

**The Nexus of Capital Structure, Profitability, and the COVID-19 Financial Crisis: An Empirical
Analysis of South African JSE listed Firms.**

By

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Acknowledgements and Dedication

I would like to express my heartfelt gratitude to my family for their unwavering love, encouragement, and support throughout this journey. Their belief in me has been my constant inspiration.

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Abstract

This study explored the interplay between capital structure choices and financial performance across 72 JSE-listed firms, spanning 2008 - 2022. By employing panel data regression, the data sourced from financial reports underwent an analysis using descriptive statistics, correlation matrices, and fixed effects regression models. Findings revealed negative associations between debt ratios and profitability metrics over the full sample period. The study addressed the COVID-19 pandemic's influence, and the results were consistent even during the crisis. In conclusion, this research potentially presents invaluable insights for stakeholders navigating the dynamic landscape of capital structure decisions and their profound implications on financial performance within the South African market, even amidst the disruptive forces of a global pandemic. As more debt usage was found to have a negative effect on profitability, firms would have to make courteous decisions in adding more debt to their capital structure(s) to avoid its dire effects on the bottom line.

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Abbreviations

AltX Board: Alternative Exchange Board

B-BBEE: Broad-based Black Economic Empowerment

BEE: Black Economic Empowerment

BFA Research Domain database

DA: Debt-to-assets ratio

DE: Debt-to-equity ratio

EPS: Earnings Per Share

FX: Foreign Exchange

GDP: Gross Domestic Product

JSE: Johannesburg Stock Exchange

LDA: Long-term debt-to-assets ratio

NPM: Net Profit Margin

NPR: Net Profit Ratio

OLS: Ordinary Least Squares

R: South African Rand

ROA: Return on Equity

ROE: Return on Equity

SARB: South African Reserve Bank

SDA: Short-term debt-to-assets ratio

ZAR: Zuid Afrikaanse Rand

1. Introduction

1.1 Motivation and Background of Study

Capital structure is a critical aspect of financial management for firms; it refers to how a company finances its operations and growth through a combination of equity, debt, and other forms of financing (Modigliani & Miller, 1958; Brusov et al., 2023; Baskaran & Ibrahim, 2023; Ahmed et.al, 2023). The choice of capital structure might have significant implications for a company's financial health, risk profile, and profitability (Abor, 2007; Mathur et.al., 2021). Moreover, the relationship between capital structure and profitability has been a topic of interest in corporate finance research for many years, with a growing body of literature dedicated to exploring the complex dynamics between these two variables (Titman & Wessels, 1988; Mashavane & Tsaurai, 2015). However, just like other relationships researched in the business world, evidence of this relationship may be positive or negative.

Before the advent of debt, businesses were fully funded by equity, meaning investors each owned a portion of the company's profits and enjoyed being the group with an exclusive residual claim to its assets (Chen et al., 2018). The main challenge with this form of financing was the continuous dilution of existing owners' equity each time more finance was raised, prompting businesses to seek alternative ways of financing business activities (Baskaran & Ibrahim, 2023). Consequently, businesses started issuing bonds and other types of debt to raise capital to address this issue. This allowed them to retain control over their assets while also reducing their dependence on equity funding.

While exposure to a wide variety of financing options is a welcome development, it poses an optimization problem for businesses as they attempt to strike a balance between their capital demands and their vulnerability to financial hazards. The seminal work by Modigliani & Miller (1958) highlighting the need to achieve an optimal capital structure has spurred extensive discussions on the relationship between capital structure and

profitability (Nassar, 2016). Profitability, commonly referred to as the bottom line, is at the core of many businesses' existence. Therefore, it becomes evident that research on capital structure and its connection to profitability is indispensable for businesses seeking to optimize their financing mix and meet their financial objectives (Ahmed & Bhuyan, 2020).

Despite numerous empirical investigations in this domain, the evidence from most studies globally has remained inconclusive to date. A review of the existing literature reveals a diverse landscape of findings. For instance, the studies by Essel (2023), Kabiru and Njeru (2019), Li and Wang (2019), Mlambo and Gwatidzo (2019), Adesola and Ekundayo (2018), Garcia and Lopez (2018), and Jensen and Smith (2017), all found a significant positive relationship between capital structure and financial performance, proxied by earnings per share (EPS), which represents the portion of a firm's profit allocated to each outstanding share of common stock. These findings suggested that higher debt levels contribute to enhanced profitability. Conversely, the work of Kamurudin et al., (2022), Nurmasari et.al., (2022), Chen et al., (2018), Hove (2017), Fakoya and Kolade (2017), Jensen and Smith (2017) and Kabir et.al., (2016), all highlighted a significant negative relationship between these variables, indicating that excessive debt burdens could lead to decreased financial performance. These divergent results underscore the complexity of the capital structure-performance nexus and the need for further examination in the specific context of the Johannesburg Stock Exchange (JSE) listed firms.

1.2 Problem Statement

While prior research has diligently explored this relationship, the true nature of the interplay between capital structure and firm performance remains unresolved given the conflicting evidence. Existing literature is often context-dependent. In the context of emerging markets, empirical investigations into this connection have yielded a mixture of outcomes and diverse results (Essel, 2023; Kamurudin et al., 2022; Nurmasari et al., 2022; Mlambo & Gwatidzo, 2019; Hove, 2017; Fakoya & Kolade, 2017; Abata et al., 2017;

Abor, 2007). The variations in these outcomes may be attributed to the unique methodologies employed in each study.

Within the South African context, several studies have explored this relationship and yielded disparate results influenced by the nature and scope of each research. For instance, Abata et al., (2017) focused exclusively on Tobin's Q as a measure of financial performance, while Abor (2007) examined a similar domain within the landscape of South African SMEs. Fosu (2013) scrutinized capital structure alongside product market competition and firm performance within JSE-listed firms, covering the years from 1998 to 2009, to name a few instances. However, the coverage of the COVID-19 era in these studies has been limited.

The COVID-19 pandemic unleashed unprecedented disruptions upon global economies, and South Africa was not spared from its implications. The financial disruptions brought about by the global pandemic add a critical dimension to the study of capital structure and firm performance during times of crisis. This is evident in the studies of Nurmasari et.al (2022) and Kamurudin et al., (2022), where the conclusions suggest that the COVID-19 pandemic may have had an impact on the interaction between these capital structure variables and corporate profitability. Despite the distinctive challenges presented by each financial crisis, there is a notable gap in research specifically tailored to JSE-listed firms during the COVID-19 era.

While the COVID-19 pandemic caused unprecedented disruption across global economies, it is important to understand that this is not the first time that companies have faced severe economic turmoil. Global financial crises such as the 2008 Global Financial Crisis, the 1997 Asian Financial Crisis, and the Eurozone debt crisis have historically tested companies' capital structures and profitability. Each of these crises has highlighted the vulnerability of companies to external shocks and led to extensive debate and research on optimizing capital structure during times of economic stress. Companies need to restructure their debt and rethink their capital structure strategies. In emerging markets such as South Africa, the impact of these crises has been particularly

pronounced, as companies often face additional challenges related to market volatility, currency fluctuations, and limited access to international financing.

This study therefore seeks to extend existing research by not only focusing on the impact of the COVID-19 pandemic but also contextualizing these findings within a broader framework of global financial crises. By comparing the impact of such a crisis on corporate performance, this study aims to provide a more comprehensive understanding of how companies can better structure their capital to withstand financial shocks, thereby providing valuable insights into the field of corporate finance.

1.3 Research Objectives

The research aims to research the relationship between capital structure and the profitability of firms listed on the JSE over a sample period from 2008 to 2022.

The research seeks to attain the following objectives:

1. To research the relationship between capital structure and the profitability of listed firms on the JSE.
2. To research the effect of COVID-19 on the relationship between capital structure and profitability of JSE-listed firms.

1.4 Research Questions

The research seeks to answer the following questions.

1. What is the relationship between capital structure on the profitability of listed firms on the JSE?
2. What is the effect of COVID-19 on the relationship between capital structure and profitability of JSE-listed firms?

1.5 Significance of Study

This study holds value in terms of its contribution to the present literature on the association between capital structure and profitability. The study endeavors to overcome the limitations and research gaps identified in prior studies by considering the context of emerging markets, especially South Africa during the COVID-19 era. As the unprecedented COVID-19 unleashed disruptions upon global economies, South Africa was not spared from the implications of the COVID-19 pandemic. Hence, taking the subject into this context allowed the researcher to assess if there is any significant influence of the COVID-19 pandemic on the association between capital structure and firm profitability. This study employed data from 2008 - 2022, a period which includes the global financial crisis of 2008/09 and the COVID-19 global pandemic, which enabled the researcher to remove time-invariant differences while reviewing the temporal order on the relationship between capital structure and financial performance. As such, the study offers a timely and unique perspective on the interplay between capital structure choices and financial performance, especially during the challenging times brought about by the COVID-19 crisis.

1.6 Overview of the Dissertation

A summary of the research problem, objectives, and importance of the study was presented in Section 1's context and setting section. The section also described the scope and delimitations of the study. The goal of the subsequent section of the literature review was to examine pertinent studies on capital structure and profitability. The section investigated ideas and models that explain how capital structure and profitability are related. It also looked at previous empirical research in this field. The research methodology will be discussed in Section 4 along with the study's population, sample size, data-gathering strategy, and data analysis methodologies. The section also covered ethical issues that were considered when conducting the study. The study's results are provided in Section 5, which includes data analysis and presentation. Using statistical techniques like regression analysis and correlation analysis, the section examined data

gathered from secondary sources. The study's summary of results, limitations, and recommendations will be outlined in Section 6's summary of findings. Based on the findings from the data analysis, the section will draw some conclusions. For businesses looking to increase their profitability through capital structure optimization, recommendations will also be given. Lastly, Sections 7 and 8 outline the references and appendices, respectively.

2. The Research Context

2.1 Introduction

This section examined the research context, with a specific focus on the dynamic landscape of the South African economy and financial markets. Understanding this market context is essential in providing a broader perspective on factors influencing the relationship between capital structure and profitability, especially within the JSE. Beginning with an exploration of the South African economy's dynamics, the section subsequently analyzes the financial markets in the region. Serving as a pivotal starting point, this section lays the groundwork for comprehending how capital structure impacts profitability in JSE-listed companies.

2.2 Dynamics of the South African Economy

South Africa has an extensive and intricate history, which has had a far-reaching effect on the country's economy (Mokgolo & Tshethlana, 2022). The nation is home to a wide variety of industries, including manufacturing, services, agriculture, and mining (Claessens & Laeven, 2018). Comprehending how capital structure influences profitability in listed firms on the JSE requires a grasp of the dynamics of these industries. Numerous elements, such as political unpredictability, social unrest, corruption, and crime, have an impact on the dynamics of the South African economy (Mokgolo & Tshethlana, 2022). Since apartheid ended in 1994, the nation has seen enormous political changes that have had a considerable impact on its economic environment such as affirmative action and Black Economic Empowerment (BEE) programs (McKeever, 2023; Musabayana & Mutambara, 2022). These regulatory issues influence the capital structure distribution among affected firms making South Africa contextually unique for this study.

The South African economy is characterised by elements of both developed- and developing economies, making it a mixed economy (Iqbal et al., 2019). Despite a robust

financial industry and innovative infrastructure, the nation contends with formidable obstacles like high unemployment, inequality, and poverty (Claessens & Laeven, 2018). Its reliance on natural resources, especially precious metals, significantly influences GDP and exports, with mining being a cornerstone industry. In addition, a diverse industrial sector, spanning manufacturing, finance, and services, further enriches the economic landscape, along with a notable 2% contribution from the agricultural sector (Mokgolo & Tshetlhana, 2022). This comprehensive economic context is pivotal when analysing the interplay between capital structure and profitability for JSE-listed firms, particularly given the unique challenges presented by the COVID-19 pandemic.

The pandemic's diverse impact on industries within the South African economy adds layers of complexity. Industries classified as essential services, such as healthcare, utilities, mining, and specific manufacturing sectors, were permitted to operate during lockdowns. While healthcare thrived, non-essential services like manufacturing faced disruptions in supply chains and labour shortages, compelling adaptive strategies in capital structures to weather the economic downturn. This sophisticated industry-specific response to the pandemic may have had unconventional effects on profitability, contributing valuable insights to the study's exploration of the nexus between capital structure and profitability in the context of the JSE-listed firms.

The South African economy has several strengths as alluded to, but it also faces some difficulties. The rampant unemployment rate, which has consistently remained high at almost 33.5%, is one of the most urgent problems (Stats SA, 2024). This is partially caused by a limited investment in education and training and a skills deficit. Another significant issue the nation is dealing with is inequality (Claessens & Laeven, 2018). With a Gini index of 0.63, South Africa has one of the highest levels of income inequality worldwide. Political upheaval and social unrest have been exacerbated by this in recent years. Infrastructure concerns, especially related to electricity supply, further compound challenges (Kgarose et al., 2024). Eskom, the state-owned utility, has encountered difficulties meeting demand, resulting in frequent blackouts that adversely impact business operations (Claessens & Laeven, 2018). These challenges carry unique

influences on capital flow, capital structure, and profitability independently. High unemployment and skills deficits can hinder capital flow into productive sectors, influencing the capital structures of businesses. Similarly, income inequality may affect consumer spending patterns, subsequently impacting the profitability of various industries (Tai, 2024). Moreover, the infrastructure issues, particularly electricity supply disruptions, pose direct challenges to the operational efficiency of businesses, further shaping the dynamics of capital structure and profitability (Avordeh et al., 2024). Recognizing these individual influences is crucial to understand the multifaceted relationship between capital structure and profitability within the South African economic context.

Conclusively, the South African economy is a complicated blend of advantages and disadvantages. The nation features a strong financial industry and innovative infrastructure, but it also has serious problems like high unemployment, inequality, and infrastructure problems (Claessens & Laeven, 2018; Musabayana, 2023). Although the government has put in place several initiatives to address these issues, more could be done to guarantee long-term economic growth and development.

2.3 Analysis of the South African Financial Markets

The South African financial markets play a crucial role in the economy of the nation (Iqbal, Rana & Rehman, 2019). The financial industry serves as a platform for investment and economic development while making a sizeable contribution to the nation's GDP (Pindado, Rodrigues & De La Torre, 2019). The stock exchange, money market, bond market, and foreign currency market will all be covered in this overview of the numerous facets of the South African financial markets.

The largest stock exchange in Africa and one of the top 20 exchanges worldwide is the JSE (Bae & Kim, 2019). The JSE provides a wide variety of financial instruments such as debt securities, derivatives, and stocks. With a total market value of R16 trillion (\$1 trillion), the exchange contains over 400 listed firms (Bae & Kim, 2019). The JSE's liquidity and regulatory structure make it a desirable investment location for overseas investors.

For banks and other financial institutions, the South African money market is an important source of short-term funding (Mokgolo & Tshethlana, 2022). Various instruments, including treasury bills, negotiable certificates of deposit, commercial paper, and repurchase agreements, are included in the money market. To control the money market, the South African Reserve Bank (SARB) sets interest rates and controls liquidity.

One of the busiest emerging markets in the world is the South African bond market (Mokgolo & Tshethlana, 2022). Government bonds, corporate bonds, and other long-term debt securities are all included in the bond market. With over 90% of all outstanding bonds being in the government bond market, it is the largest sector of the bond market. Due to its high yields, the bond market offers both domestic and foreign investors an appealing investment opportunity.

Turning to the foreign exchange (FX) market, the official currency of South Africa is the South African Rand (R) or the Zuid-Afrikaanse Rand (ZAR). Trading in many currencies, including ZAR, can be done on the foreign exchange market. An important source of liquidity for the South African financial markets is the foreign currency market. By maintaining the nation's foreign reserves and establishing an exchange rate policy, the SARB plays a significant part in controlling the foreign currency market. Yaya, O., Adenikinju, O. and Olayinka

Iqbal et al., (2019) have noted that, in general, capital markets in Sub-Saharan Africa are characterized by underdevelopment, inefficiency, and illiquidity, with shallow bond markets that are typically dominated by public debt. In comparison to other African nations, South Africa exhibits a greater reliance on long-term debt as opposed to short-term debt (Yaya, Adenikinju, & Olayinka, 2024). This trend might be attributed to the more advanced financial systems present in South Africa, which provide firms with superior access to long-term debt. Conversely, short-term debt is more prevalent in most African countries due to the prevalence of short-term deposits in their markets, which cannot be effectively matched with longer-term financing requirements. Despite these differences, the nature of the South African financial landscape makes it a stand-out emerging market

hence this study is unique as far as capital structure literature is concerned for developing countries.

The analysis of the impact of capital structure on the profitability of publicly traded companies on the JSE is placed in the perspective of the broader economic dynamics of South Africa. South Africa, which has notably the biggest stock exchange in Africa, the JSE, is where many of the nation's top businesses in a variety of industries are headquartered (Bae & Kim, 2019). The success of companies listed on the JSE is intimately related to the state of the South African economy. A company's capital structure is defined as its ratio of debt-to-equity funding. The goal of the study is to find out how, in the South African context and COVID-19, this mix affects corporate profitability. Policymakers, investors, and managers looking to optimise their capital structure to maximise profitability will find the insights useful. The relationship between capital structure and profitability may be influenced by a variety of economic factors in South Africa. For instance, a high amount of political risk may make it more challenging for businesses to obtain favorable rates on debt funding (Iqbal et al., 2019). Similarly, enterprises with significant exposure to foreign currencies may see a change in their cost of capital due to currency volatility (Iqbal, Rana & Rehman, 2019).

2.4 Summary of the Research Context

In conclusion, the South African financial markets play a crucial role in the country's economy. The markets provide investment opportunities for both domestic and foreign investors with their wide selection of financial instruments. The financial markets are transparent and stable because of the strong regulatory structure (Mokgolo & Tshetlhana, 2022). As an emerging market, South Africa offers a unique context for capital structure research. The country's diverse market conditions encompass a broad spectrum of economies, from rapidly emerging economies to those with a long history of financial markets, providing a rich background for studying the effects of different capital structures. South African markets have experienced rapid change but face fundamental challenges such as illiquidity and access, which might influence companies' capital

structure decisions and provide interesting opportunities for research. Further challenges of high unemployment, income inequality, and infrastructure issues add complexity, underscoring the need for a tailored examination of this distinctive environment. The high and persistent inequality in South Africa, influenced by regulatory frameworks like broad-based Black Economic Empowerment (B-BBEE) policies, adds a unique dimension to its capital structure landscape. This section offers an exploration of the economic environment and South Africa's financial markets, covering legal frameworks and key participants.

The forthcoming literature review will address the complex relationship between capital structure and profitability and provide a comprehensive examination of existing research in this area. This section first outlines the fundamental theories that form the connection between capital structure and profitability and provides a detailed discussion of the theoretical perspectives that have shaped current understanding. The review then presents a detailed overview of empirical studies that have examined this relationship, highlighting the specific contributions and findings of each study. By synthesizing these insights, the review aims to clarify the nuanced interplay between capital structure and profitability and provide the basis for the analysis that follows.

3. Literature Review

3.1 Introduction

This section reviews the existing literature on the impact of capital structure on firm profitability. This section aims to review existing literature on the subject as a build-up to developing a methodology for this study. The section starts by examining the theoretical frameworks proposed to explain the relationship between capital structure and profitability. These include the trade-off theory, the signalling theory, the pecking order theory, and others. Next, a review of the empirical studies conducted in this area, discussing their methodologies, findings, and limitations, is done. Finally, conclusions from the literature review are drawn and areas for further research are highlighted.

3.2 Theoretical Framework

The literature on capital structure suggests that a firm's mix of debt and equity financing might significantly impact its profitability. Many theories explain the capital structure including the traditional trade-off theory (Myers & Rajan, 1988; Ullah et al., 2020), the pecking order theory (Myers & Majluf, 1984; Yakubu et al., 2021, Esghaier, 2024), and the signalling theory (Spencer, 1973; Berger & Udell, 2020). The subsequent sections review these and other capital structure theories in more detail.

3.2.1 Trade-off Theory

The trade-off theory asserts a trade-off between firms' debt and equity financing. The theory argues that firms face a decision to choose between debt and equity financing and that the optimal capital structure of a firm balances the benefits of debt financing, such as tax savings, with the costs of debt financing, such as the risk of bankruptcy and the cost of financial distress (Kraus & Litzenberger, 1973; Ullah et al., 2020). A firm's profitability is one of the key factors in determining its optimal capital structure (Graham et.al., 2015).

In general, a firm with higher profitability might support a higher level of debt, as it has a more remarkable ability to service its debt obligations. However, the relationship between profitability and optimal debt level is not linear. As a firm increases its debt level, the risk of financial distress increases, and the benefits of additional debt begin to decline (Titman & Wessels, 1988; Saona et al., 2020, Narayan et al., 2021).

The trade-off theory has been widely studied and debated in finance. For example, Modigliani and Miller (1958) initially proposed that capital structure is irrelevant in a perfect market, but their assumptions were revised to consider the effects of taxes, bankruptcy costs, and asymmetric information. Overall, the trade-off theory suggests that firms should consider the benefits and costs of debt financing when determining their optimal capital structure (Frank & Goyal, 2019). Klapper and Tzioumis (2008) investigated the interaction between taxation and capital structure and in their study, they report that the trade-off theory posits that the more cash flow a profitable firm has, the more debt it will generate. The same study showed that as the debt capacity accumulates, it will be used to capture tax shields and leverage benefits. While profitability is critical in this decision, other factors, such as industry characteristics and market conditions, must also be considered.

Several studies have examined the relationship between profitability and optimal capital structure under the trade-off theory. For example, Frank and Goyal (2019) found that profitability is positively related to the use of debt financing. However, they also found that the effect of profitability on capital structure is weaker for firms that have already reached their optimal debt level (Frank & Goyal, 2019). Another study by Rajan and Zingales (2018) found that the effect of profitability on capital structure varies across industries. The study found that profitable companies in industries with high bankruptcy costs, such as technology and pharmaceuticals, tend to have lower leverage because their assets are specialized and intangible and lose significant value upon liquidation. In contrast, companies in industries with low bankruptcy costs, such as retail and utilities, often have higher debt levels because their assets, such as inventory or physical infrastructure, can be more easily sold or repurposed in the event of bankruptcy.

Ulla et al., (2020) conducted a similar study, and the results supported the trade-off theory. Although this study was limited to the textile industry in Pakistan, it suggested that companies should increase their debt ratio individually in their capital structure, which in turn helps to improve their performance according to the trade-off theory. Two similar studies from Iran found that capital structure decisions had a negative impact on profitability. Firm size played a key role in mitigating these effects, supporting the trade-off theory (Ahmed et al, 2023; Khan et al., 2021)

The trade-off theory can be criticised for assuming that firms have perfect knowledge about the costs and benefits of debt financing, which may not be accurate. Additionally, it assumes that firms can easily adjust their capital structure, which may not be possible in practice due to factors such as market conditions and transaction costs. On this note, this discussion turns to the pecking order theory.

3.2.2 The Pecking Order Theory

Myers (1984) extended the trade-off theory by introducing the pecking order concept. The pecking order theory of capital structure suggests that firms prefer internal financing, followed by debt financing, and lastly equity financing Yakubu et al., (2021). This theory is based on the idea that external financing is more costly than internal financing, and firms have asymmetric information about their financial positions (Esghaier, 2023). One argument against the pecking order theory is that it assumes that internal financing is always available and that firms have unlimited access to internal funds (Myers, 1984). However, in practice, firms may not have sufficient internal funds to finance all their investments. Additionally, the theory assumes that debt financing is always more costly than equity financing, which may not be accurate in all circumstances (Hackbarth, 2020).

Several studies have examined the relationship between capital structure and profitability under the pecking order theory. For example, Hovakimian et al., (2001) found that profitable firms rely less on debt financing and more on internal financing than less profitable firms. This suggests that profitable firms have greater access to internal funds

and are less reliant on external financing. Another study by Kim and Sorensen (1986) found that firms with higher profitability tend to have lower levels of debt financing. This supports the pecking order theory, suggesting that profitable firms may prefer internal financing over external financing. However, some studies have found conflicting results. For instance, Ferri and Jones (1979) found that profitability positively relates to using debt financing, contradicting the pecking order theory. Similarly, a study by Rajan and Zingales (1998) found that profitable firms in low bankruptcy-cost industries tend to have higher levels of debt financing, which is also inconsistent with the pecking order theory.

More recently, a study by Yakubu et al., (2021) conducted a study on Ghanaian listed companies supports this theory. The research found that the capital structure decisions of Ghanaian companies were guided by POT as they relied first on internal finances before considering external debt. This pattern was particularly evident in highly profitable companies that tended to avoid debt, consistent with the basic assumptions of the pecking order theory. Additionally, the study found that taxes played a less important role in influencing leverage decisions than profitability and company size. Another study by Chandra et al., (2019), who focused on companies listed in Kompas 100 in Indonesia, found evidence consistent with the pecking order theory. The study showed that companies with higher profitability took on less debt, further supporting the theory that companies prefer to finance their operations through internal resources whenever possible and use debt as a secondary option.

The relationship between capital structure and profitability under the pecking order theory is thus complex and may depend on firm-specific factors such as industry characteristics and financial health. While some studies support the theory, others provide conflicting evidence, suggesting that further research is needed to fully evaluate the pecking order theory in the context of the capital structure and profitability relationship. Evaluated next is the signalling theory.

3.2.3 The Signalling Theory

Signalling theory suggests that a firm's capital structure choices might convey valuable information to investors and the market about the firm's profitability and prospects (Spencer, 1973). Specifically, firms may use their capital structure decisions to signal their profitability and financial health to external stakeholders (Yasar et al., 2020). For instance, firms may issue more debt to signal to investors that they have confidence in their future profitability and ability to service their debt obligations. This might lead to lower debt financing costs, as investors perceive the firm as less risky. Similarly, firms may issue equity to signal that they have strong future growth prospects, which might lead to higher stock prices and increased investor confidence as was suggested by Myers (1984).

Several studies have examined the relationship between capital structure and profitability under the signalling theory in the abovementioned theories. Myers and Majluf (1984) argue that asymmetric information between firms and investors might lead to adverse selection, where investors may perceive firms that issue equity as overvalued and firms that issue debt as being in financial distress. However, according to the signalling theory, firms that issue equity may signal their future growth prospects, while firms that issue debt may signal their financial health. A study by Jensen and Smith (2017) found that firms with higher profitability tend to issue more debt, suggesting that they may use debt to signal their financial health and prospects. Miglo (2011) discusses the four major capital structure theories and in the paper's analysis of signalling, the author reports that firms use their financing decisions to convey information about their prospects to investors. Additionally, the study reports that in equilibrium firms signal positive information by substituting debt for equity. This finding supported the notion that there is a negative relationship between leverage and net worth.

A study conducted by Majumdar and Puthiya (2021) focused on the UAE bond market and found that companies with smaller assets and higher financing needs are more likely to issue sukuk, signalling their financing needs to the market. In contrast, profitable, highly leveraged nonfinancial firms tended to prefer conventional bonds, consistent with the

negative selection mechanism of signalling theory. This study highlights how companies use their choice of financial instruments such as Sukuk compared to traditional bonds to send signals about their capital needs and financial stability. Another study by Berger and Udell (2020) examined how companies with insiders who have perfect information about future cash flows prefer debt financing over equity financing. This is because issuing debt signals confidence in future profitability, while issuing equity may be interpreted negatively by the market. This supports the prediction of signalling theory that companies with positive prospects prefer debt financing as a signal of their expected performance. These studies highlight the importance of signalling theory in capital structure decisions, particularly in environments characterized by information asymmetry, as firms strategically use their financing decisions to influence investor perceptions.

It is crucial to note that the signalling theory provides a framework for understanding the relationship between capital structure and profitability. Firms may use their capital structure choices to signal their financial health and prospects to external stakeholders, leading to lower costs of financing and increased investor confidence. However, the theory also highlights the importance of considering the context and firm-specific factors that may influence the effectiveness of signalling. While covered thus far are the core theories of capital structure in the context of firm profitability, there are various other theories, and the following to be covered here will be a few of these.

3.3 Other Capital Structure Theories

3.3.1 The Agency Theory

The agency theory suggests that conflicts of interest between managers and shareholders might affect a firm's capital structure decisions (Jensen & Meckling, 1976). Managers may prefer to retain excess cash and avoid debt financing to maintain their job security, even if this leads to suboptimal financing decisions for the firm. In this context, using debt financing might help discipline managers by aligning their interests with those of shareholders, as it might reduce the amount of free cash available to managers to

pursue their agendas (Jensen & Meckling, 1976). In other words, looking at the agency theory in isolation yields the result that capital structure is influenced by managers' and shareholders' interests instead of its effect on profitability.

Critics of agency theory argue that it oversimplifies the complex relationships between managers and shareholders and that other factors, such as market conditions and industry norms, can also influence a firm's financing decisions (Jensen & Meckling, 1976; Fama, 1980). Nguyen et al., (2023) focused on exploring the impact of capital structure on a company's profitability in Vietnam. In theory, they employed agency theory, which discusses the division of ownership and management, resulting in a situation where managers may prioritize their interests over those of the owners. The results revealed a connection between firm profitability, as measured by Return on Equity (ROE) and Return on Assets (ROA), and liquidity and debt. However, agency theory remains an essential framework for understanding how conflicts of interest might impact a firm's capital structure decisions.

3.3.2 Free Cash Flow Theory

Free cash flow theory suggests that firms with excess cash flows may be more likely to use debt financing to mitigate the agency costs associated with large amounts of cash. Debt financing can help to discipline managers by limiting their ability to invest in projects that do not generate sufficient returns. In this context, firms that are generating large amounts of free cash flow may be able to take advantage of the tax benefits associated with debt financing without increasing their financial risk (Jensen, 1986).

Free cash flow theory is criticised for being unable to fully capture the complexity of financing decisions and that other factors, such as market conditions and regulatory constraints, might also influence a firm's use of debt financing. Nonetheless, like the agency theory, the free cash flow theory remains an essential framework for understanding how firms can use debt financing to mitigate agency costs and maximise shareholder value.

3.3.3 Market Timing Theory

Market timing theory implies firms may time their equity issuances to exploit favourable market conditions. For example, firms may issue equity when their stock prices are high to maximise the amount of funds raised. In this context, market timing might help to reduce the cost of equity financing and increase shareholder value (Baker & Wurgler, 2002).

Like the agency theory oversimplifies the complex relationships between managers and shareholders, the market timing theory also oversimplifies the complex relationships between market conditions and financing decisions. Other factors, such as firm size and industry norms, might influence a firm's decision to issue equity. Market timing theory, even so, remains an essential framework for understanding how firms can optimise their financing decisions in response to changing market conditions.

3.3.4 The Dynamic Trade-off Theory

In the dynamic trade-off theory, firms adjust their capital structure over time in response to changing market conditions and financial opportunities (Baker & Wurgler, 2002; Graham & Harvey, 2011; Rajan & Zingales, 1998). The theory emphasises the importance of balancing the costs and benefits of debt financing, considering factors such as tax advantages, bankruptcy costs, and agency costs (Hackbarth, 2020).

According to this theory, firms are constantly assessing their financial position and considering optimising their capital structure to achieve their shareholders' most excellent value. As market conditions change, firms may adjust their debt levels to exploit new financial opportunities or reduce risk. Regarding the relationship between capital structure and profitability, the dynamic trade-off theory suggests that firms can increase profitability by carefully managing their debt levels over time (Baker & Wurgler, 2002; Graham & Harvey, 2011). By balancing the costs and benefits of debt financing, firms might improve their financial performance and achieve greater shareholder value. However, it should be

noted that the dynamic trade-off theory is still subject to debate, and further research is needed to understand its implications for corporate finance fully.

3.4 The Golden Thread

The golden thread that connects all these theories is that a firm's capital structure can significantly impact its profitability and overall financial performance. In this study, the capital structure decisions of JSE-listed firms are analysed through the lens of various financial theories, each shedding light on different aspects of firm behaviour and decision-making. The pecking order and market timing theories seem to be the two theories that are the backbone of this research as they both help address the research problem presented in Section 1.

Pecking Order Theory sheds light on the capital structure choices made by firms in this study. The theory suggests that firms prioritize internal financing, followed by debt, and finally, equity issuance. This behaviour is examined in the South African context, where firms might follow a pecking order due to market inefficiencies and information asymmetry. For example, firms in industries with high information asymmetry, such as technology, may prefer debt to avoid disclosing sensitive financial information through equity issuance, aligning with the predictions of this theory.

Market Timing Theory is also evaluated in this research by analysing whether firms in the study take advantage of favourable market conditions to issue debt or equity. This theory is particularly relevant in assessing the timing of capital structure decisions by JSE-listed firms, especially in periods of economic volatility, such as during the global financial crisis or the COVID-19 pandemic.

Through the application of these theories, this study demonstrates that the capital structure decisions of JSE-listed firms are not made in isolation but are informed by various theoretical perspectives that emphasize the importance of balancing costs and benefits. Each theory provides a unique lens through which to view the study's results,

showing that firms adjust their capital structures in response to tax considerations, agency costs, and market conditions. The study underscores the dynamic nature of capital structure decisions and how they are shaped by both firm-specific factors and broader economic forces.

3.5 Empirical Review

Several empirical studies have researched the influence of capital structure on firm profitability. This subsection examined studies exploring the relationship between capital structure and firm profitability, categorizing them into negative and positive relationships, as well as the impact of COVID-19. These diverse studies offer contrasting insights across global contexts. While some findings associate higher debt levels with lower profitability, others reveal varied outcomes in a positive relationship. The diverse methodologies employed, and contextual factors emerge as key influences that may contribute to differences in results, providing crucial insights for navigating challenges, including those posed by the COVID-19 pandemic.

3.5.1 Studies that found a negative relationship

This part of the empirical review examined eight studies conducted in Africa, Europe, and Asia that found a negative relationship between capital structure and firm profitability. These consistent findings suggest that higher debt levels are associated with lower profitability, contributing to a better understanding of the adverse effect of high debt levels on firm profitability across different regions. The studies differ in terms of sample sizes, periods of analysis, and context.

Hove (2017) analysed a sample of 52 industrial firms listed on the JSE over eight years. Essel (2023) investigated the impact of capital structure on firm performance from an emerging capital market perspective using data from 36 listed firms on the Ghana Stock Exchange. Fakoya and Kolade (2017) in Nigeria utilized a sample of 29 firms over the same 10-year period, while their study in South Africa employed a sample of 32 firms

over a shorter period. Chen et al., (2018) investigated a sample of 330 firms in Taiwan over six years, and Kabir et al., (2016) examined a sample of 365 firms in Malaysia over seven years. Jensen and Smith (2017) analysed a sample of 500 manufacturing firms across European countries over seven years, and Garcia and Lopez (2018) focused on a sample of 200 publicly listed firms in Spain over seven years. The examination of eight studies across diverse regions reveals a consistent negative relationship between capital structure and firm profitability, indicating that higher debt levels are associated with lower profitability; the variations in sample sizes and periods highlight the universality of this relationship across different contexts.

In terms of methodology, Essel (2023) employed the dynamic panel System of Generalized Method of Moment (GMM), Hove (2017), and Fakoya and Kolade (2017), utilized panel data regression analysis while Chen et al., (2018), Jensen and Smith (2017), and Garcia and Lopez (2018) and Kabir et al., (2016) employed simple regression analysis. These technically diverse methodologies provide different perspectives on the relationship between capital structure and firm profitability, contributing to a comprehensive understanding of the subject. Due to the diverse array of capital structure measures, Essel's (2023) study unveiled both positive and negative associations. The total debt-to-equity ratio, total debt-to-assets ratio, and long-term debt ratio revealed a negative association with profitability. The positive relationships, indicative of certain capital structure measures, are discussed in the subsequent section. In the other studies covered here, the debt-to-equity ratio consistently served as the primary metric in measuring capital structure, with the total debt-to-assets ratio being supplementary.

3.5.2 Studies that found a positive relationship

Al-Thuneibat (2018), Essel (2023), Kabiru and Njeru (2019), Adesola and Ekundayo (2018), Jensen and Smith (2017), Garcia and Lopez (2018), Li and Wang (2019), and Mlambo and Gwatidzo (2019) all found evidence that higher leverage is associated with increased profitability. Four studies (Al-Thuneibat, 2018; Kabiru & Njeru, 2019; Adesola & Ekundayo, 2018; Li & Wang, 2019) used regression or panel data analysis. These

methodologies allow for a quantitative examination of the relationship and control for firm-specific variables. The remaining three studies (Jensen & Smith, 2017; Garcia & Lopez, 2018; Mlambo & Gwatidzo, 2019) also utilized empirical analysis but focused on manufacturing firms in Europe, Spain, and the Zimbabwean economy, respectively. As noted, different measures of capital structure may influence different outcomes in the ultimate relationship to profitability. This is the case with Essel's (2023)'s study, where the total-equity-to-total-assets-ratio, short-term-debt-ratio, cash conversion cycle, total assets turnover, tangibility, sales-growth, firm size, and firm age revealed positive associations with the firm performance in contrast to the earlier discussed negative associations the same study found.

The sample sizes and duration of the studies varied according to the objectives and scope of each study. Al-Thuneibat's (2018) study analyses a sample of 86 publicly listed firms in various Amman Stock Exchanges during the period 2010 and 2014. Kabiru and Njeru focus on 100 non-financial firms listed on the Nairobi Securities Exchange in Kenya (Kabiru & Njeru, 2019). Adesola and Ekundayo examined a sample of 150 firms listed on the Nigerian Stock Exchange (Adesola & Ekundayo, 2018). Jensen and Smith analysed a sample of 500 manufacturing firms across Europe (Jensen & Smith, 2017), while Garcia and Lopez focused on a sample of 200 publicly listed firms in Spain (Garcia & Lopez, 2018). Li and Wang's study included 300 manufacturing firms in China (Li & Wang, 2019). Mlambo and Gwatidzo's (2019) study focused on 36 firms listed on the Zimbabwe Stock Exchange over five years from 2012 to 2016. The sample periods ranged from four to seven years across the studies. However, it is important to acknowledge the limitations of these studies. For instance, the relatively small sample size of Mlambo and Gwatidzo's study (2019) of only 36 firms; Kabiru and Njeru (2019) of 100 firms, and Adesola and Ekundayo (2018) of 150 firms, may limit the generalizability of the results to the broader respective economies. Additionally, the focus on shorter, notably four to seven years, may not provide a comprehensive understanding of the longer-term dynamics of the relationship between capital structure and profitability.

In conclusion, the reviewed studies, spanning various regions and economies, provide a comprehensive analysis of the relationship between capital structure and profitability. Despite differences in methodologies, sample sizes, and sample periods, all studies consistently support a positive relationship, indicating that higher leverage is associated with increased firm profitability. These findings hold across African, European, and Asian contexts, enhancing the understanding of the capital structure-profitability dynamics in different regions. However, further research is needed to address limitations such as small sample sizes, and specific periods like the COVID-19 era, to gain a more comprehensive understanding of the dynamics between capital structure and profitability, and much of this is discussed in the conclusion. Furthermore, the potential for endogeneity issues arising from the reverse causality between capital structure and firm profitability is a common concern in studies of this nature, calling for further research to address this potential confounding factor.

3.5.3 Research hypothesis

Based on the reviewed literature and to achieve the research objective (1), this study formulates the following testable hypothesis:

Hypothesis for Research Question 1:

Null Hypothesis (H0): *There is no significant relationship between capital structure on the profitability of firms listed on the Johannesburg Stock Exchange (JSE).*

Alternative Hypothesis (H1): *There is a significant relationship between capital structure on the profitability of firms listed on the Johannesburg Stock Exchange (JSE).*

3.5.4 Studies that investigated the impact of financial crises (COVID-19) on the relationship between capital structure and firm profitability

A few studies have examined the impact of the COVID-19 pandemic on the relationship between capital structure and financial performance in the context of emerging markets. Kamarudin et al., (2022) examined the trend of capital structure and company performance and examined whether there is a significant difference between the capital structure and company financial performance before and after the COVID-19 pandemic using a sample of 489 Malaysian listed companies. The study showed that there is a decline in company performance. Nurmasari et al., (2022) aimed to find out how corporate capital structure decisions affect the performance of companies in the industrial sector in Indonesia during the COVID-19 period. Similar to this study, the research by Nurmasari et.al (2022) uses net profit margin, earnings per share, return on assets, and return on equity as dependent variables. The independent variable that served as a proxy for capital structure was the debt-to-equity ratio. The results showed that the debt-to-equity ratio had a negative impact on return on assets, return on equity, and net profit margin in 2020-2021. The conclusion in this case suggests that the COVID-19 pandemic may have had an impact on the interaction between these capital structure variables and corporate profitability.

3.5.5 Research hypothesis

Based on the reviewed literature, and to achieve the research objective (2), this study formulates the following testable hypothesis:

Hypothesis for Research Question 2:

Null Hypothesis (H0): *There is no significant effect of COVID-19 on the relationship between capital structure and the profitability of firms listed on the Johannesburg Stock Exchange (JSE).*

Alternative Hypothesis (H1): *There is a significant effect of COVID-19 on the relationship between capital structure and the profitability of firms listed on the Johannesburg Stock Exchange (JSE).*

3.6 Summary of the Literature Review

In conclusion, the literature review has provided a comprehensive overview of the intricate relationship between capital structure and firm profitability, revealing multifaceted insights across diverse theoretical frameworks and empirical studies. Theories such as the trade-off theory, pecking order theory, signalling theory, agency theory, free cash flow theory, market timing theory, and dynamic trade-off theory collectively underscore the complexities of capital structure decisions and their impact on profitability. Notably, the trade-off theory highlights the delicate balance between debt's benefits and costs, while the pecking order theory emphasizes firms' preferences for internal financing over external options. The signalling theory illuminates the significance of capital structure as a communication tool to convey firm prospects to external stakeholders.

Empirical studies, spanning various regions and industries, have enriched the researcher's understanding by highlighting both positive and negative relationships between capital structure and profitability. While some studies consistently demonstrate a negative correlation, indicating the adverse impact of excessive debt on profitability, others unveil a positive association, highlighting nuanced dynamics influenced by context-specific factors. The variations in methodologies, sample sizes, and periods across studies emphasize the complexity and context dependence of this relationship. These findings collectively underline the need for a comprehensive approach that considers firm-specific characteristics, market conditions, and industry norms when examining the interplay between capital structure decisions and firm profitability. Further research is imperative to address methodological limitations such as small sample sizes, specific periods, and potential endogeneity issues to enhance the comprehension of the intricate interrelations between these pivotal aspects of corporate finance.

4. Research Methodology

4.1 Introduction

This section describes the data collection methods used to create a testable sample as well as a description of the overall experimental design to be applied in this study. Firstly, the research design, philosophy, and approach are described in the context of this study. Second, an overview of the data gathered as well as the various sources used is given. The third subsection will describe the data sample whilst the fourth subsection will define the independent, dependent, and control variables. Lastly, the fifth subsection will then take the reader through the empirical methodology and show how the proposed hypotheses presented in Section 1 will be evaluated.

4.2 Research Design, Philosophy, and Approach

4.2.1 Research Design

The research is based on a quantitative and correlational design. This is well suited for examining the relationship between capital structure decisions and the financial performance of companies listed on the JSE over the period 2008 to 2022. Given the aim of this study to examine possible cause-and-effect relationships between these two variables, the panel data regression method is used, which allows for a robust analysis that captures both cross-sectional variation (between different companies) and time series variation (within the same company over time). This method provides a more comprehensive and nuanced understanding of dynamics compared to cross-sectional or time series data alone because it accounts for unobserved heterogeneity by controlling for firm-specific characteristics.

The panel data technique is particularly well suited to this study because recent research, such as that of Baltagi (2022) and Hsiao (2022), highlights the effectiveness of this method in examining financial relationships, where both time-dependent and company-

specific factors may influence the results. Additionally, panel data regression is recognized for its ability to mitigate problems of multicollinearity and endogeneity that are common in corporate finance research, as reported by Wooldridge (2020) and Woodridge (2023). This strengthens the validity of the results and enables more accurate estimates of the relationship between capital structure and financial performance.

4.2.2 Research Philosophy

This study is based on a positivist research philosophy that emphasizes the need for objective measurements, empirical observations, and uncovering causal relationships through quantitative methods. In the positivist paradigm, reality is viewed as independent of human perception. Therefore, the focus of this research is to collect empirical data that can provide unbiased, measurable insights into how capital structure decisions affect financial outcomes. This approach is consistent with the core principles of positivism as outlined by Bryman and Bell (2022), who argued that positivist research in corporate finance aims to explain phenomena through observable, testable facts, typically derived from quantitative data become.

The reliance on statistical analysis, including the use of panel data regression, further supports the positivist orientation of the research. By objectively analysing historical financial data of JSE-listed companies, this study seeks to generate generalizable insights into capital structure and performance that could potentially be applied to similar contexts in emerging markets. This philosophical stance, as expressed by Saunders (2020), and Alharahsheh & Pius (2020), is particularly suitable for financial economics research, the aim of which is to uncover deterministic relationships through data-driven analyses.

4.2.3 Research Approach

The study follows an indirect experimental approach where hypotheses are derived primarily from established theories – namely pecking order theory and market timing

theory – but the unique context of the COVID-19 pandemic introduces an element of exploration. While the main aim was to test the relationship between profitability and capital structure of JSE-listed companies, the study also sought to understand how companies' responses to external shocks, such as market volatility during the pandemic, affect these relationships.

4.2.4 Sampling Techniques

The sample for this study consists of companies listed on the Johannesburg Stock Exchange (JSE) between 2008 and 2022. Due to the nature of the study, a non-probability sampling technique was used. Convenience sampling is used because the companies included in the study were selected based on specific criteria relevant to the research objectives, particularly their inclusion on the JSE and the availability of consistent financial data over the 15 years. This approach allowed the authors to focus on companies most relevant to the study's core research question – how capital structure influences financial performance in the context of the emerging market of South Africa.

According to Etikan, Musa, and Alkassim (2022), convenience sampling is often used in studies where the researcher wants to ensure data relevance and minimize external variability. In this context, the companies selected for analysis represent a cross-section of industries, providing a diverse sample for examining the relationship between capital structure and performance. However, the study acknowledges potential sampling bias as purposive sampling may limit the generalizability of findings across JSE-listed companies or beyond the South African context.

4.3 The Data Sample

The study employed data collected from Bloomberg and McGregor BFA Research Domain databases. The population of this study consists of all companies listed on the JSE for the period 2008 to 2022. The rationale for the selection of the 15 years is based on the study attempting to carry out this specific research over a longer period. Most

studies whose results were presented in the empirical review section of this study used periods that range from six to 10 years on average.

As of 31 December 2022, there were 352 companies listed on the main board and the AltX Board. The following criteria were used to select the final sample for analysis:

1. The final sample includes companies listed on the main board of the JSE and covers a variety of industries and sectors that represent a cross-section of the South African corporate landscape.
2. The final sample only consisted of non-financial firms. This is due to the regulatory nature of the financial industry, which implies certain restrictions on the capital budgeting decisions made by the respective firms in that industry (Goh and Rumapea, 2019). Financial sector firms have access to high leverage and are subject to minimal capital requirements and this component may not have the same implications for other firms from different sectors, hence the exclusion. This requirement resulted in 124 firms being excluded from our final sample.
3. The final sample includes companies listed on the main board of the JSE, covering a variety of industries and sectors that represent a cross-section of the South African corporate landscape.
4. For a firm to be included in the sample, it should have been listed on the JSE during the specified period with all the required data available for analysis. It is important to note that this requirement might result in survivorship bias within our results but for this study, that exception will be taken as it is. Firms that did not have a complete set of observations for the required data were also excluded from the final sample. These two considerations resulted in a total of 154 firms being excluded from the final sample as some companies were migrants from the AltX Exchange hence they were not listed on the main board for the entire period under study, and others simply did not have all the data required for the analysis.

After following the criteria set for exclusion and/or inclusion of firms, the study was left with 72 listed firms which represented a total of 648 observations of the relevant variables.

4.4 Variables

4.4.1 Dependent Variables

The dependent variables used in this study are profitability ratios, following a methodology employed in similar studies such as Abor (2005), Hove (2017), Goh and Rumapea (2019), and Abata et al., (2017). Specifically, the Net Profit Ratio (NPR) is designated as the primary dependent variable, with supplementary profitability ratios (ROA, ROE, and EPS) incorporated for robustness checks. This approach aligns with the methodology adopted in comparable studies, including Hove (2017); Namalathan, (2010); Goh and Rumapea (2019).

4.4.1.1 Net Profit Ratio (NPR)

The Net Profit Ratio (NPR), also known as the Net Profit Margin (NPM), measures the proportion of net profit generated from total revenues (Marshall, 2022). NPR is computed by dividing the net profit after tax by net sales for the period concerned. The ratio reflects the company's ability to translate its sales into profit after considering all operating expenses and taxes.

4.4.1.2 Return on Assets (ROA)

Return on Assets (ROA) is a measure of financial performance calculated by dividing net income by total assets (Marshall, 2022). ROA represents the profit generated by the firm's assets. Based on the accounting equation, the firm's assets represent both the shareholder's equity and the debtholder's interests.

4.4.1.3 Return on Equity (ROE)

Return on Equity (ROE) is a measure of financial performance calculated by dividing net income by shareholders' equity (Jason, 2023). The analysis with ROE as the dependent

variable will give insights into how efficiently JSE-listed firms utilize their equity capital to generate earnings.

4.4.1.4 Earnings per Share (EPS)

Earnings Per Share (EPS) represents the portion of a sample firm's net earnings allocated to each outstanding share of common stock (David & Mautz, 1991; Arsal, 2021). The ratio serves as a fundamental measure of a company's profitability on a per-share basis, often influencing investor decisions.

4.4.2 Independent Variables

This study seeks to determine the effect of capital structure on the profitability of JSE-listed firms. The researcher uses measures of capital structure as independent variables according to the research question, and main objective. The study uses debt as a ratio of assets, short-term debt, and long-term debt as independent variables. In literature, many researchers use debt ratios as a measure of capital structure, for example, Titman and Wessels (1988), Rajan and Zingales (1995), Abor (2005), Akhtar (2005), Fattouh et al., (2005), Abor (2007), and Hove (2017).

4.4.2.1 Debt to Assets Ratio (DA)

The debt-to-assets (DA) ratio is a financial ratio that measures the proportion of a company's total assets that are financed through debt (Stekla & Grycova, 2015). It is calculated by dividing the total debt by the total assets. DA gauges the extent to which a company's total assets are funded by debt, reflecting the proportion of borrowed funds to its overall asset base.

4.4.2.2 Long-term Debt to Assets Ratio (LDA)

The long-term debt-to-assets (LDA) ratio measures the proportion of a company's extended-term debt relative to its total assets, indicating the degree to which long-term borrowing shapes its financial structure and potential risk exposure (Farah, Amin, & Pramudianto, 2021). The LDA is a variation of the DA that only considers long-term debt, and it will be useful in this study as it will help substantiate the results.

4.4.2.3 Short-term Debt to Assets Ratio (SDA)

The short-term debt-to-assets (SDA) ratio is another variation of the debt-to-assets ratio that only considers short-term debt (Kiprotich, 2022). It is calculated by dividing the short-term debt by the total assets.

4.4.3 Control Variables

The following control variables are used:

4.4.3.1 Firm Size (SIZE)

This study included firm size (SIZE) as a control variable because larger firms would generate higher earnings-generating power from their economy of scale and learning ability than smaller firms. Furthermore, larger firms are likely to have access to more debt as they can make use of their wide asset base for collateral. For this study, the natural logarithm of sales was used as a measure for SIZE. In finance research, this is a common practice as the natural logarithm helps standardize the variable and makes it easier to compare firms of different sizes (Wellalage & Locke, 2015). Large firms typically benefit from scale-related efficiency gains, according to some studies on the impact of firm size on company performance (Titman & Wessels, 1988; Frank & Goyal, 2019; Akeem et.al., 2015).

4.4.3.2 Industry (ID)

Type of industry (ID), as a control variable, was used to isolate the relationship between capital structure variables and a firm's financial performance within a specific industry. To Porter's assertion, a firm's competitive industry is the primary influence on its economic environment (Goyal, 2020). This perspective validates the methodology of selecting the firm as the unit of analysis and stratifying the sample by industry sector.

A study by Islami, Mustafa, & Topuzovska (2020) linked Porter's generic strategies to firm performance, and in that research, they examined the effect of industry membership on firm performance and reported that industry factors might affect firm performance variance. Another study by Maisiri, van Dyk, & Coetzee (2021), covered the South African context, and it reported that firms in different industries adopted Industry 4.0 technologies at varying rates, a factor which might result in differences in their respective performance levels. Adetunji and Owolabi (2016) also examined the relative importance of industry and firm-level factors on the performance of companies listed on the Nigerian Stock Exchange. This study showed that industry factors have a significant impact on firm performance and that the industry to which a firm belongs appears to be a relevant industry-level determinant of firm performance.

For this study, this was treated as a dummy variable to control for industry-related effects during the analysis. In the context of this study, a single universal industry dummy was used with all sample firms being given a value of 1 to control industry-related effects in a broad sense without distinguishing between different industries.

4.4.3.3 Firm growth (GROWTH)

This study utilized annual sales growth as a measure of firm growth, a common metric employed in numerous studies including those by Cassar and Holmes (2003) and Margaritis and Psillaki (2010). Growth and profitability were the subject of a study by Yadav, et al., (2021). When analysing profitability, the study points to a favourable

relationship between growth and profitability, suggesting that profitability increases as the size of the company increases. By building models using dynamic panel system GMM estimators, Jang and Park (2011) took an intriguing approach to examining the same relationship. According to the analysis of these models in the study, companies' profitability in the previous year had a positive impact on growth in the current year. However, profitability for the current year was negatively impacted by both the current year's and previous year's growth rates.

While total asset growth has been used as an alternative measure of growth (Degryse, Goeij, & Kappert, 2012), this study opts for sales growth as the control variable for firm growth. The primary justification for this choice is the prevalent use of this variable in similar studies. Additionally, it could be argued that sales growth provides a more dynamic- and organic representation of growth compared to the accumulation of assets over time.

4.4.3.4 Financial Crisis (Crisis_i)

This is a dummy variable that takes the value of one for the periods during a disruptive event such as the COVID-19 pandemic (2020-2021), and zero otherwise. This variable enables this work to research how the correlation changes during times of crisis.

The COVID-19 pandemic was chosen for this study primarily because it was the most recent crisis, and little literature was available at the time. The occurrence of the pandemic led to a profound and unprecedented change in the business world. As a result, this pandemic caused significant disruption and challenges for businesses, as described in Section 1.6 and Appendix A. It is particularly important to understand how the specific challenges of the pandemic have impacted the profitability of JSE-listed companies over this period, as this allows for targeted research of the immediate impact of the pandemic.

4.5 Methodology: Estimations using Panel Data Regressions

Panel data methodologies were used in this study as they combine important aspects of both the cross-sectional and time series nature of datasets. Panel data comprise of individual observations from selected cross-sectional participants over a specific series of time. This allows for research of both cross-sectional and time series data simultaneously (Butt & Hassan, 2009). Despite the challenges posed by the collection of panel data as opposed to cross-sectional or time series data, this study chose this technique because it allows for the evaluation of multiple observations on the same unit over time. This in turn results in more accurate and stronger insights revealing analysis (Hsiao, 2022; Hsiao, 2007; Hsiao, 2005). Klevmarken (1989), reported that the use of panel data is advantageous as it increases the information that can be derived from collected data.

Having designed testable hypotheses and identifying the variables of interest, this subsection will also describe how the study, through panel regression models, will investigate the relationship between capital structure and company performance. The popularly used panel data regression estimators used are the fixed effects model, pooled effects model, and the random effects model. This study runs the Hausman specification test to determine the model that best fits the data available (Fitrianto & Musakkal, 2016).

The panel regression model to be estimated for the first research question is:

$$\text{Profitability}_{i,t} = \beta_0 + \beta_1 * \text{DA}_{i,t} + \beta_2 * \text{SIZE}_{i,t} + \beta_3 * \text{ID}_i + \beta_4 * \text{Growth}_{i,t} + \alpha_i + \epsilon_{i,t} \quad (1)$$

Where:

- Profitability_{i,t} represents the profitability measure (NPR, ROA, ROE, or EPS) for firm i at time t.
- DA_{i,t} is the Debt-to-Assets Ratio for firm i at time t.

- $SIZE_{i,t}$ represents the firm size (control variable) for firm i .
- $Growth_{i,t}$ represents the growth rate (control variable) for firm i .
- ID_i represents the industry type (treated as a dummy variable) for firm i .
- α_i is the unobservable individual firm-specific effect (Fixed Effect).
- $\epsilon_{i,t}$, t is the error term.

To answer the second research question, Equation 1 is modified to encompass an additional variable, **Crisis**_{_,} which acts as a crisis dummy, to study the relationship correlation from the perspective of disruptive events. The modified equation is shown below:

$$\text{Profitability}_{i,t} = \beta_0 + \beta_1 * DA_{i,t} + \beta_2 * SIZE_{i,t} + \beta_3 * ID_i + \beta_4 * Growth_{i,t} + \beta_5 * \text{Crisis}_{-,i,t} + \alpha_i + \epsilon_{i,t} \quad (2)$$

Although this dummy could have been added to the original regression, it was intentionally omitted for methodological reasons. Without specifically considering the COVID-19 pandemic, the primary regression model aimed to examine the relationship between capital structure and profitability. The study aimed to provide a fundamental understanding of the relationship between capital structure and profitability by omitting the crisis dummy from the main regression. This would have prevented the core relationship between these two variables from being distorted by the exceptional circumstances of the pandemic. This strategy allows for a clearer assessment of the fundamental effects of the capital structure variables and provides a strong framework for later assessing how the crisis may have affected these relationships, as conducted in the supplementary analysis.

4.6 Ethical Considerations

This study ensured strict adherence to ethical standards throughout the research process. Although the data used comes from publicly available databases such as Bloomberg and McGregor BFA, the confidentiality and integrity of the information were carefully

maintained. All company-specific data was handled responsibly to avoid possible misrepresentations or biases in the results. Additionally, managing the COVID-19 pandemic required careful consideration of the impact on businesses and individuals. Financial decisions made during this period may have been influenced by survival strategies rather than strategic long-term planning, which could influence the results of the study.

Furthermore, the study ensured that the methodology, data collection, and analysis processes were carried out transparently, with every effort being made to present accurate and unbiased results. To maintain the ethical integrity of the research, all sources of information were appropriately cited, and intellectual property rights were respected. The study also actively avoided any conflicts of interest and data manipulation was strictly prohibited to maintain the validity and reliability of the conclusions. This commitment to ethical research practices ensures that findings on the relationship between capital structure and corporate profitability are both credible and trustworthy.

4.7 Summary of Research Methodology

This section described the methodology and design of the study and explains the data collection process using Bloomberg and McGregor BFA Research Domain databases. The study described a sample of non-financial companies listed on the (JSE) from 2008 to 2022. In addition to control variables (company size, growth), important dependent variables (profitability ratios) and independent variables (capital structure ratios and industry) were defined. The section also introduced the panel data regression model selected to examine the relationship between capital structure and firm performance. Both fixed effects and random effects models were assumed to account for firm-specific characteristics and unobserved heterogeneity. In addition, a regression model was used to examine the impact of the COVID-19 pandemic on capital structure and profitability.

The rigorous methodology described in this section provides a solid basis for analysing the relationship between capital structure and corporate profitability. The use of panel

data enables company-specific effects to be controlled, and the inclusion of industry-specific control variables ensures that external factors are adequately considered. Choosing fixed and random effects models increases the robustness of results while examining the impact of COVID-19 provides timely and relevant insights into business performance during global crises.

5. Presentation and Analysis of Results

5.1 Introduction

This section presents the results of the study, starting with an overview of descriptive statistics to summarize the characteristics of the data set. Correlation analysis then examined the relationships between the variables of interest. Hausman tests are performed to determine the appropriate model – fixed effects or random effects – for regression analysis. Regression analysis itself examined the relationship between capital structure and corporate profitability, with a focus on understanding how company size, growth, and industry factors influence this relationship. The overall results are then discussed considering robustness checks and additional tests are carried out to ensure the reliability of the results. An additional set of dependent variables is also tested to further validate the primary analysis.

5.2 Analysis

5.2.1 Descriptive Statistics

Table 1 and Table 2 present a set of summary statistics as well as correlation results between the variables of interest.

Table 1: Descriptive Statistics

	Mean	Median	Minimum	Maximum	Standard Deviation
NPR (%)	9.8	7.55	-47.86	495.02	11.54
EPS/c	434.61	326.04	1880.94	14419.45	725.29
ROA (%)	16.33	14.48	-32.34	150.21	18.17
ROE (%)	14.02	12.43	-441.52	225.34	41.64
LDA	0.13	0.06	0	0.82	0.1327
SDA	0.10	0.09	0	0.	0.443
Growth	11.33	9.46	-45.02	230.77	34.89
DA	0.37	0.29	0	0.76	0.2152
SIZE					
Ln(Sales)	5.76	5.68	3.74	7.22	0.5478

This study draws the following inferences from the summary statistics. The profitability variables NPR, EPS, ROA, and ROE have mean values of 9.8%; 434.6 cents; 16.33%, and 14.02%, respectively. The large differences between maximum and minimum values for the profitability metrics might show that there are discrepancies between the performance of the firms in the data sample and this may be due to size or industry effects. As such, these were controlled for in the overall equations (1) and (2).

The capital structure variable DA also had some interesting statistics. The debt to assets variable had an average value of 0.37, a median of 0.29, and a relatively low standard deviation of 0.2162. Overall, these statistics suggest that, on average, the sample firms have access to external funding through debt and this can be supported by the notion that South Africa has a set of good financial institutions ready to offer loans to their corporate clients. Furthermore, the statistics presented for LDA and SDA might show that on average long-term debt (0.13) is higher than short-term debt (0.10) and this may suggest that JSE-listed firms tend to fund their operations with more long-term debt than short-term debt.

The SIZE variable in the dataset provides a measure of the firm's relative size within the JSE all-share index. The summary statistics for the SIZE variable reveal some key insights into the distribution and characteristics of firm sizes. The mean size measured $\ln(\text{Sales})$ of 5.76 indicates that, on average, the firms in the sample are moderately sized. The median size of 5.68 is close to the mean, suggesting that the distribution of firm sizes is relatively symmetrical. The minimum size value of 3.74 indicates the presence of smaller firms in the sample while the maximum value of 7.22 points to the existence of larger firms as well. The standard deviation of 0.5478 reflects the dispersion of firm sizes around the mean hence showing that there is some variability in the sizes of the firms within the JSE, ranging from small to large, with a relatively balanced distribution around the mean. Understanding the distribution of firm sizes is essential for analysing the impact of capital structure on financial performance, as it allowed the author of this paper to consider firms of varying sizes in the regression analysis and draw meaningful conclusions about the relation between these variables.

5.2.2 Correlation Matrix

In this subsection, this study explores potential associations between the key metrics used in the analysis. Table 2 presents the Pearson correlation coefficients for the study's variables of choice. Pearson correlation coefficients range from -1 to 1, where -1 indicates a perfect negative linear relationship and the opposite is true for 1 which indicates a perfect positive relationship. A coefficient of zero on the other hand indicates no linear relationship.

Table 2: Correlation Matrix

	NPR	EPS	ROA	ROE	DA	DE	LDA	SDA	GROWTH	SIZE
NPR	1									
EPS	0.3245	1								
ROA	0.6978	0.4568	1							
ROE	0.5865	0.2673	0.6104	1						
DA	-0.0044	-0.0669	-0.0523	0.0422	1					
DE	-0.06	0.1174	-0.18	0.1542	0.7139	1				
LDA	0.0227	0.0152	-0.148	0.29	0.667	0.65	1			
SDA	-0.106	-0.095	0.07	0.0326	0.51	0.42	-0.1281	1		
GROWTH	0.1183	0.0494	0.1538	0.2417	-0.0036	-0.12	0.0017	-0.0094	1	
SIZE	0.094	0.2323	0.0077	0.0201	0.0855	-0.08	0.333	0.0261	-0.1113	1

The findings presented in Table 2 showed that the capital structure metric, DA, exhibited moderate to strong negative correlations with various financial performance metrics such as NPR, ROA, and ROE. The most notable coefficients are -0.0044; -0.0669 and -0.0523 for NPR, EPS, and ROA respectively for debt-to-assets. These negative coefficients suggest that as the capital structure becomes more debt-heavy, the financial performance variables tend to decline. It is important to note that correlation does not signal causation so at this stage, this study has not yet made any significant relationships to model the relationship between capital budgeting choices and the performance of JSE-listed firms.

Growth and SIZE are positively related to the profitability ratios and these findings suggest that control variables have an important role in explaining firm profitability.

5.2.3 Hausman Specification Tests

In this subsection, this study presents the Hausman model specification test results. Several other studies have made use of this model to check which model, fixed or random effects, is appropriate for this analysis. After estimating both models, the Hausman test provides a statistical test of the null hypothesis that the preferred model is the random effects model, implying that firm-specific effects are uncorrelated with the independent variables (Mesquita & Lara, 2003). A rejection of the null hypothesis suggests that the fixed effects model is more appropriate, indicating the presence of firm-specific effects that are correlated with the independent variables (Goh & Rumapea, 2019).

Lee et al., (2014) explain that the choice of the correct estimation model depends on the treatment of the dummy variable. The study goes further to show that where dummy variables are included as part of the intercept, the fixed effects model will be appropriate. In an instance where the dummy variables are deemed to be part of the error term, the random effects model will be the most appropriate model to use. In the analysis of the impact of capital structure and financial performance for JSE-listed firms, this study used fixed effects to control firm-specific heterogeneity and an industry dummy variable to account for industry-specific effects. Table 3 presents the results of the fixed effects model with those of the random effects model.

The results indicate that the p-values are below the 5% significance level, hence rejecting the null hypothesis. This implies that the Fixed Effects model is more suitable for this study's analysis, as it accounts for firm-specific effects correlated with independent variables. This finding therefore supports the initial rationale for using fixed effects in the regression equation to control for unobservable firm-specific heterogeneity. Secondly, the model specification results move in favour of the fixed effects model which is convenient given the nature of this study's dataset which may be characterised by firm-specific heterogeneity that is constant over time and may be correlated with the independent

variables. The choice of the two variables, DA and SIZE was based on the notion that they are the most relevant variables that can help determine the appropriateness of the FE or RE model for the study.

Table. 3 Hausman Specification Test (Hausman: 1974) Results

	Coefficients			
	(b)	(B)	(b-B)	sqrt(diag(V_b - V_B))
	fe	Re	difference	S.E
DA	-37.72534	-21.90559	-15.81975	2.27
Growth	.07546	.07633	-.00087	
SIZE	-15.11763	-5.5746	-9.54303	1.475
b = consistent under Ho and Ha; obtained from xtregar B = inconsistent under Ha; efficient under Ho obtained from xtreg Test: Ho: difference in coefficients is not systematic $\text{chi2}(2) = (b-B)'[(V_b-V_B)^{-1}](b-B)$ $= 41.86$ $\text{Prob} > \text{chi2} = 0$ <p><i>(The difference in covariances [V_b-V_B] is not positive definite)</i></p>				
<p><i>Table 3 presents the results of the Hausman test, indicating that the fixed effects model is preferred over the random effects model, implying the significance of controlling for unobservable individual-specific effects in the analysis.</i></p>				

5.2.4 Analysis of Panel Regression Results

The study examined the relationship between capital structure and company performance. NPR was used as the main dependent variable and the additional profitability measures defined earlier in the paper were used to check the robustness of the results of the main analysis. The results of the additional tests are presented in the appendix.

5.2.4.1 Testing Main Hypothesis: Effect of capital structure variables on NPR

Table 4 presents the first set of results for the analysis of the impact of capital structure on the profitability of the JSE-listed firms. Firstly, the researcher investigates the impact of DA on NPR, and the study found a negative coefficient of -12.856 which is statistically

significant at a 10* significance level. This finding suggests a moderate inverse relationship between the two variables. Specifically, as the Debt-to-Assets ratio increases, indicating a higher proportion of debt financing relative to total assets, the Net Profit Ratio tends to decrease. This result implies that JSE-listed firms with higher levels of debt may face increased interest expenditure and financial leverage, potentially leading to lower net profit margins. The negative correlation aligns with the trade-off theory discussed in Section 2 which highlights the trade-off between debt financing and profitability, where higher debt levels might lead to higher financial risk and reduced profitability.

Table 4: Results for the Fixed Effects Regression Analysis

Variable: NPR			
Method: Panel Least Squares			
Sample: 2008 2022			
Variable	1	2	3
DA	-12.856 (0.064) *		
LDA		-7.092 (0.402)	
SDA			-13.733 (0.211)
Growth	0.451 (0.000)***	0.453 (0.000)***	0.442 (0.000)***
SIZE	-6.735 (0.015) **	-6.724 (0.018) **	-7.109 (0.037) ***
C	37.14	39.749	45.247
Observations	648 (0.0028) ***	648 (0.001) ***	648 (0.001) ***
R squared	0.0625	0.0384	0.0609
F	3.89	3.8	3.83
Prob > F	0	0	0

*Table 4 presents the regression results investigating the impact of capital structure on the Net Profit Ratio (NPR) across various industries. The different models represent DA (1), LDA (2) & and SDA (3). The results reveal the coefficient estimates and the p-values shown in parentheses. The asterisk *, **, *** represent the level of significance 10%, 5%, and 1% respectively - for the impact of capital structure on the Net Profit Ratio.*

These results are consistent with those of other related studies (Stekla & Grycova, 2015; Ghayas & Lopez, 2018; Baciú et al., 2019; Saleem, 2023). When analysing the impact of DA on NPR, Stekla & Grycova (2015) used various ratios as a measure of profitability, but also showed a negative correlation between debt, assets, and net profit. NPR is used as the dependent variable in the study of the relationship for Romania, another secondary emerging market, by Baciú et al., (2019). The paper also provides evidence of a negative relationship between DA and net profit ratio, which is consistent with the results of the study. According to Khanam, Nasreen, and Pirzada (2014), there is also a poor correlation between debt to asset ratio and net profit ratio. According to Hove (2017), DA and NPR have a similarly unfavourable relationship with JSE-listed companies. After reviewing the results, the main finding at this stage of the paper is that capital structure has a significant negative effect on the profitability of JSE-listed firms. The same connection was achieved elsewhere by Booth et al., (2001), and Nenu, Vintila & Gherghina (2018), where both studies reported that an increase in indebtedness resulted in decreasing profitability for firms in emerging economies.

The results for Models 2 and 3, where long-term debt (LDA) and short-term debt (SDA) were used as respective independent variables, are also presented in the same table. The correlation between LDA and NPR is negative but not very strong, with a coefficient of -7.092. It is reported to have a similar relationship with SDA (-13.733). Raisa and Cristian (2015) also report a similar relationship between short-term debt and NPR. However, the same study showed evidence of a negative association between long-term debt and NPR, but it was reported to be insignificant. In the same study, the negative impact of debt is further attributed to the agency cost theory, according to which shareholders are likely to participate in riskier projects because the returns belong to them, while potential losses are to be shared with the debtor. Debtors are already

anticipating such behaviour, resulting in companies being charged higher costs of capital, which in turn affects the company's profitability. The same analysis might also be true for JSE-listed companies that operate in an emerging economy as well.

Finally, examining the relationship between SIZE and NPR, the findings were surprising with a negative coefficient of -6.735 at a 5% significance level. The rationale behind this finding could be evidence of the notion that as in larger firms, as the proportion of debt increases, interest expenses increase thus reducing profits for the sampler firms (Eriotis et al., 2007; Eriotis et al., 2002). Smaller firms, on the other hand, may be at an earlier growth phase thus they may be experiencing higher profit margins. Furthermore, the result might be due to the chance that smaller firms may be too reluctant to invest and expand using their earned profits, therefore they hold on to them hence the high profitability and when they reach a point where they need to make financing choices, they turn to those internal funds and/or equity financing (Frielinghaus et al., 2005).

The analysis showed that business growth has a positive and statistically significant impact on the net profit ratio (NPR) for all three models used in this study. Specifically, it was found that a one-unit increase in growth for JSE-listed companies corresponds to an increase in their net profit of approximately 0.45 units. These results are consistent with expectations and reflect the traditional assumption that companies with higher growth rates are more likely to achieve higher profitability. Previous studies in emerging market corporate finance, such as those by Yadav et al., (2021) and Jang and Park (2011), have also observed similar trends and highlighted the robustness of this relationship. Aligning these results with previous research strengthens the reliability of this paper's results and highlights the relevance of the selected control variables in the context of JSE-listed companies.

5.2.4.2 Testing the Secondary Hypothesis: Effect of the COVID-19 pandemic

The research conducted using the COVID-19 dummy variable has highlighted how this extraordinary crisis has affected the relationship between capital structure and corporate

profitability. Table 5 below presents the results for FE regression analysis with a CRISIS_Dummy.

Table 5: Results for FE Regression Analysis with a CRISIS_ Dummy

Variable: NPR			
Variable	1	2	3
DA	-10.271 (0.033)**		
LTDA		-5.047 -0.209	
STDA			-15.68 -0.239
Growth	0.0551 (0.004)**	0.0499 (0.002)**	0.0554 (0.0003)***
SIZE	-5.122 -0.157	-5.13 (0.130)**	-4.976 -0.07
CRISIS_ C	4.003 33.267 (0.055)**	3.948 30.197 (0.07)*	3.884 37.255 (0.031)**
Observations	648	648	648
R squared	0.0702	0.0699	0.071
F	3.45	3.44	3.6
Prob > F	0.000	0.000	0.000

Table 5 reports on the results of the fixed effects regression model for the influence of capital structure on NPR as a proxy of profitability, with a financial crisis dummy CRISIS_. Model 1 uses DA, Model 2 uses LDA and Model 3 uses SDA. The results reveal the coefficient estimates and the p-values shown in parentheses. The asterisk '', **, ***' represent the level of significance 10%, 5%, and 1% respectively - for the impact of capital structure on the Net Profit Ratio.*

In Table 5, the COVID-19 dummy variable turns out to be significant, highlighting the fact that the pandemic has indeed led to significant changes in the financial environment of JSE-listed companies, with a particular impact on the Net Profit Ratio (NPR). The results show a notable and significant negative relationship, -10.271, between debt-to-assets (DA) and NPR during this crisis period, indicating a significant decline in net profit ratios for companies as they relied more on debt financing relative to their total assets. Furthermore, these results might confirm the notion that long-term debt and total debt significantly reduce corporate profitability during this difficult period, consistent with the

patterns shown in the primary analysis. Interestingly, short-term debt (SDA) does not show statistical significance, suggesting that its influence on profitability is less pronounced.

These results showed the extent to which the COVID-19 pandemic has impacted the capital structure and financial performance dynamics of JSE-listed companies. It is worth noting that the author found through an unpublished analysis that the mean values of profitability ratios used in the study were lower in 2020-2021, indicating the deleterious impact of the pandemic on companies' financial performance. Consistent with previous research by Kamarudin et al., (2022) and Nurmasari et.al., (2022), this analysis provides additional support for the hypothesis that the financial stress of the pandemic has significantly influenced the relationship between capital structure and profitability. Therefore, it is obvious that the correlation between debt-to-asset ratio and company performance is still dependable and significant, especially during times of major economic disruptions such as the COVID-19 pandemic.

5.2.5 Inferences

In summary, the results of this study provide important new insights in its efforts to answer the research question and achieve the main objective of determining the influence of capital structure variables on the profitability of 72 JSE-listed companies. The study's key findings suggest that debt levels (DA) have a significant negative impact on both return on assets (ROA) and earnings per share (EPS). These results suggest that companies may experience lower asset utilization and profitability due to increasing debt to total assets. Poor financial performance may result due to rising borrowing and debt servicing costs, which have a proportionally negative impact on companies' net income. The results also showed that ROE and NPR had no significant impact. The results support the second hypothesis and showed that the dummy variable CRISIS_ did not influence the relationship between capital structure and profitability. Therefore, in the context of this study, it can be said that the COVID-19 pandemic has not changed the main conclusions about the relationship between capital structure and profitability of JSE-listed companies.

5.3 Robustness Checks and Additional Tests

This study conducted additional testing to ensure that the main results were consistent and robust. The appendix contains tables with the results of these additional tests. More importantly, in this subsection the study summarizes the results of robustness tests that examined the relationships between capital structure and profitability, using ROA, ROE, and EPS as additional independent variables. To determine whether the results of the additional analysis are consistent with those of the main FE model, the study also examined the primary research question using a pooled OLS regression model.

5.3.1 Testing using an additional set of dependent variables.

Appendix A4 presents an extension of the analysis using an additional set of profitability measures. First, the study in Table 7, with ROE as the dependent variable showed that DA has a positive 11.317 but insignificant impact on ROE. So, this revealed that the relationship between these two variables is not significant in the context of this study. This means that capital structure variables such as debt-to-asset ratio do not have a material impact on the ROE of JSE-listed companies. The results confirm the results of a study by Chinaemerem and Odita (2016), which also found a significant negative effect of the debt ratio on ROE. The study was conducted on a sample of non-financial companies listed on the Nigerian Stock Exchange (NSE), which meant a sample almost similar to that of this study. Adewale (2013) also conducted similar research on Nigerian companies and found a negative significant effect of DA on ROE. The same table also shows that company size has a negative and significant (15.289) impact on ROE.

Table 8 shows the results of the analysis with ROA as the dependent variable. For DA, the results showed a negative coefficient of -30.684, which is statistically significant at the 1% confidence level. The main conclusion that might be drawn from these results is that companies that rely heavily on debt financing tend to have lower asset utilization and profitability. The same table goes further and shows that company size has a negative (14.667) and significant impact on ROA. This result suggests that larger companies tend

to experience poor asset utilization as they become larger relative to their smaller counterparts.

Finally, Table 9 shows the regression results of the fixed effects model with EPS as the selected dependent variable. When examining the correlations between earnings per share and debt to assets, the study found a negative (1327) and significant coefficient. This finding suggests that higher debt levels lead to higher borrowing costs, such as interest paid. These increased expenses then result in lower net income and subsequently reduce the returns available to shareholders. SIZE has a positive impact on earnings per share, with a coefficient of 659.81 at the 1% significance level. This result suggests that larger companies tend to have higher earnings per share.

5.3.2 Alternative method: Pooled OLS regression model

In this subsection, the study uses a pooled OLS regression model to verify the consistency and robustness of the results presented in the previous sections. Table 6 in Appendix A3 presents the results of this analysis, with NPR selected as the dependent variable of interest.

The results of the pooled OLS regressions showed that capital structure ratios have inverse and significant relationships with profitability indicators, as is the case with ROA and EPS, except for ROE, where the relationship is positive but insignificant. This is consistent with the regression results of the fixed effects model. In both regression models used, growth had a positive and significant impact on the profitability of industrial companies. In the pooled OLS model, company size showed a positive and significant influence on EPS but a negative influence on ROA and ROE. The results for the control variables are consistent with the main results of the FE model. The only difference observed is in the NPR, where firm size has a positive effect in the pooled OLS model, while it showed a negative and significant influence in the FE model.

5.4 Summary of Findings

Finally, this subsection provides a comprehensive analysis of the complex relationship between capital structure and financial performance in JSE-listed companies. The research begins by disclosing descriptive statistics that provide a snapshot of the characteristics of the variables. The subsequent correlation matrices shed light on the connections between capital structure and financial indicators and provide initial insights into connections. The core of the analysis is conducted using regression models, predominantly using fixed effects models. These models reveal nuanced relationships between debt ratios and various financial performance indicators. In particular, DA, LDA, and SDA ratios have different impacts on financial metrics, with some exhibiting significant negative relationships. The analysis of the impact of COVID-19 on the primary relationship being investigated also aids in the reliability of the main findings of this study. The importance of using fixed effects models is supported by Hausman tests, which confirm the need to account for unobservable firm-specific differences. The section supports its results with robustness checks and additional tests that consistently validate the complex relationships observed in the primary models.

In summary, this section makes a significant contribution to the field of corporate finance by supporting theoretical viewpoints such as agency theory and trade-off theory. It clarifies the connection between capital structure decisions and financial performance outcomes within the unique landscape of JSE-listed companies through careful empirical research.

6. Conclusion

6.1 Introduction

The primary objective of this research was to analyse the influence of capital structure on the profitability of firms that are publicly listed on the JSE. Additionally, the study aimed to explore the effect of COVID-19 on the relationship between capital structure and profitability of firms that are publicly listed on the JSE. The research was centred on 72 firms that are listed on the JSE, spanning the duration from 2008 to 2022. This section provides a synopsis of the principal findings of the study and underscores the contribution of the research to the current body of literature on the impact of capital structure on company profitability. Furthermore, it proposes potential avenues for future research.

6.2 Overall findings

The analysis showed that capital structure and profitability have a strong and significant negative relationship in the sampled JSE-listed companies. These companies' net profit ratios tend to decline as they rely more heavily on debt financing relative to their total assets. The trade-off theory, which highlights the complex trade-offs associated with the leverage of these firms, is strongly supported by this result, which also supports the theory. The study also identifies an intriguing and unexpected negative relationship between company size and net profit ratio. Higher debt ratios lead to a noticeable increase in interest costs for larger companies, which then hurts profitability. The profit margins of smaller companies, which are often at the beginning of their growth path, are higher. This interesting result might be attributed to the cautious investment and expansion approach of smaller companies, which leads them to accumulate internal funds and rely on equity financing.

These results have significant practical implications as they indicate that prudent debt financing management is essential to maintaining positive profit margins. The results are consistent with previous studies by Booth et al., (2001) and Nenu and Gherghina (2018),

who repeatedly highlight the negative impact of rising debt levels on the profitability of companies in emerging markets.

With a particular focus on the COVID-19 pandemic, this study investigated the turbulent world of economic crises. Regressions on NPR highlighted the significance of an added dummy variable (CRISIS_). The results showed that the effect of short-term debt was minimal. The introduction of the crisis dummy had no impact on the original relationship between capital structure and profitability presented in the primary analysis. This research makes a significant contribution to our understanding of capital structure decisions and their impact on financial performance, particularly in the context of economic crises. The results apply to those making financial decisions and highlight the importance of careful capital structure management to maintain a balance between debt and equity financing.

6.3 Limitations of the study

The study investigated the relationship between capital structure decisions and financial performance in JSE-listed firms over the period from 2008 to 2022. The findings provided crucial insights into how debt levels negatively impacted profitability, particularly during disruptive events like the COVID-19 pandemic. These results hold significant importance for firms in making capital structure decisions, especially in emerging markets. While there were limitations, these did not undermine the overall validity of the findings. The study's robust methodology and consistent results, even during a global crisis, highlighted the relevance of its conclusions for stakeholders. This section presents the boundaries of the research methodology and data scope:

- **Time Frame:** The study covered the period from 2008 to 2022, which may not capture long-term trends beyond this period, especially in a post-COVID economic recovery phase.
- **Geographical Limitation:** The study focused exclusively on JSE-listed firms, limiting its generalizability to other markets. Results may not apply to firms in different economic environments or industries outside South Africa.

- **COVID-19 Impact:** While the study addressed the impact of the pandemic, it may not have captured the full spectrum of long-term effects of COVID-19, particularly since recovery is still ongoing, and some impacts could be felt beyond the study period.
- **Focus on Quantitative Data:** The study relied solely on quantitative data from financial reports, which may overlook qualitative factors, such as management decisions, corporate governance practices, or macroeconomic variables, that could influence capital structure choices and financial performance.

6.4 Recommendations for further study

In terms of future research directions, an extended temporal analysis of the impact of the COVID-19 pandemic on this relationship is required. Given the proximity of this study to the outbreak of the pandemic, a more comprehensive analysis could provide deeper insights into how companies adjust their capital structures in times of global crises. This research is particularly significant as it represents one of the first attempts to examine this relationship in the context of JSE-listed companies amid a global pandemic.

More so, cross-industry analysis is a fruitful avenue for further research. This approach would examine whether industry-specific factors influence the capital structure and financial performance relationship. The use of industry dummies (ID) in this study provides a foundation for this research as it allows for the identification of potential industry-related nuances. Understanding how different sectors respond to capital structure decisions might provide invaluable insights for both companies and policymakers. Furthermore, a comparative analysis of the capital structure and financial performance relationship between small and large companies could provide interesting results. This analysis could shed light on whether company size moderates this relationship. Such insights might lead to tailored financial strategies based on company size and improve decision-making in different organizational contexts.

Finally, expanding the scope of this research to an interregional level, for example, by exploring the countries of the Southern African Development Community (SADC), would contribute significantly to the African literature on this topic. Examining how different

economic regions in Africa manage the complex interplay between capital structure and financial performance might provide a broader perspective and facilitate cross-country policy comparisons.

Given these future research directions, there is a recommendation for scholars to further examine the evolving landscape of corporate finance, particularly in response to external shocks such as the COVID-19 pandemic. Furthermore, interdisciplinary studies that draw on both financial and industry-specific expertise might lead to a more comprehensive understanding of capital structure dynamics. Finally, collaboration between regions and countries might promote a more comprehensive and nuanced understanding of how different economic environments influence capital structure and the financial performance relationship. These recommendations underscore the dynamic and evolving nature of corporate finance research and its continued relevance in guiding strategic decisions for companies and policymakers alike.

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8. APPENDIX

A1. Snapshot of a Sample Firm's Data (JSE Ticker: TKG – Telkom)

The raw data was collected and computed by the author from Bloomberg financial statements, as well as McGregor BFA IRESS databases.

Bloomberg		Financial Statement Analysis							
Ticker: TKG SJ Equity		Periodicity: Annuals		Currency: USD		Note: Years shown on the report are Fiscal Years		Company: Telkom SA SOC Ltd	
Filing: Original									
BBG Adj Highlights									
	Original:2000 A	Original:2001 A	Original:2002 A	Original:2003 A	Original:2004 A	Original:2005 A	Original:2006 A	Original:2007 A	Original:2008 A
For the period ending	2000-3-31	2001-3-31	2002-3-31	2003-3-31	2004-3-31	2005-3-31	2006-3-31	2007-3-31	2008-3-31
Market Capitalization				2,056.66	6,916.82	9,591.84	14,233.87	12,121.47	8,404.19
+ Cash & Equivalents	298.78	224.28	63.78	144.78	536.63	525.48	815.71	102.64	145.75
+ Preferred & Other	7.19	14.45	11.72	24.57	31.70	35.26	48.94	38.92	64.21
+ Total Debt	3,361.74	3,271.23	2,237.80	2,803.93	2,722.16	2,426.60	1,921.14	1,420.25	1,935.15
Enterprise Value				4,740.40	9,134.04	11,528.22	15,388.25	13,478.00	10,257.79
Revenue, Adj	4,400.62	4,295.24	3,676.76	3,907.52	5,727.75	6,915.74	7,450.40	7,360.75	7,918.50
Growth %, YoY		15.63	9.07	10.31	8.77	6.50	10.46	8.39	9.04
Gross Profit, Adj									
Margin %									
EBITDA, Adj	1,227.53	1,362.88	1,032.06	1,306.63	2,280.01	2,855.83	3,181.50		2,899.82
Margin %	27.89	31.73	28.07	33.44	39.81	41.29	42.70		36.62
Net Income, Adj	247.84	222.21	131.28	169.40	635.04	1,078.49	1,436.42	1,232.90	1,121.97
Margin %	5.63	5.17	3.57	4.34	11.09	15.59	19.28	16.75	14.17
EPS, Adj									
Growth %, YoY									
Cash from Operations	859.74	844.61	878.52	1,015.64	2,026.30	2,620.85	2,251.16	2,016.33	2,298.10
Capital Expenditures	-1,535.58	-1,354.80	-668.08	-689.35	-728.27	-843.12	-1,157.02	-1,431.25	-1,638.97
Free Cash Flow	-675.84	-510.19	-89.56	426.29	1,298.03	1,677.73	1,094.13	585.08	658.13

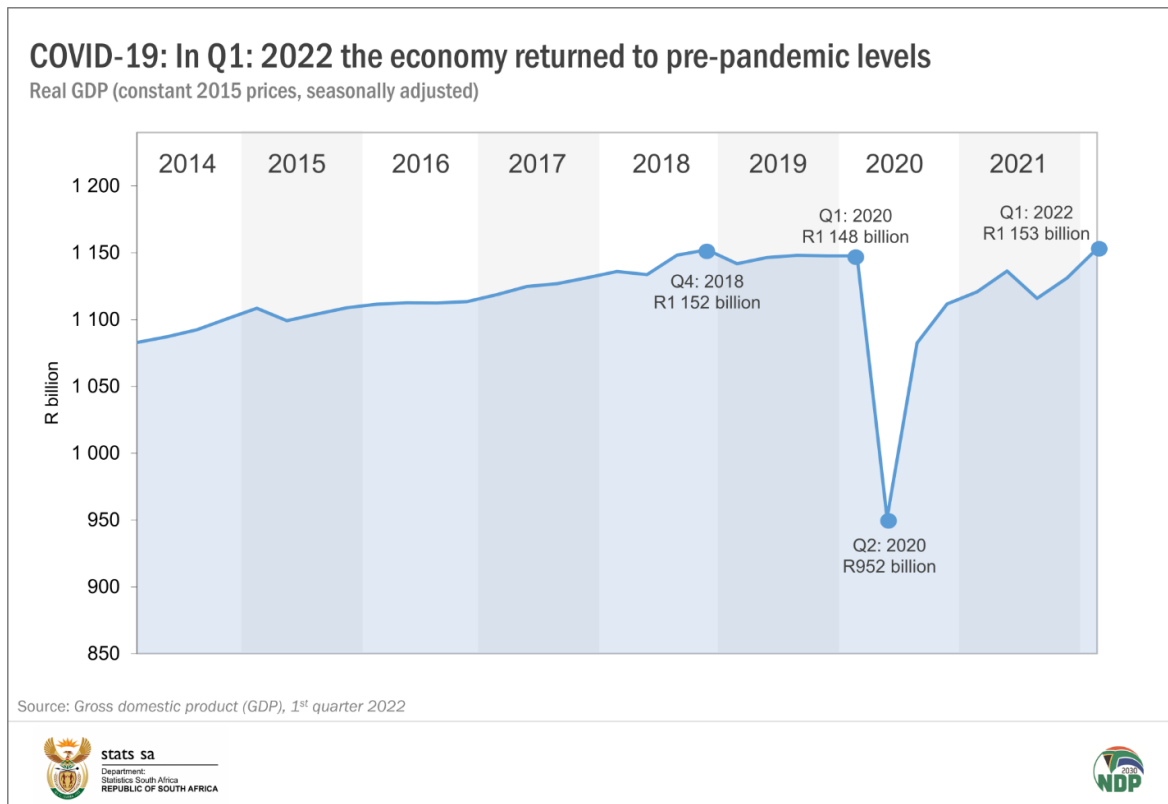
Bloomberg		Financial Statement Analysis							
Ticker: TKG SJ Equity		Periodicity: Annuals		Currency: USD		Note: Years shown on the report are Fiscal Years		Company: Telkom SA SOC Ltd	
Filing: Original									
	Original:2009 A	Original:2010 A	Original:2011 A	Original:2012 A	Original:2013 A	Original:2014 A	Original:2015 A	Original:2016 A	Original:2017 A
For the period ending	2009-3-31	2010-3-31	2011-3-31	2012-3-31	2013-3-31	2014-3-31	2015-3-31	2016-3-31	2017-3-31
Market Capitalization	5,772.26	2,448.11	2,846.49	1,634.77	845.29	1,865.94	3,396.92	2,064.90	2,949.68
+ Cash & Equivalents	312.79	669.81	510.68	415.53	472.54	175.49	388.89	285.95	123.85
+ Preferred & Other	89.62	46.66	57.17	56.76	41.01	35.84	25.90	32.20	25.14
+ Total Debt	1,933.49	1,348.85	1,235.86	940.28	720.66	393.00	414.01	358.64	468.90
Enterprise Value	7,482.58	3,173.81	3,628.83	2,216.28	1,134.42	1,919.29	3,451.93	2,169.79	3,319.88
Revenue, Adj	4,126.52	4,806.34	4,660.67	4,466.00	3,828.44	3,221.06	2,867.53	2,739.32	2,923.55
Growth %, YoY	6.93	3.89	-6.06	-6.69	-1.75	1.06	13.93	9.77	9.77
Gross Profit, Adj									
Margin %									
EBITDA, Adj	1,760.60	1,842.43	1,295.50	1,234.13	2,398.88	887.50	809.43	778.53	775.45
Margin %	42.67	38.33	27.80	27.63	62.66	27.55	28.23	28.42	26.52
Net Income, Adj	314.37	30.31	308.17	223.07	137.96	196.44	236.64	252.26	270.27
Margin %	7.62	0.63	6.61	4.99	3.60	6.10	8.25	9.21	9.24
EPS, Adj	0.62	0.06	0.61	0.44	0.27	0.38	0.45	0.49	0.52
Growth %, YoY		-90.28	907.08	-27.80	-38.15	41.68	18.59	7.07	6.04
Cash from Operations	1,695.62	1,035.44	944.28	905.11	901.25	643.56	574.59	598.36	550.39
Capital Expenditures	-1,514.55	-583.66	-603.66	-631.17	-662.83	-631.66	-454.01	-436.02	-605.05
Free Cash Flow	181.07	451.78	340.63	273.94	238.42	11.90	120.59	162.34	-54.66

The Nexus of Capital Structure, Profitability, and the COVID-19 Financial Crisis: An Empirical Analysis of South African JSE listed Firms

Bloomberg									
Financial Statement Analysis									
Ticker: TKG SJ Equity	Periodicity: Annuals			Currency: USD			Note: Years shown on the report are Fiscal Years		Company: Telkom SA SOC Ltd
Filing: Original									
For the period ending	Original:2018 A	Original:2019 A	Original:2020 A	Original:2021 A	Original:2022 A	Original:2023 A	Current,TM	Estimate:2024 A	Estimate:2025 A
	2018-3-31	2019-3-31	2020-3-31	2021-3-31	2022-3-31	2023-3-31	2023-3-31	2024-3-31	2025-3-31
Market Capitalization	2,268.85	2,514.96	574.21	1,418.78	1,489.83	975.86	641.55		
+ Cash & Equivalents	372.16	235.00	317.31	344.88	226.02	200.86	200.86		
+ Preferred & Other	30.38	13.52	-1.63	-1.69	-1.71	-1.30	-1.30		
+ Total Debt	798.62	710.13	946.19	1,080.15	1,189.68	1,152.76	1,152.76		
Enterprise Value	2,725.67	3,003.61	1,201.46	2,152.36	2,451.58	1,926.27	1,592.16		
Revenue, Adj	3,166.76	3,047.53	2,918.38	2,657.70	2,883.48	2,545.76	2,545.76	2,263.78	2,297.14
Growth %, YoY	0.12	5.33	3.04	0.42	-1.08	0.89	-1.71	-11.08	1.47
Gross Profit, Adj	2,683.77	2,667.81	2,536.98	2,363.72	2,502.57	2,127.41	2,127.41		
Margin %	84.75	87.54	86.93	88.94	86.79	83.57	83.57		
EBITDA, Adj	811.03	793.65	674.21	729.45	818.99	513.13	513.13	515.40	539.21
Margin %	25.61	26.04	23.10	27.45	28.40	20.16	20.16	22.77	23.47
Net Income, Adj	232.04	224.69	57.58	156.01	190.18	-677.57	-577.57	87.38	98.45
Margin %	7.33	7.37	1.97	5.87	6.60	-22.69	-22.69	3.86	4.29
EPS, Adj	0.45	0.44	0.11	0.31	0.38	-1.19	-1.20	0.16	0.18
Growth %, YoY	-13.01	-1.06	-74.28	173.22	20.39				12.68
Cash from Operations	638.79	550.94	696.59	681.98	550.11	302.98	302.98		
Capital Expenditures	-600.11	-553.27	-522.88	-502.49	-541.61	-390.88	-390.88	-341.43	-347.65
Free Cash Flow	38.68	-2.33	173.71	179.49	8.50	-87.70	-87.70	-92.94	-20.44

Source: Bloomberg Terminal

A2. Snapshot of South Africa's GDP changes pre and post COVID-19



Source: Stats SA

A3. Alternative Method: Pooled OLS Regression Model

Table 6: Results for the Pooled OLS Regression Analysis

Variable: NPR			
Variable	1	2	3
DA	-3.074		
	-0.511		
LTDA		732.613 (0.000)***	
STDA			598.28 (0.000)***
Growth	0.0601 (0.000)***	0.062 (0.000)***	0.0628 (0.000)***
SIZE	1.993 (0.003)***	2.014 (0.005)***	(0.005)***
C	-5.861 -0.125	-5.89 -0.133	-6.667 -0.151
Observations	648	648	648
R squared	0.1311	0.07412	0.0329
F	7.25	7.321	7.6
Prob > F	0.0001	0.0001	0.0001

Table 6 reports on the results of pooled ordinary least of squares model for the influence of capital structure on NPR as a proxy of profitability. Model 1 uses DA, Model 2 uses LDA and Model 3 uses SDA. The results reveal the coefficient estimates and the p-values shown in parentheses. The asterisk '', **, ***' represent the level of significance 10%, 5% and 1% respectively - for the impact of capital structure on the Net Profit Ratio.*

A4. Tests with additional dependent variable (ROA, ROE & ROE)

Table 7: Results for the Fixed Effects Regression Analysis

Variable: ROE			
Method: Panel Least Squares			
Sample: 2008 2022			
Variable	1	2	3
DA	11.317 -0.476		
LDA		1.462 (0.884)	
SDA			20.667 (0.345)
Growth	0.1394 (0.017)**	0.1328 (0.017)**	0.1327 (0.017)**
SIZE	-15.289 (0.022)**	-14.455 (0.035)**	-12.809 (0.024)***
C	135.247 (0.006)***	133.6548 (0.007)***	119.32 (0.019)**
Observations	648	648	648
R squared	0.03	0.0207	0.301
F	1.99	2.13	2.29
Prob > F	0	0	0

*Table 7 presents the regression results investigating the impact of capital structure on the Return on Equity (ROE) across various industries. The different models represent DA (1), LDA (2) & SDA (3). The results reveal the coefficient estimates and the p-values shown in parentheses. The asterisks *, **, *** represent the level of significance 10%, 5% and 1% respectively - for the impact of capital structure on the Return on Equity.*

Table 8: Results for the Fixed Effects Regression Analysis

Variable: ROA

Method: Panel Least Squares

Sample: 2008 2022

Variable	1	2	3
DA	-30.684 (0.000) ***		
LDA		-19.332 (0.003)***	
SDA			-9.927 (0.187)
Growth	0.651 (0.000)***	0.6423 (0.000)***	0.6488 (0.000)***
SIZE	-14.667 (0.000) ***	-13.182 (0.000) ***	-9.2588 (0.000) ***
C	77.551 (0.000) ***	69.252 (0.000) ***	80.159 (0.000) ***
Observations	648	648	648
R squared	0.1124	0.1025	0.0831
F	6.38	6.3	6.05
Prob > F	0	0	0

*Table 8 presents the regression results investigating the impact of capital structure on the Return on Assets (ROA). The different models represent DA (1), LDA (2) & and SDA (3). The results reveal the coefficient estimates and the p-values shown in parentheses. The asterisks *, **, *** represent the level of significance 10%, 5% and 1% respectively - for the impact of capital structure on the Return on Assets.*

Table 9: Results of the Fixed Effects Regression Analysis

Variable: EPS			
Method: Panel Least Squares			
Sample: 2008 2022			
Variable	1	2	3
DA	-1327 (0.000) ***		
LDA		-1550 (0.000)***	
SDA			-836.34 (0.146)
Growth	2.471 (0.000)***	3.022 (0.000)***	2.878 (0.000)***
SIZE	659.81 (0.000) ***	732.613 (0.000) ***	598.28 (0.000) ***
C	-3800.22 (0.000) ***	-4250.571 (0.000) ***	3250.7 (0.000) ***
Observations	648	648	648
R squared	0.1311	0.07412	0.0329
F	16.01	17.45	16.67
Prob > F	0	0	0

Table 9 presents the regression results investigating the impact of capital structure on the Earnings Per Share (EPS). The different models represent DA (1), LDA (2) & and SDA (3). The results reveal the coefficient estimates and the p-values shown in parentheses. The asterisks ', **, ***' represent the level of significance 10%, 5% and 1% respectively - for the impact of capital structure on the Earnings Per Share.*