. The result showed that debt and equity capital had a significant effect on SMEs' financial performance. While the current study adopted correlational and census sampling techniques, the previous study used a descriptive research design with a stratified random sampling technique.

Mwangi and Birundu (2015) investigated how capital structure affected the financial performance of small and medium-sized enterprises in Kenya's Thika Sub-County. For a period of five years, from 2009 to 2013, forty SMEs were chosen. The capital structure was based on debt ratio, assets turnover, and assets tangibility, with return on assets serving as a gauge of financial performance. A descriptive study design was used, along with the correlation and regression analysis methods. The results indicated that the financial performance of SMEs was not significantly impacted by capital structure, asset turnover, or asset tangibility. Using return on assets as a component of financial performance measurement, the researcher employed a descriptive research design throughout the study's

five-year duration. However, the current study utilized a correlational research design with components of financial performance being economic value added.

Muchiri, Muturi, and Ngumi (2016) studied the relationship between capital structure and the financial performance of listed firms at the East African Securities Exchange. The study employed an Explanatory research design and a panel data model. The study was conducted from 2006 to 2014. 61 companies listed on the East African Securities Exchange were selected for the study. Return on equity and return on assets were used as performance indicators, and the GDP growth rate was used as a moderating variable. The capital structure components included retained earnings, short-term debt, long-term debt, and equity. Two models were used to analyze the data: regression and correlation. The results showed that there was no significant positive relationship with return on equity but an insignificant negative correlation with return on assets for retained earnings, long-term debt, short-term debt, and equity. Additionally, it proved that the GDP growth rate had a significant moderating influence. The current study used a correlational research design, whereas the previous study used an explanatory research design.

Ngure, Mtea, and Muema (2018) investigated the relationship between the financial performance and financial structure of the listed companies on the Nairobi Securities Exchange in Kenya. Using a descriptive and historical research design, the study conducted a census of 51 listed firms at the Nairobi Securities Exchange between 2009 and 2016. The methods of data analysis used were multiple linear regression and descriptive statistics. The findings indicated an insignificant relationship between short-term debt and financial performance, but a statistically significant relationship between equity financing, long-term debt, and the economic performance of listed firms in the NSE.

The impact of equity on the financial performance of selected companies listed on the Nairobi Securities Exchange in Kenya was examined by Gathara, Kilika, and Mingi (2019). Using an explanatory research design, the researcher conducted a nine-year census study for 39 companies listed on the Nairobi Securities Exchange between 2007 and 2015. The financial performance indicators employed were return on assets and return on equity. The study revealed that equity significantly contributes to the company's financial performance. The current study will employ a correlational research design and EVA, whereas the previous study used an explanatory research design, a census, and traditional accounting methods for performance measurement.

Njagi, Kimani, and Kariuki (2017) examined the relationship between equity financing and the financial performance of small and medium-sized businesses in Embu town, Kenya. 60 Small and Medium enterprises were selected for the study. A stratified random technique was used in conjunction with a descriptive survey research design. Growth in sales, liquidity, profit margin, and return on assets were used as financial performance indicators, while contributions from angel investors and friends' contributions were used as equity proxies. The results showed a positive correlation between SMEs' financial performance and equity financing. While the current study will employ a combination of equity, debt, and retained earnings, the previous study only used equity financing as one component of the capital structure.

Githaiga (2015) examined the relationship between small- and medium-sized businesses' financial performance and debt financing: Kenyan evidence. The study used return on assets and the profit margin ratio as proxies for financial performance, while using both long-term and short-term loans as proxies for debt financing. For three years, from 2011 to 2013, 50 SMEs in Eldoret Town, Kenya, were chosen using the stratified sampling technique. The study used multiple regression analysis as well as an explanatory and descriptive research design. The results showed that both long-term and short-term loans had a negative impact on SMEs' financial performance. Only three years were allotted for the study, and it included elements of debt along with descriptive and explanatory methods. The current study focuses on the combination of debt, equity, and retained earnings and also uses a correlational research design. The previous study used an explanatory research design and concentrated on the debt component of capital structure.

The impact of leverage on the performance of non-financial companies listed on the Nairobi Securities Exchange was examined (Kimathi, 2015). Purposive sampling and a causal research design were used in the study to choose 38 non-financial companies that were listed at the Nairobi Securities Exchange over six years, from 2008 to 2013. Performance was measured by return on assets, with growth, debt-to-equity ratio, firm size, and liquidity serving as components of leverage. The study found that there was a negative correlation between leverage and firm performance, but there was no significant disparity in the financial performance of highly and lowly leveraged firms. Economic value added and a correlational research design will be used in this study to gauge financial performance.

Isabwa and Kajirwa (2015) employed a longitudinal research design and 11 commercial banks listed on the Nairobi stock exchange to collect data for their study on the impact of debt on firm performance. Using correlation and regression models in the analysis, it was determined that debt has a negative and statistically insignificant effect on return on assets. While the current study used funding structure and liquidity as independent variables with a correlational research design, the previous study used debt as the independent variable and a longitudinal research design.

The above literature revealed that these studies were conducted in different geographical areas, using different methodologies, that is, sampling techniques, methods of data collection, research design, and sample size. The literature also showed that most research has focused on the debt part of the capital structure, examining the relationship between return on equity and return on assets for short-term, long-term, and total debt-to-equity ratios. Based on this premise, the study aims to determine how the funding structure influences sugar manufacturing firms' financial performance in Kenya.

2.2.2 Effect of Liquidity on the Financial Performance of Sugar Manufacturing Firms in Kenya

Yameen, Tabash, and Farhan (2019) studied the effect of liquidity on a firm's performance of Indian pharmaceutical companies. For ten years, between 2008 and 2017, 82 pharmaceutical companies were chosen for the study. Using empirical data from Indian pharmaceutical companies and Leverage, firm size, and age as control variables, return on assets was used as a measure of profitability. The current ratio and quick ratio were chosen as liquidity measures. Regression analysis and balanced panel data were employed in the data analysis. The findings demonstrated a significant positive relationship between pharmaceutical companies' profitability, as determined by the return on assets, and their current liquidity ratio and quick ratio. It also demonstrated a negative correlation between the pharmaceutical companies' profitability and their age, firm size, leverage, and control variables. Return on assets was used as a measure of profitability during the ten-year study, which also included control variables. Economic value added and return on capital employed were used in this study, and no control variable was introduced for the first nine years.

Arabsalehi, Beedel, and Moradi (2014) examined the relationship between stock market liquidity and economic performance using data from Iranian-listed companies. For ten years, between 2003 and 2012, 97 companies listed on the Iranian stock exchange were chosen

using panel data and a systematic sampling technique. Tobin's Q, return on assets, and economic value added were used to gauge performance. The results demonstrated that, while stock liquidity had no significant effect on return on assets, it did have a significant positive impact on Tobin's Q and economic value added.

Pais and Gama (2015) looked at Portuguese data regarding working capital management and SMEs' profitability. Panel regression with fixed effects was used in the study, which covered 6063 Portuguese SMEs over ten years from 2002 to 2009. The findings suggested that a decrease in the amount of inventory held and the time it takes for businesses to pay their customers and settle their commercial liabilities are linked to increased corporate profitability. Additionally, it proved that the cash conversion cycle, inventory, accounts payable, and receivable all have a negative correlation with profitability. The current study will employ a correlational research design, whereas the previous study used a descriptive research design.

Goel, Chadha, and Sharma (2015) studied financial leverage and operating liquidity using data from the Indian machinery sector. For data analysis, the study used a panel data regression model. 151 Indian machinery companies were chosen between 2004 and 2014 for ten years. Age, size, and operating cash flow were control variables. The cash conversion cycle, current assets, and operating cash flow margins were regarded as components of liquidity. The debt-to-total assets ratio served as a stand-in for leverage. The outcome demonstrated that various metrics of operating liquidity are significantly impacted by financial leverage. It also revealed that the performance of Indian machinery companies is significantly impacted by operating liquidity and leverage. Economic value added was used in the previous study as an indicator of financial performance.

While investigating the relationship between firms' financial performance and liquidity, Baafi, Duodu, Sarkodie, and Boachie (2020) used data from the Ghana Stock Exchange. For 12 years, between 2008 and 2019, 21 companies listed on the Ghana Stock Exchange were chosen for the study. Both the regression model and correlational methods were applied. The results indicated a weak, positive, statistically significant relationship between return on assets and the current ratio and quick ratio. It also revealed a weak positive, statistically insignificant relationship between return on equity and the liquidity measures, and a weak negative, statistically insignificant relationship between return on capital employed and the

current ratio and quick ratio. There was no use of economic value added as a gauge of economic performance.

Demirgünes (2016) examined how liquidity affected financial performance using data from the Turkish retail sector. The Turkish retail industry's time series data from 1998 to 2015 was used. The outcome demonstrated a significant positive relationship between liquidity and financial performance. This study did not use panel data. Additionally, the study only used the current ratio as a proxy for liquidity and the return on assets as a proxy for financial performance.

Lartey, Antwi, and Boadi (2013) investigated the connection between Ghanaian listed banks' profitability and liquidity. The study used panel data and a descriptive research design, with data analysis performed using regression and correlation models. Over six years, from 2005 to 2010, the researcher chose seven banks. The metrics for profitability and liquidity were the return on assets and the temporary investment ratio, respectively. The outcome showed a very weak positive correlation between the listed banks in Ghana's profitability and liquidity. There was no use of return on capital employed or economic value added. Additionally, the quick and current ratios were not employed. Furthermore, the research design employed in the study was descriptive, unlike the correlational design utilized in the present study.

Olaoye and Okunade (2020) looked at how certain Nigerian companies' profitability was affected by their liquidity management practices. The study used a panel data model and a case study research design. Throughout five years, from 2014 to 2018, six companies were chosen using the purposive sample technique. Return on capital employed was used to gauge performance, and the current ratio, current assets to total assets, and working capital to total assets were all regarded as components of liquidity. For data analysis, multiple regression analysis and correlation techniques were utilized. The findings demonstrated that the working capital ratio, current asset/total asset ratio, and current ratio did not affect the return on capital used. The study concludes that the profitability of the chosen firms is not significantly affected positively by changes in liquidity position. For five years, this study employed a case study research design. On the other hand, a correlational research design was used for nine years in the current study.

Chukwubuikem, Okoye, and Ugochukwu (2022) examined the impact of liquidity management on the financial performance of manufacturing companies listed on the Nigerian Stock Exchange. Regression analysis was used in conjunction with an ex post facto research

design, involving 39 companies over ten years from 2010 to 2019. The results suggested that the debtor collection period had a significant, but negative, impact on the return on capital employed and, conversely, a significant, but weak, negative impact on return on assets.

Niresh (2012) examined the trade-off between profitability and liquidity through a study of a subset of Sri Lankan manufacturing companies. The study covered 31 Sri Lankan listed manufacturing companies from 2007 to 2011, over five years. In the research analysis, correlation and descriptive statistics were employed. While net profit, return on equity, and return on capital employed were regarded as indicators of profitability, the current ratio, quick ratio, and liquid ratio were considered indicators of liquidity. The findings showed there is a negative relationship between the return on capital used and the quick, current, and liquid ratios, which are indicators of liquidity. Additionally, it proved that the liquid ratio has a negative correlation with the net profit ratio, return on equity, and return on capital employed. Thus, the study concluded that there is no significant relationship between profitability and liquidity among Sri Lanka's listed manufacturing companies. The economic approach will be used in this study to gauge financial performance.

Kaysher and Akter (2016) examined the trade-off between liquidity and profitability in Bangladesh's chemicals and pharmaceutical industries. The study used regression and correlation models for data analysis, looking at 10 companies over ten years from 2005 to 2014. The working capital ratio, quick ratio, and current ratio were the components of liquidity, and return on equity, return on capital employed, and return on assets were the indicators of profitability. The results imply that the working capital ratio, quick ratio, and ROA, ROE, and ROCE are positively correlated. Regression analysis, however, revealed no significant association between liquidity and profitability in Bangladesh's chemicals and pharmaceuticals industry. Economic value added was not used in the study as a proxy for profitability.

In evaluating the effect of liquidity on steel companies' profitability (Garg & Gulia, 2022). Specifically cited the Steel Authority of India's Financial Statement Analysis Approach. The study was conducted from 2016 to 2020 over 5 years, and data analysis was done using regression and correlation techniques. It was determined that there is a significant positive relationship between ROA, ROE, and ROCE and the current ratio. Additionally, a significant positive association was found between the Acid test ratio and ROCE, ROE, and ROA. The current study will last nine years, compared to the five years of the previous study.

Dsouza and Habibniya (2021) looked at how liquidity affected the Nifty Pharma Index's profitability (NSE India). From 2012 to 2016, ten listed companies on the Nifty Pharma Index were the subject of a 5-year study. For data analysis, multiple regression models were employed. The outcome showed that while the quick ratio has a positive effect on the return on total assets, the current ratio has a positive impact on the return on capital employed. Economic value added and panel data were not used in this investigation.

Onwumere and Adanma (2015) used secondary data and the multiple regression method of analysis to study the effect of liquidity management on the performance of the Nigerian agribusiness sector. Their findings showed that liquidity management had a significant impact on the performance level in the country's agro-industrial sector.

Mohanty and Mehrotra (2018) conducted a comparative study of public and private sector banks in India to look at the impact of liquidity management on profitability. A modified version of the purposeful sampling technique was used to choose 20 private and 27 public sector banks. The dependent variables were ROA and ROE, while the independent variables were the cash deposit ratio, credit deposit ratio, and investment deposit ratio. The findings showed an insignificant relationship between ROE and the ratios of cash, credit, and investment deposits. Additionally, it indicated that the ratios of investment and cash deposits had a considerable negative impact on return on assets. Return on equity and return on assets were used in this comparative study to gauge performance. However, the current study used economic value added as a measure of financial performance.

Ismail (2016) studied the impact of liquidity management on the profitability of Pakistani firms: a case of Karachi Stock Exchange-100 Index. 64 Pakistani non-financial firms were selected for the study. Descriptive, correlation, and Multivariate regression analysis were employed for data analysis. The findings showed that liquidity variables' current ratio and cash conversion cycle have a significant positive impact on profitability as measured by return on assets. It also revealed that a high current ratio and longer cash conversion cycle contribute to firm performance.

Manyo and Ogakwu (2013) investigated how liquidity affected a company's return on assets using data from Nigeria. The study included 46 quoted companies that are listed on the Nigerian stock exchange. An ex post facto research design was utilized, and data analysis was done using the multiple regression technique. The panel data technique was also utilized in the study. The result demonstrated that return on assets is significantly positively impacted by

liquidity. Instead of using a correlational research design, the study used an ex post facto design.

Ehiedu (2014) investigated how liquidity affected the profitability of a few chosen businesses. The approach is known as financial statement analysis or FSA. used a straightforward correlation analysis in a quantitative study design. The findings indicated a significant positive relationship between profitability and the current ratio. Additionally, it showed an insignificant connection between profitability and the acid test ratio.

Charmler, Akomeah, Musah, and Gakptor (2018) looked into how Ghanaian commercial banks performed in relation to liquidity. For ten years, twenty-one banks took part in the research. The results showed that liquidity is positively correlated with return on assets using both measures of bank liquidity, using a descriptive research design and correlation and regression analysis. It did, however, show an insignificant inverse relationship between total interest-bearing liabilities and return on equity and liquid assets. Panel data were not used in their study; instead, a descriptive design was used.

Using a sample of five sugar companies between 2005 and 2016 and a cross-sectional retrospective research design with panel regression analysis, Waswa, Mukras, and Oima (2018) examined the effects of liquidity on the financial performance of the Kenyan sugar industry. The findings demonstrated a negative relationship between firm performance as measured by return on assets and liquidity management. Their study measured performance using return on assets, and a cross-sectional retrospective research design with five sugar firms participating in the study. However, panel data and nine sugar firms were used in the current study.

Odalo, Achoki, and Njuguna (2016) investigated the impact of liquidity on the financial performance of agricultural companies listed on the Nairobi Securities Exchange. Descriptive and causal research designs were used in the study. A census was conducted among the seven agricultural companies that are listed. Performance was measured using EPS, ROA, and ROE. The results showed that for agricultural companies listed on the Nairobi Securities Exchange, liquidity significantly and positively affects return on equity, return on assets, and earnings per share. Whereas the current study used a correlational research design and a census sample technique, the previous study used a descriptive and causal research design as well as a census.

It is evident from the literature reviewed above that several investigations have been carried out to ascertain the connection between liquidity and financial performance. Yet, these investigations did not yield any conclusive results. Many studies show a negative relationship between liquidity and financial performance; however, other studies also show a positive correlation between liquidity and firm performance, and still, other studies find little to no relationship between liquidity and financial performance. Based on this, the study aims to establish how liquidity affects the financial performance of sugar manufacturing firms in Kenya.

2.2.3 Moderating Effect of Liquidity on the funding structure and financial performance of sugar manufacturing firms in Kenya

The moderating effect of liquidity on the relationship between listed healthcare firms' financial performance and capital structure was observed by Sulaiman and Khalid (2023) for ten years, from 2013 to 2022, for ten listed healthcare companies, and an ex post facto research design was utilized. The findings revealed that capital structure is negatively moderated by liquidity. Airout, Alawaqleh, Almasria, Alduais, and Alawagleh (2023), Evidence from Jordan regarding the moderating role of liquidity in the relationship between the expenditures and financial performance of SMEs. Over a year, 200 SMEs took part in the study. The results revealed that accounting expenses, when controlled by liquidity, have a positive impact on SMEs' financial performance.

Musah and Kong (2019) investigated how capital structure and liquidity affected the financial performance of companies listed on the Ghana Alternative Market. Throughout four years, from 2015 to 2018, the study selected four firms using the purposive sample technique. Along with using return on assets, return on issued capital, and return on capital employed as performance proxies, it also utilized the debt-to-total assets ratio and the current ratio as components of the capital structure and liquidity, respectively. The techniques for multiple regression analysis and correlation were applied to the data. The results proved that there was an insignificant correlation between the firm's financial performance and liquidity as indicated by the current ratio. The financial performance of the company was significantly correlated with its capital structure, as indicated by the ratio of debt to total assets. Additionally, it proved that capital structure and liquidity together had a significant effect on the financial performance of the company as indicated by return on assets, return on issued capital, and return on capital employed. The research design used in this study was not correlational.

Abdulrahman (2021) looked at data from Nigerian listed deposit money banks to examine the moderating role of liquidity on the relationship between capital structure and profitability. Using panel data, the study used a descriptive research design. The hypothesis was tested using estimates of random effects. Using the census sampling technique, 15 listed banks were examined between 2010 and 2019 for ten years. Debt and retained earnings were utilized as parts of the capital structure, but return on assets was used as the performance metric, and the current ratio as the liquidity measure. The results showed that return on assets was positively and statistically significantly impacted by customer savings. It also showed that the return on assets was positively but insignificantly impacted by capital investment. The profitability of listed money banks in Nigeria was significantly impacted by the moderating effect of liquidity, but retained earnings showed a statistically significant negative relationship with return on assets. Economic value added will be used as a performance measure in the current study, which will employ a correlational research design.

Akhtar, Bakhsh, Ali, and Shazia (2019) looked at the moderating role of liquidity in examining the effect of capital structure on the performance of the textile sector in Pakistan. Thirty listed textile companies were chosen between 2007 and 2016 over ten years. Panel data were used in the investigation. Return on equity, return on assets, and earnings per share were used as performance metrics, and debt ratio and debt-to-equity ratio were used as capital structure components. The results showed that earnings per share, return on equity, and return on assets are all significantly unaffected by the total debt ratio. Additionally, it established that ROA and ROE are not significantly impacted by the debt-to-equity ratio. Even though it significantly affects EPS. Liquidity serves as a significant moderator between the debt ratio and return on assets, while it also plays a significant role in the relationship between the debt-to-equity ratio, return on assets, and earnings per share. Economic value added was used as a performance metric in this study, and cost of equity, cost of debt, and retained earnings were used as capital structure components.

Zainudin, Kanatakii, Thabet, Bin, Ani, and Rahaman (2019), an analysis of the best estimate of liquidity and its moderating effect on the debt-to-financial-performance relationship of REITs in Malaysia. A 12-year census of the 16 REITS was carried out between 2005 and 2016. Net profit margin was used to measure financial performance, and the ratio of cash and cash equivalents to total net assets was used to measure liquidity. The findings indicated that the relationship between debt and financial performance is influenced by liquidity and that

maintaining a particular level of liquidity has a negative relationship with debt. The study did not use panel data, nor did it employ a correlational research design.

Sudiyatno and Suwarti (2022) conducted an empirical study on Indonesian manufacturing companies to examine the impact of liquidity on firm performance. A purposive sampling technique was applied to choose 123 manufacturing companies that were listed between 2019 and 2021 on the Indonesian stock exchange. The method of multiple regression analysis was applied to the data. Performance was measured by return on assets, liquidity by current ratio, capital structure component by debt-to-equity ratio, and control variable by operating assets. It was determined that while operating assets and firm size had a positive impact on firm performance, liquidity had a negative impact. Additionally, the outcome displayed that, at a significance level of less than 10%, capital structure had a negative effect on firm performance. However, it was discovered that liquidity was a key moderating factor on capital structure and firm size that affected firm performance. Although control variables were used in this study, economic value added was not used as a performance metric.

What matters, according to Zulqarnain, Awan, Ahmed, Qureshi, Hasnain, and Khan (2016) a case study of Pakistan's sugar industry concerning profitability versus liquidity. For a period of five years, from 2007 to 2011, this study focused on 36 companies. The study examined several ratios: current, quick, inventory turnover, super-quick, and current assets turnover. The dependent variables were return on equity, return on assets, and return on capital. For data analysis, multiple regression and correlation analysis were used. The results show that all measures of profitability proxies, including ROE, ROA, and ROCE, have a positive and significant correlation with liquidity.

The financial performance of financial sectors was examined by Kamran, Imran, Ullah, Khan, Nouman, and Teng (2017) in their analysis of the factors (An assessment through economic value added). The study used a descriptive research design, and 145 firms were chosen between 2008 and 2012 using a purposive sample technique. Economic value added was used to gauge performance, and the dependent variable's components included leverage, liquidity, size, risk, and tangibility of assets. The research also utilized panel data and a regression analysis model. The outcome shows that the financial performance of the financial sectors, as determined by economic value added, is significantly impacted by leverage, liquidity, size, risk, and tangibility.

Barakat (2014) conducted an applied study on a sample of Saudi industrial companies to examine the effects of financial structure, profitability, and financial leverage on the share value of industrial companies. 46 companies listed between 2009 and 2012 that were part of the Saudi stock market were chosen for the study. The stock market value served as the dependent variable, and the debt to total assets, short-term debt, and long-term liabilities served as the independent variables, as well as equity return. The regression model was employed to analyze the data. The results showed that capital structure and return on equity had a statistically significant direct relationship with market stock price, but financial leverage and market stock value did not have a statistically significant relationship. It was also determined that capital structure, return on equity, and stock value of the company are positively correlated.

Kumar, Pinto, Hawaldar, Quadras, and Joseph (2017) looked into the relationship between Indian banks' financial performance and capital structure. Regression analysis was used in the study to analyze data from 21 banks that were chosen over five years between 2011 and 2015. The debt-to-equity and debt-to-total-assets ratios were used as capital structure indicators, and the net profit, net interest margin, and return on capital employed were used as performance metrics. As indicated by the return on capital employed, net interest margin, and net profit ratio, the results showed that capital structure significantly affects banks' financial performance. This study did not use economic value added as a performance metric.

Asad, Khizar, and Jafary (2019) investigated the connection between Pakistani textile industry companies' capital structure and financial performance. The researcher conducted a causal study, and for five years, from 2011 to 2015, 60 companies were chosen using a simple random sampling technique. Return on capital utilized was chosen as the dependent variable, and debt-to-equity ratio and debt-to-total funds were used as the independent variables. By utilizing regression analysis and cross-sectional data, the findings showed a significant and positive relationship between capital structure and financial performance. A total of 60 companies were sampled for the causal study, which employed a simple random technique. Nine firms were chosen for the present study using a purposive sample technique in conjunction with a correlational research design.

Singh (2013) examined the relationship between capital structure and profitability, paying particular attention to India's manufacturing sector. For eight years, from 2005 to 2012, 110 manufacturing firms were chosen using a multi-stage sampling technique. Return on capital

employed and return on assets were the components of profitability, and the expenses ratio, current ratio, debt-to-equity ratio, and total debt to total assets were the indicators of capital structure. Descriptive and regression models were employed in the study as data analysis tools. The results revealed a significant relationship between profitability and capital structure.

Durrah, Ghafeer, Jamil, and Rahman (2016) conducted an analytical study on food industry companies listed in Amnan Bursa, Jordan, to investigate the relationship between liquidity ratios and financial performance indicators. The research design used in the study was descriptive. Eight food-related industrial companies that are listed on Amnan Bursa were chosen over three years from 2012 to 2014. The elements of profitability were gross profit margin, net profit margin, operating profit margin, and return on assets; the liquidity components were current ratio, cash ratio, quick ratio, and defensive interval ratio. The methods for analyzing the data were correlation and descriptive statistics. The results demonstrated a positive correlation between return on assets and the current, quick, and cash ratios. On the other hand, it found a marginally positive correlation between the operating profit margin, net profit margin, and current ratio. Additionally, it revealed no connection between the gross profit margin and any of the liquidity ratios. Three years were spent conducting the research for this study, which employed a descriptive research design. On the other hand, the current study will employ a nine-year study period and a correlational research design.

Rufus and Ofoegbu (2015) on an investigation of capital structure on the financial performance of Nigerian quoted companies in the construction and real estate sectors. Using panel data and a pooled ordinary least squares regression analysis, the study used an ex post facto research design to examine 10 businesses for ten years, from 2005 to 2014. The results suggested that, while capital structure has an insignificant impact on return on assets, it has a positive and significant effect on financial performance proxies measured by return on equity, return on capital employed, and earnings per share. Alternative to using a correlational research design, the researcher employed an ex post facto research design. There is a need to assess liquidity's contribution to the relationship between funding structure and financial performance of Kenya's sugar industry due to the literature's inconsistent findings regarding the moderating effect of liquidity on funding structure and financial performance, and the small number of locally conducted (in Kenya) studies relating the two.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology, covering the philosophy, design, study area, target population, sampling, data types, analytical methods, model specification, and ethical considerations.

3.2 Research Philosophy

Research methodologies and theories are components of a research philosophy or worldview. The positivist research philosophy, which asserts that reality is observable, objective, and independent of the researcher, serves as the theoretical foundation for this investigation. Within the framework of positivism, knowledge is acquired through logical reasoning and empirical research, making it particularly suitable for studies that aim to identify trends and correlations among measurable variables (Creswell, 2014). This paradigm emphasizes neutrality, objectivity, and the implementation of standardized methodologies to mitigate researcher bias (Cohen, Manion, & Morrison, 2018). Positivism was selected as the research paradigm because the study relies on objective financial data and econometric modeling to test hypotheses. This approach facilitates a rigorous analysis of the causal relationships between funding structure, liquidity, and financial performance in the sugar manufacturing firms.

3.3 Research Design

The study employed a correlational research design, a type of non-experiential research (Asamoah, 2014). Asamoah (2014) defines correlational research as a quantitative approach situated within the post-positivist paradigm. This methodology primarily focuses on examining and elucidating the relationships and correlations between two variables. The main objectives of correlational research are to identify whether and what types of relationships exist between variables, as well as to provide a comprehensive rationale for these relationships. This approach enables researchers to understand how variables interact and influence one another, thereby contributing to a deeper understanding of the studied phenomena. This refers to determining whether variations in one variable are linked to variations in another. In the context of this research, correlational analysis helps in understanding how funding structure components (debt, equity, and retained earnings) and liquidity elements (current ratio and quick acid test) are related to financial performance metrics (Economic value added). This study involves analyzing financial data from sugar

firms, which is inherently quantitative. The correlational research design aligns well with this approach, as it employs statistical methods to assess the relationships between variables. While correlational research cannot establish causation, it provides a solid foundation for further studies. Significant correlations can lead to more in-depth research to explore causal relationships, such as experimental or longitudinal studies.

3.4 Study Area

According to the study, sugar firms are dispersed throughout Kenya. Kenya is located between 41/20 N and 41/20 S latitudes. Eastern Longitudes: 340 and 420. With a total area of 580,367 square kilometers, the nation comprises 11,227 square kilometers of water and 569,140 square kilometers of land. There are sixteen sugar firms in Kenya, and they are located in eight different counties: Homa Bay, Kisumu, Kakamega, Busia, Narok, Kericho, Migori, and Kwale. Kenya National Bureau of Statistics (2020). The study was conducted in the field of finance, with a focus on corporate finance.

3.5 Target Population

According to the Agricultural Food Authority (2020), the study population comprises 16 sugar firms. Of these, only 12 are actively in operation, with 7 firms being privately owned and 5 owned by the government. Refer to Table 3.1 below.

Table 3.1: The table below lists the sugar firms, their year of establishment, county of location, ownership, and status

Sugar Farms	County	Ownership	Year of Est	Status
Miwani Sugar	Kisumu	Public	1922	Under Receivership
Ramisi Sugar	Kwale	Private	1927	Closed
Muhoroni Sugar	Kisumiu	Public	1966	Under Receivership
Chemelil Sugar	Kisumu	Public	1968	Milling
Mumias Sugar	Kakamega	Public	1973	Under Receivership
Nzoia Sugar	Bungoma	Public	1978	Milling
West Kenya Sugar	Kakamega	Private	1981	Milling
Sony Sugar	Migori	Public	1989	Milling
Soin Sugar	Kericho	Private	2006	Closed
Kibos Sugar & Allied	Kisumu	Private	2007	Milling
Transmara Sugar	Narok	Private	2011	Milling
Butali Sugar	Kakamega	Private	2011	Milling
Sukari Sugar	Homabay	Private	2012	Milling
Kwale international	Kwale	Private	2014	Milling
Ole pito Sugar	Busia	Private	2017	Milling
Busia Sugar	Busia	Private	2018	Milling

Data Source: Agricultural Food Authority, 2020.

The sample size for the study was determined using specific selection criteria. Firms that were no longer operational or had not been in existence for a minimum of nine years since their establishment were excluded from consideration. Thus, firms with complete audited data over the study period were selected. This rigorous selection process ultimately yielded a total of nine firms that met the necessary criteria for inclusion in the study.

3.6 Sample and Sampling Procedure

This study utilized a census sampling method, which involves the comprehensive collection of data from the entire population under investigation. The decision to employ this method was predicated on the accessibility and manageable size of the target population, thereby enabling the collection of data from all the firms without incurring significant costs or excessive time constraints. By incorporating all the firms of the population, the census approach effectively mitigated the possibility of sampling error and ensured that the data reflected the full heterogeneity present within the study units. Such exhaustive coverage was instrumental in generating accurate, reliable, and generalizable findings, as well as in furnishing detailed information essential for rigorous statistical analysis.

Data were collected quarterly from nine sugar firms over nine years, encompassing 2014 to 2022, resulting in a total of 324 observation points. This time frame was deliberately selected to provide a comprehensive analysis of the industry's financial trends and to evaluate progress toward the goal of achieving self-sufficiency in sugar production by 2021, as delineated by the Sugar Industry Stakeholders Task Force

3.7 Data Type

In this study, secondary data were utilized to facilitate the analysis. The data was obtained from the firms' websites, periodicals, publications, and sugar boards. The data were systematically extracted from quarterly financial statements, including the income statement, balance sheet, and statement of cash flows. This approach allowed for a comprehensive examination of the relevant financial metrics over the specified period. Firms report on different physical calendar years, but are harmonized for comparisons annually. The data was gathered between 2014 and 2022 over nine years. A total of 324 observation points were obtained from the data collection on retained earnings, cost of debt, cost of equity, current ratio, acid test ratio, and Economic value added.

3.7.1 Data Analysis and Presentation

Various data analysis techniques, such as autoregressive distributed lag, descriptive statistics, and correlational analysis, were employed. The data analysis utilized ARDL, which is effective in managing a mix of stationary I (0) and non-stationary I (1) variables and is appropriate for small sample sizes. It is ideal for exploring the dynamic effects of funding structure and liquidity on financial performance, as it allows for the estimation of short-run and long-run relationships within one model. The data was standardized by transforming the raw original data into natural logarithms. This transformation was implemented to achieve several key objectives: stabilizing variance, normalizing skewed distributions, and linearizing the relationships among variables. To ensure stationarity, the transformed data were differenced. EViews software was used for the data analysis. However, the analyzed data was presented by use of tables, histograms, bar charts, and graphs, among many others.

3.8 Model Specification

The Auto Regressive Distributed Lag Model (ARDL) was utilized in the study to analyze the data. Panel ARDL models are valuable as they allow for the analysis of different short-term and long-term relationships across various groups (such as countries, firms, or individuals) (Pesaran, Shin, & Smith, 2001). This flexibility is crucial when distinct groups exhibit unique dynamics that could be obscured by a unified model. Leveraging both time series and cross-sectional data, these models enable a comprehensive analysis, capturing temporal dynamics and individual heterogeneity. Panel ARDL models can handle variables integrated into different orders I (0), I (1), or a combination, making them particularly useful in empirical research where ensuring stationary variables can be challenging (Pesaran, Shin, & Smith, 2001). Additionally, the inclusion of an error correction term in the Panel ARDL model aids in estimating short-term dynamics and long-term equilibrium relationships, offering insights into how quickly variables return to equilibrium following a short-term disturbance.

Below is a generalized ARDL regression model that was utilized.

$$y_{it} = \sum_{j=1}^{p} \delta ij y_{i,t-j} + \sum_{j=0}^{q} \beta ij X_{i,t-j} + \varphi_i + \varepsilon_{it} \quad (1)$$

Where;

y_{it} is the dependent variable,

X_{it} is a k*1 vector that are allowed to be purely I(0) or I(1) or cointegrated, δ_{ij} is the coefficients of the lagged dependent variable called scalars; β_{ij} are k*1 coefficient vectors;

φ_i is the unit specific fixed effects; I =1,2,……N; t=1,2……,T. p,q,q are optimal lag orders, ε_{it} is the error term.

The re-parameterized ARDL (p, q, q……q) error correction model is specified as

$$\Delta y_{i,t} = \theta_i\left(y_{i,t-1} - \mu_{iX_{i,t}}\right) + \sum_{j=1}^{p-1} \alpha_{i,j}\ \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \beta ij \Delta X_{i,t-j} + \varphi_i + \varepsilon_{it} \quad (2)$$

θ_i =-(1-δ_1), group-specific speed of adjustment coefficient (expected that θ_i< 0); μ_i= vector of long-run relationship, ECT ($y_{i,t-1} - \mu_i X_{it}$), the error correction term; $\alpha_{ij}\,\beta_{ij}$ These are the short-run dynamic coefficients.

It is the error correction model that is important to run a panel ARDL.

This study model will take the following form from the generalized model.

$$Fp = f\left(Fs\ ,\ Lq\right), \quad (1.1)$$

When Eq (1.1) is log-linearized, we have the following

$$inFp_{it} = \alpha_0 + \alpha_1 inFs_{i,t-1} + \alpha_2 inLq_{i,t-1} + \alpha_3\left(inFs_{i,t} x\, inLq_{i,t}\right) + \varepsilon_{it} \quad (2.1)$$

Financial performance is a function of funding structure, liquidity, and the interaction of funding structure and liquidity.

Where; Fp= Financial performance

Fs= Funding structure

Lq= Liquidity (moderator)

Fs x Lq = interaction variable (funding structure and liquidity)

In = natural logs

I = 1, 2……N denotes the firms in our sample, equal to 9.

t = 1, 2……, T; indicates the period in this case, 9 years.

The model estimated is an ARDL (p, q, q….., q).

$$\Delta InFP_{it} = \theta_i\left(FP_{i,t-1} - \vartheta_i X_{i,t}\right) + \sum_{j=1}^{p-j} \beta ij \Delta InFP_{i,t-j} + \sum_{j=0}^{q-j} \alpha ij \Delta InFS_{i,t-j} + \sum_{j=0}^{q-j} \mu ij \Delta InLq_{i,t-j} + \sum_{j=0}^{q-j} \delta ij \Delta In\, FS_{i,t-j} * InLq_{i,t-j} + \omega_i + \varepsilon_{i,t} \quad 3.1$$

Where;

$\theta_i = -(1-\delta)$, group-specific speed of adjustment coefficient (expected that $\theta_i < 0$)

ϑ_i = vector of long-run relationship.

ECT = ($(FP_{i,t-1} - \vartheta iX_{it})$, The error correction term.

$\beta_{ij}, \alpha_{ij}, \mu_{ij}, \delta_{ij}$ Are the short-run dynamic coefficients

ω_i = group-specific fixed effects error term

ε_{it} = error term

3.9 Research Ethics

During the study, ethical considerations such as confidentiality, integrity, and the rights of respondents were taken into account. Since maintaining these ethical principles is important, the researcher was patient and tolerant during data collection and processing. Before data collection, both the university and the National Commission for Science, Technology, and Innovation (NACOSTI) granted a research permit, confirming that the data acquisition was intended solely for academic purposes.

CHAPTER FOUR
RESULTS AND DISCUSSIONS

4.1 Introduction

This study examined the funding structure, liquidity, and financial performance of Kenya's sugar manufacturing firms and the moderating effects of liquidity on the relationship between funding structure and financial performance. As a result, the chapter presents descriptive statistics, correlation analysis, and optimal lag selection to thoroughly analyze the study findings. The results of the autoregressive distributed lag model and the individual unit root test of the gathered data are discussed.

4.2 Descriptive Statistics

Large data sets are succinctly summarized by descriptive statistics, which facilitates comprehension of the distribution, variances, and central tendencies of the data points. By looking at important parameters like mean, median, mode, range, variance, standard deviation, and percentiles, it aids researchers and analysts in exploring their data. Patterns, anomalies, and possible relationships in the data may become visible during this exploration stage. It also makes it possible to compare various data sets or subsets inside a data set. Analysts can spot patterns, variances, and similarities between groups by comparing means, variances, or other metrics (Weiss, 2012).

Table 4.1 Descriptive Statistics

	EVA	DEBT	EQUITY	RE	CR	ATR
Mean	2.719	2.791	2.892	2.898	2.876	2.691
Median	2.720	2.785	2.910	2.910	2.905	2.675
Maximum	3.740	3.820	3.730	3.720	3.770	3.790
Minimum	1.000	1.300	1.100	1.400	1.500	1.400
Std. Dev.	0.477	0.498	0.433	0.428	0.443	0.493
Skewness	-0.143	-0.154	-0.174	-0.073	-0.132	0.024
Kurtosis	2.683	2.609	3.008	2.551	2.703	2.425
Jarque-Bera	2.458	3.343	1.632	3.013	2.130	4.497
Probability	0.293	0.188	0.442	0.222	0.345	0.106
Sum	881.100	904.360	936.860	938.900	931.920	871.850
Sum Sq. Dev.	73.513	80.043	60.535	59.081	63.530	78.566
Observations	324	324	324	324	324	324

Source: Author computation

An overview of the statistics used in this empirical study is provided in Table 4.1 above. The mean and median values are quite close for all variables, suggesting that the data is relatively symmetric. For instance, EVA has a mean of 2.719 and a median of 2.720. The mean values for DEBT, EQUITY, CR, ATR, and RE are also close to their medians, indicating a balanced distribution without significant skewness. The standard deviations range from approximately 0.428 to 0.498, indicating moderate variability around the mean for all variables. EVA (0.477), DEBT (0.498), EQUITY (0.433), CR (0.443), ATR (0.493), and RE (0.428) all show some level of dispersion, with DEBT and ATR having slightly higher variability, meaning that firms differ more substantially in their leverage and liquidity positions than in other financial aspects. However, the ranges for the variables indicate the spread of the data. For example, EVA ranges from 1.000 to 3.740, showing a substantial range of values. DEBT ranges from 1.300 to 3.820, EQUITY from 1.100 to 3.730, CR from 1.500 to 3.770, ATR from 1.400 to 3.790, and RE from 1.400 to 3.720. These wide ranges show the disparities in firms' performance and funding practices, likely reflecting differences in operational scale and management efficiency within the industry.

Skewness values close to 0 indicate that the data is relatively symmetric. All variables have skewness values close to 0, with ATR being the closest (0.024) and the others slightly negative. A skewness of -0.143 for EVA suggests a slight left skew, meaning a few lower values are pulling the mean down. Furthermore, kurtosis measures the "tailedness" of the distribution. A kurtosis value around 3 indicates a normal distribution. All variables have kurtosis values close to 3, suggesting that the data distributions are close to normal. EQUITY has a kurtosis of 3.008, the closest to a normal distribution. The Jarque-Bera Test checks for normality. A p-value (Probability) greater than 0.05 suggests that the null hypothesis (data is normally distributed) cannot be rejected. All variables have p-values greater than 0.05, indicating that they do not significantly deviate from normality. For example, EVA has a p-value of 0.293, well above 0.05. Sum and Sum Sq. Dev. is more relevant for understanding the total and variance explained in large datasets. The sums show the total values across all observations, while Sum Sq. Dev. Indicates the total squared deviation from the mean. Each variable has 324 observations, indicating a balanced panel dataset.

The descriptive statistics demonstrate that the data are well-suited for advanced econometric modeling. The observed symmetry, moderate variability, and near-normal distribution of the data provide a robust foundation for the application of Panel Autoregressive Distributed Lag (ARDL) models. These characteristics enhance the likelihood of satisfying critical model

assumptions, including linearity, homoscedasticity, and the normality of residuals. Moreover, the relatively stable distribution of financial performance indicators such as Economic Value Added (EVA) as well as liquidity ratios, including the Current Ratio (CR) and Acid Test Ratio (ATR), suggests a consistent behavioral pattern among firms within the industry. This stability significantly enhances the interpretive power of subsequent studies focused on the influence of funding structures and liquidity on the financial performance of the sugar industry in Kenya.

4.3 Correlation Analysis

This section investigates the linear relationship between funding structure, liquidity, and financial performance within Kenya's sugar industry. Correlational analysis serves as a crucial methodological tool utilized to identify and quantify the degree of association between variables. Through the computation of correlation coefficients, such as Pearson's correlation coefficient and Spearman's rank correlation coefficient, researchers can discern both the direction and magnitude of associations among two or more variables (Creswell, 2009). Additionally, using the knowledge of one variable to predict the behavior or values of another can be helpful. By examining Pearson correlation coefficients and their statistical significance, we assess how components of the funding structure (debt, equity, and retained earnings) and liquidity (current and acid test ratios) are associated with Economic Value Added (EVA). This analysis provides insights into how financial decisions relate to value creation in the industry. Additionally, t-Statistics values indicate how many standard deviations the observed correlation coefficient is away from zero. High t-values indicate strong evidence that the correlation coefficient significantly differs from zero. The correlation matrix provides the Pearson correlation coefficients between the logarithm-transformed variables (denoted with the prefix "IN" indicating the natural log of the original variables) along with the t-statistics and p-values to test the significance of these correlations. Table 4.2 below shows the results of the correlational analysis.

Table 4.2: Correlation Analysis (log-transformed variables)

(INEVA = Log of Economic value added, INDEBT = Log of Debt, INEQUITY = Log of Equity, INRE = Log of Retained Earnings, INCR = Log of Current Ratio, INATR = Log of Acid Test Ratio)

Covariance Analysis: Ordinary

Correlation t-Statistic Probability	INEVA	INDEBT	INEQUITY	INRE	INCR	INATR
INEVA	1.000000 ----- -----					
INDEBT	0.714 {18.284} (0.000)	1.000 ----- -----				
INEQUITY	0.674 {16.370} (0.000)	0.728 {19.036} (0.000)	1.000 ----- -----			
INRE	0.709 {18.060} (0.000)	0.757 {20.814} (0.000)	0.917 {41.329} (0.000)	1.000 ----- -----		
INCR	0.730 {19.151} (0.000)	0.786 {22.824} (0.000)	0.783 {22.590} (0.000)	0.807 {24.483} (0.000)	1.000 ----- -----	
INATR	0.774 {21.956} (0.000)	0.800 {23.961} (0.000)	0.832 {26.956} (0.000)	0.845 {28.394} (0.000)	0.779 {22.258} (0.000)	1.000 ----- -----

Key
{……...} rep t-statistics
(……) rep probability
NB: all correlations are statistically significant at 1% level.
Source: Author computation

From the above table, Debt (INDEBT) shows a high positive correlation with EVA ($r = 0.714$, $p < 0.001$), indicating that higher debt levels are associated with higher economic value added. This relationship is statistically significant, suggesting that leveraging debt may be linked to enhanced value creation, potentially due to tax advantages or capital access. However, the large t-statistic of 18.284, combined with the extremely low p-value (0.000), indicates that the correlation is statistically significant. On the other hand, Equity (INEQUITY**)** is also positively associated with EVA ($r = 0.674$, $p < 0.001$), though slightly weaker than debt. This implies that firms with greater equity capital also tend to generate higher EVA. The large t-statistic of 16.370, combined with the extremely low p-value

(0.000), indicates that the correlation is statistically significant. While retained Earnings (INRE) have a strong positive relationship with EVA ($r = 0.709$, $p < 0.001$), highlighting the importance of internal financing. Firms reinvesting profits tend to perform better in terms of value generation. The correlation is statistically significant due to the high t-statistic of 18.06034 and an extremely low p-value (0.000), proving that the relationship between retained earnings and EVA is not due to random chance.

Additionally, current Ratio (INCR) and Acid Test Ratio (INATR) both show strong positive correlations with EVA ($r = 0.730$ and $r = 0.774$, respectively; both $p < 0.001$). This suggests that liquidity plays a vital role in the financial performance of sugar firms, with more liquid firms better positioned to cover obligations and support operations. The correlation is statistically significant due to the extremely high t-statistic of 19.151 and 21.956, respectively, and the very low p-value of 0.000, providing strong evidence that the relationship is not random.

However, the inter-variable relationship indicates that debt and equity have a strong positive relationship ($r = 0.727$, $p = 0.000$), showing that firms in the sugar sector most likely use a balanced combination of debt and equity in their capital structure. The relationship between retained earnings and equity ($r = 0.9173$, $p = 0.0000$) and retained earnings and debt ($r = 0.757$, $p = 0.000$) shows that strong relationships exist between debt and equity and retained earnings, suggesting that companies reinvest profits to maintain their funding structure and bolster long-term financial performance. Finally, variables related to liquidity, the current ratio (INCR), and acid test ratio (INATR) indicate a positive correlation with debt, equity, and retained earnings, revealing that companies with higher liquidity ratios typically have more stable funding arrangements. The findings presented herein lend credence to established financial theories, notably the pecking order theory, which asserts that firms typically prioritize internal financing over external sources such as debt or equity. Furthermore, these results yield significant practical implications for firms operating within the Kenyan sugar industry. It is advisable for these firms to ensure adequate liquidity and to carefully balance their debt-equity decisions to optimize economic performance.

4.4 Unit Root Test

The primary purpose of unit root tests is to determine whether the variables' movements over time are stationary, thereby preventing biases that could lead to spurious regressions and guaranteeing accurate event forecasting. The stationarity was tested using the Levin, Lin, &

Chu t*, Philip Perron (PP), the Augmented Dickey-Fuller test (ADF), and the Im, Pesaran, and Shin W-stat. The table below displays the findings from the unit root tests. While debt, retained earnings, and acid test ratio are stationary at the first difference, the economic value added, equity, current ratio, liquidity, and funding structure are integrated of order zero, or 1(0). Therefore, it can be seen from the panel unit root test results that there is a mixture of 1(0) and 1(1), and none of the variables are 1(2). This demonstrates that the panel ARDL model should be used when dealing with a combination of 1(0) and 1(1) variables. According to Muchapondwa et al. (2008), the panel ARDL model is a novel method of cointegration because it makes it possible to estimate the relationship between funding structure and financial performance of the major economic sectors in both the short and long terms.

Table 4.3: Unit Root Test

Variable	Test	Stationarity	Probability	Decision
Economic Value Added	Levin, Lin & Chu t*	1(0)	0.010	1(0)
	Im, Pesaran, and Shin W-stat	1(0)	0.000	
	ADF-Fisher Chi-square	1(0)	0,000	
	PP-Fisher Chi-square	1(0)	0.000	
Debt	Levin, Lin &Chu t*	1(1)	0.063	1(1)
	Im, Pesaran, and Shin W-stat	1(0)	0.000	
	ADF-Fisher Chi-square	1(0)	0.000	
	PP-Fisher Chi-square	1(0)	0.000	
Equity	Levin, Lin, & Chu t*	1(0)	0.000	1(0)
	Im, Pesaran, and Shin W-stat	1(0)	0.000	
	ADF-Fisher Chi-square	1(0)	0.000	
	PP-Fisher Chi-square	1(0)	0.000	
Retained Earnings	Levin, Lin, & Chu t*	1(1)	0.317	1(1)
	Im, Pesaran, and Shin W-stat	1(1)	0.033	
	ADF-Fisher Chi-square	1(0)	0.014	
	PP-Fisher Chi-square	1(0)	0.000	
Current ratio	Levin. Lin & Chu t*	1(0)	0.007	1(0)
	Im, Pesaran, and Shin W-stat	1(0)	0.000	
	ADF-Fisher Chi-square	1(0)	0.000	
	PP-Fisher Chi-square	1(0)	0.000	
Acid test ratio	Levin. Lin & Chu t*	1(1)	0.150	1(1)
	Im, Pesaran, and Shin W-stat	(1)	0.064	
	ADF-Fisher Chi-square	1(0)	0.047	
	PP-Fisher Chi-square	1(0)	0.000	
Liquidity	Levin. Lin & Chu t*	1(0)	0.006	1(0)
	Im, Pesaran, and Shin W-stat	1(0)	0.0111	
	ADF-Fisher Chi-square	1(0)	0.011	
	PP-Fisher Chi-square	1(0)	0.000	
Funding structure	Levin. Lin & Chu t*	1(0)	0.004	1(0)
	Im, Pesaran, and Shin W-stat	1(0)	0.000	
	ADF-Fisher Chi-square	1(0)	0.000	
	PP-Fisher Chi-square		0.000	

Source: Author's computation

4.5 Pedroni Residual Cointegration Test

Pedroni Residual Cointegration Test results aim to determine whether there is a long-run equilibrium relationship among the series (EVA, DEBT, EQUITY, CR, ATR, RE) across the panel dataset. The table below indicates the cointegration test result.

Table 4.4: Pedroni Residual Cointegration Test

Series: INEVA INEQUITY INDEBT INRE INCR INATR
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-3.252	0.999	-3.433	0.999
Panel rho-Statistic	-4.340	0.000	-3.553	0.000
Panel PP-Statistic	-11.398	0.000	-10.613	0.000
Panel ADF-Statistic	-3.880	0.000	-2.714	0.003

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	-2.465	0.006
Group PP-Statistic	-10.974	0.000
Group ADF-Statistic	-1.544	0.061

Cross-section-specific results

Phillips-Peron results (non-parametric)

Cross ID	AR (1)	Variance	HAC	Bandwidth
1	-0.183	0.003	0.001	34.00
2	-0.101	0.000	0.000	0.00
3	-0.008	0.005	0.005	2.00
4	0.298	1.99E-05	2.27E-05	3.00
5	0.811	5.61E-06	5.61E-06	0.00
6	-0.071	0.001	0.001	4.00
7	-0.124	0.001	0.001	3.00
8	-0.191	0.003	0.004	2.00
9	-0.119	0.002	0.002	3.00

Augmented Dickey-Fuller results (parametric)

Cross ID	AR (1)	Variance	Lag	Max lag
1	-0.354	0.003	1	--
2	-0.004	0.000	1	--
3	-0.026	0.005	1	--
4	0.413	1.98E-05	1	--
5	0.808	5.30E-06	1	--
6	-0.119	0.001	1	--
7	-0.193	0.001	1	--
8	-0.020	0.003	1	--
9	-0.282	0.002	1	--

Source: Author computation

Within-dimension (Panel Statistics) assumes a common autoregressive coefficient across the panel (within-dimension). The test statistics and their probabilities are as indicated. The high p-values (0.999 and 0.999) indicate that the null hypothesis of no cointegration cannot be rejected. But for Panel rho-Statistic, the very low p-values (0.000 and 0.000) suggest that the null hypothesis of no cointegration is strongly rejected. However, Panel PP-Statistic p-values (0.000 for both) are significantly low, indicating strong evidence of cointegration. On the other hand, Panel ADF-Statistic p-values (0.000 and 0.000) are also very low, providing strong evidence against the null hypothesis of no cointegration.

Between-dimension (Group Statistics) assumes individual autoregressive coefficients across the panel (between-dimension). The test statistics and their probabilities are as follows. Group rho-statistic p-value (0.007) is below the 0.05 threshold, suggesting rejection of the null hypothesis of no cointegration. While Group PP-Statistic p-value (0.000) is very low, indicating strong evidence of cointegration, and Group ADF-Statistic p-value of 0.061 is slightly above the typical 5% threshold, suggesting that the null hypothesis of no cointegration cannot be rejected at the 5% level**,** though it is close. This means there is weak evidence of cointegration based on the ADF statistics.

Phillips-Peron (PP) Results revealed that Most AR (1) coefficients are negative, indicating stationarity for most cross-sections. Variance and HAC (heteroskedasticity and autocorrelation consistent) statistics provide further details on the residual variances and autocorrelation adjustments. On the other hand, the Augmented Dickey-Fuller (ADF) Results show that Most AR (1) coefficients are negative, supporting stationarity in most cross-sections. Variance and lag length information provide insights into the autoregressive properties of each cross-section.

The Pedroni Residual Cointegration Test results, particularly the panel rho, PP, and ADF statistics (both weighted and unweighted) provide strong evidence of cointegration among the variables across the panel dataset. Despite short-term deviations, this suggests a long-run equilibrium relationship exists between EVA, DEBT, EQUITY, CR, ATR, and RE. The strong evidence of cointegration implies that the variables share a long-run equilibrium relationship. In practical terms, this means that changes in one variable are associated with changes in the other over the long term, and for policymakers or managers, understanding these long-run relationships can aid in making more informed decisions. For example, a change in DEBT might have long-term implications for EVA or EQUITY. The presence of

cointegration justifies using Error Correction Models (ECMs) or Vector Error Correction Models (VECMs) in subsequent analysis to capture both short-term dynamics and long-term relationships.

4.6 Hausman Test

The Hausman test, also known as the Hausman specification test, is a statistical test used to compare two estimators to determine if one of them is consistent and efficient. It is often used in panel data analysis to decide between Mean group, Dynamic fixed effect, and Pooled Mean Group models.

Ho: MG, and DFE. Estimates are not significantly different. The mean group is more efficient.

H1: Null is not true.

Decision: use MG if p. value >0.05 (Ho cannot be rejected)

Decision: use DFE if p. value < 0.05 (reject Ho).

Table 4.5: Hausman MG, DFE Test

```
. hausman mg dfe,sigmamore
```

	Coefficients			
	(b) mg	(B) dfe	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lndebt	1.548332	1.290932	.2574002	1.936675
lnequity	-.57383	.1783299	-.7521599	4.476758

b = consistent under Ho and Ha; obtained from xtpmg
B = inconsistent under Ha, efficient under Ho; obtained from xtpmg

Test: Ho: difference in coefficients not systematic

chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.03
Prob>chi2 = 0.9854

Ho: Mean group is appropriate to Dynamic fixed effect.

Ho: MG, and PMG. Estimates are not significantly different. The Pooled mean group is more efficient.

H1: Null is not true.

Decision: use PMG if p. value >0.05 (Ho cannot be rejected)

Decision: use MG if p. value < 0.05 (reject Ho).

Table 4.6 Hausman MG, PMG Test

```
. hausman mg pmg,sigmamore

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |       mg          pmg         Difference          S.E.
-------------+------------------------------------------------------------
      lndebt |   1.548332     1.454623        .0937084         .377598
    lnequity |    -.57383     .1572896       -.7311195        .9460498
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtpmg
            B = inconsistent under Ha, efficient under Ho; obtained from xtpmg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        0.73
                Prob>chi2 =      0.6956
```

Ho: Pooled mean group is appropriate to mean group.

The pooled mean group (PMG) estimator is a methodological approach that integrates both pooling and averaging techniques. This estimator allows for the intercepts, short-run coefficients, and error variances to vary freely across different groups, while imposing the constraint that the long-run coefficients remain uniform across these groups. This distinctive feature of the PMG estimator enhances its applicability in econometric analyses that involve heterogeneous panel data (Pesaran, Shin, & Smith, 1998).

4.7 Study Findings

The study's first objective sought to determine the effect of funding structure on the financial performance of the sugar industry in Kenya. The study used secondary data consisting of debt, equity, retained earnings, current ratio, and acid test ratio) from the sugar manufacturing firms financial statements to actualize its first objective. The original raw data were transformed to their natural logarithms, which led to data standardization. By normalizing the data, data transformation helps to improve its suitability for statistical analysis. By bringing the data into a shared range through normalization, models that are susceptible to variation in the scale of the variables can be made less biased. Additionally, it's critical to lessen the impact of outliers' extreme values that have the potential to distort model parameters and statistical measurements. Data can be made less susceptible to outliers by transforming it using techniques like log transformation. Subsequently, data was analysed using the ARDL model. The model was chosen due to its versatility in selecting lag lengths, handling non-stationarity, capturing both short- and long-term dynamics, controlling for endogeneity, conducting cointegration analysis, and providing strong forecasting capabilities. It also

handles variables integrated into different orders I (0), I (1), or a combination), making them particularly useful in empirical research where ensuring stationary variables can be challenging (Pesaran, Shin, and Smith, 2001). Additionally, the inclusion of an error correction term in the Panel ARDL model aids in estimating short-term dynamics and long-term equilibrium relationships, offering insights into how quickly variables return to equilibrium following a short-term disturbance. These attributes make the model an invaluable tool in data analysis, particularly in the context of economic and financial research.

4.7.1 Long and Short-run relationship analysis

The first objective sought to determine the effect of funding structure on the financial performance of the sugar manufacturing firms in Kenya.

The relationship between funding structure and financial performance is crucial within Kenya's sugar firms, as it directly impacts resource allocation, expense management, and overall profitability. Inadequate financial management can result in liquidity challenges, affecting the sector's competitiveness and sustainability. Conversely, a well-balanced funding structure, incorporating both debt and equity, has the potential to strengthen financial stability. The below table shows the results of Debt, Equity, Retained earnings and financial performance.

Table 4.7: Debt, Equity, Retained earnings, and financial performance

Dependent Variable: D(INEVA)
Method: ARDL
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): INDEBT, INEQUITY, INRE
Fixed regressors: C
Number of models evaluated: 16
Selected Model: ARDL (4, 4, 4, 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
INDEBT	0.381	0.066	5.777	0.000
INEQUITY	0.482	0.145	3.314	0.001
INRE	0.017	0.110	0.158	0.875
	Short Run Equation			
COINTEQ01	-0.603	0.276	-2.186	0.030
D (INEVA (-1))	0.093	0.249	0.375	0.709
D (INEVA (-2))	0.178	0.193	0.920	0.359
D (INEVA (-3))	0.030	0.145	0.211	0.833
D(INDEBT)	-0.795	0.559	-1.421	0.157
D (INDEBT (-1))	0.700	0.780	0.898	0.370
D (INDEBT (-2))	1.164	0.805	1.445	0.150
D (INDEBT (-3))	-1.052	1.034	-1.018	0.310
D(INEQUITY)	-1.948	1.465	-1.330	0.185
D (INEQUITY (-1))	-2.638	3.147	-0.838	0.403
D (INEQUITY (-2))	-0.399	0.273	-1.462	0.145
D (INEQUITY (-3))	1.617	2.155	0.750	0.454
D(INRE)	4.166	2.969	1.402	0.162
D (INRE (-1))	0.634	2.157	0.294	0.769
D (INRE (-2))	0.579	1.272	0.455	0.649
D (INRE (-3))	-0.264	1.350	-0.195	0.845
C	0.014	0.00	2.760	0.006

Mean dependent var	0.000	S.D. dependent var	0.067
S.E. of regression	0.031	Akaike info criterion	-4.042
Sum squared resid	0.169	Schwarz criterion	-2.221
Log-likelihood	810.840	Hannan-Quinn criterion	-3.315

*Note: p-values and any subsequent tests do not account for the model selection.

Source: Author computation

The best model, ARDL (4, 4, 4,4), chosen according to the Akaike information criterion (AIC), was used to estimate the panel ARDL results. The long- and short-term relationships between funding structure and economic value added, as determined by the pooled mean group (PMG), are shown in Table 4.7. The study discovered that equity is statistically significant and has a positive impact on economic value added. Therefore, the economic value-added increases by 48.2% for every 1% increase in equity. These results show that equity financing positively contributes to the economic value added in the Kenyan sugar manufacturing firms, implying that equity is essential for long-term financial performance.

On the other hand, there is a significant positive relationship between debt and economic value added. This means that for every 1% increase or decrease in debt, economic value-added increases or decreases by 38.1%. The positive effect indicates that investments are producing enough returns over time to offset the cost of debt and help create value (benefits over and above the cost of capital employed). It's also provided that because interest payments on debt are tax-deductible, debt is frequently seen as a less expensive source of capital than equity. Businesses can lower their total cost of capital and increase profitability by employing debt financing. A significance level of 5% (often denoted as $\alpha = 0.05$) means that there is a 95% confidence that the observed relationship is not due to random chance. In other words, there is only a 5% probability that the relationship observed between debt and EVA could have occurred by random variation alone. This level of significance is commonly used in statistical analysis to denote fairly strong evidence of a relationship. This result is in line with the findings of PB Badar and Saeed (2013), who claimed that long-term debt and firms' performance, as determined by return on assets, have a positive and significant relationship. Moreover, the results validate the findings of Abor (2007), who reported a positive and statistically significant relationship between long-term debt and gross profit Margin. Additionally, it aligns with the findings of Samiloglu, Polat, and Bagci (2014), who contended that long-term liabilities and total resources with economic value added have a positive and significant relationship.

The results, however, conflict with those of Seid (2017), who examined the effect of capital structure on firm performance from private manufacturing firms in Ethiopia's Amhara regional state. The findings showed that leverage has a significant negative influence on the financial performance of the firms. The findings of Henry Kimathi (2015), who investigated the impact of leverage on the performance of non-financial companies listed on the Nairobi Securities Exchange, are also at odds with this. The results indicated a negative correlation between leverage and business performance. Additionally, the study's findings are contrary to those of Shubita and Mroof (2012), an investigation into the profitability and capital structure of industrial firms listed on the Jordanian Amman Stock Exchange. The findings indicated a significant negative relationship between debt and profitability. Nguyen, Dao, Bui, and Dang (2019) studied the impact of capital structure on firm performance: Empirical evidence from listed food and beverage companies in Vietnam. Their findings, showed that financial leverage affects return on equity and earning per share positively while, it affects return on assets negatively.

Therefore, strategic consideration is that firms in the sugar industry should consider leveraging debt to finance projects that are expected to yield high returns. However, it is important to balance the use of debt to avoid excessive leverage, which can lead to financial distress. Effective debt management strategies are crucial to ensure that the additional debt contributes positively to the firms' value and this can be done by regular reviews of debt levels, interest rates, and repayment schedules to ensure that the benefits of debt outweigh the costs, by Conducting thorough risk assessments before taking on additional debt to ensure that the firm can manage its debt obligations even under adverse conditions.

The study also showed that retained earnings and economic value added have a positive but insignificant relationship. The p-value is 0.875, and the coefficient value is 0.017. This suggests that retained earnings do not have a meaningful long-term impact on economic value added. It also revealed that retained earnings, which are frequently viewed as a low-risk internal source of funding, have no noticeable long-term effects on the economic value added, which implies that retained earnings may not be sufficiently retained to have a substantial impact on performance, or that the Kenyan sugar manufacturing firms may not be leveraging retained earnings to drive value creation.

The results contrast with the research conducted by Le, Tran, Tran, Pham, and Scott (2020) regarding the relationship between retained earnings and the performance of firms. Vietnam-related evidence. From 2005 to 2016, they made use of 37 construction companies listed on the Hochiminh Stock Exchange. The outcome revealed the positive effect of retained earnings on company performance. It also contrasts with the findings of Oganda, Muzeve, and Mogwambo (2022), who examined the impact of financing retained earnings on the financial performance of listed manufacturing and related companies. They used a longitudinal research design and dynamic unbalanced panel analysis from 2010 to 2019. A positive correlation with economic value added was found in the study. It also contradicts the study by Agbaje, Ogunmakin, Adebayo, and Olaoye (2023), who examined the effects of capital structure on the financial performance of consumer goods companies in South Africa. utilized 10 companies between 2011 and 2021, a span of 11 years. The findings show that retained earnings and return on equity have a significant and positive relationship.

Nevertheless, the study supports the work of Ngozi, Ifeoma, and Onyekwelu (2021) on the impact of retained earnings on the operational performance metrics of Nigerian oil and gas companies. They studied four oil firms that are listed on the Nigerian Stock Exchange

between 2009 and 2018 for ten years. The findings revealed a positive and insignificant relationship with return on equity and return on assets. This finding was also in line with the study by Pibowei, Odong, and Olusegun (2021), which examined the impact of retained earnings on the financial performance of selected Nigerian breweries during times of crisis. The study revealed no significant relationship between retained earnings and return on assets or return on equity. However, the study by Daniel (2020) on the impact of retained earnings financing on the profitability of Kenyan petroleum companies shows that retained earnings and firm profitability were found to have a negative and insignificant relationship.

According to the short-term results, the error correction term (COINTEQ01) has a negative and significant coefficient of -0.603, with a p-value of 0.030. This suggests that a robust adjustment mechanism is present, as evidenced by the fact that each period corrects about 60.3% of the short-term deviations from the long-term equilibrium, guaranteeing stability over time. D (INEVA (-3)), D (INEVA (-2), and D (INEVA (-1): The dependent variables that are lag-related and indicate how the economic value added from past periods affects the current period are not statistically significant. This suggests that historical economic value-added values have little bearing on INEVA fluctuations that occur over the short term. D(INDEBT): Additionally, debt has a negative (-0.795) and statistically insignificant (p = 0.157) short-run impact. This implies that debt does not immediately impact economic value added. On the other hand, the lags exhibit notable variations. To illustrate the volatility in debt's short-run impact on performance, the second lag of debt D (INDEBT (-2) has a positive but insignificant coefficient (1.164), and the third lag D (INDEBT (-3) is negative (-1.051) and likewise insignificant. D(INEQUITY): The immediate short-run effect of equity is negative (-1.948) but statistically insignificant (p = 0.186), demonstrating the complex short-run dynamics of the asset class. Similar small effects are seen by other equity lags, indicating that equity does not significantly affect economic value added in the short run. D(INRE): Retained earnings display a positive short-run effect (4.165) but with no statistical significance (p = 0.163), indicating that changes in retained earnings do not strongly influence short-term economic value added. The constant term is significant (p = 0.006), indicating a baseline of positive economic value added that persists in the model regardless of changes in debt, equity, or retained earnings.

It appears from the significant error correction term that any short-term imbalances are generally corrected by the system. Further, in the event of a shock or divergence from the long-term relationship, the sugar industry can quickly reestablish equilibrium, ensuring long-

term financial stability. Additionally, the short-term outcomes demonstrate how erratic the impact of debt and equity is on economic value added. For example, the immediate financial strain imposed by new financing (interest payments or dilution of ownership) may be the cause of the short-term negative effect of debt and equity. However, over time, these effects do stabilize and enhance economic value added.

These results highlight how prudent debt and equity management are. In the short term, however, the dynamics suggest that either can cause financial instability due to ill-timed investments or an excessive dependence on one. To minimize short-term risks and optimize long-term gains, the industry should implement strategic debt management and equity issuance policies. The results also revealed that increased financing through these channels may result in a brief financial strain due to the short-term volatility of debt and equity. Thus, to prevent short-term liquidity problems or elevated financial risk, businesses should carefully consider their funding options.

In conclusion, the ARDL results imply that, despite short-term volatility, the Kenyan sugar industry can reap the benefits of a well-managed debt and equity mix to drive long-term financial performance. Nonetheless, it doesn't seem as though retained earnings are very important in the creation of economic value. These findings imply that granting access to the debt and equity markets could prove advantageous for policymakers in Kenya's sugar industry in the long run. The sustainability of the industry may be enhanced by enacting laws that make it easier to obtain low-cost loans and draw equity investments.

Managers should concentrate on optimizing their debt-to-equity ratio, managing short-term volatility through liquidity measures and risk mitigation strategies, and remembering that both forms of financing have long-term benefits. This study adds to the body of literature by offering empirical data from the sugar manufacturing firms in developing economies, a field with little previous study. It refutes the notion that high debt is inherently bad by demonstrating that, when handled properly, it can improve financial performance in capital-intensive industries. The long-term findings regarding retained earnings' insignificance offer a fresh viewpoint on the constrained role of internal funding in sectors dependent on large-scale operations and outside funding.

Table 4.8: Funding structure and financial performance

Dependent Variable: D(INEVA)
Method: ARDL
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): INFS
Fixed regressors: C
Selected Model: ARDL (2, 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
INFS	0.863	0.096	8.968	0.000
	Short Run Equation			
COINTEQ01	-0.645	0.142	-4.530	0.000
D (INEVA (-1))	-0.013	0.132	-0.095	0.924
D(INFS)	0.006	0.435	0.013	0.990
D (INFS (-1))	-0.923	0.410	-2.250	0.025
D (INFS (-2))	0.476	0.449	1.060	0.290
C	0.023	0.005	5.001	0.000
Mean dependent var	6.12E-05	S.D. dependent var		0.067
S.E. of regression	0.044	Akaike info criterion		-3.608
Sum squared resid	0.532	Schwarz criterion		-2.966
Log-likelihood	639.495	Hannan-Quinn criterion.		-3.352

*Note: p-values and any subsequent tests do not account for the model selection.

Source: Author computation

From the above table, the findings showed that there is a significant and positive relationship between the funding structure and economic value added, with a coefficient value of 0.863 and at (p = 0.000). Therefore, a 1% increase in funding structure results in an increase in economic value added of 86%. These results show a positive and direct relationship between long-run economic value added and funding structure. This long-run positive and significant relationship between funding structure and economic value added suggests that Kenyan sugar firms benefit from having sectorally considered the right balance of debt, equity, and retained earnings in their capital structure. Long-run growth and value creation are likely to come from firms that can balance the use of debt, equity, and retained earnings financing to maximize returns and minimize risk. Therefore, the findings highlight how crucial capital structure management and strategic financial planning are for Kenyan sugar manufacturing firms. This finding aligns with the findings of Rufus and Ofoegbu (2015), who demonstrated that capital structure significantly and positively affects financial performance as indicated by

return on equity and return on capital employed. The results also align with those of Asad, Khizar, and Jafary (2019), who found a significant positive relationship between capital structure and financial performance. These outcomes are consistent with those of Barakat (2014), whose research revealed a statistically significant correlation between capital structure and return on equity.

The results, however, conflict with those of Cole, Yan, and Hemley (2015), who examined the relationship between capital structure and firm performance in the energy, industrial, and healthcare sectors. In this study, the findings revealed a negative relationship between capital structure and return on assets. It also contradicts the study by Rasyid and Roza Linda (2019) on ownership structure, capital structure, and firm performance: An Indonesian case. The study included thirty manufacturing companies that were listed on the Indonesian stock exchange between 2010 and 2016. The findings showed a negative contribution between capital structure and return on assets, a measure of a company's performance. The study by Mohammadzadeh (2011), which examined the impact of capital structure on the profitability of entities listed on the Tehran stock exchange, is also in contrast with the findings. The study discovered a negative correlation between earnings per share, capital structure, and return on assets.

A significant and negative error correction term of -0.645 is displayed in the above results. The fact that this coefficient is significant at the 0.05 level and has the correct sign (negative) indicates that there is a long-run relationship between the independent and dependent variables. With a coefficient value of -0.645, multiplying by 100% yields 64.5%, indicating that, on average, it takes 64.5 % to go from the short run to the long run. Additionally, since the error correction term is significant and negative, we can also conclude that the variables are cointegrated. The short-run results also reveal that lagged Dependent Variable D (INEVA (-1**)**, the coefficient is -0.012, but it is not statistically significant (p = 0.924), suggesting that the previous period's economic value added does not have a significant impact on the current period in the short run. D(INFS), the short-run impact of the immediate change in funding structure is small and statistically insignificant (p = 0.990). D (INFS (-1), the lagged effect of funding structure in the short run is negative and statistically significant (p = 0.025), implying that a 1-unit increase in the previous period’s funding structure reduces economic value added by approximately 0.923 units in the short run. D (INFS (-2)): Although the second lag of funding structure has a positive coefficient (0.4764), it is statistically insignificant (p = 0.290), meaning it has no notable impact in the short term. However, the constant term is

positive and highly significant (p = 0.000), indicating a baseline positive level of economic value added in the model, regardless of other variables. Despite a significant delayed negative effect, the funding structure does not immediately impact economic value added in the short run. This indicates that changes in funding structure may initially have a negative impact on economic value added, but this effect may stabilize and become positive in subsequent periods.

The correction mechanism (COINTEQ01) also indicates that short-term discrepancies are fairly quickly adjusted toward the long-run equilibrium. It could also mean that variables other than funding structure might have a greater immediate impact on short-term financial performance and value creation. Examples of these variables include external economic factors, market conditions, pricing strategies, and operational efficiency. This means that to increase short-term economic value added, Kenyan sugar companies should concentrate on a wider range of strategic factors and operational metrics.

In summary, determining the optimal capital structure balance necessitates considering the advantages and drawbacks of debt, equity, and retained earnings in light of the company's unique needs, financial objectives, risk appetite, sectoral orientation, dividend policy, and external factors. It's a continuous and iterative process requiring financial analysis, strategic planning, and flexibility in response to shifting market conditions. These results provide actionable insights for financial managers in the sugar industry in Kenya and similar contexts, guiding them on optimal financing strategies to enhance EVA. It suggests prioritizing debt and equity over retained earnings to improve financial performance and understand the impact of different financing sources on EVA. Managers can make more informed capital allocation decisions that align to maximize shareholder value; that is, firms should adopt a capital structure framework that considers Capital Cost Trade-offs. Balancing the benefits of debt tax shields against financial risk to optimize the cost of capital. Timing of Capital Raising, aligning financing with project cash flow profiles to maximize efficiency and minimize costs. Diversified Funding Mix: Ensuring a variety of funding sources to reduce reliance on any single avenue, enhancing financial stability. Additionally, Companies can formulate policies that favor the prudent use of debt and equity issuance. This strategic approach can be integrated into corporate financial policies and long-term planning. This research provides specific insights into the capital structure dynamics of the sugar manufacturing firms in Kenya, which can be extrapolated to similar industries or regions. It

helps in understanding how local economic and financial environments influence corporate finance decisions and performance.

The second objective of the study was to establish the effect of liquidity on the financial performance of the sugar manufacturing firms in Kenya. The relationship between financial performance and liquidity in the Kenyan sugar manufacturing firms is significant, ensuring the firms can meet immediate obligations and maintain smooth operations. Low liquidity can disrupt profitability and long-term stability, while high liquidity improves operational efficiency. The table below shows the results of the current ratio, acid test ratio, and economic value added.

Table 4.9 Current ratio, Acid test ratio, and financial performance

Dependent Variable: D(INEVA)
Method: ARDL
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): INCR INATR
Fixed regressors: C
Selected Model: ARDL (1, 2, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
INCR	0.185	0.094	1.981	0.049
INATR	0.737	0.105	6.992	0.000
	Short Run Equation			
COINTEQ01	-0.686	0.148	-4.638	0.000
D(INCR)	0.778	0.393	1.978	0.049
D (INCR (-1))	-0.619	0.676	-0.916	0.360
D(INATR)	-0.147	0.187	-0.785	0.433
D (INATR (-1))	0.115	0.246	0.467	0.641
C	0.023	0.005	4.390	0.000
Mean dependent var	-1.37E-05	S.D. dependent var		0.066
S.E. of regression	0.039	Akaike info criterion		-4.435
Sum squared resid	0.401	Schwarz criterion		-3.781
Log-likelihood	774.419	Hannan-Quinn criterion.		-4.174

*Note: p-values and any subsequent tests do not account for the model selection

Source: Author computation

According to the study, the current ratio is statistically significant at the 5% level and positively affects economic value added at a P value =0.049 and a coefficient of 0.185. Therefore, a 1% increase in the current ratio results in an increase in economic value added of 18.5%. This suggests that as the current ratio rises, economic value added is likely to rise as well, particularly in the long run. This result is consistent with research by Chukwunweike (2014), who examined the effect of liquidity on the profitability of a small number of chosen businesses. The approach is known as financial statement analysis or FSA. According to his research, the current ratio significantly and favorably affects a company's profitability. It also concurs with Akenga's (2017) findings, which indicated a significant and positive relationship between return on assets and the acid test ratio. Dsouza and Habibniya (2021) looked at how liquidity affected the Nifty Pharma Index's profitability (NSE India). From 2012 to 2016, ten listed companies on the Nifty Pharma Index were the subject of a 5-year study. For data analysis, multiple regression models were employed. The outcome showed that while the quick ratio has a positive effect on the return on total assets, the current ratio has a positive impact on the return on capital employed.

The results, however, conflict with those of Musah and Kong (2019), who examined the impact of capital structure and liquidity on the financial performance of companies listed on the Ghana alternative market. Throughout four years, from 2015 to 2018, the study selected four firms using the purposive sampling technique. Along with using return on assets, return on issued capital, and return on capital employed as performance proxies, it also used the debt to total assets ratio and the current ratio as components of the capital structure and liquidity, respectively. The techniques for multiple regression analysis and correlation were applied to the data. The results demonstrated that the current ratio's measure of liquidity and the firm's financial performance were not significantly correlated. Baafi, Duodu, Sarkodie, and Boachie (2020), while investigating the relationship between firms' financial performance and liquidity, used data from the Ghana Stock Exchange. For 12 years, between 2008 and 2019, 21 companies listed on the Ghana Stock Exchange were chosen for the study. Both the regression model and correlation were applied. The results indicated a weak positive statistically significant relationship between return on assets and the current ratio and quick ratio, a weakly positive statistically insignificant relationship between return on equity and the liquidity measures, and a weakly negative statistically insignificant relationship between return on capital employed and the current ratio and quick ratio.

Maintaining a healthy level of liquidity, as indicated by a higher current ratio, is positively associated with value creation over time for sugar manufacturing firms in Kenya, as evidenced by the long-run significant and positive relationship between the current ratio and economic value added. This research emphasizes how crucial it is for businesses in Kenya's sugar sector to maintain an ideal current ratio and efficiently manage liquidity. A healthy balance between current assets and liabilities should be ensured by policies and practices that executives and financial managers should concentrate on, taking into account aspects like cash flow management, receivables management, and inventory control.

On the other hand, the Acid test ratio and Economic value added showed a significant positive relationship at a coefficient value of 0.737 and p-value 0.000. meaning a 1% increase in acid test ratio leads to a 74% increase in economic value added. The positive sign indicates a long-run positive contribution between the acid test ratio and economic value added. This indicates that there is a chance that economic value added will eventually rise in tandem with an improvement in the acid test ratio. Inventory, which includes sugar cane, finished goods, and sugar in process, is essential to the firm's operations in the sugar sector. Long-run results of the acid test ratio on economic value added may be lowered due to the characteristics of these assets and their importance in production processes.

This result is in line with the findings of Garg and Gulia (2022), who studied the Steel Authority of India's Financial Statement Analysis Approach. The study was conducted from 2016 to 2020 over 5 years, and data analysis was done using regression and correlation techniques. It was determined that there is a significant positive relationship between ROA, ROE, and ROCE and the current ratio. Additionally, a significant positive association was found between the Acid test ratio and ROCE, ROE, and ROA. Kaysher and Akter (2016) examined the trade-off between liquidity and profitability in Bangladesh's chemicals and pharmaceutical industries. The study used regression and correlation models for data analysis, looking at 10 companies over ten years from 2005 to 2014. The working capital ratio, quick ratio, and current ratio were the components of liquidity, and return on equity, return on capital employed, and return on assets were the indicators of profitability. The results imply that the working capital ratio, quick ratio, and ROA, ROE, and ROCE are positively correlated.

However, it contradicts the finding of Chukwunweike (2014), who found no significant positive association between the quick ratio and business profitability. Niresh (2012)

examined the trade-off between profitability and liquidity through a study of a subset of Sri Lankan manufacturing companies. The study covered 31 Sri Lankan listed manufacturing companies from 2007 to 2011, over five years. In the research analysis, correlation and descriptive statistics were employed. While net profit, return on equity, and return on capital employed were regarded as indicators of profitability, the current ratio, quick ratio, and liquid ratio were considered indicators of liquidity. The findings showed there is a negative relationship between the return on capital and the quick, current, and liquidity ratios, which are indicators of liquidity. Additionally, it proved that the liquidity ratio has a negative correlation with the net profit ratio, return on equity, and return on capital employed.

A significant and negative error correction term of -0.686 was observed in the short-run results. The coefficient, which is significant at the 0.05 level and has the correct sign (negative), is -0.686. This indicates that, on average, 69 % of deviations from the long-run equilibrium are corrected every period. For the first difference of the current ratio (D(INCR)), the coefficient is 0.778 with a p-value of 0.049. This means that in the short run, a 1% increase in the current ratio leads to a 78% increase in EVA, and this relationship is statistically significant. For the lagged difference of the current ratio (D (INCR (-1))), the coefficient is -0.619, but the p-value of 0.361 indicates that the lagged effect is not statistically significant in the short run. Regarding the first difference of the acid test ratio (D(INATR)), the coefficient is -0.147, and the p-value of 0.433 shows that this short-term impact is not statistically significant. As for the lagged difference of the acid test ratio (D (INATR (-1))), the coefficient is 0.115, with a p-value of 0.641, suggesting that the lagged effect is also insignificant in the short run. The constant term is 0.023, and its p-value of 0.000 demonstrates that it is highly significant.

The study reveals that the acid test ratio changes don't seem to have an immediate significant impact on EVA. Only the current ratio seems to positively and significantly affect EVA in the short term. This suggests that while stricter liquidity standards (acid test ratio) may take longer to affect performance, having more immediate cash or liquid assets available (current ratio) is essential for improving short-term financial performance. However, in the long run, EVA is significantly influenced by both the current ratio (CR) and the acid test ratio (ATR). Strong liquidity levels are positively associated with the firm's financial performance, as demonstrated by the higher liquidity these ratios represent.

In summary, the findings indicate that liquidity management is crucial for the financial performance of the sugar manufacturing firms, reinforcing the importance of maintaining an optimal balance between current assets and current liabilities to enhance a firm's value. It enables regulators and policymakers to develop frameworks and guidelines that promote better liquidity management practices within the industry, ultimately aiming to enhance the sector's sustainability and profitability. Table 4.10 below shows the results of the effect of liquidity on the financial performance of sugar manufacturing firms in Kenya.

The effect of liquidity on the financial performance of the sugar manufacturing firms in Kenya was analyzed using the Auto-Regressive Distributed Lag (ARDL) approach, with Economic Value Added (EVA) as the dependent variable. The model was selected based on the Akaike Information Criterion (AIC), and the optimal lag structure determined was ARDL (2, 3), incorporating the natural log of the liquidity index (INLQ) as a dynamic regressor and a constant term.

Table 4.10: Liquidity and Financial Performance

Dependent Variable: D(INEVA)
Method: ARDL
Maximum dependent lags: 5 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): INLQ
Fixed regressors: C
Selected Model: ARDL (2, 3)

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
	Long Run Equation			
INLQ	0.940	0.054	17.411	0.000
	Short Run Equation			
COINTEQ01	-0.770	0.147	-5.242	0.000
D (INEVA (-1))	0.054	0.128	0.423	0.672
D(INLQ)	-0.248	0.219	-1.131	0.259
D (INLQ (-1))	0.109	0.423	0.258	0.796
D (INLQ (-2))	0.312	0.194	1.607	0.109
C	0.010	0.003	3.627	0.000
Mean dependent var	6.12E-05	S.D. dependent var		0.067
S.E. of regression	0.039	Akaike info criterion		-3.973
Sum squared resid	0.413	Schwarz criterion		-3.332
Log-likelihood	698.689	Hannan-Quinn criteria.		-3.717

*Note: p-values and any subsequent tests do not account for the model selection

Source: Author computation

The above results show that liquidity has a positive and significant effect on financial performance as measured by economic value added in the long run. This means that 1% increase in liquidity results in a 94% increase in economic value added. It also indicates that liquidity is a key determinant of long-run financial performance in the sugar manufacturing firms.

These results are consistent with the assertion made by Zulqarnain, Awan, Ahmed, Qureshi, Hasnain, and Khan (2016) that there is a positive and significant correlation between liquidity and return on equity, return on assets, and return on capital employed. Moreover, the results validate the findings of Odalo et al. (2016), who reported that liquidity positively impacts return on equity, assets, and earnings per share. The outcome also aligns with the findings of Yameen, Farhan, and Tabash (2019), who discovered a significant positive relationship between liquidity and profitability of pharmaceutical companies.

However, the study differs from that of Waswa et al. (2018), who looked at how liquidity affected the financial performance of Kenya's sugar industry, applying the random effects regression model to analyze the data. The outcome showed that the financial performance of the company and liquidity management were negatively correlated. Chukwubuikem, Okoye, and Ugochukwu (2022), examined the impact of liquidity management on the financial performance of manufacturing companies listed on the Nigerian Stock Exchange. Regression analysis was used in conjunction with an ex post facto research design involving 39 companies over ten years from 2010 to 2019. The results suggested that the debtor collection period had a significant, but negative, impact on the return on capital employed and, conversely, a significant, but weak, negative impact on return on assets.

Niresh (2012) examined the trade-off between profitability and liquidity through a study of a subset of Sri Lankan manufacturing companies. The study covered 31 Sri Lankan-listed manufacturing companies from 2007 to 2011, over five years. In the research analysis, correlation and descriptive statistics were employed. While net profit, return on equity, and return on capital employed were regarded as indicators of profitability, the current ratio, quick ratio, and liquid ratio were considered indicators of liquidity. The findings showed there is a negative relationship between the return on capital and the quick, current, and liquidity ratios, which are indicators of liquidity. Additionally, it proved that the liquidity ratio has a negative correlation with the net profit ratio, return on equity, and return on capital employed.

Strategic liquidity management is essential not for instant gains but for sustained long-run improvement in firm value. Long-run economic value-added creation by Kenyan sugar manufacturing firms is positively impacted by higher levels of liquidity, as evidenced by the significant and positive relationship between the two variables. firms that have adequate levels of liquidity are better able to manage their finances, seize expansion opportunities, and make wise investments that raise their economic value added. Effective liquidity management can result in higher profitability, lower financial risk, and more operational efficiency, all of which, over time, can enhance economic value added. For Kenyan sugar manufacturing firms, this means that long-term financial success depends on maintaining sufficient liquidity levels. To maximize financial performance over time, strategic choices about capital allocation, cash flow management, and investment planning should take the positive contribution of liquidity and economic value added into account.

A significant and negative error correction term of -0.770 is displayed in the above results. The fact that this coefficient is significant at the 0.05 level and has the correct sign (negative) indicates that there is a long-run relationship between the independent and dependent variables. With a coefficient value of 0.770, multiplying by 100% yields 77%, which indicates that, on average, it takes 77% to go from the short run to the long run. Due to the significant and negative error correction term, we can also conclude that the variables are cointegrated. It also reveals that the systems are stable and responsive to shocks.

The short-run results indicate that liquidity and its lags are not statistically significant. The coefficients are as shown. INLQ is -0.248, which is negative but statistically insignificant (p-value = 0.259). This implies that short-term fluctuations in liquidity do not have a significant immediate impact on EVA. It suggests that while liquidity is important for the long-term performance of firms, short-term fluctuations may not immediately affect profitability. The coefficient for INLQ (-1) is 0.109, and it is statistically insignificant (p-value = 0.796), indicating that the effect of liquidity from the previous period is negligible in the short term. The coefficient for INLQ (-2) is 0.312, which is positive but marginally insignificant (p-value = 0.109), suggesting that liquidity changes from two periods ago may have some delayed effect on EVA, but it is not statistically conclusive. The constant term is positive and significant, indicating that in the absence of liquidity changes, EVA maintains a positive baseline trend. Additionally, it could imply that other elements like changing regulations, shifting sugar prices, interruptions in the supply chain, and intense competition could affect how directly liquidity affects economic value added. The findings' implications point to the

necessity of taking a comprehensive approach to value creation in Kenya's sugar manufacturing firms, as well as of addressing more general industry issues and improving operational performance to eventually achieve sustainable economic value added.

Therefore, this finding supports existing financial theories that suggest a strong relationship between liquidity and firm value. It empirically validates the theory that efficient liquidity management contributes to value creation, adding to the academic discourse, and by focusing on the long-run relationship, the study highlights the importance of sustainable financial practices over short-term gains. This adds to the literature on corporate finance by emphasizing the need for long-term planning and stability. Lastly, it indicates that firms with better liquidity are in a stronger position to invest in growth opportunities. This can include expanding production capacity, investing in technology, or exploring new markets, which in turn enhances their EVA. In addition, by maintaining sufficient liquidity, sugar firms can better withstand market volatility and economic downturns, ensuring long-term stability and value creation. Hence, the study enriches the body of knowledge with industry-specific insights and offers practical guidance for financial management within the sector. The third objective sought to evaluate the moderating effect of liquidity on the relationship between funding structure and the financial performance of the sugar industry in Kenya. The table below gives the findings of the study.

To examine the moderating effect of liquidity on the relationship between funding structure and financial performance, the study employed the Auto-Regressive Distributed Lag (ARDL) model with Economic Value Added (EVA) as the dependent variable. The model selection, guided by the Akaike Information Criterion (AIC), identified ARDL (4, 4, 4, 4) as optimal, incorporating: **INFS** (log of funding structure), **INLQ** (log of liquidity index), LQ**_FS** (interaction term: liquidity × funding structure).

Table 4.11 Funding structure, Liquidity, and financial performance

Dependent Variable: D(INEVA)
Method: ARDL
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): INFS INLQ LQ_FS
Fixed regressors: C

Selected Model: ARDL (4, 4, 4, 4)
Note: The final equation sample is larger than the selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation				
INFS	0.099	0.394	0.252	0.802
INLQ	-1.257	0.450	-2.797	0.006
LQ_FS	2.760	0.842	3.278	0.001
Short Run Equation				
COINTEQ01	-0.712	0.306	-2.328	0.021
D (INEVA (-1))	0.127	0.182	0.696	0.488
D (INEVA (-2))	0.003	0.241	0.012	0.990
D (INEVA (-3))	0.105	0.1333	0.790	0.431
D(INFS)	6.430	11.634	0.553	0.581
D (INFS (-1))	-5.843	13.760	-0.425	0.671
D (INFS (-2))	18.619	17.060	1.091	0.277
D (INFS (-3))	-11.954	10.158	-1.177	0.241
D(INLQ)	7.770	11.110	0.699	0.485
D (INLQ (-1))	-2.737	14.240	-0.192	0.848
D (INLQ (-2))	20.227	15.230	1.328	0.186
D (INLQ (-3))	-12.373	9.615	-1.287	0.199
D(LQ_FS)	-15.742	22.228	-0.708	0.480
D (LQ_FS (-1))	8.375	26.928	0.311	0.756
D (LQ_FS (-2))	-40.263	30.576	-1.317	0.190
D (LQ_FS (-3))	33.561	26.608	1.261	0.209
C	0.257	0.113	2.268	0.025
Mean dependent var	0.001	S.D. dependent var		0.067
S.E. of regression	0.029	Akaike info criterion		-4.221
Sum squared resid	0.145	Schwarz criterion		-2.396
Log-likelihood	837.660	Hannan-Quinn criteria.		-3.492

***Note:** p-values and any subsequent tests do not account for the model selection.

Source: Author computation

The coefficient of 0.099 in the funding structure from the table is positive but not statistically significant (p-value = 0.802). a 1% increase in funding structure does not affect the long-run financial performance as measured by economic value added. These findings indicate that the funding structure exerts a more pronounced effect on EVA when assessed in isolation from liquidity. However, when liquidity is incorporated into the analysis, it appears to be a pivotal

factor that enhances the ability to utilize the funding structure effectively. This perspective diminishes the direct impact of funding structures alone and underscores their role in generating economic value. Therefore, it can be suggested that modifications in the funding structure alone may not significantly impact the long-run financial performance of the sugar manufacturing firms in Kenya. This indicates that altering the debt-equity mix may not yield substantial benefits unless other operational efficiency factors are concurrently addressed.

On the other hand, the coefficient for the liquidity was determined to be -1.257, signifying a statistically significant negative contribution (p-value = 0.006). Meaning that a 1% increase in liquidity leads to a decline in the financial performance by 1,25% in the long run. This indicates that higher liquidity has a negative impact on long-run economic value added. In the specific context of the Kenyan sugar manufacturing firms, this finding suggests that maintaining a larger proportion of liquid assets does not contribute to improved long-term financial performance and may signal the presence of underutilized resources or operational inefficiencies. The notable negative influence of liquidity on long-run performance implies that firms within the sugar industry may be retaining surplus liquidity, which could denote inefficient resource deployment. Consequently, it may be imperative for these entities to focus on optimizing cash flows and reallocating liquid assets toward more productive endeavors.

According to the study, liquidity moderates positively the relationship between funding structure and economic value added in the long run, at a coefficient of 2.760 and p=0.001. Consequently, over time, a 1% increase in the interaction between funding structure and liquidity results in a 2.76 % increase in economic value added. The positive interaction effects imply that firms can enhance financial performance by jointly optimizing their funding and liquidity strategies.

The outcome is consistent with the findings of Abdulrahman (2021), who examined the moderating role of liquidity in the relationship between capital structure and profitability using data from Nigerian listed deposit money banks. analyzed data using a panel regression model across 15 banks over ten years, from 2010 to 2019. The outcome showed that the listed deposit money banks in Nigeria's financial profitability are positively impacted by capital structure, which is moderated by liquidity. The finding is also consistent with the study "The moderating role of liquidity in the relationship between the expenditures and financial performance of SMEs: Evidence from Jordan" by (Airout, Alawaqleh, Almasria, Alduais &

Alawaqleh, 2023). For the study, 200 SMEs took part. The results revealed that the financial performance of SMEs is positively impacted by accounting expenditure that is moderated by liquidity. However, it contradicts the study of the moderating effect of liquidity on the relationship between capital structure and the financial performance of listed healthcare firms in Nigeria (Abdulwahab, Sulaiman, & Musa, 2023). used an ex-post facto research design and ten listed healthcare companies from 2013 to 2022. The research findings indicate that liquidity-moderated capital structure has the potential to moderate capital structure, albeit negatively. Additionally, it is contrary to a study by Adeel Akhtar, Bakhsh, Mehak, and Kousar (2019), which looked at the moderating effect of liquidity on capital structure and the performance of Pakistan's textile industry. Thirty listed textile companies were chosen between 2007 and 2016 over ten years. Panel data were used in the investigation. Return on equity, return on assets, and earnings per share were used as performance metrics, and debt and debt-to-equity ratios were used as capital structure components. The results showed that while liquidity is significant in the relationship between capital structure variables, total debt to total assets ratio, and firms' variables, return on equity, and earnings per share, it does not act as a moderator between the debt ratio and return on assets.

While the significant moderation effect suggests that liquidity plays a role in moderating the relationship between funding structure and financial performance, the positive sign indicates that the interaction effect of liquidity on the relationship between funding structure and financial performance is positive. The positive and significant moderation effect of liquidity on the relationship between funding structure and financial performance in the sugar manufacturing firms in Kenya underscores the critical importance of maintaining adequate liquidity levels. This finding suggests that effective liquidity management is essential for optimizing the funding structure and enhancing financial performance. Specifically, it highlights that higher liquidity facilitates better financial stability, improves access to capital, lowers the cost of capital, and enhances strategic flexibility. Consequently, firms with robust liquidity are better positioned to navigate financial challenges, seize investment opportunities, and achieve superior financial outcomes. Therefore, liquidity management is vital to financial strategy, ensuring that companies can sustain operations and drive growth in a dynamic economic environment.

A significant and negative error correction term of -0.712 was observed in the short-run results. The coefficient, which is significant at the 0.05 level and has the correct sign

(negative), is -0.712. This indicates that in each period, roughly 71 % of the deviations from the long-run equilibrium are corrected.

The short-run changes are all statistically insignificant: this implies that short-run changes in funding structure, liquidity, or their interaction do not significantly influence financial performance. While the lagged values of D (INEVA (-1)), D (INEVA (-2)), and D (INEVA (-3)) do not exhibit statistical significance in the short term. This implies that the previous economic value-added values do not impact the current period's INEVA. Consequently, this suggests a weak autoregressive pattern in the industry's performance. Upon examining D(INFS) and its lags, it is evident that the short-term statistical significance of funding structure changes (D(INFS)) and their lags is low. This indicates that immediate changes to the funding structure do not promptly influence the magnitude of economic value added. Therefore, it can be inferred that the sugar manufacturing firms may not experience immediate financial gains from altering their debt-to-equity ratio.

The statistical analysis of the liquidity index (D(INLQ)) and its lags did not yield statistically significant results. However, it is noteworthy that certain coefficients, such as D (INLQ (-2)) with a value of 20.226, demonstrate a substantial magnitude, suggesting a potential delayed impact of liquidity, despite the lack of statistical significance. Similarly, the examination of the interaction between funding structure (D(LQ_FS)) and liquidity did not reveal statistically significant short-term effects. Although the coefficients, particularly D (LQ_FS (-2)) at -40.263, indicate that significant variations in the interactions between funding structure and liquidity may lead to performance volatility, the findings do not provide definitive evidence of short-term effects. These results indicate that, in the short term, liquidity levels do not significantly alter how funding decisions affect the sugar manufacturing firms' financial performance. It is possible that other factors, such as operational efficiency, changes in regulations, and marketing conditions, will directly affect financial performance in the short term. It might also be the result of long-term capital projects and wise investments that won't immediately affect economic value added. Modifying the funding structure to support these investments might not produce value right away, which would have a short-term negative and insignificant moderating effect. While individual adjustments to funding or liquidity may not yield immediate positive impacts, an integrated strategy addressing both aspects have the potential to foster long-term financial stability within the Kenyan sugar sector.

This finding can be put to practical use by companies, leveraging it to manage financial risks better. Understanding that higher liquidity can buffer the negative effects of a less optimal

funding structure on EVA helps firms maintain stability and potentially enhance value creation. It equally assists firms in adjusting their funding strategies, opting for structures that ensure sufficient liquidity. This could mean balancing between equity, debt, and other financing options to maintain liquidity levels that mitigate negative impacts on EVA. The information can also be used by Investors to evaluate firms. That is, firms with strong liquidity may be more attractive investments, as they are better positioned to handle suboptimal funding structures without significantly harming their economic value. This finding enriches the literature on corporate finance by highlighting the importance of liquidity in moderating the effects of funding structures. It provides empirical evidence that liquidity is a crucial factor in mitigating the downsides of certain funding choices, and it underscores the dynamic nature of financial management, suggesting that the relationship between funding structure and EVA is not static but influenced by liquidity levels. This contributes to a more nuanced understanding of how financial strategies impact firm value over time. Finally, by linking liquidity and funding structure to EVA, the study adds depth to the literature on value-based performance metrics. It suggests that liquidity is a vital component in the equation, offering a new dimension to EVA-related research. Hence, it promotes strategic financial planning by encouraging firms to consider liquidity management as part of their broader financial strategy. This integration can lead to more robust financial health and sustained value creation.

Table 4.12 Scaled Coefficients for Funding Structure and Liquidity

Included observations: 324

Variable	Coefficient	Standardized Coefficient	Elasticity at Means
INFS	0.011	0.009	0.011
INLQ	0.912	0.801	0.936

The results derived from the standardized coefficients and elasticity values obtained through regression analysis reveal that liquidity (INLQ) exerts a substantially greater influence on financial performance compared to funding structure (INFS). The standardized coefficient for liquidity, which stands at 0.801, is significantly higher than the corresponding coefficient for funding structure, registered at 0.009. This discrepancy indicates that liquidity is the more prominent predictor within the model. Moreover, the elasticity estimates indicate that a 1% increase in liquidity correlates with a 0.94% enhancement in financial performance. In

contrast, a similar 1% increase in funding structure yields only a marginal improvement of 0.011%. These findings underscore the critical importance of liquidity in driving financial performance within Kenya's sugar industry.

In summary, this study contributes to the academic discourse by empirically demonstrating that both funding structure and liquidity significantly enhance the financial performance of Kenya's sugar manufacturing firms, as measured by Economic Value Added (EVA). The findings reveal that a balanced funding structure correlates positively with EVA, while liquidity further amplifies this effect, both directly and as a moderating variable. The analysis highlights the substantial moderating role of liquidity (coefficient = 2.760, p = 0.001), indicating that firms with higher liquidity are more adept at maximizing economic value creation through strategic utilization of their funding structure. This understanding offers a nuanced perspective on the interactions between funding choices and liquidity, promoting enhanced financial sustainability. It provides valuable insights for firm stakeholders and policymakers, guiding them in the development of more effective financing mechanisms.

This research broadens the focus from capital structure to funding structure, offering a more accurate reflection of the financial realities faced by sugar manufacturing firms in Kenya. It uses Economic Value Added (EVA) to assess financial performance and examines liquidity as a moderating variable, addressing a gap in existing studies. The ARDL model is applied to capture both short-term and long-term effects between financing and performance. These methods provide context-specific insights to inform theory and practice in addressing financial challenges in the sugar sector.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATION

5.1 Introduction

This chapter articulates a comprehensive summary of the study's findings, the conclusions derived from these results, recommendations informed by the findings, and prospective avenues for future research. The primary objective of this study was to determine the effect of funding structure and liquidity on the financial performance of the sugar manufacturing firms in Kenya, while also assessing the moderating effect of liquidity within this relationship during the period from 2014 to 2022. A correlational research design was adopted, employing panel data, and the ensuing analysis was conducted using the Auto-Regressive Distributed Lag (ARDL) model.

5.2 Summary of the Findings

The first objective was to determine the effect of funding structure on the financial performance of the sugar manufacturing firms in Kenya. The long-term results revealed a positive and significant relationship between funding structure and financial performance as measured by economic value added. The alternative is accepted, and the null hypothesis that there is no meaningful relationship between funding structure and financial performance is rejected (Coeff=0.863, p-value 0.000). The short-run result indicates that there is a negative and insignificant correlation between funding structure and economic value added (coefficients of -0.013 and p=0.925). a 1% increase in funding structure leads to an 86% increase in financial performance in the long run. An appropriate debt-equity mix improves long-run financial performance.

Establishing the effect of liquidity on the financial performance of the sugar manufacturing firms in Kenya was the second objective. The long-term results show that liquidity and economic value added have a positive and significant relationship (coefficient value of 0.940 and P=0.000). As a result, the alternative hypothesis that there is a significant relationship between liquidity and financial performance is accepted, and the null hypothesis is rejected. In the short run, there is a positive and insignificant relationship between liquidity and economic value added (coefficient value of 0.054 and p=0.672). a 1% increase in liquidity results in a 94% increase in financial performance as measured by economic value added in the long run.

Evaluating the moderating effect of liquidity on the relationship between funding structure and the financial performance of the sugar manufacturing firms in Kenya was the third objective. Based on the third objective, the findings showed a highly significant positive moderation of liquidity on the relationship between funding structure and economic value added. (coefficient value of 2.760 and p=0.000). The alternative is accepted, and the null hypothesis is rejected. However, the study also found that the moderating effect of liquidity on economic value added is insignificant and negative in the short run. (Coefficient value of -15.742 and p=0.480). This implies that a 1% increase in the interaction between liquidity and funding structure leads to 276% increase in economic value added in the long run. The positive interaction effects imply that firms can enhance financial performance by jointly optimizing their funding and liquidity strategies.

5.3 Conclusion

Based on the analysis, the funding structure significantly improves the long-term financial performance of Kenya's sugar manufacturing firms (Coefficient = 0.863, p-value = 0.000). This supports the idea that changes to the funding structure lead to better financial results. However, the negative and insignificant correlation with economic value added (Coefficient = -0.013, p-value = 0.925) suggests that, in the short run, the funding structure has no noticeable impact on financial performance. Therefore, it is observable that the funding structure has a significant and positive impact on the financial performance of sugar manufacturing firms in the long run. This directly addresses the objective by confirming that how firms finance their operations impacts their financial performance. Thus, when planning for business financing, the proper balance between the funding structure's components needs to be taken into account along the sectoral parameters. firms should evaluate their current debt-to-equity ratios and consider adjusting their funding structures to align with the findings.

In line with objective two, which sought to establish the effect of liquidity on financial performance, the study concludes that there is a significant and positive relationship between liquidity and financial performance in the long run (coefficient=0.940, p-value=0.000). This implies that higher liquidity enhances financial performance. This directly addresses the objective by confirming how firms manage their liquidity impacts their financial performance. Thus, keeping a healthy level of liquidity is linked to higher levels of economic value creation for sugar manufacturing firms in Kenya in the long run. Because of this, effectively managing liquidity is crucial as a strategic element to enhancing financial performance and sustainability. Furthermore, by keeping a reasonable level of liquidity, the

sugar firms can continue to maintain the supply of the commodity without compromising demand by purchasing sugar from low-cost producers. However, the short-run result indicates that there is a positive but insignificant correlation between liquidity and economic value added (coefficient=0.054, p-value=0.672). In the short term, the relationship may not be significant, but managers in the sugar firms still need to be mindful of liquidity management. Although it might not have an immediate impact on economic value added, keeping enough liquidity is essential for long-term growth strategies, operational flexibility, and financial stability, all of which can eventually lead to increased economic value added.

Objective three was to evaluate the moderating effect of liquidity on the relationship between funding structure and financial performance. The findings showed a positive and significant moderating effect of liquidity on the relationship between funding structure and financial performance in the long run. This reveals that firms that excel in liquidity management and maintain an appropriate funding structure are more likely to achieve higher Economic Value Added (EVA) over the long run. Given the positive long-term contribution of liquidity and EVA, it can be inferred that Kenyan sugar firms should prioritize maintaining robust liquidity levels to strengthen their funding structure and ultimately create long-term value. It also suggests that liquidity levels influence the way funding decisions affect financial outcomes, though more in-depth research and contextual knowledge are needed to pinpoint the precise causes and implications.

This finding enriches the literature on corporate finance by highlighting the importance of liquidity in moderating the effects of funding structures. It provides empirical evidence that liquidity is a crucial factor in mitigating the downsides of certain funding choices, and it underscores the dynamic nature of financial management, suggesting that the relationship between funding structure and EVA is not static but influenced by liquidity levels. The study also found that the moderating effect of liquidity on economic value added is insignificant and negative in the short run. In conclusion, the study examines the effect of funding structure and liquidity on the financial performance of the sugar manufacturing firms in Kenya, specifically focusing on Economic Value Added (EVA) as a measure of performance. The findings reveal that both funding structure and liquidity have a significant positive effect on EVA, with liquidity also playing a crucial moderating role in strengthening the relationship between funding structure and financial performance. This suggests that an optimized funding structure, combined with effective liquidity management, can enhance the financial performance of the sugar manufacturing firms in Kenya.

5.4 Recommendation

In line with objective one, policymakers/ regulators should promote financing models that encourage long-term capital stability, while encouraging capital structure optimization through tax incentives. Managers of sugar firms should adopt strategic funding planning focused on sustainable growth rather than short-term fixes. Investors/stakeholders to advocate for greater transparency in capital allocation decisions. Based on the second objective, sugar companies should adopt policies that sustain an adequate liquidity level over time to improve financial performance, while government and financial institutions should provide long-term financing mechanisms, e.g., credit lines, to enhance liquidity sustainability.

Finally, firms should not view funding and liquidity in isolation; a balanced approach, where liquidity is aligned with the type and cost of funding, should be a priority.

5.5 Limitations of the Study

Although the study's goal was accomplished, it should be noted that it has certain limitations. The study had limitations, including those about the scope of the period it examined and its use of Kenya as the only nation. Moreover, the qualitative component of the study was absent, which could have helped identify the difficulties important players in the sugar industry face, which human behavior, decision-making processes, and managerial perspectives, which can be critical in understanding financial performance. Decisions related to funding and liquidity management are influenced by the experience, risk appetite, and strategic vision of the management team, factors that are better explored through qualitative research. The study only included firms that have survived over the study period, excluding those that went bankrupt or were otherwise delisted. This can skew the results, as surviving firms may have inherently different characteristics. Variable Measurement, that is, how liquidity, funding structure, and EVA are measured, can introduce bias. For instance, different firms might report financial metrics in slightly varied ways, leading to inconsistencies. Finally, Correlational research can identify relationships between variables but cannot establish causation. Meaning, that a positive correlation between liquidity and financial performance does not necessarily mean that improving liquidity directly causes better financial performance. Other underlying factors might be influencing both variables.

5.6 Suggestions for further studies

The research utilized panel data and the autoregressive distributed lag Model, incorporating liquidity as a moderating variable. Future investigations ought to contemplate incorporating

control variables and contrasting the results. To allow for comparisons and contrasts that will enable industry participants to make informed decisions, more research in the same area can be conducted using different time frames, such as semiannual and annual data. The current study used quarterly data for nine years. In addition, the study's qualitative component needs to be taken into account for more precise data (mixed method). Although the study is focused on the sugar manufacturing firms, the methodologies and insights can be adapted and applied to other firms facing similar financial challenges, thereby broadening the impact of the research. Lastly, the research sets a foundation for future studies to explore additional factors affecting financial performance, such as operational efficiency, market conditions, and technological advancements. It encourages further exploration into the causal mechanisms behind observed correlations.

Finally, this research broadens the focus from capital structure to funding structure, offering a more accurate reflection of the financial realities faced by sugar manufacturing firms in Kenya. It uses Economic Value Added (EVA) to assess financial performance and examines liquidity as a moderating variable, addressing a gap in existing studies. The ARDL model is applied to capture both short-term and long-term effects between financing and performance. These methods provide context-specific insights to inform theory and practice in addressing financial challenges in the sugar sector.

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APPENDICES

Appendix I: Secondary Data Collection Schedule

INCOME STATEMENT

Years	2014				
Sugar Companies	Equity	Debt	Retained Earnings	Current ratio	Acid test ratio
Chemelil					
Nzoia					
West Kenya					
Sony					
Kibos					
Transmara					
Butali					
Sukari					
Kwale International					

Appendix II: Data

Year	**Id**	DEBT	EQU	RE	CR	ATR	EVA	InDebt	InEquity	InRe	InCr	InAtr	InEva	Lq	FSD	FSE	FSR	FS	InLq	InFS	Lq*Fs
4/1/2014	1	2.19	2.35	2.35	2.34	2.02	2.1	0.340444115	0.371068	0.371068	0.369216	0.305351	0.322219	2.18	0.876	1.175	0.235	2.286	0.338456	0.359076	0.121532
7/1/2014	1	2.21	2.39	2.37	1.8	2.04	2.13	0.344392274	0.378398	0.374748	0.255273	0.30963	0.32838	1.92	0.884	1.195	0.237	2.316	0.283301	0.364739	0.103331
10/1/2014	1	2.26	1.9	2.38	2.38	1.99	2.14	0.354108439	0.278754	0.376577	0.376577	0.298853	0.330414	2.185	0.904	0.95	0.238	2.092	0.339451	0.320562	0.108815
12/30/2014	1	2.28	2.38	2.38	2.38	2.03	2.14	0.357934847	0.376577	0.376577	0.376577	0.307496	0.330414	2.205	0.912	1.19	0.238	2.34	0.343409	0.369216	0.126792
4/1/2015	1	2.31	2.42	2.4	2.42	2.08	2.18	0.36361198	0.383815	0.380211	0.383815	0.318063	0.338456	2.25	0.924	1.21	0.24	2.374	0.352183	0.375481	0.132238
7/1/2015	1	1.91	2.46	2.42	2.47	2.04	2.2	0.281033367	0.390935	0.383815	0.392697	0.30963	0.342423	2.255	0.764	1.23	0.242	2.236	0.353147	0.349472	0.123415
10/1/2015	1	2.4	2.47	2.42	1.5	2.17	1.5	0.380211242	0.392697	0.383815	0.176091	0.33646	0.176091	1.835	0.96	1.235	0.242	2.437	0.263636	0.386856	0.101989
12/30/2015	1	2.48	2.48	1.7	2.52	2.16	2.34	0.394451681	0.394452	0.230449	0.401401	0.334454	0.369216	2.34	0.992	1.24	0.17	2.402	0.369216	0.380573	0.140514
4/1/2016	1	2.49	2.49	2.42	2.52	1.7	2.35	0.396199347	0.396199	0.383815	0.401401	0.230449	0.371068	2.11	0.996	1.245	0.242	2.483	0.324282	0.394977	0.128084
7/1/2016	1	2.61	2.54	2.46	2.59	2.4	2.55	0.416640507	0.404834	0.390935	0.4133	0.380211	0.40654	2.495	1.044	1.27	0.246	2.56	0.397071	0.40824	0.1621
10/1/2016	1	2.57	2.51	2.43	2.55	2.4	2.51	0.409933123	0.399674	0.385606	0.40654	0.380211	0.399674	2.475	1.028	1.255	0.243	2.526	0.393575	0.402433	0.158388
12/30/2016	1	2.57	2.51	1.4	2.56	2.42	2.51	0.409933123	0.399674	0.146128	0.40824	0.383815	0.399674	2.49	1.028	1.255	0.14	2.423	0.396199	0.384353	0.152281
4/1/2017	1	2.64	2.55	2.47	2.61	2.5	2.58	0.421603927	0.40654	0.392697	0.416641	0.39794	0.41162	2.555	1.056	1.275	0.247	2.578	0.407391	0.411283	0.167553
7/1/2017	1	2.62	2.55	2.49	2.59	2.47	1.5	0.418301291	0.40654	0.396199	0.4133	0.392697	0.176091	2.53	1.048	1.275	0.249	2.572	0.403121	0.410271	0.165389
10/1/2017	1	2.54	2.5	2.45	2.55	1.4	2.46	0.404833717	0.39794	0.389166	0.40654	0.146128	0.390935	1.975	1.016	1.25	0.245	2.511	0.295567	0.399847	0.118182
12/30/2017	1	2.39	2.45	2.42	2.46	2.2	2.28	0.378397901	0.389166	0.383815	0.390935	0.342423	0.357935	2.33	0.956	1.225	0.242	2.423	0.367356	0.384353	0.141195
4/1/2018	1	1.7	2.45	2.44	2.46	2.17	2.27	0.230448921	0.389166	0.38739	0.390935	0.33646	0.356026	2.315	0.68	1.225	0.244	2.149	0.364551	0.332236	0.121117
7/1/2018	1	2.44	2.47	2.44	2.5	2.19	2.28	0.387389826	0.392697	0.38739	0.39794	0.340444	0.357935	2.345	0.976	1.235	0.244	2.455	0.370143	0.390051	0.144375
10/1/2018	1	2.21	2.42	2.4	2.42	1.9	2.01	0.344392274	0.383815	0.380211	0.383815	0.278754	0.303196	2.16	0.884	1.21	0.24	2.334	0.334454	0.368101	0.123113
12/30/2018	1	2.16	2.36	2.36	2.33	1.83	2	0.334453751	0.372912	0.372912	0.367356	0.262451	0.30103	2.08	0.864	1.18	0.236	2.28	0.318063	0.357935	0.113846
4/1/2019	1	2.08	1.7	2.35	2.29	1.83	1.95	0.318063335	0.230449	0.371068	0.359835	0.262451	0.290035	2.06	0.832	0.85	0.235	1.917	0.313867	0.282622	0.088706
7/1/2019	1	2.12	2.34	2.35	2.28	1.91	2.04	0.326335861	0.369216	0.371068	0.357935	0.281033	0.30963	2.095	0.848	1.17	0.235	2.253	0.321184	0.352761	0.113301
10/1/2019	1	2.11	2.36	2.37	2.32	1.83	2	0.324282455	0.372912	0.374748	0.365488	0.262451	0.30103	2.075	0.844	1.18	0.237	2.261	0.317018	0.354301	0.11232
12/30/2019	1	2.12	2.5	2.2	2.4	1.86	2	0.326335861	0.39794	0.342423	0.380211	0.269513	0.30103	2.13	0.848	1.25	0.22	2.318	0.32838	0.365113	0.119896
4/1/2020	1	2.05	2.35	2.36	2.3	1.81	1.92	0.311753861	0.371068	0.372912	0.361728	0.257679	0.283301	2.055	0.82	1.175	0.236	2.231	0.312812	0.3485	0.109015
7/1/2020	1	2.03	2.35	2.36	2.3	1.81	1.9	0.307496038	0.371068	0.372912	0.361728	0.257679	0.278754	2.055	0.812	1.175	0.236	2.223	0.312812	0.346939	0.108527
10/1/2020	1	2.08	2.33	2.35	2.3	1.88	1.96	0.318063335	0.367356	0.371068	0.361728	0.274158	0.292256	2.09	0.832	1.165	0.235	2.232	0.320146	0.348694	0.111633
12/30/2020	1	2.06	2.32	2.34	2.28	1.87	3.05	0.31386722	0.365488	0.369216	0.357935	0.271842	0.4843	2.075	0.824	1.16	0.234	2.218	0.317018	0.345962	0.109676
4/1/2021	1	2.06	2.33	2.34	2.27	1.83	1.9	0.31386722	0.367356	0.369216	0.356026	0.262451	0.278754	2.05	0.824	1.165	0.234	2.223	0.311754	0.346939	0.10816
7/1/2021	1	2.05	2.31	2.32	2.24	1.83	1.9	0.311753861	0.363612	0.365488	0.350248	0.262451	0.278754	2.035	0.82	1.155	0.232	2.207	0.308564	0.343802	0.106085

10/1/2021	1	2.12	2.36	2.36	2.34	1.85	1.93	0.326335861	0.372912	0.372912	0.369216	0.267172	0.285557	2.095	0.848	1.18	0.236	2.264	0.321184	0.354876	0.113981
12/30/2021	1	2.07	2.5	2.2	2.4	1.81	1.9	0.315970345	0.39794	0.342423	0.380211	0.257679	0.278754	2.105	0.828	1.25	0.22	2.298	0.323252	0.36135	0.116807
4/1/2022	1	2.12	2.4	2.4	2.38	1.87	3.05	0.326335861	0.380211	0.380211	0.376577	0.271842	0.4843	2.125	0.848	1.2	0.24	2.288	0.327359	0.359456	0.117671
7/1/2022	1	2.12	2.38	2.4	2.36	1.82	1.99	0.326335861	0.376577	0.380211	0.372912	0.260071	0.298853	2.09	0.848	1.19	0.24	2.278	0.320146	0.357554	0.114469
10/1/2022	1	2.12	2.37	2.39	2.34	1.83	1.98	0.326335861	0.374748	0.378398	0.369216	0.262451	0.296665	2.085	0.848	1.185	0.239	2.272	0.319106	0.356408	0.113732
12/30/2022	1	2.12	2.37	2.39	2.34	1.91	1.99	0.326335861	0.374748	0.378398	0.369216	0.281033	0.298853	2.125	0.848	1.185	0.239	2.272	0.327359	0.356408	0.116673
4/1/2014	2	2.16	2.4	2.4	2.36	1.96	2.06	0.334453751	0.380211	0.380211	0.372912	0.292256	0.313867	2.16	0.864	1.2	0.24	2.304	0.334454	0.362482	0.121234
7/1/2014	2	2.19	2.41	2.41	2.37	2	2.08	0.340444115	0.382017	0.382017	0.374748	0.30103	0.318063	2.185	0.876	1.205	0.241	2.322	0.339451	0.365862	0.124192
10/1/2014	2	2.19	2.4	2.42	2.36	2	2.08	0.340444115	0.380211	0.383815	0.372912	0.30103	0.318063	2.18	0.876	1.2	0.242	2.318	0.338456	0.365113	0.123575
12/30/2014	2	2.12	2.37	2.4	2.3	2	2.05	0.326335861	0.374748	0.380211	0.361728	0.30103	0.311754	2.15	0.848	1.185	0.24	2.273	0.332438	0.356599	0.118547
4/1/2015	2	2.1	2.35	2.37	2.28	2	2.04	0.322219295	0.371068	0.374748	0.357935	0.30103	0.30963	2.14	0.84	1.175	0.237	2.252	0.330414	0.352568	0.116493
7/1/2015	2	2.11	2.35	2.37	2.3	1.99	2.02	0.324282455	0.371068	0.374748	0.361728	0.298853	0.305351	2.145	0.844	1.175	0.237	2.256	0.331427	0.353339	0.117106
10/1/2015	2	2.11	2.36	2.38	2.29	2	2.03	0.324282455	0.372912	0.376577	0.359835	0.30103	0.307496	2.145	0.844	1.18	0.238	2.262	0.331427	0.354493	0.117489
12/30/2015	2	2.19	2.39	2.4	2.34	2.07	2.12	0.340444115	0.378398	0.380211	0.369216	0.31597	0.326336	2.205	0.876	1.195	0.24	2.311	0.343409	0.3638	0.124932
4/1/2016	2	2.16	2.38	2.39	2.31	2.04	2.1	0.334453751	0.376577	0.378398	0.363612	0.30963	0.322219	2.175	0.864	1.19	0.239	2.293	0.337459	0.360404	0.121622
7/1/2016	2	2.12	2.38	2.39	2.31	2.02	2.08	0.326335861	0.376577	0.378398	0.363612	0.305351	0.318063	2.165	0.848	1.19	0.239	2.277	0.335458	0.357363	0.11988
10/1/2016	2	2.09	2.37	2.37	2.29	2.01	2.04	0.320146286	0.374748	0.374748	0.359835	0.303196	0.30963	2.15	0.836	1.185	0.237	2.258	0.332438	0.353724	0.117591
12/30/2016	2	2.1	2.37	2.37	2.28	2.04	2.06	0.322219295	0.374748	0.374748	0.357935	0.30963	0.313867	2.16	0.84	1.185	0.237	2.262	0.334454	0.354493	0.118561
4/1/2017	2	2.1	2.35	2.37	2.27	2.05	2.07	0.322219295	0.371068	0.374748	0.356026	0.311754	0.31597	2.16	0.84	1.175	0.237	2.252	0.334454	0.352568	0.117918
7/1/2017	2	2.11	2.34	2.37	2.28	2.07	2.09	0.324282455	0.369216	0.374748	0.357935	0.31597	0.320146	2.175	0.844	1.17	0.237	2.251	0.337459	0.352375	0.118912
10/1/2017	2	2.1	2.37	2.38	2.3	2.07	2.09	0.322219295	0.374748	0.376577	0.361728	0.31597	0.320146	2.185	0.84	1.185	0.238	2.263	0.339451	0.354685	0.120398
12/30/2017	2	2.11	2.37	2.38	2.3	2.06	2.08	0.324282455	0.374748	0.376577	0.361728	0.313867	0.318063	2.18	0.844	1.185	0.238	2.267	0.338456	0.355452	0.120305
4/1/2018	2	2.13	2.38	2.39	2.32	2.06	2.09	0.328379603	0.376577	0.378398	0.365488	0.313867	0.320146	2.19	0.852	1.19	0.239	2.281	0.340444	0.358125	0.121922
7/1/2018	2	2.14	2.37	2.39	2.31	2.08	2.1	0.330413773	0.374748	0.378398	0.363612	0.318063	0.322219	2.195	0.856	1.185	0.239	2.28	0.341435	0.357935	0.122211
10/1/2018	2	2.16	2.38	2.39	2.34	2.1	2.12	0.334453751	0.376577	0.378398	0.369216	0.322219	0.326336	2.22	0.864	1.19	0.239	2.293	0.346353	0.360404	0.124827
12/30/2018	2	2.25	2.39	2.4	2.36	2.16	2.2	0.352182518	0.378398	0.380211	0.372912	0.334454	0.342423	2.26	0.9	1.195	0.24	2.335	0.354108	0.368287	0.130413
4/1/2019	2	2.26	2.39	2.39	2.36	2.2	2.24	0.354108439	0.378398	0.378398	0.372912	0.342423	0.350248	2.28	0.904	1.195	0.239	2.338	0.357935	0.368845	0.132022
7/1/2019	2	2.27	2.41	2.41	2.38	2.22	2.25	0.356025857	0.382017	0.382017	0.376577	0.346353	0.352183	2.3	0.908	1.205	0.241	2.354	0.361728	0.371806	0.134493
10/1/2019	2	2.29	2.41	2.42	2.38	1.9	2.28	0.359835482	0.382017	0.383815	0.376577	0.278754	0.357935	2.14	0.916	1.205	0.242	2.363	0.330414	0.373464	0.123398
12/30/2019	2	1.5	2.42	2.43	2.39	2.26	2.29	0.176091259	0.383815	0.385606	0.378398	0.354108	0.359835	2.325	0.6	1.21	0.243	2.053	0.366423	0.312389	0.114466
4/1/2020	2	2.34	2.42	2.43	2.4	2.26	2.3	0.369215857	0.383815	0.385606	0.380211	0.354108	0.361728	2.33	0.936	1.21	0.243	2.389	0.367356	0.378216	0.13894
7/1/2020	2	2.33	2.43	2.43	2.4	2.26	2.29	0.367355921	0.385606	0.385606	0.380211	0.354108	0.359835	2.33	0.932	1.215	0.243	2.39	0.367356	0.378398	0.139007
10/1/2020	2	2.33	2.42	2.43	2.39	2.26	2.3	0.367355921	0.383815	0.385606	0.378398	0.354108	0.361728	2.325	0.932	1.21	0.243	2.385	0.366423	0.377488	0.13832
12/30/2020	2	2.36	1.8	2.44	2.42	2.26	3.2	0.372912003	0.255273	0.38739	0.383815	0.354108	0.50515	2.34	0.944	0.9	0.244	2.088	0.369216	0.31973	0.11805

4/1/2021	2	2.36	2.44	2.44	2.42	2.24	2.3	0.372912003	0.38739	0.38739	0.383815	0.350248	0.361728	2.33	0.944	1.22	0.244	2.408	0.367356	0.381656	0.140204
7/1/2021	2	2.35	2.44	2.44	2.4	2.25	2.28	0.371067862	0.38739	0.38739	0.380211	0.352183	0.357935	2.325	0.94	1.22	0.244	2.404	0.366423	0.380934	0.139583
10/1/2021	2	2.34	2.43	2.43	2.39	2.25	2.27	0.369215857	0.385606	0.385606	0.378398	0.352183	0.356026	2.32	0.936	1.215	0.243	2.394	0.365488	0.379124	0.138565
12/30/2021	2	2.31	2.43	2.43	2.39	2.24	2.27	0.36361198	0.385606	0.385606	0.378398	0.350248	0.356026	2.315	0.924	1.215	0.243	2.382	0.364551	0.376942	0.137414
4/1/2022	2	2.32	2.43	2.43	2.4	2.25	2.28	0.365487985	0.385606	0.385606	0.380211	0.352183	0.357935	2.325	0.928	1.215	0.243	2.386	0.366423	0.37767	0.138387
7/1/2022	2	2.35	2.44	2.44	2.41	2.26	2.3	0.371067862	0.38739	0.38739	0.382017	0.354108	0.361728	2.335	0.94	1.22	0.244	2.404	0.368287	0.380934	0.140293
10/1/2022	2	2.35	2.43	2.44	2.4	2.27	1.7	0.371067862	0.385606	0.38739	0.380211	0.356026	0.230449	2.335	0.94	1.215	0.244	2.399	0.368287	0.38003	0.13996
12/30/2022	2	2.36	2.42	2.43	2.4	2.29	2.34	0.372912003	0.383815	0.385606	0.380211	0.359835	0.369216	2.345	0.944	1.21	0.243	2.397	0.370143	0.379668	0.140531
4/1/2014	3	2.39	2.43	2.43	2.41	2.35	2.37	0.378397901	0.385606	0.385606	0.382017	0.371068	0.374748	2.38	0.956	1.215	0.243	2.414	0.376577	0.382737	0.14413
7/1/2014	3	2.37	2.43	2.43	2.41	2.34	2.37	0.374748346	0.385606	0.385606	0.382017	0.369216	0.374748	2.375	0.948	1.215	0.243	2.406	0.375664	0.381296	0.143239
10/1/2014	3	2.39	2.44	2.44	2.42	2.37	2.39	0.378397901	0.38739	0.38739	0.383815	0.374748	0.378398	2.395	0.956	1.22	0.244	2.42	0.379306	0.383815	0.145583
12/30/2014	3	2.4	2.44	2.44	2.42	2.37	2.39	0.380211242	0.38739	0.38739	0.383815	0.374748	0.378398	2.395	0.96	1.22	0.244	2.424	0.379306	0.384533	0.145855
4/1/2015	3	2.4	2.44	2.44	2.42	2.37	2.38	0.380211242	0.38739	0.38739	0.383815	0.374748	0.376577	2.395	0.96	1.22	0.244	2.424	0.379306	0.384533	0.145855
7/1/2015	3	2.39	2.44	2.44	2.42	2.36	2.37	0.378397901	0.38739	0.38739	0.383815	0.372912	0.374748	2.39	0.956	1.22	0.244	2.42	0.378398	0.383815	0.145235
10/1/2015	3	2.38	2.44	2.44	2.42	2.34	2.35	0.376576957	0.38739	0.38739	0.383815	0.369216	0.371068	2.38	0.952	1.22	0.244	2.416	0.376577	0.383097	0.144265
12/30/2015	3	2.38	2.44	2.44	2.42	2.35	2.36	0.376576957	0.38739	0.38739	0.383815	0.371068	0.372912	2.385	0.952	1.22	0.244	2.416	0.377488	0.383097	0.144615
4/1/2016	3	2.4	2.45	2.45	2.44	2.35	2.37	0.380211242	0.389166	0.389166	0.38739	0.371068	0.374748	2.395	0.96	1.225	0.245	2.43	0.379306	0.385606	0.146263
7/1/2016	3	2.44	2.46	2.46	2.45	2.37	2.4	0.387389826	0.390935	0.390935	0.389166	0.374748	0.380211	2.41	0.976	1.23	0.246	2.452	0.382017	0.38952	0.148803
10/1/2016	3	2.46	2.47	2.46	2.47	2.39	2.43	0.390935107	0.392697	0.390935	0.392697	0.378398	0.385606	2.43	0.984	1.235	0.246	2.465	0.385606	0.391817	0.151087
12/30/2016	3	2.47	2.49	2.48	2.5	2.41	2.44	0.392696953	0.396199	0.394452	0.39794	0.382017	0.38739	2.455	0.988	1.245	0.248	2.481	0.390051	0.394627	0.153925
4/1/2017	3	2.55	2.53	2.5	2.55	2.48	2.52	0.40654018	0.403121	0.39794	0.40654	0.394452	0.401401	2.515	1.02	1.265	0.25	2.535	0.400538	0.403978	0.161809
7/1/2017	3	2.59	2.53	2.51	2.58	2.52	2.55	0.413299764	0.403121	0.399674	0.41162	0.401401	0.40654	2.55	1.036	1.265	0.251	2.552	0.40654	0.406881	0.165413
10/1/2017	3	1.7	2.57	2.55	2.61	2.54	2.57	0.230448921	0.409933	0.40654	0.416641	0.404834	0.409933	2.575	0.68	1.285	0.255	2.22	0.410777	0.346353	0.142274
12/30/2017	3	2.6	2.58	2.55	2.59	2.52	2.56	0.414973348	0.41162	0.40654	0.4133	0.401401	0.40824	2.555	1.04	1.29	0.255	2.585	0.407391	0.412461	0.168033
4/1/2018	3	2.59	2.56	2.54	1.75	2.53	2.56	0.413299764	0.40824	0.404834	0.243038	0.403121	0.40824	2.14	1.036	1.28	0.254	2.57	0.330414	0.409933	0.135448
7/1/2018	3	2.6	2.56	2.55	2.59	2.53	1	0.414973348	0.40824	0.40654	0.4133	0.403121	0	2.56	1.04	1.28	0.255	2.575	0.40824	0.410777	0.167696
10/1/2018	3	2.6	2.57	2.55	2.6	2.5	2.54	0.414973348	0.409933	0.40654	0.414973	0.39794	0.404834	2.55	1.04	1.285	0.255	2.58	0.40654	0.41162	0.16734
12/30/2018	3	2.64	1.7	2.58	2.64	2.57	2.6	0.421603927	0.230449	0.41162	0.421604	0.409933	0.414973	2.605	1.056	0.85	0.258	2.164	0.415808	0.335257	0.139403
4/1/2019	3	2.71	2.65	2.6	2.7	2.6	2.66	0.432969291	0.423246	0.414973	0.431364	0.414973	0.424882	2.65	1.084	1.325	0.26	2.669	0.423246	0.426349	0.18045
7/1/2019	3	2.76	2.64	2.6	2.7	2.68	2.76	0.440909082	0.421604	0.414973	0.431364	0.428135	0.440909	2.69	1.104	1.32	0.26	2.684	0.429752	0.428783	0.18427
10/1/2019	3	2.72	2.61	2.57	2.66	2.68	2.73	0.434568904	0.416641	0.409933	0.424882	0.428135	0.436163	2.67	1.088	1.305	0.257	2.65	0.426511	0.423246	0.180519
12/30/2019	3	2.71	2.64	2.58	2.68	2.67	2.71	0.432969291	0.421604	0.41162	0.428135	0.426511	0.432969	2.675	1.084	1.32	0.258	2.662	0.427324	0.425208	0.181702
4/1/2020	3	2.65	2.58	2.56	2.61	2.6	2.62	0.423245874	0.41162	0.40824	0.416641	0.414973	0.418301	2.605	1.06	1.29	0.256	2.606	0.415808	0.415974	0.172965
7/1/2020	3	2.56	2.52	2.51	2.55	2.55	2.56	0.408239965	0.401401	0.399674	0.40654	0.40654	0.40824	2.55	1.024	1.26	0.251	2.535	0.40654	0.403978	0.164233

10/1/2020	3	2.55	2.53	2.53	2.56	2.52	2.52	0.40654018	0.403121	0.403121	0.40824	0.401401	0.401401	2.54	1.02	1.265	0.253	2.538	0.404834	0.404492	0.163752
12/30/2020	3	2.47	2.51	2.52	2.51	2.45	2.44	0.392696953	0.399674	0.401401	0.399674	0.389166	0.38739	2.48	0.988	1.255	0.252	2.495	0.394452	0.397071	0.156625
4/1/2021	3	2.41	2.52	2.53	2.51	2.35	2.36	0.382017043	0.401401	0.403121	0.399674	0.371068	0.372912	2.43	0.964	1.26	0.253	2.477	0.385606	0.393926	0.1519
7/1/2021	3	2.42	2.7	2.6	2.56	2.4	2.3	0.383815366	0.431364	0.414973	0.40824	0.380211	0.361728	2.48	0.968	1.35	0.26	2.578	0.394452	0.411283	0.162231
10/1/2021	3	2.5	2.61	2.61	2.61	2.26	2.36	0.397940009	0.416641	0.416641	0.416641	0.354108	0.372912	2.435	1	1.305	0.261	2.566	0.386499	0.409257	0.158177
12/30/2021	3	2.61	2.64	2.61	2.65	2.44	2.55	0.416640507	0.421604	0.416641	0.423246	0.38739	0.40654	2.545	1.044	1.32	0.261	2.625	0.405688	0.419129	0.170036
4/1/2022	3	2.64	2.66	2.63	2.67	2.45	2.57	0.421603927	0.424882	0.419956	0.426511	0.389166	0.409933	2.56	1.056	1.33	0.263	2.649	0.40824	0.423082	0.172719
7/1/2022	3	2.66	2.67	2.64	2.69	2.49	2.6	0.424881637	0.426511	0.421604	0.429752	0.396199	0.414973	2.59	1.064	1.335	0.264	2.663	0.4133	0.425371	0.175806
10/1/2022	3	2.68	2.7	2.68	2.72	2.52	2.62	0.428134794	0.431364	0.428135	0.434569	0.401401	0.418301	2.62	1.072	1.35	0.268	2.69	0.418301	0.429752	0.179766
12/30/2022	3	2.72	2.75	2.73	2.75	2.55	2.66	0.434568904	0.439333	0.436163	0.439333	0.40654	0.424882	2.65	1.088	1.375	0.273	2.736	0.423246	0.437116	0.185008
4/1/2014	4	2.74	2.74	2.72	2.75	2.6	2.7	0.437750563	0.437751	0.434569	0.439333	0.414973	0.431364	2.675	1.096	1.37	0.272	2.738	0.427324	0.437433	0.186926
7/1/2014	4	2.69	2.71	2.68	2.71	2.61	2.66	0.42975228	0.432969	0.428135	0.432969	0.416641	0.424882	2.66	1.076	1.355	0.268	2.699	0.424882	0.431203	0.18321
10/1/2014	4	2.69	2.72	2.68	2.72	2.61	2.64	0.42975228	0.434569	0.428135	0.434569	0.416641	0.421604	2.665	1.076	1.36	0.268	2.704	0.425697	0.432007	0.183904
12/30/2014	4	2.72	2.75	2.72	2.75	2.64	2.67	0.434568904	0.439333	0.434569	0.439333	0.421604	0.426511	2.695	1.088	1.375	0.272	2.735	0.430559	0.436957	0.188136
4/1/2015	4	2.74	2.73	2.7	2.74	2.68	2.7	0.437750563	0.436163	0.431364	0.437751	0.428135	0.431364	2.71	1.096	1.365	0.27	2.731	0.432969	0.436322	0.188914
7/1/2015	4	2.81	2.5	2.5	2.6	2.73	2.76	0.44870632	0.39794	0.39794	0.414973	0.436163	0.440909	2.665	1.124	1.25	0.25	2.624	0.425697	0.418964	0.178352
10/1/2015	4	2.79	2.74	2.69	2.77	2.71	2.73	0.445604203	0.437751	0.429752	0.44248	0.432969	0.436163	2.74	1.116	1.37	0.269	2.755	0.437751	0.440122	0.192663
12/30/2015	4	2.73	2.7	2.67	2.72	2.67	2.69	0.436162647	0.431364	0.426511	0.434569	0.426511	0.429752	2.695	1.092	1.35	0.267	2.709	0.430559	0.432809	0.18635
4/1/2016	4	2.69	2.69	2.65	2.7	2.63	2.65	0.42975228	0.429752	0.423246	0.431364	0.419956	0.423246	2.665	1.076	1.345	0.265	2.686	0.425697	0.429106	0.182669
7/1/2016	4	2.7	2.7	2.66	2.7	2.65	2.66	0.431363764	0.431364	0.424882	0.431364	0.423246	0.424882	2.675	1.08	1.35	0.266	2.696	0.427324	0.43072	0.184057
10/1/2016	4	2.72	2.72	2.69	2.71	2.68	2.69	0.434568904	0.434569	0.429752	0.432969	0.428135	0.429752	2.695	1.088	1.36	0.269	2.717	0.430559	0.43409	0.186901
12/30/2016	4	1.9	2.74	2.72	2.73	2.7	2.72	0.278753601	0.437751	0.434569	0.436163	0.431364	0.434569	2.715	0.76	1.37	0.272	2.402	0.43377	0.380573	0.165081
4/1/2017	4	2.82	2.8	2.77	2.81	2.79	2.8	0.450249108	0.447158	0.44248	0.448706	0.445604	0.447158	2.8	1.128	1.4	0.277	2.805	0.447158	0.447933	0.200297
7/1/2017	4	2.85	2.8	2.79	2.83	2.81	2.84	0.45484486	0.447158	0.445604	0.451786	0.448706	0.453318	2.82	1.14	1.4	0.279	2.819	0.450249	0.450095	0.202655
10/1/2017	4	2.86	2.82	2.81	2.85	2.81	2.84	0.456366033	0.450249	0.448706	0.454845	0.448706	0.453318	2.83	1.144	1.41	0.281	2.835	0.451786	0.452553	0.204457
12/30/2017	4	2.85	2.84	2.83	2.86	2.8	2.82	0.45484486	0.453318	0.451786	0.456366	0.447158	0.450249	2.83	1.14	1.42	0.283	2.843	0.451786	0.453777	0.20501
4/1/2018	4	2.83	2.82	2.8	2.84	2.81	2.81	0.451786436	0.450249	0.447158	0.453318	0.448706	0.448706	2.825	1.132	1.41	0.28	2.822	0.451018	0.450557	0.20321
7/1/2018	4	2.86	2.84	2.81	2.88	2.8	2.82	0.456366033	0.453318	0.448706	0.459392	0.447158	0.450249	2.84	1.144	1.42	0.281	2.845	0.453318	0.454082	0.205844
10/1/2018	4	2.95	2.88	2.84	2.91	2.86	2.91	0.469822016	0.459392	0.453318	0.463893	0.456366	0.463893	2.885	1.18	1.44	0.284	2.904	0.460146	0.462997	0.213046
12/30/2018	4	3.03	2.91	2.84	2.95	2.95	2.98	0.481442629	0.463893	0.453318	0.469822	0.469822	0.474216	2.95	1.212	1.455	0.284	2.951	0.469822	0.469969	0.220802
4/1/2019	4	3.02	2.9	2.83	2.95	2.94	2.97	0.480006943	0.462398	0.451786	0.469822	0.468347	0.472756	2.945	1.208	1.45	0.283	2.941	0.469085	0.468495	0.219764
7/1/2019	4	3.06	2.97	2.88	3.02	2.96	2.99	0.485721426	0.472756	0.459392	0.480007	0.471292	0.475671	2.99	1.224	1.485	0.288	2.997	0.475671	0.476687	0.226746
10/1/2019	4	3.03	2.96	2.87	3.02	2.95	2.99	0.481442629	0.471292	0.457882	0.480007	0.469822	0.475671	2.985	1.212	1.48	0.287	2.979	0.474944	0.474071	0.225157
12/30/2019	4	3.07	2.97	2.91	3.02	2.98	3.03	0.487138375	0.472756	0.463893	0.480007	0.474216	0.481443	3	1.228	1.485	0.291	3.004	0.477121	0.4777	0.227921

4/1/2020	4	3.1	3.03	2.93	3.07	3.06	3.07	0.491361694	0.481443	0.466868	0.487138	0.485721	0.487138	3.065	1.24	1.515	0.293	3.048	0.48643	0.484015	0.23544
7/1/2020	4	3.09	3.05	2.93	3.1	3.06	3.05	0.489958479	0.4843	0.466868	0.491362	0.485721	0.4843	3.08	1.236	1.525	0.293	3.054	0.488551	0.484869	0.236883
10/1/2020	4	3.03	2.98	2.9	3.06	2.96	2.98	0.481442629	0.474216	0.462398	0.485721	0.471292	0.474216	3.01	1.212	1.49	0.29	2.992	0.478566	0.475962	0.227779
12/30/2020	4	2.94	2.96	2.91	2.98	2.89	2.88	0.46834733	0.471292	0.463893	0.474216	0.460898	0.459392	2.935	1.176	1.48	0.291	2.947	0.467608	0.46938	0.219486
4/1/2021	4	2.95	2.7	2.8	2.9	2.6	2.89	0.469822016	0.431364	0.447158	0.462398	0.414973	0.460898	2.75	1.18	1.35	0.28	2.81	0.439333	0.448706	0.197131
7/1/2021	4	3.05	3.07	2.98	3.08	2.92	2.95	0.484299839	0.487138	0.474216	0.488551	0.465383	0.469822	3	1.22	1.535	0.298	3.053	0.477121	0.484727	0.231273
10/1/2021	4	3.02	3.06	2.99	3.06	2.9	2.93	0.480006943	0.485721	0.475671	0.485721	0.462398	0.466868	2.98	1.208	1.53	0.299	3.037	0.474216	0.482445	0.228783
12/30/2021	4	2.96	3.01	2.93	3.03	2.86	2.87	0.471291711	0.478566	0.466868	0.481443	0.456366	0.457882	2.945	1.184	1.505	0.293	2.982	0.469085	0.474508	0.222585
4/1/2022	4	2.94	3.02	2.96	3.02	2.86	2.88	0.46834733	0.480007	0.471292	0.480007	0.456366	0.459392	2.94	1.176	1.51	0.296	2.982	0.468347	0.474508	0.222234
7/1/2022	4	1.5	3	2.93	1.56	2.81	2.87	0.176091259	0.477121	0.466868	0.193125	0.448706	0.457882	2.185	0.6	1.5	0.293	2.393	0.339451	0.378943	0.128633
10/1/2022	4	2.86	2.99	2.93	2.96	2.78	2.83	0.456366033	0.475671	0.466868	0.471292	0.444045	0.451786	2.87	1.144	1.495	0.293	2.932	0.457882	0.467164	0.213906
12/30/2022	4	2.71	2.92	2.88	2.87	2.66	2.69	0.432969291	0.465383	0.459392	0.457882	0.424882	0.429752	2.765	1.084	1.46	0.288	2.832	0.441695	0.452093	0.199687
4/1/2014	5	2.61	2.85	2.84	2.78	2.58	2.59	0.416640507	0.454845	0.453318	0.444045	0.41162	0.4133	2.68	1.044	1.425	0.284	2.753	0.428135	0.439806	0.188296
7/1/2014	5	2.52	2.83	2.82	2.77	2.49	2.5	0.401400541	0.451786	0.450249	0.44248	0.396199	0.39794	2.63	1.008	1.415	0.282	2.705	0.419956	0.432167	0.181491
10/1/2014	5	2.36	2.81	2.81	2.72	2.31	2.33	0.372912003	0.448706	0.448706	0.434569	0.363612	0.367356	2.515	0.944	1.405	0.281	2.63	0.400538	0.419956	0.168208
12/30/2014	5	2.31	2.74	2.78	2.61	2.22	2.25	0.36361198	0.437751	0.444045	0.416641	0.346353	0.352183	2.415	0.924	1.37	0.278	2.572	0.382917	0.410271	0.1571
4/1/2015	5	2.46	2.76	2.79	2.73	2.35	2.39	0.390935107	0.440909	0.445604	0.436163	0.371068	0.378398	2.54	0.984	1.38	0.279	2.643	0.404834	0.422097	0.170879
7/1/2015	5	2.62	2.85	2.84	2.84	2.42	2.47	0.418301291	0.454845	0.453318	0.453318	0.383815	0.392697	2.63	1.048	1.425	0.284	2.757	0.419956	0.440437	0.184964
10/1/2015	5	2.73	2.87	2.85	2.88	2.56	2.6	0.436162647	0.457882	0.454845	0.459392	0.40824	0.414973	2.72	1.092	1.435	0.285	2.812	0.434569	0.449015	0.195128
12/30/2015	5	2.8	2.91	2.85	2.92	2.69	2.73	0.447158031	0.463893	0.454845	0.465383	0.429752	0.436163	2.805	1.12	1.455	0.285	2.86	0.447933	0.456366	0.204421
4/1/2016	5	2.76	2.88	2.84	2.88	2.6	2.65	0.440909082	0.459392	0.453318	0.459392	0.414973	0.423246	2.74	1.104	1.44	0.284	2.828	0.437751	0.451479	0.197635
7/1/2016	5	2.69	2.81	2.8	2.81	2.55	2.6	0.42975228	0.448706	0.447158	0.448706	0.40654	0.414973	2.68	1.076	1.405	0.28	2.761	0.428135	0.441066	0.188836
10/1/2016	5	2.59	2.78	2.78	2.78	2.5	2.53	0.413299764	0.444045	0.444045	0.444045	0.39794	0.403121	2.64	1.036	1.39	0.278	2.704	0.421604	0.432007	0.182136
12/30/2016	5	2.54	2.76	2.77	2.75	2.44	2.48	0.404833717	0.440909	0.44248	0.439333	0.38739	0.394452	2.595	1.016	1.38	0.277	2.673	0.414137	0.426999	0.176836
4/1/2017	5	2.53	2.78	2.79	2.74	2.39	2.44	0.403120521	0.444045	0.445604	0.437751	0.378398	0.38739	2.565	1.012	1.39	0.279	2.681	0.409087	0.428297	0.175211
7/1/2017	5	1.4	2.78	2.79	2.72	2.22	2.3	0.146128036	0.444045	0.445604	0.434569	0.346353	0.361728	2.47	0.56	1.39	0.279	2.229	0.392697	0.34811	0.136702
10/1/2017	5	2.45	2.81	2.8	2.74	2.16	2.29	0.389166084	0.448706	0.447158	0.437751	0.334454	0.359835	2.45	0.98	1.405	0.28	2.665	0.389166	0.425697	0.165667
12/30/2017	5	2.54	2.8	2.8	2.77	2.32	2.42	0.404833717	0.447158	0.447158	0.44248	0.365488	0.383815	2.545	1.016	1.4	0.28	2.696	0.405688	0.43072	0.174738
4/1/2018	5	2.6	2.82	2.82	2.82	2.31	2.44	0.414973348	0.450249	0.450249	0.450249	0.363612	0.38739	2.565	1.04	1.41	0.282	2.732	0.409087	0.436481	0.178559
7/1/2018	5	2.53	2.81	2.8	2.77	2.31	2.42	0.403120521	0.448706	0.447158	0.44248	0.363612	0.383815	2.54	1.012	1.405	0.28	2.697	0.404834	0.430881	0.174435
10/1/2018	5	2.6	2.81	2.79	2.78	2.36	2.47	0.414973348	0.448706	0.445604	0.444045	0.372912	0.392697	2.57	1.04	1.405	0.279	2.724	0.409933	0.435207	0.178406
12/30/2018	5	2.6	2.81	2.79	2.79	2.38	2.5	0.414973348	0.448706	0.445604	0.445604	0.376577	0.39794	2.585	1.04	1.405	0.279	2.724	0.412461	0.435207	0.179506
4/1/2019	5	2.61	2.83	2.78	2.8	2.39	2.52	0.416640507	0.451786	0.444045	0.447158	0.378398	0.401401	2.595	1.044	1.415	0.278	2.737	0.414137	0.437275	0.181092
7/1/2019	5	1.7	2.88	2.8	2.83	2.54	2.64	0.230448921	0.459392	0.447158	0.451786	0.404834	0.421604	2.685	0.68	1.44	0.28	2.4	0.428944	0.380211	0.163089

10/1/2019	5	2.71	2.5	2.9	1.5	2.4	1.9	0.432969291	0.39794	0.462398	0.176091	0.380211	0.278754	1.95	1.084	1.25	0.29	2.624	0.290035	0.418964	0.121514
12/30/2019	5	2.66	2.84	2.76	2.81	2.56	2.63	0.424881637	0.453318	0.440909	0.448706	0.40824	0.419956	2.685	1.064	1.42	0.276	2.76	0.428944	0.440909	0.189125
4/1/2020	5	2.71	2.85	2.79	2.82	2.62	2.67	0.432969291	0.454845	0.445604	0.450249	0.418301	0.426511	2.72	1.084	1.425	0.279	2.788	0.434569	0.445293	0.19351
7/1/2020	5	2.77	2.87	2.91	2.85	2.69	2.73	0.442479769	0.457882	0.463893	0.454845	0.429752	0.436163	2.77	1.108	1.435	0.291	2.834	0.44248	0.4524	0.200178
10/1/2020	5	1.8	2.89	2.93	2.89	2.72	2.76	0.255272505	0.460898	0.466868	0.460898	0.434569	0.440909	2.805	0.72	1.445	0.293	2.458	0.447933	0.390582	0.174954
12/30/2020	5	2.92	1.9	2.93	2.92	2.81	2.87	0.465382851	0.278754	0.466868	0.465383	0.448706	0.457882	2.865	1.168	0.95	0.293	2.411	0.457125	0.382197	0.174712
4/1/2021	5	2.92	2.9	2.93	2.9	2.83	2.87	0.465382851	0.462398	0.466868	0.462398	0.451786	0.457882	2.865	1.168	1.45	0.293	2.911	0.457125	0.464042	0.212125
7/1/2021	5	2.93	2.92	2.94	2.92	2.85	2.89	0.46686762	0.465383	0.468347	0.465383	0.454845	0.460898	2.885	1.172	1.46	0.294	2.926	0.460146	0.466274	0.214554
10/1/2021	5	2.99	2.93	2.95	2.9	2.97	2.98	0.475671188	0.466868	0.469822	0.462398	0.472756	0.474216	2.935	1.196	1.465	0.295	2.956	0.467608	0.470704	0.220105
12/30/2021	5	3.13	2.96	2.99	2.99	3.08	3.09	0.495544338	0.471292	0.475671	0.475671	0.488551	0.489958	3.035	1.252	1.48	0.299	3.031	0.482159	0.481586	0.232201
4/1/2022	5	3.18	3	3.03	3.03	3.16	3.16	0.50242712	0.477121	0.481443	0.481443	0.499687	0.499687	3.095	1.272	1.5	0.303	3.075	0.490661	0.487845	0.239366
7/1/2022	5	1.3	2.96	2.98	2.95	3.12	3.13	0.113943352	0.471292	0.474216	0.469822	0.494155	0.495544	3.035	0.52	1.48	0.298	2.298	0.482159	0.36135	0.174228
10/1/2022	5	3	2.92	2.97	2.91	2.98	2.99	0.477121255	0.465383	0.472756	0.463893	0.474216	0.475671	2.945	1.2	1.46	0.297	2.957	0.469085	0.470851	0.220869
12/30/2022	5	3.02	2.91	2.99	2.93	3.06	3.07	0.480006943	0.463893	0.475671	0.466868	0.485721	0.487138	2.995	1.208	1.455	0.299	2.962	0.476397	0.471585	0.224662
4/1/2014	6	2.98	2.91	2.99	2.92	3.01	3.02	0.474216264	0.463893	0.475671	0.465383	0.478566	0.480007	2.965	1.192	1.455	0.299	2.946	0.472025	0.469233	0.221489
7/1/2014	6	3	2.94	3.01	2.94	3.05	3.03	0.477121255	0.468347	0.478566	0.468347	0.4843	0.481443	2.995	1.2	1.47	0.301	2.971	0.476397	0.472903	0.225289
10/1/2014	6	2.93	2.94	3.01	2.92	2.96	2.94	0.46686762	0.468347	0.478566	0.465383	0.471292	0.468347	2.94	1.172	1.47	0.301	2.943	0.468347	0.46879	0.219557
12/30/2014	6	3.05	2.98	3.05	2.99	3.07	3.06	0.484299839	0.474216	0.4843	0.475671	0.487138	0.485721	3.03	1.22	1.49	0.305	3.015	0.481443	0.479287	0.230749
4/1/2015	6	3.15	3.02	3.08	3.07	3.12	3.12	0.498310554	0.480007	0.488551	0.487138	0.494155	0.494155	3.095	1.26	1.51	0.308	3.078	0.490661	0.488269	0.239574
7/1/2015	6	3.17	3.03	3.1	3.1	3.11	3.13	0.501059262	0.481443	0.491362	0.491362	0.49276	0.495544	3.105	1.268	1.515	0.31	3.093	0.492062	0.49038	0.241297
10/1/2015	6	3.16	3.02	3.09	3.09	3.07	3.09	0.499687083	0.480007	0.489958	0.489958	0.487138	0.489958	3.08	1.264	1.51	0.309	3.083	0.488551	0.488974	0.238888
12/30/2015	6	3.17	3.06	3.11	1.9	3.02	3.07	0.501059262	0.485721	0.49276	0.278754	0.480007	0.487138	2.46	1.268	1.53	0.311	3.109	0.390935	0.492621	0.192583
4/1/2016	6	3.24	3.08	3.15	3.16	3.19	3.21	0.51054501	0.488551	0.498311	0.499687	0.503791	0.506505	3.175	1.296	1.54	0.315	3.151	0.501744	0.498448	0.250093
7/1/2016	6	3.18	3.08	3.15	3.12	3.09	3.14	0.50242712	0.488551	0.498311	0.494155	0.489958	0.49693	3.105	1.272	1.54	0.315	3.127	0.492062	0.495128	0.243633
10/1/2016	6	3.09	3.07	3.12	3.08	3.01	3.05	0.489958479	0.487138	0.494155	0.488551	0.478566	0.4843	3.045	1.236	1.535	0.312	3.083	0.483587	0.488974	0.236461
12/30/2016	6	3.04	3.04	3.08	3.04	3.01	3.02	0.482873584	0.482874	0.488551	0.482874	0.478566	0.480007	3.025	1.216	1.52	0.308	3.044	0.480725	0.483445	0.232404
4/1/2017	6	2.99	3.01	3.07	2.99	2.97	2.96	0.475671188	0.478566	0.487138	0.475671	0.472756	0.471292	2.98	1.196	1.505	0.307	3.008	0.474216	0.478278	0.226807
7/1/2017	6	2.92	3.01	3.06	3	2.83	2.85	0.465382851	0.478566	0.485721	0.477121	0.451786	0.454845	2.915	1.168	1.505	0.306	2.979	0.464639	0.474071	0.220271
10/1/2017	6	2.79	3	3.04	2.96	2.7	2.73	0.445604203	0.477121	0.482874	0.471292	0.431364	0.436163	2.83	1.116	1.5	0.304	2.92	0.451786	0.465383	0.210254
12/30/2017	6	2.81	3.05	3.08	2.99	2.7	2.73	0.44870632	0.4843	0.488551	0.475671	0.431364	0.436163	2.845	1.124	1.525	0.308	2.957	0.454082	0.470851	0.213805
4/1/2018	6	2.93	3.11	3.12	3.08	2.72	2.79	0.46686762	0.49276	0.494155	0.488551	0.434569	0.445604	2.9	1.172	1.555	0.312	3.039	0.462398	0.482731	0.223214
7/1/2018	6	2.85	3.09	3.11	3.04	2.65	2.72	0.45484486	0.489958	0.49276	0.482874	0.423246	0.434569	2.845	1.14	1.545	0.311	2.996	0.454082	0.476542	0.216389
10/1/2018	6	2.84	3.06	3.08	3.02	2.68	2.72	0.45331834	0.485721	0.488551	0.480007	0.428135	0.434569	2.85	1.136	1.53	0.308	2.974	0.454845	0.473341	0.215297
12/30/2018	6	2.96	3.09	3.1	3.07	2.81	2.87	0.471291711	0.489958	0.491362	0.487138	0.448706	0.457882	2.94	1.184	1.545	0.31	3.039	0.468347	0.482731	0.226086

4/1/2019	6	1.9	3.13	3.14	3.12	2.86	2.94	0.278753601	0.495544	0.49693	0.494155	0.456366	0.468347	2.99	0.76	1.565	0.314	2.639	0.475671	0.421439	0.200467
7/1/2019	6	3.05	3.13	3.15	3.12	2.86	2.93	0.484299839	0.495544	0.498311	0.494155	0.456366	0.466868	2.99	1.22	1.565	0.315	3.1	0.475671	0.491362	0.233727
10/1/2019	6	2.94	3.1	3.12	3.08	2.79	2.83	0.46834733	0.491362	0.494155	0.488551	0.445604	0.451786	2.935	1.176	1.55	0.312	3.038	0.467608	0.482588	0.225662
12/30/2019	6	2.87	3.09	3.11	3.05	2.7	2.76	0.457881897	0.489958	0.49276	0.4843	0.431364	0.440909	2.875	1.148	1.545	0.311	3.004	0.458638	0.4777	0.219091
4/1/2020	6	2.89	3.08	3.11	3.05	2.69	2.77	0.460897843	0.488551	0.49276	0.4843	0.429752	0.44248	2.87	1.156	1.54	0.311	3.007	0.457882	0.478133	0.218929
7/1/2020	6	2.76	3.05	3.08	3.01	2.58	2.64	0.440909082	0.4843	0.488551	0.478566	0.41162	0.421604	2.795	1.104	1.525	0.308	2.937	0.446382	0.467904	0.208864
10/1/2020	6	2.78	3.05	3.08	3.01	2.59	2.65	0.444044796	0.4843	0.488551	0.478566	0.4133	0.423246	2.8	1.112	1.525	0.308	2.945	0.447158	0.469085	0.209755
12/30/2020	6	2.83	3.05	3.08	3.6	2.61	1.8	0.451786436	0.4843	0.488551	0.556303	0.416641	0.255273	3.105	1.132	1.525	0.308	2.965	0.492062	0.472025	0.232265
4/1/2021	6	2.78	3.02	3.06	2.98	2.58	2.64	0.444044796	0.480007	0.485721	0.474216	0.41162	0.421604	2.78	1.112	1.51	0.306	2.928	0.444045	0.466571	0.207178
7/1/2021	6	2.86	2.8	3.1	3.03	2.65	2.9	0.456366033	0.447158	0.491362	0.481443	0.423246	0.462398	2.84	1.144	1.4	0.31	2.854	0.453318	0.455454	0.206466
10/1/2021	6	2.87	3.06	3.08	3.03	2.69	2.75	0.457881897	0.485721	0.488551	0.481443	0.429752	0.439333	2.86	1.148	1.53	0.308	2.986	0.456366	0.47509	0.216815
12/30/2021	6	2.82	3.06	3.08	3.01	2.65	2.71	0.450249108	0.485721	0.488551	0.478566	0.423246	0.432969	2.83	1.128	1.53	0.308	2.966	0.451786	0.472171	0.213321
4/1/2022	6	2.79	3.05	3.07	2.99	2.64	2.69	0.445604203	0.4843	0.487138	0.475671	0.421604	0.429752	2.815	1.116	1.525	0.307	2.948	0.449478	0.469527	0.211042
7/1/2022	6	2.76	3.03	3.05	2.96	2.63	2.67	0.440909082	0.481443	0.4843	0.471292	0.419956	0.426511	2.795	1.104	1.515	0.305	2.924	0.446382	0.465977	0.208004
10/1/2022	6	2.7	3	3.04	2.91	2.59	2.62	0.431363764	0.477121	0.482874	0.463893	0.4133	0.418301	2.75	1.08	1.5	0.304	2.884	0.439333	0.459995	0.202091
12/30/2022	6	2.67	2.99	3.03	2.87	2.56	2.59	0.426511261	0.475671	0.481443	0.457882	0.40824	0.4133	2.715	1.068	1.495	0.303	2.866	0.43377	0.457276	0.198353
4/1/2014	7	2.59	2.93	2.99	2.81	2.47	2.51	0.413299764	0.466868	0.475671	0.448706	0.392697	0.399674	2.64	1.036	1.465	0.299	2.8	0.421604	0.447158	0.188524
7/1/2014	7	2.67	2.98	3.01	2.88	2.53	2.57	0.426511261	0.474216	0.478566	0.459392	0.403121	0.409933	2.705	1.068	1.49	0.301	2.859	0.432167	0.456214	0.197161
10/1/2014	7	2.7	3	3.03	2.92	2.54	2.59	0.431363764	0.477121	0.481443	0.465383	0.404834	0.4133	2.73	1.08	1.5	0.303	2.883	0.436163	0.459845	0.200567
12/30/2014	7	2.7	3.01	3.05	2.94	2.53	2.59	0.431363764	0.478566	0.4843	0.468347	0.403121	0.4133	2.735	1.08	1.505	0.305	2.89	0.436957	0.460898	0.201393
4/1/2015	7	2.69	3	3.04	2.92	2.51	2.57	0.42975228	0.477121	0.482874	0.465383	0.399674	0.409933	2.715	1.076	1.5	0.304	2.88	0.43377	0.459392	0.199271
7/1/2015	7	2.76	3.01	3.05	2.94	2.6	2.65	0.440909082	0.478566	0.4843	0.468347	0.414973	0.423246	2.77	1.104	1.505	0.305	2.914	0.44248	0.46449	0.205527
10/1/2015	7	2.76	2.99	3.03	2.91	2.61	2.65	0.440909082	0.475671	0.481443	0.463893	0.416641	0.423246	2.76	1.104	1.495	0.303	2.902	0.440909	0.462697	0.204007
12/30/2015	7	2.78	2.99	3.03	2.92	2.65	2.69	0.444044796	0.475671	0.481443	0.465383	0.423246	0.429752	2.785	1.112	1.495	0.303	2.91	0.444825	0.463893	0.206351
4/1/2016	7	2.85	3	3.03	2.95	2.7	2.76	0.45484486	0.477121	0.481443	0.469822	0.431364	0.440909	2.825	1.14	1.5	0.303	2.943	0.451018	0.46879	0.211433
7/1/2016	7	2.88	2.99	3.02	2.95	2.76	2.8	0.459392488	0.475671	0.480007	0.469822	0.440909	0.447158	2.855	1.152	1.495	0.302	2.949	0.455606	0.469675	0.213987
10/1/2016	7	2.94	3.02	3.04	2.99	2.82	2.86	0.46834733	0.480007	0.482874	0.475671	0.450249	0.456366	2.905	1.176	1.51	0.304	2.99	0.463146	0.475671	0.220305
12/30/2016	7	2.94	3.03	3.05	2.99	2.81	2.86	0.46834733	0.481443	0.4843	0.475671	0.448706	0.456366	2.9	1.176	1.515	0.305	2.996	0.462398	0.476542	0.220352
4/1/2017	7	2.94	3.04	3.06	3.01	2.8	2.86	0.46834733	0.482874	0.485721	0.478566	0.447158	0.456366	2.905	1.176	1.52	0.306	3.002	0.463146	0.477411	0.221111
7/1/2017	7	2.99	3.07	3.1	3.05	2.86	2.9	0.475671188	0.487138	0.491362	0.4843	0.456366	0.462398	2.955	1.196	1.535	0.31	3.041	0.470557	0.483016	0.227287
10/1/2017	7	2.99	3.08	3.11	3.06	2.86	2.91	0.475671188	0.488551	0.49276	0.485721	0.456366	0.463893	2.96	1.196	1.54	0.311	3.047	0.471292	0.483872	0.228045
12/30/2017	7	2.99	3.08	3.11	3.06	2.84	2.89	0.475671188	0.488551	0.49276	0.485721	0.453318	0.460898	2.95	1.196	1.54	0.311	3.047	0.469822	0.483872	0.227334
4/1/2018	7	3.01	3.1	3.12	3.08	2.84	2.91	0.478566496	0.491362	0.494155	0.488551	0.453318	0.463893	2.96	1.204	1.55	0.312	3.066	0.471292	0.486572	0.229317
7/1/2018	7	3.06	3.12	3.13	3.1	2.86	2.95	0.485721426	0.494155	0.495544	0.491362	0.456366	0.469822	2.98	1.224	1.56	0.313	3.097	0.474216	0.490941	0.232812

10/1/2018	7	3.09	3.14	3.14	3.12	2.91	2.98	0.489958479	0.49693	0.49693	0.494155	0.463893	0.474216	3.015	1.236	1.57	0.314	3.12	0.479287	0.494155	0.236842
12/30/2018	7	3.13	3.16	3.16	3.14	2.95	3.01	0.495544338	0.499687	0.499687	0.49693	0.469822	0.478566	3.045	1.252	1.58	0.316	3.148	0.483587	0.498035	0.240843
4/1/2019	7	3.12	3.13	3.13	3.12	2.96	3	0.494154594	0.495544	0.495544	0.494155	0.471292	0.477121	3.04	1.248	1.565	0.313	3.126	0.482874	0.494989	0.239017
7/1/2019	7	3.16	3.13	3.14	3.13	3.06	3.08	0.499687083	0.495544	0.49693	0.495544	0.485721	0.488551	3.095	1.264	1.565	0.314	3.143	0.490661	0.497344	0.244027
10/1/2019	7	3.21	3.16	3.16	3.15	3.08	3.15	0.506505032	0.499687	0.499687	0.498311	0.488551	0.498311	3.115	1.284	1.58	0.316	3.18	0.493458	0.502427	0.247927
12/30/2019	7	3.3	3.18	3.17	3.18	3.16	3.22	0.51851394	0.502427	0.501059	0.502427	0.499687	0.507856	3.17	1.32	1.59	0.317	3.227	0.501059	0.508799	0.254938
4/1/2020	7	3.33	3.2	3.19	3.21	1.5	3.24	0.522444234	0.50515	0.503791	0.506505	0.176091	0.510545	2.355	1.332	1.6	0.319	3.251	0.371991	0.512017	0.190466
7/1/2020	7	3.34	3.21	3.19	3.22	3.24	3.25	0.523746467	0.506505	0.503791	0.507856	0.510545	0.511883	3.23	1.336	1.605	0.319	3.26	0.509203	0.513218	0.261332
10/1/2020	7	3.33	3.21	3.2	3.21	3.23	3.24	0.522444234	0.506505	0.50515	0.506505	0.509203	0.510545	3.22	1.332	1.605	0.32	3.257	0.507856	0.512818	0.260438
12/30/2020	7	3.33	3.21	3.21	3.22	3.25	3.25	0.522444234	0.506505	0.506505	0.507856	0.511883	0.511883	3.235	1.332	1.605	0.321	3.258	0.509874	0.512951	0.261541
4/1/2021	7	3.31	3.22	3.21	3.22	3.25	3.25	0.519827994	0.507856	0.506505	0.507856	0.511883	0.511883	3.235	1.324	1.61	0.321	3.255	0.509874	0.512551	0.261337
7/1/2021	7	3.31	1.1	1.5	3.22	1.7	3.26	0.519827994	0.041393	0.176091	0.507856	0.230449	0.513218	2.46	1.324	0.55	0.15	2.024	0.390935	0.306211	0.119708
10/1/2021	7	3.26	3.19	3.19	3.18	3.2	3.2	0.5132176	0.503791	0.503791	0.502427	0.50515	0.50515	3.19	1.304	1.595	0.319	3.218	0.503791	0.507586	0.255717
12/30/2021	7	3.27	3.19	3.19	3.19	3.22	2.1	0.514547753	0.503791	0.503791	0.503791	0.507856	0.322219	3.205	1.308	1.595	0.319	3.222	0.505828	0.508126	0.257024
4/1/2022	7	3.3	3.2	3.19	3.2	3.25	3.25	0.51851394	0.50515	0.503791	0.50515	0.511883	0.511883	3.225	1.32	1.6	0.319	3.239	0.50853	0.510411	0.259559
7/1/2022	7	3.38	3.23	3.22	3.24	3.33	3.32	0.5289167	0.509203	0.507856	0.510545	0.522444	0.521138	3.285	1.352	1.615	0.322	3.289	0.516535	0.517064	0.267082
10/1/2022	7	3.52	3.33	3.3	1.9	3.46	3.46	0.546542663	0.522444	0.518514	0.278754	0.539076	0.539076	2.68	1.408	1.665	0.33	3.403	0.428135	0.531862	0.227709
12/30/2022	7	3.52	3.37	3.34	3.39	3.47	3.47	0.546542663	0.52763	0.523746	0.5302	0.540329	0.540329	3.43	1.408	1.685	0.334	3.427	0.535294	0.534914	0.286336
4/1/2014	8	3.48	3.34	3.32	3.34	3.49	3.47	0.541579244	0.523746	0.521138	0.523746	0.542825	0.540329	3.415	1.392	1.67	0.332	3.394	0.533391	0.530712	0.283077
7/1/2014	8	3.49	3.38	3.37	3.37	3.48	3.47	0.542825427	0.528917	0.52763	0.52763	0.541579	0.540329	3.425	1.396	1.69	0.337	3.423	0.534661	0.534407	0.285726
10/1/2014	8	3.63	3.52	3.5	3.53	3.55	3.55	0.559906625	0.546543	0.544068	0.547775	0.550228	0.550228	3.54	1.452	1.76	0.35	3.562	0.549003	0.551694	0.302882
12/30/2014	8	3.76	3.55	3.52	3.6	3.72	2.1	0.575187845	0.550228	0.546543	0.556303	0.570543	0.322219	3.66	1.504	1.775	0.352	3.631	0.563481	0.560026	0.315564
4/1/2015	8	3.59	3.44	3.44	3.47	3.58	3.56	0.555094449	0.536558	0.536558	0.540329	0.553883	0.55145	3.525	1.436	1.72	0.344	3.5	0.547159	0.544068	0.297692
7/1/2015	8	3.24	3.32	3.35	3.3	3.15	3.16	0.51054501	0.521138	0.525045	0.518514	0.498311	0.499687	3.225	1.296	1.66	0.335	3.291	0.50853	0.517328	0.263077
10/1/2015	8	3.1	3.28	3.29	3.22	2.96	2.99	0.491361694	0.515874	0.517196	0.507856	0.471292	0.475671	3.09	1.24	1.64	0.329	3.209	0.489958	0.50637	0.2481
12/30/2015	8	3.16	3.33	3.33	3.25	3.09	3.09	0.499687083	0.522444	0.522444	0.511883	0.489958	0.489958	3.17	1.264	1.665	0.333	3.262	0.501059	0.513484	0.257286
4/1/2016	8	3.33	3.41	3.4	3.38	3.21	3.24	0.522444234	0.532754	0.531479	0.528917	0.506505	0.510545	3.295	1.332	1.705	0.34	3.377	0.517855	0.528531	0.273703
7/1/2016	8	3.44	3.44	3.44	3.45	3.33	3.36	0.536558443	0.536558	0.536558	0.537819	0.522444	0.526339	3.39	1.376	1.72	0.344	3.44	0.5302	0.536558	0.284483
10/1/2016	8	3.52	3.46	3.46	3.47	3.45	3.45	0.546542663	0.539076	0.539076	0.540329	0.537819	0.537819	3.46	1.408	1.73	0.346	3.484	0.539076	0.542078	0.292221
12/30/2016	8	3.65	3.54	3.52	3.55	3.62	3.6	0.562292864	0.549003	0.546543	0.550228	0.558709	0.556303	3.585	1.46	1.77	0.352	3.582	0.554489	0.554126	0.307257
4/1/2017	8	3.7	3.55	3.52	3.58	3.74	3.68	0.568201724	0.550228	0.546543	0.553883	0.572872	0.565848	3.66	1.48	1.775	0.352	3.607	0.563481	0.557146	0.313941
7/1/2017	8	3.64	3.53	3.51	3.55	3.71	3.64	0.561101384	0.547775	0.545307	0.550228	0.569374	0.561101	3.63	1.456	1.765	0.351	3.572	0.559907	0.552911	0.309579
10/1/2017	8	3.68	3.58	3.56	3.6	3.69	3.64	0.565847819	0.553883	0.55145	0.556303	0.567026	0.561101	3.645	1.472	1.79	0.356	3.618	0.561698	0.558469	0.31369
12/30/2017	8	3.62	3.57	3.56	3.6	3.59	2.4	0.558708571	0.552668	0.55145	0.556303	0.555094	0.380211	3.595	1.448	1.785	0.356	3.589	0.555699	0.554973	0.308398

4/1/2018	8	3.66	3.62	3.6	3.64	3.62	3.6	0.563481085	0.558709	0.556303	0.561101	0.558709	0.556303	3.63	1.464	1.81	0.36	3.634	0.559907	0.560385	0.313763
7/1/2018	8	3.79	3.65	3.63	3.68	3.79	2.1	0.57863921	0.562293	0.559907	0.565848	0.578639	0.322219	3.735	1.516	1.825	0.363	3.704	0.572291	0.568671	0.325445
10/1/2018	8	3.7	3.6	3.58	3.64	3.69	3.65	0.568201724	0.556303	0.553883	0.561101	0.567026	0.562293	3.665	1.48	1.8	0.358	3.638	0.564074	0.560863	0.316368
12/30/2018	8	3.75	3.66	3.63	3.69	3.7	3.69	0.574031268	0.563481	0.559907	0.567026	0.568202	0.567026	3.695	1.5	1.83	0.363	3.693	0.567614	0.567379	0.322053
4/1/2019	8	3.82	3.7	3.68	3.74	3.74	3.74	0.582063363	0.568202	0.565848	0.572872	0.572872	0.572872	3.74	1.528	1.85	0.368	3.746	0.572872	0.573568	0.328581
7/1/2019	8	3.8	3.73	3.71	3.77	3.69	3.7	0.579783597	0.571709	0.569374	0.576341	0.567026	0.568202	3.73	1.52	1.865	0.371	3.756	0.571709	0.574726	0.328576
10/1/2019	8	3.73	3.72	3.72	3.74	3.61	3.63	0.571708832	0.570543	0.570543	0.572872	0.557507	0.559907	3.675	1.492	1.86	0.372	3.724	0.565257	0.57101	0.322767
12/30/2019	8	3.52	3.59	3.61	3.59	3.39	3.42	0.546542663	0.555094	0.557507	0.555094	0.5302	0.534026	3.49	1.408	1.795	0.361	3.564	0.542825	0.551938	0.299606
4/1/2020	8	3.55	3.62	3.62	3.61	3.38	3.44	0.550228353	0.558709	0.558709	0.557507	0.528917	0.536558	3.495	1.42	1.81	0.362	3.592	0.543447	0.555336	0.301796
7/1/2020	8	3.66	3.68	3.68	3.68	3.51	3.55	0.563481085	0.565848	0.565848	0.565848	0.545307	0.550228	3.595	1.464	1.84	0.368	3.672	0.555699	0.564903	0.313916
10/1/2020	8	3.69	3.67	3.67	3.68	3.6	3.61	0.567026366	0.564666	0.564666	0.565848	0.556303	0.557507	3.64	1.476	1.835	0.367	3.678	0.561101	0.565612	0.317366
12/30/2020	8	3.64	3.63	3.62	3.64	3.54	3.55	0.561101384	0.559907	0.558709	0.561101	0.549003	0.550228	3.59	1.456	1.815	0.362	3.633	0.555094	0.560265	0.311
4/1/2021	8	3.64	3.63	3.61	3.64	3.54	3.55	0.561101384	0.559907	0.557507	0.561101	0.549003	0.550228	3.59	1.456	1.815	0.361	3.632	0.555094	0.560146	0.310934
7/1/2021	8	3.59	3.61	3.6	3.62	3.49	3.5	0.555094449	0.557507	0.556303	0.558709	0.542825	0.544068	3.555	1.436	1.805	0.36	3.601	0.55084	0.556423	0.3065
10/1/2021	8	3.64	3.66	3.65	3.67	3.52	3.54	0.561101384	0.563481	0.562293	0.564666	0.546543	0.549003	3.595	1.456	1.83	0.365	3.651	0.555699	0.562412	0.312532
12/30/2021	8	3.58	3.64	3.62	3.64	3.43	3.47	0.553883027	0.561101	0.558709	0.561101	0.535294	0.540329	3.535	1.432	1.82	0.362	3.614	0.548389	0.557988	0.305995
4/1/2022	8	3.44	3.57	3.56	3.56	3.16	3.29	0.536558443	0.552668	0.55145	0.55145	0.499687	0.517196	3.36	1.376	1.785	0.356	3.517	0.526339	0.546172	0.287472
7/1/2022	8	3.38	3.51	3.5	3.51	3.07	3.24	0.5289167	0.545307	0.544068	0.545307	0.487138	0.510545	3.29	1.352	1.755	0.35	3.457	0.517196	0.538699	0.278613
10/1/2022	8	3.23	3.39	3.4	3.38	3.04	3.12	0.509202522	0.5302	0.531479	0.528917	0.482874	0.494155	3.21	1.292	1.695	0.34	3.327	0.506505	0.522053	0.264422
12/30/2022	8	3.21	3.36	3.36	3.34	3.09	3.12	0.506505032	0.526339	0.526339	0.523746	0.489958	0.494155	3.215	1.284	1.68	0.336	3.3	0.507181	0.518514	0.26298
4/1/2014	9	3.19	3.36	3.36	3.32	3.07	3.1	0.503790683	0.526339	0.526339	0.521138	0.487138	0.491362	3.195	1.276	1.68	0.336	3.292	0.504471	0.51746	0.261043
7/1/2014	9	3.15	3.35	3.38	3.31	3.06	3.07	0.498310554	0.525045	0.528917	0.519828	0.485721	0.487138	3.185	1.26	1.675	0.338	3.273	0.503109	0.514946	0.259074
10/1/2014	9	3.19	3.37	3.4	3.33	3.09	3.11	0.503790683	0.52763	0.531479	0.522444	0.489958	0.49276	3.21	1.276	1.685	0.34	3.301	0.506505	0.518646	0.262697
12/30/2014	9	3.2	3.35	3.38	3.31	3.12	3.12	0.505149978	0.525045	0.528917	0.519828	0.494155	0.494155	3.215	1.28	1.675	0.338	3.293	0.507181	0.517592	0.262513
4/1/2015	9	3.19	3.34	3.36	3.3	3.11	3.12	0.503790683	0.523746	0.526339	0.518514	0.49276	0.494155	3.205	1.276	1.67	0.336	3.282	0.505828	0.516139	0.261077
7/1/2015	9	3.19	3.34	3.37	3.31	2.5	3.11	0.503790683	0.523746	0.52763	0.519828	0.39794	0.49276	2.905	1.276	1.67	0.337	3.283	0.463146	0.516271	0.239109
10/1/2015	9	3.27	3.38	3.41	3.36	3.17	3.18	0.514547753	0.528917	0.532754	0.526339	0.501059	0.502427	3.265	1.308	1.69	0.341	3.339	0.513883	0.523616	0.269078
12/30/2015	9	3.32	3.43	3.45	3.42	3.21	3.23	0.521138084	0.535294	0.537819	0.534026	0.506505	0.509203	3.315	1.328	1.715	0.345	3.388	0.520484	0.529943	0.275827
4/1/2016	9	3.35	3.47	3.48	3.45	3.23	3.25	0.525044807	0.540329	0.541579	0.537819	0.509203	0.511883	3.34	1.34	1.735	0.348	3.423	0.523746	0.534407	0.279894
7/1/2016	9	3.32	3.46	3.47	3.44	3.2	2.3	0.521138084	0.539076	0.540329	0.536558	0.50515	0.361728	3.32	1.328	1.73	0.347	3.405	0.521138	0.532117	0.277306
10/1/2016	9	3.28	3.45	3.47	3.42	3.16	3.18	0.515873844	0.537819	0.540329	0.534026	0.499687	0.502427	3.29	1.312	1.725	0.347	3.384	0.517196	0.52943	0.273819
12/30/2016	9	3.3	3.46	3.48	3.43	3.17	3.19	0.51851394	0.539076	0.541579	0.535294	0.501059	0.503791	3.3	1.32	1.73	0.348	3.398	0.518514	0.531223	0.275447
4/1/2017	9	3.31	3.47	3.49	3.45	3.2	3.22	0.519827994	0.540329	0.542825	0.537819	0.50515	0.507856	3.325	1.324	1.735	0.349	3.408	0.521792	0.5325	0.277854
7/1/2017	9	3.29	3.46	3.47	3.43	3.19	3.2	0.517195898	0.539076	0.540329	0.535294	0.503791	0.50515	3.31	1.316	1.73	0.347	3.393	0.519828	0.530584	0.275812

10/1/2017	9	3.31	3.47	3.48	3.45	3.21	3.22	0.519827994	0.540329	0.541579	0.537819	0.506505	0.507856	3.33	1.324	1.735	0.348	3.407	0.522444	0.532372	0.278135
12/30/2017	9	3.36	3.51	3.52	3.49	3.25	3.27	0.526339277	0.545307	0.546543	0.542825	0.511883	0.514548	3.37	1.344	1.755	0.352	3.451	0.52763	0.537945	0.283836
4/1/2018	9	3.39	3.54	3.54	3.52	3.27	3.29	0.530199698	0.549003	0.549003	0.546543	0.514548	0.517196	3.395	1.356	1.77	0.354	3.48	0.53084	0.541579	0.287492
7/1/2018	9	3.46	3.6	3.6	3.58	3.29	3.33	0.539076099	0.556303	0.556303	0.553883	0.517196	0.522444	3.435	1.384	1.8	0.36	3.544	0.535927	0.549494	0.294488
10/1/2018	9	3.49	3.61	3.61	3.6	3.29	3.35	0.542825427	0.557507	0.557507	0.556303	0.517196	0.525045	3.445	1.396	1.805	0.361	3.562	0.537189	0.551694	0.296364
12/30/2018	9	3.49	3.59	3.59	3.59	3.31	3.35	0.542825427	0.555094	0.555094	0.555094	0.519828	0.525045	3.45	1.396	1.795	0.359	3.55	0.537819	0.550228	0.295923
4/1/2019	9	3.47	3.54	3.54	3.54	3.35	3.36	0.540329475	0.549003	0.549003	0.549003	0.525045	0.526339	3.445	1.388	1.77	0.354	3.512	0.537189	0.545555	0.293066
7/1/2019	9	3.45	3.53	3.52	3.53	3.34	3.35	0.537819095	0.547775	0.546543	0.547775	0.523746	0.525045	3.435	1.38	1.765	0.352	3.497	0.535927	0.543696	0.291381
10/1/2019	9	3.39	3.5	3.49	3.49	3.28	3.29	0.530199698	0.544068	0.542825	0.542825	0.515874	0.517196	3.385	1.356	1.75	0.349	3.455	0.529559	0.538448	0.28514
12/30/2019	9	3.28	3.45	3.46	3.43	3.15	3.18	0.515873844	0.537819	0.539076	0.535294	0.498311	0.502427	3.29	1.312	1.725	0.346	3.383	0.517196	0.529302	0.273753
4/1/2020	9	3.23	3.44	3.45	3.4	3.09	3.11	0.509202522	0.536558	0.537819	0.531479	0.489958	0.49276	3.245	1.292	1.72	0.345	3.357	0.511215	0.525951	0.268874
7/1/2020	9	3.2	3.43	3.45	3.39	3.05	3.08	0.505149978	0.535294	0.537819	0.5302	0.4843	0.488551	3.22	1.28	1.715	0.345	3.34	0.507856	0.523746	0.265988
10/1/2020	9	3.23	3.44	3.46	3.41	3.11	3.13	0.509202522	0.536558	0.539076	0.532754	0.49276	0.495544	3.26	1.292	1.72	0.346	3.358	0.513218	0.526081	0.269994
12/30/2020	9	3.29	3.47	3.49	3.44	3.14	3.19	0.517195898	0.540329	0.542825	0.536558	0.49693	0.503791	3.29	1.316	1.735	0.349	3.4	0.517196	0.531479	0.274879
4/1/2021	9	3.21	3.44	3.46	3.4	3.07	3.11	0.506505032	0.536558	0.539076	0.531479	0.487138	0.49276	3.235	1.284	1.72	0.346	3.35	0.509874	0.525045	0.267707
7/1/2021	9	3.14	3.38	3.42	3.34	3.01	3.03	0.496929648	0.528917	0.534026	0.523746	0.478566	0.481443	3.175	1.256	1.69	0.342	3.288	0.501744	0.516932	0.259367
10/1/2021	9	3.05	3.32	3.36	3.26	2.94	2.96	0.484299839	0.521138	0.526339	0.513218	0.468347	0.471292	3.1	1.22	1.66	0.336	3.216	0.491362	0.507316	0.249276
12/30/2021	9	3.06	3.33	3.37	3.27	2.96	2.97	0.485721426	0.522444	0.52763	0.514548	0.471292	0.472756	3.115	1.224	1.665	0.337	3.226	0.493458	0.508664	0.251005
4/1/2022	9	3.09	3.34	3.37	3.28	2.97	2.1	0.489958479	0.523746	0.52763	0.515874	0.472756	0.322219	3.125	1.236	1.67	0.337	3.243	0.49485	0.510947	0.252842
7/1/2022	9	3.09	3.34	3.38	3.28	2.96	2.98	0.489958479	0.523746	0.528917	0.515874	0.471292	0.474216	3.12	1.236	1.67	0.338	3.244	0.494155	0.511081	0.252553
10/1/2022	9	3.08	3.33	3.37	3.27	2.97	2.99	0.488550717	0.522444	0.52763	0.514548	0.472756	0.475671	3.12	1.232	1.665	0.337	3.234	0.494155	0.50974	0.25189
12/30/2022	9	3.06	3.28	3.33	3.23	2.6	2	0.485721426	0.515874	0.522444	0.509203	0.414973	0.30103	2.915	1.224	1.64	0.333	3.197	0.464639	0.504743	0.234523

Appendix III: Proposal Approval

MASENO UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Office of the Dean

Our Ref: PHD/BE/00054/2017

Private Bag, MASENO, KENYA
Tel:(057)351 22/351008/351011
FAX: 254-057-351153/351221
Email: sgs@maseno.ac.ke

Date: 4th July, 2024

TO WHOM IT MAY CONCERN

RE: PROPOSAL APPROVAL FOR ODOYO SAMSON OANDO—PHD/BE/00054/2017

The above named is registered in the programme of Doctor of Philosophy in Business Administration in the School of Business and Economics, Maseno University. This is to confirm that his research proposal titled **"Effect of Funding Structure and Liquidity on the Financial Performance of Sugar Industry in Kenya"** has been approved for conduct of research subject to obtaining all other permissions/clearances that may be required beforehand.

Dr. Patrick Onyango
ASSOCIATE DEAN, SCHOOL OF GRADUATE STUDIES

Appendix IV: NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **289928**

Date of Issue: **12/August/2024**

RESEARCH LICENSE



This is to Certify that Mr.. SAMSON ODOYO OANDO of Maseno University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Homabay, Kisumu, Migori, Mombasa, Narok on the topic: EFFECT OF FUNDING STRUCTURE AND LIQUIDITY ON FINANCIAL PERFORMANCE OF SUGAR INDUSTRY IN KENYA for the period ending : 12/August/2025.

License No: **NACOSTI/P/24/38729**

289928

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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See overleaf for conditions

Appendix V: Unit Root Test

Economic value added

Panel unit root test: Summary
Series: INEVA
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.09737	0.0010	9	306
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.60488	0.0002	9	306
ADF - Fisher Chi-square	46.8628	0.0002	9	306
PP - Fisher Chi-square	110.461	0.0000	9	315

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

Debt at Level

Panel unit root test: Summary
Series: INDEBT
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.53159	0.0628	9	306
Null: Unit root (assumes individual unit root process)				
Im, Pesaran, and Shin W-stat	-3.70165	0.0001	9	306
ADF - Fisher Chi-square	50.0486	0.0001	9	306
PP - Fisher Chi-square	101.268	0.0000	9	315

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

Debt at First Difference

Panel unit root test: Summary
Series: D(INDEBT)
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-11.8228	0.0000	9	297
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-13.9111	0.0000	9	297
ADF - Fisher Chi-square	183.411	0.0000	9	297
PP - Fisher Chi-square	163.332	0.0000	9	306

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

Equity at level

Panel unit root test: Summary
Series: INEQUITY
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-Sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.37230	0.0004	9	306
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.22076	0.0000	9	306
ADF - Fisher Chi-square	66.5363	0.0000	9	306
PP - Fisher Chi-square	117.832	0.0000	9	315

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

Retained earnings at level.

Panel unit root test: Summary
Series: INRE
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-0.47491	0.3174	9	306
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.84525	0.0325	9	306
ADF - Fisher Chi-square	41.1570	0.0014	9	306
PP - Fisher Chi-square	61.2963	0.0000	9	315

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

Retained earnings First difference.

Panel unit root test: Summary
Series: D(INRE)
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-10.9211	0.0000	9	297
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-11.9564	0.0000	9	297
ADF - Fisher Chi-square	154.978	0.0000	9	297
PP - Fisher Chi-square	162.681	0.0000	9	306

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

Current ratio at level

Panel unit root test: Summary
Series: INCR
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.44278	0.0073	9	306
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.30432	0.0000	9	306
ADF - Fisher Chi-square	58.2341	0.0000	9	306
PP - Fisher Chi-square	125.005	0.0000	9	315

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

Acid test at level

Panel unit root test: Summary
Series: INATR
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.03665	0.1500	9	306
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.52188	0.0640	9	306
ADF - Fisher Chi-square	29.0898	0.0473	9	306
PP - Fisher Chi-square	48.4341	0.0001	9	315

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

Acid test at First difference

Panel unit root test: Summary
Series: D(INATR)
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-10.6594	0.0000	9	297
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-11.7606	0.0000	9	297
ADF - Fisher Chi-square	152.341	0.0000	9	297
PP - Fisher Chi-square	187.378	0.0000	9	306

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

Liquidity at level

Panel unit root test: Summary
Series: INLQ
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.49248	0.0063	9	306
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.29210	0.0109	9	306
ADF - Fisher Chi-square	34.3634	0.0114	9	306
PP - Fisher Chi-square	73.8736	0.0000	9	315

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

Funding structure at level

Panel unit root test: Summary

Series: INFS

Exogenous variables: Individual effects

User-specified lags: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

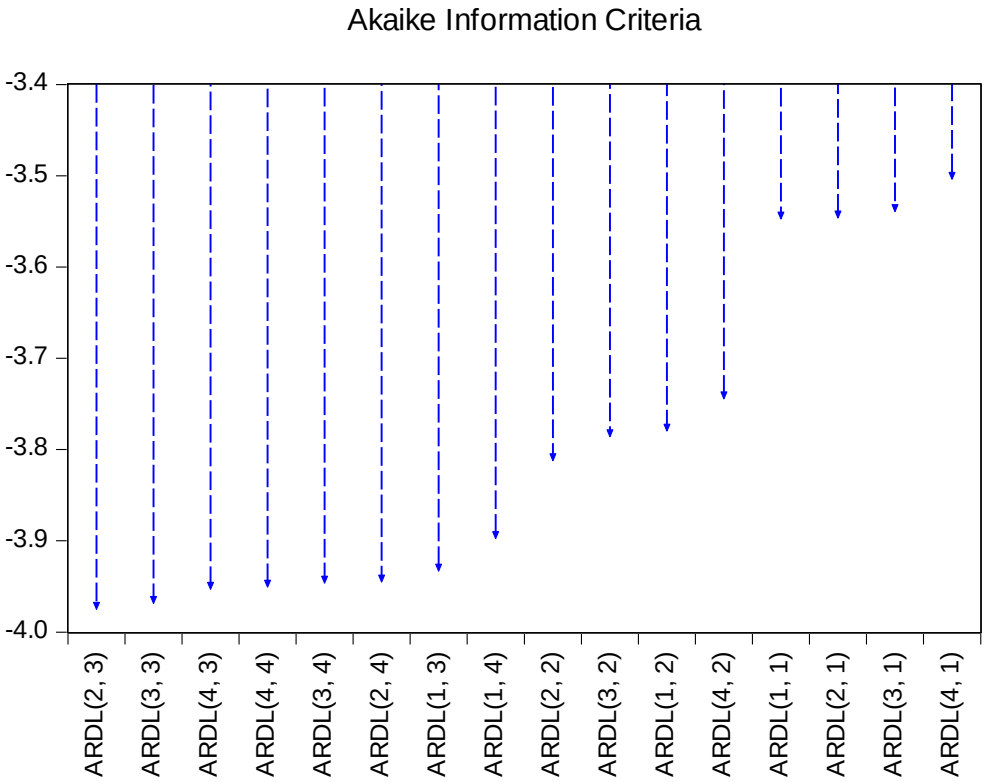
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.65471	0.0040	9	306
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.79974	0.0001	9	306
ADF - Fisher Chi-square	46.4553	0.0003	9	306
PP - Fisher Chi-square	95.8194	0.0000	9	315

** Probabilities for Fisher tests are computed using an asymptotic Chi

-square distribution. All other tests assume asymptotic normality.

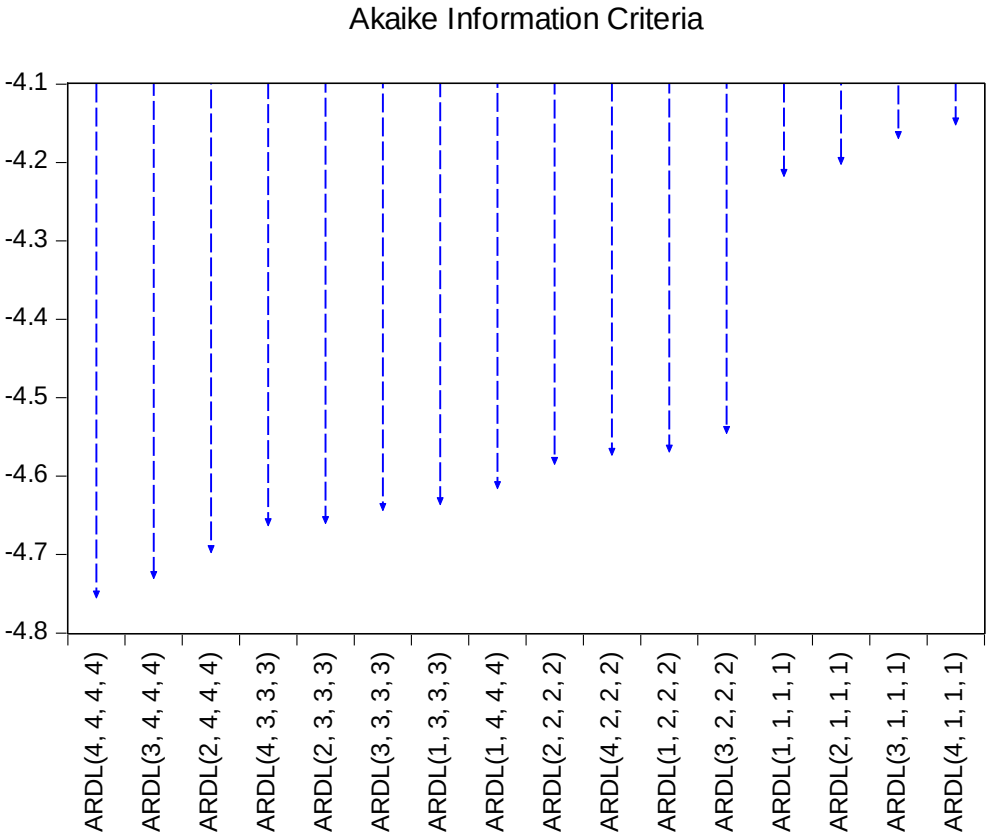
Appendix VI: Model Selection Summary

Funding structure and financial performance



Liquidity and financial performance

Model	Log L	AIC*	BIC	HQ	Specification
7	681.643413	-4.351690	-3.652167	-4.071363	ARDL (2, 3)
6	671.823024	-4.345993	-3.760937	-4.111538	ARDL (2, 2)
10	679.679900	-4.338055	-3.638531	-4.057728	ARDL (3, 2)
2	661.145411	-4.334343	-3.863754	-4.145760	ARDL (1, 2)
11	685.686517	-4.317267	-3.503276	-3.991069	ARDL (3, 3)
8	685.339965	-4.314861	-3.500870	-3.988662	ARDL (2, 4)
14	683.860299	-4.304585	-3.490594	-3.978387	ARDL (4, 2)
3	664.559701	-4.295553	-3.710497	-4.061098	ARDL (1, 3)
12	691.209844	-4.293124	-3.364665	-3.921054	ARDL (3, 4)
15	689.550599	-4.281601	-3.353143	-3.909531	ARDL (4, 3)
16	696.767261	-4.269217	-3.226291	-3.851275	ARDL (4, 4)
4	667.983381	-4.256829	-3.557305	-3.976502	ARDL (1, 4)
1	627.022169	-4.159876	-3.803755	-4.017164	ARDL (1, 1)
5	635.975328	-4.159551	-3.688962	-3.970967	ARDL (2, 1)
9	644.180475	-4.154031	-3.568975	-3.919576	ARDL (3, 1)
13	649.243703	-4.126692	-3.427169	-3.846365	ARDL (4, 1)


Akaike Information Criteria
-4.1
-4.2
-4.3
-4.4
-4.5
-4.6
-4.7
-4.8
ARDL(4, 4, 4, 4)
ARDL(3, 4, 4, 4)
ARDL(2, 4, 4, 4)
ARDL(4, 3, 3, 3)
ARDL(2, 3, 3, 3)
ARDL(3, 3, 3, 3)
ARDL(1, 3, 3, 3)
ARDL(1, 4, 4, 4)
ARDL(2, 2, 2, 2)
ARDL(4, 2, 2, 2)
ARDL(1, 2, 2, 2)
ARDL(3, 2, 2, 2)
ARDL(1, 1, 1, 1)
ARDL(2, 1, 1, 1)
ARDL(3, 1, 1, 1)
ARDL(4, 1, 1, 1)