CHAPTER III
RESEARCH METHODS

3.1 Object of Research

According to Luan et al. (2016), the object of research is a quality, trait, or quantity that pertains to an individual. According to Carruthers et al. (2015) researchers select specific objects or activities with discernible variations to conduct studies and subsequently draw conclusions. Based on the aforementioned definition, it can be inferred that the subject of investigation pertains to a scientific objective that is characterized by distinct aims and applications, with the purpose of acquiring diverse data that varies in terms of significance, magnitude, or dimensions. The present study focuses on four key variables, namely capital structure as the independent variable, firm size as the moderating variable, profitability as the dependent variable, and growth as the control variable.

3.2 Types of Research and Method

This constitutes the fundamental basis upon which the research would be constructed. Research design serves as the fundamental framework or blueprint for a research investigation. A research methodology provides a framework for researchers to design and execute their study, while also ensuring that adequate measures are taken to control for variables that may impact the study's outcomes.

The present study will employ a descriptive review methodology to investigate the impact of capital structure on the profitability of publicly traded firms listed on the Ghana Stock Exchange. Descriptive research is a methodology employed to gather data pertaining to the present state of a given phenomenon, with the aim of describing the variables or conditions that exist within a particular situation.

To achieve the aims of this investigation, a quantitative and verification methodology will be employed to enhance comprehension and potentially facilitate more profound analysis of the study's findings. Annual reports of the qualified listed companies for 20 years will be used. Ghana Stock Exchange website is equally utilised to gain useful information on the qualified sample listed companies from 2002 to 202.

3.3Population and Sample

The focus of this study pertains to the population and sample, which will serve as the foundation for the research findings. The study population refers to the entirety of elements from which the sample is gathered. As per Saunders et al. (2003), the term 'population' pertains to the complete collection of data that is relevant to the investigator. Due to the impracticality of gathering data from the entire statistical population, the present study opted to employ a sampling approach, focusing on all firms that have been listed on the GSE within a twenty-year timeframe spanning from 2002 to 2021.

The sample size for this study is relatively small, and the utilization of the entire population as the sample would not have posed significant issues in terms of cost and time. Similarly, to the research conducted by Abor (2005a), all of the firms included in the sample were required to meet three fundamental criteria. Initially, it is imperative that all of the designated enterprises were duly registered on the Ghana Stock Exchange by the 31st of December, 2001. Secondly, it is imperative that none of the companies under scrutiny are delisted during the designated period of investigation. Additionally, it is required that all corporations included in the study provide twenty-year financial statements for analysis. During the COVID-19 pandemic, a reduction in the number of listed companies occurred, with 8 companies being delisted out of the initial 37. As a result, the total number of listed companies decreased to 29. A total of fourteen companies were excluded from the selection due to their failure to meet the established criteria, specifically, their listing after the year 2001. The sample comprised 15 out of 29 companies listed, encompassing 300 financial statements spanning a twenty-year period that concluded on December 31st, 2021. Table 3.1 presents a roster of fifteen firms, comprising both Ghanaian and non-Ghanaian entities, that were listed on the stock exchange. The primary purpose of this table was to gather the perspectives of the research subjects.

Table 3.4 Sample of Research

No	Name of Firms	Code of Firms	Industry Clasification

1	Produce Buying Company	PCB	Buying of Cocoa Beans
2	Alluworks	ALU	Aluminium
3	Camelot Ghana Limited	CAM	Service
4	Fan Milk Ghana Limited	FAN	Security Printing, Business forms manufacture and design facility
5	Ghana Commercial Bank	GCB	Financial Services
6	Guinness Ghana Limited	GUIN	Manufacturing (Premium Drinks)
7	Uniliver Ghana Limited	UNIL	Manufacturing and Marketing
8	Republican Bank	REP	Financial Services
9	Societe Generale Ghana	SOG	Financial Services
10	Cocoa Processing Company Limited	COCA	Manufacturing
11	Total Petroleum	TOPR	Oil and Gas
12	Sam Woode Limited	SWL	Publishing
13	Trust Bank	TRST	Financial Services
14	Tullow Oil	TUL	Oil and Gas exploration
15	Mechanical Loyd	MCLD	Automotive

Source : (Ghana Stock Exchange, 2022)

3.4 Operational Variables

The variables used in this study consist of:

An **independent variable** (X) is a discrete variable that remains unaffected by any external factors. The present analysis considers the independent variable of capital structure, which refers to the amalgamation of debt and equity that publicly traded firms utilize to finance their assets. The metrics utilized to assess the financial

leverage of a company include the Debt- to -Equity Ratio (DER), Debt to Assets Ratio (DAR), and Long -Term- Debt to Equity Ratio (LTDER).

A **moderating variable**, denoted as M, is a type of variable that has the ability to either enhance or diminish the impact of independent variables on the dependent variable. The study incorporates firm size as a moderating variable. The aggregate value of assets possessed by the organization. The natural logarithm of total assets is typically employed as an indicator.

In the realm of research, **a dependent variable** (Y) is a type of variable that is not susceptible to determination by other variables. Profitability is the dependent variable utilized in this study. Profitability is a metric utilized to assess a publicly traded firm's capacity to generate profits through the utilization of its owned resources, including assets, capital, or company sales. This metric is commonly measured through indicators such as Return on Equity (ROE), Return on Assets (ROA), and Net Profit Margin (NPM).

d. In a research study, a **control variable** refers to any factor that is maintained at a constant level or restricted in order to prevent it from influencing the outcome of the study. The study's objectives do not encompass the variable in question, however, it is being controlled due to its potential to impact the outcomes. The growth variable serves as the control in this study. The percentage change in asset growth over time is determined by subtracting the total asset value of year "t-1" from the total asset value of year "t" and dividing the result by the total assets of year "t-1".

Variable operations refer to the systematic procedures that are employed to measure and quantify the attributes of variables. These operations enable researchers to obtain accurate indicators of variables, thereby enhancing the precision of hypothesis testing tools. Further information can be observed in the tabulated data presented below.

Table 3.5 Operational Variables

Variable	Definition	Indicator	Scale
Capital Structure (X)	Capital structure is a combination of debt and equity that a	DER (Debt to Equity Ratio) DAR (Debt to Assets Ratio)	Ratio

Variable	Definition	Indicator	Scale
	company holds to fund its assets (Habibniya et al., 2022)	LTDER (Long Term Debt to Equity Ratio)	
Profitability (Y)	Profitability is a ratio that measures the company's ability to generate profits by using the resources owned by the company, such as assets, capital, or company sales.(Ilham et al., 2023)	ROE (Return on Equity) ROA (Return on Assets) NPM (Net Profit Margin)	Ratio
Firm Size (M)	The amount of total assets owned by the company (Ahmad & Muslim, 2022)	Natural Logarithm of Total Assets	Ratio
Growth	The rate of asset growth is expressed as a percentage that changes over the years (Auerbach & Gale, 2022)	Δ Total Assets	Ratio

3.5 Types and Sources Data

The present investigation utilized secondary data as its primary source of information. According to Hermawan (2006), secondary data refers to a pre-existing data set that pertains to variables which have been previously gathered and organized by external sources. Secondary data refers to data that is gathered or

acquired by researchers from pre-existing sources, such as libraries, prior research reports, and company publications and bulletins. Misbahudin's work was published in 2013.

The proposed study will be executed in adherence to established research ethics and standards. The information pertaining to these companies has been sourced from the GSE database. This study, akin to the research conducted by Tisdall et al. (2008), is based on a sample period during which financial statements of all firms listed for twenty years were accessible. Thus, the selected time frame spans from 2002 to 2021. The GSE database provides users with the ability to conduct analyses on companies. The GSE database comprises data pertaining to the capital structure and profitability of firms. The provision of this information facilitated the execution of the study by utilizing precise search parameters.

3.6 Data Analysis Techniques and Hypothesis Testing

3.6.1. Panel Data Regression Analysis

In order to evaluate the impact of capital structure on profitability while moderating the influence of firm size and controlled growth, it is necessary to conduct hypothesis testing using a verification methodology for this study. The present study employed panel data. Panel data refers to a type of data that combines both time series and cross-sectional data, wherein multiple observations of the same cross-sectional unit are collected. To clarify, panel data refers to the collection of longitudinal observations of identical individuals. Given T time periods (t = 1, 2,..., T) and N subjects (I = 1, 2,...), the resulting panel data will yield NT units of observation. A balanced panel refers to a dataset where each individual or participant is observed for an equal number of time units. In cases where the allocation of time units to each member of a panel is not uniform, the panel is classified as uneven.

The utilization of panel data methodology confers a greater number of benefits in comparison to the employment of time series and cross-sectional methodologies. The panel data methodology is a hybrid approach that integrates both time series and cross-sectional techniques. In recent years, the panel data method has been chosen as a preferred approach by scholars such as (Michaelas et al., 1999), (Sogorb-Mira & Lopez-Gracia, 2003) and (Frank & Goyal, 2003). The

utilization of panel data entails the amalgamation of observations on a group of entities across multiple time intervals, and yields outcomes that are not discernible in studies that solely focus on cross-sectional or time-series analyses. The researcher has adopted a versatile panel data model that enables the estimation of panel data with considerable flexibility and the formulation of distinctions in the conduct of the cross-sectional components.

Several studies have utilized panel data analysis in their research, however, none have specifically examined the impact of capital structure on the profitability of listed firms in Ghana over a 20-year timeframe. The General research model for panel data regression can be represented by the following equation:

$$\begin{aligned} \text{Profitability} = \ & \beta_1 + \beta_2 Capital\ Structure_{it} \\ & + \beta_3 Firm\ Size_{it} + \beta_4 Capital\ Structure_{it} * Firm\ Size_{it} \\ & + \beta_5 Growth_{it} + u_{it} \end{aligned}$$

Testing the research model will be carried out using three different models where each model uses different indicators of profitability and capital structure with the aim of finding the best indicator that is able to explain the relationship between capital structure and profitability.

Model 1

$$\begin{aligned} \text{ROE} = \ & \beta_1 + \beta_2 DER_{it} + \beta_3 Firm\ Size_{it} + \beta_4 DER_{it} * Firm\ Size_{it} \\ & + \beta_5 Growth_{it} + u_{it} \end{aligned}$$

$$\begin{aligned} \text{ROA} = \ & \beta_1 + \beta_2 DER_{it} + \beta_3 Firm\ Size_{it} + \beta_4 DER_{it} * Firm\ Size_{it} \\ & + \beta_5 Growth_{it} + u_{it} \end{aligned}$$

$$\begin{aligned} \text{NPM} = \ & \beta_1 + \beta_2 DER_{it} + \beta_3 Firm\ Size_{it} + \beta_4 DER_{it} * Firm\ Size_{it} \\ & + \beta_5 Growth_{it} + u_{it} \end{aligned}$$

Model 2

$$ROE = \beta_1 + \beta_2 DAR_{it} + \beta_3 Firm\ Size_{it} + \beta_4 DAR_{it} * Firm\ Size_{it} + \beta_5 Growth_{it} + u_{it}$$

$$ROA = \beta_1 + \beta_2 DAR_{it} + \beta_3 Firm\ Size_{it} + \beta_4 DAR_{it} * Firm\ Size_{it} + \beta_5 Growth_{it} + u_{it}$$

$$NPM = \beta_1 + \beta_2 DAR_{it} + \beta_3 Firm\ Size_{it} + \beta_4 DAR_{it} * Firm\ Size_{it} + \beta_5 Growth_{it} + u_{it}$$

Model 3

$$ROE = \beta_1 + \beta_2 LTDER + \beta_3 Firm\ Size_{it} + \beta_4 LTDER_{it} * Firm\ Size_{it} + \beta_5 Growth_{it} + u_{it}$$

$$ROA = \beta_1 + \beta_2 LTDER + \beta_3 Firm\ Size_{it} + \beta_4 LTDER_{it} * Firm\ Size_{it} + \beta_5 Growth_{it} + u_{it}$$

$$NPM = \beta_1 + \beta_2 LTDER + \beta_3 Firm\ Size_{it} + \beta_4 LTDER_{it} * Firm\ Size_{it} + \beta_5 Growth_{it} + u_{it}$$

The common effect model (CEM), fixed effect model (FEM), and random effect model (REM) are used in the panel data regression analysis approach. To determine the best model, the Chow test, Hausman test, and Lagrange multiplier test were carried out. Then the three panel models must identify the most appropriate model to predict the panel data regression parameters. In this case, the F test is performed using the panel data regression model selection procedure:

1. Selection between the CE and FE Models

The Chow test or F test is used to determine whether the FE model is greater than the CE model. Types of F numbers are:

$$\text{F-Count} = \frac{(RSS_1 - RSS_2) / n - 1}{(RSS_2) / (nT - n - K)}$$

Where n is the individual number; T is the time period; K is the number of parameters of the FE model and RSS1 and RSS2 is the number of other CE and FE models. Assessment of the CEM or FEM model is based on the following criteria:

H0 : if the prob. F-Test > 0.05 (CE models)

H1 : if the prob. F-Test < 0.05 (FE Model)

2. Selection between the FEM and REM

The Hausman test serves to assess whether the FE model is superior to the RE model. The statistics for Hausman fit Wald's criteria and follow the following chi-square distribution (always 2):

$$W = \Box^2 [K] = [\hat{\beta}, \hat{\beta}_{GLS}]\Sigma^{-1}[\hat{\beta} - \hat{\beta}_{GLS}]$$

The FE or RE model is based on the following criteria:

H0 : if the Prob value $\Box$ > 0.05 (FE Model)

H1 : if the Prob value $\Box$ < 0.05 (RE Model)

The next step is to test the classical assumptions through 2 classical assumption tests, including the multicollinearity test and the heteroscedasticity test. Normality and auto-correlation tests were not carried out because the samples used were more than 40 (Ghasemi & Zahediasl, 2012). The autocorrelation problem is solved using the Generalized Least Square (GLS) model (Gujarati & Porter, 2008)

3.6.2. Hypothesis Testing Design

The formula for predicting changes between variables, the regression model analysis is used to evaluate the assumptions made in Chapter 2. The mathematical theory that will be evaluated based on the panel regression equation is:

H0 ; $\Box\Box_0 = 0$, Company size does not moderate the effect of capital structure on profitability which is controlled by company growth

Ha ; $\Box_i \neq 0$, Company size moderates the effect of capital structure on profitability which is controlled by company growth

The theory is examined partially or at the same time. Hypothesis testing is carried out partially with the following criteria:

1. Probability value $< \square$ (5%), accept H0

2. Probability value $> \square$ (5%), rejects H0

At the same time, the value of F is evaluated using the following criteria:

1. Prob(F-statistic) value $< \square$ (5%), accept H0

2. The value of Prob(F-statistic) $> \square$ (5%), reject H0

The next hypothesis test determines the importance of determining the effect on the dependent variable with the R-Square (R2) and Square Modified R values of the independent variables (Adj. R2). These two values are sometimes called valuation coefficients. This coefficient explains how much difference can be explained by the independent variable in the dependent variable. This value indicates how close we are on the regression line to the actual result. $0 < R2 < 1$ is the value of R2. The higher R2 the better the regression model. All descriptive and inferential analysis methods use MS tools for panel results.

This study used Eviews statistical analysis method. Eviews data analysis for panel data is the ideal package for quickly and efficiently managing data, performing econometric and statistical analysis, generating forecasts or model simultaneously and producing high quality graphs and tables for publication or inclusion in other applications