

Effect of Financial Structure on Financial Performance of Listed Energy and Petroleum Firms in Kenya

Ruth Cherotich Sang¹, Dr. Robert Simiyu², Dr. Dickson Sing'oei³

¹Masters Student, ^{2,3}Lecturers, Department of Postgraduate Studies, AMECEA Gaba Campus, The Catholic University of Eastern Africa, Nairobi, Kenya.

Corresponding Author: Ruth Cherotich Sang'

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ABSTRACT

This study examined the effect of financial structure on financial performance of listed energy and petroleum firms at the Nairobi Securities Exchange, Kenya. The dependent variable was financial performance of listed energy firms, measured by the return on assets ratio. The study analysed the following research objectives; to analyse the effect of equity financing on financial performance of listed energy and petroleum sector firms in Kenya; and to establish the effect of debt financing on financial performance of listed energy and petroleum sector firms in Kenya. The study was anchored on the Pecking order Theory, and Trade-off theory as the main study theories. A correlational research design was adopted by the study while dealing with the research objectives where the scope of the study covered four listed firms as per the Nairobi Securities Exchange records under the energy and petroleum sector firms. Data was obtained from the audited and published financial statements of the listed energy firms, covering the 7-year period running from 2018 to 2024. Data analysis was carried out using the Statistical Package for Social Sciences version 29 and Microsoft Excel spreadsheet in respect to the study objectives. Multiple regression

and Pearson's correlation statistical methods were used for data analysis. The study findings revealed a positive but moderate relationship between equity financing and financial performance ($r=0.552$, $p=0.01$; $\beta=0.11524$); and debt financing had a positive and significant effect on financial performance ($r=0.576$, $p=0.01$; $\beta=0.23217$). while firm size had a positive and statistically significant moderating effect on the relationship between the independent variables and financial performance of the listed energy firms as indicated by an increase of 19.21% in the r^2 value. The study findings were of great importance to management of listed energy and petroleum sector firms and other non-listed energy and petroleum firms as well as other business entities in relation to financial structure. The results added to the existing knowledge on financial structure and provided scholars and future researchers with necessary literature review for future research.

Keywords: Financial Structure, Financial Performance, Equity Financing, Debt Financing

INTRODUCTION

The energy sector is very competitive and mainly characterized by controlled prices done by EPRA, strict taxation framework,

and besides products that are more of the same type, which is compounded by a less controlled economy that all calls for serious strategies other than pricing to enhance profits (Luganji & Miroga, 2023). This study examined the effect of financial structure on financial performance of listed energy and petroleum firms with the main focus on equity financing, debt financing, trade credit and firm liquidity as the study independent variables.

Globally, in the study investigated by Anis and Shaha (2020) titled “Capital structure and financial performance: A case of Saudi petrochemical industry” and measured the impact of capital structure, profitability and financial performance on the success of the business organizations, the variables included equity and debt financing, and based on the secondary data of the petrochemicals companies of Saudi Arabia. Financial Ratio variability analysis and Trend Indices of financial ratios (TICBI) were measured. The findings revealed that size, demand, cost of production, profitable streams of products, and low-cost capital in external funds were the factors responsible for overall growth development of the petrochemicals industry of Saudi Arabia. However, this study only narrowed down to capital structure of the petrochemicals companies but not the financial structure, the study was also carried out in a more developed scope than Kenya.

Regionally, Igwe et al. (2017) reported that capital structure has significant effect on performance of agro-allied companies listed on the Nigerian Exchange Group (NGX); while Salim and Yadav (2022) showed that firm performance in terms of ROA, ROE, and EPS have negative relationship with Short-term debt (STD), Long term debt (LTD) and total debt (TD). Also, Mouna et al. (2017) studied effect of capital structure on performance of firms in Morocco; and debt ratio (DR) had negative but significant effect on ROA, debt equity ratio (DER) has negative significant impact on ROE, and that size had positive significant impact on performance.

Locally, Luganji and Miroga (2023), examined the effect of capital structure on the financial performance of listed energy and petroleum sector firms in Kenya. The study was anchored on the debt financing, equity financing, retained earnings and asset growth variables on Financial Performance of Listed Energy and Petroleum Sector firms in Kenya. The study adopted a correlational research design, and a census method that covered all the four listed firms under the study scope with the collected secondary data being analyzed using SPSS version 29 software. The study findings indicated a statistically significant effect of the independent variables on financial performance of listed energy and petroleum firms in Kenya. This study, however, focused mainly on capital structure but not the financial structure of the listed firms as for the current study.

Concept of Financial Performance.

Performance refers to a firm's ability to generate new resources from day-to-day operations over a given period (Gathara, Kilika & Maingi, 2019). The growth in firms' sales, the improvement in their profit margin, their capital investment decisions and financial structure decisions mainly influence the shareholder's wealth (Luganji & Miroga, 2023).

In this study, financial performance, referred to returns generated from the firms' investments. It can be described as an objective indicator on the general performance and financial health of an organization that can be used to compare an industry performance (Gitati et al. 2026). With shareholders expecting good returns, firms must earn a good return from their investments that enables the board of directors make a good dividend payout (Montanya, 2019). Financial performance is measured by different ratios ranging from; return on assets or investment, return on equity, earnings per share and even net profit margin (Mrefu & Gichure, 2022). This study measured financial performance using the return on assets ratio (ROA).

Concept of Financial Structure

Financial structure of a firm is the aggregate of current liabilities, non-current liabilities, common and preferred securities, and the retained earnings that are used to finance the firm. It is the basic firm's finance that has far reaching implications on its profits (Joshua, 2017; Omesa et al., 2017; Oyugi et al., 2021). According to Montanya (2019), financial structure is the composition of both the short term and long-term instruments concerned with how a petroleum firm sources its finances to meet its obligations and finance its operations. Financial structure basically involves how a firm finances its assets by combining different sources of capital through a single source (Luganji & Miroga, 2023).

For a firm to be able to meet its current and long-term obligations, it must have a suitable financial structure that ensures adequate cash flows (Montaya, 2019). Every listed firm endeavor to maximize its profits and shareholders wealth among other goals through capital investments that are financed by long term finances and short-term investments and hence the need for a suitable financial structure that guarantees returns (Akot *et al.*, 2018).

Empirical tests in the UK confirm predictions by the trade off and the pecking order theory whereby firms that were highly profitable with few investments paid a higher dividend to their shareholders (Kinyua & Muriu, 2017). Serghiescu and Vaidean (2021) conducted panel data regression analysis on 196 Romanian firms listed on the Bucharest Stock Exchange over the period 2013-2020 and established a negative relation between liquidity and financial structure. The study by Gharaibeh (2022) on the relationship between financial structure, stock returns and liquidity of 15 firms listed in the Amman Stock Exchange for the period 2018-2021 found a weak relationship between liquidity and financial performance of these firms.

Many firms struggle with inappropriate financial structures in the African markets which dampen the vibrant and promising

sector eventually making it less attractive (Oyugi et al., 2021). Most oil firms in Sub-Saharan Africa have had their financial structures progressively considered as an obstacle to human and economic development which has greatly affected profits due to the financing in the energy sector being limited to traditional equity and debt methods (Muraguri, 2022).

Some studies have arrived at inconclusive results with regard to the financial structure-financial performance nexus. Using panel data to analyze 257 South African firms for the period 2008-2019, Sujay (2020) found a positive relationship between financial structure and financial performance.

The studies concluded that financial structure is a strategic tool greatly having a bearing on overall performance of the firms' financial performance.

Energy and Petroleum Industry in Kenya

The petroleum sector in Kenya is comprised of both the local firms and the multinational corporations. The industry is regulated by the Energy and Petroleum Regulatory Authority (EPRA) a body that is tasked with ensuring fairness and quality within the industry. The industry is mainly an oligopolistic structure with a few key players. For example, in the petroleum sector in Kenya the market is dominated by Total Kenya, vivo energy and Rubis (formerly Kenol Kobil) while the energy sector, mainly electricity, which is produced by KenGen and delivered by KPLC is a monopoly for each of the two companies in their roles in electricity generation and delivery (Ombati & Ng'ang'a, 2021).

Due to over-dependence on traditional financing approaches, African firms in the energy and petroleum sector continue to face critical challenges. The sector is largely characterized by inadequate finances and limited access to modern energy services, low purchasing power, inadequate infrastructure and investments thereby reporting minimal profits if not losses (Cyton, 2025). In both their studies, Ofori *et al.*, (2019) and Wan *et al.*, (2018) posited

that financial structure positively relates to Ghanaian firms' profitability.

The studies concluded that financial structure is a strategic tool greatly having a bearing on overall performance of the firms' financial performance. Mokaya *et al.*, (2017) recommended that there is need for an elaborate overlap between financial structures and financial performance hence need to implement controls aimed at reducing conflicts between management and shareholders which end up curtailing performance of the company as far as profitability is concerned. Industry firms have largely relied on debt and equity financing methods with trade credit, and retained earnings employed towards supporting green energy projects (Pathirawasam, 2013). Being a unique, significant and great economic pillar to economic performance in Kenya, the energy and petroleum sector drives other industries/firms by providing energy for their operations (Montanya, 2019). The Kenyan economy highly regulates the energy sector through price caps, bond payment at point of entry in order to ensure energy imports arrive at targeted destinations.

Prohibitively high connection costs, petroleum products coupled with low incomes among majority households call for a concerted effort in determination of the most suitable financial structure that maximizes profits (Oyugi *et al.*, 2021). Management of most firms in Kenya mainly focus on financial investments, dividend payouts, and financing which great results in major focus on long term investments (capital structure) than focusing on financial structure that addresses both long term and short-term aspects of corporate finance. However, it is evident that a company that is adequately liquid has greater ability to quickly invest in profitable opportunities, hence, generate more cash flows for its future and therefore tend to have low risk, which enhances higher profits (Ogenche *et al.*, 2018).

Additionally, the sector depends on raw materials like; crude oil, natural gas and other specialized equipment that are all imported and are significantly affected by international price fluctuations making profitability in the sector to be unpredictable. Besides the above, the sector being regulated by the powerful Energy and Petroleum Regulatory Authority (EPRA) a body that regulates all imports to the energy sector. The commission also regulates the generation and supply of electricity. This excess regulation has led to an immense exodus of energy corporations from the Kenyan market due to low yields in the sector. The above argument is supported by Masavi and Munyasi, (2021) who also pointed out the significance of a suitable financial structure by contending that it is critical in addressing such underlying imbalances.

With adoption of green energy systems as an alternative to custom (crude oil) being the modern way, there is need for optimal financial structure that can enable firms to construct energy plants, develop systems like biomass, windmills and small hydro energy, which have a potential of mass-production to meet ever increasing energy needs in the country (Goli *et al.*, 2018).

Statement of the Problem

Firms in highly competitive environment like the energy and petroleum sector over time have found themselves operating under circumstances where profitability is guaranteed (Luganji & Miroga, 2023). However, this argument is not supported by all findings from previous studies which either did not find a correlation or found minimal correlation between capital structure and financial performance of the firms (Muchiri, 2017). Like many other companies, energy and petroleum companies are expected to generate profits through effective and efficient utilization of resources to create a sound asset portfolio and ensure the maximization of shareholders' wealth (EPRA 2024; Gitati *et al.* 2026).

However, even so, uneven results across seven years have been recorded by the listed energy and petroleum firms where some were steady and others less predictable (EPRA, 2024). Moreover, earnings power shapes how well a company can keep running under strict rules and shifting prices which as Mupa (2024) mentioned, are the two typical conditions in Kenya's energy sector and worldwide. TotalEnergies Marketing Kenya PLC and Umeme have maintained consistent profitability over time (Capital Markets Authority [CMA], 2024). Similar findings from researches in the African continent have been reported. Minoo et al. (2023) who did a study on the impact of brief time period debt, long time debt capital and equity capital on liquidity of manufacturing corporations indexed in Nairobi Security Exchange, Kenya with corporation size forming the moderating variable. Nine Firms listed under the Manufacturing and allied sector of the Nairobi Securities Exchange were used as the study population. The study concluded that financial structure affects liquidity of listed manufacturing firms in Kenya and that firm size had a positive effect on the liquidity of listed energy firms in NSE, Kenya. However, this study focused on financial structure and financial performance with liquidity as an independent variable. Most studies have arrived at findings that financial structure impacts profitability differently depending on the industry or sector under study which left a gap that this study sought to fill. Of great importance is that despite the research on financial structure and capital structure on financial performance of firms, few documented studies have been carried out in the petroleum industry, more so on listed firms in the sector. Oyugi et al. (2021) carried out research on determinants of financial structure on financial performance of listed manufacturing firms at the NSE, Kenya and concluded that financial performance was significantly affected by financial structure. In Wamugo *et al.*, (2014), the focus was on the profitability of

64 listed firms in Kenya, among them were just 3 petroleum firms which was quite a small portion of the target population and an insufficient percentage to represent the petroleum sector. This study therefore investigated the effect of financial structure on financial performance of the listed petroleum and energy sector firms at the NSE, Kenya.

Research Objectives

The study objectives were;

1. To analyze the effect of equity financing on performance of listed energy and petroleum sector firms in Kenya.
2. To establish the effect of debt financing on performance of listed energy and petroleum sector firms in Kenya.
3. To assess the role of firm size as a moderating factor on the relationship between financial structure and performance of listed energy and petroleum sector firms in Kenya.
- 4.

Research Hypothesis

The study tested the following research hypotheses:

H01: Equity financing has no statistical effect on performance of listed energy and petroleum sector firms in Kenya

H02: Debt financing has no statistical effect on performance of listed energy and petroleum sector firms in Kenya

H03: Firm size has no statistically significant moderating effect on the relationship between financial structure and performance of listed energy and petroleum sector firms in Kenya

LITERATURE REVIEW

Pecking Order Theory

This theory was first suggested by Donaldson in 1961. The theory starts with asymmetric information since managers are more informed on company prospects, risks and value than outside investors. It postulates that the asymmetric information is a catalyst for increase in cost of financing. Business financing is known to come from

three sources namely internal funds, debt, and new equity. It was noted by Simiyu and Gichure (2023) that Pecking order theory is founded on information asymmetry vis-a-vis insiders and the outsiders in relation to the actual value of the firm and therefore to finance its current investments and future income expectations and prospects, external capital is considered costly as compared to internal capital.

Companies prefer using internal funds first before going for debt and will only use equity as the last resort. This theory therefore postulates that companies have a hierarchy of financing sources. Pecking order theory proponents suggested that firms should follow well-specified priority order with respect to financing source to minimize the firms' information asymmetry costs by giving priority to the retained earnings, then debt before opting for equity as a source of raising revenue (Kabando et al., 2021). The retained earnings should be considered first especially when seeking for funds to finance the long-term projects, in case the RE is exhausted, then debt and if the two options are not available then the last resort will be through equity. The theory holds that the more profitable a firm is the lesser the urge to enlist the external financing option since the internal financing will be more viable (Myers, 1984; Kabando et al., 2021)).

This theory was modified and popularized by Myers and Majluf (1984) who argued that equity is a less preferred means to raise capital because when managers issue new equity, investors relate this to firm overvaluation and management urge to take advantage of the situation. The result will be investors placing lower values on firms the new equity issuance. Fama and French (2002), found that some features of the data are better explained by the pecking order than by the tradeoff theory. Oyugi et al. (2021) posed that pecking order theory fails especially with small firms where information asymmetry is considered a major problem. For research on financial structure, this theory anchored the study's

first two independent variables: equity financing and debt financing.

Trade-off Theory

This theory assumes that an optimal target capital structure is identified by a firm which is believed to cover the benefits of the interest tax shield against the costs related to financial distress. While the interest tax shield is likely to enhance value of the firm, however, this only happens to a certain level as increase in leverage increases the risk of default which is likely to result into financial distress costs. Therefore, the benefits of the interest tax shield are eroded by the increase in financial distress, and this reduces the value of the firm (Mabinda, 2018).

According to Myers (1997), as quoted by Mabinda (2018), in her analysis of the link between financing of debts and value of the firm, it was established that profits earned by firms are used in paying leverage and this lowers leverage. The analysis also established that profitable business organizations use low leverage if Trade off Theory is in force. In Trade-off Theory, the larger firms are highly levered as they have large stability with cash flows that are less volatile and are likely to benefit from economies of scale that accrue after issue of securities at the market (Oyugi et al., 2021). As regards the firm size, information asymmetry in the market is a key factor because more information is available for larger firms (Firm Size) about them at the market and this makes them easily access financial resources. The study by Mabinda (2018) opined that information asymmetries increase the costs of small firms in accessing external sources of finances. He quipped that a negative relationship exists between debt ratios and firm size. These scholars concluded that smaller firms have limited access to equity markets and as such tend to depend on loans from financial institutions to fund their operations. The study used the trade-off theory to explain the firm size objective for firms listed under the energy and petroleum sector at the NSE.

Mabinda (2018) stated that as an organization takes on debt, it trades off its freedom to make decisions influencing its profitability with debt constraints and that this also introduces the risk of bankruptcy in cases where the firm fails to repay the debt as scheduled. The trade-off theory was key to this study given that it very well covered the firm size moderating variable considered in the study.

Empirical Review of Literature

Equity Financing on Performance

Equity financing, according to Muraguri (2022), comprise of initial public offering and SEOs issues of stock by a firm as means to raise funds through the sale of stock rather than the issuance of additional debt. The offering for common stock may be done using rights offer or a cash offer. SEOs differ from IPOs in that they are made by firms that have matured beyond the IPO with a significant track record of financial performance and with shares already actively trading in the equity market while IPO involve selling stock on a major exchange for the first time (Masavi *et al.*, 2017). Capital need by firms for investment in projects such as acquisitions of heavy machinery, research and development and availability of debt, firm's current cash flow, investment opportunities at hand are some of the motivating factors for firms to issue equity,

In his study Pandey (2019) opined that long term debt affects future cash flows which in turn affects liquidity which prompts managers to issue seasoned equity. Managers often view the equity offers as an effective way of increasing firm size and offers incentives to grow their firm beyond optimal size since their compensation is dependent on asset size rather than profitability (Masavi *et al.*, 2017). Montanya (2019) found that firms with more investment and growth opportunities opt for equity issuance to avoid debt which is tied to periodic interest payments. Equity financing add value to shareholders by way of improving capital structure of firms to an

optimal level to balance the benefits of the tax shield and the costs of financial distress.

Debt Financing on Performance

In their study, Olusola et al. (2022) assessed the effect of capital structure on firms' performance in Hong Kong. A panel data model was adopted by the study. ROA was used to measure performance, while capital structure was proxied by Total Debts Ratio (TDR). The study used 202 sample size covering the period of 2014 to 2018. The study established that TDR has positive significant influence on performance of listed firms in Hong Kong.

According to Averkamp (2019), debt finance is a type of finance employed as part of equity but is externally acquired hence attracts some form of interest based on agreement with the obligation to repay at a particular time. Debt finance is popularly given by commercial banks and other financial institutions based on collateral provided by firms in need.

In their study, Luganji and Miroga (2023), examined the effect of capital structure on the financial performance of listed energy and petroleum sector firms in Kenya. The study was anchored on the debt financing variable on Financial Performance of Listed Energy and Petroleum Sector firms in Kenya, while adopting a correlational research design, and a census method that covered all the four listed firms under the study scope. The study findings indicated a statistically significant effect of debt financing on financial performance of listed energy and petroleum firms in Kenya. Although the study was carried out locally, it focused on capital structure but not the financial structure of the listed firms.

Study by Nijarini and priya (2013) on capital structure and financial performance of Sri Lanka listed companies. Capital structure showed a positive relationship with financial performance. Ahmad *et al.*, (2012) studied Malaysian firms using ROA and ROE for financial performance and capital structure variables of short-term debts, total debt and long-term debt. This

research showed return on assets was positive for short term debt and total debt. All the debt levels significantly negatively affected ROE.

According to Badar and Saeed (2013), long term debt affected financial performance of the listed companies in food segment of Karachi stock exchange, positively while short term debt negatively affected financial performance. Ali and Faisal (2020) studied capital structure and financial performance: a case of Saudi petrochemical industry. Capital structure variables were long term debt to asset ratio total debt to asset ratio and short-term debt to asset ratio. Return on equity, return on assets, and gross profit margin measured financial performance. The conclusion was that the relationship between capital structure and financial performance was weak or nonexistent.

While researching on non-financial firms listed at Nairobi stock exchange, Wamugo *et al.*, (2014) concluded that return on asset and return on equity financial measures are negatively affected by increased debt. The study advocates for reduction of long-term debt to improve performance. The study findings are similar to Bafana *et al.*, (2015) and Gichangi (2014) who showed that ROA performance measure is negatively affected by debt.

In his study on all companies listed NSE from 2008-2013, Amenya (2018) found that return on equity is negatively affected by rise in debt. The research advocates for debt reduction to improve financial performance. Kuria and Omboi (2015) did a study on capital structure and performance of banking and investment companies at NSE and uncovered that financial performance is not statistically significantly affected by long term debt. ROE was positively affected by debt-to-equity ratio and negatively affected ROA for investments and banking firms listed in NSE.

In the study on the agricultural sector at NSE, Masavi *et al.*, (2017) in their results showed that debt ratio increases improved financial performance and increased debt-equity decreased after tax profit.

Firm Size

Firm size is the size of a company in a given industry at a given time which results in the lowest production costs per unit of output. Firm size commonly measured by either natural logarithm of assets, or sales volume or employees. Larger firms are associated with having more diversification capabilities, ability to exploit economies of scale and scope and also being highly formalized concerning procedures. In this study, firm size was determined by natural logarithm of total assets (Oyugi, et al., 2021).

It is important to consider firm size's moderation effect while studying the relationship between financial structure and firm performance (Mouhammed et al., 2016). The financial structure of a firm determines the asset structure of a firm and by extension the firm size. According to Gathara, et al. (2019), asset structure is a combination of the various asset components which were identified as: financial fixed assets; tangible fixed assets; current assets; and current investments and cash in hand and at bank. This affects the financial structure of a company significantly. A similar approach was taken by Oyugi, et al. (2021), where asset structure was described in terms of: current assets; long term investments and funds; Property, Plant and Equipment; intangible assets; and other assets. The assets' structure was comprised of total assets, which gave the firm size. The concept of assets structure also became important in this study.

In his study titled "Does the Size Matter in Firm Performance? Evidence from US Public Firms," and quoted by Ringui (2016), Lee (2009) established that total assets controlled by a firm as measured by the total assets have an influence on the level of profitability recorded from one year to another. Building on this same concept, Ogenche, et al. (2018) in their research titled "Effect of Capital Structure on Financial Performance of Consumer Goods Firms Listed in the Nairobi Securities

Exchange” quipped that large firms are associated with high profits as they enjoy economies of scale due to their mass production which gives them a competitive advantage over small firms. Further Ogenche, et al. (2018) added that large firms also have higher market share than their counterparts due to their penetration giving them a competitive advantage and that from these statements, it's clear that the size affects profitability in form of the preference of financial structure mix. As big companies have advantageous position in raising external funds easily from the capital markets, also there is less reliance on internal funds (Oyugi, et al., 2021).

Study by Montanya (2019) added that small firms suffer number of challenges because of their size that negatively affect their financial performance. He, therefore, in his conclusion found that firm size has a positive linear correlation with financial performance of firms. Firm size could be seen from many perspectives- market structure, level of turnover and profitability, asset's structure, or number of employees in an organization (Ogenche, et al., 2018). Firm size is commonly measured by either natural logarithm of assets, sales volume, or employees. In this study, firm size will be determined by the natural logarithm of total assets.

While researching on the impact of size on the capital structure choice of listed Nigerian firms on influencing their corporate financing strategy and performance analysis, Olakunle and Jones (2020) analyzed secondary data of 47 firms over a period 2013 to 2018 using Ordinary Least Squares regression analysis of natural logarithm of sales for firm size had results showing that firm size positively influenced firm performance of the listed Nigerian firms.

While studying the influence of firm-specific factors on capital structure of Kenyan insurance firms, between 2007 and 2017, using panel data methodology with firm size as one of the independent variables, Wahome, et al. (2019) concluded

that firm size significantly influenced capital structure. While Yadav (2020), on determinants of capital structure on financial leverage of selected Indian companies, found a negative correlation between firm size and financial leverage as measured using debt to equity ratio from the correlation and regression analysis results.

Study on the impact of Firm Size on Profitability was also done by Anafo et al. (2020). By collecting data, for the 2012 to 2018 period, from 17 banks listed at the Ghana Stock Exchange, used descriptive statistics and multiple regression models, revealed a positive and significant relationship between Firm Size (measured by natural logarithm of total assets) and profitability (measured by ROA).

While studying on the impact of capital structure on firm performance: case of processing and manufacturing industry in Vietnam, Do et al. (2022) concluded that firm size had a positive impact on Tobin's Q market value. This happens because large enterprise size promotes the brand and be widely known to the market. Widely, in addition, it also increases the consumption of the company's products, thereby improving the company's profits. It can be said that a large firm increase the value of the market, or a large firm will be valued in the market. Since then, the increase in the value of stocks of manufacturing companies is completely appropriate, and at the same time indicates that the Vietnamese stock market has achieved a certain level of efficiency. This result was similar to the conclusion of Mardones and Cuneo (2020). For purposes of this study, trade credit financing will be measured as total current liabilities divided by total debt.

Dao and Nguyen (2020) found that there is a negative influence of size (bank) on profitability. Nguyen et al. (2020) found that the profitability of the business organization is affected by the firm size, growth rate of sale, working on equity, and age of business organization.

Performance of Listed Energy and Petroleum Sector Firms

The financial structure of a firm plays a key role towards the performance of the firm as well as being of great importance to both the firm management and providers of funds. This can be further explained by the adage that a wrong mix of the components of financial structure, i.e. debt and equity, greatly affects the performance and eventual survival of the firm. The primary objective of the management of a firm is to maximize shareholders' wealth which is then reflected in the performance (profitability) and cash flows (Masavi *et al.*, 2021). According to Muraguri (2022), repayment of debt by the firm is borne out of a sound performance otherwise the lenders of debt risk suffering high losses of non-repayment increased risk of adverse performance of the firm investment ventures.

Performance is the measurement of the results from a firms' strategies, policies and operations in monetary terms as reflected by the firms' return on assets (ROA) and return on investments (ROI). Performance is measured by profitability, financial efficiency, and repayment capacity among other parameters (Oyugi, et al., 2021). According to Ng'ang'a (2017), ownership structure of a firm is a corporate governance platform that influences a firms' performance. This study will adopt the return on assets (ROA) in measuring performance.

MATERIALS & METHODS

Research Design

According to Masavi and Munyasi (2021), a research design is a blueprint or a clear plan on how to conduct research and helps the researcher to stick to the plan. This study was based on a correlational research design in view of the study research questions. This type of research design was critical in gathering required information concerning the status of the phenomena with the purpose of describing "what exist" with respect to the study variables.

Target Population

Target population is the study of the entire items or individuals over which the study findings are generalized (Muraguri, 2022). Creswell and Creswell (2023) defined target population as the group of individuals or participants with specific attributes of interest and relevance. The study targeted the four listed firms at the NSE, Kenya, under the Energy and Petroleum sector whose 7-year audited financial statements, period running from 2018 to 2024, was the focus of the study. The study was limited to the listed firms due to the non-availability of the data for non-listed energy and petroleum firms which were largely private and family businesses. The study unit of analysis were the listed energy and petroleum *firms* (the entities being studied) while the unit of observation were the *firm-year observations* (e.g., 4 firms $\times$ 7 years = 28 panel data points).

Sample Size and Sampling Procedures

A study sample refers the subjects from which the required information for the study is obtained (Do *et al.*, 2022). Mugenda and Mugenda (2003) defined sample size as the number of items involved in the study as the study respondents. They further defined sampling technique as the scientific process through which the sample elements are selected. The sampling technique is the method or mode of selecting a sample from a population (Nguyen & Nguyen, 2020). This study adopted a census method for purposes of analyzing the audited financial statements in arriving at detailed and well-informed conclusions since the target population of four listed firms was a small sample.

Data Collection Instrument

The study focused on the secondary data for the listed energy and petroleum firms over the 7-year period and hence there was no need for the researcher to approach individual respondents for data collection. Secondary data was downloaded from the audited and published financial statements

of the firms from the respective firms' websites. The researcher obtained a letter from the university that facilitated her obtaining of the research permit from NACOSTI as a requirement as well as permission for data collection. The data downloaded was quantitative and had been prepared in accordance with the International Financial Reporting Standards (IFRS). The study used a data collection sheet as a data collection instrument.

Data Analysis Procedures

Collected data was analyzed using the Statistical Package for Social Sciences (SPSS v29) together with Microsoft Excel software. Data was then analyzed using descriptive and inferential statistical tools (Arithmetic Mean, Standard Deviation, ANOVA and Regression & Correlation Analysis). Equity financing was measured by the equity ratio; (Equity divided by total assets); and Debt financing was measured using the debt ratio, (Total Liabilities divided by Total Assets) while firm size was measured by the natural logarithm of total assets.

The dependent variable financial performance of the energy and petroleum firms listed at the NSE was measured by Return on Asset (ROA) being the main ratio of income to its total assets (Masavi & Munyasi, 2021). A higher ROA reflected efficiency in the utilization of the resources by the firm. Correlation and Regression analysis were used to determine the relationship between the study variables, where the study had the simple linear regression models for each variable. The multiple regression model was adopted with full understanding of the key assumptions that hold the model true, which were that.

- there must exist a linear relationship between the independent variables and the outcome variable,
- Scatter plots can show whether there is a linear or curvilinear relationship,
- the residuals are normally distributed,
- the independent variables are not highly correlated with each other and finally,
- the error terms variance are similar across the independent variable values.

The study presented single linear regression models per variable as shown below;

Equity financing variable: $Y = \beta_0 + \beta_1 X_{it1} + \alpha_i + \varepsilon_{it} \dots \dots \dots \text{eqn} \dots (i)$

Debt financing variable: $Y = \beta_0 + \beta_2 X_{it2} + \alpha_i + \varepsilon_{it} \dots \dots \dots \text{eqn} \dots (ii)$

The following multiple linear regression models were used in the study.

$Y_{it} = \beta_0 + \beta_1 X_{it1} + \beta_2 X_{it2} + \varepsilon_{it}$ (without the moderator variable).....eqn.(v)

$Y_{it} = \beta_0 + \beta_1 X_{it1} + \beta_2 X_{it2} + \beta_3 (\mu_{it} * X_{it1} * X_{it2}) + \varepsilon_{it} \dots \dots \dots$ (With the moderator variable).....eqn. (vi)

Where;-

Y_{it} - Performance of Listed Energy and Petroleum Firms in Kenya

β_0 - Is a constant representing Performance when all other independent variables are zero.

$\beta_1, \dots, \beta_2$ - Are coefficients whose marginal change affects Performance correspondingly

β_3 - The interaction effect coefficient, which tests whether moderation is present

X_{it1} - Equity Financing

X_{it2} - Debt Financing

μ_{it} - Firm Size

$\mu_{it} * X_{it1} * X_{it2}$ - The interaction term

ε_{it} - Error Term

Presentation of the Findings

The primary objective of this study was to investigate the impact of financial structure on the performance of listed energy and petroleum sector firms in Kenya. The study objectives included; equity financing, and debt financing on financial performance of

energy and petroleum listed firms at the NSE in Kenya. Firm size was used to measure the moderating effect on the relationship between the independent variables and financial performance. The listed energy firms in Kenya included: Total Energies Marketing Kenya PLC, Umeme Ltd, KenGen PLC and KPLC Ltd. The descriptive statistics results per variables were presented as follows:

Equity Financing on Financial Performance

The study established the effect of equity financing on financial performance of energy and petroleum firms listed at the Nairobi Securities Exchange, Kenya. The equity financing variable was measured by equity ratio which was total equity (shareholders' funds) divided by firm total assets. The results were then tabulated as below;

Table 1: Equity Ratio

Variable	N	MIN	MAX	MEAN	STDEV	SKEW
TOTAL (K) Ltd	7	0.41	0.65	0.53	0.1	-0.354
UMEME Ltd	7	0.17	0.4	0.28	0.08	-1.176
KENGEN PLC	7	0.48	0.57	0.53	0.03	0.51
KPLC	7	0.16	0.24	0.20	0.03	2.104
AVERAGE				0.39	0.06	0.271

Source: Research Data, 2026

The findings on the equity financing variable indicated that Total Energies Marketing Kenya PLC had a mean of 0.53; SD 0.10, Skew -0.354), Umeme (K) Ltd (Mean 0.28, SD 0.08, Skew -1.176); KenGen PLC (Mean 0.53, SD 0.03, Skew 0.51) while KPLC (Mean 0.20, SD 0.03, Skew 2.104). the sector average mean was 0.39, which implied that firms with a mean greater than the sector mean (Total Energies Marketing Kenya PLC and KenGen PLC) stood a higher chance of accessing equity funds between the 2018 and 2024 study period, while Umeme (K) Ltd and KPLC

Ltd had lower chances of appealing to investors to inject more equity capital into their operations within the same period.

Debt Financing on Financial Performance

The study sought to establish the effect of debt financing on financial performance of the listed energy and petroleum sector firms at the NSE, Kenya. The debt financing variable was measured by total liabilities divided by the total assets. The findings were presented in the table below;

Table 2: Debt Ratio

Variable	N	MIN	MAX	MEAN	STDEV	SKEW
TOTAL (K) Ltd	7	0.35	0.59	0.47	0.10	0.354
UMEME Ltd	7	0.6	0.83	0.72	0.08	1.176
KENGEN PLC	7	0.43	0.51	0.47	0.03	-0.539
KPLC	7	0.76	0.84	0.80	0.03	-1.972
AVERAGE				0.61	0.06	-0.245

Source: Research Data, 2026

From the findings; Total Energies Marketing Kenya PLC revealed (mean 0.47; SD 0.10, Skew 0.354), Umeme (K) Ltd (Mean 0.72; SD 0.08, Skew 1.176), KenGen PLC (Mean 0.47; SD 0.03; Skew -0.539), while KPLC revealed a mean of 0.80; SD of 0.03 and a skewness of -1.972. The results

indicated an overall mean of 0.61 and SD of 0.06 with a -0.245 skewness. These results implied that both KenGen PLC and Total Energies Marketing Kenya PLC had the ability to pay-off their liabilities and even attract debt from financiers since they

returned means higher than the sector average mean over the period under study.

Firm Size Moderating Effect on Financial Structure and Financial Performance

The study sought to examine the role of firm size on the relationship between financial

structure and performance of listed energy and petroleum firms at the Nairobi Securities Exchange. Firm size was measured using natural log of total assets. The results were as presented in the table below;

Table 3: Natural Log of Total Assets

Variable	N	MIN	MAX	MEAN	STDEV	SKEW
TOTAL (K) Ltd	7	7.57	7.88	7.72	0.13	0.212
UMEME (K) Ltd	7	7.67	7.95	7.89	0.10	-2.486
KENGEN PLC	7	8.57	8.71	8.64	0.06	0.105
KPLC	7	8.51	8.55	8.53	0.02	0.926
AVERAGE				8.20	0.08	-0.311

Source: Research Data, 2026

The study findings in the above table showed that Total Energies Marketing Kenya PLC had a (7.72 mean; SD, 0.13; Skew, 0.212), Umeme (K) Ltd had (7.89 mean; SD, 0.10; Skew, -2.486), KenGen PLC had (8.64 mean; SD, 0.06; Skew, 0.105) while KPLC had (8.53 mean; SD, 0.02; Skew, 0.926). the findings revealed that KenGen PLC controlled huge assets between 2018 and 2024 hence able to generate more profits as compared to KPLC Ltd had (8.53 mean; SD, 0.02; Skew, 0.926), Umeme (K) Ltd had (7.89 mean; SD, 0.10; Skew, -2.486) and Total Energies Marketing Kenya PLC had a (7.72 mean; SD, 0.13; Skew, 0.212) that had less assets over the same period in a descending order respectively.

Financial Performance of Energy and Petroleum Listed Firms

The study sought to establish the extent to which financial performance of the listed energy firms was affected by the study independent variables for a seven-year period between 2018 and 2024. The study covered turnover, earnings after tax and total assets for measuring financial performance by ROA which was determined by dividing earnings after tax by total assets.

Return on Assets (ROA)

To establish the extent to which financial performance in the listed energy and petroleum sector firms was affected by the study independent variables for the seven-year period between 2018 and 2024, the study computed the Return on Assets ratio and presented the results as shown in the table below;

Table 4: Return on Assets (ROA)

Variable	N	MIN	MAX	MEAN	STDEV	SKEW
TOTAL (K) Ltd	7	5.23	8.93	7.11	0.176	-0.175
UMEME Ltd	7	4.44	8.35	6.69	0.212	-0.369
KENGEN PLC	7	3.26	6.9	5.02	0.205	-0.096
KPLC	7	-0.27	0.73	0.22	0.525	0.873
AVERAGE				4.76	0.2795	0.05825

Source: Research Data, 2026

The results showed ROA ratio of Total Energies Marketing Kenya PLC (Mean 7.11; SD, 0.176; Skew, -0.175), Umeme (K) Ltd had (mean 6.69; SD, 0.212; Skew, -

0.369), KenGen PLC had (mean 5.02; SD, 0.205; Skew, -0.096), and KPLC had (mean 0.22; SD, 0.525; Skew, 0.873). The overall sector averages revealed a mean of 4.76, SD

of 0.2795 and a skewness of 0.05825. The average mean of 7.11 implied that Total Energies Marketing Kenya PLC performed better financially between 2018 and 2024 compared to Umeme (K) Ltd (6.69) and KenGen PLC who had 6.69 and 5.02 means respectively that were more than the sector mean at 4.76. however, KPLC did not

perform well since its mean of 0.22 was way below the sector mean.

Interpretation of the Findings

Inferential Statistics

Correlation Analysis of Variables

The strength of the relationship among the study variables was measured using correlation analysis and the results tabulated as shown in the table below;

Table 5: Pearson Correlation Matrix

		Financial Performance	
Equity Financing	Pearson Correlation	0.552**	
	Sig. (2-tailed)	0.011	
	N	28	
Debt Financing	Pearson Correlation	0.576**	
	Sig. (2-tailed)	0.032	
	N	28	
Trade Credit Financing	Pearson Correlation	0.485**	
	Sig. (2-tailed)	0.007	
	N	28	
Firm Liquidity	Pearson Correlation	0.540**	
	Sig. (2-tailed)	0.005	
	N	28	

****Correlation is significant at the 0.05 level (2-tailed).**

Source: Research Data, 2026

The correlation analysis results established a strong and positive, albeit varied from one variable to another, significant relationship between each independent variable and the dependent variable, financial performance of listed energy firms. In a descending order: debt financing ($r = 0.576$, $p = 0.032$), and equity financing ($r = 0.552$, $p = 0.011$). These findings implied that financial structure affected the financial performance of the listed energy firms and was therefore responsible for the firms' financial performance. The results also indicated that the independent variables' effect on the financial performance of the listed firms changed in the same direction, suggesting that these variables could improve financial performance if well managed, particularly in the order they affected it. The results align with Shikumo (2021), who concluded that changes in financial performance can be positively attributed to changes in firm equity, and that financial growth is positively and significantly influenced by

share capital, which can be quantified by gains in market capitalization. While Kerongo et al. (2022) who concluded that liquidity positively influenced the financial performance of the non-financial enterprises listed at the NSE, Kenya.

Regression Analysis

The study examined the effect of financial structure on performance of energy and petroleum firms listed at the Nairobi Securities Exchange. The regression model was used to test the nature of the relationship between the variables. The dependent variable (financial performance) was measured by ROA while equity financing (by equity ratio), and debt financing (by debt ratio) were the financial structure components.

Regression Model

The analysis findings on the regression results helped in the construction of the regression model without the moderation

variable and with the interaction effect as in tables 6 below;
extracted from the SPSS v29 and presented

Table 6: Regression Coefficients

Variable	Coefficient	Dependent Variable: ROA		
		Std Error	t-Statistic	P-Value
Constant	0.13283	0.0521	2.54952	0.032
Equity Financing	0.09521	0.0297	3.20572	0.019
Debt Financing	0.19673	0.0481	4.09002	0.00526
R-squared	0.45371	Mean dependent var		11.3147
Adj. R-Square	0.20585	S.D dependent var		0.75481
S.E of regression	0.03125	Akaike info criterion		7.1543
Sum squared resid.	6128.09	Shwarz criterion		7.93451
Log. likelihood	-211.1104	Hannan-Quinn criter		7.6345
F-statistic	11.56471	Durbin Watson stat		1.4611
Prob. (F-statistic)	0.00000			
Constant	0.15737	0.04901	3.21098	0
Equity Financing	0.11524	0.03188	3.61481	0.00216
Debt Financing	0.23217	0.0481	4.82682	0.00231
Firm Size	0.24373	0.04066	5.99434	0.00015
R-squared	0.64581	Mean dependent var		12.24513
Adj. R-Square	0.5971	S.D dependent var		0.645237
S.E of regression	0.02553	Akaike info criterion		7.51677
Sum squared resid.	6459.78	Shwarz criterion		7.91745
Log. likelihood	-232.9025	Hannan-Quinn criter		7.6783
F-statistic	12.37132	Durbin Watson stat		1.77511
Prob. (F-statistic)	0.00000			

Source: Research data, 2026. Note: At 5% level of sig.

From table 6 above, a significant result of the F-calculated value, without the interaction effect ($F = 11.56471$) was reported which was greater than the F-critical value ($F = 2.80$) i.e. ($F = 12.37132 > 2.80$). The study therefore concluded that the model was reliable for establishment of conclusions on the study at 5% significance level and that there is a significant linear relationship between financial structure and financial performance of the listed energy firms (the dependent variable as measured by ROA).

Further, the regression results in Table 6, the relationship between the explanatory variables and the dependent variable without moderation was positive and statistically significant at a 5% level, and this was consistent with the correlation results as presented in Table 5 and the a priori expectation of $\beta_1, \beta_2 > 0$.

The constant was 0.13283 which was greater than zero. The coefficients; equity financing $\beta = 0.09521$, and debt financing $\beta =$

0.19673 were used in building the multiple linear regression model. From the model, debt financing bore the highest effect on financial performance, followed by equity financing, respectively. The regression model (without moderation) extracted took the form below;

$$Y_{it} = \beta_0 + \beta_1 X_{it1} + \beta_2 X_{it2} + \varepsilon_{it}$$

$$Y_{it} = 0.15737 + 0.09521X_{it1} + 0.19673X_{it2}$$

While the data analysis of the multiple regression model coefficients with the interaction effect were as presented in Table 6. The table depicted a positive beta coefficient of equity financing (0.11524, $p < 0.05$), and debt financing (0.23217, $p < 0.05$) and firm size (0.24373, $p < 0.05$). This implied that the constant, independent variables and the moderating variable (Firm Size) significantly contributed to the model. The findings further indicated that when financial structure was moderated by firm size, it explained 64.58% (R^2) of the changes in the financial performance of listed energy firms compared to the R^2 value

without the interaction effect at 45.37%. Therefore, firm size moderated up to 19.21% of the relation between financial

structure and financial performance of listed energy firms.

The multiple regression equation was presented as follows:

$$Y_{it} = 1.5248 + 0.2057X_1 + 0.3058X_2 + 0.2501 * X_1 * X_2 * X_3 * X_4$$

The model was concluded to be paramount in the provision of relevant information/data for the prediction of financial performance from the independent variables together with the moderating variable (Oyugi et al., 2021).

The results agreed with those by Oyugi et al (2021) who concluded in their study that firm size, both in terms of total assets, positively affected/influenced financial performance. The marginal changes in the coefficients, when tested with and without the moderating factor, indicated how the Return on assets (ROA) was affected or influenced by a unit of relevant financial structure with the moderator variable. It is imperative to note that firm size had a moderating effect on the relationship between financial structure (equity financing, and debt financing) and financial performance of listed energy firms in Kenya.

These findings agreed with Ngue et al. (2023) who found a positive moderating effect of firm size on the relationship between financial structure and performance in their study.

Hypothesis Testing

The following hypotheses were tested by the study in line with the independent variables and the moderating variable:

H₀₁: Equity financing has no effect on financial performance of energy and petroleum firms listed in Kenya

From the multiple regression table above, the research analysis findings on the effect of equity financing on financial performance of the listed energy firms, was 0.11524 while the p-value was 0.00216 which was less than 0.05 significance level ($0.0216 < 0.05$). The result revealed a statistically significant and positive

relationship between equity financing and financial performance as measured by ROA. Therefore, from the research findings, the first hypothesis that stated that equity financing had no effect on performance of listed energy and petroleum sector firms in Kenya; was rejected.

H₀₂: Debt financing has no effect on financial performance of energy and petroleum firms listed in Kenya

The second study research hypothesis stated that debt financing had no significant influence on financial performance of the listed energy firms at the NSE, Kenya. The research findings showed a debt financing coefficient in a multiple regression model of 0.23217 and p-value of 0.00231 which was less than the level of significance used at 0.05. This showed the strongest positive and significant relationship between debt financing and financial performance, thereby negating the hypothesis statement. Hence, the null hypothesis statement, which stated that; debt financing had no effect on performance of listed energy and petroleum sector firms in Kenya, was rejected.

H₀₃: Firm size has no significant role in the relationship between financial structure and financial performance of energy and petroleum firms listed in Kenya.

Finally, the study tested the null hypothesis that; Firm size has no significant role in the relationship between financial structure and financial performance of energy and petroleum firms listed in Kenya. The findings indicated a positive relationship and a significant moderating effect of firm size on the relationship between the financial structure (equity financing, debt financing, trade credit financing, and firm

liquidity) and financial performance of the listed energy firms at a coefficient of 0.24373. with a p-value of 0.00015 which was less than the study level of significance of 0.05. These results indicated a moderating influence of firm size on the study independent variables, and financial performance (ROA) which was statistically significant, and hence the rejection of the moderator null hypothesis.

CONCLUSION

The study conclusions were reached in relation to the findings of the effect of the explanatory variables; equity financing, and debt financing on the predicted financial performance of the listed energy firms in Kenya. Each explanatory variable conclusion was as indicated below:

Equity Financing on Financial Performance

From the coefficient value and at a significance level of 0.05, the relationship between equity financing and financial performance of the listed energy firms in Kenya was considered significant. This led to a conclusion, and with the variable bearing the second strongest effect on financial performance, that the firms raised funds from shareholders as the second alternative before considering other options to finance their projects.

Debt Financing on Financial Performance

As the second independent variable of the study, its effect to performance of energy and petroleum sector firms listed at the NSE, Kenya was measured and from the findings, the coefficient value indicated a positive relationship between debt financing and financial performance of the listed energy firms in Kenya, which was considered significant. It was concluded that the listed energy firms' debt ratios were well managed and that they significantly affected financial performance.

The Moderating effect of Firm Size

The results indicated a positive and significant moderating effect of firm size on the relationship between financial structure and financial performance of the listed energy firms in Kenya. From the results, it was concluded that firm size had an overall moderating effect on the study explanatory variables towards financial performance of the listed energy firms in Kenya (dependent variable).

Recommendations

The study drew the following recommendations from the findings of each study objective:

Equity Financing

From the study findings, equity financing positively affected financial performance of the listed energy firms in Kenya, at $\beta=0.11524$. This led to the recommendation that firms need to rely on equity financing, where appropriate, in order to overcome the massive related interest expenses payable whenever other sources like debt financing are adopted. This is in line with the recommendation made by Kabando et al. (2021). The study also recommended that listed energy and petroleum listed firms with high levels of current assets should consider the use of equity financing for their daily operations (Oketah & Ekweronu (2020).

Debt Financing

The findings of the study revealed a positive and statistically significant association between debt financing and financial performance. Being the strongest effect on performance of the four variables ($\beta=0.23217$), it was recommended that the listed energy firms should use more debt to grow profitability to benefit on the tax-shield benefits that come with it.

Declaration by Authors

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