An empirical study of the impact of macroeconomic variables on the capital structure of South African firms during periods of heightened economic uncertainty

BY

Marvin Plaatjies (PLTMAR006)

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Supervisor: Professor Phillip De Jager

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Contents

Abstract

In this empirical research, the impact of national debt to GDP (and other selected macroeconomic variables) on the capital structure of South African firms is investigated during a period of heightened economic uncertainty. Economic uncertainty, as defined in this study, refers to the degree of unpredictability and lack of confidence that exist in the economic environment. In the context of South Africa, economic uncertainty is attributed to the year-on-year overall deterioration of key macroeconomic variables (my variables of interest), namely the national debt to GDP, GDP growth rate, inflation rate, interest rates, and tax rate. This research is built on previous research conducted by Pierre Erasmus in 2010, which covered the capital structure, and the debt maturity decision, of South African firms during the period between 1989 to 2008. Erasmus mainly considered the following macroeconomic variables: GDP, inflation rate, growth rate, and exchange rate. I have expanded on the study of Erasmus by incorporating other macroeconomic variables, including national debt to GDP, interest rates, and tax rate. I conducted generalised method of moments (GMM) alongside pooled Ordinary Least Squares (OLS) and performed a series of endogeneity checks using alternative regression models. The findings of this study, which are explained by the pecking order theory, indicate that national debt to GDP, inflation rate and tax rate are important factors that influence the capital structure decisions of South African firms. The study concludes that South African firms tend to exhibit a risk averse nature towards gearing and prefer equity finance over debt financing. Pierre Erasmus also concluded that South African firms adjust their capital structure choices in response to the evolving economy and prefer equity finance over debt finance.

Chapter 1: Introduction

The concept of capital structure has been a focal point of discussion in the field of finance for several decades (Frank and Goyal, 2009). To date scholars are still establishing systematic reviews and frameworks for the determinants of capital structure (Martinez et al, 2018). Capital structure describes how a firm uses a mix of debt and equity to fund its operations. Scholars and industry experts who weigh the advantages and disadvantages of various financing options have long debated the topic of what makes up an optimal capital structure in the field of finance (Brusov, Filatova and Orekhova, 2023; Voulgaris, Asteriou, and Agiomirgianakis, 2002). While some argue that using more debt will allow firms to maximise their tax benefits and increase returns, others support a more conservative strategy that places a greater emphasis on equity financing and lowers debt levels.

The concept of an optimal capital structure for a firm is still being debated, but there is no ultimate answer when it comes to what that should be (Brusov, Filatova and Orekhova, 2023). It all depends on a number of variables, including the industry the firm is in, the costs of debt and equity, the financial state of the firm, the environment in which it operates, and the firm's risk tolerance. Many factors, such as a nation's legal and tax systems, the availability of trustworthy information, the size of a firm, the profitability, asset tangibility, and the market-to-book ratio, have been investigated as determinants of capital structure decisions (Hovakimian, 2006; Saif-Alyousfi et al.,2020). It is worth noting that the majority of studies on capital structure have concentrated on developed markets and have been carried out in stable macroeconomic environments (Ahmad and Etudaiye-Muhtar, 2017; Alves and Ferreira, 2011; Awartani et al., 2016; Çam & Özer, 2022; Demirgüç-Kunt et al., 2020; Martinez et al., 2018; Matemilola et al., 2019; Turkki, 2021), leaving a knowledge gap regarding the capital structure decisions made in more uncertain and unstable macroeconomic environments (Gwatidzo and Ojah, 2009; Auret, Chipeta, and Krishna, 2013).

Although observations and capital structure factors are often discussed in research, there is a lack of aligning these studies with literature and an ever-changing economic environment such as South Africa. In order to remain relevant in a world where things change all the time, it is imperative that we close this gap by examining a variety of factors that affect capital structure

choices based on current economic changes. For example, a study conducted by Pierre Erasmus in 2010 focused on a period when South Africa experienced positive economic growth, which unfortunately does not adequately capture the impact of periods of greater uncertainty, including periods encompassed by the effects of COVID-19.

This research encompasses the Zuma and Ramaphosa eras, which saw notable political and economic changes in the nation and runs from 2009 to 2022. The Zuma era was characterised by concerns over corruption, political instability, and policy uncertainty (Parker, 2023). The Ramaphosa era, with its primary focus on combating corruption, political instability, and policy uncertainty, has unfortunately fallen short of effectively addressing these concerns (A van Nieuwkerk, 2020). During the period covered by this study, national debt to GDP increased from a low of 31.1% in 2009 to a high of 70.7% in 2020 and 67.4% in 2022. The tax rate increased from a low of 21.9% in 2009 to a high of 25% in 2022. The GDP growth rate averaged approximately 1.2% while inflation rate averaged 2.3% higher than the targeted inflation rate of 3%. Interest rates have on average increased from 8.4% in 2010 to 11.4% in 2022. The deterioration in these macroeconomic variables underscores the need to evaluate the financing decisions made by South African firms on the back of a struggling economy.

Moreover, studies by Booth, Aivazian, Demirgüç-Kunt, and Maksimovic (2001); Demirgüç-Kunt, Martinez Peria, and Tressel (2015); and Bancel and Mittoo (2004) all highlight the difficulties in raising capital by nations with weak financial systems.

According to Booth et al. (2001), external factors such as national debt, economic fluctuations, and changes in the financial industry are important determinants of capital structure. Fan, Titman, and Twite (2012) note that lower debt ratios are found in nations with poorer legal systems coupled with corruption, underscoring the importance of institutional considerations in influencing capital structure decisions. Öztekin and Flannery (2012) investigate how institutional characteristics affect the rates at which capital structures change in 37 different countries. They discovered that firms operating in less supportive institutional settings alter their capital structures more slowly. The choice of debt is significantly influenced by country-specific characteristics, such as the management of corruption (Chipeta & Deressa, 2016). Further to this, they point out that the pace at which capital structures are adjusted is correlated with the growth of financial markets, with businesses operating in highly regulated legal settings making adjustments to their debt levels more swiftly.

This study aims to investigate the impact of national debt to GDP, GDP growth rate, inflation rate, interest rate, and tax rate on capital structure decisions during periods of heightened economic uncertainty. The heightened economic uncertainty is shown by the fact that my variables of interest (national debt to GDP, GDP growth rate, inflation rate, interest rate, and tax rate) are deteriorating from one year to the next during the period of study.

With the exception of the banking sector, this study examines data from 156 distinct firms listed on the JSE in various industries. Authorities have regulated specific capital requirements that the banking industry must follow (Ashraf et al., 2020). Including banks in the research could add complications that don't match the patterns of capital structure seen in other sectors of the economy.

When comparing the findings of this study to Pierre Erasmus' study, he discovered that macroeconomic variables had no significant impact on the capital structure choices of South African firms. This study found that national debt to GDP, inflation rate and tax rate are important determinant of capital structure in South African companies. It is also important to keep in mind that, when more macroeconomic factors are introduced in this study, there may have been some degree of overlap between the variables, which could have affected the coefficient's declining trends. However, various tests and measures were performed to ensure that the impact of overlap was minimised. The other macroeconomic variables, such as the national debt to GDP ratio, show a strong positive correlation with capital structure, which in turn influences how firms modify their financing strategies in response to shifting market conditions. I conducted generalised method of moments (GMM) alongside pooled Ordinary Least Squares (OLS) and performed a series of endogeneity checks using alterative regression models to establish statistical connections and quantifying the impact of my variables of interest on capital structure decisions, particularly in times of economic uncertainty.

The following chapters comprise the study.

Chapter 1: Introduction

This chapter outlines the research topic and its importance in the context of South Africa and its ever-changing economy.

Chapter 2: Literature Review

This chapter summarises capital structure theories and studies.

Chapter 3: The South African Economic Environment

The economic environment of South Africa is summarised in this chapter. I focus on the year-on-year trends in my variables of interest defined earlier in this study.

Chapter 4: Research Methodology

I outline the research methodology.

Chapter 5: Model assessment

I assess the model fitness and outline the research methodology followed as well as the regression model used for comparative purposes with Pierre Erasmus study.

Chapter 6: Empirical Results

I discuss the results of my model in this chapter. This chapter illustrates whether my various of interest are correlated to the capital structure decisions adopted by South African firms and whether there is an assumed causation.

Chapter 7: Limitations and Opportunities for Future Research

I discuss the limitation of my study in this research and outline areas for future research.

Chapter 8: Conclusion and Recommendations

I summarise and conclude on my findings in this chapter.

Chapter 2: Literature Review

2.1 Introduction

This chapter provides an overview of capital structure theory and concepts. Although an effort is made to summarise the key points and connect them to this study from the wealth of literature on capital structure theory, it is outside the scope of this study to cover all the literature available.

Capital structure theory

Various theories have been developed over the years which are all focussed on finding and determining what constitutes an optimal capital structure for a firm. This concept aims to establish the optimal combination of various capital forms to optimise a firm's worth and reduce its capital expenditures (Myers, 1984). The fundamental idea behind capital structure theory is that a firm's financing of its activities has an impact on its overall worth. The theories basically look at the costs and advantages of employing debt vs. equity financing and try to determine the best combination of these two funding sources. The theory examines how a firm's capital structure choices are influenced by several variables, including risk, tax consequences, and the cost of capital.

2.2 Optimal capital structure

The goal of creating what is referred to often by scholars as the optimal capital structure for a firm has been an area of focus by various scholars and researchers. The decision-making process that businesses use to decide how much debt and equity to include in their financing is the subject of capital structure theories. The goal is to find a balance that maximises value while minimising risk. In order to understand the link between capital structure decisions and business success, scholars and practitioners analyse variables such as tax benefits, bankruptcy costs, and the influence on shareholders' wealth. At the heart of financial management is the pursuit of the ideal capital structure, which offers organisations tactics and instincts to help

them navigate the complicated world of financing possibilities and ensure long-term success (Brusov, Filatova and Orekhova, 2023).

A firm with a low cost of capital may borrow money at a reduced interest rate, which can boost its profitability (Firer, Ross, Ross Westerfield, and Jordan, 2004). On the other hand, a capital structure with a larger debt load may also have a higher risk of financial loss. In order to maximise firm value, the ideal structure for the debt funding ratio is therefore the compromise between these two variables. In his study, Myers (1984), came to a different conclusion. His research revealed that different theories of capital structure are unable to adequately explain a firm's financing decisions or capital structure decisions; hence, studies that try to determine what a firm's ideal capital structure looks like are likely to be inaccurate. Numerous studies have been conducted since Myers (1984), and although some have come to the opposite conclusion, others have shown a positive association between the optimal capital structure and the maximisation of a firm's value.

Fama and French (2002) found a positive relationship between the debt funding ratio and corporate performance, suggesting that higher debt funding ratio tends to boost share prices and returns on equity (Horne and Jr, 2005). Rajan and Zingales (1994), on the other hand, found a negative relationship between debt and profitability. De Wet (2006) suggested that value might increase significantly when one approaches the optimal degree of gearing. The applicability of capital structure theory was questioned by Beattie, Goodacre, and Thomson (2006), who argued that it lacked empirical support and cast doubt on the relationship between capital structure and business value. Margaritis and Psillaki (2010) added to the complexity of the theory by demonstrating a negative relationship between debt funding and efficiency, with favourable outcomes at low-to-mid debt ratios and unfavourable outcomes at high debt levels. Myers (2001) reiterated this complexity by stating in his research conducted in 2001 that there are no universal theory governing capital structure decisions. The debate is still complicated, reflecting the complex interactions that shape the dynamic landscape of the ideal capital structure and how they affect the maximisation of firm value.

2.3 Modigliani and Miller's capital structure theory

Scholars believe that the "irrelevance" arguments presented by Modigliani and Miller in their 1958 work served as the basis for contemporary theories of capital structure. According to

Modigliani and Miller (1958), a firm's enterprise value is unaffected by its financing method in an efficient market that is free from taxes, agency fees, bankruptcy costs, asymmetric knowledge, and other expenses. The idea basically states that gearing shouldn't have an impact on a firm's total value if it chooses to issue additional debt to fund a new project or expansion since the higher debt would be balanced out by an equivalent rise in the firm's assets and cash flow. Stated differently, the advantages of the new endeavour or growth would outweigh the costs associated with debt.

Key assumptions used in their study:

The theory is predicated on the idea that capital markets are ideal and that neither taxes nor transaction costs exist. As a result, businesses may lend and borrow money at the same interest rate, and investors can access all pertinent firm information.

No bankruptcy costs: The theory makes the assumption that there aren't any expenses related to filing for bankruptcy, such as filing fees or business reorganisation charges. This implies that there are no drawbacks when businesses switch between varying degrees of debt and equity funding.

Investors who behave rationally: The theory makes the assumption that investors always act in their own best interests. This implies that the projected profits and hazards of a certain investment will be the only factors taken into account by investors when making choices about their investments.

Homogeneous expectations: According to the idea, all investors anticipate future cash flows, profits, and other pertinent variables that influence a firm's value in the same way.

No agency costs: The theory makes the assumption that agency difficulties, which happen when management and shareholders have conflicting interests, have no associated costs. This indicates that there are no conflicts of interest between these two groups and that managers always operate in the best interests of shareholders.

To sum up, Miller and Modigliani were cited as stating that "the size of the pie does not change regardless of how you slice it" in their 1958 study. The validity of M&M's hypothesis is thus called into question because, as Myers (2001) points out, the ideas put forth by the firm are questionable from a theoretical standpoint. He compares the M&M perfect-market

proposals with a hypothetical perfect-market supermarket where a pizza's value is independent of how it is cut. Customers will be willing to spend somewhat more per slice than they would per entire item.

2.4 Modigliani and Miller revised paper on capital structure

Many criticisms were levelled at the assumptions made by Modigliani and Miller in their 1958 paper. The findings of that paper were based on the idea of a perfect market, which does not exist and caused Modigliani and Miller to revise some of their assumptions in order to account for corporate taxes in their 1963 paper. Modigliani and Miller (1963) observed a direct relationship between debt funding and the value of a firm, concluding that the value of a firm increases when you increase debt funding.

2.4.1 Importance of corporate taxes

In their paper, Desai, Foley, and Hines (2003) attempt to emphasise the significance of corporate income tax, concluding that a rise in the rate of corporate income tax is anticipated to lead to an increase in the amount of debt a firm uses. Faccio and Xu (2015) in their research on taxes and capital structure found that tax rate changes are an important determinant of capital structure on countries with low tax evasion. One explanation for this expectation could be that higher corporate tax rates lower the after-tax profitability of firms; consequently, firms might try to minimise the increased tax burden by maximising their debt usage. By taking on more debt, firms can deduct interest payments from their taxable income, lowering their overall tax liability. This tactic can help offset the effects of higher tax rates and enhance the firm's after-tax cash flows. But it's crucial to remember that debt financing also comes with a number of risks and costs, especially when it comes to debt funding. The more debt a business has, the more debt funding it has, amplifying both profits and losses. Higher debt funding also raises the risk of financial distress and bankruptcy, so businesses must weigh the potential costs of financial distress against the tax benefits of debt financing.

The overall conclusion of many capital structure studies states that the best capital structure usually consists of a combination of debt and equity financing instead of depending only on debt financing. This is because the tax benefits of debt financing are traded off against the possible costs and risks of debt funding.

2.4.2 Importance of bankruptcy costs

A firm's capital structure can affect how vulnerable it is to bankruptcy costs. A high debt capital structure means that in the event of financial distress, debt holders will have the legal right to claim assets before equity holders do. When a highly debt fundings firm experiences financial difficulties, it may find it difficult to make its debt payments, which could result in default and bankruptcy. Scott (1976) proposed a capital structure model that took bankruptcy costs into account and suggested the existence of an ideal debt-equity ratio. The model states that the optimal debt-equity ratio can be found by weighing the possible costs of bankruptcy against the tax benefits that result from interest tax deductibility. In other words, the optimal level of debt utilisation is attained when the interest tax benefit associated with debt financing equals the present value of bankruptcy costs (Bradley, Jarrell and Kim, 1984).

Antill and Grenadier (2019) examine the impact of two types of bankruptcy costs names: liquidation costs and reorganisation on capital structure. They present a model where firms, aiming to maximize equity value, decide how much debt to issue, knowing that if they default, they must choose between the two bankruptcy options. The model shows that bankruptcy costs influence debt decisions because creditors and shareholders have conflicting preferences. Shareholders may prefer to reorganise, while creditors might get better returns in liquidation. To account for these risks, creditors demand higher interest rates for firms with large debt, reducing the firm's debt funding. The possibility of an inefficient reorganisation leads firms to take on less debt than traditional models predict, highlighting how bankruptcy costs play a key role in shaping capital structure.

Deterrent to taking on excessive debt is the inclusion of bankruptcy costs in the capital structure model, which acknowledges that taking on excessive debt can increase the risk of financial distress and potential bankruptcy. Bankruptcy costs include a variety of expenses, including legal fees, loss of business reputation, and the potential loss of future business opportunities (Bradley, Jarrell and Kim, 1984) . On the other hand, debt financing provides tax benefits due to interest tax deductibility. Since interest payments on debt are usually tax deductible, debt financing lowers the firm's total tax obligation and delivers a financial benefit that might increase the debt financing's value. In the context of bankruptcy and tax savings, Brennan, M. and Schwartz (1978) highlight the possible effects of additional debt usage on a firm's value. Based on their analysis, the impact of taking on more debt is determined by two

competing factors: the increase in realised tax savings and the decrease in the probability of the firm's survival.

First of all, interest tax savings that were previously experienced by a bankrupt business will no longer be available. Put differently, the bankrupt firm will no longer be able to deduct interest charges from its taxable income. Since the real-world dynamics of a firm's value and the impact of debt are influenced by a multitude of factors beyond tax savings, including the firm's operating performance, market conditions, industry dynamics, and management decisions, it is important to note that the analysis provided by Brennan, M. and Schwartz (1978) is predicated on certain assumptions and simplifications. Consequently, while their argument offers guidance into the potential effects of additional debt, it should be considered in conjunction with a thorough analysis of a firm's particular circumstances.

2.5 Capital structure theories

Theories on capital structure provide a framework for understanding how businesses choose the ratio of debt to equity in their capital structure. These theories give an understanding of the variables affecting business financing decisions and the ideal capital structure that maximises firm value (De Miguel and Pindado, 2001). A number of theories have evolved from empirical studies conducted since Modigliani and Merton H. Miller in 1958 to explain the determinants of capital structure by firms.

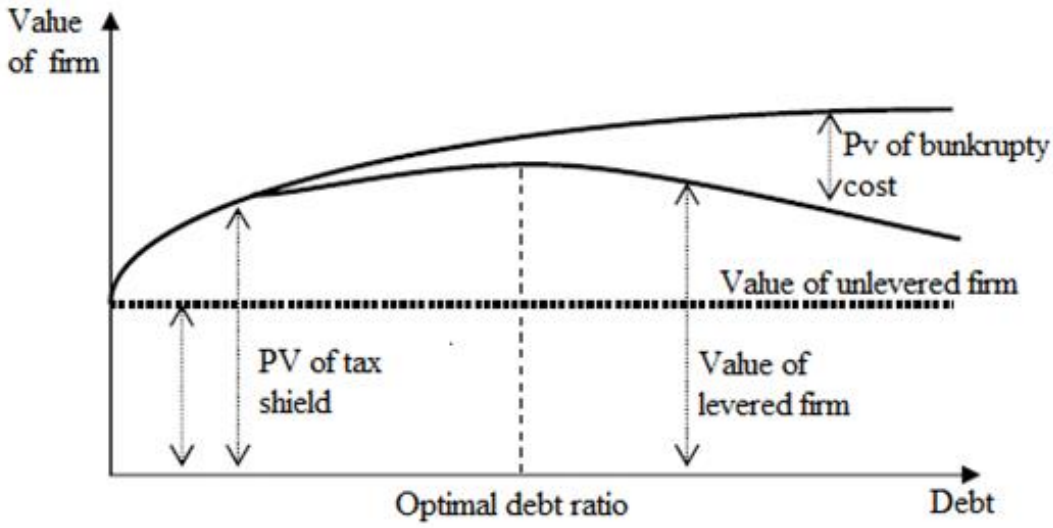
2.5.1 Trade- off theory

Building on the shortcomings of Modigliani and Miller's perfect market theory, which assumes no corporate taxes and bankruptcy costs, the trade-off theory adds the existence of corporate taxes and bankruptcy costs while maintaining Modigliani and Miller's market efficiency and symmetric information. The theory implies that there is a trade-off between the tax advantages of debt and the costs associated with financial distress. According to Baker and Wurgler (2002); Ai, Frank and Sanati (2020) the trade-off theory suggests firms have an optimal capital structure that balances the benefits and costs of debt financing. The tax shield benefit of debt, or the tax deductibility of interest payments on debt, lowers the firm's tax liability and increases cash flows; on the other hand, the costs of financial distress include both direct costs (like legal fees and bankruptcy costs) and indirect costs (like loss of

confidence from suppliers, customers, and employees). These factors are the main considerations for firms when determining their optimal capital structure, according to the trade-off theory supported by Myers (1984); Titman and Wessels (2007); Ai, Frank and Sanati (2020).

A firm's value is maximised at an optimal point, according to the trade-off theory, when the firm's value is balanced between these two factors. Initially, when a firm increases its level of debt, the tax shield benefits increase, leading to higher cash flows. However, at some point, the costs of financial distress start to outweigh the benefits of debt. This is because the increased probability of financial distress reduces the firm's value more than the tax shield benefits add to it.

Figure 1. Static trade off theory of capital structure



Source: Myers (1984:577)

The trade-off theory goes on to say that based on variables including industry features, profitability, growth prospects, and risk profile, various organisations may have various optimal capital structures.

2.5.2 Pecking order theory

According to Sanusi and Taha (2015), pecking order theory is behavioural in nature and was first proposed by economists Donaldson and Myers (1984). The theory suggests that firms have a preference for financing their operations and investments in a specific order, based on the availability and cost of different funding sources. Pecking order theory states that businesses prefer to fund their investments through internal sources first, such as retained earnings or profits from their operations (Sanusi and Taha, 2015). De Miguel and Pindado (2001) state that businesses that are able to raise money internally do so rather than borrowing it. Internal financing is regarded as the most preferred source of funding because it avoids taking on new debt or issuing new equity, which can have associated costs and signalling effects.

In the event that internal financing proves inadequate or unavailable, firms will fall back on debt financing before turning to equity (Baker and Wurgler, 2002; De Miguel and Pindado, 2001; Michaelas, Chittenden and Poutziouris, 1999; Wiwattanakantang, 1999).

According to Yıldırım and Çelik (2021), companies on the Borsa Istanbul generally follow the pecking order theory, which means they prefer using internal funds first, then debt, and lastly equity for financing. This preference is stronger as investment needs grow, especially for smaller firms. However, the theory doesn't hold for all companies: those with high debt levels tend to choose equity when internal funds aren't enough, while low-debt firms prefer borrowing first. Before the global financial crisis (2000-2009), companies followed this pecking order more strictly, but after the crisis (2010-2018), they relied more on borrowing to fund investments.

Debt financing can take the form of bank borrowing, short-term loans, or the issuance of corporate bonds. Since interest payments on debt are tax deductible, debt is perceived as a relatively less expensive source of financing than equity. The least preferred option in the hierarchy is equity financing. Firms may issue new equity shares to raise capital if debt and internal financing are not available or sufficient. Equity financing entails selling ownership stakes in the firm to investors, diluting the ownership and control of current shareholders. Issuing new equity may also have negative signalling effects, indicating that the firm may be overvalued or in financial distress. According to Cotei and Farhat (2009), managers will opt to finance new initiatives with assets that are not discounted by the market, such as internal

funds or low-cost debt, in order to avoid the underinvestment problem caused by information asymmetry. Khan and Nafees (2013) argue that the pecking order theory becomes essential as investors struggle to decide between external and internal investment due to information asymmetry. Pecking order theory, however, is more commonly viewed as a supplement rather than as a replacement for trade-off theory due to these limitations. Khan and Nafees (2013) pointed out that the pecking hypothesis has some drawbacks, including the following: it ignores the difficulties associated with financial managers' choice to accumulate a sizable financial deficit since it makes them more resistant to market discipline. Second, it ignores how taxes, the cost of creating new securities, agency fees, and financial crises affect investment opportunities.

2.6 Importance of asymmetric information

Information asymmetry is the concept that certain individuals or groups possess information that others do not. In this context, it suggests that employees of a firm may possess valuable information that the public is unaware of (Harris and Raviv, 1991), information that could impact the market perception of the firm. The market cannot determine the real nature of a project or whether it will be lucrative when there is informational asymmetry since not all members of the market have access to the information required to make that determination (Barnea, Haugen, and Senbet, 1981). The choice of a firm's capital structure, or how it finances its operations, is also influenced by asymmetric information. If a firm has a lot of information that is not publicly available, it may find it more difficult to raise capital from outside sources. When a firm sells stock, managers may be reluctant to do so if the price of the stock is too high. Research indicates that when a firm announces that it is selling new shares, the price of the stock typically declines.

According to Gao and Zhu (2015), information availability (information asymmetry) affects companies' capital structure decisions and the cost of capital differently across different countries. Their study finds that companies facing high information asymmetry tend to use more debt but avoid long-term debt. This may be because information asymmetry raises the costs of different types of capital differently. The relationship between information asymmetry and higher debt usage is stronger in countries with well-developed banking sectors or clear bankruptcy laws. However, this link is weaker in countries with strong legal systems, strict law enforcement, or extensive financial disclosure requirements, which help reduce information gaps.

Retained earnings, or profits not paid to shareholders as dividends, are another way that asymmetric information affects a firm's ability to raise capital. Dividends give signals about a firm's current and future earnings. Some experts believe that when investors undervalue a firm, it's better for the firm to borrow money (issue debt), and when investors overvalue the firm, it's better for the firm to sell shares (issue equity). The pecking order hypothesis, which creates a hierarchical financial structure, is the most significant asymmetric information theory. The theory of asymmetric information basically holds that firms try to finance their needs in a specific order: they use their own money first, then borrow money, and they sell shares only as a last resort. This is because different sources of financing have different costs and reveal different information to the market.

2.6.1 Signalling theory

Signalling theory, which refers to the use of signals by firms to convey information about their financial health, prospects, or management quality to investors, lenders, and other market participants, is primarily motivated by asymmetric information (Harris and Raviv, 1991). It focuses on how firms strategically communicate information to influence investor behaviour and market perceptions. Signalling theory states that a firm's financing decisions can convey signals about the quality of its investment opportunities and future prospects. For instance, if a firm issues new debt or equity, this could be interpreted as a signal from management that the firm has bright future prospects, which could draw investors and raise the firm's stock price. Similarly, dividend policies can also be interpreted as signals. A firm that maintains a high dividend policy or gradually raises dividend payouts may be perceived as financially stable and confident in its future earning potential. On the other hand, a firm that holds back from paying dividends may be seen as experiencing financial difficulties.

Pecking order theory focuses on the order in which firms prefer to access different sources of financing options based on asymmetric information; in contrast, signalling theory is said to look at how financing decisions can be used strategically to communicate information to the market. Myers (1984) and Baskin (1989) state that management is likely to issue debt when they perceive the value of a firm is undervalued and equity when they perceive the value of a firm is overvalued.

Bae, Masud and Kim (2018) investigate how a company's board structure and shareholding arrangements communicate signals to the market and stakeholders, based on signalling and agency theories. The findings show that companies with more foreign and institutional investors, larger boards, and a higher proportion of independent directors tend to disclose more information about their sustainability practices. This suggests that such governance features send positive signals to the market, reducing information gaps and promoting transparency. On the other hand, when directors hold a significant number of shares, companies tend to disclose less about sustainability, which might indicate potential conflicts of interest. Overall, the study concludes that strong corporate governance can effectively convey positive signals, build trust, and reduce information asymmetry by encouraging more transparent sustainability disclosures.

2.6.2 Agency cost theory

The two agency conflicts covered by the agency cost theory are the conflict between shareholders and managers and the conflict between shareholders and creditors (Abor and Biekpe, 2006). The agency cost theory was first developed by Jensen and Meckling (1976). Their paper argued that there must be other determinants of capital structure outside the existence of debt, corporate taxes, and bankruptcy costs.

2.6.2.1 Agency conflict between shareholders and managers

When shareholders and managers have different interests and goals shareholders owning the firm and managers hired to run it a conflict known as "agency conflict" arises because of these differences in goals and incentives, which may lead to actions that help one party at the expense of the other (Jensen and Meckling, 1976). Some of the causes of this conflict can be attributable to differences in goals between shareholders and managers. Shareholders typically seek to maximise their wealth through increased share value and dividends, while managers may prioritise their own job security, status, or personal interests over shareholder wealth maximization (Masulis and Reza, 2015). Shareholders often have a diversified portfolio and are more risk-tolerant, whereas managers may be more risk-averse, as their careers and compensation can be directly impacted by poor performance. Managers possess more detailed information about the firm's operations, financials, and opportunities compared to shareholders. This information advantage can lead to conflicts if managers withhold or manipulate information to their advantage or engage in actions not aligned with

shareholders' best interests (Harris and Raviv, 1991). Under this conflict, if a firm takes on debt, managers might engage in risk-shifting behaviours to benefit from the tax shield associated with debt. As a result, shareholders could bear the cost of increased financial risk, potentially leading to financial distress and reduced firm value.

2.6.2.2 Agency conflict between shareholders and creditors

When shareholders and creditors have conflicting priorities and risk exposures with regard to a firm's financial health, it can lead to agency conflict. As the firm's owners, shareholders want to maximise their returns, while creditors want to safeguard their loans or investments (Jensen and Meckling, 1976). Some of the reasons for this conflict can be attributed to the different objectives that creditors and shareholders have (Masulis and Reza, 2015). Creditors prioritise the preservation of their capital and the timely repayment of their loans, while shareholders are more likely to take on riskier strategies that carry a greater risk of default and potentially higher returns, which could jeopardise creditors' interests. In distressed situations, conflicts may arise when creditors and shareholders have divergent interests regarding the firm's restructuring or bankruptcy proceedings. Shareholders may seek to retain control and maximise their stake.

Agency costs affect a firm's capital structure decisions by influencing the attractiveness of different financing sources, the inclusion of monitoring mechanisms, and the overall cost of capital. Jensen and Meckling (1976) state that firms must carefully consider these costs and trade-offs to determine an optimal capital structure that aligns the interests of various stakeholders while maximising shareholder value. Conflicts of interest between principals (owners) and agents (managers) can result in inefficiencies and costs within organisations. These costs arise from the need for monitoring, aligning incentives, and mitigating risks in order to minimise the possibility of opportunistic behaviour by agents.

2.7 Equity market timing theory

The equity market timing theory has gained popularity over the years and is a crucial component of capital structure. The theory is based on the idea that shares should be issued when prices are high and repurchased when prices are low. Management recognises opportunities from temporary volatilities in the cost of equity compared to other forms of

financing, and shareholders who maintain their shareholding typically benefit from increases in share prices as well as from other shareholders leaving the firm due to declines in share prices.

There are two ways to time the stock market that have similar effects on a firm's financial structure. The first way is based on a theory by Myers and Majluf (1986) and involves rational managers and investors. They consider the costs of selecting stocks and how these costs can differ between firms or over time. Other studies also examine how these selection costs can vary. For example, Choe, Masulis and Nanda (1993) look at how selection costs change over time, Korajczyk, Lucas and McDonald (1991) focus on variations in selection costs between firms. These studies find that firms tend to announce stock offerings after releasing information, which can help reduce information differences between investors. They also find that stock offerings tend to cluster around periods with smaller announcement effects. All of these findings suggest that temporary changes in a firm's market value compared to its book value can have lasting effects, as long as the costs of deviating from an optimal financial structure are relatively small.

The second way to time the stock market involves irrational investors or managers who believe that stock prices are either overvalued or undervalued at different times. In this case, managers issue new shares when they think the stock price is unreasonably low and buy back shares when they believe the price is unreasonably high. The market-to-book ratio, which measures a firm's market value relative to its book value, is known to be inversely related to future stock returns. Extreme values of the market-to-book ratio have been linked to extreme investor expectations in various studies. The empirical evidence shows that net stock offerings are positively related to the market-to-book ratio, supporting the idea that managers are trying to take advantage of overly optimistic or pessimistic investor expectations. If there is no specific optimal financial structure for a firm, managers may not reverse these decisions when the stock price appears to be fair, and the cost of equity seems normal. As a result, temporary changes in the market-to-book ratio can have permanent effects on a firm's financial debt funding.

The main premise of this second method of market timing is that managers feel they can effectively time the market; it does not, however, need the stock market to be inefficient or for managers to properly anticipate future stock returns. Chief financial officers (CFOs) of

firms acknowledged that they attempted to time the stock market, according to a survey by Graham and Harvey (2001). Of those CFOs who thought about issuing common stock, two-thirds stated that the valuation of their stock whether it was overvalued or undervalued—was a significant factor in their decision. This survey reinforces the central tenet of market timing theory that managers think they can time the market. It does not, however, make a clear distinction between two forms of market timing: mispricing and dynamic asymmetric information. The low long-term stock returns that follow equity issuances and the high long-term returns that follow stock repurchases provide evidence that managers are generally successful at timing the equity market. For example, Loughran and Ritter (1995) point out that the long-term abnormal returns for firms issuing equity, which indicate the extent of exploitable mispricing, are much larger than the announcement effects of equity issuances, which reflect the recognition of asymmetric information. In addition, Baker and Wurgler (2002) provide evidence that firms issuing equity can, on average, time the market to determine the cost of equity. This suggests that the overall gains from market timing are even larger in comparison to the negative effect of announcements, implying that exploiting mispricing is the primary motivation behind the equity market.

The complexity of market timing theories and the assumptions made by the theory dissected for purposes of gaining a thorough understanding of the theory. While there is evidence that managers may benefit from mispricing, it is equally important to approach this information critically. The market's complex dynamics and the unpredictable nature of future movements highlight the need for caution when interpreting these findings. As such, it is critical to take market timing theories into account in the larger context of financial decision-making and risk management, taking into account the inherent uncertainties and potential limitations associated with these strategies.

2.8 Determinants of Capital Structure

In order to determine the main indicators of capital structure, Frank and Goyal (2009) started with a long list of possible factors that corresponded to different theories. They then painstakingly analysed more than 50 years of data about American firms in order to condense this long list and identify the important variables influencing capital structure. As per their findings, the critical factors included, but were not limited to, tangibility, business size, growth

prospects, and profitability. When it comes to tangibility of assets, prior studies by Titman & Wessels (2007), Rajan & Zingales (1994), and Fama and French (2002) indicate that the ratio of fixed assets to total assets is a significant factor in a firm's debt load, but it is unclear in advance which way this relationship will bend.

The trade-off theory suggests that there should be a positive correlation between debt levels and the proportion of tangible assets. On the one hand, having more tangible assets can help resolve conflicts between bondholders and shareholders. With tangible assets, creditors have a better chance of being repaid if the firm runs into trouble. Even in the worst-case scenario, these assets can be sold to generate some value. Conversely, managers of highly indebted firms will be less free to enjoy excessive benefits because bondholders will be closely monitoring these firms; generally, monitoring these firms will result in higher costs, particularly for firms with non-collateralized assets; that is, firms with non-collateralized assets may decide to take on more debt in order to limit the excessive benefits for managers. This suggests that there is a negative relationship between the tangibility of assets and debt levels.

Firm size: Is an important determinant of capital structure (Saif-Alyousfi *et al.*, 2020). The amount of debt a firm takes on has a mixed effect on debt funding. Some research indicates that smaller firms incur higher bankruptcy costs (Warner, 1977), while larger firms are more diversified and have a lower failure rate (Titman & Wessels, 1988; Kurshev and Strebulaev,2015). Based on the trade-off theory, this implies that smaller firms would be more likely to file for bankruptcy and, consequently, have a positive relationship between debt funding and firm size (Alipour, Mohammadi and Derakhshan, 2015). This prediction is consistent with the free cash flow theory's assertion that larger firms with more stable cash flows are more likely to use debt (Jensen and Meckling, 1976). Alternatively, firm size can also be interpreted as a measure of the information gap that exists between insiders of the firm and the financial markets. This is because larger firms tend to have lower levels of debt because they attract more attention from analysts and are therefore easier to issue stocks with information. This viewpoint is consistent with the pecking order theory, which postulates a negative relationship between debt funding and firm size and suggests that larger firms would prefer equity financing over debt financing.

Growth Opportunities: Is an important determinant of capital structure (Saif-Alyousfi *et al.*, 2020). Jensen's free cash flow theory states that firms with more investment opportunities don't rely as much on debt payments to control their available cash. The trade-off model suggests that firms with more investment opportunities tend to have less debt because they want to show that they won't underspend or replace their assets. It is well known that firms with good growth prospects pay more when borrowing money and also deal with conflicts between shareholders and bondholders. The results of prior research, however, have been conflicting. Titman and Wessels's (1988) study, for example, found a negative relationship between debt and growth opportunities; Rajan & Zingales' (1994) study found a positive relationship. The simple version of the pecking order theory, on the other hand, supports the latter conclusion. It states that a firm's debt typically increases when it invests more than it earns, and that debt decreases when it invests less than earnings. As a result, firms with more investment opportunities are expected to have higher levels of debt based on profitability.

From a more sophisticated standpoint, firms take into account not only the present but also the costs of financing future investments. To balance these costs, firms with large growth potential may choose to keep their debt levels lower in order to avoid financing future investments through new stock offerings or even by forgoing them entirely. As a result, the more comprehensive version of the pecking order theory predicts that firms with larger expected investments have less current debt.

Profitability: Is an important determinant of capital structure (Saif-Alyousfi *et al.*, 2020). The trade-off theory suggests that more profitable businesses typically have higher levels of debt for several reasons. First, higher profitability lowers the expected costs of bankruptcy. Secondly, higher debt funding in agency models forces managers to allocate a larger portion of the firm's excess cash to creditors, which helps to control management and decision-making issues. This commitment to paying out more to creditors suggests a positive relationship between debt levels and profitability. Finally, Ross's (1977) signalling hypothesis supports the idea that managers can use higher levels of debt to indicate that the firm is profitable.

The pecking order model, on the other hand, predicts a negative relationship between debt levels and profitability because higher earnings should lead to lower levels of debt. Businesses prefer to raise capital first from retained earnings, then from debt, and lastly, by issuing new

equity. This behaviour is caused by the costs associated with issuing new equity when there is information asymmetry. Debt increases when investment exceeds retained earnings and decreases when investment is lower than retained earnings. Past empirical research, however, has produced contradictory findings. For example, Jensen and Meckling (1992) showed a positive association between debt and profitability, supporting the trade-off hypothesis, while Rajan & Zingales (1994) found a negative relationship, supporting the pecking order theory.

2.9 Macroeconomic factors and capital structure

The impact of macroeconomic factors can be explained by the trade-off theory and pecking order theory. The trade-off theory suggests a positive relationship between GDP and debt funding, as companies tend to be more profitable during economic upturn and less profitable during economic downturn, leading to higher debt levels during economic upturn and lower debt levels during economic downturn. This view is supported by the findings of (Bokpin, 2009; Joeveer, 2013; Memon et al., 2015; Rehman, 2016; Temimi et al., 2016; and Huong, 2017). On the other hand, the pecking order theory predicts a negative relationship between GDP and debt financing, as companies may rely less on debt when economic growth offers more internal funding opportunities. Khemiri & Noubbigh (2018) found evidence of this negative relationship in five Sub-Saharan African countries, attributing it to increased growth opportunities during economic upturn. This aligns with the findings of (Bokpin, 2009; Gajurel, 2006; Joeveer, 2013; Mokhova & Zinecker, 2014; Muthama et al., 2013; Nejad & Wasiuzzaman, 2011; Pepur et al., 2016). It suggests that rising economic activity can reduce the need for companies to rely on debt funding.

According to the pecking order theory, the relationship between inflation and debt funding is complex and can vary (Frank and Goyal,2009). Temimi (2016) found a positive relationship in GCC (Gulf Cooperative Council which comprises of the following countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates) countries. In Malaysia, and Thailand, inflation lowers the real cost of debt, making borrowing more attractive. Additionally, companies might seek tax benefits during inflationary periods (Nejad & Wasiuzzaman, 2015). Gajurel (2006) argued that inflation often causes short-term interest

rates to rise faster than long-term rates, prompting firms to favour long-term debt to avoid higher costs. This positive association between inflation and debt funding is also supported by studies from (Huong, 2017; Memon et al., 2015; Muthama et al., 2013; Nejad and Wasiuzzaman, 2015; Pepur et al., 2016;).

On the other hand, Tehrani and Khoee (2017) found that inflation makes firms riskier due to revenue and cost volatility, leading them to avoid taking on more debt. This negative relationship was also reported by (Bokpin, 2009; Gajurel, 2006; Ying et al., 2016). Rehman (2016) highlighted a situation in Pakistan where currency depreciation increased sales but also led to higher inflation and cost pressures, limiting the ability of firms to borrow more despite higher sales.

Mokhova and Zinecker (2014) studied European countries from 2006 to 2010 and found that the relationship between inflation and debt funding was positive in France and Greece but negative in countries like the Czech Republic, Slovakia, Poland, Hungary, and Germany. Overall, the effect of inflation on debt funding depends on various factors, including regional economic conditions and company strategies

Cook and Tang (2010) investigated the impact that macroeconomic conditions have on the adjustment speed of capital structure for unlisted USA based firms. In their study, the macroeconomic variables included: the difference between long-term and short-term interest rates (term spread), the difference between yields on different bond ratings (default spread), the rate of growth of the Gross Domestic Product (GDP), and the ratio of dividend payments to the value of stocks in the market (market dividend yield). Their finding revealed that firms operating in stronger macroeconomic environment are more susceptible to adjusting their capital structure faster than those operating in poorer macroeconomic environments. Chipeta and Deressa (2016) examine the effects of firm-and-country specific factors on capital structure on data focused on firms in Sub-Saharan Africa found that capital structure adjustment speeds are directly related to the development of the financial markets and that firms in strong legal environments adjust faster towards their target levels of debt (Chipeta and Deressa, 2016).

Firms generally tend to utilise higher levels of debt when interest rates are low, as this results in a lower cost of debt financing. On the other hand, elevated interest rates increase the

opportunity cost, prompting firms to retain cash. This situation often leads to a substitution effect among financing options, where firms prefer equity financing during periods of high interest rates. Further to this, an increase in interest rates raises the likelihood of financial distress. Mokhova and Zinecker (2014) identify a negative relationship between interest rates and debt funding, evident in both short-term and long-term debt. Similarly, Memon et al. (2015) and Nejad and Wasiuzzaman (2015) support the notion that low interest rates encourage firms to issue more debt. In contrast, Rehman (2016) notes that in Pakistan, higher interest rates result in a cost of financial distress that outweighs the tax benefits of using debt. Nonetheless, Khemiri and Noubbigh (2018) argue that firms may increase debt when nominal interest rates rise, particularly when accompanied by expectations of inflation. Firms are likely to opt for debt now rather than later. Bokpin (2009) finds that companies typically increase short-term debt before long-term debt. Meanwhile, Muthama et al. (2013) reaffirms that interest rates exhibit a positive relationship with long-term debt but a negative relationship with short-term debt.

Pierre Erasmus's 2010 research, on which my study is built on examined the capital structure and debt maturity options of South African listed industrial firms from 1989 - 2008, is the foundation for my work. Erasmus examined macroeconomic variables like GDP growth, inflation, exchange rates, and interest rates during a time of robust economic expansion.

My research, on the other hand, broadens the scope to include the years 2009 - 2022, which are characterised by heightened economic uncertainty. This period is important for comprehending economic dynamics during unstable times. Additionally, my study presents a new angle by including national debt to GDP as an important and previously missing macroeconomic variable. Since rising government debt is frequently linked to economic instability, my study intends to investigate its influence on business financial decisions.

Pierre Erasmus discovered that, in the years he studied, South African firms were generally conservative when it came to debt financing; they typically used short-term debt and ordinary share capital to finance a sizable portion of their total capital requirements. Erasmus's work also took into account important events like the 1994 transition to a newly elected democratic government and the lifting of international sanctions, which resulted in a rise in direct foreign investment.

2.10 Summary

It has been shown through the review of related literature that the theories currently in use do not adequately explain how firms determine their capital structure, indicating a substantial knowledge gap (Rajan and Zingales, 1994). As a result, it is plausible to suggest that other economic factors that these theories do not take into account have a significant impact on capital structure decisions. In addition, there has been a dearth of research on capital structure decisions made between 2009 and 2022. In particular, the effect of national debt levels on the responses of firms in these uncertain times has not been sufficiently studied. These gaps in knowledge, coupled with the unique economic circumstances of South Africa, call for more research. In view of the aforementioned, the purpose of this research is to examine the effects of macroeconomic factors, national debt, and capital structure decisions made by South African firms during times of increased economic uncertainty.

Chapter 3: The South African economy

A number of factors that make up a country's economic landscape have an impact on its overall economic performance and efforts (Guilhoto, Marjotta-Maistro, and Hewings, 2002). It affects a variety of aspects of a country's economy and has a big influence on investments, business, and people's general well-being. For many years, South Africa has struggled with an inadequate supply of energy, which has led to periodic, planned power outages known as "load-shedding" that have become worse over time (Goldberg, 2015). These power outages, which in 2022 amounted to about nine hours a day, disrupted the economy and raised operating costs for firms (L. Engelbrecht, 2023). A lot of firms were forced to use pricey diesel generators. The lack of power also had a negative effect on other infrastructure, including IT, water, and the provision of services in the health and education sectors.

Weak structural growth and the COVID-19 pandemic have made socioeconomic problems worse (Lone and Ahmad, 2020). According to the World Bank (2023), the pre-pandemic GDP of South Africa has been restored; however, employment levels have not yet increased. Women and young people were disproportionately impacted by almost half a million fewer jobs by the end of 2022 as compared to the end of 2019 (L. Engelbrecht, 2023). The nation continues to have among the worst rates of inequality in the workplace, and the forecast for poverty in 2022, based on the poverty line of upper-middle-income countries, was 63% a mere 5% below the peak during the pandemic (L Engelbrecht, 2023). More people are requesting government help as a result of these changes, which, if granted, might jeopardise public budgets.

The global climate has been favourable, but internal limitations have caused the GDP to develop more slowly than expected (L. Engelbrecht, 2023). The World Bank (2023) reports that in 2022, GDP grew by 4.9% to 2%. Because of load shedding and traffic jams, mining output fell while industrial production stagnated. The financial, transportation, and personal services industries, as well as domestic commerce, were the main drivers of growth. The employment ratio increased just somewhat from its low point of 35.9% in September 2021 to 39.4% by the end of 2022, indicating that the labour market remained sluggish (L. Engelbrecht, 2023). The COVID-19 Social Relief Distress Grant was created in May 2020 and

extended until March 2024 in order to solve these issues. Rising food and gas prices had a disproportionately negative impact on the poor, which made the socioeconomic issues worse. In 2022, inflation was 6.9% on average, but for those in the lowest 20% of the income distribution, it was 8.2% (L. Engelbrecht, 2023).

Since democratising in the middle of the 1990s, South Africa has worked hard to raise the standard of living for its people. Nevertheless, throughout the last ten years, this progress has stalled (L Engelbrecht, 2023). Between 2005 and 2010, the share of the population living below the poverty line in an upper-middle-income nation fell from 68% to 56% (L Engelbrecht, 2023). However, after that, there has been a minor increasing trend, with the proportion rising to 57% in 2015 and predicted to reach 60% by 2020 (L Engelbrecht, 2023).

Poverty reduction has been hampered by poor economic and structural issues, which have been made worse by the COVID-19 pandemic. The deterioration in unemployment has hindered efforts to improve household welfare (L. Engelbrecht, 2023). Unemployment among South African youth is trending at approximately 66.5%, which is regarded as exceptionally high, especially for those between the ages of 15 and 24 (L. Engelbrecht, 2023).

3.1 The economic classification of South Africa

Hough and Neuland (2007) categorise countries into developed, less developed, and developing nations based on their economic growth. Developed nations have advanced economies with high incomes, stable political systems, and well-established educational systems. Less developed nations have lower incomes, high illiteracy rates, lack of investment capital, and political instability. Developing countries are transitioning from less developed to more developed, with stable political environments, continuous educational and human development advancements, effective technical infrastructure, and rapid financial industry growth. South Africa is considered a developing country.

3.2 Economic factors

The economic variables of concern (referred in this study as my variables of interest) in this study are national debt to GDP ratio, GDP growth rate, inflation rate, interest rate and tax rate.

3.2.1 National debt to GDP

National debt is an important macroeconomic issue that impacts a nation's economic stability (Ajayi and Oke, 2012). It is the total amount a government owes to domestic and foreign lenders and creditors and can take various forms, like bonds and loans. National debt is used by governments to finance fiscal objectives, fund social programmes, infrastructure development, and economic stimulation during recessions, and has the potential to boost economic growth (Rodden, Eskeland and Litvack, 2003).

Further to this, a nation's budget is directly impacted by its degree of national debt (Shalishali, 2008). Governments are required to set aside a percentage of their yearly budget for debt servicing, which includes interest payments on borrowed money. Excessive debt payment expenses may put strain on the budget and reduce funds available for other crucial government initiatives. An economy's interest rates may also be influenced by the amount of national debt (Neumeyer and Perri, 2005). The demand for loanable funds rises when governments borrow large amounts of money, which might lead to an increase in interest rates (Neumeyer and Perri, 2005). In consequence, high interest rates may have an impact on investment, consumer spending, and overall economic activity (Neumeyer and Perri, 2005).

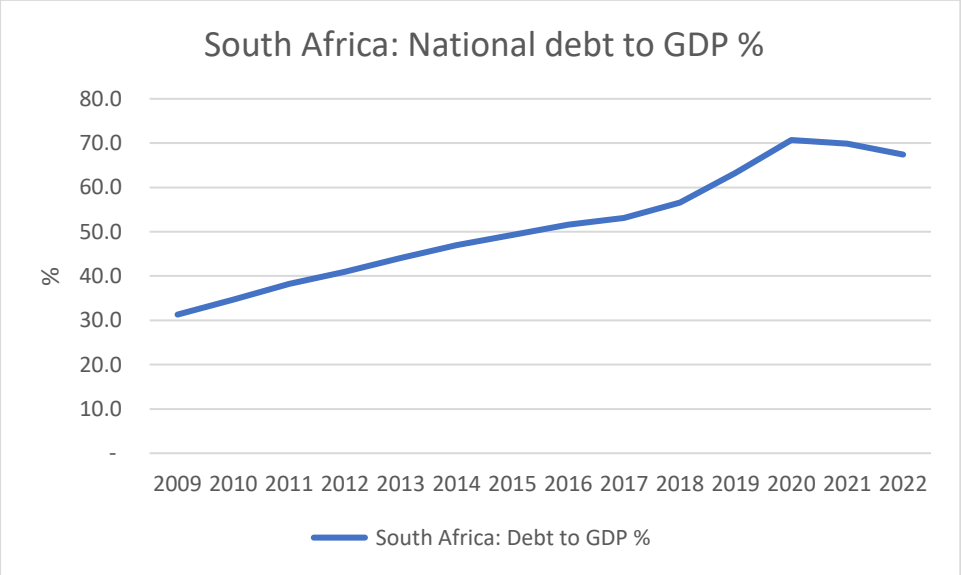
If the government prints money to pay down its debt, an excessive amount of national debt may put inflationary pressures on the economy (Ugai, 2007). According to Kapetianos et al. (2012), this technique has the potential to weaken the currency's buying power and disturb price stability. According to Kharas (1984), a nation's trustworthiness in global financial markets may be impacted by the amount of national debt it has. Overspending without prudent management may result in credit downgrades, which raise the cost of future government borrowing (Kharas, 1984). The "crowding out" effect is the result of governments competing with private borrowers for available cash when they borrow large amounts. This

rivalry may hinder private investment, which would have an impact on the expansion of the economy as a whole (Seater, 1993).

The debt to GDP ratio is a commonly used metric by economists to evaluate the amount of national debt relative to the GDP of the nation (Pegkas, 2018). A greater ratio indicates a heavier debt load compared to the size of the economy, which helps assess a nation's capacity to pay its debt. Furthermore, a number of variables, such as interest rates, fiscal restraint, and economic development, affect how sustainable the national debt is. Long-term debt accumulation that grows faster than economic growth may make debt unmanageable and can trigger financial crises (Krugman, 1999).

The national debt as a percentage of GDP is provided below:

Figure 1: National debt to GDP ratios from 2009 to 2022 (Trade Economics, 2022)



Source: Author generated and data from Trading Economics

The debt to GDP ratio in South Africa rose significantly from 31.30% to 56.60% between 2009 and 2018. The increase could be partially attributable to the impacts of the global financial crisis of 2008 as well as the mismanagement of funds by the government during the Zuma era. The increase in national debt is significantly in excess of GDP growth, which ranged between 0.3% and 3%, according to the Reserve Bank of South Africa.

In 2019, the debt to GDP ratio increased significantly from approximately 63.30% in 2019 to approximately 70.70% in 2020. This sharp increase is attributable to financial difficulties

mainly brought on by the COVID-19 pandemic. Such a sudden rise might be unsettling and could point to problems with public budget management.

From 2020 (70.70%) to 2022 (67.40%), there was a little decline in the debt to GDP ratio. Even if the decline is modest, it can be interpreted favourably if it signifies a stabilisation or a proactive attempt to deal with the mounting debt.

3.2.2 GDP growth

GDP is a crucial macroeconomic variable used to evaluate a country's economic performance over a specific time frame, typically a quarter or a year (Landefeld, Seskin, and Fraumeni, 2008). It represents the total monetary worth of all products and services produced within a nation within a specific period (Lepenies, 2016). GDP is often expressed in monetary terms like dollars or euros, providing a comprehensive overview of a country's economic state.

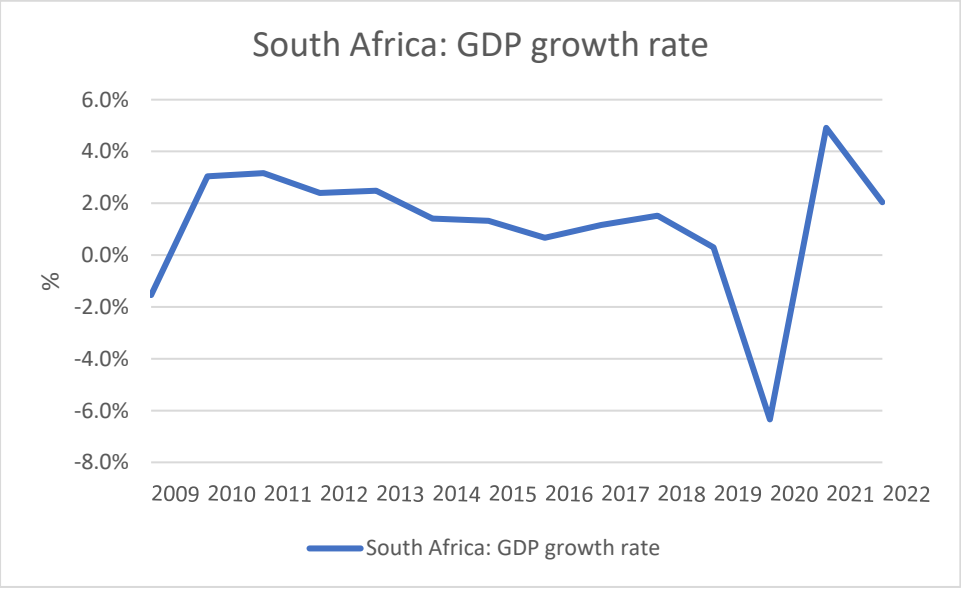
The evaluation of a nation's overall economic performance is one of the main purposes of GDP (Lepenies, 2016). While a falling GDP may signify an economic downturn or recession, a rising GDP usually denotes economic expansion and prosperity. Because of this, GDP is an essential tool for both economists and policymakers (Coyle, 2015). The four primary components of GDP are usually consumption, investment, net exports, and government expenditure (Landau, 1983). These elements aid in comprehending the origins of economic activity and their roles in generating GDP as a whole (Perotti, 2005). According to Kubiszewski *et al.* (2013), growing GDPs are often seen as indicators of expanding economies and progress. It may result in better infrastructure, more job possibilities, and greater living standards. Furthermore, GDP may be used to evaluate the general state of an economy, particularly when GDP per capita is considered (GDP divided by population) (Van den Bergh, 2009). It's important to remember, however, that a high GDP per capita doesn't always imply a fair distribution of wealth.

GDP data is used by governments and policymakers to create economic policies (Chen and Dahlman, 2005). Based on GDP performance, they may modify monetary and fiscal policies to promote economic development or combat inflation policies (Chen and Dahlman, 2005). GDP is also a useful tool for cross-national comparisons, enabling analysts to evaluate how one country's economy compares to others (Grier and Tullock, 1989).

However, GDP is not without its limits. Important variables, including the extent of the informal sector, environmental sustainability, quality of life, and economic disparity, are not considered (Giannetti *et al.*, 2015). Moreover, non-monetary transactions and the underground economy, which might be significant areas, are not taken into consideration (Van den Bergh, 2009). Economists often concentrate on the GDP growth rate—also referred to as the rate of change in GDP in order to get a more precise picture of an economy's development (Coyle, 2015). Economic expansion is shown by positive growth, while decline is indicated by negative growth. To provide a more realistic view of economic growth throughout time, economists also differentiate between nominal GDP (measured in current market values) and real GDP (adjusted for inflation) (Coyle, 2015). These differences make it possible for researchers and policymakers to see an economy's performance in more detail than just its GDP (Kubiszewski *et al.*, 2013).

The GDP growth rate graph is presented below:

Figure 2: GDP growth rate from 2009 to 2022 (Trade Economics, 2022)



Source: Author generated and data from Trading Economics

The year 2009 saw a major downturn in South Africa's economy, with a GDP growth rate of only 1.5%. The global financial crisis, which affected economies all around the globe, was the main cause of this surge. There were various economic situations in South Africa throughout the tenure of President Jacob Zuma. The first term of Zuma was generally characterised by

moderate and relatively consistent GDP growth rates from 2009 to 2013. But in the latter part of Zuma's presidency, the economy started to perform worse, with growth rates falling below 2% in 2014 and 2015. Allegations of corruption and problems with governance characterised this time, which may have increased economic uncertainty and hindered investment.

The economy grew slowly from 2016 to 2018, with the GDP growth rate being below 2% over that period. Concerns about corruption also grew during this time, especially considering the Gupta family's influence over political choices. These problems could have had a detrimental effect on the economy under Zuma's administration. The election of Cyril Ramaphosa to the president in 2018 signalled a sea change in the political and economic climate of South Africa. During his administration, attempts were made to strengthen government and fight corruption. Under his direction, GDP growth picked up a little in 2018 to 1.5%, indicating the start of a more promising economic trajectory.

But the real test came in 2020 when the COVID-19 pandemic broke out. The GDP of South Africa shrank by a notable -6.3%, reflecting the worldwide economic crisis. The administration of Ramaphosa took action to lessen the pandemic's negative consequences and promote economic recovery.

A notable recovery occurred in 2021, with a 4.9% GDP growth rate. Numerous causes, such as the economy's reopening after lockdowns linked to the pandemic, the rise in global demand for certain commodities, and fiscal stimulus measures, are responsible for this robust rebound. The Zondo Commission's creation, which demonstrates President Ramaphosa's commitment to combating corruption, could have added to investor confidence. The growth rate had dropped after the first post-pandemic boom, as shown by its mild 2022 growth rate of 2.0%. However, this positive growth rate indicates that the economy is still stable and implies that the government's initiatives to fight corruption and promote economic expansion were not entirely ineffective.

3.2.3 South Africa's inflation

An economy's shape is significantly influenced by inflation, as determined by the Consumer Price Index (CPI) (Bryan and Cecchetti, 1993). It matters for several reasons:

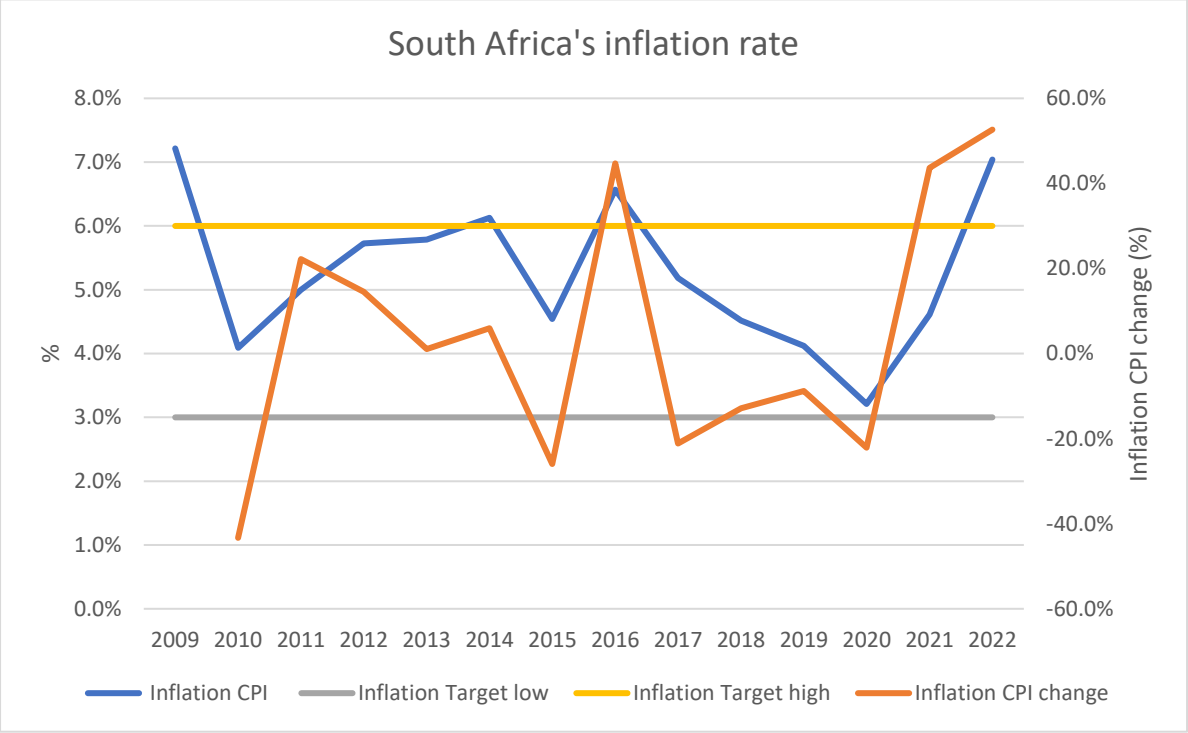
Firstly: inflation is the long-term, steady increase in the average price of goods and services in an economy. One often used measure to describe inflation is the CPI (Bryan and Cecchetti, 1993). It closely tracks changes in the costs of a regular selection of products and services that are used by a typical household, thus reflecting the average consumer's cost of living (Boskin *et al.*, 1998). The progressive loss of money's buying power is one of the main effects of inflation. The buying power of every unit of money decreases as prices rise (Friedman and Schwartz, 1986). Customers may be significantly impacted by this reduction in buying power, especially if their earnings aren't increasing at the same rate as inflation. Using the CPI and other inflation benchmarks to guide monetary policy, central banks are essential in reacting to inflation patterns (Lubik and Schorfheide, 2007). These organisations work to maintain a target inflation rate, which is often represented by lower levels in many industrialised nations and higher levels in less industrialised nations such as South Africa (Truman, 2003). They adjust interest rates appropriately, increasing them when there is high inflation to restrain price increases and slow down the economy. On the other hand, they could cut interest rates to encourage saving and investing during times of low inflation or deflationary trends (Hodge, 2006). An economy may seem insecure due to inflation, especially if it is high or erratic (Sarel, 1996). Given the uncertainty surrounding future expenses and pricing, this uncertainty may be intimidating for organisations trying to think and prepare for the future. In the end, these uncertainties may result in lower investment and exacerbate economic instability (Rodrik, 2001).

Furthermore, not every demographic group is equally impacted by inflation. Retirees and other individuals with fixed incomes may experience a decline in buying power if their income remains constant despite growing costs (Schulz, 2000). On the other hand, as their loans lose actual value over time, borrowers could profit from inflation. International commerce is not immune to the effects of inflation. A country's exports may become more expensive if its inflation rate is much greater than that of its trade partners (Black, 1986). This might reduce the demand for the country's goods and services in foreign markets. Policymakers and economists regularly monitor the CPI and other inflation indicators to assess the overall state

of the economy in light of these implications (Lubik and Schorfheide, 2007). A warning indicator of underlying economic problems such as excessive demand, supply chain breakdowns, or budgetary mismanagement may be elevated and fluctuating inflation (Lubik and Schorfheide, 2007). Remedial measures may be taken by governments and central banks to maintain economic stability and stabilise prices.

The South African inflation graph is presented below:

Figure 3: The South African inflation rate from 2009 to 2022 (Trade Economics, 2022)



Source: Author generated and data from Trading Economics

With an inflation rate of 7.2% in 2009, the SARB's goal range was exceeded. This very high inflation was probably caused by several reasons, including the global financial crisis and the budgetary measures implemented during President Zuma's first year in office. Inflation was driven up by higher import prices because of the worldwide economic slump.

The year 2010 had a 4.1% inflation rate, which was mostly caused by the economy's recovery from the recession. During this time, the government of President Zuma could have taken steps to reduce inflation. The year 2016 saw a sharp increase in inflation reaching 6.6%, mostly because of political and economic unrest under President Zuma. This surge was probably

caused by several factors, including charges of corruption, political unrest, and dissatisfaction with government policy. With an inflation rate of 4.5% in 2018, the SARB's goal range was still met. This reflected better economic mood and more stability when President Cyril Ramaphosa took office in February 2018. Enacting pro-growth measures and restoring investor confidence were the administration's goals. Inflation fell to 3.2% in 2020, which was below the SARB's goal range's bottom bound. The COVID-19 pandemic's economic effects, which decreased consumer demand and oil prices, are to blame for this. Monetary easing and stimulus programmes were put in place by the government to lessen the effects on the economy.

Inflation surged to 7.0% in 2022, over the goal range's top bound. Several variables, such as increased global commodity costs, supply chain interruptions, and financial difficulties, could have had a role. Overseeing inflation amid the continuing attempts to revive the economy would have presented challenges for the administration.

3.2.4 South Africa’s interest rate

Interest rates, controlled by central banks, significantly impact a nation's economic landscape, and serve as a crucial macroeconomic component (Blinder et al., 2008); (Rudebusch and Williams, 2008). They are used to carry out monetary policy and affect the money supply through changes in key interest rates, such as the repo rate in India or the federal funds rate in the US (Blinder et al., 2008). Lower interest rates stimulate borrowing and spending, while higher rates make borrowing more costly and lead to less investment and expenditure (Blanchard, 2019. One of the main goals of central banks is to control inflation, which is another important function of interest rates (Svensson, 1999). To do this, they set a target inflation rate, let’s say 2% each year. Central banks may raise interest rates to reduce consumer and firm expenditure and relieve inflationary pressures when inflation exceeds the objective (Friedman and Kuttner, 2010).

Interest rates have a big impact on how much it costs to borrow money for both people and firms. Higher rates raise the cost of financing, which discourages consumers from spending as much on large-ticket products like houses and vehicles and reduces borrowing for corporate projects. On the other hand, reduced interest rates encourage borrowing, which raises consumption and investment. The exchange rates of a nation may also be affected by interest

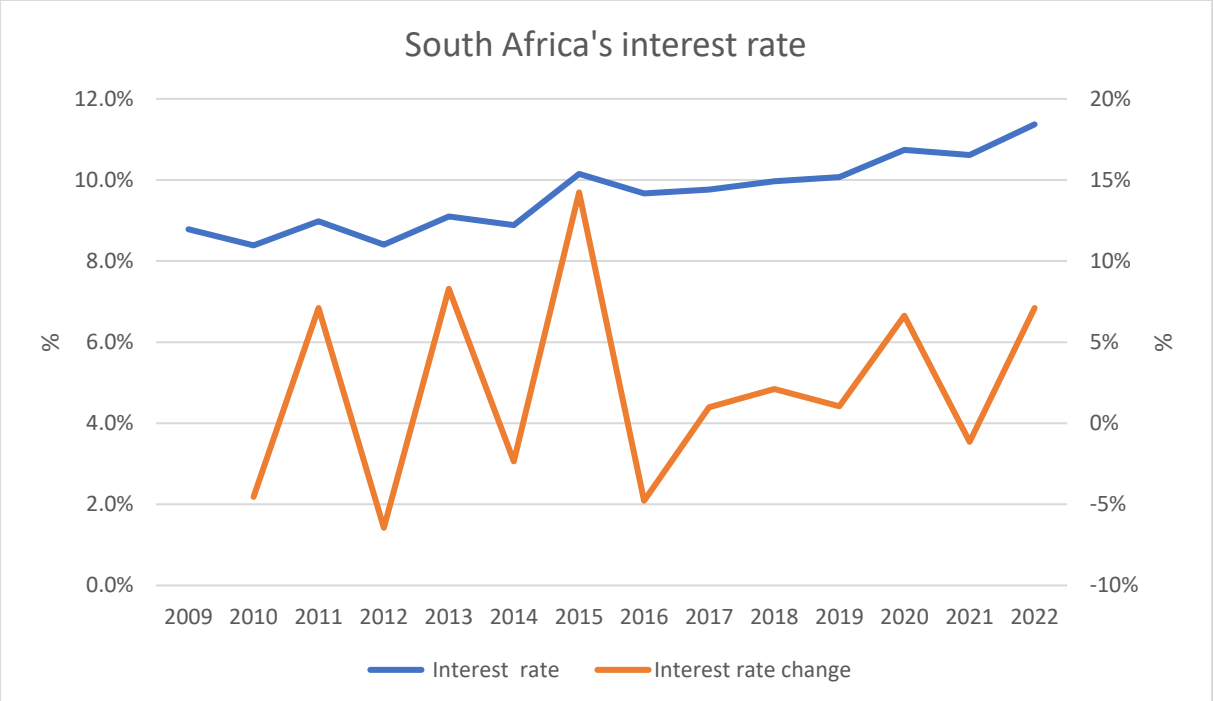
rates (Asari et al., 2011). In an effort to provide greater returns, higher rates draw in foreign money, which might boost the home currency. Lower rates, on the other hand, would deter foreign investment and undermine the currency (Obstfeld, 2009). Interest rates have an impact on people's choices about investments and saving. While low rates may stimulate spending or riskier investments, high rates may encourage saving in interest-bearing accounts or investments (Thaler, 1990).

According to Arellano (2008), interest rate fluctuations have an impact on the cost of repaying debt held by firm, governments, and households, which might put more strain on borrowers.

Prevailing interest rates serve as the foundation for business choices about employment, capital spending, and growth. While higher rates may discourage corporate investment, lower rates make borrowing more appealing for commercial reasons (Neumeyer and Perri, 2005). Interest rates have an impact on customer attitude and confidence as well (Thaler, 1990. Reduced mortgage rates, for example, may stimulate the property market and perhaps raise consumer confidence and expenditure.

The South African interest rate graph is presented below:

Figure 4: The South African interest rate from 2009 to 2022 (Trade Economics, 2022)



Source: Author generated and data from Trading Economics

The period covering Jacob Zuma's first term, from 2009 to 2013, had volatility in the interest rate. The interest rate was 8.8% in 2009 and dropped by 5% in 2010. Given that central banks often cut interest rates to promote economic development during crises, this might be a reaction to the global financial crisis. From 2010 to 2013, interest rates rose gradually, reaching 9.1%. These rises might be a sign of increasing inflationary pressures and the need to keep them under control. During the second term of Jacob Zuma, from 2014 to 2017, interest rates fluctuated between 8.4% and 9.8%, remaining quite high. These swings may have been caused by the economic unpredictability of this time, which was characterised by claims of policy instability and corruption. Interest rates increased in the years that followed, especially under Cyril Ramaphosa's administration. The rate rose to 10% in 2018, presumably because of initiatives to restore investor confidence and stabilise the economy. Even after changes in leadership, the interest rate stayed over 10% until 2021, signalling persistent economic difficulties. Interest rates rose to 10.7% in 2020 during the COVID-19 pandemic, most likely in reaction to growing borrowing requirements and economic uncertainty. Interest rates saw a little dip in 2021 (10.6%), which may have been a sign of the central bank's optimism in the nation's economic recovery. But in 2022, interest rates spiked to 11.4%, presumably because of other economic worries or inflationary pressures.

3.2.5 Tax rate

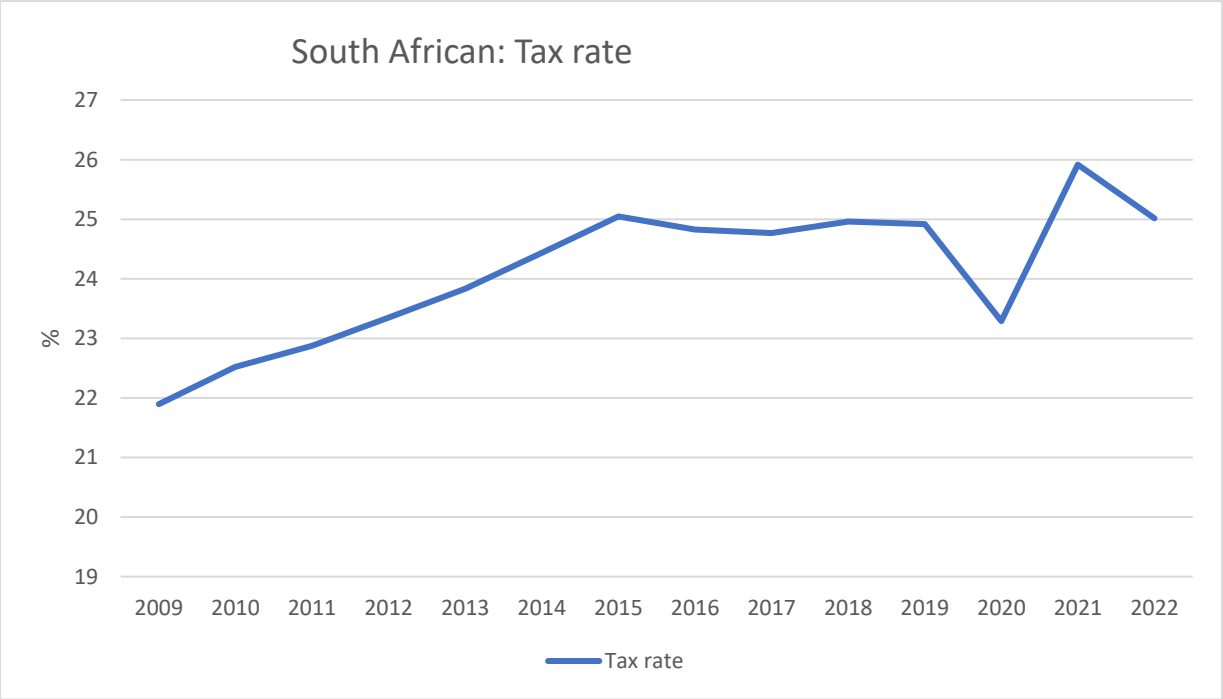
In macroeconomics, tax rates are important because they have a big influence on economic activity. The direct impact of tax rates on government income and spending is one of the main reasons they are regarded as significant macroeconomic variables. In general, higher tax rates provide more revenue for the government, which allows for larger expenditures on infrastructure, healthcare, education, and other vital services. On the other hand, although lower tax rates may encourage economic expansion, they may also lead to a decrease in government income, which may restrict the amount of money that can be allocated to public programmes (Fullerton, 1982).

A crucial element of fiscal policy, which uses taxes and expenditures by the government to affect the economy, is tax rates. Tax rates may be purposefully changed by governments to control economic cycles, boost, or decrease economic activity, and deal with problems like inflation and recession. Governments can adapt to shifting economic circumstances thanks to

the flexibility that fiscal policy offers (Easterly and Rebelo, 1993). Additionally, corporate tax rates have a significant impact on how businesses behave. They affect investment choices and the profitability of enterprises. Reduced corporation taxes may encourage businesses to increase their capital, R&D, and expansion spending, which will boost the economy and create jobs. However, greater corporation taxes can result in lower investment and earnings, which might slow down the economy (Avi-Yonah, 2014). The competitiveness of a nation is influenced by its tax rates in an increasingly globalised economy. Reduced tax rates have the ability to increase economic activity by luring in international firms and investment. Concerns have been raised, meanwhile, about international tax rivalry and the possibility of a "race to the bottom," in which nations cut their tax rates in an attempt to entice enterprises at the cost of tax income (Chirinko and Wilson, 2017).

The South African tax rate graph is presented below:

Figure 5: shows the trends in the South African tax rate from 2009 to 2022.



Source: Author generated and data from S&P Capital IQ

The blended tax rate grew gradually between 2009 and 2011, hitting 22.87% in that year. The primary cause of the surge is the 2008 global financial crisis. 2015 sees the growth continue, reaching a high of 25.05%. The balance between the government's budgetary requirements

and the overall state of the economy defined these years. The blended tax rate saw a plateau between 2016 and 2019, circling around the mid-24% level. Despite a little decline in 2017, the years that followed showed a fair amount of consistency. During this stage, authorities may be taking a cautious approach and taking the effect of taxes on economic activity into account. The year 2020 brought with it special difficulties both internationally and in South Africa. The tax rate decreased significantly to 23.29%, which was a result of attempts to manage economic uncertainty. But by 2021, the rate had increased to 25.92%, indicating a proactive reaction to the changing economic environment. The decline in 2022 points to the need for a delicate balancing act as the country works to stabilise its budgetary situation and promote economic growth. This complex approach highlights how tax policies are dynamic and respond to both local and international variables.

3.2.6 Summary

South Africa's economy has been plagued by a series of interconnected economic issues since 2009. The debt to GDP ratio increased steadily between 2009 and 2018, raising concerns about the sustainability of government debt. The COVID-19 pandemic-related economic challenges were cited as the reason for the sharp rise in the ratio in 2019–2020. Although there was no discernible decrease in the debt to GDP ratio from 2020 to 2022, the overall trend illustrates the challenges associated with managing public finances. The GDP growth rate graphs demonstrate that South Africa went through a significant decline under President Jacob Zuma's administration, with moderate growth rates in the early years giving way to a decrease due to governance problems and suspicions of corruption. Cyril Ramaphosa's ascent to power in 2018 marked a fortunate turn, leading to a slight acceleration in GDP growth. However, the COVID-19 pandemic in 2020 resulted in a significant decline that was followed by a strong rebound in 2021.

Inflation rates have been influenced by both domestic and international factors, and interest rates have changed due to the need for economic stability, inflationary pressures, and economic uncertainty. Central banks regulate interest rates, which have a profound impact on a country's economic environment, affecting currency rates, borrowing costs, inflation, money supply, investment decisions, and firm decisions. Interest rates have varied throughout South Africa's history, reaching highs in 2009, 2010, 2016, 2018, 2020, and 2022. Tax rates are also

important macroeconomic factors, as they directly affect government revenue and expenditure. Increased tax rates enable the government to spend more on infrastructure, healthcare, and education, while lower rates may promote economic growth but restrict funding for public initiatives. Corporate tax rates have an effect on investment decisions and profitability, which in turn affects corporate behaviour.

Chapter 4: Research methodology

4.1 Introduction

In the context of a constantly shifting economic environment, the complex interaction between macroeconomic circumstances and corporate capital structure choices is a topic of major relevance (Korajczyk and Levy, 2003). I aim to investigate how these variables impact capital structure choices of South African firms particularly during times of heightened economic uncertainty. My research looks at how my variables of interest and more so how the national debt to GDP ratio affect the capital structure decisions made by South African businesses. For the goals of this study, a quantitative analysis was used on the secondary data that was gathered. Using a quantitative technique, I extracted financial data from S&P Capital IQ for JSE listed firms and calculated correlations between the year-over-year changes in the D/E ratio and my variables of interest, which included the national debt to GDP, GDP growth rate, inflation rate, interest rate, and tax rates. Apart from the main aim of the research, I have incorporated entity-specific control variables, such as asset tangibility, firm size, growth opportunities, and profitability metrics (ROE and ROA), in order to establish correlations between the movements of the D/E ratio year-over-year and the corresponding control variable.

4.2 Period

The time frame covered by this study is from 2009 to 2022. This period was chosen because of the increased economic uncertainty that existed between the Zuma and Ramaphosa administrations. During this time, there was a persistent increase in the national debt, a rise in crime, a slowdown in GDP growth, an increase in the CPI, and an increase in interest rates. In addition, this time frame includes the profound effects of the COVID-19 pandemic, which almost put an end to the economy. Because of this, the timeframe that was selected provides a thorough and pertinent framework for analysing the economic difficulties and upheavals that South Africa faced throughout the designated time range.

4.3 Data sample

Bloomberg provided a list of 300 South African firms listed on the Johannesburg Stock Exchange (JSE), which was obtained to guarantee a representative capital structure examination of firms. The organisations in question span a wide variety of industries, with the exception of the banking sector, which is distinguished from other sectors by certain characteristics and financial rules. Regulatory agencies have established guidelines and specific capital requirements for banks. The inclusion of banks in the research may create complexity that are not consistent with the patterns of capital structure seen in other sectors. Following that, a comprehensive analysis of the data was carried out in order to pinpoint the organisations that were excluded from the list for the whole-time frame of 2009 to 2022. This was made possible by the use of Capital IQ. After all of this investigation, it was discovered that just 156 businesses had stayed on the list the whole time. The remaining firms' exclusion was necessary to preserve the analysis's correctness and dependability since it enables a targeted evaluation of capital structure decisions made during the uncertain economic times.

4.4 Hypothesis

Economic factors like GDP growth rate, inflation rate, tax rates, interest rate, and national debt to GDP will all have a large influence on how South African enterprises choose to build their capital structures. It is anticipated that higher GDP growth rates and lower inflation rates would have a favourable correlation with debt financing since stronger economic circumstances may make borrowing less hazardous for businesses. Higher interest rates, on the other hand, can deter businesses from using debt financing as much and instead encourage them to use more equity financing. Higher levels of government debt might make borrowing more expensive for businesses as they fight for scarce funds in the market. Because of this, businesses may choose to have a larger percentage of equity financing and lower debt ratios in order to lessen their vulnerability to future credit crunches or higher interest rates brought on by a large national debt load.

Hypothesis 1: There is a relationship between national debt to GDP, GDP growth rate, inflation rate, interest rate, tax rate and capital structure choices adopted by South African firms during period of heightened economic uncertainty.

4.5 Data processing

Financial statement data was extracted for the period 2009- 2022 using capital IQ. Throughout the time, Excel was used to clean, format, and find any gaps or missing data. Businesses that lacked sufficient data were taken out of the sample. Using EViews, correlations and regressions were utilised to show the links between my variables of interest, the control variables, and the capital structure decisions.

4.6 Dependent and Independent variable

The dependent variable for purposes of this study refers to the capital structure (D/E ratio). The independent variables refer to national debt to GDP, GDP growth rate, inflation rate, interest rates and the tax rates.

Chapter 5: Model assessment

5.1 Model assessment

I evaluated the regression model to ensure its robustness and reliability. As part of this evaluation, I ran a multicollinearity test, specifically calculating the Variance Inflation Factor (VIF) for the variables under consideration. All variables had VIF values less than 10, indicating that there were no severe multicollinearity concerns.

I run a variety of other diagnostic tests to identify potential issues with the model. A heteroskedasticity test was performed, and in response to the found heteroskedasticity, I used Heteroscedasticity-Autocorrelation Robust (HAC) adjustment to improve the accuracy of standard errors in regression analysis. This adjustment is intended to address the potential bias introduced by heteroskedasticity, resulting in more reliable coefficient estimates.

In addition, a stationarity test was performed to determine the presence of a unit root in my time series. The residuals were tested using the augmented Levin, Lin & Chu Unit Root Test test, which yielded a p-value of 0. This result provides strong evidence against the null hypothesis of the presence of a unit root, implying that the residuals are stationary. A p-value of 0 typically indicates a high level of statistical significance, supporting the conclusion that the residuals do not have a unit root, which strengthens the model's reliability.

5.2 Proposed model

The proposed model formular (OLS) is as follows:

Model (1)

$Debt/Equity_{it} = \beta_0 + B_1 National\ debt\ to\ GDP_{it} + \beta_2 GDP\ growth_{it} + \beta_3 Inflation\ rate_{it} + \beta_5 Interest\ rate_{it} + \beta_6 Tax\ rate_{it} + \beta_7 Asset\ tangibility_{it} + \beta_8 Firm\ size_{it} + \beta_9 Growth\ opportunities_{it} + \beta_{10} ROA_{it} + \beta_{11} ROE_{it} + \varepsilon_{t:}$ where :

β = Coefficient

β_0 = Constant/intercept

i = ith term (Firm name)

t = time component

ε = error term

Due to the endogeneity problem, the estimates from pooled OLS (ordinary lease square), FEM (fixed effect model), and REM (random effect model) are biased and inconsistent. To address this issue, we will eliminate endogeneity by employing Arellano-Bond's two-step GMM estimation (Arellano & Bond, 1991) using appropriate instrumental variables. As a result, Model (1) will be modified in detail as follows Model (2). The results of model 1 and model 2 will both be presented and compared to reduce the element of biasness from the OLS model.

Model (2)

Model (2) has less instrument (my variables of interest only). In the SGMM model having too many instruments can lead to overfitting and biased estimates (Roodman, 2009). I have thus place emphasis on my variables of interest.

$Debt/Equity_{it}$ = $Debt/Equity_{it-2}$ + B_1National debt to GDP_{it-1} + β_2GDP $growth_{it-1}$ + β_3Inflation $rate_{it-1}$ + β_5Interest $rate_{it-1}$ + β_6Tax $rate_{it-1}$ +β_0 where :

β = Coefficient

β_0 = Constant/intercept

i = ith term (Firm name)

t = time component

ε = error term

5.3 Autocorrelation assessment

Forte et al. (2013) finds that endogeneity arises when examining the relationship between the proxies for the determinants of capital structure and the debt ratio. Additionally, the study by Campello and Giambona (2011) addresses the potential endogeneity between debt and tangibility. To mitigate this endogeneity in the model, they employed the Arellano-Bond two-step SGMM estimation with robust standard errors, as outlined by Arellano and Bond (1991) and Blundell and Bond (1998). This approach is advantageous because it effectively identifies

strong instrumental variables to address the endogeneity issue. The Arellano-Bond estimation utilises lags of the dependent variable (debt to equity; t-1) as instrumental variables.

In all GMM specifications, the number of instruments is consistently kept below the number of groups (Roodman, 2009). Furthermore, the Arellano-Bond tests for first-order (AR(1)) and second-order (AR(2)) autocorrelations of the residuals indicate that the endogeneity problem is resolved at the AR(2) level. The Wald (joint) test chi-square statistics (Bekana, 2021) confirm that the overall SGMM model is a good fit.

5.3.1 Serial correlation test

Arellano-Bond Serial Correlation Test
Equation: AUTOCORRELATIONFIXED
Date: 10/12/24 Time: 14:45
Sample: 2009 2022
Included observations: 1872

Test order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	-32.714931	-18.826280	0.575464	0.0000
AR(2)	9.315813	9.259742	0.993981	0.0000

Source: EViews generated

The negative m-statistic and rho values indicate a significant first-order autocorrelation AR(1). The probability of 0.00 suggests that the null hypothesis (which typically states that there is no autocorrelation) can be rejected. This means there is strong evidence of first-order autocorrelation in the residuals.

For the second-order test AR(2), the positive m-statistic and rho values indicate significant second-order autocorrelation. Again, the probability of 0.00 means we can reject the null hypothesis of no autocorrelation at this level.

The results show that there is significant first-order autocorrelation AR(1), but the AR(2) results indicate that the endogeneity problem has been addressed. Typically, significant AR(1) with non-significant AR(2) suggests that the model is appropriately specified and the instruments used are effective in mitigating autocorrelation issues.

5.3.2 Multicollinearity assessment

Variance Inflation Factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0,034256	1515,765	NA
Variable of interest			
NATIONAL_DEBT_TO_GDP	1,42E-06	174,4933	9,755392
GDP_GROWTH_RATE	0,078637	2,728648	2,248406
INFLATION_RATE	2,73E-05	35,10281	1,605690
INTEREST___RATE	0,000220	912,6440	7,518933
TAX_RATE	7,22E-05	1862,383	4,032094
Control Variable			
ASSET_TANGIBILITY	0,000335	2,350952	1,009781
FIRM_SIZE	2,31E-14	1,335807	1,036373
GROWTH_OPPORTUNITIE	7,50E-07	1,004222	1,001379
ROA	0,004899	2,148203	1,487858
ROE	0,000317	1,679670	1,489147

Source: EViews generated

The assessment of multicollinearity within the regression model is critical for understanding the relationships between variables and ensuring the accuracy of the estimated coefficients. This analysis focuses on the centred Variance Inflation Factor (VIF) values, which are a key metric for determining the degree of multicollinearity. A centred VIF value less than 10 is generally thought to indicate the absence of severe multicollinearity, whereas values greater than 10 suggest the presence of severe multicollinearity.

The centred VIF for my variables of interest ranged from (1,605690) to (9,755392), all of which were less than the threshold of 10, indicating a lower risk of severe multicollinearity. I note that the centred VIF for national debt to GDP was (9,755392), which is close to the threshold of 10. Various factors may be driving the high centred VIF, but the value is less than 10, implying that there is no serve multicollinearity. The centred VIF values for my control variables ranged from (1.001379) to (1.489147), indicating no severe multicollinearity.

5.3.3 Heteroskedasticity assessment

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	2.875814	Prob. F(10,2138)	0.0014
Obs*R-squared	28.52245	Prob. Chi-Square(10)	0.0015
Scaled explained SS	294.3887	Prob. Chi-Square(10)	0.0000

Source: EViews generated

The results of the heteroskedasticity test, which was performed using the Breusch-Pagan-Godfrey model, confirm the presence of heteroskedasticity in the analysed model. This finding is consistent with the expected outcome, given the deliberate use of a multi-regression model rather than a fixed effect model. The chosen model is based on the framework proposed by Pierre Erasmus, and no changes were made to the model for comparative analysis.

5.3.4 The LLC Unit Root

Null Hypothesis: Unit root (common unit root process)
Series: D(D_E_RATIO)
Date: 10/12/24 Time: 15:13
Sample: 2009 2022
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Total (balanced) observations: 1716
Cross-sections included: 156

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-18.9843	0.0000

** Probabilities are computed assuming asympotic normality

Source: EViews generated

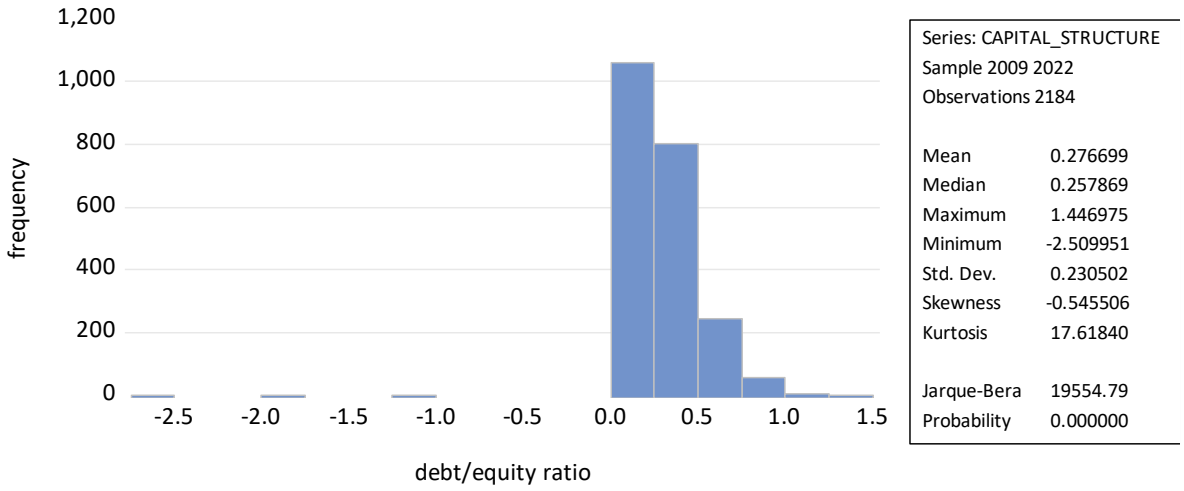
The LLC Unit Root test was used to determine the stationarity of the residuals in our regression model. The test looks for a unit root in a time series, which, if present, indicates a lack of stationarity. The results of this analysis produced a p-value of zero, indicating strong evidence against the null hypothesis of a unit root. Rejecting the null hypothesis means that the residuals are stationary, indicating a consistent and stable pattern over time. This outcome is especially significant because non-stationary residuals can undermine the validity of regression analyses. As a result, the LLC test results add to the reliability of our model by confirming the absence of a unit root in the residual.

Chapter 6: Empirical results

6.1 Descriptive statistics analysis

In summary statistics, descriptive statistics are those that quantitatively describe characteristics from a data set. The objective of descriptive statistics is to summarise a sample rather than to learn about the population that the sample represents. Measures of central tendency, such as the mean, median, and mode, as well as measures of variability, such as the standard deviation, minimum and maximum values of variables, kurtosis, and skewness, are utilised frequently. The data and its characteristics can be better understood with the assistance of these measures. Throughout the course of my research, I made use of descriptive statistics in order to gain an understanding of the inherent qualities of my data. The descriptive statistics of my dataset are presented in the table that can be found below.

Figure 6: Histogram on Capital Structure & Descriptive statistics



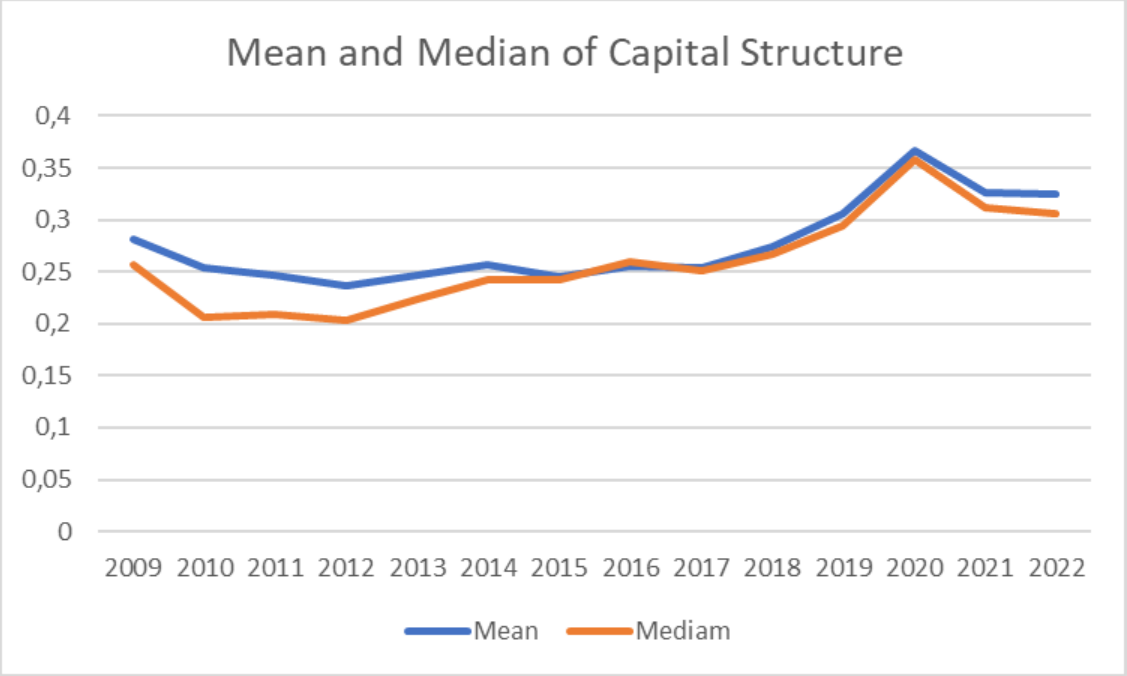
Source: Author generated histogram from EViews

The mean and median for my sampled data is (0.276699) and (0.257869) respectively. Both are below 1 demonstrating that the typical firm's capital structure (debt/equity ratio) based on my sample has a higher proportion of equity than debt. The proximity of the mean and median suggest that the data distribution is approximately symmetrical.

The capital structure ranged from a minimum of – (2.509951) to a maximum of (1.446975). This ratio should ideally never be a negative as this may indicate an abnormality. On the other hand, instances of a negative capital structure ratio could be as a result of share buybacks which relates to a firm repurchasing its own share thereby reducing its equity. Another result of negative equity occurs when a firm's accumulated losses coupled with a share buyback exceed its assets.

Negative equity generally signals financial distress or poor financial performance. However, negative equity due to a share buyback may be interpreted as a strategic initiative to enhance shareholder value through capital structure optimisation. This condition is of a temporary nature and may serve as a signal about management's confidence in the financial affairs of the firm. In my sample, the negative equity pertains to Tongaat Hullett Limited (Ton) from 2018 to 2022 as a result of the financial distress the business faced.

Figure 7: Mean and Median graph of Capital Structure



Source: Author generated data from EViews

Figure 7 demonstrates that over the period of this study (2009 – 2022) the mean and median capital structure ratio consistently remained below 1. The capital structure ratio for both the

mean and median decreases between 2009 and 2010 understandable due to the impact of the global financial crisis of 2008. The mean and median capital structure ratio as per the graph above (figure 7) appears to have minor fluctuations around (0.25) for about 3 years between 2014 and 2017. This could largely be due to firms stabilising post the global financial crisis. There is a noticeable increase from 2018, the increase is steeper from 2019 to 2020. During that period, the government introduced payment holidays and various Covid-19 relieve measures which could have impacted the increase in gearing. A decreasing trend is observed from 2020 into 2021 largely driven by the impact of Covid-19. The years surrounding the global financial crisis and the Covid-19 pandemic have parallels in their capital structure trends, since both saw a decline in the mean and median capital structure. This implies that during times of economic hardship, South African businesses are more cautious when it comes to loan borrowing.

The graph also shows that the debt-to-equity ratio's median values closely follow the mean's behaviour. According to this alignment, the mean and median have a tendency to congregate around a central value or point. The mean and median usually show comparable directional changes in unimodal distributions (mean and median follow same pattern) with a single notable peak in the data.

A single, distinct peak or mode within the data, signifying a particular value or range that occurs most often, is what distinguishes unimodal distributions. The frequency or density of data values steadily drops as you proceed in either direction away from this mode.

6.2 The independent variables

The descriptive statistics (mean, median, standard deviation, minimum value, maximum value, skewness, and kurtosis) for the independent variables are indicated in below table 2.1.

Table 2.1

	Variables of interest					Control variables				
	NATIONAL DEBT TO GDP	GDP GROWTH RATE	INFLATION RATE	INTEREST RATE	TAX RATE	ASSET TANGIBILITY	FIRM SIZE	GROWTH OPPORTUNITIES	ROA	ROE
Mean	51,26091	0,011748	5,261373	9,633244	24,11498	0,300896	17108,11	0,292766	0,055191	0,116494
Median	49,30000	0,014138	5,260000	9,667600	24,43193	0,235240	5085,979	0,067661	0,049552	0,122483
Maximum	70,70000	0,049131	7,200000	11,37180	25,91578	0,990457	272746,0	245,7861	0,678686	2,750848
Minimum	31,30000	-0,063425	3,060000	8,387143	21,89487	0,000000	-17883,82	-4,074425	-1,110279	-6,235940
Std. Dev.	12,47708	0,025426	1,152198	0,878208	1,123542	0,261150	31835,44	5,495195	0,082864	0,325762
Skewness	0,128424	-1,636783	-0,253264	0,263346	-0,448801	0,766602	3,402856	41,96544	-2,464564	-7,224190
Kurtosis	1,854151	5,960989	2,240560	2,080063	2,117494	2,543497	16,75356	1858,856	43,95680	130,8046
Jarque-Bera	123,4726	1744,602	74,61687	100,6169	141,8793	229,1471	21085,09	3,09E+08	152378,0	1481267,
Probability	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000
Sum	110159,7	25,24671	11306,69	20701,84	51823,08	646,6259	36765337	629,1540	118,6052	250,3462
Sum Sq. Dev.	334395,3	1,388632	2851,601	1656,644	2711,521	146,4916	2,18E+12	64863,52	14,74896	227,9479
Observations	2149	2149	2149	2149	2149	2149	2149	2149	2149	2149

As an illustration, the ratio of the national debt to the gross domestic product (GDP) can vary anywhere from 31.30 percent to 71.7 percent, as demonstrated in Table 2.1. The fluctuations in the ratio are a sign that the nation's approach to managing its debt has been altered, as indicated by the fluctuations. On the other hand, this change is cause for concern because it does not correspond with an increase in GDP growth that is proportional to it. The fact that the minimum growth rate is – (6.3%) and the maximum growth rate is – (4.9%) is evidence of this. It is possible that South Africa is having trouble generating sufficient revenue to pay off its debt, which could potentially put the country in a difficult financial position. The existence of this disparity raises the possibility that this is the case.

As a result of the fact that the Consumer Price Index (CPI) varied between 3.06 percent and 7.20 percent over the course of the time period that was being investigated, it can be concluded that the rate of inflation was not consistent. From 2009 to 2022, this range of inflation demonstrates a significant increase in overall price levels, sometimes exceeding South Africa's current inflation goal of 3% to 6%. This range of inflation falls within the range of 3% to 6%. Over the course of the research period, interest rates went from a low of approximately 8.4% to a high of 11.4%. This finding is supported by the rise in interest rates, which went from a low of approximately 8.4% to a high of 11.4%. In an effort to rein in spending and maintain the value of money, the South African Reserve Bank (SARB) is currently adjusting interest rates. This is being done to maintain the value of money. The fluctuation of the tax rate, which ranged from a low of (21.8%) to a high of (25.9%), reflected the volatility of changes in fiscal policy and the potential influence on government income throughout the period of time that was specified. Between the low and high points, the tax rate ranged from (21.8%) to (25.9%).

Based on the findings of the study, it was determined that there was a relatively small amount of variation between the mean and the median, except for the national debt to GDP calculation. Additionally, metrics and independent variables that were associated with profitability were investigated in this examination. This is something that has transpired because of changes in economic conditions, policies, and external factors. Most of the independent variables, including the dependent variable, exhibited a closer alignment between their average and median figures, which can be interpreted as an indication of consistency in their functioning. This is the case for most of the variables. There was a

significant increase in the growth opportunity component, which showed a significant increase from a minimum of (-4.074425) to a maximum of (245.7861). This indication indicated that there were increased opportunities for business growth. The growth opportunity component demonstrated a significant increase, and the asset tangibility ranged from 0 to 0.990457 from the beginning to the end. The profitability ratios exhibited a considerable amount of variation, with ROA ranging from -1.110279 to (0.678686) and ROE ranging from -6.235940 to (2.750848). Both of these ratios were observed to have a significant amount of variation. This suggests that there were significant variations as a consequence of the various levels of profitability that were present among the businesses that were subjected to the sampling process.

During the analysis, the presence of negative skewness and high positive kurtosis values demonstrated that the profitability ratios, ROA and ROE, exhibited a platykurtic distribution. This was demonstrated by the fact that the platykurtic distribution was observed. On the other hand, the growth rate of GDP, the inflation rate, and the tax rate all displayed negative skewness and positive kurtosis, which is one of the characteristics that is indicative of a distribution that is negatively skewed. Leptokurtic distribution was demonstrated by the presence of positive skewness and positive kurtosis in the interest rate, national debt to GDP ratio, and GDP growth rate, all of which showed positive values. This was an indication that the distribution was indeed leptokurtic. Additionally, positive skewness and kurtosis values were found for the tangibility of assets, the size of the company, and the opportunities for growth. These values were observed. It would appear, on the basis of the findings, that profitability metrics and macroeconomic variables deviate from the normal distribution, which is indicative of behaviour that is not consistent with the standard distribution. Although the median-mean rule is a useful guideline for determining skewness and symmetry, the variables in this study frequently deviated from it. This is despite the fact that the rule is a helpful guideline.

Panel data were utilised for the purpose of calculating specific firm ratios; however, economic data cannot be classified as panel data due to the fact that it is generated through an annual examination of specific variables being considered. Economic indicators were computed on a monthly basis and then averaged over a period of twelve months in order to take into account

the effects of temporal fluctuations. This was done in order to ensure that their effects were taken into account.

6.3 Correlation Analysis

The strength and direction of a relationship between two or more variables can be measured through the use of a statistical method known as correlation analysis or correlation analysis. Correlations can be broken down into two primary categories: Pearson and Spearman. Spearman correlation is used for categorical data and requires minimal to no assumptions, whereas Pearson correlation is used for continuous data and requires robust assumptions. Both types of correlations are examples of statistical analysis. In order to investigate a wide range of different kinds of relationships, Spearman's correlation is a versatile tool. For the purpose of this investigation, Spearman's correlation was utilised because the available economic and financial data only covered a span of fourteen years, which may not have been sufficient to satisfy the requirements of Pearson correlation. Due to the fact that economic data frequently contains outliers, Spearman's correlation lends itself more effectively to the management of these outliers. The analysis was carried out with median capital structure values, and a two-tailed correlation test was chosen as the method of investigation.

Table 2.2

Correlation analysis between the dependent variable, variable of interest and control variables.

	DEBT TO EQUITY		NATIONAL DEBT TO GDP	GDP GROWTH RATE	INFLATION RATE	INTEREST RATE	TAX RATE	ASSET TANGIBILITY	FIRM SIZE	GROWTH OPPORTUNITIES	ROA	ROE
Dependent variable												
DEBT TO EQUITY	1,000000		0,129677	-0,084993	-0,032299	0,123388	0,026563	0,151920	0,140585	-0,035133	-0,106108	-0,141874
Variable of interest												
NATIONAL DEBT TO GDP	0,129677	*	1,000000	-0,223182	-0,146408	0,908159	0,717519	0,022609	0,132975	-0,000254	-0,124159	-0,150991
GDP GROWTH RATE	-0,084993	*	-0,223182	1,000000	0,417054	-0,228652	0,308324	-0,019386	-0,009557	0,009164	0,071604	0,111155
INFLATION RATE	-0,032299		-0,146408	0,417054	1,000000	0,040452	0,146786	-0,016754	0,004187	-0,006211	0,054963	0,066435
INTEREST RATE	0,123388	*	0,908159	-0,228652	0,040452	1,000000	0,662222	0,018315	0,123357	-0,000787	-0,117451	-0,135807
TAX RATE	0,026563		0,717519	0,308324	0,146786	0,662222	1,000000	-0,003975	0,108553	0,015117	-0,072346	-0,053596
Control variables												
ASSET TANGIBILITY	0,151920	*	0,022609	-0,019386	-0,016754	0,018315	-0,003975	1,000000	0,031234	-0,003924	0,063051	-0,015967
FIRM SIZE	0,140585	*	0,132975	-0,009557	0,004187	0,123357	0,108553	0,031234	1,000000	-0,003946	0,107472	0,073029
GROWTH OPPORTUNITIES	-0,035133		-0,000254	0,009164	-0,006211	-0,000787	0,015117	-0,003924	-0,003946	1,000000	-0,024535	-0,014337
ROA	-0,106108	*	-0,124159	0,071604	0,054963	-0,117451	-0,072346	0,063051	0,107472	-0,024535	1,000000	0,560639
ROE	-0,141874	*	-0,150991	0,111155	0,066435	-0,135807	-0,053596	-0,015967	0,073029	-0,014337	0,560639	1,000000

* Significance level at 1%
** Significance level at 5%
*** Significance level at 10%

The link between my variables of interest, the control variable, and the capital structure ratio is shown using the correlation analysis in Table 2.2. The degree and direction of these associations are typically shown by the correlation coefficient (Rs).

Capital structure and national debt to GDP: The capital structure of a firm and the national debt levels of a nation seem to be strongly positively correlated, as shown by a highly significant probability value (Rs = 0.129677, p-value = 0.0000).

Capital structure and GDP growth rate: There is a strong negative association between a firm's capital structure and the GDP growth rate which is shown by a highly significant probability value (Rs = -0.084993, p-value = 0.0001).

Capital structure and interest rate: The capital structure of a firm and interest rates are highly correlated as shown by the significant p value (Rs = 0.123388, p-value = 0.0000). This suggesting that businesses may modify their debt funding in reaction to changes in borrowing costs.

The relationship between capital structure, inflation rate, and tax rate is weak, suggesting that these macroeconomic variables had very little to almost no impact on the capital structure choices of South African firms.

Capital structure showed a strong positive correlation with asset tangibility and firm size, but a negative strong relationship is observed for ROA (return on assets) and ROE (return on equity). Growth opportunities have a weak negative correlation with capital structure, indicating that they have little effect on a firm's capital structure choices.

The correlation analysis revealed positive and negative relationships, some of which had statistical significance. However, the presence of correlation does not necessarily indicate causation. The transition from correlation to causation is complex and requires a more nuanced examination, which is informed by regression analysis, as discussed in the subsequent discussion.

6.4 Regression analysis

Regression analysis is a statistical method used to analyse the relationship between independent variables and dependent variables. It quantifies the strength and direction of these relationships, determining whether an increase in one variable is linked to an increase or decrease in another. There are two common types of regression analysis: simple linear regression, which examines the relationship between one independent variable and one dependent variable, and multiple linear regression, which extends this to multiple independent variables.

This research paper uses a multiple regression model to examine the relationship between capital structure, my variables of interest and control variables. Lags are incorporated to account for delayed effects of independent variables on the dependent variable. In economic modelling, changes in interest rates or government policies may take time to impact variables like GDP or inflation. Lagged values of these variables can account for these delayed effects. The study uses time-series cross-sectional regression (TSCSREG), which uses panel data collected over multiple time periods to represent the evolution of variables over time. Cross-sectional data represents different cross-sectional units observed at each time point, such as individuals, firms, or regions. This approach helps account for delayed effects in economic modelling.

Multiple Regression Equation (Non-Lagged)

Model 1

$\text{Debt/Equity}_{it} = \beta_0 + B_1\text{National debt to GDP}_{it} + \beta_2\text{GDP growth}_{it} + \beta_3\text{Inflation rate}_{it} + \beta_5\text{Interest rate}_{it} + \beta_6\text{Tax rate}_{it} + \beta_7\text{Asset tangibility}_{it} + \beta_8\text{Firm size}_{it} + \beta_9\text{Growth opportunities}_{it} + \beta_{10}\text{ROA}_{it} + \beta_{11}\text{ROE}_{it} + \varepsilon_{t:}$ where :

β = Coefficient

β_0 = Constant/intercept

i = ith term (Firm name)

t = time component

ε = error term

Model 2

$Debt/Equity_{it}$ = $Debt/Equity_{it-2}$ + B_1National debt to GDP_{it-1} + β_2GDP $growth_{it-1}$ + β_3Inflation $rate_{it-1}$ + β_5Interest $rate_{it-1}$ + β_6Tax $rate_{it-1}$ +β_0 where :

β = Coefficient

β_0 = Constant/intercept

i = ith term (Firm name)

t = time component

ε = error term

Table 2.3

Regression analysis (excluding lag)

	OLS model (model 1)					GMM model (model 2)				
Variable	Coefficient		Std. Error	t-Statistic	Prob.	Coefficient		Std. Error	t-Statistic	Prob.
C (intercept)	0.720072		0.185083	3.890533	0.0001	0.365953		0.187717	1.949491	0.0514
Variable of interest										
NATIONAL_DEBT_TO_GDP	0.003241	*	0.001190	2.722854	0.0065	0.003123	*	0.000884	3.533075	0.0005
GDP_GROWTH_RATE	0.155220		0.280423	0.553521	0.5800	0.081460		0.190158	0.428381	0.6690
INFLATION_RATE	0.003699		0.005229	0.707356	0.4794	0.008670	**	0.002927	2.961966	0.0350
INTEREST__RATE	0.006213		0.014847	0.418471	0.6756	0.005558		0.005245	1.059671	0.2910
TAX_RATE	-0.030142	*	0.008498	-3.546826	0.0004	-0.016350	**	0.006850	-2.386787	0.0182
Control Variable										
ASSET_TANGIBILITY	0.128169	*	0.018297	7.004976	0.0000	2.313624	*	0.270209	8.562342	0.0000
FIRM_SIZE	1.01E-06	*	1.52E-07	6.625896	0.0000	-0.000003	**	1.29E-06	-2.48E+00	0.0142
GROWTH_OPPORTUNITIES	-0.001452	***	0.000866	-1.676707	0.0937	0.020965	*	0.005482	3.822602	0.0002
ROA	-0.184761	*	0.069995	-2.639616	0.0084	0.719541	*	0.183123	3.929273	0.0001
ROE	-0.066327	*	0.017812	-3.723681	0.0002	-0.026841	**	0.010484	-2.560118	0.0114
R-squared	0.083217									
F-statistic	19.40684									

* Significance level at 1%
** Significance level at 5%
*** Significance level at 10%

Analyzing my variables of interest

* According to Table 2.3 above, capital structure, national debt to GDP, inflation rate and tax rate are important determinants of capital structure with national debt to GDP significant at the 1% significance level. Contrary to prior expectations, the coefficient is positive, suggesting that as national debt to GDP increases, firms do not necessarily gear down.

The trade-off theory best explains the results and is supported by Bokpin, 2009; Joeveer, 2013; Temimi et al., 2016; Memon et al., 2015; Rehman, 2016; and Huong, 2017). The theory suggests a positive relationship between GDP and debt funding, as companies tend to be more profitable during economic upturn and less profitable during economic downturn,

leading to higher debt levels during economic upturn and lower debt levels during economic downturn.

Capital structure and inflation rate according to the GMM model is statistically significant at the 5% significance level. The result of my study is supported by Gajurel (2006) who found that inflation often causes short-term interest rates to rise faster than long-term rates, prompting firms to favor long-term debt to avoid higher costs. This positive association between inflation and debt funding is also supported by studies from (Muthama et al., 2013; Memon et al., 2015; Nejad and Wasiuzzaman, 2015; Pepur et al., 2016; Huong, 2017).

Contrary to the findings of (Bokpin, 2009; Muthama et al., 2013; Memon et al., 2015; Ying et al., 2016) that established a negative relationship between inflation and capital structure. There studies were premised on revenue and costs being affected by inflation volatility which effectively leads companies to avoid taking on more debt.

The results for the tax rate are best explained by the trade-off theory (Modigliani and Miller,1963). The results are also supported by previous studies by (Barakat & Rao, 2003; Barclay et al., 2013; Faccio & Xu, 2015; Heider & Ljungqvist, 2015).

Below on table 2.4 we will look at the multiple regression model with lagged variables. In time series data, it's often important to account for the fact that the current value of a variable may be influenced by its past values. For example, in economics, many variables exhibit temporal dependencies where the current value depends on what happened in previous time periods. Lagged variables can help establish causal relationships in regression models. By including lagged independent variables as predictors, you can assess whether past values of a variable have a causal impact on the current value of the dependent variable.

Multiple Regression Equation (Lagged)

$$\text{Debt/Equity}_{it} = \beta_0 + B_1\text{National debt to GDP}_{it-1} + \beta_2\text{GDP growth}_{it-1} + \beta_3\text{Inflation rate}_{it-1} + \beta_5\text{Interest rate}_{it-1} + \beta_6\text{Tax rate}_{it-1} + \beta_7\text{Asset tangibility}_{it-1} + \beta_8\text{Firmsize}_{it-1} + \beta_9\text{Growth opportunities}_{it-1} + \beta_{10}\text{ROA}_{it-1} + \beta_{11}\text{ROE}_{it-1} + \varepsilon_{t-1}$$

β = Coefficient

β_0 = Constant/intercept

i = ith term (Firm name)

t = time component

ε = error term

Table 2.4

Regression Analysis on lagged variables.

Variable	Coefficient		Std. Error	t-Statistic	Prob.
C (intercept)	0,365953		0.187717	1.949491	0,0514
Variable of interest					
NATIONAL_DEBT_TO_GDP(-1)	0,002623	**	0.001207	2.172418	0,0299
GDP_GROWTH_RATE(-1)	0,143220		0.284469	0.503464	0,6147
INFLATION_RATE(-1)	-0,009030	***	0.005305	-1.702063	0,0889
INTEREST__RATE(-1)	-0,007354		0.015064	-0.488186	0,6255
TAX_RATE(-1)	-0,005833		0.008622	-0.676503	0,4988
Control Variable					
ASSET_TANGIBILITY(-1)	0,105148	*	0.018559	5.665670	0,0000
FIRM_SIZE(-1)	9,40E-07	*	1.54E-07	6.092495	0,0000
GROWTH_OPPORTUNITIES(-1)	-0,001412		0.000878	-1.607553	0,1081
ROA(-1)	-0,168685	**	0.070996	-2.375990	0,0176
ROE(-1)	-0,028961		0.018066	-1.603095	0,1091
R-squared	0,058086				
F-statistic	13,17854				

* Significance level at 1%

** Significance level at 5%

*** Significance level at 10%

The R-squared value in the new model has decreased from (0.083217) to (0.058086), indicating that approximately 5.8% of the variability in the dependent variable is explained by the lagged independent variable(s) included in the model. This indicates a relatively low explanatory power, suggesting that other factors or sources of variability may be influencing the dependent variable that are not captured by the lagged independent variable(s).

The lagged national debt to GDP ratio had a positive coefficient and a statistically significant p-value, indicating that changes in national debt to GDP in the past had a significant influence on the current level of capital structure. However, the lagged GDP growth rate did not have a significant impact on capital structure, suggesting that capital structure is less responsive to past GDP growth rates.

The lagged inflation rate had a negative coefficient, but its p-value was marginally insignificant. This implies a negative impact on capital structure in the previous period, but further investigation is needed to determine the relationship between inflation rate and capital structure.

The lagged interest rate did not significantly affect the current capital structure, suggesting a complex relationship between interest rates and capital structure over time.

Among the control variables, lagged asset tangibility and firm size had positive coefficients and highly significant p-values, indicating that changes in asset tangibility and firm size in the past significantly influenced the current level of capital structure.

The lagged growth opportunities had a weak negative impact on capital structure, but the lack of statistical significance calls for further investigation into the relationship between growth opportunities and capital structure.

The lagged return on assets (ROA) and return on equity (ROE) had negative coefficients, with the former being statistically significant. This suggests that changes in past financial performance, primarily ROA, had a significant impact on the current level of capital structure, indicating a negative association between past financial performance and current debt structure.

6.5 Comparison of results to Pierre Erasmus study

Pierre discovered that none of the macroeconomic variables he examined, namely inflation, GDP, exchange rate, FDI/GDP, and tax rate, had a statistically significant impact on the capital structure decisions of South African firms. This study incorporated the national debt into the calculation of the Gross Domestic Product (GDP), and the results showed a statistically significant relationship at a significance level of 1%. The tax rate has achieved statistical significance. This study discovered that all control variables exhibit statistical significance, with the exception of growth opportunities, which demonstrate a significance level of 10% according to the OLS method and 1% according to the GMM method. Pierre Erasmus' study found that only the size of the firm had a statistically significant impact, with a significance level of 1%. The inflation rate is found to be statistically significant at a 5% level using the GMM method. Based on the comparison, it is evident that the relationship between national debt

to GDP and capital structure exists. Therefore, it is recommended to include national debt to GDP as a macroeconomic variable in future research.

These changes and new variables highlight the shifting landscape of economic factors that influence financial decisions in South Africa. Firms appear to be adapting their strategies in response to changes in economic policies, regulations, and overall economic trends. Understanding these changes is critical for firms navigating today's economic landscape and adapting their financial structures to changing economic conditions.

6.6.5 Summary

The primary goal of this research project was to look into the impact of national debt to GDP and selected macroeconomic variables on South African firms' capital structure choices during periods of increased economic uncertainty (2009–2022).

The secondary objectives were to first establish the nature of the relationship between the variables, the extent to which national debt affects the capital structure of the firms included in the study, and second, to determine the capital structure model used by South African listed firms.

The primary financial goal of any firm should be to increase the wealth of its shareholders. This includes optimising the firm's stock price. Numerous factors can influence a firm's share price, and managers can take a variety of actions to maximise it. These include investment and financial decisions. Investment decisions are focused on building valuable investment portfolios. Financing decisions have an impact on the capital structure of the firm as well as the cost of raising capital.

Capital structure theory is concerned with achieving an ideal capital arrangement. Firms can use a variety of debt and equity financing structures. In an ideal capital market, a firm's value is unaffected by its capital structure. Nonetheless, when factors such as taxes, bankruptcy-related expenses, and uneven access to information are considered, a firm's level of debt may have an impact on its value. As a result, firms should choose a debt-to-equity combination that maximises value while minimising expenses.

Furthermore, a firm's profitability metrics may affect its capital structure ratio. There are numerous capital structure models, but two intrinsic models better describe how firms want to structure their capital. These are the Pecking Order and Trade-off theories, respectively.

The national debt to GDP ratio indicates how much debt South Africa has incurred relative to its GDP in percentage form. The national debt to GDP ratio is an important indicator of a country's capacity to manage its debt. A high ratio indicates that a country's debt burden is disproportionate to its economic size. Developing countries frequently strive to maintain a stable debt to GDP ratio in order to avoid default and financial crises. This is one variable that other studies have not taken into account, but its importance to a firm's capital structure and how it can navigate through difficult economic times. South Africa has experienced periods of severe economic instability as a result of ineffective fiscal and monetary policy implementation. South Africa's national debt has been a source of concern in recent years, rising without any positive results to show for it.

In this study, changes in GDP were used to represent the growth rate. Nation-states are typically classified as advanced, underdeveloped, or emerging economies based on their GDP.

Firms should consider the country's interest rate, which has a direct impact on the costs associated with debt financing. In South Africa, the repo rate, which is set by the South African Reserve Bank (SARB) for borrowing cash reserves, determines the cost of debt financing provided by banks. Given the higher cost of debt financing, firms are likely to reduce their reliance on it as interest rates rise. Nonetheless, businesses should consider the overall trend in interest rates, as this can provide opportunities for long-term interest cost savings as long-term rates remain stable or moderate.

Inflation is the continuous rise in the overall price level of an economy. The inflation rate, as measured by changes in the consumer price index (CPI), indicates how quickly prices are rising. The South African Reserve Bank (SARB) follows an inflation-targeting strategy, aiming for an inflation rate of between 3% and 6%. The Fisher equation states that the nominal interest rate is equal to the real interest rate plus an inflation premium. As a result, an increase in the inflation rate typically results in a higher nominal interest rate, which affects a firm's capital structure. When the cost of debt financing, or interest payments, rises, businesses tend to decrease their reliance on debt financing. Furthermore, the inflation rate affects a variety of other economic factors in a country. An increase in inflation means that the rand's value falls

by the same percentage as the CPI in terms of the goods and services that can be purchased with a single rand.

In this study, I looked at how economic changes affected the capital structure of a sample of South African firms between 2009 and 2022. During this time, the South African economy experienced significant transformations. I obtained the data required to compute various metrics from the South African Reserve Bank (SARB). Furthermore, economic data was obtained from Trading Economics.

Various data analysis methods were used to examine the collected data. Descriptive statistics were used to better understand the dataset's characteristics. The results of skewness and kurtosis statistics, as well as the R-squared test, indicated that the dataset did not have a normal distribution. In light of this, median values, which are non-parametric and less influenced by outlier values, were used instead of mean values for correlation and regression analyses.

The Spearman correlation, a non-parametric method, was used to investigate possible relationships between firm-specific and economic variables. There was a significant positive correlation between interest rates and the median capital structure ratio. In essence, and under normal conditions, the relationship between D/E and interest rates is inverse (when one increases, the other decreases). Typically, when the cost of debt financing rises, businesses use less debt. The correlation between tax rate and median capital structure ratio was found to be insignificant.

A country's economic growth is frequently hampered by a decrease in investments caused by a drop in interest rates. This, in turn, reduces the country's total available capital, resulting in a depreciation of its currency. As a result, the country's goods become more affordable in the global market, resulting in increased sales, production, and, eventually, economic growth. As a result, it appears that changes in interest rates (whether they rise or fall) and their subsequent impact on inflation rates are inextricably linked to the significant correlation observed between a country's GDP and profitability ratios.

There is usually no direct relationship between a country's national debt to GDP and a firm's ROE. ROE is a financial metric that measures a firm's profitability, whereas national debt refers to a country's total government debt. However, high levels of national debt can have an

indirect impact on ROE in certain situations. When a country has a high national debt burden, it may face higher interest rates or taxation, which can impact a firm's borrowing costs and overall financial health. These factors can then have an impact on a firm's return on equity.

Similar to ROE, there is typically no direct relationship between national debt to GDP and a firm's ROA. ROA is a metric that measures a firm's profitability in relation to its total assets.

Elevated national debt can have an indirect impact on a country's economic conditions, which can then affect business performance. For example, a high national debt can lead to fiscal policies that cause economic downturns or instability, affecting a firm's ROA.

It is important to note that the relationship between these variables is complex and influenced by a variety of factors, including government policies, economic conditions, and the unique circumstances of individual businesses. As a result, while there may not be a direct and clear correlation, a country's overall economic health and fiscal policies can have an indirect impact on the financial performance of businesses, including ROE and ROA.

The correlation analyses revealed significant correlations between specific variables. Nonetheless, it is important to note that correlations cannot be used to determine causation. Regression analyses were used to investigate causality by determining how changes in one independent variable affect shifts in the dependent variable while keeping the other independent variables constant. In this study, I utilised a TSCSREG (time-series cross-section regression). The regression model is designed specifically for panel data sets that include time-series observations from multiple cross-sectional units. This model is ideal for my dataset because it includes both panel and economic data. Furthermore, one-year lags were added to the model to account for the impact of economic changes, which typically manifest with a certain time delay.

The dataset used had few outliers, so the regressions were performed on all variables, including the outliers. The regression model of economic variables yielded an R-square value of (0.083207). This is a low R-squared value, indicating that the multiple regression model's independent variables explain approximately 8.32% of the variance in the dependent variable. We don't have a unique intercept term for each firm, so we can't use the fixed-effect model.

Chapter 7: Limitations and opportunities for future research

This study focuses exclusively on the capital structure choices of South African listed firms. It does not consider the capital structure choices of unlisted firms. The results of this study may not be applicable to non-listed firms.

Banks were excluded from this study due to the regulatory environment in which they operate. As a result, the findings may not be applicable to the banking sector, and additional research is required to investigate banks' capital structure choices in the South African context.

The descriptive statistics identify outliers in the data, which were not corrected for in this study to prevent data tampering. There weren't many outliers.

The firms chosen for this study were listed consistently between 2009 and 2022. The decision to exclude firms not listed throughout the study period introduces the possibility of survivorship bias in the sample. The deliberate exclusion of firms with inconsistent listings aims to prevent the distortion of results caused by short-lived entities. This approach is consistent with the deliberate decision made by Pierre Erasmus in a similar context.

In this study, a multiple regression model was used; however, the results were not compared to those that could have been obtained from other models, such as the fixed effect model. This was done to ensure consistency with the methodology used in Pierre Erasmus's study. Furthermore, my variables of interest do not change by firm, so I do not use the fixed effect model.

This comparative analysis was carried out in accordance with Pierre Erasmus' study. However, limitations were identified based on the results of the heteroskedasticity and serial correlation tests, which confirmed the presence of heteroskedasticity in the studied model. In response to these concerns, I used the heteroskedasticity and serial correlation consistency standard errors to identify potential biases in the regression results.

Chapter 8: Conclusion and recommendations

8.1 Conclusion

The correlation analysis showed a few strong relationships between the economic variables however, some of the variables did not portray a significant impact on the firms' capital structure. This conclusion is based on the regression model without the lag, showing significantly low coefficients despite the statistical significance. When incorporating the p-value of significance, some variables like national debt to GDP, the tax rate and ROE gave a statistical significance proving that they are signs of causation on capital structure. The relatively low significant impact could be a resultant of inter-correlation between the variables. A change in one variable can indirectly impact a firm's choices regarding its capital structure by affecting other variables over time. The influence of economic factors isn't typically immediately apparent but becomes visible after some time has passed. It's important to take into account that there were numerous economic shifts during the 14-year research period that might have influenced how firms structure their capital. As a result, the combined impact of all these economic changes likely had a relatively minor effect on capital structure, as these factors could potentially offset each other. That's why I incorporated the lag model which depicted a level of statistical significance of variables towards capital structure.

National debt to GDP is highly correlated with tax and interest rate. This showed that the country's debt levels have a strong relationship with other economic variables. The results of the lagged period proved statistical significance where economic variables' level of causation was significantly apparent. This observation does show that there's sufficient impact contributed by the country's level of debt to how firms structure their capital.

The correlation and regression results for profitability ratios and the debt-to-equity ratio (D/E) showed a notably strong relationship. The collective influence of these variables had a significant effect on the D/E ratios of the firms under examination.

8.2 Pecking order theory versus the trade-off theory

Based on the hypotheses and conclusions drawn, it appears that South African firms appear to exhibit characteristics of both the Pecking Order theory and the Trade-off theory in their capital structure decisions.

Pecking Order Theory: The hypothesis testing suggests that South African listed firms consider economic indicators such as GDP growth rate, inflation rate, and interest rates when making capital structure decisions. This aligns with the Pecking Order theory, which proposes that firms prioritize internal financing and prefer equity over debt when external financing is required. South African firms seem to respond to economic conditions by considering debt financing during periods of lower risk (higher GDP growth, lower inflation) and leaning towards equity financing when interest rates are higher.

Trade-off Theory: The hypothesis also indicates that national debt levels have a significant impact on capital structure choices. The Trade-off theory suggests that firms aim to strike a balance between tax benefits associated with debt and financial distress costs. South African firms appear to consider the trade-off between the benefits of debt financing and the risks associated with high national debt. When national debt levels are high, they may opt for a lower debt ratio to mitigate potential credit crunches or higher interest rates.

Both Theories: The conclusions drawn from correlation and regression analyses provide further evidence of both theories' relevance. The strong relationships between economic variables and capital structure decisions, along with the significant impact of national debt levels, align with the Trade-off theory. Firms are weighing the benefits of debt against economic conditions and national debt levels.

Additionally, the correlation and regression results for profitability ratios (e.g., ROE) and the capital structure ratio also highlight a strong relationship. This finding aligns with the Pecking Order theory, as it suggests that profitability metrics significantly influence capital structure decisions.

South African firms appear to consider a combination of economic indicators, national debt levels, and profitability ratios when making capital structure decisions. They balance the Pecking Order theory's emphasis on internal financing and equity with the Trade-off theory's consideration of debt benefits and financial distress costs. The exact approach may vary

among individual firms and depend on their unique circumstances, risk tolerance, and market conditions.

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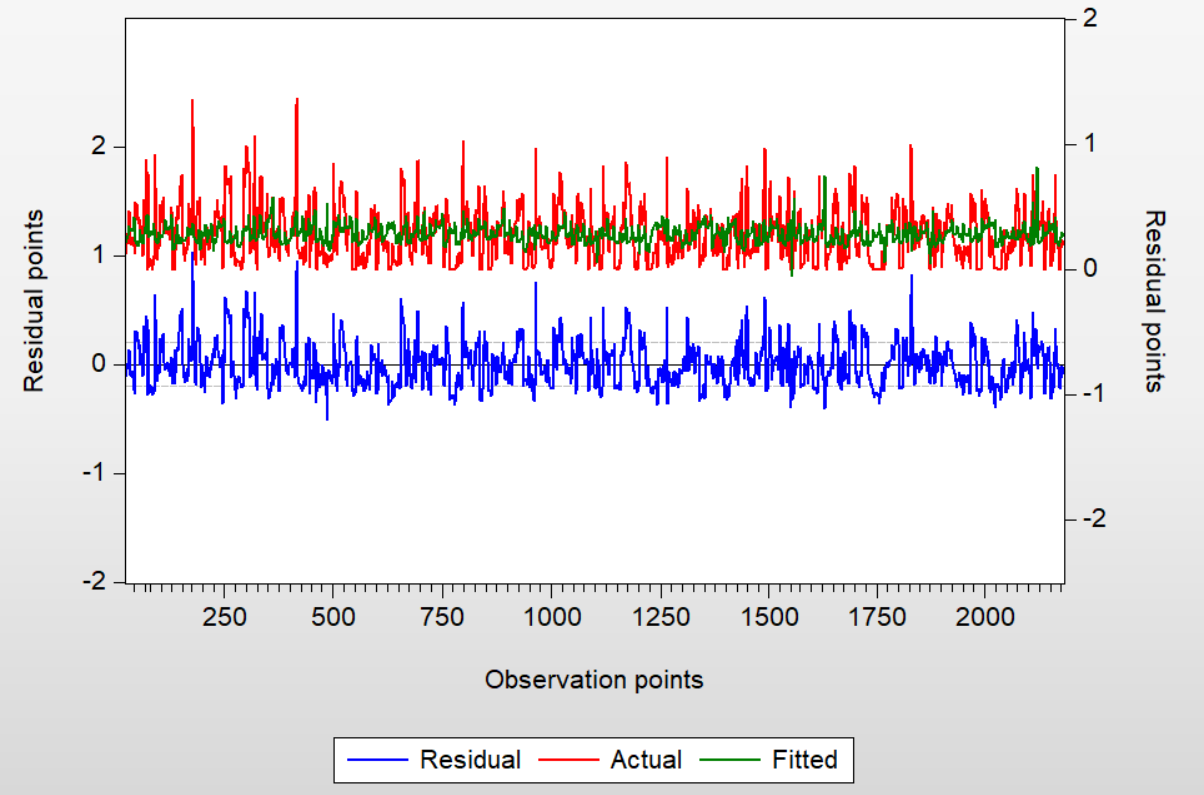
Appendix

5.1.11 Residual Graph



The residual graph presented above allows for an assessment of the goodness of fit for the regression model employed in this study. The observed distribution of residuals, both negative and positive, contributes to a nuanced understanding of how well the model captures the variability in the dataset. Despite the presence of occasional spikes, the fitted line appears relatively stable, suggesting a consistent trend in the predictions.

One notable feature of the residual graph is the coexistence of negative and positive residuals. This indicates that at various data points, the model both underestimates and overestimates the actual values for the observations. However, the overall effect of these underestimates and overestimates on are described by the fitted line.

Upon closer inspection, it becomes evident that the underestimates and overestimates exhibit a certain degree of symmetry and cancel each other out. In other words, the model's tendency

to underestimate in some instances is counteracted by its tendency to overestimate in others. This dynamic interplay between negative and positive residuals contributes to the stability of the fitted line.

The cancelling effect observed in the relatively stable fitted line suggests that, on average, the model performs well in capturing the underlying patterns in the data. While individual observations may deviate from the predicted values, the collective impact results in a balanced and consistent representation of the relationship between the dependent and independent variables.

I acknowledge that the decision not to adjust for outliers in this study may contribute to the occasional spikes in the residual graph. However, the cancelling effect observed in the fitted line implies that these outliers do not unduly compromise the overall performance of the model. The stable fitted line, despite the presence of outliers, indicates that the model is robust and fit for its intended purposes.