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The Drivers of Debt Financing Within State-Owned Corporations in South Africa

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ABSTRACT

The public sector financial management reforms being adopted by many countries, such as South Africa, have encouraged the adoption of private-sector management style, such as debt management, within the state-owned corporations. The reform agenda on debt financing is that state-owned corporations should face competitive conditions regarding access to finance. To highlight on the achievements of these reforms, this study explored the questions as to whether the drivers of debt financing within state-owned corporations in South Africa are similar to those of private-sector corporations. Applying a hybrid of cross sectional and longitudinal quantitative surveys, a panel data regression model was used to analyse data from 26 income-generating state-owned corporations in South Africa for the eight-year period 2007-2014 using the generalized method of moments (GMM). The results identified the main determinants of debt financing within the state-owned corporations in South Africa to include asset tangibility, corporation's growth and liquidity.

Keywords: Debt financing, State-owned corporations, Debt management, Public financial management, drivers of debt financing

INTRODUCTION

State-owned corporations are believed to be less efficient than their private counterparts (Ramstetter & Ngoc, 2013, p. 28). The managers of state-owned corporations are constantly tempted to base decisions, including debt financing, on political rather than market criteria, and strategic state investment may be misdirected because of simple miscalculation ((Fukuyama, 1995, p. 96); (MacCarthaigh, 2011, p. 215)). The financing decisions of state-owned corporations are unique compared to the private-sector corporations. The decisions are made by the Chief Executive Officers (CEO) with technical advice from the finance managers or officers. If the intended borrowing involves a large amount, then the financing strategy must be approved by the Board of Directors or the Cabinet Secretary or Minister in charge of the state-owned corporation ((Palcic & Reeves, 2013, p. 121); (OECD, 2005, p. 21)).

Most state-owned corporations get their financial resources from foreign governments, from the private sector, from the revenue generated internally and from their own governments in the form of bona fide loans (Gantt & Dutto, 1968, p. 115). In addition to these sources of finance, some of them also get central government or international grants which they treat as increase in equity. The financing practice of state corporations also varies from one country to another and from one corporation to another. Adamolekum (1999, p. 40), argued that financing within state-owned corporations has also been a critical issue in most countries, particularly because of the strong linkage between finance and autonomy. This study therefore, attempted to identify the major drivers of debt financing within state-owned corporations in a developing country like South Africa.

In South Africa, public-sector management reforms towards a responsive, accountable and transparent state, including the state-owned corporations, were declared by the African National Congress (ANC) leadership about a decade ago (Wenzel, 2007, p. 50). However, Wenzel (2007, p. 50) argued that, in practice, anticipation is narrowed to consultation or simply information dissemination and propaganda. He observed that the shift from a traditional bureaucratic model to the market model of governance, including debt financing, was based on the belief that private-sector financial-management methods are generally superior.

Further, the public sector financial management reforms, being adopted by many countries, such as South Africa, have encouraged the adoption of private-sector management style, such as debt management, within the state-owned corporations (Koppell, 2007, p. 255). The reforms are geared towards the improvement of financial performance of state-owned corporations from emerging economies, like South Africa. The reform agenda on debt financing is that state-owned corporations should face competitive conditions regarding access to finance (OECD, 2005, p. 21). Their relations with state-owned banks, state-owned financial institutions and other state-owned companies should be based on purely commercial grounds. The state-owned corporations should further be subject to the same high quality accounting and auditing standards as listed companies. To achieve the objectives of these reforms, this study explored the questions as to whether the drivers of debt financing within state-owned corporations in South Africa are similar to those of private-sector corporations.

LITERATURE REVIEW

Theories of debt financing

In one of his early studies, Myers (2001, p. 81) argued that there is no universally accepted theory of debt-equity choice and there is no reason to expect one. Nevertheless, he assents to the fact that there are a number of conditional theories which have been established. The accepted theories start with the celebrated capital structure irrelevance proposition by Modigliani and Miller (1958, p. 268), developed in 1958. They argued in their first proposition that the market value of any firm is independent to its capital structure and is given by capitalizing its expected return at the rate appropriate to the risk class. Simply put, the debt financing level of the firm has no effect on the value of the corporation. The proposition was theoretically very sound but was based on the assumptions of perfect capital market and no tax world, which are not valid in reality.

The Modigliani and Miller paper inspired serious research dedicated to challenging the irrelevance proposition as a matter of theory or as an empirical matter. These consequential researches have shown that the Modigliani–Miller theorem does not apply under a selection of conditions (Frank & Goyal, 2005, p. 140). The most frequently adopted conditions include consideration of taxes, transaction costs, bankruptcy costs, agency conflicts, adverse selection, lack of division between financing and operations, time-varying financial market opportunities, and investor clientele effects.

Since so many different conditions that may affect debt financing levels within a corporation are available, it is not surprising that many different theories have been proposed after the Modigliani and Miller proposition. Most corporate finance literature point to the "trade-off theory", in which taxation and deadweight bankruptcy costs are taken into consideration (Frank & Goyal, 2009, p. 1). Myers (1984, p. 581) proposed the "pecking-order theory" in which there is preference of retained earnings, debt and then equity. Frank and Goyal (2009, p. 1) argued that the idea that firms engage in "market timing" has also become popular, especially for publicly-traded corporations. Finally, the "agency theory" lurks in the background of much of the theoretical discussion. Agency concerns are normally included in the trade-off framework when deduced broadly. Each theory, however, has tried to explain the reasons behind the choice between debt financing and other forms of financing within corporations.

Drivers of debt financing

There are extensive studies on factors influencing debt financing within private-sector corporations. However, very few or none has been applied entirely on state-owned corporations, more so from Kenya. The few studies, such as Majumdar and Chhibber (1999, p. 291); Dewenter and Malatesta (2001, p. 320); King and Santor (2008, p. 2426); Huang and Song (2006, pp. 16-17) and Lim (2012, p. 191), that have attempted to look at the factors influencing debt-financing decisions within state-owned corporations, have only concentrated on stock exchange-listed corporations, which included some state-owned corporations which are listed in the stock exchange.

The empirical results from most studies on private-sector corporations have identified different factors depending on the industry and the economic environment of the country (Mokhova & Zinecker, 2014, p. 534). The previous studies have identified the specific factors of corporations, such as profitability, corporation size, asset tangibility, corporation growth, corporation risk, corporation tax, liquidity, probability of bankruptcy and corporation age. In addition, macroeconomic factors, such as gross domestic product, inflation and interest rates, have also been identified as factors influencing debt-financing decisions within corporations.

Profitability

Some studies have identified that profitability influences debt-financing decisions negatively within corporations, under the pecking order theory (Baltacı & Ayaydın, 2014, p. 54; Bassey, Arene, & Okpukpara, 2014, p. 43; Lemma & Negash, 2013, p. 1083; Moosa & Li, 2012, p. 10). Other studies also identified a positive influence of profitability on debt-financing decisions within corporations, in support of the trade-off theory (Chakraborty, 2013, p. 117; Gungoraydinoglu & Öztekin, 2011, p. 1467; Kouki & Said, 2012, p. 221).

Corporation size

Further, in line with the trade-off theory, many studies have identified corporation size to have a positive influence on debt financing of corporations (Baltacı & Ayaydın, 2014, p. 53; Bassey et al., 2014, p. 44; Dang, 2013, p. 180; Forte, Barros, & Nakamura, 2013, p. 362; Jõeveer, 2013, p. 306; Kouki & Said, 2012, p. 221). Some studies also observed a negative influence of corporation size on debt financing of corporations, confirming the proposition of the pecking order theory (Chakraborty, 2013, p. 118; Gaud, Hoesli, & Bender, 2007, p. 206; Majumdar 2012, p. 21; Smith, 2012, p. 144).

Asset tangibility

The pecking order theory recognizes a negative relationship between the asset tangibility and debt-financing level, whereas the trade-off theory supports a positive one (Baltacı & Ayaydın, 2014, p. 50). Some studies like Smith (2012, p. 144); Dang (2013, p. 179); Drobetz, Gounopoulos, Merikas, and Schröder (2013, p. 51); Lemma and Negash (2013, p. 1104); Antonczyk and Salzmann (2014, p. 145) and Bassey et al. (2014, p. 44) have reported a positive relationship between tangibility and debt financing. Other studies, like Öztekin and Flannery (2012, p. 107); (Kouki & Said, 2012, p. 222); Lemma and Negash (2013, p. 1104); Jõeveer (2013, p. 306) and Baltacı and Ayaydın (2014, p. 54), reported a negative relationship, especially when more than one measure is used for debt-financing levels.

Corporation growth

The expected theoretical relationship between corporation growth opportunities and debt is negative in line with the trade-off and agency theories since the growth of corporations increases financial distress and the agency costs of debt (Deesomsak, Paudyal, & Pescetto, 2004, p. 393). Most observations have supported the negative relationship between a corporation's growth opportunities and its debt financing level (Chakraborty, 2013, p. 117; Dang, 2013, p. 180; Lemma & Negash, 2013, p. 1104; Mateev, Poutziouris, & Ivanov, 2013, p. 43). On the other hand, some observations, like Cortez and Susanto (2012, p. 129); Forte et al. (2013, p. 362); Alzomaia (2014, p. 61); Antonczyk and Salzmann (2014, p. 145) and Bassey et al. (2014, p. 44), have shown a positive relationship.

Corporation risk

Studies, like Lim (2012, p. 197); Drobetz et al. (2013, p. 51); Forte et al. (2013, p. 364); Alzomaia (2014, p. 61) and Baltacı and Ayaydın (2014, p. 54), have found a negative relationships between corporation risk and debt financing. On the contrary, Gaud, Jani, Hoesli, and Bender (2005, p. 63); Foster and Young (2013, p. 7) and Lemma and Negash (2013, p. 1109) found both positive and negative relationships when they used different measures of debt-financing level.

Corporation tax

Few studies that have found some reasonable results for taxation, like Huang and Song (2006, p. 32); Antoniou, Guney, and Paudyal (2008, p. 73); De Jong, Kabir, and Nguyen (2008, p. 1961); Foster and Young (2013, p. 6) and Jõeveer (2013, p. 306), have established a negative relationship. Conversely, Antonczyk and Salzmann (2014, p. 146), studying corporations across different countries, identified a positive relationship and Lemma and Negash (2013, p. 1104) observed both a positive relationship, for some countries in Africa, and a negative relationship for others within the continent.

Liquidity

Empirically, studies such as Deesomsak et al. (2004, p. 398); Smith (2012, p. 157) and Mateev et al. (2013, p. 43) confirmed the expected negative theoretical relationship between liquidity and debt financing of corporations. On the contrary, Gungoraydinoglu and Öztekin (2011, p. 1467), looking at some new international evidence, found a positive relationship between liquidity and debt financing.

Non-debt tax shield

Studies, such as Cortez and Susanto (2012, p. 130); Lim (2012, p. 197) and Lemma and Negash (2013, p. 1105), found a negative influence of non-debt tax shield on debt financing of corporations. On the contrary, studies like Kouki and Said (2012, p. 221); Chakraborty (2013, p. 117); Dang (2013, p. 179) and Antonczyk and Salzmann (2014, p. 145), found a positive relationship between non-debt tax shields and debt financing.

Probability of bankruptcy

Trade-off hypothesis predicts a negative relationship between probability of bankruptcy and debt financing (Kayo & Kimura, 2011, p. 360). Justifying this hypothesis, Smith (2012, p. 160) found a negative relationship using total debt to total assets as a measure of debt financing level, while Gaud et al. (2005, p. 63) and Kouki and Said (2012, p. 221) found a positive relationship in support of the pecking order theory of debt financing (Titman & Wessels, 1988, p. 6).

Gross domestic product

Most studies on macroeconomic factors of debt financing have found statistically significant results between the gross domestic products (GDP) of countries and the debt-financing levels of corporations. Good examples are De Jong et al. (2008, p. 1966); Gungoraydinoglu and Öztekin (2011, p. 1467) and Baltacı and Ayaydın (2014, p. 54) which found a statistically significant positive relationship between the GDP and corporations' debt financing levels. In contrast, Kayo and Kimura (2011, p. 367); Drobetz et al. (2013, p. 67) and Jõeveer (2013, p. 306) also found statistically significant results but with a negative relationship.

Inflation rate

The empirical results of the inflation rate have not been consistent (Mokhova & Zinecker, 2014, p. 533). Literature reviewed by Gungoraydinoglu and Öztekin (2011, p. 1467); Drobetz et al. (2013, p. 67); Jõeveer (2013, p. 306); Antonczyk and Salzmann (2014, p. 146) and Baltacı and Ayaydın (2014, p. 54) found a negative relationship between inflation and debt financing. On the other hand, Frank and Goyal (2009, p. 26) found a positive relationship, in contrast to the above hypothesis.

Interest rates

Few studies have found any statistically significant relationships between interest rates and debt financing. Antoniou et al. (2008, p. 32) and Mokhova and Zinecker (2014, p. 534) found a negative relationship while studying the macroeconomic factors of debt financing levels of corporations of European countries.

Other factors

Other studies have attempted to find observations on other factors which have not been frequently studied. For instance, Welch (2004, p. 120); Frank and Goyal (2009, p. 14) and Baltacı and Ayaydın (2014, p. 53) found a positive relationship between the industry's mean debt financing level with the corporation's debt-financing level. De Jong et al. (2008, p. 1965) found a positive relationship between financial institutions' development and corporations' debt financing, while Kayo and Kimura (2011, p. 367) found a positive relationship between the two. Smith (2012, p. 155) and Bassey et al. (2014, p. 44) also observed a negative relationship between the corporation's age and its debt financing level, which is consistent with the theoretical expectation of the pecking order theory of debt financing. Jõeveer (2013, p. 306) incorporated the corporation's corruption perception index in his study and found that it was positively related to the corporation's debt financing level.

METHODOLOGY

The study applied a hybrid of cross sectional and longitudinal quantitative surveys. Rindfleisch, Malter, Ganesan and Moorman (2008: 276), in their study of cross-sectional versus longitudinal, argued that both the designs have limitations and a combination will give a strong output. Therefore, the combination of the techniques allowed the researcher to analyse data across state-owned corporations and also over a period of eight years from 2007 to 2014.

The population of this study was defined in terms of the number of state-owned corporations established by the Acts of Parliament in South Africa. The population frame data was from the official website of the Department of Government Communication and Information System of Republic of South Africa. According to this data, there are 128 established state corporations in South Africa, out of which 26 are income-generating corporations (State-owned corporations). Hence, the target population for this study was made up of the 26 income-generating state corporations in South Africa as at 31st December 2014.

The sample size for the study is made up of all the 26 income-generating corporations, selected from the general population using the stratified non-probability sampling technique. The non-income generating corporations are excluded from the study, since their financial performance is not profit based and may not be influenced by market-oriented decisions, such as debt financing strategies. Struwig and Stead (2013, p. 116) argued that the non-probability sampling technique should be used in special cases, usually when the population has much in common, like the case of income-generating state corporations.

The study used the information from the financial statements to measure the study variables across the state-owned corporations. In addition, ratio analysis was used to measure the variables from the financial statements over the eight-year period. Most of the study variable measures were extracted from the financial statements of the state-owned corporations for the eight-year period 2007-2014 and the macroeconomic variables were collected from the World Bank country data. The financial statements were collected from the official websites of the 26 targeted state-owned corporations.

In the identification of drivers of debt financing, the study used a multiple-linear panel-data regression model 1, which has been applied by most studies such as Gungoraydinoglu and

Öztekin (2011, p. 1461); Cortez and Susanto (2012, p. 128); Lim (2012, p. 196); Moosa and Li (2012, p. 7); Smith (2012, p. 146); Chakraborty (2013, p. 113); Drobetz et al. (2013, p. 59); Lemma and Negash (2013, p. 1092); (Alzomaia, 2014, p. 62) and (Bassey et al., 2014, p. 41). The applied multiple regression panel data model is of the form:

$$\boldsymbol{Y_{it} = a_0 + \sum_{k=1}^{N} \beta_k X_{kit} + \mu_{it} + \varepsilon_{it}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \mathbf{1}$$

Where $\boldsymbol{Y_{it}}$ is a measure of debt financing (financial leverage) of firm i in year t and X represents the measure of independent variables (firm specific drivers and macroeconomic drivers). μ represents unobserved factors (either firm-specific or macroeconomic) and α_0 is the constant. β form $k = 1\ to\ N$ are unknown parameters to be estimated. The measure of independent variables X includes k factors which are the total number of all factors influencing debt financing observed in this study. The independent variables and their respective measures are given in table 3.1. The independent variables include both the firm-specific drivers and macroeconomic drivers. In addition, to establish the significance of the variables in each of the regression models, the t-test was applied at 90%, 95% and 99% levels of confidence.

The common regression model estimator, from the reviewed literature, appears to be the pooled ordinary least squares (Guthrie & Olson) method and the generalized method of moments (GMM). However, this study estimated the coefficients of multiple regression models 1 above, using the independent and dependent variables of the study, through the GMM system panel regression model. According to Bond (2002, pp. 141-142), panel data models have an advantage over pooled ordinary least squares (Guthrie & Olson) model since the former incorporates the cross-sectional and longitudinal variables of the model. The panel data advantages over pooled ordinary least squares (Guthrie & Olson), therefore, include the possibility that underlying microeconomic dynamics (heterogeneity) may be concealed by pooling biases, and the scope panel data offers to investigate heterogeneity in adjustment dynamics between different types of individuals, household or corporations.

Table 3.1 : Research variables and measures

Variable	Measure	Formulae (Proxy)
Dependent Variables		
Total debt ratio	TDR	Total debt/Total assets
Long-term debt ratio	LDR	Long-term debt/Total assets
Short-term debt ratio	SDR	Short-term debt/Total assets
Independent Variables		
Profitability	PROF	Operating profit/Annual sales
Corporation size	SIZ	Natural logarithm of total assets
Asset tangibility	TANG	Tangible assets/Total assets
Corporation growth	GROW	Percentage (%) change in total assets
Corporation risk	RISK	Standard deviation of operating profits/Total assets
Corporation tax rate	TAX	Income tax charge/Profit before tax
Liquidity	LIQ	Current assets/Current liabilities
Non-debt tax shield	NDTS	Depreciation charge/Operating profit
Probability of bankruptcy	BKCY	Interest charge/Operating profit
Gross domestic product	GDP	Annual GDP of the country
Inflation rate	INFL	Annual average inflation rate
Interest rates	INT	Annual average commercial banks lending rates
Financial markets conditions	FMC	Market capitalization

Table 3.1 represents the research variables and measures, followed by their proxies.

It has been observed that endogeneity is a common problem that econometric model research, such as debt financing, has to deal with. In regard to this observation, Lemma and Negash (2013, p. 1092) argued that modern debt-financing research should apply system-GMM procedures, which are robust to data endogeneity problems (Antoniou et al., 2008, p. 61; Baltacı & Ayaydın, 2014, p. 51; Dang, 2013, p. 175; Gaud et al., 2007, p. 206; Gaud et al., 2005, p. 58; Gungoraydinoglu & Öztekin, 2011, p. 1462; Mateev et al., 2013, p. 42; Öztekin & Flannery, 2012, p. 90). In other words, the system-GMM estimator controls for the presence of unobserved firm-specific effects and for the endogeneity of explanatory variables (Mateev et al., 2013, p. 42). According to Bond (2002, p. 160), the system-GMM method is particularly useful when the panel regression model of interest contains endogenous or predetermined explanatory variables, but the processes generating these series are not completely specified. Therefore, a specification test is done to show that the excluded variables have explanatory power for the right-hand-side endogenous variables, the instruments are uncorrelated with the error term and that the exclusion restrictions are valid.

Under the system-GMM estimator procedure, the panel regression equation 1, for drivers of debt financing will be changed into equation 2.

$$\boldsymbol{Y_{it} = a_0 + \lambda Y_{it-1} + \sum_{k=1}^{N} \beta_k X_{kit} + \mu_{it} + \varepsilon_{it}} \quad \text{.....2}$$

Where the new variable $\boldsymbol{Y_{it-1}}$ is the lagged value of the dependent variable, i.e., lagged value of financial leverage, with its coefficient $\boldsymbol{\lambda}$. The presence of the lagged dependent variable $\boldsymbol{Y_{it-1}}$ controls for autocorrelation or serial correlation within the dependent variables.

In addition, the regression analysis process required data cleaning in order to achieve better results. Since, the debt financing procedures of state-owned corporations within the financial sector are unique, the data from state-owned corporations from the financial sector were excluded from the regression analysis (Alzomaia, 2014, p. 59; Lemma & Negash, 2013, p. 1093). Further, for a better trend analysis, the data from financial statements used in the regression analysis included figures for the eight-year period from 2007 to 2014, subject to availability of the statements.

The data analysis was done using the Data analysis and Statistically Software (STATA) and the presentations and discussions of the results are shown below. In the analysis of GMM panel data regression model, the Arellano-Bond GMM estimator in STATA software was applied, since, in addition to the aforementioned benefits of using system-GMM estimator, it was designed for small-time series (T), in this case a minimum of eight years, and large cross-sectional individual observations (N), in this case, 17 non-financial state-owned corporations.

RESULTS

Summary statistics

Table 4.1 demonstrates the summary statistics for the regression analysis used for identifying the major drivers of debt financing within the state-owned corporations in Kenya.

Table 4.1: Summary statistics for the regression analysis models from 2007 to 2014

Variable	Mean	Std. Dev.	Min	Max	Observations
TDR	0.679	0.999	0.045	8.548	125
LDR	0.370	0.826	0.000	7.082	125
SDR	0.306	0.287	0.019	1.556	125
PROF	0.066	0.275	-1.436	1.017	123
SIZ	22.672	1.831	15.943	26.948	125
TANG	0.648	1.550	0.035	12.715	124
GROW	0.082	0.200	-1.000	0.845	110
RISK	0.079	0.057	0.010	0.270	124
TAX	4.291	33.046	-1.915	276.831	124
LIQ	2.417	2.409	0.085	12.588	125
NDTS	0.558	2.477	-6.261	19.413	122
BKCY	0.261	0.914	-3.640	6.623	124
GDP	2.403	1.837	-1.538	5.361	136
INFL	6.562	2.106	4.262	11.537	136
INT	10.651	2.284	8.500	15.125	136

Table 4.1 shows that the mean of total debt ratio is almost 0.7 (0.679) with a standard deviation of 0.999 and minimum of 0.045, and a maximum of 8.548. This indicates that use of debt is a

common practice amongst the state-owned corporations in South Africa, with some state-owned corporations having a total debt being eight times more than the total assets (insolvent). On the other hand, table 4.1 also shows that the use of long-term debt, with a mean of 0.37, makes more than half of the total debt. The minimum value (0.00) of long-term debt indicates that there are some state-owned corporations in South Africa which use only short-term debt as a form of debt financing.

Correlation analysis

Table 4.2 presents the Pearson correlation coefficients (r) for the panel data regression analysis variables used in the study. Table 4.2 presents all variables used in the identification of the drivers of debt financing within the state-owned corporations in South Africa. The table shows that the total debt leverage (TDL), long-term debt leverage (LDL) and short-term debt leverage (SDL), which are measures of debt-financing, have a significant strong positive correlation (0.942, 0.973 and 0.514 respectively) with the tangibility of state-owned corporations in South Africa. This indicates that state-owned corporations with more tangible assets tend to have more of debt financing, both long-term and short-term debts, since tangible assets can be used as collateral for the acquired debt.

On the other hand, table 4.2 shows a significant positive correlation between the measures of debt financing (TDL, LDL and SDL) and state-owned corporation's growth, i.e. -0.364, -0.369 and -0.226 respectively. This implies that as state-owned corporations grow, the level of their debt financing tend to reduced, but at a low rate. Further, the correlation analysis results also highlight a significant negative correlation between all the three debt financing measures (TDL, LDL and SDL) and liquidity level of state-owned corporations, i.e. -0.256, -0.165 and -0.459 respectively. This also indicates that state-owned corporations which are liquid enough tend to have slightly low levels of debt financing, both long-term and short-term.

Table 4.2: Correlation Analysis

	TDL	LDL	SDL	PROF	SIZ	TANG	GROW	RISK	TAX	LIQ	NDTS	BKCY	GDP	INT	FMC
TDL	1														
LDL	0.975***	1													
SDL	0.724***	0.555***	1												
PROF	0.094	0.126	0.039	1											
SIZ	0.049	0.086	-0.092	0.200*	1										
TANG	0.942***	0.973***	0.514***	0.117	0.089	1									
GROW	-0.364***	-0.369***	-0.226*	-0.088	0.086	-0.359***	1								
RISK	0.163	0.143	0.171*	0.109	-0.050	0.137	0.101	1							
TAX	-0.013	-0.023	-0.020	-0.072	-0.107	-0.003	-0.116	-0.283***	1						
LIQ	-0.255***	-0.165*	-0.459***	-0.254***	-0.058	-0.133	-0.023	-0.151	-0.064	1					
NDTS	-0.007	-0.035	-0.148	-0.100	-0.100	-0.001	-0.038	-0.056	-0.016	-0.218**	1				
BKCY	-0.018	-0.035	-0.192**	-0.123	-0.199**	-0.025	-0.006	-0.080	-0.004	-0.263***	-0.806***	1			
GDP	-0.024	-0.024	-0.020	-0.028	-0.004	-0.023	-0.021	-0.030	-0.074	-0.016	-0.082	-0.002	1		
INT	-0.099	-0.111	-0.033	-0.126	-0.085	-0.112	-0.094	-0.105	0.215**	-0.034	-0.091	-0.057	-0.061	1	
FMC	0.126	-0.130	-0.073	-0.109	-0.036	-0.126	-0.060	-0.048	-0.105	-0.061	-0.147	-0.056	-0.289***	-0.470***	1

The table presents all the variables used in identification of the drivers of debt financing within the state-owned corporations in South Africa. The symbols *, **, and * indicate significance at the 1, 5 and 10 percent levels, respectively.**

Drivers of debt financing

The generalized method of moments (GMM) estimator using panel data regression equation 2 was applied in the process of identification of the drivers of debt financing within the state-

owned corporations in South Africa. Table 4.3 presents the total debt leverage (TDL) regression model results.

Table 4.3: Total Debt Leverage model results

Dynamic panel-data estimation, one-step system GMM						
Group variable: id				Number of obs =	80	
Time variable : year				Number of groups =	17	
Number of instruments = 80				Obs per group: min =	2	
Wald chi2(12) = 4085.18				Avg =	4.71	
Prob > chi2 = 0.000				max=	5	
TDL	**Coef.**	**Std. Err.**	**z**	**P>z**	**[95% Conf.**	**Interval]**
TDL						
L1.	0.309	0.034	9.200	0.000	0.243	0.375
PROF	-0.112	0.071	-1.570	0.116	-0.251	0.028
SIZ	-0.011	0.012	-0.990	0.324	-0.034	0.011
TANG	0.530	0.013	39.530	0.000	0.504	0.556
GROW	0.292	0.113	2.590	0.010	0.071	0.513
RISK	0.459	0.408	1.120	0.261	-0.341	1.259
LIQ	-0.045	0.008	-5.500	0.000	-0.061	-0.029
NDTS	-0.001	0.019	-0.050	0.957	-0.039	0.037
BKCY	0.019	0.048	0.400	0.692	-0.075	0.113
GDP	0.148	0.078	1.900	0.057	-0.005	0.300
INFL	0.175	0.099	1.770	0.076	-0.019	0.369
INT	0.105	0.053	1.990	0.047	0.001	0.209
_cons	-1.771	1.197	-1.480	0.139	-4.117	0.575
Arellano-Bond test for AR(1) in first differences: z = -1.66 Pr > z = 0.097						
Arellano-Bond test for AR(2) in first differences: z = -2.12 Pr > z = 0.034						
Sargan test of overid. restrictions: chi2(67) = 209.95 Prob > chi2 = 0.000						

The p>z values in table 4.3 shows that the lagged total debt leverage (TDL) (0.309) is significant at 99%, implying that the previous period's total debt (debt financing) has a significant positive (0.309) influence on the current period's total debt (debt financing). In addition, the table also shows that the significant drivers of debt financing are tangibility (TANG), corporation's growth (GROW) and liquidity (LIQ), which are all significant at 99% confidence interval levels. Both corporation's tangibility and growth coefficients' are positive, 0.530 and 0.292 respectively. This indicates that state-owned corporations in South Africa, with more tangible assets and high growth rates, use more of debt financing. This may hold since growth requires more funding and tangible assets can easily be offered as collateral for debt financing.

On the other hand, the table 4.3 shows that coefficient of corporation's liquidity is negative (-0.045) which indicates that liquid state-owned corporations in South Africa borrow less. The table also shows that the macroeconomic factors, such as the nation's GDP, inflation and

interest rates are positively (0.148, 0.175 and 0.105 respectively) related with total debt, though significant mostly at 90% interval levels. These results indicate that has the nation's GDP, inflation (INFL) and interest rates (INT) increase, the debt financing levels of state-owned corporations in South Africa tend to increase, but the influence is not very significant.

Table 4.4 presents the long-term debt leverage (LDL) panel data regression model results. The long-term debt leverage (LDL) results are mostly consistent with the total debt leverage (TDL) results in table 4.3.

Table 4.4: Long-term Debt Leverage model results

Dynamic panel-data estimation, one-step system GMM						
Group variable: id				Number of obs =	80	
Time variable : year				Number of groups =	17	
Number of instruments = 80				Obs per group: min =	2	
Wald chi2(12) = 8987.81				Avg =	4.71	
Prob > chi2 = 0.000				max =	5	
LDL	**Coef.**	**Std. Err.**	**z**	**P>z**	**[95% Conf.**	**Interval]**
LDL						
L1.	0.257	0.025	10.400	0.000	0.208	0.305
PROF	0.009	0.040	0.220	0.824	-0.070	0.088
SIZ	0.002	0.007	0.310	0.757	-0.011	0.015
TANG	0.462	0.008	57.670	0.000	0.446	0.478
GROW	0.204	0.064	3.200	0.001	0.079	0.329
RISK	0.307	0.231	1.330	0.184	-0.146	0.759
LIQ	-0.011	0.005	-2.480	0.013	-0.020	-0.002
NDTS	-0.014	0.011	-1.320	0.186	-0.036	0.007
BKCY	0.048	0.027	1.770	0.076	-0.005	0.102
GDP	0.075	0.044	1.700	0.089	-0.012	0.162
INFL	0.082	0.056	1.470	0.142	-0.028	0.193
INT	0.054	0.030	1.770	0.076	-0.006	0.113
_cons	-1.164	0.678	-1.720	0.086	-2.494	0.165
Arellano-Bond test for AR(1) in first differences: z = -1.69 Pr > z = 0.090						
Arellano-Bond test for AR(2) in first differences: z = -1.37 Pr > z = 0.169						
Sargan test of overid. restrictions: chi2(67) = 240.72 Prob > chi2 = 0.000						

The LDL regression results also show that the corporation's tangibility (TANG) and growth (GROW) have positive coefficients (0.462 and 0.204 respectively), with 99% confidence interval level. Liquidity (LIQ) has a negative (-0.011) coefficient, with a 95% confidence interval level. In addition, table 4.4 also shows that corporation's bankruptcy (BKCY), GDP and interest rates (INT) have positive coefficients (0.048, 0.075 and 0.054 respectively), all with 90% confidence interval levels. Furthermore, the lagged LDL results is also positive (0.257) and significant at 99% confidence interval level.

Table 4.5 presents short-term debt leverage (SDL) regression model results of the study. The results also show some consistency with the total debt leverage (TDL) model and long-term debt leverage (LDL) model results.

Table 4.5: Short-term Debt Leverage model results

Dynamic panel-data estimation, one-step system GMM						
Group variable: id				Number of obs =	80	
Time variable : year				Number of groups =	17	
Number of instruments = 80				Obs per group: min =	2	
Wald chi2(12) = 422.39				Avg =	4.71	
Prob > chi2 = 0.000				max =	5	
SDL	**Coef.**	**Std. Err.**	**z**	**P>z**	**[95% Conf.**	**Interval]**
SDL						
L1.	0.710	0.060	11.870	0.000	0.593	0.828
PROF	-0.071	0.050	-1.410	0.157	-0.170	0.027
SIZ	-0.004	0.008	-0.430	0.667	-0.020	0.013
TANG	0.070	0.008	8.820	0.000	0.055	0.086
GROW	0.173	0.074	2.340	0.019	0.028	0.318
RISK	0.294	0.287	1.030	0.304	-0.267	0.856
LIQ	-0.018	0.006	-3.010	0.003	-0.030	-0.006
NDTS	0.012	0.014	0.880	0.381	-0.015	0.038
BKCY	-0.031	0.034	-0.930	0.355	-0.097	0.035
GDP	0.071	0.054	1.310	0.189	-0.035	0.176
INFL	0.088	0.069	1.280	0.199	-0.046	0.222
INT	0.046	0.037	1.240	0.213	-0.026	0.118
_cons	-0.902	0.827	-1.090	0.275	-2.524	0.719
Arellano-Bond test for AR(1) in first differences: z = -1.75 Pr > z = 0.081						
Arellano-Bond test for AR(2) in first differences: z = -1.72 Pr > z = 0.085						
Sargan test of overid. restrictions: chi2(67) = 91.75 Prob > chi2 = 0.024						

Table 4.5 shows that the significant drivers of debt financing within state owned corporations in South Africa area asset tangibility, corporation's growth and liquidity. As shown under total-debt leverage (TDL) and long-term debt (LTD) models, table 4.5 also highlights that asset tangibility (TANG) and corporation's growth (GROW) have a positive influence (0.070 and 0.173 respectively) on short-term debt financing of state-owned corporations in South Africa. On the other hand, the table shows that the liquidity (LIQ) of the corporation has a negative (-0.018) influence on the short-term debt financing of state-owned corporations in South Africa. In addition, the lagged variable for short-term debt financing (SDL) also has a significant positive (0.710) influence on the current period's short-term debt. This indicates that short-term debt of previous period has a strong positive on the short-term debt of the current period.

The regression models tables 4.3, 4.4 and 4.5 also presents the validity and reliability tests (i.e., Wald chi2 (F), AR (1), AR (2) and Sargan test for the models. The Arellano-Bond AR (1) and AR (2) p tests are applied under system-GMM models, to test for autocorrelation or serial correlation within the first difference (AR (1)) level and the second difference (AR (2)) level, respectively. It is expected that autocorrelation should only exist at level one, and not at level two. If there is autocorrelation in level one then the system-GMM model should report AR (1) $p<0.05$ at 95% level of confidence, and if there is no autocorrelation in level two, then AR (2) $p>0.05$ at 95% level of confidence (Blundell & Bond, 1998, p. 116; Bond, 2002, p. 149). Therefore, the system-GMM estimator results are more efficient when AR (1) is significant and AR (2) is insignificant, and are believed to be more accurate than other panel regression methods, such as the fixed effects (FE) and the random effects (RE) results.

The Wald test applied under system-GMM, to test the reliability of the estimators (coefficients) of the models, i.e., whether they are different from zero, symmetric and the estimator itself not seriously biased (Windmeijer, 2005, p. 26). The p (chi2) <0.05 of Wald test indicate that the model coefficients or estimators are reliable at 95% level of confidence. Further, Sargan tests are applied to test the validity of the models under system-GMM by testing the over-identifying restrictions of the instruments (variables) (Bond, 2002, p. 149; Windmeijer, 2005, pp. 37-41). Higher values of p (chi2) indicate that the model is robust, but weakened by many instruments, and low values indicate that the model is not robust, but not weakened by many instruments.

Therefore, the results of table 4.4 for long-term debt leverage (LDL), with AR (1) p-value = 0.090 and AR (2) P-value = 0.169 and Sargan test of p (chi2) = 0.000 is slightly a better model compared to TDL model, with AR (1) p = 0.097 and AR (2) P = 0.034, and SDL model, with AR (1) p = 0.081 and AR (2) P = 0.085. However, all the models highlights that the major drivers of debt financing amongst the state-owned corporations in South Africa are asset tangibility and corporation's growth, which have a positive influence, , and corporation's liquidity, which have a negative influence on their debt financing levels. These results are consistent with most studies on debt financing of private owned corporations, such as Smith (2012, p. 144); Dang (2013, p. 179); Drobetz et al. (2013, p. 51); Lemma and Negash (2013, p. 1104); Antonczyk and Salzmann (2014, p. 145) and Bassey et al. (2014, p. 44).

Further, the results also highlights that other macroeconomic factors such as the country's growth domestic product (GDP), inflation and prevailing interest rates also have a positive influence on the debt financing levels of state-owned corporations in South Africa. Nevertheless, these macroeconomic factors are only significant under the total debt leverage (TDL) regression model results. All the same, these macroeconomic results are also similar to results of other studies, such as Gungoraydinoglu and Öztekin (2011, p. 1467); Baltacı and Ayaydın (2014, p. 54) and Frank and Goyal (2009, p. 26).

CONCLUSION

As aforementioned, the public sector reform agenda on debt financing emphasises that state-owned corporations should face competitive conditions regarding access to finance. To highlight on the achievements of these reforms, this study explored the questions as to whether the drivers of debt financing within state-owned corporations in South Africa are similar to those of private-sector corporations. The key findings of the results have highlighted the main

drivers of debt financing within the state-owned corporations in South Africa to include asset tangibility, corporation's growth and liquidity, with minimal influence from the macroeconomic factors such as the growth domestic product (GDP), inflation and interest rates. The findings are consistent with most findings on studies of drivers of debt financing within the private owned corporations. It implies that the public sector reform agenda on debt financing, with emphasis on state-owned corporations embracing the private sector debt financing practice, is being achieved in South Africa.

References

Adamolekum, L. (1999). *Public Administration in Africa: Main issues and selected country studies*. United States of America: Westview Press.

Alzomaia, T. S. F. (2014). Capital Structure Determinats of Publicly Listed Companies in Saudi Arabia. *International Journal of Business & Finance Research (IJBFR), 8*(2), 53-67.

Antonczyk, R. C., & Salzmann, A. J. (2014). Overconfidence and optimism: The effect of national culture on capital structure. *Research in International Business and Finance, 31*(0), 132-151. doi: http://dx.doi.org/10.1016/j.ribaf.2013.06.005

Antoniou, A., Guney, Y., & Paudyal, K. (2008). The determinants of capital structure: capital market-oriented versus bank-oriented institutions. *Journal of financial and quantitative analysis, 43*(1), 59-92.

Baltacı, N., & Ayaydın, H. (2014). Firm, Country and Macroeconomic Determinants of Capital Structure: Evidence from Turkish Banking Sector. *EMAJ: Emerging Markets Journal, 3*(3), 47-58. doi: 10.5195/emaj.2014.46

Bassey, N. E., Arene, C. J., & Okpukpara, B. C. (2014). Determinants of Capital Structure of Listed Agro Firms in Nigeria. *Economic Affairs: A Quarterly Journal of Economics, 59*(1), 35-47. doi: 10.5958/J.0976-4666.59.1.004

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics, 87*(1), 115-143.

Bond, S. R. (2002). Dynamic panel data models: a guide to micro data methods and practice. *Portuguese economic journal, 1*(2), 141-162.

Chakraborty, I. (2013). Does capital structure depend on group affiliation? An analysis of Indian firms. *Journal of Policy Modeling, 35*(1), 110-120. doi: http://dx.doi.org/10.1016/j.jpolmod.2012.02.006

Cortez, M. A., & Susanto, S. (2012). The Determinants of Corporate Capital Structure: Evidence from Japanese Manufacturing Companies. *Journal of International Business Research, 11*, 122-134.

Dang, V. A. (2013). Testing capital structure theories using error correction models: evidence from the UK, France and Germany. *Applied Economics, 45*(2), 171-190.

De Jong, A., Kabir, R., & Nguyen, T. T. (2008). Capital structure around the world: The roles of firm-and country-specific determinants. *Journal of Banking & Finance, 32*(9), 1954-1969.

Deesomsak, R., Paudyal, K., & Pescetto, G. (2004). The determinants of capital structure: evidence from the Asia Pacific region. *Journal of Multinational Financial Management, 14*(4–5), 387-405. doi: http://dx.doi.org/10.1016/j.mulfin.2004.03.001

Dewenter, K. L., & Malatesta, P. H. (2001). State-owned and privately owned firms: An empirical analysis of profitability, leverage, and labor intensity. *The American Economic Review, 91*(1), 320-334.

Drobetz, W., Gounopoulos, D., Merikas, A., & Schröder, H. (2013). Capital structure decisions of globally-listed shipping companies. *Transportation Research Part E: Logistics and Transportation Review, 52*(0), 49-76. doi: http://dx.doi.org/10.1016/j.tre.2012.11.008

Forte, D., Barros, L. A., & Nakamura, W. T. (2013). Determinants of the Capital Structure of Small and Medium Sized Brazilian Enterprises. *BAR - Brazilian Administration Review, 10*(3), 347-369.

Foster, M. D., & Young, M. T. (2013). Capital Structure Determinants for Emerging Markets by Geographic Region. *Journal of Applied Financial Research, 1*, 55-87.

Frank, M. Z., & Goyal, V. K. (2005). Trade-off and pecking order theories of debt. *Handbook of empirical corporate finance, 2*, 135-202.

Frank, M. Z., & Goyal, V. K. (2009). Capital structure decisions: which factors are reliably important? *Financial Management, 38*(1), 1-37.

Fukuyama, F. (1995). Social capital and the global economy. *Foreign affairs, 74*(5), 89-103.

Gantt, A. H., & Dutto, G. (1968). Financial Performance of Government-Owned Corporations in Less Developed Countries (Le comportement financier des entreprises d'Etat dans les pays moins développés)(Comportamiento financiero de las empresas públicas de los países menos desarrollados). *Staff Papers-International Monetary Fund*, 102-142.

Gaud, P., Hoesli, M., & Bender, A. (2007). Debt-equity choice in Europe. *International Review of Financial Analysis, 16*(3), 201-222.

Gaud, P., Jani, E., Hoesli, M., & Bender, A. (2005). The Capital Structure of Swiss Companies: an Empirical Analysis Using Dynamic Panel Data. *European Financial Management, 11*(1), 51-69. doi: 10.1111/j.1354-7798.2005.00275.x

Gungoraydinoglu, A., & Öztekin, Ö. (2011). Firm- and country-level determinants of corporate leverage: Some new international evidence. *Journal of Corporate Finance, 17*(5), 1457-1474. doi: http://dx.doi.org/10.1016/j.jcorpfin.2011.08.004

Guthrie, J., & Olson, O. (1999). Debating developments in New Public Financial Management: The limits of global theorising and. *Financial Accountability & Management, 15*(3/4), 209.

Huang, G., & Song, F. M. (2006). The determinants of capital structure: evidence from China. *China Economic Review, 17*(1), 14-36.

Jõeveer, K. (2013). Firm, country and macroeconomic determinants of capital structure: Evidence from transition economies. *Journal of Comparative Economics, 41*, 294–308.

Kayo, E. K., & Kimura, H. (2011). Hierarchical determinants of capital structure. *Journal of Banking & Finance, 35*(2), 358-371. doi: http://dx.doi.org/10.1016/j.jbankfin.2010.08.015

King, M. R., & Santor, E. (2008). Family values: Ownership structure, performance and capital structure of Canadian firms. *Journal of Banking & Finance, 32*(11), 2423-2432. doi: http://dx.doi.org/10.1016/j.jbankfin.2008.02.002

Koppell, J. G. S. (2007). Political Control for China's State-Owned Enterprises: Lessons from America's Experience with Hybrid Organizations. *Governance, 20*(2), 255-278. doi: 10.1111/j.1468-0491.2007.00356.x

Kouki, M., & Said, H. B. (2012). Capital Structure Determinants: New Evidence from French Panel Data. *International Journal of Business & Management, 7*(1).

Lemma, T. T., & Negash, M. (2013). Institutional, macroeconomic and firm-specific determinants of capital structure: The African evidence. *Management Research Review, 36*(11), 3-3.

Lim, T. C. (2012). Determinants of Capital Structure Empirical Evidence from Financial Services Listed Firms in China. *International Journal of Economics & Finance, 4*(3).

MacCarthaigh, M. (2011). Managing state-owned enterprises in an age of crisis: an analysis of Irish experience. *Policy Studies, 32*(3), 215-230. doi: 10.1080/01442872.2011.561688

Majumdar , R. (2012). The Determinants of Indebtedness in Unlisted Manufacturing Firms in India: A Panel Data Analysis. *MPRA Paper No. 43427*, 1-32.

Majumdar, S. K., & Chhibber, P. (1999). Capital structure and performance: Evidence from a transition economy on an aspect of corporate governance. *Public Choice, 98*(3-4), 287-305.

Mateev, M., Poutziouris, P., & Ivanov, K. (2013). On the determinants of SME capital structure in Central and Eastern Europe: A dynamic panel analysis. *Research in International Business and Finance, 27*(1), 28-51. doi: http://dx.doi.org/10.1016/j.ribaf.2012.05.002

Ministry of Planning, N. D. a. V. (2012). *Economic Survey 2012* Kenya National Bureau of Statistics Retrieved from http://www.knbs.or.ke/index.php?option=com_phocadownload&view=category&id=16:economic-survey-highlights&Itemid=563.

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American economic review*, 261-297.

Mokhova, N., & Zinecker, M. (2014). Macroeconomic Factors and Corporate Capital Structure. *Procedia - Social and Behavioral Sciences, 110*(0), 530-540. doi: http://dx.doi.org/10.1016/j.sbspro.2013.12.897

Moosa, I., & Li, L. (2012). Firm-Specific Factors as Determinants of Capital Structure:: Evidence From Indonesia. *Review of Pacific Basin Financial Markets & Policies, 15*(2), 1150007-1150001-1150007-1150017.

Myers, S. C. (1984). The capital structure puzzle. *The Journal of Finance, 39*(3), 574-592.

Myers, S. C. (2001). Capital structure. *The Journal of Economic Perspectives, 15*(2), 81-102.

OECD Guidelines on Corporate Governance of State-Owned Enterprises (2005).

Öztekin, Ö., & Flannery, M. J. (2012). Institutional determinants of capital structure adjustment speeds. *Journal of financial economics, 103*(1), 88-112. doi: http://dx.doi.org/10.1016/j.jfineco.2011.08.014

Palcic, D., & Reeves, E. (2013). State-Owned Enterprise Policy and the Loss of Economic Sovereignty: The Case of Ireland. *Public Organization Review, 13*(2), 117-130. doi: 10.1007/s11115-013-0232-0

Ramstetter, E. D., & Ngoc, P. M. (2013). Productivity, ownership, and producer concentration in transition: Further evidence from Vietnamese manufacturing. *Journal of Asian Economics, 25*(0), 28-42. doi: http://dx.doi.org/10.1016/j.asieco.2012.12.001

Rindfleisch, A., Malter, A. J., Ganesan, S., & Moorman, C. (2008). Cross-sectional versus longitudinal survey research: concepts, findings, and guidelines. *Journal of Marketing Research, 45*(3), 261-279.

Smith, G. P. (2012). Capital Structure Determinants for Tax-Exempt Organisations: Evidence from the UK. *Financial Accountability & Management, 28*(2), 143-163. doi: 10.1111/j.1468-0408.2012.00540.x

Struwig, F. W., & Stead, G. B. (2013). *Research: Planning , Designing and Reporting*. South Africa: Pearson Education South Africa (Pty) Ltd 2013.

Titman, S., & Wessels, R. (1988). The determinants of capital structure choice. *The Journal of Finance, 43*(1), 1-19.

Welch, I. (2004). Capital structure and stock returns. *Journal of Political Economy, 112*(1), 106-132.

Wenzel, P. (2007). Public-sector transformation in South Africa: getting the basics right. *Progress in Development Studies, 7*(1), 47-64.

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of econometrics, 126*(1), 25-51. doi: http://dx.doi.org/10.1016/j.jeconom.2004.02.005