Does Capital Structure Impact on the Performance of South African Listed Firms?

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Abstract: Issues surrounding capital structure and performance have been widely debated in literature, yet there has been no conclusion as to how composition of firm's capital impact on it performance. Using data on 136 quoted companies on the JSE from January 2000 to December 2014, and with a GMM analysis we explore the impact of capital structure on firm performance metrics in South African. The study suggests that total debt to total equity and total debt to total assets are inversely related to both Tobin q and return on assets, while long-term debt to total assets was related positively to both Tobin q and return on assets. On the other hand, total debt to total equity and long-term debt to total assets were inversely related to return on equity, while total debt to total assets were positively related to return on equity. It is therefore recommended that firms need to define their financial objective – either to maximise ROA or ROE. However, an optimal debt/equity mix must be sought, if both financial objectives must be pursued.

Keywords: Capital structure; firm performance; Generalized Method of Moments; return on assets; and return on equity

JEL Classification: G34; M41

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1. Introduction

Capital structure is the mix of a firm's debt and equity which it uses to finance its operations (Abor, 2005). Using various proportions of debt and equity by managers is a ground-laying approach of firms to improving their financial performance (Gleason et al., 2000). Managers who are insightful in terms of identifying and deploying the right combination of debt and equity are normally recompensed in the market – because the right debt-equity mix minimises the firm's cost of financing, maximises net returns, and leads to improved competitive advantage in the marketplace. Capital structure and its interplay with a firm's value and performance, has been debated in financial management since the seminal work of Modigliani and Miller (1958, 1963). These authors posited that a firm's value is not determined by the security mix issued, but rather by its real assets – although their claim had unrealistic assumptions such as perfect capital markets, homogenous expectations of investors, a tax-free economy, and no transaction costs. However, Jensen and Meckling (1976) claimed that the amount of leverage in a firm's capital structure impacts the agency conflicts between managers and shareholders by restraining managers to act more in the interest of shareholders. Thus, this can affect a manager's behaviours and operating decisions, meaning that the amount of leverage in capital structure affects firm performance (Harris & Raviv, 1991; Graham & Harvey, 2001; Brav et al., 2005).

Much of the empirical work on the correlation between capital structure and firm financial performance has been devoted to developed countries, although it has yielded mixed results (Chathoth & Oslen, 2007; Margaritis & Psillaki, 2010). In the developing economies, however, there have been few studies (Abor, 2007; Ebid, 2009; Lin & Chang, 2011; Leonard & Mwasa, 2014; Abata & Migiro, 2016). Abor (2007) investigated the effect of capital structure on the performance of Small and Medium Enterprises (SMEs) in Ghana and South Africa. He used 200 South African firms, including 68 listed firms, and found that capital structure significantly influences SME performance, and particularly long-term debt and total debt ratios negatively affect SME performance. He found a significant negative association between return on assets and long-term debt, and total debt sales growth had a significant positive association with the gross profit margin for all metrics of debt. Fatoki, George and Mornay (2010) studied the impact of the usage of debt on the profitability of SMEs in the Buffalo City Municipality and found that the usage of debt has a significant negative impact on the profitability of SMEs. Ramje and Gwatidzo (2012) investigated the dynamics of capital structure decisions of South African listed firms and found that profitability and tax are negatively associated with leverage, while tangibility, growth, size and risk are positively related to leverage. Equally, capital structure decisions of South African listed firms followed both pecking order and trade-off theories. Fosu (2013) analysed capital structure, product market competition and

firm performance in South Africa – using panel-data techniques on 257 firms from 1998 to 2009, and found that leverage significantly improves firm performance. From the above studies, the impact of capital structure on firm performance remains unresolved, despite being focused on by many researchers over the years.

In South Africa, there has been little attention on the application of appropriate mix of debt and equity by corporate managers in firm financial decisions – and hence the authors' interest in empirically examining the relationship between debt-equity level and financial performance in quoted firms on the Johannesburg Stock Exchange from 2000 to 2014. This study therefore addresses the research question - Is there a significant relationship between capital structure and the performance of South African listed firms?.

The study findings are expected to caution firm management, investors, and entrepreneurs against excessive use of debt or equity financing – and that they should rather choose the best capital mix or portfolios in order to maximise their returns.

The next sections review the extant literature, present the research method used, the data analysis and interpretation, and finally the conclusion and recommendations.

2. Literature Review

This study reviews most of the famous capital structure theories, including Modigliani and Miller (1958, 1963), the Pecking order theory, the Tradeoff theory, the free cash flow theory, the Signaling theory, the Agency theory, and prior studies in capital structure association with firm performance. These theories are discussed below.

The Modigliani and Miller theory – also known as the irrelevance capital structure theory – suggested that managers and owners of firms are indifferent about their capital structure, because the value of the firm does not depend on its capital structure but on its total assets. In order for them to come up with these findings, they made certain assumptions which were considered unreasonable by successors doing the same research. They assumed a world without taxes, and perfect markets without any transaction costs. The criticisms of these assumptions forced Modigliani and Miller (1963) to revise their study and they introduced taxes into their model. The results showed that the value of a firm increases with more debt due to the tax shield, and this was also known as the relevance capital structure theory.

The Trade-off theory was a modification of Modigliani and Miller's models, and was meant to reflect financial distress and agency costs. Optimal capital structure is gained by balancing the tax-shield benefits provided by leverage against the costs of financial distress and agency – and so the costs and benefits of leverage are traded off against one another. This theory postulates that highly profitable firms have more debt repayment capacity with high taxable income to shield them – so that they will have a higher debt to equity ratio compared to low profit firms. The more profitable firms will use more debt due to lower bankruptcy probability and higher debt ratings, while on the contrary, the Pecking order theory implies that firms with higher profits will use less debt as they have more retained earnings to finance their operations and new projects (Kale, 2014; 2013). The **Pecking Order Theory** proposed by Myers and Majluf (1984), claims that optimal capital structure does not exist. They argued that to reduce the problem of asymmetric information between firm managers and investors, a financial pecking order – a hierarchy of financing that begins with retained earnings, followed by debt and finally by new equity issue – should take place. Drawing from these facts, Mykhailo Iavorskyi (2013) concluded that very profitable firms that generate sufficient cash flows will use less debt finance. With **Signalling theory**, as a result of the asymmetric information between management and shareholders, signals are vital for financing in a company, and high-quality firms will use more long-term debt and have higher leverage as a signal of future profitability (Ross, 1977). In order to separate the good profitable firms from the low-quality firms or "the lemons", the quality firms will go for high debts and thus attract scrutiny – while the low-quality firms cannot simulate because, with scrutiny, they will be discovered. Signaling theory argues that most financial decisions taken by firm senior management are designed to signal management's confidence to the stock market of the future profitability of the firm, and also its ability to meet future obligations. The action of adding more debt is a sign of higher future cash-flow expectations. The wrong signals may lead to a moral hazard, as managers are unlikely to bear the costs of the risks – but rather the cost of the risk will be borne by the shareholders and the adverse selection where banks/debt holders will have to charge high interest rates and insurance costs to cover potential losses. **Agency theory**: studies of this relationship include the works of Jensen and Meckling (1976) and Myers (1977). They suggested that agency costs are related to conflicts of interest between debt-holders and equity-holders. For instance, whenever a venture is financed through debt, the creditors will charge an interest rate that is believed to adequately compensate for the risk involved. Given that the creditor"s claim is fixed, their concern is about the extent to which firms invest in excessively risky projects. Ideological differences are the bane of another form of agency problem between shareholders and debt holders. While the former are by nature more risk takers looking for higher returns, the latter are risk averse and want assured returns, even at a lower level. For this reason, shareholders may prefer

taking on high-risk projects than debt holders. Whenever the projects succeed, the stockholders will take extra returns, but if there is failure, debt holders and shareholders will bear all the losses (Jensen & Meckling, 1976). For this reason, more indebted firms take lower-risk projects, and hence Myers (1977) stated that the differences between debt holders and shareholder aims could lead to under-investment – which might equally lead to poor corporate performance.

Various studies have empirically investigated the correlation between capital structure and corporate performance in different countries. Saedi and Mahmoodi (2011) investigated the interplay between capital structure and firm performance using a sample of 320 quoted firms on the Teheran Stock Exchange from 2002 and 2009. They found that firm performances measured by EPS and Tobin's Q, are significantly and directly related to capital structure, while an inverse relationship was found between capital structure and ROA – with no significant correlation between ROE and capital structure. Ebrati, Farzad, Reza and Ghoban (2013) studied the effect of capital structure on firm performance using multiple regression analysis to analyse the correlation between leverage level and firm performance. They found that firm performance measured by EPS and ROA, was inversely related to capital structure. Using share price as a proxy for value and numerous ratios for capital decisions, Chowdhury and Chowdhury (2010) examined the interplay between capital structure and firm value in Bangladesh. They found that by changing capital structure composition, a firm can increase its market value – showing that managers can utilise debt to form an optimal capital structure to maximise the wealth of shareholders (Chowdhury & Chowdhury, 2010). Exploring the impact of capital structure on firm performance and shareholder wealth in the Pakistani textile sector, Mujahid and Akhtar (2014) found a significantly direct correlation between a firm's financial performance and shareholder wealth. They used a regression analysis to analyse 6 years data from 2006 to 2011, by proxying ROE and ROA ratios as a firm performance measure and EPS ratio as a shareholder wealth measure to check affiliation between capital structure of the firms and their shareholders" wealth (Mujahid & Akhtar, 2014). Hasan, Bokhtiar, Ahsan, Mainul Rahaman, Afzalur Alam and Nurul (2014) studied the influence of capital structure on firm performance using a sample of 36 Bangladeshi firms for the period 2007 to 2012. Firm performance, as calculated by EPS, was found to be directly and significantly related to capital structure as measured by STDTA. In contrast, EPS was significantly inversely associated with LTDTA, while EPS had an insignificant relationship with TDTA. Gwatidzo, Ntuli and Mlilo (2015) studied capital structure determinants in South Africa using data on 239 listed firms for the period 1996 to 2010. They found a significantly direct association between asset tangibility and leverage, and a significantly positive correlation between firm size and long-term debt and total-debt ratios. Equally, a negative interplay was found between tax and leverage. Though these findings

were contrary to the Trade-off theory, they are consistent with the proposition of the Pecking order theory as developed by Myers and Majluf (Hasan et al., 2014).

Nirajini and Priya (2013), in their study on the impact of capital structure on the financial performance of Sri Lanka-listed trading firms, found a significant correlation between debt-asset ratio, debt-equity ratio and long-term debt and gross profit margin, net profit margin, ROCE, ROA and ROE, at levels 0.05 and 0.1. This led them to conclude that capital structure was directly associated with financial performance, and hence they recommended that the firm should appropriately combine debt and equity decisions to enhance business survival and optimise profit (Nirajini & Priya, 2013). El-Sayed (2009) explored the association between capital structure and the performance of listed firms in Egypt for the period 1997 to 2005, using regression analysis. He found that neither STD, LTD, nor TTD were significantly correlated with a firm's performance measured by ROE, and that in general terms capital structure choice has a weak to no significant impact on Egyptian listed firms" performance. Wang et. al. (2010) examined 60 listed Chinese real estate firms and found that low-growth and high-growth opportunity firms had a negative association with debt financing, while mid-growth opportunity firms have a direct interplay with operating performance.

Shah (2014) investigated the effect of capital structure on the performance of cement companies quoted on the Karachi Stock Exchange from 2009 to 2013. Using the Pearson correlation and multiple regression analysis, he found a significantly negative interplay between debt to assets and firm performance variables (GPM, NPM, ROA, and ROE). Equally, a positive association was found between debt to equity and firm performance variables (GPM and NPM) on the one hand, and a negative association between debt to equity and firm performance variables (ROA and ROE) on the other hand. Conclusively, capital structure variables were found to significantly impact on firm performance, and hence Shah (2014) recommended the application of an optimal mix of debt and equity and proper allocation and utilisation of resources in order to achieve an optimal productivity level.

Lastly, Akeem, Terer, Kiyanjui, Kayoed and Matthew (2014) explored the impact of capital structure on the performance of manufacturing companies in Nigeria from 2003 to 2012. Using a regression technique to analyse the effects of some key variables like ROA, ROE, total debt to total assets, and total debt to equity ratio on firm performance – a negative association was found between capital structure measures (total debt and debt to equity ratio) and firm performance. The researchers recommended the use of more equity to debt in the financing of business activities, provided the business value is enhanced by the use of debt capital.

It is therefore clear from the above-mentioned empirical analyses between capital structure and firm performance, that there are mixed results that have left literature in this area rather inconclusive.

3. Research Method

This study selected 136 firms from a population of 402 companies from different sectors listed on the JSE, as of 31 December 2014. The study excluded newly listed firms and those which had been suspended for more than three years during the period 2000 to 2014, since they would make the model inconsistent. The selection was predicated on the rationale of complete dataset availability. The purposive non-probability sampling technique was adopted, and data were sourced from the annual audited financial reports of the selected firms between 2000 and 2014.

3.1. Variables and Models Used for Data Analysis

Three dependent variables – the Tobin Q ratio which mixes market values with accounting values (Zeitun & Tian, 2007) and accounting-based measures of return on equity (ROE) and return on assets (ROA) – were used as the representatives of firm performance measures. ROE is defined as net profit after tax divided by total equity. ROA is calculated as net profit after tax divided by total assets. On the other hand, three independent variables – the debt/equity ratio (DE), long-term debt to total assets ratio (LTDTA) and total debt to total assets ratio (TDTA) – were used to represent capital structure. In addition, size of the firm (Size), which is determined by the logarithm of total assets, was also considered as a controlled variable.

Panel data analysis permits the unobserved heterogeneity for each observation in the sample to be removed as well as to alleviate multicollinearity among variables (Fauzi, Basyith & Idris, 2013). Several issues like multicollinearity and endogeneity problems, among others, are, according to Maddala and Lahiri (2009), responsible for the inconsistencies in OLS estimation. The empirical model of Dang (2005) in examining the performance of the two opposing theories of capital structure, trade-off and pecking order, were used with Anderson and Hsiao IV and Arellano and Bond generalized methods of moment (GMM) – which were argued to yield consistent estimates for dynamic panel data. Hence, we adopted the reduced form of the dynamic panel GMM model of Cameron and Trivedi (2010), as follows:

$$y_{it} = \omega_i + \rho_i y_{i,t-1} + x'_{it}\rho + \varepsilon_{it} \quad (1)$$

Where, $t = \tau + 1, \ldots, T$ and ε_{it} is assumed to be serially uncorrelated. From this we have our regression model written as:

$$y_{kit} = \omega_{kit} + \rho_{kit} y_{ki,t-1} + \varphi_{kit} tdte_{kit} + \vartheta_{kit} tdta_{kit} + \gamma_{kit} ltdta_{kit} + \varepsilon_{it} \quad (2)$$

Where y represents performance measures, ROA, ROE and Tobin"s Q respectively, k denotes the number of regressions, it represents firm i in time t, $tdte$ is total debt to total equity, $tdta$ is total debt to total assets and $ltdta$ represents long-term total debt to total assets. Analysis of the data takes the form of descriptive and inferential statistics – that is correlations and regressions.

4. Discussion of Results

The results in table 1 (below) show the relationship between the variables. The relationship between total assets, debt/assets and LTDTA is a positively weak relationship, and debt/equity to total assets exhibited a negative relationship. There is also a negative relationship between debt/assets and LTDTA, and return on equity and return on assets – except for the Tobin Q ratio which has a positive relationship. This means that when the debt/asset ratio increases, the ROE and ROA decrease at a very low level. However, the results show that when debt/equity increases, it is only ROA which goes down at a very low rate. However, return on equity and Tobin q show a very weak positive correlation.

Table 1. Correlation Results

	totalassets	size	debassets	debtequity	ltdta	roa	roe	qratio
totalassets	1							
size	0.5826	1						
debtassets	0.0055	-0.1112	1					
debtequity	-0.0056	-0.0044	0.0527	1				
ltdta	0.0919	-0.0397	0.722	0.0075	1			
roa	0.0456	0.149	-0.1539	-0.0292	-0.1358	1		
roe	0.0127	0.0739	-0.0207	0.0042	-0.0578	0.1122	1	
qratio	-0.0101	-0.0759	0.0205	0.001	0.0209	0.0106	-0.0075	1

Source: Authors' estimation (2017)

Running a dynamic analysis usually requires estimation of the static models for a more robust analysis of the result. Tables 1, 2 and 3 present the results of both the static and dynamic panel data estimation of the 136 JSE companies under consideration. Pre-estimation correlation analysis of the independent variables revealed a high correlation between long-term debt to total assets and total debt to total assets. This is normally expected since long-term total debt to total assets is a component of total debt to total assets. As GMM is a normality free approach, we were not concerned about the stability test neither did we do anything about the possibility of a serial correlation, as this will be expected at order 1.

Models 1 to 3 of Table 1 show the results of the pooled ordinary least square regression, which usually is the starting point of the analysis. The results of the first model show total debt to total equity to be negative and weakly statistically significant to tobinq at the 10% significance level, while total debt to total assets is positive and statistically significant and long-term debt to total assets is negative but statistically significant. More specifically, a percentage increase in total debt to total equity, total debt to total assets, and long-term debt to total assets will cause a 0.04% decrease, 23% increase, and a 230% decrease in tobinq respectively. With model 2, a percentage increase in total debt to total equity, total debt to total assets, and long-term debt to total assets, will cause a 0.012% increase, 8.6% decrease and 850.9% increase respectively in return on assets, as all the variables are statistically significant. With model 3, only long-term debt to total assets is positively related to return on equity, but none of the variables are statistically significant – to warrant any economic inference. Because of the inherent problems with OLS and especially with panel data analysis, we ran a fixed effects and random effects model.

Table 2. Pooled OLS

	model 1	model 2	model 3
VARIABLES	tobinq	roa	Roe
tdte	-0.000491*	0.0123***	-0.0135
	(0.00029)	(0.00469)	(0.0116)
tdta	0.230***	-8.614***	-0.674
	(0.0175)	(0.282)	(0.694)
ltdta	-23.79***	850.9***	19.91
	(2.032)	(32.84)	(80.83)
Constant	0.509**	63.36***	28.29***
	(0.23)	(3.714)	(9.141)
Observations	2,024	2,024	2,024
R-squared	0.08	0.316	0.002
Notes			
Standard errors in parentheses,		*** p<0.01, ** p<0.05, * p<0.1	

Authors' estimation (2016)

Given that the result of the Hausman test favours the fixed effects model, we explain its result as contained in models 1 to 3 in table 3, and only displayed the random effects model results in models 4 to 6 for evidence. Interpretation of the fixed effects follows the same pattern as in the pooled OLS. We found total debt to total equity to be weakly and negatively significant with Tobin, total debt to total assets to be positive, while long-term total debt to total assets is negative and

statistically significant with Tobin. Aside from the slight difference in magnitude, the results of the fixed effects model are consistent with those of pooled OLS in signs and pattern of significance for Tobin. We also found this to be same for return on assets, as the relationship between return on assets and the explanatory variables repeated the same pattern of significance and signs under the fixed effects model as in the pooled OLS. Surprisingly, the results of the fixed effects model show total debt to total equity to be statistically significant, but maintained the sign as in pooled OLS, while total debt to total assets and long-term debt to total assets both maintained their signs as well but not statistically significant as in the pooled OLS. Suffice to say, the result of the random effects model shared the same pattern of signs and significance with the pooled OLS and the fixed effects models. The seemingly consistent results between the pooled OLS, fixed effects and random effects models, only needed to be confirmed with more robust analysis to ascertain our estimates for a better and/or an improved policy decision. Hence, we finally proceeded to estimate a GMM model.

Table 3. Fixed and Random Effects models

VARIABLES	Model 1 tobinq	Model 2 roa	Model 3 roe	Model 4 tobinq	Model 5 roa	Model 6 roe
Tdte	-0.000481*	0.0133***	-0.0317***	-0.000486*	0.0130***	-0.0149
	(0.000281)	(0.00444)	(0.0119)	(0.000279)	(0.0045)	(0.0116)
Tdta	0.313***	-10.93***	-0.785	0.278***	-	-0.681
	(0.0191)	(0.303)	(0.813)	(0.0181)	(0.288)	(0.7)
ltdta	-32.81***	1,129***	58.04	-29.06***	986.6***	22.07
	(2.228)	(35.26)	(94.57)	(2.101)	(33.54)	(81.49)
Constant	0.0213	74.42***	27.71***	0.225	68.93***	28.29***
	(0.247)	(3.914)	(10.5)	(0.319)	(4.733)	(9.4)
Observation	2,024	2,024	2,024	2,024	2,024	2,024
R-squared	0.127	0.413	0.005			
Number of	136	136	136	136	136	136

*Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

Source: Authors' estimation (2017)

For robust, efficient and consistent estimates, we ran a two-step dynamic system GMM with orthogonal deviation to cater for missing values and the survivorship bias of our unbalanced panel. Table 4 (below) shows the results of the GMM estimation for the 3 models – tobinq, return on assets, and return on equity. A quick look at the GMM results shows the lag of tobinq to be positive but not significant, the lag of return on assets to be positive and significant, and the lag of return on equity to be negative and significant. While the lag of tobinq has no economic implication because it is not statistically significant, the implications for return on assets and return on equity are that past return on assets and return on

equity respectively has the effect of increasing the present return on assets/reducing the present return on equity. In other words, the return on assets/equity in the past has a significant impact on the outcomes of their present value and future values. Model 1 shows total debt to total equity to be negative but statistically insignificant to tobinq. This insignificant relationship may perhaps be expected, as the results of pooled OLS, fixed effects and random effects showed their relationship to be weak and only significant at the 10% level of significance. However, the signs are found to be consistent with the previous results – even though it might have no economic values for policy making. Furthermore, total debt to total assets is negative and statistically significant, indicating that a percentage change in total debt to total assets will result in a 0.05% decrease in tobinq. Long-term total debt to total assets is also statistically significant but positively related to tobinq – in which case a percentage increase in long-term total debt to total assets will imply a 5.3% increase in tobinq. We noted inconsistencies in the signs in relation to the pooled OLS, the fixed, and the random effects models. While those were positive in the case of total debt to total assets and negative for long-term debt to total assets, they are the opposite for GMM results – that is negative for total debt to total assets and positive for long-term debt to total assets respectively.

Table 4. GMM Result

	model 1	model 2	model 3
VARIABLES	tobinq	roa	Roe
L.tobinq	0.108		
	(0.132)		
tdte	-5.18E-06	-0.00350***	-0.0411***
	(5.22E-05)	(0.000872)	(0.00754)
tdta	-0.0548***	-0.655**	6.082**
	(0.0208)	(0.266)	(2.374)
ltdta	5.308***	53.75**	-642.7***
	(2.016)	(26.69)	(249.3)
L.roa		0.297***	
		(0.105)	
L.roe			-0.0314***
			(0.00965)
Constant	1.817***	12.41***	-10.52
	(0.233)	(1.977)	(11.96)
Observations	1,875	1,875	1,875
R-squared			
Number of id	136	136	136
Notes			
Standard errors in parentheses,		*** p<0.01, ** p<0.05, * p<0.1	

Author's estimation (2017)

On the second model of the GMM results, return on assets indicates that all the explanatory variables are statistically significant to elicit economic implications. A percentage increase in total debt to total equity will cause a decrease of 0.0035% in return on assets. Likewise, a percentage increase in total debt to total assets, results in a 0.655% decrease in return on assets. Only long-term debt to total assets is positively related to return on assets, with the ability to cause a 53.75% increase in return on assets when it increases by 1%. These results are consistent with the three previous models in sign and statistical significance – with the exception of total debt to total equity that now has a negative sign relative to the positive signs in the other models, so representing a fundamental departure. Lastly, for return on equity in model 3, all the explanatory variables are again strongly statistically significant. Recall that none of these variables is statistically significant to return on equity in the three preceding models, except for total debt to total equity for the fixed effects model. Similarly, only total debt to total equity retained the same sign of the other models, while the signs of total debt to total assets and long-term total debt to total assets are in the opposite of the other three models. For clarity, total debt to total equity is negatively related to return on equity and can cause up to a 0.0411% decrease in it, with a 1% increase, total debt to total assets is positively related to return on equity with a significant impact of about 6.082%, and long-term debt to total assets is negatively related to return on assets with a 642.7% impact.

Having done the interpretations above, our discussions are centred on the results of the GMM being the most robust and efficient of the estimates. Generally, financial and/or capital structure theories and empirical works expect firm use of leverage to impact their financial performance (Harris & Raviv, 1991; Graham & Harvey, 2001; Brav et al., 2005). However, the nature of the impact has been unclear and there have been mixed results. Specifically, in answering our question–there are significant relationships between capital structure and firm performance in South African-listed firms. In hindsight, we found total debt to total equity to be negative, total debt to total assets to be negative, and long-term debt to total assets to be positively related to Tobin"s Q and return on assets. Tobin"s Q as a performance measure, measures performance of firms" physical assets in relation to their market value. While total debt to total equity is negative, total debt to total assets is positive, and long-term total debt to total assets is negatively related to return on equity. Overall, the results give a ratio of 2 to 1 for the capital structure measures used in relation to the performance measures used to favour an inverse relationship between capital structure and the performance of listed firms in South Africa. Although further insight may be required in terms of analysing the proxies individually in South Africa, we found evidence to support Abohr (2007), who established a negative relationship between return on assets and long-term total debt to total assets, perhaps because of differences in samples

and methods used, as they concentrated on SMEs using correlation analysis. However, our result is consistent with Fatoki, George and Mornay (2010), who found a negative relationship between profitability and capital structure among municipal SMEs in South Africa. Again, we found evidence to support the results of Ramje and Gwatidzo (2012), that there was a negative relationship between profitability and capital structure among listed firms in South Africa.

Beyond South African studies, our study aligns with literature that has found that capital structure does not improve the performance of firms.[1] The implication is that listed firms in South Africa have to be meticulous in their choice of the structure of their capital. As leverage is a formidable part of capital formation, the South African government and relevant regulatory bodies may want to investigate why its use has a significant positive relationship with performance in some countries[2], and look at what could be done differently to encourage the use of debt. Perhaps interest rates set by the reserve bank could be considered, among other things.

To provide credence for our analysis, the overall goodness of fit of the regression given the Wald statistics shows that our results are acceptable and that explanatory variables can explain the dependent variables. Although we have some concerns with our AR1 which ordinarily assumes the presence of autocorrelation at order 1, in our case this is not so. This is not expected to invalidate our results, as, according to Mileva (2007), AR2 is most important and of interest in the test and rejects H_O at order two – thus implying the absence of serial correlation in our sample. The contribution of Hansen J statistics is acknowledged here, as all our instruments do not suffer from mis-specification (see Table 5, below).

Table 5. Post Estimation Test

	model	model	model 3	
	tobinq	roa	roe	
Wald	0.020	0.000	0.000	
AR1	0.314	0.071	0.193	
AR2	0.601	0.163	0.247	
Hanse	0.455	0.324	0.903	

Author's estimation (2016)

[1] See (inter alia, Ebrati et al., 2013; Saedi & Mahmoodi, 2011; Bokhtiar et al., 2014).
[2] See (Mujahid & Akhtar, 2014; Nirajini & Priya, 2013).

5. Conclusion and Recommendations

The study explored the association and impact between capital structure and firm performance, and assessed if optimal capital structure exists. The study showed that there is a negative relationship between total debt to total equity, total debt to total assets and tobin q and return on assets – meaning that when the level of debt increases, the return on assets decreases. This claim concurs with Fatoki et al. (2010) and Ramje and Gwatidzo (2012). Therefore, it is important to mention that it is not worthwhile to borrow more funds to finance the assets, since this would result in less return on those assets. This might be due to high interest rates charged on assets – which is more than the income generated by those assets. However, these findings are very interesting, as they refute Modigliani and Miller's main theory in the history of capital structure – which proposes that firm value increases with more debt. Moreover, the study presents different views on whether the results are significant or not, with debt/equity showing they are insignificant, but with LTDTA and debt/assets showing a significant relationship which tallies with the assertion of Abor (2007).

Furthermore, the above results might differ from those of Modigliani and Miller, due to the differences in the study timeframes, or it might be due to different study areas – with our study dwelling particularly on JSE firms. Moreover, the high interest rates charged in emerging economies like South Africa make borrowing more expensive, and the lack of proper bond market in the financial markets worsens the situation. This therefore explains why many firms are failing due to financial distress – as reported by the Ministry of Small Enterprises and Community Development (SABC News, November 2015).

Mixed results were found regarding ROE and the independent variables mentioned above. While total debt to total equity and long-term debt to total assets negatively relate to ROE, total debt to total assets positively relates. The results show mixed outcomes, with debt/equity and debt assets showing an insignificant positive relationship. This is in line with the Tradeoff theory, which argues that firms with high debt/equity generate more profits. LTDTA shows a negative relationship, which also points to the same explanation above – that an increase in debt negatively impacts on firm value. This concurs with the findings of Iavorskyi (2013), who concluded that very profitable firms use low debt levels.

From the above analysis, the researchers found that only total debt to total equity had a consistently negative relationship with tobin q, ROA and ROE – while the two other independent variables gave different results. Given this interesting observation, it is therefore possible to conclude that firms should try to strike a balance between their debt and equity levels, so as to maintain a capital structure that will support an optimal performance. It was also feasible to refute the Pecking order theory, which proposes that optimal capital structure does not exist, and

supports the available literature on finance, which highlights the need for firms to find an optimal capital structure.

It is therefore recommended that firms and financial managers clearly define their financial objectives, if their main aim is to maximise a return on assets or return on equity. If the aim is to maximise ROA, then they need to reduce their debt levels, since it would negatively affect their objectives, and if the aim is to maximise profits then they need to keep their debt levels higher than equity. Where the aim is to pursue both objectives – they need to find the optimal level between debt and equity. South African quoted firms should strive to strike a balance between their debt and equity financing levels, so that their optimal performance can be enhanced.

5. References

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