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Research Paper

# Financing Of State-Owned Entities: Can The Trade-Off Theory Explain the Debt Structure?

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**Abstract**

The trade-off theory has long been a pillar in the understanding of how organizations choose their capital structures. According to this theory, organizations balance the advantages and drawbacks of debt financing. Thus, the purpose of this research is to determine if the financing behavior of South African state-owned entities (SOEs) has a target capital structure which they adjust towards and if so, the speed of adjustment, a central tenet of the Trade-off Theory. An unbalanced panel data set from a sample of thirty-three commercial SOEs were studied using a dynamic partial adjustment model. The findings provide strong evidence that South African SOEs follow the trade-off theory based on the existence of a target capital structure and speed of adjustment of 21.5% per annum towards the target which is slower than other SOEs in developing economies. The findings also revealed that these SOEs take almost five years to close off two-thirds of the gap between the actual and optimal capital structures. The findings will be of interest to observers of the economy, as they measure the capacity of SOEs to play a leading role in investment and in improving the efficiency of the economy. They could also inform decision-making and policy development on SOEs.

**Keywords** *optimal capital structure, the speed of adjustment and leverage*

## INTRODUCTION

State-owned enterprises (SOEs) play a significant role in driving development, particularly in developing economies (Mbo, 2017). According to the constitution, South African SOEs are required to provide services to the public and advance the national economy. Their contribution to advancing socioeconomic development and transformation has grown since the establishment of democracy in 1994 (Fourie & Malan, 2020).

The use of SOEs as tools for socio-economic development in South Africa has a long history, and they have significantly aided in this process. However, Fourie (2001) observed, almost two decades ago, that structural and operational issues have significantly impacted SOEs' service delivery and infrastructural growth, leading to irregular and unequal development patterns. The author further explained that at a more general macroeconomic level, SOEs sought to attract more foreign direct investment to reduce the amount of debt taken on by the government and to improve the economy in ways that would promote both financial growth and industrial competitiveness. According to studies, SOEs are in a grave financial situation. They are continuously seeking governmental aid to keep bailing them out since they are unable to meet their debts as the government is aware that some SOEs' business models are unviable and that their capital structures are too reliant on being debt-funded (Treasury, 2018).

The South African Reserve Bank (2018) stated that the expected inability of SOEs to refinance debt and achieve financial consolidation may make the government responsible for the debt and possibly unable to finance it which is straining public resources. The failure of SOEs to refinance debt suggests that the government would need to borrow more money, which would lead to a


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deteriorating financial position. This can worsen the nation's financial stability and eventually lead to more credit-rating downgrades (Saungweme & Odhiambo, 2018).
The underwhelming performance of South African SOEs has been the subject of persistently hostile media coverage. These organizations frequently find themselves in difficult financial situations where they are unable to pay their debts, requiring them to be bailed out by the government. The financial performance of many SOEs is not improving, and they are in a condition of ongoing financial crisis despite additional government guarantees. Thus, SOEs in South Africa are often underperforming and dependent on the government constantly. There have been calls for the government to sell some of the underperforming SOEs due to lackluster overall economic growth (Chilenga, 2016; Mafukata & Musitha, 2018). Even while the government has made changes to help these SOEs operate better, these efforts have not yet had a substantial impact on their financial stability (Demirci et al., 2019). These organizations drain the government coffers empty by providing guarantees and bailouts. This begs the question of what justifies the financing of SOEs as well as the debt structure and how can this structure be explained?

Numerous capital structure theories have been produced by academics over the years. Each theory was put forth to address flaws found in earlier hypotheses. This study emphasizes the trade-off theory. Other theories that explain the debt structure of SOEs may exist, and their existence may indeed offer a more thorough knowledge of the dynamics of debt structure and contribute to a sound theoretical framework (Bajaj et al., 2021; Frank & Goyal, 2003; Mubeen et al., 2020). Even though the trade-off theory is the study's main focus, it's crucial to recognize the applicability and potential influence of other theories when assessing the debt structure of SOEs. These supplemental theories can improve the overall image of debt structure analysis.
For instance, the pecking order theory contends that due to information asymmetry and signaling issues, organizations, including SOEs, prefer internal financing (retained earnings) over external financing (debt or equity). This can imply that SOEs may display certain debt structure patterns that are impacted by their preferred methods of financing and the availability of internal resources (Frank & Goyal, 2003; Mubeen et al., 2020).

The link between principals (the government as the owner) and agents (management) in SOEs is also clarified by the agency theory. The conflict of interest and agency costs that result from the division of ownership and control are highlighted in this article. It implies that agency considerations, such as lining up managerial incentives with shareholder interests and preventing potential agency conflicts, may have an impact on debt structure decisions in SOEs (Bajaj et al., 2021; Berger & Di Patti, 2006).

This study primarily focuses on the trade-off theory. The trade-off theory outlines that an optimal capital structure results from an optimization process in which SOEs can trade off the costs and benefits of debt, such as tax benefits, agency costs, and costs associated with financial distress, to maximize their net worth (Khoa & Thai, 2021). This study tries to explore more into the elusive idea of optimal debt levels, even though earlier studies have looked at the factors that influence debt structure choices. This study examines the variables that affect ideal debt levels across South African SOEs. The trade-off theory has long been a well-known framework for comprehending capital structure choices. By concentrating on this theory, one can make use of its benefits to learn important things about debt structure and its consequences for managerial practice (Khoa & Thai, 2021). Although the trade-off theory continues to be significant, it is vital to recognize that financial theories are constantly changing and that there are other key ideas in the finance industry as well. This paper aims to determine if the trade theory explains the financing behavior of South African SOEs. But do the South African SOEs follow the trade-off theory in terms of their debt structure?

## LITERATURE REVIEW

### Capital structure

The capital structure of a company is the ratio of debt to equity used to finance its operations (Ajibola et al., 2018). Raising the money required for a corporation's operations and investments through finance might involve combining internal and external sources of funding. External

financing, which originates from share capital and loans, contrasts with internal financing, which uses funds generated within a company and includes undistributed earnings. While debt and equity are categorized as external finance, retained earnings are categorized as internal funding (Donaldson, 2000; Lazonick & Shin, 2019).

The ideal capital structure is the debt-to-equity ratio that maximizes shareholder value while reducing the firm's weighted average cost of capital. Given that an organization must pay interest as required by law and could be forced into liquidation if it does not, debt financing is riskier but less expensive for the organization. The organization is not obligated by law to pay dividends to shareholders if it is performing poorly, thus equity financing is more expensive but less risky. Financial leverage raises the percentage of debt, which results in more debt and higher interest payments, which lowers the earnings attributable to shareholders (Donaldson, 2000; Nukala & Prasada Rao, 2021).

**Capital structure theories**

Capital structure theories can be categorized, firstly, into those that assume the existence of an optimal debt level. These include the trade-off theory; the agency theory and the free cash flow theory. The second category consists of theories that are not based on the existence of an optimal debt level and include the pecking order theory and market timing theory. Both categories can be modeled into either a static or dynamic framework. The dynamic version of the first category of theories is associated with adjustment behavior toward the target debt level while the second category of theories is not associated with targets; instead, the non-target factors include the cost of adverse selection for the pecking order theory and the mispricing of common stock relating to the market timing theory (Demirgüneş, 2017; Grosse-Rueschkamp et al., 2019).

The framework for the capital structure puzzle, to which numerous theorists have contributed, was laid by the fundamental work of Modigliani and Miller (1958, 1963), which launched the capital structure discussion. Researchers have looked for the optimal balance between debt and equity to increase the firm's worth. By using an ideal capital structure, management can impact both the environment in which the company operates and its long-term survival while also maximizing the firm's worth. As a result, various capital structure theories have been created to provide a framework for comprehending both the capital structure of businesses and financing choices (Jensen & Meckling, 2019; Shan et al., 2019). In this article, only the trade-off theory is conversed.

*Trade-off theory*

The Modigliani and Miller (1963) theory had flaws when corporation taxes were included, leading to a benefit of debt under the supposition that the firm earns its debt obligation with certainty. This led to the development of the trade-off theory. The assumption that the firm's debt financing is 100% is due to the market value of the company being a linear function of the amount of debt used (Yildirim et al., 2018). There was a need to offset the cost of debt, which includes bankruptcy penalties, to avoid the extreme scenario where any move to minimize taxes would raise the firm's worth. The MM theorem was criticized for, among other things, failing to account for the costs of financial distress, which rise as greater leverage is applied. Thus, the tax benefits of debt and the costs of bankruptcy were added to the framework by Kraus and Litzenberger (1973), demonstrating the presence of an ideal capital structure in the trade-off theory. An ideal capital structure is the result of an optimization process in which businesses trade off the advantages and disadvantages of debt, such as tax benefits, agency charges, and costs associated with financial crises, to maximize the value of the company (Yildirim et al., 2018).

One of the major advantages of debt is the ability to deduct interest from income, meaning that the more debt a company has in its capital structure, the less tax it will have to pay. Other advantages include managing agency issues, lowering free cash flow issues because loan repayments are contractual obligations, and lowering managers' wasteful spending. Financial distress costs are incurred when a company has too much debt. According to the trade-off theory, when businesses

borrow excessively, they run the risk of declaring bankruptcy and incurring high indirect costs, such as legal and administrative fees, which significantly lower the value of the business.

Due to the interest tax shield, when a company uses debt financing, its value rises. The valuation eventually plateaus since the company might not have enough taxable income. There is a chance that the company would experience financial hardship and the associated costs as it takes on additional debt. As a result of the costs related to financial distress, the firm's value will decline at high levels of borrowing. The best capital structure for a company is one in which the marginal costs of debt are roughly equal to the marginal benefits of debt (due to the interest tax shield) (through financial distress costs). The debt percentage of businesses would vary greatly. The tax advantages that come with having a lot of debt may be more important to some people than others. Additionally, there will be variations in the expenses of distress that businesses experience, which could be more expensive for some than others. Because of this, there will be cross-sectional disparities in the leverage ratios of the various firms; specifically, enterprises with less expensive distress will be able to borrow more, and vice versa. This suggests that depending on the company features that define the benefits and costs, the amount of optimal debt held by enterprises varies largely (Frank & Goyal, 2009; Nicodano & Regis, 2019).

**The determinants of capital structure**

Empirical studies reveal that several different factors influence capital structure. The literature demonstrates that a firm's decision regarding its capital structure is influenced by both its qualities and the economic and legal customs of the nation in which it conducts business.

Numerous studies have divided the variables affecting capital structure into macroeconomic and firm-specific variables. Age, size, asset structure, profitability, growth, firm risk, and liquidity are examples of firm-specific characteristics. Economic expansion, inflation, and interest rates are examples of macroeconomic variables (Bandyopadhyay & Barua, 2016; Moradi & Paulet, 2019; Murigu, 2014). According to Harris and Raviv (1991), a firm's capital structure is influenced by several firm-specific criteria, such as size, potential for expansion, tangibility, and profitability.

*Leverage*

The amount of borrowed money a company uses to finance its investments is referred to as leverage. Leverage has been measured using a variety of methods in the financial literature, including market or book value, total debt, long-term debt, and short-term debt (Armstrong et al., 2019).

*Profitability*

The trade-off theory can be used to explain the inconsistent theoretical and empirical findings about the relationship between profitability and leverage. The static trade-off theory demonstrates a favorable correlation between leverage and profitability, with more profitable companies using external financing to fund their operations because the likelihood of bankruptcy is reduced, providing a tax benefit. As a result of greater tax benefits, the trade-off theory predicts that more successful businesses will have higher target debt levels and possibly more valuable assets (Jarallah et al., 2019). According to the dynamic trade-off theory, there will be a decline in debt levels as businesses amass cash flows in their capital structures to finance investments (Sogorb-Mira & Lopez-Gracia, 2003). As long as the adjustment costs are greater than the costs associated with maintaining a target debt level, earnings can still be accumulated even when there is a departure from the ideal debt level. Since leverage has an adverse impact on capital structure deviation rather than the target capital structure, there is a negative correlation between profitability and leverage (Ai et al., 2020; Calomiris & Mamaysky, 2019).

*Tangible assets*

Given that tangible assets serve as forms of collateral for lenders to use as sources of borrowing and as sources of debt security in a world of information asymmetries, a firm's asset structure would directly influence its capital structure. A favorable correlation between tangible assets and leverage is predicted under the trade-off theory. Opler and Titman (1994) demonstrated that tangible assets are linked to higher leverage as they provide higher security for loans at a lower interest rate and lend more money at lower rates of interest. This is because the agency costs of debt are reduced for the lender and the tangible asset value of the firm at liquidation is higher (Balakrishnan et al., 2019). Although South Africa's capital markets are more developed than those of other African nations. Muttakin et al. (2020) suggested that collateral is crucial in reducing the consequences of information asymmetry in the country's debt markets.

*Age*

This variable has been observed to follow the life cycle of the firm, with newer firms exerting less leverage due to availability issues. More cash is required as the company matures, and it is obtained through external debt or equity. Given that older businesses are more established, have fewer bankruptcy concerns, and pay less in agency fees, the trade-off theory predicts a positive link between age and leverage (Khaki & Akin, 2020). Siqueira et al. (2018) suggested that the expectations of the trade-off theory, show that younger enterprises with an operating history of one to three years prefer to utilise internal capital.

*Size*

Larger companies have more consistent cash flows and are able to take on more debt, giving them more access to other sources of financing during times of financial difficulty (Opler & Titman, 1994). The trade-off theory supports a favorable conclusion, as larger businesses prefer to issue more debt due to the potential for lower bankruptcy costs and the entire tax shield. Additionally, they can access the financial market more easily (Khoa & Thai, 2021).

*Risk*

The difficulty of honoring interest payments would be expected to increase the costs of financial crises for businesses with erratic cash flows. They should employ less debt because there is a higher likelihood that the tax shield benefit will not be completely utilized. As risk increases, shareholders suffer; as a result, the trade-off theory suggests that riskier businesses should employ less debt (Agyei et al., 2020; Gospodinov et al., 2019).

*Taxation*

The ability to deduct interest from taxes is one of the main advantages of debt. Therefore, a company pays less tax the more debt it has in its capital structure. This means that according to the trade-off theory, there is a positive correlation between the tax rate and leverage, with a higher tax rate meaning a bigger interest tax shield and hence more debt (Ai et al., 2020; Bradshaw et al., 2019).

*Probability of bankruptcy*

Due to the increased bankruptcy expenses anticipated when the chance of bankruptcy grows, the trade-off theory predicts a negative link between leverage and the probability of bankruptcy. To lower the expenses of bankruptcy, businesses cut their debt levels. When managers believe bankruptcy would cost them money, they are more motivated to work more, spend less on luxuries, and make wiser financial decisions. This reduces the likelihood of bankruptcy (Antill & Grenadier, 2019; Harris & Raviv, 1991). The prospect of bankruptcy forces businesses with lesser profitability to lower their target debt levels because a decline in profitability increases the cost of bankruptcy. Similar to the last point, more unpredictable earnings imply lower tax rates and higher expenses

associated with bankruptcy, which should encourage smaller, less diversified businesses to reduce their target leverage (Bukair, 2019).

## METHODOLOGY

### Data

In this study, a quantitative methodology was used. The final sample consisted of 33 commercial State-Owned Enterprises. Commercial SOEs were covered by Schedule 2 (Public Entities), Schedule 3b ( National Business Enterprises), and Schedule 3d (Provincial Business Enterprises) of the Public Financial Management Act (PFMA). The McGregor BFA Library, Bloomberg, and the SARB website were the external data sources that were utilized and offered financial data feeds and analysis tools, covering JSE and international share prices and entities information, comprising the annual reports and financial statements. The data collection for this investigation included cross-sectional and longitudinal dimensions for the years 1995 to 2017 because, from 1995, many SOEs were formed as South Africa became a democratic country in 1994.

### Variables and measures

The variables chosen were predicated on capital structure theories and earlier empirical studies. Only firm-specific elements that had been demonstrated in previous research to have an impact on the target leverage level and the speed of adjustment towards achieving this target were included as independent variables and are displayed in the table below:

Table 1. Variables and measures: Trade-off Model

| VARIABLE | MEASUREMENT | FORMULAE / PROXY |
|---|---|---|
| Profitability | PROF | Operating Profit / Sales |
| Age | AGE | No of years in existence |
| Size | SIZE | Natural logarithm of total assets |
| Asset tangibility | TANG | Tangible assets / Total assets |
| Growth | GROW | % change in total assets |
| Business Risk | RISK | The standard deviation of operating profit / total assets |
| Tax rate | TAX | Tax charge/profit before tax |
| Liquidity | LIQ | Current assets / current liabilities |

Source: Authors' contribution

### Model Specification

This section will examine whether there is an optimal amount of debt for South African SOEs as well as how quickly they can adjust to it. Measuring the speed at which SOEs adjust towards the target indicates how important that target is which, in turn, tests a central tenet of the trade-off theory.

According to the trade-off theory, the capital structure is decided by balancing the advantages and disadvantages of debt. In a perfect market, entities would naturally migrate in the direction of the ideal debt level in the absence of transactions and adjustments. However, in an imperfect world with excessively high adjustment costs, businesses might not immediately change their behavior to attain a certain target debt ratio. This issue could be resolved by incorporating a dynamic capital structure adjustment through a partial adjustment process that uses a lagged dependent variable in the empirical model. The following is a conventional partial adjustment model created by Marc Nerlove that would determine whether there were adjustments made towards the target debt level and at what speed of adjustment:

$$DR_{it} - DR_{it-1} = \lambda(DR_{it}^{*} - DR_{it-1}) + e_{it} \ldots (1)$$

Where DR* is the target debt ratio. It is however challenging to assess this target, which makes it more challenging to estimate the aforementioned model. Establishing a credible estimate of the target debt utilizing factors and variables that affect the firm's capital structure could be a solution. The trade-off theory suggests that there is an ideal debt ratio for businesses, but it can vary over time and between various businesses depending on firm characteristics. The equation below can be used to define this:

$$DR_{it}^{*} = \alpha + \beta X_{it-1} + e_{it} \ldots (2)$$

Where DR* is the target debt ratio, β the coefficient vector that must be > 0 and ≤ 1; and X is a vector of firm characteristics (PROF, AGE, SIZE, TANG, GROW, RISK, TAX, LIQ, BKCY, NDTS).

The SOA can be determined using the two-stage procedure of equations 1 and 2 where the actual leverage is regressed on the capital structure determinants in equation 2 and the fitted values to be used as the proxy for target leverage are obtained. Thereafter, using the target leverage, the SOA is estimated using Equation 1.

The equation below has used a one-stage estimation by substituting equation 2 into the partial adjustment equation 1, which results in the following reduced form:

$$DR_{it} = \lambda\alpha + (\lambda\beta)X_{it-1} + (1-\lambda)DR_{it-1} + \lambda e_{it} \ldots (3)$$

Where λ (lambda) is the firm's SOA to close the gap between actual debt and the targeted debt level. (1 – λ) is the adjustment parameter that measures the adjustment speed.

When λ = 0, the SOA is zero, implying no adjustment, and when λ = 1, the SOA is one, which is very high, implying that the firm is always at its target debt level. The λ is expected between 0 and 1, where 0 or a very small SOA implies that the firm does not have a target capital structure and 1 implies that the firm is always on target.

By substituting the lagged firm-specific variables into equation 3, the final model specification for investigating the SOA is as follows:

$$DR_{it} = \alpha_0 + \alpha_1 PROF_{it-1} + \alpha_2 AGE_{it-1} + \alpha_3 SIZE_{it-1} + \alpha_4 TANG_{it-1} + \alpha_5 GROW_{it-1} + \alpha_6 RISK_{it-1} + \alpha_7 TAX_{it-1} + \alpha_8 LIQ_{it-1} + \alpha_9 BKCY_{it-1} + \alpha_{10} NDTS_{it-1} + (1-\lambda)DR_{it-1} + e_{it} \ldots (4)$$

This dynamic model is developed from the trade-off theory hypothesis where target leverage is difficult to observe but can be estimated and is a function of the lag variables of its determinants.

After the SOA has been calculated, the number of years to reach the target can be computed. This can be done using equation 5 where $Y_n$ is the target capital structure and λ is the SOA to reach the target.

$$n = \frac{log\ (1-Y_n)}{log\ (1-\lambda)} \ \ldots\ (5)$$

## FINDINGS AND DISCUSSION

### Descriptive analysis

Table 2. Descriptive analysis

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| **TD** | 493 | 0.56300 | 0.28439 | 0.04734 | 1.53682 |
| **SIZE** | 493 | 15.0661 | 1.73456 | 11.6975 | 19.1331 |
| **PROF** | 469 | 0.07010 | 0.24821 | -1.3985 | 0.80301 |
| **AGE** | 495 | 10.5616 | 6.04133 | 1.00000 | 23.0000 |
| **TANG** | 493 | 0.99135 | 0.02861 | 0.46711 | 1.00000 |
| **GROW** | 475 | 0.10816 | 0.18083 | -0.26491 | 1.25891 |
| **RISK** | 493 | 0.11062 | 0.11379 | 0.01178 | 0.77778 |
| **TAX** | 490 | 0.09339 | 0.17506 | -0.58869 | 1.00412 |
| **LIQ** | 493 | 2.00384 | 1.83950 | 0.20575 | 13.0053 |
| **BKCY** | 484 | 0.02369 | 0.96507 | -5.9137 | 2.59025 |
| **NDTS** | 493 | 0.03243 | 0.02334 | 0.00000 | 0.10719 |

Source: Authors' contribution

The table above provides a summary of the descriptive statistics for each variable utilized in the trade-off model. These statistics were derived from a sample of 33 South African SOEs from 1995 to 2017. The financial information provided includes book leverage, which is calculated using the overall debt's book value and firm-specific elements of the sampled SOEs. A deeper understanding of the nature of the data is provided by the numerical descriptive measures, which include the mean (average), standard deviation, minimum, and maximum (range) of the panel data across the variables.

The average total debt ratio for the sampled SOEs is 56.3%, which is higher than the results of other studies in developing nations, such as Ganiyu et al. (2019), who established that Nigerian firms had total leverage of 50.5% and Soekarno and Prayogo (2018), who discovered that Indonesian SOEs had total leverage of 46%. The South African SOEs are over-leveraged compared to other SOEs in emerging economies, as seen by the high average debt ratio.

The average profitability (PROF), which is determined by operating profit as a percentage of sales, is 7%, which is a sign of South African SOEs' subpar performance. The average liquidity (LIQ) as determined by the current asset to current liability ratio is 2, which is in line with the industry standard of 2.

In comparison to other developing economies like Kenya, where SOEs claim a growth rate of 15.65%, the overall growth, as measured by a percentage change in total assets, was 10.8% (Kinyua, 2016). The majority of the variables have relatively low standard deviations, which means that there is little variation between the actual data and the mean or predicted values. Since the mean values and standard deviation of each variable lie between the minimum and maximum range, this indicates a high level of consistency.

**Trend analysis**

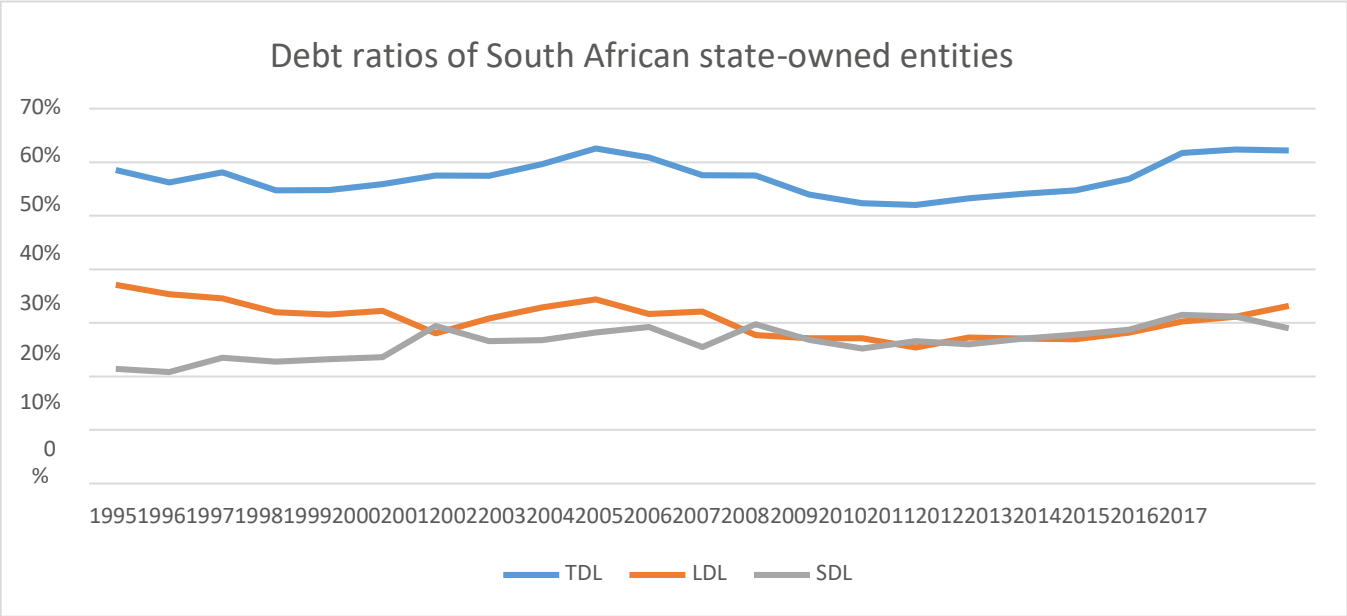


Figure 1. The trend of debt ratios
Source: Authors' contribution

The figure above illustrates how debt ratios have stayed relatively stable over the past 20 years, with early years reporting larger long-term debt and current years showing a narrowing of the long-term and short-term debt gaps as SOEs accessed more short-term loans. Long-term financing helps businesses to be in a stronger position for longer-term projects like capital investments, and the set interest rate aids in better managing financial risk in the event that interest rates rise. Operating budget management and supporting working capital needs are better suited to short-term borrowing. Due to their poor performance and already high debt levels, SOES may be unable to obtain long-term finance as seen by the reduction in long-term debt and rise in short-term debt.

**Correlation analysis**

Table 3. Correlation analysis

| | TD | Size | PROF | AGE | TANG | GROW | RISK | TAX | LIQ | BKCY | NDTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **TD** | 1.0000 | | | | | | | | | | |
| **Size** | 0.1502 | 1.0000 | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | | | | | | | | | | |
| | (0.0008) | | | | | | | | | | |
| **PROF** | -0.1824* | 0.1703* | 1.0000 | | | | | | | | |
| | (0.0001) | (0.0002) | | | | | | | | | |
| **AGE** | -0.0550 | 0.3053* | -0.0244 | 1.0000 | | | | | | | |
| | (0.2231) | (0.0000) | (0.5986) | | | | | | | | |
| **TANG** | -0.0298 | -0.1287* | -0.1147* | -0.1107* | 1.0000 | | | | | | |
| | (0.5086) | (0.0042) | (0.0129) | (0.0139) | | | | | | | |
| **GROW** | -0.0437 | 0.0306 | 0.1542* | 0.0803 | 0.0435 | 1.0000 | | | | | |
| | (0.3424) | (0.5058) | (0.0010) | (0.0805) | (0.3446) | | | | | | |
| **RISK** | -0.0740 | -0.2587* | 0.0315 | -0.4005* | 0.0193 | -0.0588 | 1.0000 | | | | |
| | (0.1007) | (0.0000) | (0.4958) | (0.0000) | (0.6690) | (0.2005) | | | | | |
| **TAX** | -0.1312* | 0.0711 | 0.1705* | 0.0001 | -0.0827 | 0.1068* | 0.1915* | 1.00000 | | | |
| | (0.0036) | (0.1158) | (0.0002) | (0.9989) | (0.0674) | (0.0202) | (0.0000) | | | | |
| **LIQ** | -0.3760* | -0.2222* | -0.1269* | -0.0113 | 0.0291 | 0.0198 | -0.0232 | 0.0350 | 1.0000 | | |
| | (0.0000) | (0.0000) | (0.0059) | (0.8024) | (0.5198) | (0.6664) | (0.6074) | (0.4389) | | | |
| **BKCY** | -0.0318 | -0.0346 | 0.3167* | -0.1446* | -0.0439 | 0.1075* | 0.0474 | 0.0736 | 0.0179 | 1.0000 | |
| | (0.4854) | (0.4475) | (0.0000) | (0.0014) | (0.3352) | (0.0201) | (0.2977) | (0.1060) | (0.6937) | | |
| **NDTS** | 0.0527 | -0.0559 | -0.0974* | -0.2104* | -0.1145* | -0.0999* | 0.2256* | 0.2939* | -0.0922* | 0.1491* | 1.00000 |
| | (0.2429) | (0.2156) | (0.0350) | (0.0000) | (0.0109) | (0.0294) | (0.0000) | (0.0000) | (0.0408) | (0.0010) | |

Source: Authors' contribution

The correlation matrix that shows the direction and strength of the linear relationship between pairs of variables is presented in Table 3 above. The degree of association between the pairs of variables reveals the linear relationship and also whether any multi-collinearity exists between the variables, as this can pose serious issues in the estimations. Multicollinearity exists when there is a perfect relationship between some or all explanatory variables and when the explanatory variables are highly correlated with each other. The Pearson correlation test was utilized in this study to assess the degree of multi-collinearity. However, to determine whether any of the correlation coefficients were above 0.80, which would suggest serious multi-collinearity problems, the pairwise correlation coefficient was computed between the independent variables. There are no multi-collinearity issues to be concerned about, according to Table 3, which shows that no two explanatory variables have substantial correlations with one another beyond the threshold of 0.80.

The results of the correlation analysis show that there are substantial correlations between total leverage (TDL), which is a measure of capital structure, and size, profitability, tax, and liquidity.

Total debt and non-debt tax shields have a positive correlation. Total debt is negatively connected with profitability, firm growth, insolvency risk, age of the firm, asset tangibility, business risk, tax, and liquidity.

**Determinants of capital structure of South African state-owned entities**

*Profitability*

Operating profit as a percentage of sales, a measure of profitability, has a starkly negative relationship with the overall debt ratio (significant at 0.01). This suggests that more successful SOEs in South Africa will produce larger cash flows and typically prefer to use internal funds rather than loan funding to finance initiatives. The demand for debt financing declines as profitability rises since retained earnings rise alongside with profits.

The findings contradict the static trade-off theory's assertion that firms will choose to issue debt when their profitability is higher to pay as little tax as possible. The dynamic trade-off theory's negative prediction is brought on by the result of profitability which impacts the deviation from the target.

This significant negative prognosis may be the result of political influence from the government impairing critical decision-making about debt financing. Additionally, Ahmad et al. (2017) discovered that profitability has a detrimental effect on leverage in Malaysia, where SOEs use more domestically generated money as a result of their exceptional performance.

While the impactful results are varied, the substantial findings that differ from those SOEs in other developing economies may be a clue that South African SOEs are more focused on making a profit than with one of their primary focuses, namely, the provision of services.

*Growth*

Leverage is negatively impacted by growth, which is statistically significant (at the 1% level) and assessed by the percentage change in total assets. Opportunities for high growth are also linked to agency issues like asset substitution, where managers of businesses with high growth are more likely to take on more risk with their projects to the benefit of shareholders and the detriment of bondholders. The trade-off argument is supported by these agency issues, which also highlight the inverse relationship between development prospects and leverage discovered in this study.

The agency theory predicts that firms with greater growth opportunities use less risky debt and that as firms grow, this allows for managers to act opportunistically, which can be curbed by using more debt in the capital structure. This prediction is positive because it shows that firms with

greater growth opportunities use less risky debt (Ganiyu et al., 2019). South African SOEs should use long-term debt financing, which is better suited to growth potential based on capital expansion, acquisition, and share repurchase, among others, when in need of financing and once internal sources of finance are exhausted.

*Asset tangibility*

The findings demonstrate that leverage is positively impacted by asset tangibility. These results are not noteworthy. Since tangible assets are simpler to value from a distance and hence have fewer information asymmetries, they are associated with lower agency costs because businesses can use them to secure debt (Jensen & Meckling, 2019). Given that tangible assets serve as sources of collateral to lenders for borrowing and securing debt, a firm's asset structure would directly influence its capital structure in a world of knowledge asymmetries.

*Age*

The findings demonstrate that leverage in the case of South African SOEs is adversely impacted by the firm's age, which is also viewed as a metric of repute. At a 1% level of significance, there is a statistically significant link that suggests older enterprises have lower debt levels and are less leveraged than younger firms. This partly results from the fact that established businesses have a reputation in the capital market, making them eligible for less expensive financing.

Since more established and older companies have greater domestically generated cash flows, they should lessen their reliance on loans. The majority of the SOEs sampled in this study were founded before the study period even started. However, of all the sampled SOEs, Broadband Infraco, a company that develops fiber-optic infrastructure was formed in 2007, had the highest debt levels. This reinforces the idea that age and leverage go against one other, with younger SOEs having higher debt levels. The SOE has pleaded with the government for additional cash infusions and bailouts to maintain operations despite having a high amount of debt. This would compromise its liquidity situation by raising its debt levels further (Marimuthu, 2019).

*Size*

The natural logarithm of total assets, which measures the size of SOEs, has a positive and significant (at the 1% level) impact on total debt. Asymmetric information levels and reputation are frequently correlated with size, with larger companies having lower asymmetric information levels and better reputations to uphold. These businesses must safeguard their reputation by fulfilling their debt obligations since they are aware that the market is keeping an eye on them.

Larger companies could also take on ambitious projects that require more funding than they can generate domestically, necessitating the need for debt financing. The demand for borrowing as well as the willingness of lenders to grant credit to larger companies are crucial elements that support the favorable link between business size and leverage. Larger SOEs' rising debt levels may also be a result of government assistance in the form of subsidies and guarantees.

*Risk*

Risk and leverage are found to be statistically significantly inversely related (at the 1% level). This suggests that riskier businesses have less debt since the consequences of financial instability are higher for them. This can be explained by the idea that riskier companies might experience severe penalties in the loan market, leading them to turn to alternative sources of funding. A high-risk image, which is frequently interpreted as a sign of bad credit, makes it less likely that SOEs would attract investor financing. This can also be read as having erratic cash flows, which suggests that the likelihood of using the tax shelter to its fullest extent is diminished. Due to the difficulty in honoring interest payments and the higher likelihood that the tax shield benefit will not be

completely used, firms with fluctuating cash flows should use less debt to avoid financial distress (Demirgüç-Kunt et al., 2020; Frank & Goyal, 2009). The trade-off theory predicts that riskier enterprises should utilize less debt since the increased risk is inimical for shareholders. In addition, the government may provide financial support to SOEs with high profits volatility, however, there may be tight terms and conditions attached to the grant.

*Tax*

At the 1% level of significance, a statistically significant and favorable link between tax and leverage is discovered. This result backs up the trade-off theory, which states that businesses will take on more debt to reap the tax benefits of lower interest rates. Taxation also affects the leverage distribution differently at the top versus the bottom. This shows that taxes affect capital structure differently for companies with higher debt levels compared to companies with lower debt levels. The trade-off theory's predictions are supported by this finding.

*Probability of bankruptcy*

At the 5% confidence level, the likelihood of bankruptcy is statistically significant and negative. This conclusion is also consistent with the trade-off theory's predictions that there is a negative correlation between leverage and bankruptcy risk since higher bankruptcy costs are anticipated as bankruptcy risk rises. To lower the expenses of bankruptcy, firms need to cut their debt levels. If managers believe bankruptcy to be expensive, the likelihood of bankruptcy can be decreased. Debt can then provide an incentive for individuals to work more, consume fewer luxuries, and make wiser financial choices to decrease the likelihood of this happening (Harris & Raviv, 1991).
The threat of bankruptcy forces businesses with lesser profitability to lower their target debt levels because a decline in profitability increases the cost of bankruptcy. Similar to the previous point, more unpredictable earnings suggest lower tax rates for businesses and higher expenses associated with bankruptcy, which should encourage smaller and less diverse businesses to reduce their target leverage. These results show that when the costs of financial hardship are high or the likelihood of bankruptcy increases, SOEs that adhere to the trade-off theory limit their usage of debt.

As shown by the high debt ratios, the trade-off theory becomes the main driver of financing decisions at high levels of debt financing. Bankruptcy costs climb at an increasing rate while tax savings rise at a decreasing rate if the departure from the acceptable debt level is from above. The lost tax savings increase while the avoided bankruptcy costs increase at a decreasing rate when the deviation from the intended debt level is below. Both of these circumstances offer SOEs significant incentives to realign their capital structures in the direction of the aim, making the speed of adjustment an escalating function of the deviation.

The conclusion that South African SOEs adhere to the trade-off hypothesis is strongly supported by the above results. This conclusion is based on empirical evidence that a target capital structure exists and that a SOA of 21.5% per year is being made toward the target. The majority of studies have found a few key factors that may have an impact on financing behavior in terms of capital structure theories. Researchers have used the variables' behavior to determine whether the theory holds for observed practice. As a result, the behavior of the determinants was taken into account in addition to the initial methods of evaluating the trade-off theory.

## CONCLUSIONS

To conclude, the inference that South African SOEs employ the trade-off theory is backed by substantial evidence. This conclusion is based on empirical evidence that a target capital structure exists and that a speed of adjustment of 21.5% per annum towards the target.

As a result, the behavior of the determinants was taken into account in addition to the initial means of evaluating the trade-off theory. As discussed previously, the majority of the results were

consistent with the theoretical predictions of the trade-off theory of the determinants of the capital structure.

The high debt ratios and the existence of a target capital structure in which the difference between the current and the target debt level is closed at an average speed of adjustment are further indications that the trade-off theory is indeed a major driving force behind financing decisions at high levels of debt financing for the South African SOEs.

In conclusion, this study makes contributions to management decision-making as well as theoretical knowledge. Theoretical ramifications include strengthening the debt structure literature, developing the trade-off theory, and solving-knowledge gaps related to SOEs. Informed decision-making, strategic and innovative thinking, and risk management are all managerial implications for achieving financial sustainability. By offering these insights, the article contributes to the larger capital structure research and provides advice to high-ranking government officials on how to make sound debt structure decisions.

## LIMITATIONS & FURTHER RESEARCH

- Executives have the potential to alter profitability metrics, these metrics have come under critics as an indicator of an SOE's performance that could sway the outcomes. Future studies should consider other metrics.
- Using audited financial statements does not guarantee that accounting policies are uniform, hence different SOEs may have different practices. The outcomes could be considerably impacted by this.
- The study was limited to commercial SOEs whose data was available for the reporting period on the McGregor database or the SOE's website. Hence, the findings may not be generalizable to all SOEs without additional research.
- Future research can be conducted given that government guarantees impose a serious burden on the fiscus, research could be conducted on the influence of issued and exposed government guarantees on central government debt.

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