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Debt Financing and Firm Performance in Zambia's Manufacturing Sector: Panel Evidence from Listed Firms on the Lusaka Securities Exchange

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Abstract

This study sought to examine the relationship between capital structure and financial performance of industrial enterprises listed at Lusaka Securities Exchange between 2011 and 2024. Basically it studies if firms that employ greater debt financing perform better or worse in terms of shareholder returns. The study employed audited annual reports of nine listed manufacturing firms. This provided a balanced panel of 126 firm-year observations. The return on equity was used to measure financial performance while the debt ratio was used to measure capital structure. Control variables such as company size, liquidity and growth were considered. The results indicate that debt is negatively and statistically significant in relation with return on equity. In other words, the more corporations finance their assets with debt, the lower the returns for shareholders. The results indicated that firm size improved performance, whereas liquidity and growth did not significantly effect performance. The Hausman test favored the random-effects model, but the fixed-effects and random-effects models yielded remarkably similar findings. The results corroborate the pecking order theory suggesting that more lucrative enterprises tend to use domestically generated money first before resorting to debt. However, the results could also reflect the high cost of borrowing, financial distress concerns and restricted access to cheap long-term lending in Zambia. The study therefore indicates that debt should not be completely shunned but utilized with prudence and only if predicted returns on projects are higher than the cost of borrowing. Also, the necessity for strategies to address the finance constraints encountered by manufacturing enterprises is suggested.

1. Introduction

The capital structure of a firm is the specific mix of debt and equity used to fund the firm's assets, operations and growth (Baker and Martin, 2011). The selection of this combination is a very crucial decision for business management as it affects the cost of capital, the allocation of risk amongst the suppliers of finance and ultimately the shareholder value. A firm might be equity intense, debt intensive or anything in between (Dare and Sola, 2010) and the quest for the optimal mix of finance that maximizes firm value has been preoccupying the mind of financial researchers ever since the fundamental work of Modigliani and Miller (1958).

The financing decision is particularly crucial for manufacturing enterprises that normally need large investment in plant and machinery, raw material inventory, storage and distribution facilities and other inputs required by the production process. Given the macro-economic climate in Zambia, namely high interest rates, inflationary pressures and underdeveloped capital market, the availability and cost of finance are important to the profitability and survival of the industrial sector. Thus, the manner in which finance decisions affect performance is of enormous practical interest in this context.

The empirical evidence on the link between capital structure and performance is mostly inconclusive. Some researchers argue that leverage increases value through the disciplining role of debt and the interest tax shield, while others find that leverage decreases performance because of the burden of interest obligations and the possible costs of financial distress (Onaolapo and Kajola, 2010; Zeitun and Tian, 2007). The empirical literature on capital structure and company performance in emerging markets is rising, but evidence from Zambia is scarce, especially for listed industrial firms. Empirical attention has been given to the manufacturing sectors of Ghana, Nigeria, Kenya and South Africa, but comparatively little work has been done on manufacturing in Zambia, which operates in a high interest rate and somewhat shallow capital market environment. Therefore, this study contributes by presenting panel evidence from listed Zambian manufacturing firms throughout the period 2011-2024, a period characterized by macro-economic volatility, shifting borrowing costs and financial-market limitations.

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Given the inconsistent findings and the insufficient evidence for listed manufacturers in Zambia, the present investigation is motivated. The paper addresses three aims of the larger study. The first objective is to assess the impact of debt ratio on the financial performance of listed manufacturing enterprises in Zambia. The second is to examine the impact of firm specific control factors such as firm liquidity, growth and size on financial performance. Third, we examine whether the debt-performance link lends credence to the pecking order, trade-off or agency cost hypotheses in the Zambian industrial environment. These objectives focus on the issue that appears to be of greatest importance to managers and investors, namely, whether and in what direction the mix of debt and equity matters for shareholder returns.

2 Literature Review

2.1 Theories

Modern capital structure theory starts with Modigliani and Miller's (1958) irrelevance argument. This theorem says that in a perfect capital market without taxes and transaction costs, and with uniform expectations, the value of a corporation is independent of how it finances its assets. Taking account of the tax deductibility of interest, Modigliani and Miller (1963) further modified the theory to state that because interest payments lower taxable income, debt has a tax advantage and value consequently increases with leverage. The assumptions underlying the irrelevance result are unrealistic and alternative theories have been developed since then to explain why capital structure changes have a substantial effect on business value.

According to the tradeoff theory, the optimal capital structure is achieved when the benefit of tax savings from higher debt is just compensated by the increase in costs of financial hardship and bankruptcy. The agency cost theory of Jensen and Meckling (1976) emphasizes the agency problem due to separation of ownership and control and proposes that debt can discipline managers or produce additional agency costs through risk shifting and underinvestment. According to the pecking order theory of Myers and Majluf (1984) organizations finance themselves in a fixed sequence using asymmetric information: first from internally generated cash, then from debt, and only eventually from fresh stock. The negative association between debt ratio and firm performance could be consistent with the pecking order approach, since more profitable enterprises could rely more heavily on internally generated fund. However, the above-mentioned association could also be explained by the financial distress costs, debt overhang, excessive borrowing costs or reverse causality.

2.2 The Relationship between Debt and Performance

Most of the studies show that leverage has negative relation with company performance. Abor (2005) in his research of listed firms in Ghana found mixed evidence on the association between debt and return on equity. He saw that short term debt had a positive relation to return on equity, whereas long term debt had a negative relation to return on equity. Zeitun and Tian (2007) examined a sample of 167 enterprises in Jordan and found that capital structure had a significant negative effect on both accounting and market-based measures of performance. Similarly, Onaolapo and Kajola (2010) applied ordinary least squares on Nigerian listed businesses and found that there was a negative association between debt ratio and return on assets and return on equity. Umar et al (2012) also arrived at the same conclusion, as they discovered that capital structure has a negative impact on return on equity, net profit margin, return on assets and return on capital employed of prominent quoted companies in Pakistan.

Yet other study finds a beneficial relationship between debt and corporate performance. For example, Ganiyu et al. (2019) in their study of Nigerian non financial companies using dynamic panel models found a statistically significant relationship between capital structure and performance at modest leverage levels, but a non-monotonic relationship beyond a certain threshold. These various results suggest that the relationship between leverage and performance may be dependent on the level of leverage, the context and the performance measure used.

2.3 Recent Evidence from Emerging and African Markets

Recent research have shown that the relationship between capital structure and business performance is different in different nations, sectors and firm conditions. In emerging and frontier economies, companies generally struggle with high borrowing costs, weak capital markets, restricted access to long-term funding, inflation and macroeconomic instability. These factors can diminish the benefits of debt finance and make excessive leverage damaging to profitability.

There is also conflicting data from Africa. Studies from Kenya and Ghana suggest that capital structure impacts business performance, although the intensity and direction of this link can be contingent on firm-specific factors such as size, liquidity, growth and asset structure. This implies that debt should not be analysed in isolation, but relative to the larger financial and operating features of the organization.

More recent post COVID-19 studies also suggest that crisis conditions influence financing decisions. Economic uncertainty, revenue instability and refinancing concerns may alter the way corporations use debt. Other recent research imply that the leverage impact may not be linear, i.e., debt can sustain performance to a certain extent but may undermine profitability when it gets excessive or costly.

This position is supported by institutional evidence from the OECD, IMF, World Bank and IFC, which shows that high corporate debt, rising interest rates and refinancing pressures can exacerbate vulnerability in emerging markets. This is particularly essential for manufacturing companies which need significant credit for plant, machinery, inventory and working capital.

Overall, the literature indicates that debt is not automatically bad. Its impact depends on whether borrowed funds provide returns in excess of the cost of financing. In emerging and frontier countries like Zambia, high interest rates, refinancing risk, inflation and insufficient capital-market depth may lead excessive debt to diminish profitability. Thus, a negative association between debt ratio and return on equity should be viewed as an indication that expensive or overleveraging debt might impair financial performance, rather than as an indication that companies should never use debt.

2.4 Leverage Structure and Performance

A related literature explores the structure of leverage rather than the simple existence of debt. Leverage structure relates to the proportional usage of debt and equity, the duration of debt, and the degree to which borrowed funds are used in productive investment. In a study of listed manufacturing enterprises in Sri Lanka, Leon (2013) found leverage to be negatively related to return on equity. He argued that firms with high levels of debt may record low returns

to shareholders as fixed interest obligations may consume operational profits. Similarly, Ganiyu et al. (2019) reported evidence of a non-monotonic link between capital structure and performance, suggesting that debt might be favorable up to a specific threshold but detrimental beyond an ideal level.

This distinction is essential because the debt ratio doesn't just tell you whether or not a corporation utilizes debt; it tells you what share of assets are financed by debt. A larger debt ratio therefore indicates greater dependence on borrowed funds relative to the firm's entire asset base. For manufacturing companies this can be an advantage where borrowed funds are invested in production capacity, technology, inventories and expansion. However, leverage may impair profitability and weaken shareholder value if debt is expensive or where borrowed funds do not create sufficient operating returns. Thus, for firms operating in high-cost financing settings like Zambia, the performance effect of leverage is probably dependent on whether debt-financed investments yield returns in excess of the cost of borrowing.

2.5 Hypotheses

Based on the theoretical and empirical research described above, we hypothesize:

H01: Debt ratio does not significantly affect return on equity of listed manufacturing enterprises in Zambia.

H02: Company-specific variables, that is liquidity, growth and company size, do not significantly affect return on equity among listed manufacturing firms in Zambia.

In addition to these formal predictions, the paper assesses the direction and relevance of the debt-ratio coefficient in reference to the key capital structure theories. A negative and substantial debt-ratio coefficient would be compatible with the pecking order theory, which argues that more profitable enterprises are more likely to rely on internally generated cash and less likely to rely on loans. But such a result may also be due to excessive borrowing rates, financial distress risk or debt-overhang effects, especially in an emerging market scenario such as Zambia. A positive coefficient on the debt ratio would be more compatible with trade-off or agency cost arguments, where debt can give tax-shield benefits or impose financial discipline on management.

3 Methodology

3.1 Research Design and Data

This study used a quantitative, correlational and explanatory research approach to explore the relationship between capital structure and financial performance of listed manufacturing enterprises in Zambia. The study used secondary panel data from audited annual reports of manufacturing enterprises registered at Lusaka Securities Exchange. Other financial data were sourced from the Lusaka Stock Exchange and African Financials database.

The sample comprises nine quoted manufacturing enterprises with continuously available audited financial statements for the period 2011-2024. This resulted in a balanced panel of 126 firm-year observations with nine cross-sectional units over fourteen years. The selection of panel data is justified because it allows the study to control for both cross-firm differences and time variations, which increases the efficiency of the estimates than the solely cross-sectional or time-series methods.

Table 1: Sampled Manufacturing Firms Listed on the Lusaka Securities Exchange

No	Company Name	Sector / Industry Classification	Period Covered	Reason for Inclusion
1	Zambia Bata Shoe Company Plc	Footwear manufacturing / Consumer products	2011–2024	Listed before 2011; manufacturing company with audited financial accounts
2	National Breweries Plc	Beverage manufacturing / Consumer goods	2011–2024	Pre-2011 listing, manufacturer of beverages with audited financial accounts
3	AECI Mining Explosives Plc	Industrial chemicals and explosives manufacturing	2011–2024	Listed before 2011; industrial manufacturing company with audited financial accounts
4	Zambia Sugar Plc	Agro-processing / Sugar manufacturing	2011–2024	Listed before to 2011; sugar producer with audited financial accounts
5	British American Tobacco Zambia Plc	Tobacco products manufacturing / Consumer goods	2011–2024	pre-2011; manufacturing enterprise with certified financial statements
6	Zambeef Products Plc	Food processing and agro-processing	2011–2024	Listed pre-2011; integrated food production and processing company with certified financial accounts
7	Zambian Breweries Plc	Beverage manufacturing / Consumer goods	2011–2024	Listed before 2011; brewer & soft drink manufacturer; Audited financial statements
8	Metal Fabricators of Zambia Plc	Industrial manufacturing / Cable and metal products	2011–2024	Pre-2011 listing; manufacturing company with audited accounts
9	Chilanga Cement Plc	Cement manufacturing / Building materials	2011–2024	Listed before 2011; cement producer with audited financial statements

Source: Author.

We only include firms who have complete financial data for the whole period of our study. This resulted in a balanced panel, but might have introduced a survivorship bias by excluding firms without full data. This restriction is acknowledged in the interpretation of the results.

3.2 Variables and Measurement

The dependent variable is the financial performance evaluated by return on equity (ROE). Return on equity was chosen as it shows the return to the shareholders made from the capital invested in the firm.

The key independent variable is capital structure, proxied by the debt ratio. The debt ratio measures the proportion of total assets financed by debt and so it is a suitable measure of the degree to which the firm is dependent on borrowed cash.

The study also contains three firm-specific control variables: liquidity, growth and size of the firm. Liquidity is assessed by the current ratio. Growth is measured by annual sales growth. Firm size is measured by the natural logarithm of total assets. These factors are included because past research suggests that internal firm characteristics may affect company performance in addition to capital structure.

Table 2: Variable Definition and Measurement

Variable	Symbol	Measurement	Expected Sign
Return on equity	ROE	Net income / Total equity	Dependent variable
Debt ratio	DR	Total debt / Total assets	Negative or positive
Liquidity	LIQ	Current assets / Current liabilities	Positive or negative
Growth	GR	Annual percentage change in sales	Positive
Firm size	SIZE	Natural logarithm of total assets	Positive

Source: Author.

3.3 Model Specification

To examine the effect of capital structure on financial performance, the study estimates the following panel-data model:

$$ROE_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 LIQ_{it} + \beta_3 GR_{it} + \beta_4 SIZE_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Where:

ROE_{it} = Return on Equity

DR_{it}= Debt Ratio

LIQ_{it}=Liquidity

GR_{it}=Sales Growth

$SIZE_{it}$=Firm Size

i=Firm;

t=Years;

μ_i=Firm Specific Effect

λ_t=Time Specific Effect

ε_{it} = Idiosyncratic Error Term.

The coefficient of interest for the main purpose is the debt ratio coefficient. This coefficient measures the association of a firm's debt financing behavior with its return on equity. A negative and significant coefficient indicates that enterprises with higher amounts of debt likely to deliver worse returns for shareholders. A positive coefficient would imply that debt financing may enhance performance, potentially due to tax advantages or that debt financially disciplines managers.

3.4 Estimation Procedure

The model was estimated using panel data approaches. We initially evaluated pooled ordinary least squares, fixed-effects and random-effects models. The fixed-effects model controls for unobserved heterogeneity at the firm level that could be connected with the explanatory variables, whereas the random-effects model assumes that unobserved heterogeneity at the firm level is not correlated with the regressors.

To evaluate whether a fixed-effects or random-effects model is appropriate, the Hausman specification test was conducted. The null hypothesis of the Hausman test is that the random effects estimator is consistent. If the probability value is higher than 0.05, the random effect model is favored . If the probability value is below 0.05, the fixed-effects model is suggested.

3.5 Diagnostic Tests

To check the reliability of the panel regression estimates, several diagnostic tests were used. The Variance Inflation Factor was used to test for multicollinearity. The Breusch-Pagan or White test was used to check for heteroskedasticity. The Wooldridge test for autocorrelation in panel data was used to test for serial correlation. Pesaran CD test was used for cross sectional dependency. Robust or clustered standard errors were utilized to increase the reliability of statistical inference when heteroskedasticity, serial correlation or cross-sectional dependence was discovered.

Table 3 Diagnostic Procedures

Diagnostic Issue	Test Used	Decision Rule
Multicollinearity	Variance Inflation Factor	VIF below 10 indicates no serious multicollinearity
Heteroscedasticity	Breusch-Pagan / White test	p-value below 0.05 indicates heteroscedasticity
Serial correlation	Wooldridge test	p-value below 0.05 indicates serial correlation
Cross-sectional dependence	Pesaran CD test	p-value below 0.05 indicates cross-sectional dependence
Model selection	Hausman test	p-value above 0.05 supports random effects
Robust inference	Robust / clustered standard errors	Used where diagnostic problems are detected

Source: Author.

These tests strengthen the reliability of the results and ensure that the estimated coefficients are interpreted using appropriate panel-data procedures.

4 Results and Discussion

4.1 Descriptive Statistics

The descriptive statistics of the variables of interest are presented in Table 4. The average ROE was 0.128, which implies that the shareholders got an average return of around 12.8% throughout the data period. ROE ranged from −0.081 to 0.292, indicating that some firms incurred losses while others

had comparatively high returns. The negative skewness implies that some companies lost money throughout the sample time period. The average debt ratio was 0.453 indicating that on average debt financed 45.3 per cent of total assets which ranged between 0.183 to 0.786. The average liquidity value was 1.71, which suggested current assets were larger than current liabilities by a factor of 1.71. Average sales growth was 0.119, or around twelve per cent each year. Average business size (natural logarithm of total assets) was 21.65. The standard deviations suggest moderate variability within the sample.

Table 4: Descriptive statistics

	ROE	GR	DR	LIQ	SIZE
Mean	0.128290	0.119419	0.453203	1.713748	21.652969
Median	0.142064	0.082261	0.450735	1.746544	21.510482
Maximum	0.291898	0.985349	0.785849	2.593514	23.538905
Minimum	-0.081094	-0.436833	0.183233	0.810172	19.927077
Std. Dev.	0.077729	0.314738	0.115425	0.495748	0.998300
Skewness	-0.410904	0.551453	-0.033841	-0.024927	0.074639
Kurtosis	2.736724	2.780706	2.581954	1.834401	1.661159
Jarque-Bera	3.909585	6.638538	0.941551	7.096929	9.527580
Probability	0.141593	0.036178	0.624517	0.028768	0.008538
Observations	126	126	126	126	126

Source: EViews output.

4.2 Correlation Matrix

Table 5 shows the pairwise correlation matrix. Return on equity is negatively related with debt ratio (negative 0.330), liquidity (negative 0.108) and weakly with business size (negative 0.038). However, it is positively but weakly related with growth (0.051). One interesting finding is the moderately strong positive association between the debt ratio and firm size (0.570), which implies that larger enterprises in the sample carried a somewhat higher debt load. The correlations among the explanatory variables are below the threshold at which substantial multicollinearity would be of concern and the variables can be entered into the regression with confidence (see, for example, Tabachnick & Fidell, 2007).

Table 5: Correlation matrix

Covariance Correlation	ROE	GR	DR	LIQ	SIZE
ROE	0.00599397... 1				
GR	0.00122854... 0.050619177161979 82	0.09827414... 1			
DR	-0.0029341... -0.329652188630623 6	-0.0007781... -0.0215896...	0.01321732... 1		
LIQ	-0.0041446... -0.108417941360374 4	0.00303578... 0.01961197...	0.00700872... 0.12346289...	0.24381567... 1	
SIZE	-0.0028994... -0.037664105809663 76	0.00714177... 0.02291160...	0.06517471... 0.57013335...	0.01265015... 0.02576523...	0.98869372... 1

Source: EViews output.

4.3 Regression Results

Table 6 presents panel least squares estimate under the random effects specification. The entire model is significant with F statistic of 9.10 and probability less than 0.001 and explains around fifty-nine per cent variation in return on equity with R squared of 0.589 and the adjusted R squared of about 0.524. The debt ratio is significant at the one percent level, the business size is significant at the five percent level, while growth and liquidity are not statistically significant. The Durbin Watson statistic is 2.08 which is close to two indicating the absence of first order serial correlation.

Table 6: Panel regression results (dependent variable: ROE)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.094645	0.167596	-0.564721	0.5734
DR	-0.319482	0.075908	-4.208827	0.0001
GR	0.009396	0.022475	0.418063	0.6767
LIQ	-0.007151	0.013549	-0.527787	0.5987
SIZE	0.017441	0.008531	2.044554	0.0432

Source: EViews output. Estimation by panel least squares with random effects; n = 126; cross sections = 9; periods = 14; R squared = 0.589; adjusted R squared = 0.524; Durbin Watson = 2.08; F statistic significant at p below 0.001.

4.4 Model Selection and the Hausman Test

Because the data are panel in nature, we have to choose between a fixed or random effects specification. Thus, a Hausman test was conducted, the results of which are shown in Table 7. The test generated a chi square statistic of 1.86, with four degrees of freedom, and a probability of 0.761(χ^2 = 1.861, p = 0.761). This probability is substantially over the traditional five per cent level of significance, and hence we cannot reject the null hypothesis

that the random effects estimator is consistent. Thus the random effects specification is preferred. The estimated variance of the period effects was found to be virtually zero, implying that heterogeneity across periods is insignificant and the random effects estimator collapses towards the pooled estimator. Table 7 demonstrates that the coefficient estimates of fixed effects and random effects are extremely similar. The median of the debt ratio is estimated at negative 0.319 with fixed effects and negative 0.300 with random effects; the close similarity of the fixed effects and random effects coefficients indicates that the negative relationship between debt ratio and ROE is not very sensitive to the choice of panel specification.

Table 7: Hausman test (correlated random effects), chi square = 1.86, d.f. = 4, probability = 0.761

Variable	Fixed	Random	Var(Diff.)	Prob.
DR	-0.319482	-0.290651	0.000908	0.3386
GR	0.009396	0.007230	0.000078	0.8062
LIQ	-0.007151	-0.007733	0.000012	0.8666
SIZE	0.017441	0.013507	0.000012	0.2556

Source: EViews output. Comparison of period fixed and random effects coefficient estimates.

4.5 The Relationship between Debt and Performance

The initial purpose was to determine whether there is a relationship between debt and performance of the listed manufacturing enterprises. The analysis addresses this question unambiguously. The coefficient of −0.319 suggests that, holding other factors constant (liquidity, growth and firm size), a 0.10 rise in the debt ratio is related with a decrease in ROE of around 0.032, or nearly 3.2 percentage points. Thus, the null hypothesis that there is no meaningful association between debt ratio and performance is rejected. It is statistically significant as well as economically significant in that enterprises with more debt get worse returns.

This finding is consistent with most international findings. This finding is consistent with the negative effect of leverage by Zeitun and Tian (2007) in Jordan, Onaolapo and Kajola (2010) in Nigeria and Umar et al (2012) in Pakistan, providing support for the pecking order theory of Myers and Majluf (1984). It seems that in the instance of Zambia the cause is the high cost of debt. If debt has a high interest payment load then the fixed cost of financing would tend to increase, this would consume more income and consequently the marginal contribution to ROE from the utilization of each new unit of debt will diminish. The findings therefore suggest that the selection of funding is significant under circumstances of information asymmetry, cost of debt and danger of financial distress, against the irrelevance proposition of Modigliani and Miller (1958).

4.6 Capital Structure and Performance: Interpretation of the Debt Ratio

The results suggest that enterprises with a higher proportion of debt funded assets are more likely to report a poorer return on equity. Given that the debt ratio (total debt/total assets) is a measure of total debt to total assets, this conclusion shows that more reliance on borrowed capital is related with worse shareholders' returns in the sample of listed manufacturing firms. This does not mean that debt is fundamentally bad. Instead, it implies that debt might impair performance if the costs of borrowing are high, if repayment commitments eat into operational income, or if investments financed with debt do not provide returns in excess of the cost of borrowing.

This explanation is particularly pertinent in the context of Zambian manufacturing where enterprises frequently encounter high interest rates, restricted access to long-term funding and macroeconomic uncertainty. Manufacturers require a considerable investment in plant, machinery, inventories and working capital. Thus, when used correctly, debt can be a propeller for productive expansion. However, if the cost of debt exceeds the returns on debt-financed assets, leverage can diminish profitability and shareholders' returns.

The negative and statistically significant effect on the debt ratio is therefore consistent with the pecking order approach which argues that enterprises with higher profitability tend to rely more on internally generated cash and less on external borrowing. At the same time, the conclusion may also reflect considerations of trade-off theory, namely the likelihood that the costs of financial crisis exceed the tax shield benefits of debt. Hence, the finding should be regarded as an indication that too much/too costly debt correlates with weaker financial performance, rather than an indication that enterprises should not borrow at all.

4.7 Diagnostic Tests

Diagnostic tests were performed to check the reliability of the estimates obtained by panel regression. The study employs panel data and hence the analysis extended beyond correlation, Durbin-Watson and normality tests by looking at multicollinearity, heteroskedasticity, serial correlation, cross-sectional dependence and residual normality.

Multicollinearity was tested with the Variance Inflation Factor (VIF). VIFs less than 10 indicated that multicollinearity was not serious. We evaluated for heteroskedasticity using the Breusch-Pagan or White test and for serial correlation using the Wooldridge test for panel data. The Pesaran CD test was used to test for cross-sectional dependence, as enterprises in the same market may be subjected to shared macroeconomics shocks such as inflation, changes in interest-rate and movements in exchange-rate. The residual normality was checked by the Jarque-Bera test on the residuals of the regression.

Robust or clustered standard errors were utilized to increase the reliability of statistical inference when heteroskedasticity, serial correlation or cross-sectional dependence was found. The diagnostic tests carried out increase the reliability of the panel regression results and assure the interpretation of the results according to the relevant econometric criteria.

5 Conclusion and Recommendations

The objective of this research was to identify the relationship between debt and performance of manufacturing firms listed on Lusaka Securities Exchange and how debt and equity combinations impact on the performance of the firms. The data suggest that listed manufacturing firms in Zambia with high

debt levels tend to have worse return on equity. This shows that a greater reliance on debt financing could lead to lower shareholder returns, especially if borrowing costs are high or if the investments supported by debt do not yield returns that exceed the cost of capital. The Hausman test confirmed that the random effects specification was suitable and the fixed and random effects estimates were very similar, giving some confidence in the key conclusion. Firm size was also found to be favorably and strongly associated to performance. Overall, the results are consistent with the pecking order theory, in which managers prefer internal funds and then resort to debt, and are inconsistent with the irrelevance statement of Modigliani and Miller.

Although the work reports correlation analysis, model-selection results and normalcy tests, further diagnostic testing utilizing VIF, tests for heteroskedasticity, Wooldridge serial correlation tests and Pesaran cross-sectional dependence tests would increase the reliability of the estimations. Hence, the results ought should be taken as evidence of association rather than precise causality. In future work, the robustness of the results should be further examined using robust or clustered standard errors and dynamic panel estimators.

Two major recommendations are put up. First, the results indicate selective and strategic use of debt, primarily when the estimated project returns are above the cost of borrowing. The findings do not imply that debt is bad per se but that excessive or pricey debt may dilute returns to shareholders in Zambia's manufacturing sector. Second, managers should assess debt-financed initiatives based on the expected return, ability to repay, and the cost of borrowing. Debt should not be fully eschewed but utilized prudently when it augments productive capacity and when the expected returns are more than the cost of financing.The universality of these implications might be tested by extending the study to include non-listed enterprises, additional sectors and a longer panel.

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The article followed all ethical standards appropriate for this kind of research.

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