

Financial Leverage and Systematic Risk of Listed Manufacturing Firms in Nigeria

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ABSTRACT

The study examined the effect of financial leverage on systematic risk of listed manufacturing firms in Nigeria. The specific objective was to examine the effect of debt to equity ratio and debt to asset ratio on systematic risk of listed manufacturing firms in Nigeria. The study utilized an ex-post facto research design. The population consisted of 44 manufacturing firms listed on the Nigerian Exchange Group, from which a purposive sample of 25 firms was selected. Secondary data were gathered from the annual reports of these firms for the period spanning 2012 to 2023. The hypotheses were evaluated using Panel Estimated Generalized Least Squares (EGLS). The findings showed that: debt-to-equity ratio significantly and positively affects the systematic risk of listed manufacturing firms in Nigeria ($\beta = 0.0000681$, $p\text{-value} = 0.0012$); debt-to-asset ratio has a significant positive effect on the systematic risk of listed manufacturing firms in Nigeria ($\beta = 0.0000138$, $p\text{-value} = 0.0076$). In conclusion, firms that choose to increase debt financing may enjoy the potential for higher returns in favorable market conditions, but this comes with the trade-off of increased exposure to systematic risk, which could translate into greater price volatility and consequently lower investor confidence. The study recommends that the Nigerian Securities and Exchange Commission (SEC) should implement guidelines or monitoring mechanisms that encourage manufacturing firms to limit their overall debt levels in relation to their assets. This would mitigate the systemic risk faced by these firms and contribute to greater financial stability within the sector.

Keywords: Financial Leverage, Systematic Risk, Debt to Equity Ratio, Debt to Asset Ratio

INTRODUCTION

As the business environment of this age is getting continuously tougher in competition, organisations are also constantly faced with a range of risks, many of which are systematic, affecting not just one company but entire industries or even countries (Derbali, 2024). One of the most critical challenges for firms, particularly those listed on stock exchanges, is the ability to manage these risks effectively. Systematic risk refers to the risk inherent to the entire market or sector, which cannot be eliminated through diversification (Yisau et al., 2024). It is often influenced by factors such as economic changes, political instability, or natural disasters, and can significantly impact a company's performance and stock price. Zen GRC Team (2024) argued that manufacturing firms, as key players in the economy, are particularly vulnerable to such risks due to their sensitivity to changes in raw material prices, interest rates, labor costs, and overall economic conditions. Systematic risk is a key concern for investors and firms alike, as it determines the market volatility and the broader economic environment in which a firm operates (Obani & Ozuomba, 2024).

In an increasingly competitive and uncertain business environment, the relevance of effective financial management, especially in terms of leveraging a firm's financial structure, has gained significant attention (Wiyono & Mardijuwono, 2020). Financial leverage, the use of debt to finance the firm's assets, is a crucial tool for companies aiming to maximize their return on equity (Aggreh et al., 2022). However, the relationship between financial leverage and systematic risk has been the subject of much debate. In an era marked by economic volatility, inflationary pressures, and frequent financial crises, firms must be especially mindful of how they structure their capital to mitigate risks while taking advantage of the benefits of leverage. The challenge lies in the fact that while financial leverage can potentially enhance returns by magnifying profits, it can also

magnify losses in periods of economic downturn, thus increasing a company's exposure to systematic risk. Financial leverage, measured through ratios such as the debt-to-equity and debt-to-asset ratios, is a tool that companies use to fund their operations, growth, and expansion (Yimam et al., 2023). The debt-to-equity ratio, which compares a firm's total debt to its shareholders' equity, reflects the balance between debt and equity financing (Hastuty & Hou, 2023). On the other hand, the debt-to-asset ratio, which measures the proportion of a firm's assets financed by debt, indicates the company's financial stability and the extent to which it relies on borrowed funds (Ameira & Mohammad, 2023). Both of these leverage ratios are important indicators for assessing a firm's financial health and the risks associated with its capital structure.

The impact of financial leverage on systematic risk is multifaceted and can be understood through its role in amplifying a firm's exposure to market-wide risks (Wiyono & Mardijuwono, 2020). Systematic risk is primarily driven by factors that affect the entire market, such as economic conditions, interest rate changes, inflation, and political events. Financial leverage, by increasing a firm's debt obligations, inherently raises the potential for higher returns, but it also heightens the risk of default and financial distress (Nworie et al., 2023), especially during periods of economic instability. The relationship between financial leverage and systematic risk can be understood through two main leverage ratios: the debt-to-equity ratio and the debt-to-asset ratio. A higher debt-to-equity ratio generally indicates that a firm is more leveraged, meaning it has a higher proportion of debt relative to equity (Hastuty & Hou, 2023). While this can lead to higher returns in a stable economic environment, it also exposes the firm to greater risks during economic downturns, as debt obligations remain fixed regardless of the firm's financial performance. On the other hand, the debt-to-asset ratio provides a measure of how much of a firm's assets are financed by debt. A higher ratio suggests that the company is more reliant on debt to fund its operations, which increases its exposure to interest rate fluctuations and market volatility.

Nigeria, as a developing economy, faces a range of macroeconomic challenges, including fluctuating exchange rates, inflation, and policy instability, which can create a volatile business environment (Oyadeyi, 2024; Effiong & Adanu, 2024). Manufacturing firms in Nigeria are often at the mercy of these factors, as they rely on imports for raw materials and face challenges in accessing affordable financing. In such an environment, firms with higher levels of financial leverage may experience amplified risks, as their debt obligations can become burdensome when market conditions worsen. For instance, during periods of high inflation or economic contraction, manufacturing firms may struggle to meet their debt obligations, leading to a higher probability of default. Moreover, the volatility of the Nigerian Naira (Ogunmokun, 2024) and the uncertainty surrounding government policies on tariffs, trade, and taxation can further increase the exposure of these firms to market risks.

Furthermore, it is important to recognize the potential consequences of excessive financial leverage. While it can lead to higher returns on equity, it also magnifies the effects of any downturns in the market, thereby increasing a firm's exposure to systematic risk (Wiyono & Mardijuwono, 2020). Companies that use a high degree of leverage may face higher volatility in their stock prices, as the market perceives them to be riskier investments. However, while financial leverage is widely utilized, many firms face challenges in managing their debt effectively (Yisau et al., 2024). High levels of debt, driven by reliance on external financing, are common, with firms often over-leveraging in an attempt to maximize returns. This practice, while potentially lucrative in stable economic conditions, increases the vulnerability of these firms to systematic risks, such as fluctuations in interest rates, exchange rates, and broader economic volatility. In the Nigerian context, where macroeconomic conditions are often unpredictable (Oyadeyi, 2024), these firms may not have the financial resilience to cope with the adverse effects of excessive leverage.

As a result, when firms over-leverage, they amplify their exposure to market-wide risks, which can result in increased volatility in their stock prices, reduced profitability, and in the worst-case scenario, financial distress or bankruptcy. In Nigeria's manufacturing sector, where firms already face external challenges such as fluctuating raw material prices, foreign exchange instability, and regulatory uncertainty, the failure to manage financial leverage properly exacerbates these vulnerabilities. The inability to mitigate systematic risks can lead to a decline in investor confidence, a reduction in market share, and an overall weakening of the sector's competitiveness, hence the need for this study.

Objective of the study

The main objective of the study is to examine the effect of financial leverage on systematic risk of listed manufacturing firms in Nigeria. The specific objectives are as follows:

- 1) To examine the effect of debt to equity ratio on systematic risk of listed manufacturing firms in Nigeria.
- 2) To ascertain the effect of debt to asset ratio on systematic risk of listed manufacturing firms in Nigeria.

Hypotheses

H01) Debt to equity ratio has no significant effect on systematic risk of listed manufacturing firms in Nigeria.

H02) Debt to asset ratio has no significant effect on systematic risk of listed manufacturing firms in Nigeria.

LITERATURE REVIEW

Conceptual Review

Financial Leverage

Financial leverage refers to the use of debt financing to increase the potential return, essentially amplifying the capacity of a firm to generate profits from its capital structure (Bahodirovich, 2024). It is a key concept in corporate finance that involves borrowing funds to invest in assets with the expectation that the returns from those assets will exceed the cost of borrowing. Financial leverage can significantly magnify both the potential gains and losses of a company. When a firm uses debt to finance its operations or investments, it assumes a financial risk because the interest payments on the debt are obligatory, regardless of the firm's profitability. As a result, the company must ensure that its returns from the borrowed funds exceed the cost of debt to benefit from leveraging (Wiyono & Mardijuwono, 2020).

The decision to use financial leverage hinges on the trade-off between risk and reward (Obi & Nworie, 2024; Nworie & Mba, 2022). In situations where the firm's return on investment is higher than the interest rate on debt, financial leverage can lead to a higher return on equity for the shareholders. However, if the firm's investments underperform, the cost of debt can outweigh the benefits, causing financial distress or even bankruptcy (Fatimah & Fadjaranie, 2024). This dual effect makes financial leverage a double-edged sword: while it can increase profitability, it also increases a firm's vulnerability to economic downturns, market fluctuations, or poor investment decisions. For instance, highly leveraged firms may struggle to meet debt obligations during periods of low profitability, potentially leading to a reduction in credit ratings or higher borrowing costs in the future.

The optimal degree of financial leverage varies depending on industry characteristics, the firm's financial stability, market conditions, and the company's business model. Companies with stable cash flows and low business risk are generally able to take on more debt and utilize higher leverage (Bahodirovich, 2024). On the other hand, businesses with unpredictable earnings or high operational risks tend to limit their use of debt to reduce the financial strain of debt repayments. Therefore, financial leverage is a crucial tool for decision-makers in companies, as it plays a central role in shaping a firm's risk profile and overall financial health.

Debt to Equity Ratio

The debt to equity ratio (D/E ratio) is a financial metric used to assess the relative proportion of debt and equity used by a company to finance its assets (Hastuty & Hou, 2023). It is one of the most important indicators of a firm's financial leverage and solvency. The ratio is calculated by dividing a company's total debt by its total equity. By evaluating the debt to equity ratio, investors, creditors, and analysts can gauge how much debt a company is using to fund its operations compared to its own equity capital (Permada & Sari, 2024).

A higher debt to equity ratio indicates that a company is more leveraged, meaning it relies more on borrowed funds than on equity financing (Hastuty & Hou, 2023). This can be perceived as a riskier financial position

because debt obligations must be repaid regardless of the firm's profitability, and a high level of debt increases the potential for financial distress if the company fails to meet its obligations. On the other hand, a lower debt to equity ratio suggests that the company is less reliant on debt financing and is in a safer financial position with respect to its leverage (Permada & Sari, 2024). However, this might also mean that the company is not fully utilizing the benefits of debt financing, such as tax advantages that come from interest deductions.

Debt to Asset Ratio

The debt to asset ratio is a financial leverage ratio that compares a company's total debt to its total assets (Ameira & Mohammad, 2023). This ratio is a measure of the proportion of a company's assets that are financed through debt. It is calculated by dividing a firm's total debt by its total assets, where total debt includes both short-term and long-term debt, while total assets encompass all the assets owned by the firm, such as cash, property, and equipment. This ratio is significant because it provides an indication of the firm's financial risk and its dependence on external borrowing to fund its operations and growth (Hastuty & Hou, 2023). The higher the debt to asset ratio, the greater the proportion of the company's assets financed by debt, which can be seen as a signal of higher financial risk.

A high debt to asset ratio suggests that a company may be over-leveraged, meaning it relies heavily on debt financing rather than equity to fund its assets (Oktrima, 2024). Such a structure could increase the company's vulnerability to financial distress, especially if the firm's income does not meet expectations, making it difficult to service its debt. On the other hand, a low debt to asset ratio typically implies that a firm has less financial risk, as it is less reliant on borrowed funds and more on its own capital to finance its operations (Ameira & Mohammad, 2023). However, this might also indicate that the firm is not taking full advantage of the potential benefits of leveraging, such as the ability to invest in growth opportunities without diluting ownership.

Systemic Risk

Systemic risk refers to the risk of a collapse or significant disruption in the entire financial system or economy due to the failure or distress of a major institution, sector, or event (Yisau et al., 2024). Unlike specific or idiosyncratic risk, which affects individual firms or assets, systemic risk has the potential to impact a broad range of financial entities and markets (Ashara & Ofor, 2022). This type of risk arises from interconnectedness within the financial system, where the failure of one institution or market can trigger a cascading effect on others. The most notable example of systemic risk is the global financial crisis of 2008, which began with the collapse of major financial institutions and subsequently spread throughout the global economy, leading to widespread economic turmoil.

Systemic risk is often difficult to predict because it stems from various macroeconomic, geopolitical, and financial factors that can interact in complex ways. One key feature of systemic risk is its ability to transcend individual firms or industries, affecting the broader market (Vongphachanh & Ibrahim, 2020). For example, if a large bank faces insolvency due to poor lending practices, the resulting panic may lead to a loss of confidence in the financial sector, triggering widespread withdrawals from other financial institutions, stock market crashes, and economic recessions. This risk is heightened in modern economies due to the complex and highly interconnected nature of financial markets, where firms are linked through various financial instruments such as derivatives, loans, and investments.

The measurement of systemic risk often involves the use of financial models that estimate the potential for contagion and the broader implications of a firm's failure on the stability of the entire market. One common approach is the calculation of a firm's beta coefficient, which measures its exposure to market-wide risks (Abad, 2021). Higher beta values indicate that a firm's stock is more volatile relative to the overall market, suggesting that it is more susceptible to systemic risk. Various factors contribute to systemic risk, including excessive leverage, interconnectedness between financial institutions, and systemic shocks such as political instability, regulatory changes, or natural disasters. Policymakers and financial regulators closely monitor systemic risk to ensure the stability of the financial system, using tools like stress tests, liquidity requirements, and capital buffers to mitigate potential systemic disruptions. Thus, understanding and managing systemic risk is crucial for maintaining the stability of both individual firms and the broader financial system.

Theoretical Framework

The Trade-Off Theory of capital structure was first proposed by economists David Modigliani and Merton Miller in their seminal works in the 1950s and 1960s (Ahmadimousaabab et al., 2013). While the Modigliani-Miller theory initially argued that a firm's capital structure does not impact its value in a world without taxes and other market imperfections, the Trade-Off Theory emerged in response to the limitations of this view (Cekrezi, 2013). In the 1970s, researchers like Kraus and Litzenberger extended the Modigliani-Miller model by introducing the idea that a firm's capital structure is a trade-off between the benefits and costs of debt (Abdeljawad et al., 2013). This theory acknowledged that firms could indeed benefit from debt financing due to tax shields, but it also recognized the increased risk and costs associated with excessive borrowing, such as bankruptcy costs and financial distress. The Trade-Off Theory, therefore, provides a more nuanced perspective on capital structure by suggesting that firms balance the advantages of debt with the potential risks of over-leveraging.

The core postulations of the Trade-Off Theory revolve around the notion that firms aim to find an optimal capital structure that maximizes their value by balancing the benefits of debt against its associated costs (Ahmadimousaabab et al., 2013). The primary benefit of debt is the tax shield: interest payments on debt are tax-deductible, which reduces the overall tax liability for the firm. This tax shield acts as an incentive for firms to take on debt to enhance their profitability. However, the Trade-Off Theory also emphasizes the costs associated with high levels of debt, particularly the risk of bankruptcy, financial distress, and agency costs. As a firm increases its debt, the risk of not being able to meet its obligations rises, which can lead to increased costs of borrowing, potential financial distress, and a reduction in the firm's value (Abdeljawad et al., 2013). Therefore, firms must carefully consider the optimal amount of debt in their capital structure that maximizes the benefits while minimizing the risks.

The Trade-Off Theory is highly relevant to the study of the effect of financial leverage on the systematic risk of listed manufacturing firms in Nigeria, as it offers a practical framework for understanding how leverage influences a firm's risk profile. In the context of Nigerian manufacturing firms, this theory helps explain how firms might weigh the advantages of debt financing—such as the tax benefits and potential for growth—against the risks of over-leverage, especially in an economy subject to external shocks like fluctuating oil prices and currency depreciation. Manufacturing firms in Nigeria, which often require substantial investment for infrastructure, equipment, and working capital, might rely on debt to fund these needs. However, the Trade-Off Theory suggests that the higher the debt level, the greater the exposure to risks like market volatility and economic downturns, which are common in Nigeria's macroeconomic environment. Thus, this theory provides a solid foundation for understanding how financial leverage can impact the systematic risk of firms operating in such an unstable and challenging market.

Empirical Review

In a study by Yisau et al. (2024) in Nigeria, the authors investigated the influence of leverage on the systematic risk in industrial and consumer goods companies. Their findings suggest that combined leverage has a positive impact on systematic risk, while financial leverage alone has a negative but statistically significant relationship with risk.

Similarly, in the context of Nigeria, the study by Obani and Ozuomba (2024) examined firm attributes and their effects on systematic risk in industrial firms. They found that financial leverage has a negative relationship with systematic risk, which aligns with the findings of Yisau et al. (2024). Contrastingly, a study by Ashara and Ofor (2022) on deposit money banks in Nigeria found that leverage had significant and negative effects on systematic risk. This finding stands in contrast to some other studies, such as that of Obani et al. (2022), where financial leverage was found to have a non-significant negative impact. The divergence in findings between studies focusing on different sectors (banking vs. industrial goods) could be due to sector-specific characteristics, such as regulatory frameworks and the capital requirements of the banking sector, which may mitigate the effect of leverage on systematic risk compared to manufacturing firms.

Furthermore, international studies also offer useful perspectives. For instance, the study by Vongphachanh and Ibrahim (2020) examined the impact of financial variables on systematic risk in several industries in Thailand.

The results revealed that financial leverage had a positive relationship with systematic risk, which is consistent with some of the Nigerian studies that indicate leverage can increase risk exposure. Similarly, Tekin and Bilgehan (2021) in Turkey found no significant impact of leverage on systematic risk in technology firms, highlighting that the effect of leverage on risk can vary across industries and countries, depending on factors like market conditions and firm-specific characteristics.

In examining the role of financial leverage, several studies have focused on its direct impact on systematic risk, often noting the trade-off firms face between the benefits of leveraging (such as tax shields) and the risks associated with increased debt. For example, in Iran, Amirian et al. (2022) observed that debt advantages, along with liquidity and profitability, play significant roles in reducing firms' exposure to systematic risks in the medical tourism industry. This aligns with the view that leverage, when carefully managed, can help firms withstand external shocks, although the effect on systematic risk remains contingent upon the broader economic and sectoral context.

A noteworthy finding in some studies is the interaction between financial leverage and firm size. Larger firms, particularly in the manufacturing and industrial sectors, tend to have a higher capacity to absorb risks and thus may be less susceptible to the negative effects of leverage. This is reflected in the study by Bui et al. (2017) in Vietnam, where firm size was found to positively affect systematic risk, while financial leverage inversely affected risk. Similarly, in Western Europe, Louhichi et al. (2024) emphasized that high liquidity creation increases systemic risk, particularly during financial crises, highlighting the importance of firm size and liquidity in the risk assessment process.

Gap in Literature

The variability in findings across studies indicates that the relationship between financial leverage and systematic risk is not linear or uniform, with factors such as industry, economic environment, and firm-specific characteristics like size, profitability, and liquidity significantly influencing how leverage impacts a firm's exposure to market-wide risks. Additionally, sector-specific dynamics, including regulatory requirements and market competition, also play a role in shaping how leverage translates into risk. After reviewing numerous studies, it becomes clear that a gap exists in the literature, as no research in Nigeria has simultaneously examined the debt to asset ratio and debt to equity ratio as proxies for financial leverage while exploring their relationship with systemic risk. This study contributes to filling that gap, offering a significant advancement in understanding the nexus between financial leverage and systematic risk in Nigeria.

METHODOLOGY

This research utilized an ex-post facto research design to explore the effect of financial leverage on the systematic risk of listed manufacturing companies in Nigeria. The ex-post facto approach is suitable for this study as it enables the examination of existing data over time without manipulating the independent variables. The study focused on a sample of 25 firms selected purposively from a population of 44 manufacturing firms listed on the Nigerian Exchange Group. These firms were chosen based on their data availability and consistency, ensuring a reliable representation of the industry. Secondary data for the analysis was obtained from the annual reports of the selected firms, covering a twelve-year period from 2012 to 2023.

The primary financial leverage indicators used in this study are the debt-to-equity ratio and the debt-to-asset ratio, with systematic risk assessed through the firm's beta coefficient. The debt-to-equity ratio is calculated by dividing total debt by shareholders' equity, providing an indication of the firm's reliance on debt compared to equity. The debt-to-asset ratio is calculated by dividing total debt by total assets, showing the proportion of assets financed by debt. Systematic risk is measured using the beta coefficient, defined as $\text{Beta} = \frac{\text{Covariance}(R_i - R_m)}{\text{Variance}(R_m)}$, where R_i represents the return for the firm and R_m is the market return. The beta coefficient quantifies the firm's exposure to market-wide risks, making it a vital indicator of systematic risk.

For data analysis, descriptive statistics were first used to assess the basic characteristics of the data. Hypothesis testing was conducted using Panel EGLS (Estimated Generalized Least Squares) to account for possible heteroscedasticity and autocorrelation in the panel data (Anaike, Nworie & Ochuka, 2024). The model was

structured as a multiple regression, where systematic risk (beta) is the dependent variable, and the debt-to-equity ratio and debt-to-asset ratio serve as the independent variables.

The regression equation is:

$$SSR = \beta_0 + \beta_1 DER_{it} + \beta_2 DAR_{it} + e.$$

Where: SSR = Systematic Risk

DER = Debt-to-Equity Ratio

DAR = Debt-to-Asset Ratio

β_0 = Constant

β_1 to β_2 = Coefficients of the parameter estimates

ε = Error term

i = ith firm for cross-section

t = period

The decision rule for hypothesis testing was set at a 5% significance level, meaning any p-value below 0.05 was deemed statistically significant. This approach ensures a rigorous and comprehensive analysis of how financial leverage affects systematic risk in Nigerian manufacturing firms.

Data Analysis

Descriptive Analysis

Table 4.1 Descriptive Analysis

	SSR	DER	DAR
Mean	0.467762	1.757630	1.084044
Median	0.478378	1.178389	0.557558
Maximum	0.690561	47.92299	20.01988
Minimum	0.223805	-8.455286	0.032253
Std. Dev.	0.187695	3.682530	2.786849
Skewness	-0.044574	8.305172	5.198793
Kurtosis	1.272339	94.84922	29.76773
Jarque-Bera	37.40950	108902.3	10307.76
Probability	0.000000	0.000000	0.000000
Sum	140.3287	527.2891	325.2131
Sum Sq. Dev.	10.53356	4054.746	2322.192

Observations	300	300	300
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Source: Output from Eviews 10 (2024)

Table 4.1 shows that the mean value of the systematic risk (SSR) is 0.4677, indicating that, on average, the firms in the sample are moderately exposed to market-wide risks. The maximum value of SSR is 0.6906, which suggests that some firms experience higher exposure to systematic risk, likely due to unfavorable market conditions or poor risk management strategies. The minimum value of 0.2238 reflects firms with lower exposure to market-wide risks, possibly due to strong risk mitigation practices. The standard deviation of 0.1877 indicates that there is a moderate level of variability in the SSR across the sample, suggesting some differences in the firms' exposure to market risk. The negative skewness value of -0.0446 indicates that the distribution of SSR is slightly left-skewed, meaning that most firms have a moderate to low exposure to systematic risk, with fewer firms experiencing extremely high exposure. The kurtosis value of 1.2723 suggests a relatively platykurtic distribution, indicating that the data is less concentrated around the mean compared to a normal distribution. The probability of the Jarque-Bera test being 0.000000 suggests that the distribution of SSR is not normal, with significant departures from normality.

The mean debt-to-equity ratio (DER) is 1.7576, signifying that, on average, the firms rely more on debt financing than equity. This suggests a relatively high level of financial leverage, which could increase both potential returns and the exposure to financial risks. The maximum DER value of 47.9229 indicates that some firms are highly leveraged, possibly using excessive debt compared to equity, which could lead to increased vulnerability to financial distress if not managed properly. The minimum DER value of -8.4553 is unusual and could be a result of negative equity in some firms, which might suggest severe financial difficulties or misreporting. The standard deviation of 3.6825 is relatively high, indicating significant variability in the leverage structure of firms, with some firms exhibiting very high levels of debt relative to equity while others have more balanced structures. The highly positive skewness of 8.3052 indicates that most firms have low to moderate debt levels, but there are a few firms with extremely high debt-to-equity ratios, pulling the distribution to the right. The kurtosis value of 94.8492 is significantly high, indicating that the distribution is extremely leptokurtic, with a very heavy tail and most firms concentrated around the lower end of the leverage spectrum. The probability of the Jarque-Bera test being 0.000000 confirms that the DER data is not normally distributed, with substantial skewness and kurtosis.

The mean debt-to-asset ratio (DAR) is 1.0840, suggesting that, on average, firms have more debt than assets, which may indicate a high reliance on debt financing. This is concerning, as it implies that a majority of the firms may not have sufficient assets to cover their liabilities in the event of a downturn. The maximum DAR value of 20.0199 is exceptionally high, showing that some firms have an extremely high proportion of debt relative to their assets, which could significantly elevate their financial risk. The minimum value of 0.0323 reflects firms with minimal debt, indicating a conservative approach to leverage. The standard deviation of 2.7868 indicates a wide variation in the debt levels across firms, with some having very high ratios of debt to assets while others maintain lower debt levels. The skewness of 5.1988 is highly positive, showing that the distribution of DAR is right-skewed, meaning that while most firms have moderate to low debt relative to their assets, a few firms exhibit extremely high debt-to-asset ratios. The kurtosis value of 29.7677 is exceptionally high, signifying a very leptokurtic distribution with heavy tails, suggesting that the majority of firms have low to moderate DAR, but a few firms with high ratios cause the distribution to be highly peaked. The probability of the Jarque-Bera test being 0.000000 further confirms that the data distribution is far from normal, with significant skewness and kurtosis.

Test of Hypothesis

H01) Debt to equity ratio has no significant effect on systematic risk of listed manufacturing firms in Nigeria.

H02) Debt to asset ratio has no significant effect on systematic risk of listed manufacturing firms in Nigeria.

Table 4.2 Test of Hypotheses

Dependent Variable: SSR				
Method: Panel EGLS (Period SUR)				
Date: 12/27/24 Time: 08:14				
Sample: 2012 2023				
Periods included: 12				
Cross-sections included: 25				
Total panel (balanced) observations: 300				
Linear estimation after one-step weighting matrix				
Period SUR (PCSE) standard errors & covariance (d.f. corrected)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DER	0.0000681	0.0000207	3.282168	0.0012
DAR	0.0000138	0.00000513	2.686418	0.0076
C	0.467112	3.21E-05	14549.32	0.0000
Weighted Statistics				
R-squared	0.024411	Mean dependent var		53.30300
Adjusted R-squared	0.017841	S.D. dependent var		180.1117
S.E. of regression	0.371977	Sum squared resid		41.09492
F-statistic	3.715687	Durbin-Watson stat		1.018261
Prob(F-statistic)	0.025477			

Source: Output from Eviews 10 (2024)

Table 4.2 shows the regression output which analysed the effect of financial leverage on systematic risk of listed manufacturing firms in Nigeria. The model's overall validity can be assessed by looking at two key statistics: the R-squared and the p-value of the F-statistic. The R-squared value of 0.0244 suggests that only 2.44% of the variation in systematic risk (SSR) can be explained by the independent variables, namely the debt-to-equity ratio (DER) and debt-to-asset ratio (DAR). This is a relatively low explanatory power, indicating that there are other factors outside of financial leverage that contribute to systematic risk, which are not captured in this model. The low R-squared suggests that the model does not account for much of the variability in systematic risk. The p-value of the F-statistic is 0.0255, which is below the 5% significance threshold (0.05). This indicates that the overall model is statistically significant, meaning that at least one of the independent variables (DER or DAR) significantly affects the dependent variable (SSR) in explaining systematic risk.

Debt-to-Equity Ratio (DER) Interpretation:

The coefficient for the debt-to-equity ratio (DER) is 0.0000681, and the corresponding p-value is 0.0012. This means that for each unit increase in the debt-to-equity ratio, the systematic risk (SSR) of a firm increases by 0.0000681 units, holding all other variables constant. The marginal effect of this coefficient suggests a positive relationship between financial leverage (measured by DER) and systematic risk, implying that higher debt relative to equity results in greater exposure to market-wide risks.

The p-value of 0.0012 is less than the 5% significance level, indicating that this effect is statistically significant. Therefore, we can reject the null hypothesis (H01) that debt-to-equity ratio has no significant effect on systematic risk. The evidence supports the conclusion that debt-to-equity ratio significantly and positively affects the systematic risk of listed manufacturing firms in Nigeria ($\beta = 0.0000681$, p-value = 0.0012).

Debt-to-Asset Ratio (DAR) Interpretation:

The coefficient for the debt-to-asset ratio (DAR) is 0.0000138, with a p-value of 0.0076. This coefficient means that for each unit increase in the debt-to-asset ratio, the systematic risk (SSR) of a firm increases by 0.0000138 units, holding other variables constant. Similar to the debt-to-equity ratio, the marginal effect here suggests a positive relationship between the level of debt financing (relative to the firm's assets) and exposure to market-wide risks. The higher the debt-to-asset ratio, the greater the firm's exposure to systematic risk, indicating that firms with higher debt compared to their total assets are more vulnerable to market fluctuations.

The p-value of 0.0076 is also below the 5% significance level, indicating that this effect is statistically significant. As a result, we reject the null hypothesis (H02) that debt-to-asset ratio has no significant effect on systematic risk. Thus, we conclude that the debt-to-asset ratio has a significant positive effect on the systematic risk of listed manufacturing firms in Nigeria ($\beta = 0.0000138$, p-value = 0.0076).

DISCUSSION OF FINDINGS

Finding 1: Debt-to-Equity Ratio and Systematic Risk

The finding that the debt-to-equity ratio (DER) significantly and positively affects the systematic risk of listed manufacturing firms in Nigeria suggests that as firms increase their reliance on debt relative to equity, their exposure to market-wide risks also rises. This is because higher leverage, as reflected by an increased debt-to-equity ratio, magnifies the firm's financial obligations, which can become more challenging during periods of market instability. Essentially, firms with higher debt burdens are more vulnerable to changes in market conditions, making them more susceptible to systematic risks. This effect is compounded by the potential for greater fluctuations in earnings and stock prices, which are characteristic of firms that rely heavily on debt. The results imply that while leveraging may offer benefits such as tax shields or higher returns in good times, it exposes firms to greater volatility and risk in the face of external market changes.

Supporting this finding, several studies highlight the positive relationship between financial leverage and systematic risk. For example, Yisau et al. (2024) found that combined leverage positively impacted the systematic risk of industrial and consumer goods companies in Nigeria, aligning with the present study's results. Similarly, the study by Vongphachanh and Ibrahim (2020) in Thailand also concluded that financial leverage had a positive effect on systematic risk, highlighting the vulnerability of firms with higher leverage. Conversely, Obani and Ozuomba (2024) reported a negative relationship between financial leverage and systematic risk in industrial firms, which diverges from the present finding but still underscores the complexity of financial leverage's role in different contexts. Moreover, Tekin and Bilgehan (2021) found no significant impact of leverage on risk in Turkish technology firms, suggesting that sectoral differences can affect how leverage influences systematic risk. These findings collectively demonstrate that the effect of leverage on risk varies across contexts and sectors.

Finding 2: Debt-to-Asset Ratio and Systematic Risk

The positive and significant effect of the debt-to-asset ratio (DAR) on systematic risk further reinforces the notion that increased debt exposure leads to higher susceptibility to market risks. As the debt-to-asset ratio increases, it reflects a higher proportion of a firm's assets being financed by debt, which, similarly to the debt-to-equity ratio, increases the firm's vulnerability to market fluctuations. Firms that finance a significant portion of their assets through debt are more likely to experience larger changes in their stock prices when the market faces volatility. This increased financial leverage results in higher operational risks, especially when the firm cannot easily meet its debt obligations. This effect can significantly impact a firm's stock performance during periods of market downturns, as investors may demand higher returns for the increased risk exposure.

This finding is consistent with several studies that explore the impact of financial leverage on systematic risk. Yisau et al. (2024) found that combined leverage positively impacted systematic risk in industrial and consumer goods firms, while also noting that financial leverage alone has a statistically significant negative relationship with risk. However, their study still supports the broader idea that financial leverage can increase a firm's exposure to market-wide risks. Similarly, the study by Vongphachanh and Ibrahim (2020) in Thailand found that financial leverage positively influenced systematic risk, reinforcing the findings of the current study. On the other hand, Obani et al. (2022) reported that financial leverage had a non-significant negative effect on systematic risk, suggesting that the influence of leverage on risk could differ depending on the sector and firm-specific factors. Studies by Ashara and Ofor (2022) in the Nigerian banking sector also indicated that leverage had a significant and negative effect on systematic risk, which contrasts with the positive relationship observed in the current study for manufacturing firms. These discrepancies highlight the importance of considering the sector-specific characteristics and the different ways financial leverage can affect firms across various industries.

CONCLUSION AND RECOMMENDATION

Firms, particularly those in the manufacturing sector, are supposed to effectively manage their capital structure, using financial leverage as a strategic tool to optimize their operations, maximize returns on equity, and reduce exposure to market risks. This is only achievable in an instance of an optimal level of leverage that balances debt and equity financing, thereby enhancing their financial performance while minimizing the potential negative impacts of systematic risks. The findings of this study highlight the crucial role of financial leverage in determining the exposure of listed manufacturing firms in Nigeria to systematic risk. The significant positive relationship between financial leverage (both in terms of debt-to-equity and debt-to-asset ratios) and systematic risk indicates that firms with higher leverage are more vulnerable to market-wide fluctuations. This is a key hint for investors and analysts as it suggests that firms with higher debt burdens, whether through equity or asset financing, are more sensitive to broader economic changes, such as market downturns or economic shocks. The results reflect the importance of considering the leverage structure of firms when assessing their risk profiles, particularly in volatile market conditions. Investors, therefore, need to factor in these risk exposures when making investment decisions, as companies with higher debt relative to equity or assets may experience more volatile returns.

The significant positive effects of leverage on systematic risk also have implications for firm managers, particularly those in the manufacturing sector. The findings suggest that the financial decisions made by these firms regarding their capital structure can directly influence their susceptibility to market-wide risks. In conclusion, firms that choose to increase debt financing may enjoy the potential for higher returns in favorable market conditions, but this comes with the trade-off of increased exposure to systematic risk, which could translate into greater price volatility and consequently lower investor confidence.

Given the significant positive effect of the debt-to-equity ratio on the systematic risk of listed manufacturing firms in Nigeria, it is recommended that firm managers carefully manage their capital structure by maintaining an optimal balance between debt and equity and avoid over-leveraging, which could exacerbate their exposure to economic fluctuations. Firm managers should conduct regular assessments of their leverage levels, ensuring they do not increase debt disproportionately to equity, particularly during periods of economic uncertainty.

In light of the significant positive effect of the debt-to-asset ratio on systematic risk, regulatory authorities such as the Nigerian Securities and Exchange Commission (SEC) should consider implementing guidelines or monitoring mechanisms that encourage manufacturing firms to limit their overall debt levels in relation to their assets. This would mitigate the systemic risk faced by these firms and contribute to greater financial stability within the sector. Regulators should emphasize the importance of sustainable debt management practices in financial reporting and corporate governance frameworks.

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