

**PROFITABILITY, LEVERAGE, EFFICIENCY AND FINANCIAL DISTRESS  
IN COMMERCIAL AND MANUFACTURING STATE CORPORATIONS IN  
KENYA**

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## DECLARATION

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## **DEDICATION**

I dedicate this work to my dearest wife MeryDinah, our children, James Njoroge, Sowannah Gathoni and Dishon Oyoya for their sincere love and moral support during the hard times of COVID-19 pandemic, the time I was conducting this research and in honour of my late parents, James Kibe and Beatrice Muthoni for nurturing me to become a responsible citizen. May their souls rest in eternal peace.

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## OPERATIONAL DEFINITION OF TERMS

### **Commercial and Manufacturing**

#### **State Corporations**

Government Owned Enterprises whose mandate is to offer specific services and goods at a subsidized price.

#### **Efficiency**

Operating efficiency gauges how successfully a state corporation engages its assets to create revenue. This variable was proxied by working capital turnover ratio.

#### **Financial Distress**

A condition where state corporations cannot generate sufficient revenues to meet their financial commitments. In this study, financial distress was proxied by Altman's Z-Score.

#### **Financial Leverage**

Use of debt to finance asset purchase with expectation that the assets will generate incomes that surpass borrowing costs. In this study, leverage was proxied by total liabilities to total assets ratio.

#### **Profitability**

Capacity of company to generate revenue using its assets to meet operational expenditures. In this study, profitability was proxied by return on asset measured by net profit to total asset ratio.

#### **Size of a State Corporation**

Refers to quantity of investment in terms of assets, human resource capacity or turnover. Firm size was proxied by logarithm of total assets.

## **ABBREVIATIONS AND ACRONYMS**

<b>EAPCC</b>	-East African Portland Cement Company
<b>ISC</b>	-Inspectorate of State Corporations
<b>KBC</b>	-Kenya Broadcasting Corporation
<b>NACOSTI</b>	-National Commission for Science, Technology and Innovation
<b>ROA</b>	-Return on Assets
<b>SCAC</b>	-State Corporations Advisory Committee
<b>SOEs</b>	-State Owned Enterprises
<b>STATA</b>	-Statistical Software for Data Sciences
<b>TARDA</b>	-Tana and Athi River Development Authority

## ABSTRACT

Since attainment of independence to date, the Government of Kenya has heavily funded and invested in various State Corporations. In spite of this State funding, Commercial and Manufacturing State Corporations continue to struggle financially and have resorted to the Government for debt bailouts and on many occasions, the accumulated losses have eaten up these State Corporations, leaving huge loans that are paid from the exchequer. In recent years, the Government of Kenya has spent billions of shillings to fund the recovery of various cash strapped State Corporations which have not been able to honour their debt obligations. The increased number of State Corporations facing financial crisis in the recent past therefore prompted this study. The major goal was to investigate effect of profitability, leverage, and efficiency on financial distress in Commercial and Manufacturing State Corporations in Kenya. Consequently, specific objectives included; determine effect of profitability on financial distress; analyse effect of leverage on financial distress and to establish effect of efficiency on financial distress in Commercial and Manufacturing State Corporations in Kenya. The study also attempted to determine moderating effect of firm size on relationship between profitability, leverage, efficiency and financial distress. The study adopted positivist philosophy that required researcher to be independent of the study. Explanatory non-experimental research design was used in the study. For the purposes of this study, a census of 25 Commercial and Manufacturing Corporations was employed in study. Study used Secondary data from audited accounts of State Corporations for period 2015-2021 in analysis. Data was obtained from office of auditor general and Kenya Parliament digital library. Researcher used Logit Regression Model to analyse quantitative data. Diagnostics tests included multicollinearity, heteroscedasticity and likelihood ratio and Hosmer-Lemeshow goodness of fit tests. Study used STATA Version 13.10 statistical software to analyse data and findings presented using tables. Results indicated that profitability, leverage and efficiency were statistically significant to financial distress. However, the moderating influence of firm size on the relationship between profitability, leverage and efficiency was statistically non-significant to financial distress. The study recommended that in order to increase profitability, Commercial and Manufacturing State Corporations should improve their operational efficiency and reduce leverage (use of debt) particularly the government guaranteed loans. The study concluded that there is a dire need by State Corporations to reduce reliance on government loans and bailouts by engaging efficiently in profitable ventures that would maximise the wealth of the firm. The study also concluded that profitability, leverage and efficiency were useful ratios to management, those charged with governance and users of financial statement information in detection and mitigation of financial distress. Findings are also useful to the government by providing an insight of distressed firms so that the exchequer can know and make prudent decision on the distressed State Corporations that require financial bailouts.

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the Study**

Economies of countries and financial well-being of people all around the world rely heavily on State Corporations (Gersonskaya, 2020) and (Putnins, 2015). State Corporations serve as the basis for the formulation and implementation of State policies (Maina, 2020). State Corporations act as strategic co-ordinators of government activities by supporting positive institutional and structural economic reforms towards achieving the objectives (Onyango, 2016).

Many Governments are facing the problem of bailing out Public Corporations that offer vital services and whose collapse would bring dire economic consequences to economy of a country (Hamdamov, 2017). While many State Owned Agencies across the globe continue to be a drain of exchequer resources, some countries have seen the greatest success in terms of having financially non-distressed State Corporations. Non-distressed state corporations for instance characterize Norway while China's State Owned Corporations have been spurred on by various events, which include increased autonomy and impacts of market forces (Koch, 2016).

In recent years, the Government of South Africa has been bailing out several debts stricken State Corporations. Among these State Corporations is the power producer Eskum Holding limited which is attributed for 82% of the 162 Billion Rands Government bailouts. By financial year ending December 2016, State Corporations in South Africa has accumulated debts to the tune of \$33.1 Billion (Mbatha, 2020).

Over the past fiscal years, the government of Kenya has heavily invested in various State Corporations in Kenya. In spite of this state funding, various State Corporations continue to struggle financially and have resorted to the government for debt bailouts. On many occasions the accumulated losses have eat up State Corporations, leaving huge loans that are paid from the exchequer. Keeping these struggling State corporations in operation is a huge cost to the taxpayer and government (Harris et al, 2020). The mandate of Commercial and Manufacturing State Corporations is to perform a commercial role of wealth creation through profit maximisation (Fiebelkom et al., 2021). Despite their efforts to keep expenses down, these State Corporations continue to struggle financially, necessitating Government assistance (Mihyo & Mukuna, 2018).

Ikpesu (2019) identifies profitability, liquidity and Size to be firm specific predictors of financial distress among State Corporations in Nigeria. Baimwera and Muriuki (2014) identify profitability, leverage, and growth as major indicators of financial distress in Kenyan Security Exchange-listed companies. Continuing poor financial health among Commercial and Manufacturing State Corporations in Kenya, which have depended significantly on government for debt bailouts prompted this research. This study therefore seeks to investigate effect of profitability, leverage and efficiency on financial distress and the moderating effect of firm size on the relationship between profitability, leverage and efficiency in Commercial and Manufacturing State Corporations in Kenya from fiscal years 2015 to 2021.

### **1.1.1 Financial Distress**

Financial distress occurs when a company fails to fulfil its contractual commitments of its creditors (Amoa-Gyarteng, 2019). According to (Tinoco & Wilson, 2013), business bankruptcy is an option that may be necessary in the event of financial distress. According to (El-Ansary & Bassam, 2019) a company is considered financially distressed when its operational income is negative in two consecutive years. According to (Sautner & Vladimirov, 2016) managers need persuasive arguments to convince internal and external stakeholders to continue doing business with a financially challenged organization.

El-Ansary (2019) notes that predicting financial distress is critical since it signals an early warning on defaulting risks for firms and therefore a very crucial concern of an economy. Rezende et al., (2017) argue that when firms are not able to pay their debt obligations and operating expenses exceed operating income in two consecutive years, they are considered financially distressed. According to Gyarteng (2019), legal fees paid for bankruptcy proceedings are examples of direct costs of financial distress.

Opler & Titman (1994) identifies failure, insolvency and bankruptcy as the typical circumstances that constitute financial distress. Large debts, abrupt and unplanned expansions in a tense competition could also lead to financial distress (Ngwa, 2016). A business environment with high inflation rates, political and civil unrests, high interest rates and corruption would bring about financial distress (Maina, 2018).

### **1.1.2 Profitability**

Profitability is capability of a firm to keep realizing gains by increasing revenues and investments in assets (alemu, 2015). Profits are thus the gains realized when incomes surpass firm's operating expenses. Financial distress is detrimental to a company's

profitability by way of direct and indirect costs. Indirect costs include debts while direct-costs include legal costs, loss in market shares and administrative expenses. Finishtya (2015) used net income divided by total assets (ROA) in assessing influence of profitability on distress. Profitability measured emerged significant in financial distress prediction.

### **1.1.3 Leverage**

Leverage refers to segment of stock and debt used to finance a firm. Without issuing stock, a firm might use debt financing to fund operations and acquire assets. It is riskier to employ debt financing than common equity since it needs mandatory interest payments and a return on the investment (Shaked & Altman, 2016). In global financial crisis (2008-2015), financial leverage was a key determinant of financial distress and firms that did not employ debt financing efficiently and prudently were more exposed to financial risks and high costs of borrowing which increased financial distress risk (Zeitun & Saleh, 2015).

According to Kosikoh (2014), use of debt significantly affects distress and highly geared companies tended to respond financially by way of debt restructuring and dividend cuts to lower distress risks. According to research by Nyamboga (2014), high leverage ratios are indicators of a huge proportion of debt to equity and during favourable operating conditions, highly leveraged firms recorded better returns on their investments compared to highly leveraged companies operating in dire conditions. This study employed total liabilities to asset ratio in measuring leverage. Higher liabilities to total assets ratio imply the company was susceptible to distress risk (Sporta, 2018).

#### **1.1.4 Efficiency**

Operational efficiency is realized when a firm uses available resources profitably, judiciously and efficiently in accordance with firm's financial policies relating to operations (Dhillon and Vachhrajani, 2012). Ability of a company to produce and deliver services to and goods to merchants and clients cost effectively while maintaining the product and service quality (Olalere et al., 2015). According to Azad et al (2018), firms that productively engage their assets in their daily operations are said to be efficient in their operations. Azad et al. (2018) notes that different operating efficiency ratios such as assets and debts turnover ratios, working capital and stock turnover ratios were suitable proxies to measure operational efficiency.

Improving operational efficiency directly affects firm's profitability because efficient enterprises are more cost effective. Since efficient firms do better than inefficient ones, management and those charged with governance should therefore pursue aspects related to operational efficiency. Efficiency ratios variously called activity ratios and expressed as turnover include; inventory turnover, debtors turnover, creditors turnover, capital turnover, total assets turnover, fixed assets turnover and working capital turnover ratio (Dhillon & Vachhrajani, 2012). To measure operational efficiency, this study used to work capital turnover ratio, which was proxied by Cost of Sales (direct costs) to working capital. This ratios measures efficiency of working capital employed. High working capital turnover ratio implies greater efficiency in firm's operations and sound financial health (Sporta, 2018).

#### **1.1.5 Firm Size**

Various studies on effect of profitability, leverage, efficiency and liquidity on financial distress have yielded contradicting and ambiguous results. Some studies findings giving

negative and others reporting positive relationships (Azeez, 2015). This ambiguity has resulted due to failure of researchers to model the role of firm size on relationship between predictor variables and financial distress (Ibhagui & Olokoyo, 2018). According to a study by Ibhagui & Olokoyo, (2018), negative influence of leverage on financial performance is very evident and significant in small firms and evidence of negative effect reduces as the firm grows. The moderating effect of firm size on the relationship between profitability, leverage and efficiency in State Corporations was therefore incorporated in this study to better understand the role of firm size and its effect on financial distress.

According to study by Dirman (2020), firm size is the asset base a company holds and can be very useful in predicting financial distress because companies with a bigger asset base appear to be stronger and less likely to plunge into financial distress. According to Wangsih et al (2021), companies with huge asset base have a less probability of being financially unhealthy by the virtue of them having reached a maturity level. Oktasari (2020) categorizes size as either log of assets, quantity of total assets, log or market valuation of firm's shares. In their study, size of a company can affect the ability of a firm to contain financial distress risk and size significantly and positively affects financial distress.

Isayas (2021) measured firm size by logarithm of aggregate asset base and established that size significantly affected financial distress suggesting firms with big asset base were out of the financial distress zone. To measure the size of a Commercial and Manufacturing State Corporations, this study used the logarithms of total assets.

### **1.1.6 Commercial and Manufacturing State Corporations in Kenya**

Chapter (466) section 3 of State Corporations Act defines a State Corporation as an entity in which Government owns majority or all of the shares, or a Corporation in which Government owns majority or all shares in accordance with Chapter 486 of the companies Act (SCAC, 2022).

Kenya's economic development, as well as the State's technical capacity to aid and enable national development, are heavily reliant on these Corporations. As a result, they are crucial in developing countries. State Corporations are vital to a country's economic well-being and expected to make major contributions towards growth and development (ISC, 2021). State Corporations in Kenya fall into eight major functional categories: Commercial and Manufacturing; financial; Public Universities; Regulatory; Service; Tertiary education; Training and Research and Regional Development.

In Kenya, the Inspectorate of State Corporations (ISC) is responsible for advising the Government on issues affecting the successful running of State Corporations. In Kenya, Commercial and Manufacturing State Corporations are expected to play a key role in wealth creation. However, majority of these State Corporations have not been financially performing well. According to a report by Presidential Task Group on State Corporation Reforms (2013) and IMF (2018), notable State Corporations in the Sugar sector with huge debts guaranteed by the Government included Chemelil, Mumias, Nzoia and Muhoroni Sugar Companies (Otuki et al., 2019).

In fiscal years 2017 to 2019 State Corporations with outstanding debts, include Kenya Airways, Numerical Machining Complex, Kenya Ports Authority, Kenya Railways, Kenya Broadcasting Corporation, Kenya Meat Commission, East Africa Portland Cement Company (EAPCC), Tana Athi Development Company (TARDA) and Kenya

Electricity Generating Company (Kimia, 2019). In the last decades, the Government of Kenya has spent billions of shillings in bailing out the above cash strapped Commercial and Manufacturing State Corporations (Macharia, 2020).

**Table 1.1 Performance Results for State Corporations**

<b>Grading</b>	<b>Corporations</b>	<b>Percentages (%)</b>
Excellent	18.00	7.600
Very-Good	102.00	43.200
Good	97.00	41.100
Fair	19.00	8.100
Poor	0	0
<b>Total</b>	<b>236.00</b>	<b>100.00</b>

**Source: National Treasury (2022)**

As shown in Table 1.10 above, from 236 corporations, 120 that represent 50.80% achieved annual performance targets but 116, representing 49.20% could not. This Analysis on performance of Corporations imply improvement of performance in fiscal year 2021/2022 compared to that of fiscal year 2020/2021 because average aggregate score improved from 3.119100 to 3.003600.

**Table 2.2 Evaluation using Functional Category**

<b>No.</b>	<b>Category</b>	<b>Mean composite score</b>
1	Public Universities	2.775200
2	Training and Research	2.919600
3	Service	2.935100
4	Financial	2.977300
5	Regulatory	3.073400
6	Regional Development	3.100100
7	Tertiary-Education	3.100500
8	Commercial & Manufacturing	3.346000

**Source: National Treasury (2022)**

As per table 1.20 above, best performing State Corporation by functional category in financial year 2021/2022 is Public Universities while Commercial and Manufacturing is worst performing. Public Universities were best performing by functional category in fiscal year 2020/2021 and Commercial and manufacturing category was worst performing in same period. In comparison to performance evaluation outcomes for year 2020/2021, most improved functional-category, as per composite-score is Regional-Development Authorities, while Regulatory category was highly deteriorated.

## **1.2 Statement of the Problem**

State Corporations are key sector players expected to exercise their mandates to enable the actualization of Kenya vision 2030 by providing services and goods that will result into a thriving and globally competitive economy. The vision 2030 goals are thus only achievable when these State Owned Enterprises are financially sound. A review by Kenya State Corporation Review (2021) indicated that various State Corporations received grants and bailouts from the exchequer but failed to provide enough economic value to make a net gain to the Government. Cash strapped Commercial and Manufacturing State Corporations continues to struggle financially are in dire need of Government assistant to bail them out of guaranteed loans and pending bills. In Kenya, various studies on financial distress have laid emphasis mainly on effects of micro and macroeconomic factors on financial distress of Companies listed at country's stock exchange Market.

Other scholars in Kenya explored impact of financial and non-financial factors and distress of Companies trading at the Kenyan Securities Market. The studies include those by; Kihooto et al., (2016), Muigai (2016), Maina & Sakwa (2017), Wangige (2016), Onchangwa (2019), Kanyugi (2016), Atosh & Iraya (2018), Muigai & Nasieku

(2021). Other studies have focused on financial distress in Insurance firms and local authorities (Kosikoh, 2014) and (Ntoiti, 2013) respectively. Since most of studies above focused on financial distress of Companies trading at National Securities Exchange market, little research conducted on financial distress in Kenya's State Owned Corporations. As a result, there is lack of enough studies in Kenya relating to financial distress of State Corporations.

### **1.3 Objectives of the Study**

#### **1.3.1 General Objective**

Examine effect of profitability, leverage and efficiency on financial distress in Commercial and Manufacturing State Corporations in Kenya.

#### **1.3.2 Specific Objectives**

- i.** Determine the effect of profitability on financial distress in Commercial and Manufacturing State Corporations in Kenya.
- ii.** Determine the effect of leverage on financial distress in Commercial and Manufacturing State Corporations in Kenya.
- iii.** Establish the effect of efficiency on financial distress in Commercial and Manufacturing State Corporations in Kenya.
- iv.** Establish the moderating effect of size on relationship between profitability, leverage, efficiency and financial distress in Commercial and Manufacturing State Corporations in Kenya.

### **1.4 Research Hypotheses**

**H<sub>01</sub>** There is no statistically significant relationship between profitability and financial distress in Commercial and Manufacturing State Corporations in Kenya.

**H<sub>02</sub>** There is no statistically significant relationship between leverage and financial distress in Commercial and Manufacturing State Corporations in Kenya.

**H<sub>03</sub>** There is no statistically significant relationship between efficiency and financial distress in Commercial and Manufacturing State Corporations in Kenya.

**H<sub>04</sub>** Firm Size does not moderate the relationship between profitability, leverage and efficiency on financial distress of Commercial and Manufacturing State Corporations in Kenya.

### **1.5 Significance of the Study**

Results of this study are to be practically and theoretically useful to stakeholders. First, regulatory bodies such as the Government, Advisory Committee of State Corporation, Presidential Task Force on State Corporation reforms and Inspectorate of State Corporations can apply the findings for policy improvement and financial distress management. In this study, researchers from Kenya's Commercial and Manufacturing State Corporations will get new insights into, knowledge about, and a theoretical framework on effect of profitability, leverage and efficiency on financial distress. The models developed can be useful to those intending to research in this sector. Scholars can use the recommendations contained in this study for future research and as a foundation for their own investigations. The management and those charged with governance of State Corporations in Kenya will also derive benefits from the study findings. They will understand the linkages between profitability, leverage, efficiency and financial distress, which in turn will inform sound policymaking. Suppliers and providers of credit facilities can also use the findings in assessing the risks of advancing credit to the affected State Corporations and do a credit rating.

## **1.6 Scope of Study**

The Study was on a census of all 25 Commercial and Manufacturing State Corporations whose audited accounts were available. These State Corporations formed analysis units of study and observations made from audited accounts of commercial and manufacturing state-corporations. The research period was 2015-2021 since it is around this time that the Kenyan government bailed out numerous cash-strapped State Corporations. The study focused on financial distress factors consistent with the theories applied. Study observed financial distress factors from published accounts of these State Corporations. Financial distress factors used included profitability, leverage, efficiency and firm size.

## **1.7 Limitations of Study**

Of the 33 commercial and manufacturing state corporations, only twenty-five corporations availed their audited financial statements while eight State Corporations did not avail their audited accounts thus reducing the size of the study population to twenty-five out of 33. Study used Panel data on a census of the twenty-five State Corporations, which increased the observations over a seven-year study period thereby increasing the quantity of data and improving quality of research analysis.

## **1.8 Organization of Study**

The study has five chapters. Chapter 1 contains study background, statement of problem, general and specific objectives, hypotheses and scope and significance of study. Chapter 2 reviews theories used and an empirical review of various literatures of study. Third chapter outlines the methodology used to realize aims of the study. Chapter 4 dwells on outcomes obtained after conducting analysis and lastly chapter 5 gives an outline of summaries, conclusions and recommendations.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This section looked critically at existing theories and studies on financial distress and the independent variables. Study used a diagrammatic framework to demonstrate the links between the variables under investigation and in addition, a review of pertinent theories. The chapter laid an emphasis on financial distress theories, independent variables (profitability, leverage and efficiency), research gaps and findings from previous researchers. The literature review encompassed local and foreign studies on financial distress.

#### **2.2 Theoretical Review**

This study relied on Agency, Stewardship, Efficiency, Pecking order and Trade-off theories.

##### **2.2.1 Agency Theory**

Postulated by Jensen & Meckling (1976), this theory relies on a Principal-Agent connection. According to Jensen and Mackling's agency theory (1976), managers may run their organisations to further their own agendas rather than the interests of shareholders. According to agency theory, debt financing inhibits managers' inclination towards self-serving and opportunistic conduct. According to Monks & Sykes (2017), a company's directors are obligated to manage the business to optimise cash flows, earnings, and long-term returns to shareholders. Park and Jang (2013) assert that debt financing reduces the company's free cash flows by requiring fixed interest payments, which in turn compels management to avoid riskier initiatives and act in the best interests of shareholders.

If the management compromise efficiency, the firm will not achieve wealth maximization objective in the end (Minoja, 2012). This theory views the firm as a black box operating for purposes of maximizing its profits and values. Effective teamwork and coordination among the involving parties in the firm's operations help realize Wealth maximization of Principals. However, parties have varying preferences and interests, which often bring about conflicting relations in the work place. An agency relationship comes into existence in the case where the actions of particular individual impacts on both the individual's welfare as well as that of another or other persons as contained in a binding contractual relationship. This theory was very vital in defining financial distress in Commercial and Manufacturing State Corporations because there exists contractual relationship between the State and all the State Corporations through performance contracting.

According to Jensen & Meckling (2019), capital structure can reduce agency conflict by raising debt levels. Managers should make lucrative investments in order to maximise shareholder value. Selfish actions by the heads of State Corporations such as mismanagement, excess debts and poor liquidity management decisions may trigger financial distress in these government owned enterprises. Based on the postulations of agency theory, therefore, this study sought to assess whether use of debt financing (Leverage) had any effect on financial distress of Commercial and Manufacturing State Corporations in Kenya. The study also sought to examine the nature of such effect on financial distress. This theory therefore supported leverage variable in this study.

### **2.2.2 Stewardship Theory**

Proposed by Donaldson & Davis (1991), the theory asserts that directors may achieve goals of a firm by utility maximization rather than fulfilling their self-interests.

This theory asserts that if managers worked with discretion they would pursue interests of the firm. This theory states that managers carry out their duties because they want to perform to a satisfactory level. According to Donaldson & Davis (1991) managers are driven by a desire to succeed and find intrinsic fulfilment by taking on difficult tasks, exerting their power, and winning the respect of their subordinates and superiors. According to this theory, the major goal of managers of a company is to maximise shareholder wealth. The theory claims that if left alone, managers act as responsible stewards of assets under their care, with the goal of achieving organisational objectives. This behaviour of management eventually helps the principals by raising earnings per share (Omware et al., 2020). The directors and management of a business work together as a stewardship team, and in order to fulfil the wealth maximisation aim, management and those responsible with governance must perform effectively to guarantee that shareholders receive a return on their investment (Davis et al., 1997).

Lungatso and Otuya (2019) assert that stewardship theory serves as a source of motivation for managers, taking the role of agency theory's lack of faith in authority and desire for moral behaviour that enhances a firm's success. Scholars agree that monetary incentives motivate managerial behaviour and the need for wealth maximization by managers. Stewardship theory further highlights that career advancement and a positive reputation inspires management to best act in interests of shareholders, maximising wealth thus reducing agency costs (Glinkowska & Kaczmarek, 2015). Stewardship theorists suggest that organisations must establish structures that allow for the harmonisation of goals that managers and shareholders must attain in order to achieve greater performance. In stewardship theory, agents prioritise the firm over their own interests by working effectively and considering

themselves significant human resource to the firm. Stewardship theory contends that intangible or non-financial motivators prevent opportunistic managerial behaviour (Isaac, 2022). Since management and those charged with governance (Stewards) of Commercial and Manufacturing State Corporations are expected to protect and maximize shareholders' wealth through performance, the arguments of stewardship theory supports the financial distress variable in the study.

### **2.2.3 Efficiency Theory**

Introduced by Demesetz in 1973, this theory is about “x-efficiency” and “scale efficiency” hypotheses. The first hypothesis asserts that management of organizations have in place adequate organizational practices where they are able to have control costs incurred while increasing earnings (Fisseha, 2015). The second proposition (scale-efficiency hypothesis) suggest that sound institutions lead to lower costs, and help attain operational scales. Ultimately, lower costs lead to improved profitability, increase growth of institutions that are scale-efficient (Frantz, 2013). Efficiency theory holds the assertion that scale economies and most efficient production are achievable and optimum efficiency can be attained at an output level if economies of scale are fully utilized (Niresh &Thirunavukkarasu, 2014). The theory further asserts that corporations with experienced managers and updated technologies can minimize costs and increase firm value.

Economic efficiency theory, which focuses on allocative and proactive efficiency and holds that firms should achieve their output by incurring the least possible costs on each output unit produced to realize economies of scale (Barus et al., 2017). Allocative efficiency occurs when all industry players charge an optimal price for their goods and services. With regard to commercial and manufacturing state corporations, productive

efficiency is achieved when resources are employed efficiently to maximise production at lowest inputs without compromising quality. Productive efficiency in state corporations is realized by investing in low risk portfolio of assets such as government bonds and bills.

In view of this study, efficiency theory holds the view that the stability or financial distress of institutions is a function of internal decisions by managers and policies of an institution. It is worth noting that institutions are impacted by both internal and external attributes (Ang & Longstaff., 2013). The nature and manner of addressing these attributes impacts on the general operations of institutions. The postulation of this theory argues that improvements in operational scale efficiency lead to increased performance and in turn decreasing likelihood of financial distress. Higher earnings obtained through efficiency ensures cost minimization and income maximization. The more efficient a company's operations are, the less likely it will face financial difficulties in its day-to-day operations.

Efficiency theory was therefore relevant in the study since it guides in cost reduction and making prudent investment decisions to reduce the risk of financial distress. Efficiency Theory's postulation therefore supported relationship between operating efficiency and financial distress in Commercial and Manufacturing State Corporations.

#### **2.2.4 Pecking Order Theory**

Proposed by Donaldson in 1961, later popularized by Myers in 1984, pecking order theory, which supports financial leverage variable in this study, asserts that companies choose to utilize internal sources of funds before engaging in external sources of funds in order to maintain firm stability. Myers (1984) argues that in case external financing is required, firms should use safest security starting with debt or convertible securities

and equity issued only as last option. Myers (1984) argues that firms stick to hierarchy of finance sources and prefer internal sources if available and in case external funding be needed firms would prefer debt over equity (Siro, 2013). If frequently used to fund the firm's operations, debt financing may expose a firm to financial risks especially if the company is having difficulty meeting recurring obligations (Wesa & Otinga, 2018). Pandey and Sing (2015) concurred with Myer's (1984) postulations that management of firms preferred to employ internal sources of funds and would issue share as a last resort due to the relative cost of financing options.

Internal sources of funds are preferred over external sources by companies because they are cheaper as seen in studies by Daskalakis et al., (2013), Jabeen et al., (2021) and Baker et al.,(2020) who concluded that firms had a hierarchical order of financing preferences and that firms preferred internal sources of funds over external equity. Pecking order theory recommends that firms should balance various sources of finance available to them in order to maximize firm value and increase firm stability (Muigai & Muriithi, 2016). Pecking-order theory therefore supported the relationship between leverage and financial distress in Commercial and Manufacturing State Corporations.

### **2.2.5 Trade-off Theory**

Modigliani and Miller (1958) developed various capital-structure theories used in decision making with regard to preferences for debts with many literature reviews indicating dominance of trade-off and pecking-order theories in firm's capital-structure decision (Ahmadimousabad et al., 2013). The theory stipulates that use of debt in financing a company's operations maximise its value. The theory also points out that firms should have limits on use of debt since excess debt would reduce value of firm plunging the company to financial risks and distress. In addition, it recommends an

optimal capital structure attained by maintaining a balance between cost borrowing and gains realized from borrowing (Ikpesu, 2019). Trade off theory promotes use of leverage in building capital structures by acquiring leverage benefits. To attain optimum degree of leverage, firms should balance the advantages in interest payments against cost of debt. Use of debt gives firm debt-tax shields, which reduces predicted tax costs and maximise after- cash flows after tax (Modigliani and Miller, 1958). As a result, trade-off theory predicts cost-benefit analysis of debt finance to reach an optimum capital structure. Trade-off theory demonstrates positive association between financial leverage and profitability by demonstrating that profitable enterprises prioritise investments with external funding in order to protect their profits from taxation through leverage.

To have optimal capital structure, firms must trade off costs of debt and equity against benefits derived. Major benefit in use of debts is debts tax shields advantage. Similarly, the cost of distress is a drawback of debt financing, particularly when a business incurs large debts. Tax deductibility of interests payment is the major advantage of debt that promotes debt use and grows with presence of non-debt tax protection and personal taxes (DeAngelo & Masulis, 1980) and (Miller, 1977) respectively.

Previous research on trade-off theories have yielded mixed results. Studies by Titman & Wessels (1988), Rajan & Zingales, (1995) and Fama & French (2002) affirmed that profitable firms borrowed less, which is inconsistent with the actual trade-off prediction that highly profitability companies borrow more to reduce tax liabilities. Graham (2000) while estimating the cost and benefit of debt finds that large profitable firms with low financial distress use debt conservatively. As per trade off theory, healthy firms issue more debt to minimize taxable income. On the contrary, pecking order

notion is different in a sense that profitable firms would try to reduce their debt level in accordance with the rule that internal funds exhaust before external funding. When retained earnings are not adequate policies shall include external financing. One shortcoming of trade-off theory is the negative correlation between profitability and debt. This theory supported financial leverage variable in the study.

## **2.3 Empirical Literature**

### **2.3.1 Effect of Profitability on Financial Distress**

Pardeshi (2022), explored effect of profitability, working capital and capital adequacy on financial distress in 27 engineering firms drawn from the Central Public Enterprises in India for a 10-year period. Financial distress was proxied by Altman's Z-score. Study used binary logistic regression for data analysis. Results indicated that profitability, liquidity, labour cost to sales and sales to total assets significantly influenced probability of financial distress. Study however did not consider effect on financial distress of other variables such as moderating-effect of firm size and leverage. This study took place in India while the current study is about Kenya's Commercial and Manufacturing State Corporations.

Dwiantari and Artini (2021) investigated impact of profitability, liquidity, leverage on distress in firms in Indonesian in period 2017-2019. Causal research design and purposive sampling used to extract 53 firms that formed the study sample. Profitability was proxied by Return on Asset (ROA). Logistic regression results established that profitability, liquidity had a negative significant effect on firm's financial distress while leverage yielded a positive significant effect on distress. This study however did not consider the moderation effect of size on financial distress or other factors such as

efficiency. The study took place in Indonesian firms. Current study is about Commercial and Manufacturing State corporations Kenya.

Finishtya (2019) investigated the effect profitability, cash flows and leverage had on distress in manufacturing firms listed in year 2016 in Indonesia Stock Exchange. Purposive sampling helped to obtain a sample of 111 firms. Study used binary logistic regression to analyse secondary data from accounts of the 111 firms in the financial year ended 2016. Findings showed that profitability measured by return on assets and cash flows to net sales were significant to firm's financial distress. Financial leverage however had insignificant effect on financial distress. The researcher did not test effect of efficiency and moderating role firm size on financial distress in manufacturing firms under investigation thereby creating a gap for research. The current study was conducted in Kenya's commercial and manufacturing state corporations.

Saputri and Asrori (2019) investigated effect of profitability, liquidity, leverage and moderating role of audit committee on financial distress. Researcher used purposive sampling to select a sample of 20 mining firms listed in Indonesia with data obtained from financial reports of period 2013-2016. Regression analysis results indicated that profitability, leverage and liquidity had no significant influence on financial distress while audit committee moderated the relationship between profitability, leverage, liquidity and financial distress. However, moderation effect of firm size on financial distress and effect of efficiency were not featured in the study. The study concentrated on mining firm while the current study dwelt on Commercial and Manufacturing State Corporations in Kenya.

Masdupi et al. (2018) investigated effect of profitability, leverage and liquidity on financial distress in 118 listed Indonesia's Manufacturing firms selected by purposive sampling. Secondary data obtained from accounts of these firms was used in analysis. Regression results revealed that profitability, leverage and liquidity negatively and significantly influenced financial distress. Researchers however, did not consider moderating influence of size on financial distress neither did they consider other variables such as efficiency. Research was conducted in Asia while this study was conducted in Kenya.

Tuda (2016) investigated application of multiple discriminant analysis on financial distress in Commercial and Manufacturing State Corporations in Kenya. Specifically, researcher tested effect of profitability, liquidity and leverage on financial distress. Exploratory research design was adopted on a census of 27 firms forming the study sample. Audited financial accounts for a five-year duration from 2010-2015 was used to extract relevant ratios for each study variable. Altman Model (1993) was used together with excel to perform data analysis. Findings indicated that Profitability, liquidity and leverage had major influence on financial distress of Commercial and Manufacturing State Corporations in Kenya. However, moderation effect of size on financial distress was not incorporated in the study thereby leaving a future research gap.

Nketiah (2017) conducted a quantitative study examining effect of profitability and liquidity on financial distress in 20 gas and oil firms from 2010-2016 in the United States. Secondary data obtained from financial reports of 20 firms was analysed using Altman's multiple and discriminant analysis model. Analysis results revealed that profitability and liquidity significantly influenced financial distress. Researcher

however, did not analyse effect of size and leverage on financial distress thereby leaving study gap.

### **2.3.2 Effect of Leverage on Financial Distress**

Mahardini (2023) examined effect of leverage and Chief Executive Officers (CEOs) characteristics on financial distress in Indonesian State Owned Enterprises. Logistic regression findings concluded that leverage (proxied by total liabilities to total assets), tenure and education of Chief executive officer did not exhibit significant impact on distress. Age of a chief executive officer and sales growth were significant in predicting financial distress. However, researcher excluded effect of variables such as firm size and profitability on financial distress and thus leaving a study gap. Current study was conducted in Commercial and Manufacturing State Corporations in Kenya.

Bahri et al. (2022) analysed effect of leverage (debt to equity) ratio, liquidity (current ratio) and profitability (return on assets) on Financial distress during the period 2017-2019 in Perkebunan Nusantara, Indonesia. Regression outcomes on secondary data drawn from financial reports indicated that leverage, profitability and liquidity significantly influenced financial distress. However, firm size was excluded from the study thus bringing in a research gap.

Octavia et al., (2021) examined effect of leverage and liquidity on financial distress of Companies in food and beverage sub-sector for six-year period from 2015 to 2020 in Indonesia. Financial reports of 17 Companies provided data that was used to run multiple linear regression analysis. Results indicated that leverage (proxied by debt to equity ratio) and liquidity (proxied by current ratio) significantly affected financial distress. The study however left out effect of other factors such as efficiency and size on financial distress.

Marimuthu (2021), investigated effect of leverage (proxied by long-term debt ratio), liquidity and growth opportunities on financial distress in 33 state owned companies in South Africa. Multiple regression analysis results indicated that leverage, liquidity, growth opportunities and non-debt tax shields had significant negative effect on financial distress in state owned companies in South Africa. The researcher excluded effect of efficiency, size and profitability creating a gap for further research.

Diyanto (2020) investigated effect of leverage, liquidity and profitability on financial distress of manufacturing companies listed in Riau province in Indonesia. A sample of 129 manufacturing firms experiencing financial distress was selected using purposive sampling. Multiple linear regression results indicated that leverage (proxied by debt to equity ratio), liquidity (proxied by current ratio) and profitability (return on asset) significantly affected financial distress. The researcher did not incorporate effect of other factors such as firm size and operating efficiency thereby creating a research gap.

Dirman (2020), explored effect of leverage, liquidity, profitability, firm size and free cash flows on financial distress of companies in the chemical sector of Indonesia for period 2016-2018. Purposive sampling was used to select 90 companies listed at the stock exchange market. Results indicated that leverage, liquidity, firm size and free cash flows had insignificant effect on financial distress. Profitability had significant positive effect on financial distress. The study however, excluded moderation effect of size and other variables such as efficiency creating study gap.

Oktasari (2020) investigated effect of leverage, liquidity and firm size on distress in mining firms of Indonesia. Leverage was proxied by debt to equity ratio, liquidity was proxied by current ratio and firm was measured by logarithm of total asset. Study used secondary data obtained from accounts of mining companies in 2014-2018. Eviews

version 8 was used in data analysis using the fixed and random effect model with results indicating that leverage did not significantly affect financial distress. Liquidity and firm size were significant in financial distress prediction. This study however did not incorporate effect of efficiency and profitability had on distress.

Muin et al. (2020) investigated effect of leverage (debt to equity), assets growth, asset turnover and liquidity on financial distress in 118 State corporations of Indonesia in the period 2012-2016. Multiple linear regression with fixed effect established that leverage, asset growth, asset turnover and liquidity significantly and positively affected financial distress. Financial leverage (debt to equity) was not significant in explaining financial distress. Researchers however, did not incorporate moderating role of firm size on financial distress thereby creating a study gap.

Bernardin and Tifani (2019) examined effect of leverage (proxied by debt to equity ratio) and cash flows on financial distress in Inda Karya (Persero) and the moderating role of capital intensity on the relationship between leverage and cash flows on financial distress. Descriptive research was used with data obtained from quarterly financial statements from 2013-2017. Multiple linear regression results indicated that leverage did not exhibit significant influence on distress. The researcher excluded variables such as moderating effect of size, efficiency and profitability on financial distress leaving a research gap.

Ufo (2015) examined the impact of leverage on financial distress in Manufacturing Companies from 1999-2005 in Ethiopia. Results obtained from a random effect regression analysis revealed that financial leverage significantly influenced financial distress. Researcher excluded impact of other variables such as profitability, efficiency and firm size on financial distress.

### **2.3.3 Effect of Efficiency on Financial Distress**

Jerop (2021) investigated impact of efficiency, liquidity, profitability and leverage on financial distress while testing the efficiency of multiple discriminant analysis in Kenyan Market. A sample of 21 listed firms formed population of study. Data obtained from 2009-2019 audited accounts were used to extract relevant ratios. Findings indicated that efficiency, liquidity, profitability and leverage all had major influence on financial distress. Researcher however, did not evaluate moderating effect of firm size on financial distress.

Lord et al., (2020) examined effect of efficiency, profitability, liquidity and net worth on financial distress in the period 2000-2015 on 164,268 facilities in United States of America. The independent financial variables included operating efficiency. Stepwise multiple discriminant analysis model was adopted in data analysis. Findings established that efficiency was significant predictor of distress using stepwise analysis. Researchers however, did not consider effect that size and leverage had on financial distress.

Rahman and Ali (2018) investigated effect of investment efficiency on financial distress of firms listed in Pakistan Stock Exchange and the moderating role of managerial ownership on relationship between efficiency and financial distress. Proportional allocation sampling technique was adopted in which a sample of 94 companies were selected for period 2011-2015. A fixed random effect regression was used on data obtained from financial reports of 94 firms under investigation. Regression results indicated negative effect of efficiency on distress. Managerial ownership also moderated the relationship between investment efficiency and financial distress. The researcher however, did not look at effects of other factors such as leverage, profitability, firm size thus leaving a study gap.

Shahwan and Habib (2020) examined influence of corporate governance efficiency and intellectual capital efficiency on financial distress in 51 firms trading in Egyptian exchange from years 2014-2016. Malmquist data development model and modified Z-score was used to assess firm's financial distress. Findings indicated that Intellectual capital efficiency had significance effect on financial distress while corporate governance efficiency did not have impact on the likelihood of distress. This study did not consider effect of profitability, leverage and firm size on financial distress.

### **2.3.4 Effect of Size on Financial Distress**

Karina and Soenarno (2022) investigated effect of firm size, sustainability disclosure and earnings management on financial distress in 61 firms in Malaysia, Indonesia and Thailand. Regression results revealed that size of company had significant effect on financial distress. However, researcher excluded other factors such as profitability, efficiency and leverage on financial distress and thereby left research gap.

Wangsih et al. (2021) explored simultaneous effect of firm size, leverage and sales on distress of seventeen firms listed in Indonesia in from year 2016-2020. Logistic regression results indicated that size of firm had negative significant effect on financial distress while leverage had positive significant effect on financial distress. Sales growth did not have any significant effect on financial distress. Researcher did not consider effect of other variables like efficiency and profitability.

Isayas (2021) investigated effect of firm size, profitability, leverage and company age on financial distress in Ethiopian firms using panel data of 11 companies obtained from financial reports of 2008-2019. Study used quantitative research approach and explanatory research and analysis performed using random effect analysis. Results revealed that size of firm, profitability, leverage and firm age had negative effect on

distress. Researcher did not look at effect of efficiency on financial distress thereby leaving a research gap.

Liahmad et al., (2021) examined effect of size, liquidity, institutional-ownership and earnings on financial distress in 15 Indonesian insurance firms from 2017-2020. Descriptive and logistic regression analysis results revealed that firm size significantly influenced financial distress. The researcher excluded effect of other factors such as efficiency and profitability on financial distress. The study was hinged on insurance firms and not manufacturing state owned enterprises leaving research gap.

Sayidah and Assagaf (2020) assessed effect of firm size, investment, leverage and cash flows from operations on financial distress of state owned firms in Indonesia. Research was quantitative in nature and purposive sampling used to select 19 firms whose financial statements for years 2014-2017 were used for analysing. Regression analysis showed firm size, investment, leverage and cash flows negatively and significantly affected financial distress of state owned corporations of Indonesia. Profitability and efficiency were not incorporated in study leaving research gap.

Abdioglu (2019) examined effect of size of firm and leverage on financial distress in Turkish companies between years 2007-2017. Panel regression outcome concluded that size and financial leverage variables were positively significant in distress prediction. However, effect of other variables such as efficiency and profitability were excluded in the study creating research gap. Gichaiya et al., (2019) explored moderating influence of firm size and risk on distress of listed firms in Kenya. Using data from accounts of listed firms (non-financial) in Kenya in period 2006-2015 panel regression results showed that interactions terms firm Size and corporate risk and size and unsystematic risk had positive insignificant effect on distress while corporate risk significantly and

positively influenced financial distress. This study did not look into effects of other factors such Profitability, leverage and efficiency on financial distress.

Ikpesu (2019) examined effect of firm size, liquidity, profitability and leverage on financial distress in 18 listed firms in Nigeria in the period 2010-2017. Researcher used fully modified least square model in analysis. Regression results indicated that firm size (proxied by log of assets) was significant in financial distress prediction. However, researcher did not look at effect of other factors such as operating efficiency on financial distress. The study was done in Nigeria and was hinged on manufacturing firms and not state owned enterprises.

#### **2.4 Summary of Literatures Reviewed and Research Gaps**

Existing studies on effect of profitability, leverage, efficiency and size on financial distress have not considered the moderation effect that size of company has on the relationships between profitability, leverage, efficiency and distress in commercial and manufacturing state corporations. For instance, Kenyan studies on financial distress are skewed to firms trading at Nairobi-Securities exchange (NSE) and not commercial and manufacturing state corporations thereby limiting the research literature available for review. Other studies, for instance by Pardeshi (2022), Dwiantari and Artini (2021), Finishtya (2019), Saputri and Asroli (2019), Masdupi et al., (2018) and Tuda (2016) explored effect of profitability and other variables but did not include moderating effect of size of company on distress.

Other studies under review for example Mahardini (2023), Diyanto (2020), Dirman (2020), Oktasari (2020), Muin et al., (2020), Bernadin and Tifani (2019) and Ufo (2015) considered only effect of leverage and other factors but excluded moderating effect of firm size on distress thereby leaving a research gap.

Some studies for example those by Jerop (2021), Lord et al., (2020), Rahman and Ali (2018) and Nketiah (2018) investigated the effect of efficiency and other variables but excluded moderating effect of firm size on financial distress leaving a study gap.

Other studies reviewed explored influence of firm size on distress leaving out other variables, for instance Karina and Soenarno (2020) did not consider effect of profitability, leverage and efficiency on distress. Wangsih et al., (2021) did not include profitability and efficiency variables while Liahmad et al., (2021), did not consider effect profitability and efficiency has on financial distress. Sayidah & Assagaf (2020) did not incorporate effect of profitability and efficiency on distress in their study, Abdioglu (2019) did not include effect of efficiency and profitability on distress, Gichaiya et al., (2019) did not investigate influence of profitability, leverage and efficiency on distress and Ikpesu (2019) excluded effect of efficiency on financial distress thus leaving study gaps.

**Table 2.1 Summary of Literatures Review and Research Gaps**

<b>Author Year</b>	<b>Focus of Research</b>	<b>Findings</b>	<b>Research Gaps</b>	<b>Addressing Research Gaps</b>
Pardeshi (2022)	Effect of profitability, working-capital and capital adequacy on distress in 27 engineering firms in India.	Found profitability, liquidity and capital adequacy to have significant effect on financial distress.	Moderating effect of firm size and leverage were not considered.	Current study incorporated effect of leverage and firm size on financial distress and focused on Commercial and Manufacturing State Corporations in Kenya.
Dwiantari and Artini (2021)	Effect of profitability, liquidity and leverage on financial distress in firms in Indonesian.	Profitability and liquidity was significant on firm's financial distress. Leverage yielded a positive significant effect.	Did not consider effect of size and efficiency on distress.	Current study included moderating effect of Size and efficiency on distress.
Finishtya (2019)	Influence of Profitability, cash flows and leverage on financial distress in Manufacturing firms listed in year 2016 in Indonesia Stock Exchange	Profitability measured Return on Assets were significant towards company's distress. Financial leverage had insignificant effect on distress.	Did not test effect of efficiency and moderating role firm size on financial distress.	Thus study addressed effect of efficiency and moderating role of firm size on financial distress.
Saputri and Asrori (2019)	Effect of profitability, liquidity, leverage and moderating role of audit committee on financial distress in 20 firms in Indonesia.	Profitability, leverage and liquidity had no significant effect on distress. Audit committee moderated relationship between profitability, leverage, liquidity and distress.	Moderation effect of size on distress and effect of efficiency not featured. The study was conducted in Indonesia.	Current study featured effect of efficiency and moderating role of size on distress. Focused on Commercial and Manufacturing State Corporation in Kenya.

<b>Author Year</b>	<b>Focus of Research</b>	<b>Findings</b>	<b>Research Gaps</b>	<b>Addressing Research Gaps</b>
Masdupi et al. (2018)	Effect of profitability, leverage and liquidity on financial distress in Indonesia's Manufacturing firms.	Profitability, leverage and liquidity negatively and significantly influenced distress.	Did not consider effect of efficiency and moderating influence of size on distress.	Tested effect of Moderating role of Firm Size and effect of efficiency on distress.
Tuda (2016)	Application of multiple discriminant analysis on distress in Manufacturing State Corporations in Kenya.	Profitability, liquidity and leverage had major influence on financial distress of Commercial and Manufacturing State Corporations in Kenya.	Moderation effect of size on financial distress was not incorporated in the study.	Current study incorporates effect of efficiency and moderating effect of firm size on distress.
Mahardini (2023)	Effect of leverage and Chief Executive Officers (CEOs) characteristics on distress in State Owned Enterprises (SOEs).	Leverage, Tenure and education of Chief executive officer did not exhibit significant impact on distress.	Excluded effect of variables such as firm size, efficiency and profitability on distress.	Current study looked at effect of firm size, efficiency and profitability on distress.
Bahri et al., (2022)	Effect of leverage, liquidity and profitability on distress in Indonesian listed Companies.	Leverage, profitability and liquidity had significant effect on financial distress.	Effect of efficiency and moderation role of firm size on financial were not included.	Current study focused on effect of efficiency and moderation role of size on distress.
Marimuthu (2021)	Effect of leverage, liquidity and growth opportunities on financial distress in 33 state owned companies in South Africa.	Leverage, liquidity, growth opportunities and non-debt tax shields had significant negative effect on financial distress.	The researcher excluded effect of efficiency, size and profitability on financial distress.	This study included effect of efficiency and moderating role of firm size on financial distress.
Jerop (2021)	Impact of efficiency, liquidity,	Efficiency, liquidity, profitability and	Researcher did not evaluate moderating effect	This study addressed moderating role

	profitability and leverage on financial distress in Kenyan firms.	leverage all had major influence on distress.	of firm size on distress.	of firm size on distress.
Lord et al., (2020)	Effect of efficiency, profitability, liquidity and net worth on distress of firms in United States.	Efficiency was significant predictor of distress using stepwise regression analysis.	Did not consider effect of firm size and leverage on financial distress.	This study considered moderating effect of firm size and leverage on distress.
Rahman and Ali (2018)	Effect of investment efficiency on financial distress of firms listed in Pakistan stock exchange.	Regression results indicated negative effect of efficiency on distress.	Did not look at effects of other factors such as leverage, profitability, firm size on distress.	Current study added effect of leverage, profitability and firm size on distress.
Shahwan and Habib (2020)	Influence of corporate governance efficiency and intellectual capital efficiency on distress in Egyptian firms.	Intellectual capital efficiency had significance effect on financial distress while corporate governance efficiency had insignificant effect on distress.	Did not consider effect of profitability, leverage and firm size on financial distress.	This study incorporated effect of profitability, leverage and firm size on distress.
Karina and Soenarno (2022)	Effect of firm size, sustainability and earnings management on distress in 61 firms in Malaysia, Indonesia and Thailand.	Regression results revealed that size of company had significant effect on financial distress.	Study did not include effect of other factors such as profitability, efficiency and leverage on distress.	This study added effect of profitability, efficiency and leverage on distress.
Wangsih et al., (2021)	Effect of firm size, leverage and sales on distress of 17 retail firms listed in Indonesia in the period 2016-2020.	Size had significant effect on financial distress while leverage had positive significant effect on distress.	Researcher did not consider effect of other variables like efficiency and profitability.	Study incorporated effect of efficiency and profitability on distress.

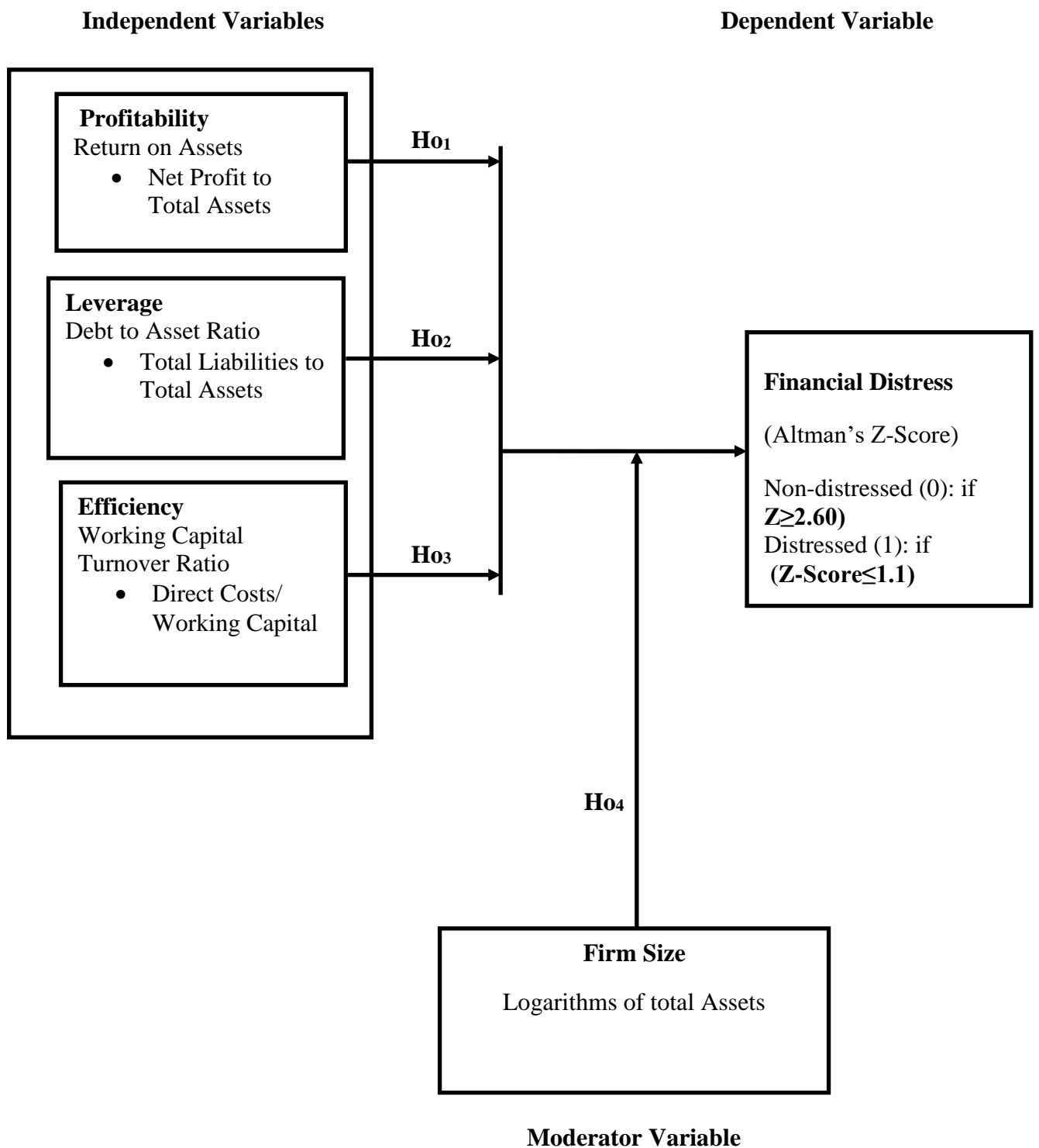
Isayas (2021)	Effect of firm size, profitability, leverage and company age on distress in Ethiopian firms.	Size firm, profitability, leverage and company age had negative effect on distress.	Researcher did not look at effect of efficiency on distress.	Looked at effect of efficiency on distress.
Liahmad et al., (2021)	Effect of firm size, liquidity institutional ownership and earnings on distress in Indonesian firms.	Firm size significantly influenced financial distress while liquidity and institutional ownership were not significant.	Did not include effect of efficiency and profitability on distress.	Included effect of efficiency and profitability on distress.
Sayidah and Assagaf (2020)	Effect of firm size, investment, leverage and cash flows on financial distress of state owned firms in Indonesia.	Size of firm, investment, leverage and cash flows negatively and significantly affected distress.	Profitability and efficiency were not incorporated in the study.	Incorporated effect of profitability and efficiency on distress.
Abdioglu (2019)	Effect of size of firm and leverage on financial distress in Turkish companies in 2007-2017.	Size and financial leverage variables were positively significant on distress.	Effect of efficiency and profitability were excluded in the study creating research gap.	Included effect of efficiency and profitability on distress.
Gichaiya et al.,(2019)	Explored moderating effect of size and risk on financial distress of listed firms in Kenya.	Interactions terms firm Size had positive insignificant effect on distress.	Did not look into effects of Profitability, leverage and efficiency on distress.	Current study explored effect of profitability, leverage and efficiency on distress.
Ikpesu (2019)	Effect of firm size, liquidity, profitability and leverage on distress in listed firms in Nigeria.	Results indicated that firm size proxied by log of assets was significant in distress prediction.	Did not look at effect of other factors such as operating efficiency on distress.	Incorporated effect of efficiency on distress.

Source: Researcher (2023)

## **2.1 Conceptual Framework**

By displaying the visual links between study concepts, this graphic demonstrates how a researcher conceptualises the connections between the variables being studied (Mugenda, 2013). The dependent variable used in this study was financial distress. Being binary, financial distress was measured using Altman's Z-score where State Corporations with "Z" score of  $\geq 2.6$  were categorised as Non-distressed and assigned a dummy variable (0). State Corporations with "Z" score  $\leq 1.10$  were categorized as distressed (Altman et al., 2017).

Predictor variables included profitability, leverage and efficiency. Profitability was proxied by net profit to total assets ratio. Leverage was proxied by total liabilities to total assets ratio while efficiency was proxied by working capital turnover ratio. Size of a State Corporation proxied by logarithm of assets as an interaction variable. Study used firm size as a moderator to establish how asset base of a State Corporation influenced relationship between profitability, leverage, efficiency and financial distress in Commercial and Manufacturing State Corporations in Kenya.



**Figure 2.1 Conceptual Framework**

**Source: Researcher (2023)**

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter discusses philosophy and design of research, operationalization and variables measurement, the model, targeted study population, design and procedures for sampling, procedures used to gather data, data analysis methods and diagnostic tests.

#### **3.2 Research Design**

Research design outlines what researcher will undertake while addressing study questions (Myers et al., 2013). This study used an explanatory research approach to evaluate effect of profitability, leverage and efficiency on financial distress in Commercial and Manufacturing State Corporations in Kenya. Explanatory study variously called causal research determines the breadth and type of cause and effect linkages as well as establish the impacts of specific changes on prevailing norms and procedures.

Explanatory (Causal) research designs are often deductive in character, with research aims attained through conducting tests on hypotheses (Blatter & Haverland, 2012). Causal research design is quantitative and organized in order to analyse the cause and effect links among study variables (Cooper & Schindler, 2009). Causal research designs determine if predictors cause changes in the dependent variable (Omagwa, 2014). This design was chosen since researcher does not interfere with independent variables thereby minimising biasness of the outcome.

### **3.2.1 Research Philosophy**

This research adopted the positivism philosophy hinged on the notion that science is the only way of learning about the truth. In positivist's research, there are no personal interests or results manipulations by the person conducting the study (Dudovski, 2018). Positivism relies on several approaches of science: First, Science is deterministic and hinged on the notion 'x' affects 'y' in certain scenarios. Researcher's role becomes following scientific approaches in discovering specific nature of cause and effect relationship (Burton et al., 2015).

Positivism also assumes that science is mechanistic and research hypotheses are to be approved or disapproved using specific research methods. According to positivism, science uses methods in operationalizing theories and hypotheses. Methodology entails selecting samples, measurement and analysis aimed at arriving at conclusions regarding hypotheses. According to Gill & Johnson (2010), positivism entails looking for cause and effect links in the data to create generalization. In his or her research, a positivist tries to remain neutral from the study and data to avoid influencing the results (Saunders et al., 2016). Researcher used this paradigm because of its underlying assumption that the research environment and events of interest are objective, external and independent of the researcher.

### **3.3 Target Population**

This comprised of all Commercial and Manufacturing State Corporations in Kenya. The Government of Kenya had 33 Commercial and Manufacturing State Corporations as at 31<sup>st</sup> December 2020. These 33 Commercial and Manufacturing State Corporations were screened against several factors that included data availability and integrity. Eight Commercial and Manufacturing State Corporations did not meet the set criteria

(availability of audited accounts) and thus the remaining 25 State Corporations became the target of study.

**Table 3.1 Target Population**

<b>No.</b>	<b>State entity classification</b>	<b>State Corporations</b>	<b>Proportion in %</b>
1	Commercial and Manufacturing	25	100%
	<b>Total</b>	<b>25</b>	<b>100.00%</b>

**Source: State Corporation Advisory Committee (2023)**

### **3.4 Sampling Design and Technique**

Researcher adopted a census approach due to the small number of Commercial and Manufacturing State Corporations in Kenya. Census approach enhance data validity (Saunders, Lewis and Thornhill, 2016). The total number of commercial and manufacturing state corporations in the study were 25.

### **3.5 Data Collection Instruments**

Data collection was aided by data extraction tool in appendix I. Data was gathered from the 25 State Corporations' published accounts in accordance with the procedures outlined in the operationalization and measurement of variables. Researcher collected annual data for the years spanning from 2015 to 2021. Researcher used excel to gather data from statements of financial performance and statements of financial position. This data helped compute the proxy ratios for independent variables in the study.

### **3.6 Data Collection Procedure**

Researcher applied to NACOSTI for research license to allow use of audited and publicly available financial accounts from Kenyan Commercial and Manufacturing State Corporations. The data gathered was panel in nature with both time series and

cross sectional components. Commercial and Manufacturing State Corporations being studied formed the cross sections, while the period of study from 2015-2021 formed the time series dimensions. The study data, mainly financial statements of Commercial and Manufacturing State Corporations, was obtained from office of the auditor general and Kenya Parliament digital library. The required data in form of financial ratios was obtained from statements of financial position and financial performance. The study used a guide on data gathering to extract the required ratios in the best format exported to STATA version 13.0 for a binary logistic regression analysis and diagnostic testing.

### **3.7 Empirical Model**

Study used binary logistic model to analyse study hypotheses on effect of profitability, leverage and efficiency on financial distress in Kenya's Commercial and Manufacturing State Corporations. Financially distressed Commercial and Manufacturing State Corporations were categorized as one (1), whereas financially sound state corporations were categorized as zero (0). A binary logit analysis requires a dichotomous result variable, no outliers, and interdependent predictor variables (Hair et al., 2014). Study used a combination of time series and longitudinal datasets to track the behaviour of various entities through time. With panel data, it is possible to influence variables that change over time but not across the entities. It is possible to control individual variability of variables using panel data. Researchers can add variables at multiple levels of analysis, making panel data appropriate for multilevel and hierarchical models. A bigger sample size is possible because panel data has both temporal and cross-sectional dimensions. Because of its unique qualities, panel data generates a large data set with higher diversity and minimal collinearity across the variables under study. Study variables' fixed and random effects can be more accurately estimated using a

panel approach than with a cross-sectional or time-series data collection (Stock and Watson, 2008). Since this study focused on a census of 25 Commercial and Manufacturing State Corporations in period of 7 years, panel analysis expanded this data to 175 observations, which is a large sample to satisfy the asymptotic distribution theory. Panel data caters for missing variables and accepts unbalanced data for regression analysis (Wansbeek and Meijer, 2007).

### **3.7.1 Altman's Z-Score Financial Distress Model**

Binary logistic regression assumption requires the dependent variable to be dichotomous. In the study, dependent variable financial distress was binary requiring researcher to classify firms as either distressed or not distressed. This study employed the revised Altman's (1983) Z-score multiple discriminant analysis model to compute financial distress. This model was developed for manufacturing, non-manufacturing firms as well as private firms and public companies (Altman et al., 2017) and Altman (1983).

The model is as follows: -

$$\mathbf{Z=6.56X_1+6.26X_2+6.72X_3+1.05X_4}$$

**Where: -**

Z" =Overall Index

X<sub>1</sub>=Working capital/Total Assets

X<sub>2</sub>=Retained Earnings/ Total Assets

X<sub>3</sub>= Earnings before Interest and Taxes/Total Assets

X<sub>4</sub>=Book Value of Equity/Total Liabilities

If "Z" value is  $\geq 2.6$  firms are classified as non-bankrupt whereas if their index value ranges between **1.10 to 2.60** firms will be considered to be in grey zone and if "**Z**" value is  $\leq 1.10$  firms are considered distressed and headed for bankruptcy (Altman,

1983). The accuracy of this model was 97% for non-bankrupt firms and 90.9% for bankrupt Firms (Cindik & Armutlulu, 2021).

### 3.7.2 Logit Regression Model

This study used logit model to examine effect of profitability, leverage and efficiency on financial distress in State Corporations. Researcher adopted the following model as suggested by Mungai (2009).

$$\Pr (Y_i) = (1/X_i) = f(\beta_0 + \beta_1 X_{1i} + \epsilon_i) \dots \dots \dots 3.1$$

The logistic model measures probability of dependent variable as 1 (Y=1) implying a likelihood of occurrence of an event. Researchers prefer logit and probit models to linear regression models since they help solve anomalies associated with linear models such as heteroscedasticity (Mungai, 2009) and (Muathe, 2010). Specific objectives of this study include; determine effect of Profitability (X<sub>1</sub>), determine effect of leverage (X<sub>2</sub>); establish effect of efficiency (X<sub>3</sub>) and establishing moderating effect of size (X<sub>4</sub>) on financial distress in Commercial and Manufacturing State Corporations. This study applied logistic model as applied by Gemma (2014).

$$\Pr (Y) = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \epsilon_i \dots \dots \dots 3.2$$

Where:-

**Pr**= Probability that a character of interest occurs

**Y**=Financial distress of a State Corporation

**X<sub>1it</sub>**= Profitability of State Corporation<sub>i</sub> at time<sub>t</sub>

**X<sub>2it</sub>**= Leverage of State Corporation<sub>i</sub> at time<sub>t</sub>

**X<sub>3it</sub>**= Efficiency of State Corporation<sub>i</sub> at time<sub>t</sub>

**β<sub>0</sub>**= Constant Term *i*=Observations

*t*=2015-2021 (period/time)

**β<sub>1</sub>, β<sub>2</sub>, β<sub>3</sub>** = co-efficient of independent variables

**ε** = Error-term

Decision criteria on the dependent variable was based on Altman’s model. A score below or equal to 1.1 meant that a State Corporation was financially distressed and headed for bankruptcy while a score above or equal to 2.6 implied that the State Corporation was financially healthy. The discriminating line in this study was in line with Binary Logit Regression model results where a score of one (1) implied that the Commercial and Manufacturing State Corporations are financially distressed while a score of Zero (0) implied that the State Corporation is non-distressed.

### 3.7.3 Model with Moderating effect

The study adopted product interaction approach to moderate effect of firm size with Profitability, firm size with Leverage and Firm size with efficiency as presented in the equation below: -

$$Pr(Y) = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 \{X_{4it} * X_{1it}\} + \beta_6 \{X_{4it} * X_{2it}\} + \beta_7 \{X_{4it} * X_{3it}\} + \epsilon_{it} \dots \dots \dots 3.3$$

Where:

**Pr**= Probability of occurrence of character of interest

**Y**= Financial distress of a State Corporation

**X<sub>1it</sub>**= Profitability of State Corporation<sub>i</sub> at time<sub>t</sub>

**X<sub>2it</sub>**= Leverage of State Corporation<sub>i</sub> at time<sub>t</sub>

**X<sub>3it</sub>**= Efficiency of State Corporation<sub>i</sub> at time<sub>t</sub>

**X<sub>4it</sub>**= Size of State Corporation<sub>i</sub> at time<sub>t</sub>

**β<sub>0</sub>**= Constant Term *i*=Observations

*t*=2015-2021 (period/time)

**β<sub>1</sub>, β<sub>2</sub>, β<sub>3</sub> ..... β<sub>7</sub>** = co-efficient of independent variables **ε** = Error-term

### 3.8 Operationalization and Measurements of Variables

This study used profitability, leverage and efficiency as independent variables.

Researcher used size of firm to moderate relationship between predictor variables and financial distress (dependent variable). Table 3.2 below shows how dependent and independent variables were operationalised, measured and hypothesized directions.

**Table 3.2 Operationalization and Measurement of Variables**

Variable Category	Study Variables	Operationalisation	Measurement	Authoritative Sources	Hypothesised Direction
Independent Variable	Profitability	This is the asset return The return on investment for each shilling Put into assets.	Net Profit/Total Assets	Jayathilaka (2020)	Positive /Negative
Independent Variable	Leverage	Amount of total liabilities in the total assets.	Total liabilities/Total assets	Enekwe et al., (2014)	Positive /Negative
Independent Variable	Efficiency	Ability of a firm to generate adequate revenue to cover operating expenses.	Direct Costs/Working capital	Dhillon & Vachhrajani, (2012)	Positive /Negative
Moderating variable	State corporation Size	Measures size of a State Corporation.	Measured by log of assets in each state corporation.	Dang and Yang (2018)	Positive /Negative
Dependent Variable	Financial Distress	Inability of a firm to generate sufficient income to meet financial obligations.	Altman's Z-score Non-Distressed ( $Z \geq 2.60$ ) Distressed: ( $Z\text{-Score} \leq 1.1$ )	Tung and Phung, (2019) Altman (1983)	Distressed (1) Non-Distressed (0)

**Source: Researcher (2023)**

### 3.9 Data Analysis and Presentation

After collection, data went for cleansing and review for errors and outliers. Data from financial statements was arranged using Microsoft excel spreadsheets. The researcher used Excel to compute the necessary proxy measures for each study variable in each State Corporation across all the years of study. After extracting the data in panel format,

it was exported to STATA version 13 ready for use in performing necessary estimations and tests. The extracted data from Commercial and Manufacturing State Corporations' financial statements was analysed using binary logit model. The researcher used the statistical software to perform the logistic regression analysis of the independent variables (Profitability, Leverage, Efficiency, Size of Firm and the dependent variable (financial Distress). Researcher used inferential analysis in testing the various null hypotheses of the study formulated in view of the respective specific objectives.

### **3.10 Diagnostic Tests**

To be confident in the estimates given by the researcher's binary logistic regression model equation, the researcher must comply with all logit regression model's assumptions. A logistic regression, according to Kassambara (2018), presupposes that the result is binary and uses variables such as "either yes or no" or "either one or zero". Secondly, logistic regression presupposes that there is a linear connection between the logit of the result and each predictor variable, third, that outliers in the predictors do not exist, and lastly, that multicollinearity among the predictors does not occur. The violation of these assumptions may result in inconsistent, biased and untrustworthy results. To avoid this anomaly researcher performed multicollinearity, heteroscedasticity and likelihood ratio and goodness of fit tests.

#### **3.10.1 Multicollinearity Test**

The amount of collinearity among the predictor variables was assessed using a correlation matrix. Gujarati and Porter (2003) points out that in circumstances of significant multicollinearity, issues like large standard errors and variances of ordinary least square estimators are more likely to occur. When an estimator's standard errors rise, it becomes more difficult to determine the estimator's real value, resulting in a reduction in the precision of ordinary least square estimators (Kim, 2019).

Other problems with severe multicollinearity noted include wider confidence intervals due to large standard errors. The rule of thumb is correlation matrix tests between the variables with coefficient values more than 0.8 are indicative of significant Multicollinearity. Severe Multicollinearity problems is remedied by removing the variable or variables with the highest levels of collinearity from the model, collecting new data, redesigning the model, and seeking for previous knowledge regarding parameters and variable transformations.

### **3.10.2 Heteroscedasticity Test**

This is a scenario where variances of the error-terms are non-constant, causing most linear hypothesis testing procedures to violate the premise of equal variances of residuals. According to Uyanto (2019), disturbance terms in linear models of regression entering a regression are not heteroscedastic and have the equal variance and if this is not the case, then we have the situation of heteroscedasticity. The normal hypothesis testing method is unreliable in the presence of heteroscedasticity, which increases the risk of reaching incorrect conclusions. Breusch-pagan (1979) used in testing heteroscedasticity. Heteroscedasticity is predicated on significance level of 0.05, and rejection of null hypothesis indicates presence of a heteroscedasticity problem.

### **3.10.3 Likelihood Ratio Test**

The researcher assessed the probability of data under the entire model to the likelihood of data under a model with milder indicator components using likelihood-ratio tests. When an indicator variable is removed from a model, the log of risk falls, leading the model to fit less well. It is critical to figure out if the reported model fit, variation is indeed substantial (Seaman and White, 2013).

To do this test, the Null ( $H_0$ ) claims that "the reduced-model is genuine, and a P-value incentive in the general model fits measurement less than 0.05 would induce the scientist to reject the wrong theory, offering arguments against the reduced-model for the current-model" (Atmathew, 2015).

#### **3.10.4 Hosmer-Lemeshow Goodness of Fit**

In evaluating a statistical model, testing goodness of fit is a vital step. It is important to evaluate goodness of fit of a regression model with categorical model to adhere to logistic model assumptions (Fagerland & Hosmer, 2012). This study used Hosmer-Lemeshow goodness of fit for binary logistic regression model to test model fitness and suitability. According to (Hosmer and Lemeshow, 2000) the test contains discrimination and calibration elements. Whilst discrimination measures ability of model to classify observations correctly into outcome-categories, calibration on the other hand measures how well estimated probabilities of the model agree with observed outcomes and is usually examined using goodness of fit.

#### **3.11 Ethical Considerations**

The researcher sought from NACOSTI permission to use the publicly available audited financial accounts of Commercial and Manufacturing State Corporations. As a result, all information gathered from these financial statements was managed with extreme caution and not shared with unauthorized third parties for any reason. All sources cited in this study were appropriately credited. In order to avoid biased outcomes, it was also ethical to undertake data analysis and presentation with precision for accuracy. Finally, it was important that the researcher honoured all those who assisted in the completion of this research thesis.

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION AND INTERPRETATION

#### 4.1 Introduction

This chapter consists of data analysis, presentations and discussions regarding research findings. The chapter contains descriptive statistics, diagnostic tests and hypotheses test results.

#### 4.2 Descriptive Statistics

To understand basic features of the study variables, researcher conducted descriptive analysis of study variables under investigation. The analysis yielded various statistics including number of observations, means, standard deviations, minimums and maximums as illustrated in table 4.1 below.

**Table 4.1 Summary of Descriptive Statistics**

#### Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Financial Distress	175	0.3828571	0.4874787	0	1
Profitability	175	-0.0404885	0.292645	-3.213545	0.8527385
Leverage	175	0.9356684	1.133475	0.0366436	5.196072
Efficiency	175	3.519015	14.39228	0.0000349	189.1291
Size	175	4.009123	1.077522	1.118797	5.882503

**Source: Research data (2023)**

Table 4.1 presents a summary of predictor variables under investigation, which explained financial distress of Commercial, and Manufacturing State Corporations in Kenya. Before analysis, researcher converted all predictor variables into ratios.

The Mean value of profitability from 175 observations is (-0.0404885); standard deviation (0.292645); minimum and maximum (-3.213545) and (0.8527385) respectively. Negative mean for profitability proxied by net profit to total asset ratio (ROA) indicates that Commercial and Manufacturing State Corporations were on average unprofitable even though some of them did operate at a profit as shown by the positive maximum observed value of profitability of 0.8527385.

Again, from the table results, the leverage mean value from 175 observations is 0.9356684 with a standard deviation of 1.133475 indicating that on average, Commercial and Manufacturing State Corporations were not highly geared. The observed minimum leverage result measured by debt to asset ratio was 0.0366436 indicating that the State Corporations used less debt to finance their assets and thus being conservative. The leverage maximum observed figure of 5.196072 indicates that even though the State Corporations used less debt in asset financing, there was one particular State Corporation whose total liabilities exceeded its total assets by five times indicating existence of extreme debts or huge pending bills.

Operating efficiency, which was proxied by working capital turnover ratio, had mean of (3.519015), standard deviation (14.39228) from 175 observations. The minimum and maximum observed statistics for efficiency were 0.0000349 and 189.1291 indicating that on average; most of the State corporations efficiently managed their working capital. As seen from a maximum of 189.1291, there was one particular State Corporation whose working capital turnover ratio was 189.1291 implying high level of management efficiency in operations. The observed minimum and maximum of 0 and 1 for financial distress indicate that the dependent variable is binary with 1 (one) representing distress and 0 (zero) indicating non-distressed.

### 4.3 Diagnostic Tests

In order to ensure non-violation of the assumptions of logistic regression models and take appropriate remedial actions if violation occurs, the researcher carried out various diagnostic tests. This part presents the results of estimation tests, which included multicollinearity test, heteroscedasticity test and likelihood ratio test.

#### 4.3.1 Multicollinearity Results

Multicollinearity occurs when independent variables in a study are highly correlated. Researcher did correlation matrix test to examine the amount of multicollinearity. Table 4.2 below shows correlation matrix results.

**Table 4.2 Correlation Matrix**

<b>Variables</b>	<b>Profitability</b>	<b>Leverage</b>	<b>Efficiency</b>	<b>Size</b>
Profitability	1.0000			
Leverage	-0.3132	1.0000		
Efficiency	0.0465	-0.0580	1.0000	
Size	0.2234	-0.0268	-0.0205	1.0000

**Source: Research data (2023)**

As per table 4.2 above, study employed correlation matrix in detecting existence of multicollinearity problem. Explanatory variables were profitability, leverage, efficiency and firm size. The outcome indicate that correlation coefficients of predictor variables are below 0.8 inferring that data used in study did not contain severe multicollinearity if any (Dormann et al., 2013).

#### 4.3.2 Heteroscedasticity Results

To detect presence of linear heteroscedasticity, the study adopted the Breusch Pagan approach. Null hypothesis is that error-terms are of equal variances and homoscedastic

while the alternative hypothesis is that the error-terms have unequal variances. The Breusch-pagan test yielded a chi-value of (74.48) and probability of (0.000). Since probability value was significant, the null hypothesis was rejected signifying presence of heteroscedasticity. However, assumptions of logit regressions do not require study data to be linear, normally distributed or homoscedastic.

### **Table 4.3 Heteroscedasticity Results**

#### **Breusch-Pagan Heteroscedasticity Test**

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Breusch-Pagan / Cook-Weisberg test for heteroscedasticity

Ho: Constant variance

Variables: fitted values of Profitability

chi2(1) = 74.48

Prob > chi2 = 0.0000

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**Source: Research data (2023)**

#### **4.3.3 Likelihood Ratio Test Results**

This test compares two nested regression models where one model (model 1) is nested within another model (Model 2). The null hypothesis is that the restricted model is statistically better than full model.

Researcher fits both the unrestricted and restricted model using the maximum likelihood-method. The regressed results of the unconstrained logit model (Full Model) without omitting any variable after regressing financial distress with predictor variables (profitability, leverage, efficiency and size) were as shown here below: -

**Table 4.4 Likelihood Ratio Test Results (Full Model)**

<b>Logistic regression</b>							
<b>Distress</b>	<b>Coef.</b>	<b>St.Err.</b>	<b>t-value</b>	<b>p-value</b>	<b>[95% Conf</b>	<b>Interval]</b>	<b>Sig</b>
Profitability	-29.842	11.669	-2.56	0.011	-52.713	-6.972	**
Leverage	16.156	4.642	3.48	0.001	7.058	25.254	**
Efficiency	-4.220	1.234	-3.42	0.001	-6.640	-1.801	**
Size	-0.665	0.687	-0.97	0.333	-2.011	0.681	
Constant	-6.148	3.873	-1.59	0.112	-13.740	1.444	
Mean dependent var		0.383	SD dependent var			0.487	
Pseudo r-squared		0.864	Number of obs			175.000	
Chi-square		201.234	Prob > chi2			0.000	
Akaike crit. (AIC)		41.672	Bayesian crit. (BIC)			57.496	
						** $p < 0.05$	

**Source: Research data (2023)**

Results in table 4.4 indicate that the full model with  $R^2 = 0.864$  indicates that 86.40% of predictor variable explained the dependent variable (financial distress). The constrained-model was fitted by omitting one-predictor variables (Firm Size).

**Table 4.5 Likelihood Ratio Test Results (Constrained Model)**

<b>Logistic regression</b>							
<b>Distress</b>	<b>Coef.</b>	<b>St.Err.</b>	<b>t-value</b>	<b>p-value</b>	<b>[95% Conf</b>	<b>Interval</b>	<b>Sig</b>
Profitability	-31.688	10.916	-2.90	0.004	-53.083	-10.293	**
Leverage	15.593	4.424	3.52	0.000	6.923	24.264	**
Efficiency	-3.944	1.116	-3.53	0.000	-6.132	-1.756	**
Constant	-9.039	2.771	-3.26	0.001	-14.470	-3.608	**
Mean dependent var		0.383	SD dependent var			0.487	
Pseudo r-squared		0.859	Number of obs			175.000	
Chi-square		200.132	Prob > chi2			0.000	
Akaike crit. (AIC)		40.774	Bayesian crit. (BIC)			53.433	
						** $p < 0.05$	

**Source: Research data (2023)**

The results of reduced model obtained in table 4.5 yielded an  $R^2$  of 0.859 indicating that profitability, leverage and efficiency were jointly significant, explained 85.90% of the dependent variable (financial distress). The full model was therefore better model,

and likelihood ratio was more accurate. We therefore reject null and conclude that full model (unrestricted) is better than restricted (reduced model).

#### 4.4 Hypotheses Testing

To ascertain effect and significance of predictor variables on financial distress in Commercial and Manufacturing State Corporations, researcher performed a panel logit regression. Logistic regression results are presented in table 4.6 below.

**Table 4.6 Logistic Regression Results**

Log likelihood = -16.386835

<b>Financial Distress</b>	<b>Coef.</b>	<b>St.Err.</b>	<b>t-value</b>	<b>p-value</b>	<b>[95% Conf Interval]</b>	<b>Sig</b>
Profitability	-31.68816	10.9159	-2.90	0.004	-53.08294 -10.29338	**
Leverage	15.59337	4.423953	3.52	0.000	6.922579 24.26415	**
Efficiency	-3.944415	1.116355	-3.53	0.000	-6.13248 -1.756396	**
Constant	-9.038975	2.770976	-3.26	0.001	-14.46999 -3.607932	**
Mean dependent var		0.383	SD dependent var			0.487
Pseudo r-squared		0.859	Number of obs			175.000
Chi-square		200.132	Prob > chi2			0.000
Akaike crit. (AIC)		40.774	Bayesian crit. (BIC)			53.433

\*\*  $p < 0.05$

**Source: Research data (2023)**

The panel logistic regression result in table 4.6 above indicate that profitability and financial distress have an inverse relationship ( $\beta = -31.68816$  and  $p = 0.004$ ) implying that when profitability increases by one unit, distress is reduced. Negative coefficient implied that a unit increase in profitability reduced financial distress by 31.6882. Results also indicated that leverage and financial distress have a direct relationship and significantly explained financial distress with coefficient  $\beta = 15.59337$  and probability ( $P = 0.000$ ) implying that a unit increase in use of debt increased financial distress by approximately 156% in State Corporations. Operating efficiency and financial distress in State Corporations had an inverse relationship ( $p = 0.000$  and  $\beta = -3.944415$ ) implying

that a unit increase in operating efficiency in State Corporations decreased the risk of financial distress by 39.4%. Results above also indicate a log-likelihood of -16.387. According to (Mungai, 2009), logistic models with negative log likelihood ratios with values closer to zero are considered to be better fitting models. The log likelihood value of (-16.387) therefore implied that the model was good. Findings also produced a (Pseudo  $R^2 = 0.8590$  and  $P = 0.000$ ) inferring that profitability, leverage and efficiency jointly explained 85.90% of variations in financial distress and therefore the model was fit. Based on the above results, the logistic regression equation is as follows:

$$\Pr(y) = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \epsilon_{it}$$

$$\Pr(y) = -9.038975 - 31.68816X_{1it} + 15.59337X_{2it} - 3.944415X_{3it} + \epsilon_{it}$$

Where  $\Pr(y)$  = Probability of financial distress

$X_1$  = Profitability

$X_2$  = Leverage

$X_3$  = Efficiency

$\epsilon_{it}$  = Error Terms

$\beta_0$  = Constant

#### **4.4.1 Effect of Profitability on Financial Distress in State Corporations**

The first objective was determining effect of profitability on financial distress in Commercial and Manufacturing State Corporations. Null hypothesis stated profitability had no significant effect on financial distress of Commercial and Manufacturing State Corporations. Regarding hypothesis (i), the logit regression results presented in table 4.6 above indicate that the coefficient of profitability of -36.6882 was statistically significant at 5 percent level with probability value ( $p = 0.004$ ) less than 0.05 leading to rejection of null hypothesis at 5% significance-level. This implied that per unit increase in profitability coefficient decreased financial distress by 31.6882%. Negative relation between profitability and distress is expected since profitability improves financial

health of a firm thereby reducing the risk of financial distress. With regard to profitability, the results of study are in agreement with findings of Masdupi, Tasman and Davista (2018), Dwiantari and Artini (2021), Pardeshi (2022) and Fatima, Toha and Prakoso (2019) who concluded that profitability measured by return on asset (ROA) had significant effect on financial distress of Commercial and Manufacturing Companies in Indonesia.

#### **4.4.2 Effects of Leverage on Financial Distress in State Corporations**

Determining effect of leverage on financial distress in Commercial and Manufacturing State Corporations in Kenya was the second study objective. The logistic regression coefficient of leverage (15.59337) had a probability value of ( $p=0.000$ ) at 5 percent significance level. Null hypothesis stated leverage had no significant effect on distress in Commercial and Manufacturing State Corporations in Kenya. We reject null and conclude leverage has significant effect on financial distress. These results agree to findings by (Marimuthu, 2021), (Octavia, 2021), (Ufo, 2015), (Muin, 2020), (Diyanto, 2020) and (Bahri et al., 2022) whose findings concluded that financial leverage positively and significantly influenced financial distress in State Owned Enterprises. However, these results contradict those of Mahardini (2023), Dirman (2020), Oktasari (2020) and Bernadin & Tifani (2019) who concluded that leverage had no positive significant effect on financial distress.

#### **4.4.3 Effect of Efficiency on Financial Distress in State Corporations**

Establishing effect of efficiency on financial distress in Commercial and Manufacturing State Corporations in Kenya was the third study objective. Null hypothesis was that efficiency did not have significant effect on financial distress of Commercial and Manufacturing State Corporations. The coefficient for efficiency ( $\beta=-0.0994815$ ) has

probability of ( $p=0.000$ ) leading to rejection of the null hypothesis at 5% significance level to conclude that efficiency had negative significant effect on Financial distress in Commercial and Manufacturing State Corporations in Kenya. A unit increase in efficiency decreased financial distress by approximately 39.44412%. The findings on effect of efficiency on distress correspond to those of Jerop (2021), Lord et al., (2020), Rahman & Ali (2018) and Nketiah (2017) who concluded that efficiency had a significant negative effect on financial distress in State Owned Enterprises.

#### 4.4.4 Moderating effect of Size on Financial Distress in State Corporations

The study adopted product interaction approach to determine the existence of any moderation effect of firm size on relationship between profitability, leverage, efficiency and financial distress in Commercial and manufacturing State Corporations. Researcher added the moderation term (firm Size) to original logit model as shown in equation 3.2. Results of the moderation effect using financial distress as the dependent variable are presented in the table 4.7 below:

**Table 4.7 Regression with Moderation Effect of Firm Size on Distress**

Financial Distress	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
Size	12.208	11.835	1.03	0.302	-10.989	35.405
Profitability	177.548	96.482	1.84	0.066	-11.554	366.650
Leverage	174.113	114.707	1.52	0.129	-50.709	398.935
Efficiency	-26.435	17.593	-1.50	0.133	-60.918	8.047
Size and Profitability	-98.999	53.290	-1.86	0.063	-203.446	5.448
Size and Leverage	-21.283	18.162	-1.17	0.241	-56.881	14.314
Size and Efficiency	1.139	2.029	0.56	0.575	-2.839	5.116
Constant	-100.341	71.081	-1.41	0.158	-239.657	38.974
Mean dependent var		0.383	SD dependent var			0.487
Pseudo r-squared		0.959	Number of obs			175.000
Chi-square		223.444	Prob > chi2			0.000
Akaike crit. (AIC)		25.462	Bayesian crit. (BIC)			50.780

**Source: Research data (2023)**

Results in table 4.7 above indicates that the interaction between firm size and profitability had coefficient (-98.999) and probability ( $p=0.063$ ) leading to acceptance

of null hypothesis at 5% significance level. This implied no moderating effect existed of size on the relationship between profitability and financial distress in State Corporations investigated.

Table 4.7 also indicates that interaction between firm size and leverage has coefficient ( $\beta=-21.283$ ) and a probability ( $p=0.241$ ) which was insignificant at 5% leading to acceptance of the null hypothesis indicating lack moderating effect of size on relationship between profitability, leverage, efficiency and financial distress of State Corporations being investigated. Finally, the outcomes in table 4.7 indicate that the interaction between firm size and efficiency has coefficient ( $\beta=1.139$ ) with a probability ( $p=0.575$ ) insignificant at 5% level signifying that firm size did not have moderating influence on the relationship between operating efficiency and distress in Commercial and Manufacturing State Corporations in Kenya. In summary, the size of State Corporations did not influence financial distress. Financial distress equally affected both small and big Commercial and Manufacturing State Corporations contradicting the theory of small firms.

#### **4.4.5 Hosmer-Lemeshow Goodness of Fit Model Test Results**

A binary logistic regression model describes relationship between a binary outcome variable and one or more predictor variables. This study used Hosmer-Lemeshow test (Hosmer & Lemeshow, 2000) which is available in STATA 13.0 to test model fitness. According to (Hosmer and Lemeshow, 2000) a binary logistic model is deemed fit when its Hosmer-Lemeshow test value is greater than 0.05 (Fagerland & Homer, 2012).



## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter gives summaries, conclusions, recommendations and suggests areas of future study.

#### **5.2 Summary**

This study intended to ascertain effect of profitability, leverage and efficiency on financial distress and moderation effect that size of State Corporation has on relationship between profitability, leverage, efficiency and financial distress of commercial and manufacturing state corporations in Kenya. Specific objectives of study included: determining effect of profitability on financial distress in Commercial and Manufacturing State Corporations in Kenya. Second objective was to ascertain effect of leverage on distress in commercial and manufacturing corporations in Kenya. Third objective was to determine effect of efficiency on financial distress in Commercial and Manufacturing corporations in Kenya. The fourth and last objective was establishing moderation effect of size on relationship between profitability, leverage and efficiency on distress in Commercial and Manufacturing State corporations in Kenya.

Results of study were founded on hypotheses and research objectives. Findings of study showed that profitability had significant negative effect on financial distress in Commercial and Manufacturing State Corporations in Kenya therefore null hypothesis was rejected. Similarly, efficiency had significant negative effect on financial distress of commercial and manufacturing corporations and thus null hypothesis was rejected. The study also ascertained that leverage had positive significant effect on financial

distress of state corporations leading to rejection of the null hypothesis. Study further established that firm size did not moderate the relationship between profitability, leverage, efficiency and financial distress in Commercial and manufacturing State Corporations in Kenya.

### **5.3 Conclusions**

Profitability, leverage and efficiency variables in the study had significant effect on financial distress in Commercial and Manufacturing State Corporation in Kenya implying they are key determinants of financial distress in State Owned Corporations in the Commercial and Manufacturing sector. Accordingly, management or those charged with governance of state owned corporations should endeavour to improve their profitability and operational efficiency to maximise their wealth. Commercial and Manufacturing State Corporations should reduce borrowings and government bailouts to improve profitability. The significance of profitability and operating efficiency supports the agency, stewardship and efficiency theories in this research.

We can therefore conclude that financially distressed firms that have relied on exchequer for frequent bailouts due to liquidity problems are because of profitability, borrowing and operating efficiency problems. Management and those in charge of governance of the distressed state owned enterprises should therefore focus on improving profitability and efficiency in their operations as well as reducing borrowings.

### **5.4 Policy Implications and Recommendation**

This study's findings address important policy concerns at the industry, business, and national level. Those charged with governance in the distressed State corporations should efficiently manage firm's resources to increase their asset turnover and

maximise the value of the firm. The study recommends a review of borrowing policies to reduce reliance on government guaranteed debts. Top management of State Corporations should monitor key financial ratios including profitability, leverage and efficiency ratios. These ratios will assist those charged with governance in developing strategic plans and turnaround strategies to bring back to life the distressed State Corporations so that they can contribute positively towards growth of the economy. It is worth noting that most State Corporations do not submit on time their drafts unaudited financial report to the office of the auditor general who is required to audit those accounts from 1<sup>st</sup> October to 31<sup>st</sup> of December of every financial year.

The national audit office should ensure adherence strict timelines for submission of accounts so that interested stakeholders including parliament can table and discuss the findings and opinions regarding the going concern of the State Corporations. Consequently, the office of the auditor general should follow up on previous year's recommendations in the management letters to ensure compliance. Distressed Commercial and Manufacturing State Corporations should strictly adhere to Public Financial Management Act on financial prudence.

The office of auditor general should deviate from the traditional audit strategies and embrace the concept of value for money auditing on economy, efficiency and effectiveness in auditing the accounts of State Corporations. Finally, the outcomes of this study indicate that the Government, Management, those charged with governance and users of financial information of state corporations may mitigate against financial distress by giving serious attention to profitability, leverage and efficiency ratios to ensure that these State Corporations operate prudently and efficiently in the near future.

## **5.5 Suggestions for Further Research**

Most studies on financial distress in Kenya have been inclined to firms listed at the Nairobi Securities Exchange and very few studies done on financial distress of State Corporations. Kenyan State Corporations are categorised as tertiary education, commercial and manufacturing, training and research, regulatory, service, financial, public universities and regional development. The researcher suggests further studies on financial distress in the categories above which have not been researched. Further, the researcher recommends use of different regression models such as multinomial logistic, probit and panel regression models or any other non-classical or linear models such as factor analysis. The researcher also recommends other international researchers to study the impact of financial distress of State Owned Corporations in their countries to add to the limited existing literature. Since most studies on financial distress have been skewed to effects of financial factors which tend to be quantitative in nature, this study recommends further studies on effects of qualitative non-financial factors such as effect of corporate governance, government policy, human resource policy and strategic policies on financial distress in State Corporations. The researcher recommends replication of a similar study on effects of profitability, leverage, efficiency and firm size in other sectors of the economy such as the telecommunication industry, small and medium sized enterprises, microfinance firms, savings and credit co-operative societies among others. Finally, since most studies reviewed on financial distress covered a study period of not more than five years due to data unavailability, time and resource constraints researcher suggests future researchers on financial distress to increase study period to more than five years for credible and conclusive results.

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## APPENDICES

### Appendix I: Data Collection Guide

No	State Corporation	Year	Profitability	Leverage	Efficiency	Size	Financial Distress Altman's (Z-Score)
1		2015					
		2016					
		2017					
		2018					
		2019					
		2020					
		2021					
2		2015					
		2016					
		2017					
		2018					
		2019					
		2020					
		2021					
3		2015					
		2016					
		2017					
		2018					
		2019					
		2020					
		2021					
4		2015					
		2016					
		2017					
		2018					
		2019					
		2020					
		2021					


Source: Researcher (2023)

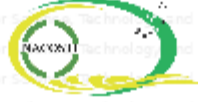
## Appendix II: Commercial and Manufacturing State Corporation in Kenya

	<b>Commercial and Manufacturing State Corporations in Kenya</b>
1.	Agro Chemicals and Food Co.Ltd
2.	Chemelil Sugar Co. Ltd
3.	East Africa Portland PLC
4.	Geothermal Development Co. Ltd
5.	Kenya Airports Authority
6.	Kenya Broadcasting Corp (KBC)
7.	Kenya Electricity Generating Co.
8.	Kenya Electricity Transmission Co.
9.	Kenya Med-Supplies Authority
10.	Kenya National-Trading Corporation
11.	Nuclear Power and Energy Agency
12.	Kenya Ordnance-Factories Corporation
13.	Kenya Pipeline Co. Ltd
14.	Kenya Power
15.	Kenya Railways Corp
16.	Kenya Safari Lodges and Hotels
17.	Veterinary Vaccines- Production Institute (Kenya)
18.	Mwea Rice Mills
19.	National Cereal Produce Board
20.	National Housing Corp.
21.	New Kenya Co-operative Creameries Limited
22.	Nzoia Sugar Co. Limited
23.	Postal Corporation Kenya
24.	School Equipment Production Unit
25.	Western Kenya Rice Mills

Source: SCAC (2023)


### Appendix III: Research License

  
REPUBLIC OF KENYA

  
**NATIONAL COMMISSION FOR  
SCIENCE, TECHNOLOGY & INNOVATION**

RefNo: **234948** Date of Issue: **25/May/2022**


**RESEARCH LICENSE**




**This is to Certify that Mr. Peter Njoroge Kibe of Kenyatta University, has been licensed to conduct research in Nairobi on the topic: PROFITABILITY, LEVERAGE, EFFICIENCY AND FINANCIAL DISTRESS IN COMMERCIAL AND MANUFACTURING STATE CORPORATIONS IN KENYA for the period ending : 25/May/2023.**

License No: **NACOSTI/P/22/17812**

**234948**  
Applicant Identification Number

  
Director General  
**NATIONAL COMMISSION FOR  
SCIENCE, TECHNOLOGY &  
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## Appendix IV: Research Authorization



**KENYATTA UNIVERSITY  
GRADUATE SCHOOL**

E-mail: [dean-graduate@ku.ac.ke](mailto:dean-graduate@ku.ac.ke)

Website: [www.ku.ac.ke](http://www.ku.ac.ke)

P.O. Box 43844, 00100  
NAIROBI, KENYA  
Tel. 020-8704150

Our Ref: D58/CTY/PT/27946/2014

DATE: 20<sup>th</sup> April, 2022

Director General,  
National Commission for Science, Technology  
and Innovation  
P.O. Box 30623-00100  
**NAIROBI**

Dear Sir/Madam,

**RE: RESEARCH AUTHORIZATION FOR MR. KIBE PETER NJOROGE – REG.  
NO. D58/CTY/PT/27946/14**

I write to introduce Mr. Kibe Peter Njoroge who is a Postgraduate Student of this University. He is registered for M.Sc. degree programme in the **Department of Accounting & Finance**.

Mr. Kibe intends to conduct research for a M.Sc. thesis Proposal entitled, **“Profitability, Leverage, Efficiency and Financial Distress in Commercial and Manufacturing State Corporations in Kenya.”**

Any assistance given will be highly appreciated.

Yours faithfully,

A handwritten signature in blue ink, appearing to read 'E. Kimani', is written over the typed name of the Dean.

**PROF. ELISHIBA KIMANI  
DEAN, GRADUATE SCHOOL**



EC/omw

## Appendix V: Research Proposal Approval



### KENYATTA UNIVERSITY GRADUATE SCHOOL

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#### Internal Memo

**FROM:** Dean, Graduate School

**DATE:** 20<sup>th</sup> April, 2022

**TO:** Mr. Kibe Peter Njoroge  
C/o Department of Accounting & Finance

**REF:** D58/CTY/PT/27946/14

**SUBJECT:** APPROVAL OF RESEARCH PROPOSAL

=====  
This is to inform you that Graduate School Board, at its meeting on **31<sup>st</sup> March, 2022**, approved your Research Proposal for the M.Sc. Degree entitled, "**Profitability, Leverage, Efficiency and Financial Distress in Commercial and Manufacturing State Corporations in Kenya.**"

You may now proceed with your Data collection, subject to clearance with the Director General, National Commission for Science, Technology & Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking and Progress Report Forms per semester. The forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

**DR. EDWIN OBUNGU**  
**FOR: DEAN, GRADUATE SCHOOL**



CC. Chairman, Department of Accounting & Finance

**Supervisors:**

1. Dr. Lucy Wamugo Mwangi  
C/o Department of Accounting & Finance  
Kenyatta University
2. Mr. Gerald Atheru  
C/o Department of Accounting & Finance  
Kenyatta University