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The Nexus Between Financial Leverage and Profitability: Evidence from Top-40 Johannesburg Security Exchange (JSE) Listed Companies

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Abstract: The study investigate the nexus between financial leverage and profitability with specific reference from top-40 JSE firms. This study originate from emerging countries. It is on this background that this study attempts to investigate the connection between financial leverage and profitability from a South African viewpoint. The system generalized method of moments (GMM) was used to analyze the relationship between financial leverage and profitability. The sample of 21 of the top-40 JSE firms from 2011 to 2019 was used. The secondary data for the article were collected from Iress INET BFA database. The results of the study revealed that financial leverage has negative influence on profitability of top-40 JSE companies. Whereas other variables such as liquidity, firm size, and growth opportunity are also negatively influences profitability. The study is restricted to the top-40 JSE companies only which means cannot generalise the finding to all listed companies on JSE and different sectors of the economy. The study suggests that directors and managers should control and manage leverage as they improve the variety and the quality of the firm's profitability. This results might be beneficial for future researchers, manager and investor as a point of reference.

Keywords: Total debt ratio; return on assets; profitability; JSE top 40

JEL Classification: G17

1. Introduction

The effective management of a firm's financial leverage is considered a core element of management functions for all businesses of all sizes. Kibuchi (2015) argues that ineffective management of a firm's financial leverage leads to difficulties in meeting its financial commitments when they are due. Moreover, he highlighted that effective management of financial leverage requirements of a company has direct effects on

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profitability. Organizations often utilise a desired leverage to accomplish a particular objective (Al Habsi & Khalil, 2021).

Al Habsi and Khalil (2021) further posit that there is a breaking point to the utilisation of leverage in organizations. Thus, financial leverage link with organization profitability, which is among the many variables that influence the organization's performance whether that is positive or adverse consequences.

In developing markets, a few studies have been conducted linking financial leverage and profitability with inconclusive and yielded mixed results. Several such studies are Dakua (2019), Källum and Sturesson (2017), Nawaiseh (2015), Rehman (2013), Daryanto, Samidi and Siregar (2018), and Onofrei, Tudose, Durdureanu and Anton (2015).

It is against this background that the objective of this study is to examine the link between financial leverage and profitability. The study complements the existing body of knowledge on the subject matter. It utilizes a sample of firms from the top-40 JSE companies. The reason of utilising the top-40 JSE firms is that the South African securities market has been considered as the biggest security exchange in Africa. The top-40 JSE firms offer more than 80% of market capitalisation on the South African market. Mashamba and Magweva (2019) observe that JSE in South Africa is the largest security exchange on the African continent with market capitalisation assessed at R14-trillion in June 2017. According to the World Economic Forum's global competitiveness survey for 2016- 2017, South Africa's JSE was among the highest-ranked in position three in respect of supervision of securities exchanges around the world.

2. Literature Review

2.1. Theoretical Literature Review

There are several theories theories that underpin the choice of capital structure by a firm. These include the irrelevance theory, agency cost theory, trade-off theory, and pecking order theory.

2.1.1. Irrelevance Theory

Irrelevance theory was introduced in 1958 by Modigliani and Miller and is currently seen as the beginning stage of the presently used capital structure theory. Modigliani and Miller (1958) highlight that irrelevance capital structure assumes that financial leverage indirectly influences the firm value. The proven works of Modigliani and Miller (1963) are relevant to this study as they recommended that there are advantages to having a financial obligation in the capital structure. According to the theory, there is no financing structure which is better than the other.

2.1.2. The Agency Theory

The agency theory of Jensen and Meckling (1976) expresses that high debt instils discipline in managers and is therefore associated with better financial performance (Evgeny, 2015). Hence, the agency theory keeps up the utilisation of debt financing to enhance financial performance (Muchiri, Muturi & Ngumi, 2016). The agency theory likewise offers significant assistance in understanding a firm's use of debt (Marete, 2015). This theory was established on the idea that a manager's conduct can be constrained by debt financing (Mohamed, 2016). The theory is therefore applicable to the present study since it informs one of the independent variables that is financial leverage.

2.1.3. The Trade-off Theory

Myers and Majluf originally initiated the trade-off theory in 1984. The trade-off theory underscores that choosing the ideal trade-off among equity and debt. Adongo (2012) contends that the trade-off anticipates that big firms will use more debt financing since they will undoubtedly have a high tax assessment rate and low bankruptcy hazard. The theory is suitable to this review given that the greater part of the top-40 JSE firms select debt for their financing since debt is better positioned to generate higher income and tax benefits (Kayhan & Titman, 2007).

2.1.4. Pecking order theory

The pecking order theory by Myers and Majluf (1984) is driven by the desire to enhance financial performance. In this theory, the firm's management uses a hierarchical way to decide which method of financing first to pay its assets. The hierarchy theory proposes that firms lean toward internal payment over debt capital and spell out that organisations use internally available funds first, then issue debt. Lastly, if all else fails, they allocate equity capital (Abeywardhana, 2017). The pecking order theory supports the connection between financial leverage and firm financial performance, as suggested by Al-Tally (2014). However, Bistrova, Lace and Peleckiene (2011) argued that pecking order theory is inconsistent with relationship between debt ratio and profitability. The pecking order theory recommends that organisations that are use borrowing send a good signal about their future possibilities. This indicates that the organisation has greater investment opportunities and signalling is consistent with shareholder's wealth maximisation (Adongo, 2012).

2.2. Empirical Literature Review

Financial leverage is one of the core elements in determining the firm performance. Nguyen, Nguyen, Tran and Nghiem (2019) observe that using financial leverage has a significant influence on the business performance of enterprises. However, various

empirical studies done on the related topic has produced inconsistent results. Studies by Banal Estanol, Siciliani, and Yoon (2022), Abubakar and Mohammed (2021), Lestari (2021), Mamaro and Legotlo (2021), Hongli, Ajorsu and Bakpa (2019), Dey, Hossain and Rahman (2018) have observed that financial leverage has a positive influence on profitability. On the contrary, studies by Banal Estanol, Siciliani, and Yoon (2022), Ravindran and Kengatharan (2021), Papadimitri, Pasiouras and Tasiou (2021), Rahman, Saima, and Jahan (2020), Nguyen, Nguyen, Tran and Nghiem (2019), Jeleel and olayiwola (2017) found the relationship between financial leverage and profitability to be negative.

Banal Estanol, Siciliani, and Yoon (2022) researched the connection between profitability and financial leverage for US-listed non-financial organizations by considering the level of product similarities among competing firms. Their results when taking into account business sectors portrayed by excessive cost mark-ups despite high product similarities, the connection between profitability and financial leverage was found to be negative. Alternatively, when the rest of the market was used, their study found that the relationship between profitability and financial leverage was positive. Such result is in consistent with the trade-off theory of corporate finance, whereby firms increase their level of financial leverage to enhance performance.

Papadimitri, Pasiouras, and Tasiou (2021) analyzed the effect of financial leverage on the profitabilty of FinTech firms. Utilizing an sample of 146 U.S. FinTech firms working in ten market sections over the period 2000-2016, they found that financial leverage has an adverse effects profitability and risk-adjusted-performance.

Nguyen, Nguyen, Tran and Nghiem (2019) empirically tested the impact of financial leverage on return on assets (ROA) and return on equity (ROE). They used 58 real estate firms listed on the Vietnam Stock Exchange. Their results revealed that financial leverage has a negative impact on ROA and a positive impact on ROE.

Dinh and Pham (2020) examined the effect of capital structure on the financial performance of pharmaceutical enterprises listed on Vietnam's stock market. The results show that financial leverage has a positive relationship with firm performance. In addition, firm size, fixed asset rate and growth were also observed to have a positive impact on firm performance.

Ravindran and Kengatharan (2021) investigated the impact of financial leverage on the profitability of listed non-financial firms in Sri Lanka based on 82 firms from the data collected from 2013 to 2017. Their study analysed the mix of debt and equity proportions and the influence on the firms' profitability. Their study employed a fixed-effect model which revealed a significant negative impact of liquidity, financial leverage on the firms' profitability.

Samo and Murad (2019) studied the impact of liquidity and financial leverage on profitability, using a sample of 40 selected publicly quoted companies in the textile sector of the Pakistani economy. Their results revealed a negative relationship between financial leverage and profitability.

Lestari (2021) investigated the connection between financial leverage and financial performance of traditional banks listed on the Indonesia Stock Exchange. They utilized return on assets and return on equity as their dependent variables. Whereas, debt ratio, debt to equity ratio, interest coverage ratio, and cash coverage ratio were used as independent variables. Their results showed that the debt ratio has a positive influence on the return on assets and return on equity.

Hongli, Ajorsu and Bakpa (2019) analysed the effect of liquidity and financial leverage on firm performance of manufacturing industries quoted on the Ghana Stock Exchange from six different sectors from 2007-2015. They used ROA and ROE as proxy variables for enterprise performance. They used a fixed-effect model and random effect model for modelling. Their study discovered that financial leverage has a strong positive impact on firm performance (ROA & ROE). Furthermore, liquidity risk and profitability were found to be positive.

Mamaro and Legotlo (2021) investigated the impact of debt financing on the financial performance of retail firms listed on the Johannesburg Stock Exchange from 2010–2019. The ROE was used to measure the profitability and total debt ratio (TDR) was used as a measure of financial leverage. Their results revealed TDR has a significant positive on ROE.

Abubakar and Mohammed (2021) examined the impact of financial leverage on the financial performance of six listed construction/real estate and natural resources firms in Nigeria, covering the period 2005 to 2019. Their results revealed that the short-term debt ratio has a significant negative impact on the financial performance; and the long-term debt ratio has a positive and significant impact on the financial performance. However, the total debt-equity ratio was found to have no significant effect on the financial performance.

3. Research Methodology

3.1. Source of Data

Secondary data were obtained directly from published and audited yearly reports of top-40 JSE listed companies from the Iress INET BFA database. The variables that were obtained from the yearly reports are current ratio, total debt ratio, firm size, growth opportunity and return on assets. All these variables were used as measures of the main variables which are liquidity risk, financial leverage and firm's financial performance. The year-to-year financial information was retrieved from the financial

statements for the period of nine years from the beginning of the 2011 financial year to year-end of 2019 financial year. The consideration of yearly reports is because they portray the full company performance.

The target population consisted of top-40 JSE listed firms for nine years from 2011 to 2019. The sample of twenty-one (21) companies listed on top-40 JSE firms was selected based on the full availability and accessibility of data from 2011 to 2019.

3.2. Estimation Model

The general expression of the GMM formula proposed by Arellano and Bond (1991), expanded by Arellano and Bover (1995) and Blundell and Bond (1998) and further explained by Oseni, Akinbode, Babalola, and Adegboyega (2020) was adopted for this study.

$$Y_{it} = \alpha Y_{it-1} + \beta X_{i\,t-1} + \mu_i + \varepsilon_{it} \qquad (3.1)$$

Where Y represents an independent variable, X represents dependent variables, μ_i is an unobserved effect, ε_{it}, which is the error term, whereas t represents the period and i the company. The nature of the $\varepsilon_{it} = u_t + u_i$, where u_t represent the unobserved time effects and u_i represents the unobserved individual effects.

The choice of utilising the system GMM model is validated by conducting the specification tests as proposed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). In addition, the Sargan and Hansen test of over recognising limitations is performed to test for the legitimacy of the instruments (Arellano & Bond, 1991; Arellano & Bover, 1995). The return on asset (ROA) as measurements for profitability was used as dependent variables whereas, total debt ratio (TDR) as a proxy for financial leverage, liquidity (CR), firm size (FirmSZ) and growth opportunities (GRO) were used as independent variables. Therefore, the following GMM model was created for this study to examine the correlation between financial leverage and profitability with evidence from top-40 JSE firms.

$$ROA_{it} = (\alpha - 1)\Delta ROA_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta LIQ_{it} + \beta_2 \sum_{i=1}^{n} \Delta TDR_{it} + \beta_3 \sum_{i=1}^{n} \Delta FIRMSZ_{it} + \beta_4 \sum_{i=1}^{n} \Delta Growth_{it} + \Delta \varepsilon_{it} \qquad (3.2)$$

Where ROA_{it} represent ROA as time t, D/E_{it} represent debt to equity ratio, which measures financial leverage at time t. LIQ_{it} represent liquidity at time t, $FIRMSZ_{it}$ represent firm size at time t, $Growth_{it}$ represent asset growth at time t, β1, β2, β3, β4 represent the Beta Coefficients and ε_{it} is the error term. The following section presents the results of the study.

4. Results and Discussions

Table I below presents the descriptive statistics of variables used in the estimations for the sample of 21 of the top-40 companies listed on JSE.

Table 1. Summary of Descriptive Statistics

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
CR	1.4722	1.2200	6.6700	0.1600	1.0540	189.0000
D_E	5.1930	1.0000	288.9700	0.0000	21.6521	189.0000
FIRMSZ	18.4187	18.0825	21.5455	15.5463	1.4273	189.0000
GRO	0.0955	0.0938	0.8174	- 0.8935	0.1595	189.0000
ROA	8.4624	7.4600	38.4400	- 8.2100	9.7935	189.0000
ROE	15.2201	15.3200	441.5200	- 483.6500	49.9980	189.0000
TDR	0.5240	0.5200	1.3700	0.0000	0.2892	189.0000

Source: Author's compilation

Notably, the debt-equity ratio and ROA and ROE exhibit a lot of volatility as shown by their high standard deviations. The other variables do not exhibit much varaiability. Table 2 below shows paired correlations of the variables.

Table 2. Correlation Matrix for the Main Variables Used in this Study

Variables	CR	D_E	FIRMSZ	GRO	ROA	ROE	TA	TDR
CR	1,0000							
D_E	-0,1826**	1,0000						
FIRMSZ	-0,2963***	0,0605	1,0000					
GRO	0,0485	0,0104	0,0306	1,0000				
ROA	0,0668	0,12624*	-0,4109**	0,24123***	1,0000			
ROE	0,0321	0,7455***	-0,0178	-0,1583**	0,1664**	1,0000		
TA	-0,3284***	0,0658	0,8307***	-0,0323	-0,4149***	0,0074	1,0000	
TDR	-0,6026***	0,2564***	0,2386***	0,0487	0,0400	-0,0871	0,2650***	1,0000

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$*
Source: Author's compilation

Table 2 showed that current ratio (CR) 0.06675, total debt ratio (TDR) 0.0400 and Growth opportunity (GRO) 0.2412 are positively related to profitability as calculated by the return on assets (ROA). These results imply that an increase in all these variables will increase the profitability of top-40 JSE listed firms. However, firm size is negatively related to profitability as calculated by both ROA. Table 3 shows results of diagnostic tests.

Table 3. Diagnostic Tests with ROA as the Measure of Profitability as the Dependent Variable and Leverage (TDR)

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H0 : \boldsymbol{\alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0}$ $HA: : \boldsymbol{\alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0}$	F=2.74	0.0003	Cross-sectional individual effects are not valid.
Breusch Pagan (1980) LM test for random effects $H0: \boldsymbol{\delta_\mu 2 = 0}$ $HA: \boldsymbol{\delta_\mu 2 \neq 0}$	LM = 0.0000	0.9776	Random effects are not present. Random effects model is not preferred.
Hausman (1978) specification test $H0: \mathbf{E(\mu_{it}|X_{it}) = 0}$ $HA: \mathbf{E(\mu_{it}|X_{it}) \neq 0}$	Chi2 = 54.62	0.0000	Regressors not exogenous. Hence the Fixed effects specification is valid.
Heteroscedasticity $H0: \boldsymbol{\delta_i 2 = \delta}$ *for all i* $H0: \boldsymbol{\delta_i 2 \neq \delta}$ *for all i*	LM =8.65	0.0033	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-sectional dependence tests $H0: \rho_{ij} = \rho_{ji} = co$ $HA: \rho_{ij} \neq \rho_{ji} = 0$ **Pesaran (2004) CD test** **Frees (1995) CD test**	CD= 21.671 F= 1.621	0.0947 $\alpha=$ 0.10 : 0.3169 $\alpha=$ 0.05 : 0.4325 $\alpha=$ 0.01 : 0.6605	Cross-sections are independent.

The joint validity of individual cross-sectional effects test affirmed the importance of individual cross-sectional effects as the F-statistic (2.74) is higher than the test estimation (0.0003). On the contrary, the probability value (0.0003) is less than 5%;

hence, the individual cross-sectional effects are not valid, and the null hypothesis is rejected. Furthermore, this test shows that firms are heterogeneous and that the TDR negatively influences ROA. Therefore, using the fixed effects pooled OLS assessment technique was not effective.

Secondly, the Breusch Pagan (1980) LM test confirms that random effects are absent and the random-effects model is not preferred. Thirdly, the results of the Hausman (1978) specification demonstrate that the fixed effects specification is valid; hence regressors are not exogenous. Finally, the heteroscedasticity test confirms that the variance of the error term is unstable.

Cross-sectional dependence is assessed using the Pesaran (2004) cross-sectional dependence test. The null hypothesis of independence of cross-sections is accepted. In contrast, the Frees test confirms that cross-sectional effects are present. Finally, the study prefers the fixed effect with the Driscoll and Kray (1998) standard errors estimator, which controls the heteroscedasticity and cross-sectional dependence. However, Table 4 shows results a battery of techniques for comparison basis.

Table 4. The Determinants of Leverage as Measured by TDR and ROA as a Measure of Profitability

Groups	21	21	21	21	21
F-stas/Wachi2					
767.31*		21.93	767.31***	11.27***	16.50***
R-SQUARED 0.3208		0.4358	0.3208		
Arellano-Bond AR(1)				-0.86	
Arellano-Bond AR(2)				-1.86	
Sargan test of overid				12.41	
Hansen test of overid				5.85	
Instruments				11	
	Pooled Effects	Fixed Effects	Random Effects (3)	System GMM	FGLS (5)
	(1) ROA	(2) ROA	ROA	(4) ROA	ROA
L.ROA	0.816***	0.373***	0.816***	0.820	0.816***
	(0.0357)	(0.0737)	(0.0357)	(0.719)	(0.0350)
LIQ	-0.577	-0.408	-0.577	-5.589*	-0.577
	(0.380)	(0.471)	(0.380)	(2.106)	(0.373)
FIRMSZ	-0.749**	-5.555***	-0.749**	-1.142***	-0.749**
	(0.251)	(1.052)	(0.251)	(0.268)	(0.247)
GROWTH	1.753	5.692**	1.753	-4.464	1.753
	(2.031)	(2.050)	(2.031)	(22.64)	(1.994)
TDR	-0.258	-5.988	-0.258	-10.70*	-0.258
	(1.378)	(3.322)	(1.378)	(5.179)	(1.353)
_cons	15.60**	110.6***	15.60**	35.85	15.60**
	(4.871)	(19.57)	(4.871)	(43.61)	(4.783)
N	168	168	168	168	168

*Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*

Post estimation diagnostic statistics in Table 4 showed that the model was robust and not weakened by many instruments as the groups are more significant than the number of instruments. Furthermore, the system GMM module results indicate a positive and insignificant relationship between ROA and its lagged value. This demonstrates that firm performance is stable. The results agree with Nawaiseh's

(2015) findings that leverage is stable.

The study observes a negative and significant connection between liquidity and ROA. This demonstrates that as liquidity deteriorates, the ROA rises. These findings are in line with the trade-off theory that anticipates a negative connection between liquidity and ROA. These results are consistent with Ravindran and Kengatharan (2021) findings who found the negative relationship between liquidity and profitability. However, they disagree with the findings of Hongli, Ajorsu and Bakpa (2019) who found a positive relationship between liquidity risk and profitability. Yusoff (2017) recommends that companies improve their profitability by raising the degree of liquidity and keeping up their ideal debt structure level.

The study also revealed an opposite and significant correlation between firm size and ROA. This demonstrates that the firm's size cannot automatically determine the firm's performance. These findings disagree with those of Dinh and Pham (2020), which revealed the positive correlation between firm size and ROA. On the contrary, the study revealed a negative and insignificant connection between growth opportunity and ROA. This means that the company's profitability does not depend on firm growth. These results are inconstitent with Dinh and Pham (2020) findings, which demonstrated an indirect connection between firm growth and ROA.

The study revealed a negative and significant connection between TDR and ROA. This means that as leverage falls, ROA will appreciate. These findings are consistent with the pecking order theory, which forecasts a negative connection between TDR and ROA. The results are supported by those of Papadimitri, Pasiouras, and Tasiou (2021), Ravindran and Kengatharan (2021) and Abubakar and Mohammed (2021). However, Hongli, Ajorsu and Bakpa, (2019) obtained opposite results.

5. Conclusions

This study aimed to investigate the nexus between financial leverage and profitability using the sample of 21 companies listed on top-40 JSE in South Africa from 2011 to 2019. The GMM model was used to find the relationship between the dependent and independent variables. The study revealed that financial leverage as calculated by TDR negatively influences profitability as calculated by ROA.

Future studies should focus on using a qualitative research approach in a similar topic, giving the perceptions of the other stakeholders such as investors, shareholders, managers, and policymakers. Moreover, further studies can be conducted on this topic using control variables like interest rate, gross domestic products (GDP), return on equity to measure profitability, debt to equity ratio to measure leverage and inflation using different methodologies.

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