
DOES WOMEN DIRECTORSHIP DRIVE DEBT FINANCING? A CRITICAL MASS PERSPECTIVE

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Abstract: The critical mass of female directors in Nigeria's emerging economy serves as a crucial factor for manufacturing firms to make prudent financial decisions regarding debt usage. This research examines how women directors affect debt financing practices in Nigerian listed manufacturing companies using the Critical Mass Theory as its theoretical foundation. This research examines debt financing through an analysis of board female gender tokenism and board female gender critical mass using Linear Bootstrap Regression Analysis to test the hypotheses. A sample of forty-six (46) manufacturing firms listed on the Nigerian Exchange Group (NGX) from 2014 to 2023 provided the data which were obtained through purposive non-probability sampling technique. The research shows that companies with substantial female board members adopt more risk-averse financial strategies including lower debt usage in line with the "Critical Mass Theory" principles. Decisions about debt financing remain unaffected by token female board members while companies with critical mass female representation on their boards demonstrates better financial management practices that boost organizational resilience during Nigeria's unstable economic environment. The study recommends that stakeholders including regulators and investors should make gender diversity a strategic asset for long-term financial stability.

Keywords: Women Directorship, Debt Financing, Tokenism, Critical Mass Theory, Bootstrap Regression.

Introduction

Financing decisions play a crucial role in corporate finance literature, particularly in understanding how firms determine their capital structure, which involves the choice between debt and equity financing. Corporate governance factors commonly examined in this context include the composition of corporate boards, with specific attention to board women directorship (Hussain, Ahmad, Fazal, & Menegaki, 2024; Bansal, 2024; Di Vito & Trottier, 2022) and this have given board gender diversity prominence as a dominant determining factor that influence financial decisions, since it affects the risk preferences and strategic approaches of the firm. Gender diversity represents a widely researched and debated issue in board demographic studies (Almor et al., 2022; Menicucci & Paolucci, 2022).

Studies indicate that boards with gender diversity tend to make risk-averse financial choices through lower debt usage because female directors have different risk profiles and decision-making styles (Hyun et al., 2016). Organizations with female board members achieve improved corporate governance practices that result in better financing decisions and balanced debt management. Examining board gender diversity in corporate financing is necessary for corporate finance since organizations need to ensure their governance systems are in line with the best financial strategies and ways to reduce debt risk.

Studies in academia now focus on the relationship between board diversity and the results of a company in financial and non-financial areas. Studies conducted by Bennouri et al. (2018), Chijoke-Mgbame et al. (2020), Joecks et al. (2024), Bosun-Fakunle et al. (2023), Nguyen et al. (2020), Wang et al. (2021) and Josiah et al. (2023) investigates the effects of gender diversity on organizational performance. Having a diverse mix of genders on boards supports equality, helps with decision-making, improves board effectiveness and leads to better results for the company. Various theoretical approaches study board gender diversity to understand its impact on board effectiveness together with task performance. Three main theoretical approaches including agency theory together with resource dependency theory and stewardship theory have been applied to this study. The study of Abdullahi and Lawal (2023), Chatterjee and Nag (2023), Chen et al. (2021) and Li and Chen (2018) employed the theories to study female director involvement in corporate governance. The theories demonstrate how female directors improve governance through diverse viewpoints and cost reduction measures and their ability to secure necessary resources. The agency theory demonstrates that female directors help control executive opportunistic behaviour while resource dependency theory shows their role in acquiring resources and building networks (Farooq et al., 2023; Cardillo et al., 2021; Byoun et al., 2016).

The academic and policy discourse on board gender diversity has developed two main streams which scholars call the equality case and the business case (Harjoto et al., 2018). The equality case which relies on gender justice principles and corporate fairness standards advocates for female board membership to correct the heavily male-biased directorship demographics. This perspective is aligned with the demographic proposition of corporate fair play, which seeks to rectify historical biases and ensure a more inclusive corporate environment (Abdullahi & Lawal, 2023; Kolev & McNamara, 2020). Board gender diversity finds its business justification through agency and resource dependency theories that view female directors as essential governance assets. This perspective emphasizes the role of female directors in enhancing executive monitoring, improving strategic oversight, and facilitating resource mobilization (Garcia-Blandon, 2023; Konadu et al., 2022; Li & Chen, 2018). The business case posits that diverse boards are better equipped to address complex challenges, navigate competitive environments, and leverage diverse networks for resource acquisition.

Pro-gender activists present multiple arguments about breaking gender inertia and prejudices to create corporate opportunities for women to reach their complete potential (Oever & Beerens, 2021; Konadu et al., 2022). Advocates maintain women deserve the same opportunity as men to show intellectual skills and take part in firm governance particularly at board level (Carter et al., 2010). Women need to actively participate in corporate leadership positions because the traditional male-dominated business world shows insufficient female representation. Board diversity advocates that mixed gender representation on boards increases both transparency and accountability standards. Mather et al. (2021) argue that women on boards often play a significant role in ensuring adherence to corporate best practices. This perspective highlights the unique value women bring to governance, offering different viewpoints that enrich board deliberations, improve decision-making, and ultimately increase board effectiveness (Farooq et al., 2023; Briano-Turrent, 2022). Female directors are often perceived as bringing a more independent mindset to board discussions, partly due to their detachment from the “old boys club” (Kang et al., 2007). This independent disposition positions them as effective corporate monitors, enhancing the implementation of strategic decisions that align with stakeholder interests (Hillman, 2015). Furthermore, women on boards have been linked to fostering corporate innovation and competitiveness. Several studies suggest that women directors contribute to a company’s ability to innovate

and adapt, making firms more competitive in dynamic markets (Chen et al., 2021; Arioglu, 2020; Ilaboya & Ashafoke, 2017; Nguyen et al., 2015). Women's involvement in governance appears to accelerate the adoption of strategies that meet evolving market demands. In addition to this, some studies propose that women's intrinsic characteristics, such as being less self-serving and overbearing, enhance their effectiveness in governance roles (Mather et al., 2021; Chen et al., 2016). Women's presumed risk aversion is also highlighted as a key factor in promoting board vigilance and safeguarding corporate reputation. Risk-averse by nature, women are believed to take a more cautious approach to decision-making, which encourages higher levels of scrutiny in board actions, ultimately benefiting the organization's performance (Sattar et al., 2022). This quality is essential for corporate governance, especially in today's climate of increased scrutiny on companies' social and environmental responsibilities.

Studies have confirmed that female directors bring advantages to boards but a numerous debate continues about their effect on organizational performance. Research findings about female director impact on board performance have become inconsistent which raises doubts about the importance of female board representation. Some studies suggest that having a critical mass of women on the board is necessary for them to influence board actions and overall governance (Lefley & Janeček, 2023; Nuber & Velte, 2021). Scholars looking to explore this issue further have turned to the concept of critical mass, which draws on collective action theory, to better understand the conditions under which women's presence can make a substantive difference in corporate decision-making (Menicucci & Paolucci, 2022). In contrast to the traditional resource dependency theory, which views board composition primarily as a means of securing resources and influence (Chen et al., 2021), critical mass approach provides a clinical understanding of how female directors contribute to governance. For example, studies on financing decisions show that a board with women leads to different strategic choices made by the firm (Chen et al., 2021). This emerging school of thought suggests that, rather than simply adding women to boards, understanding how their collective influence can be leveraged is key to achieving better governance outcomes.

This study relies on the critical mass theory to show how the inclusion of minority groups (women in corporate boards) leads to changes in group behavior (Kanter, 1977; Torchia et al., 2011). In this study, the Nigerian setting provides unique insights into the lack of initiatives to boost female board representation. Gender stereotypes deeply influence societal understandings of traditional female and male roles throughout the Nigerian environment (Ogharanduku, et al., 2021). Nigeria maintains its position as the lowest performing nation regarding women's leadership according to the Nigerian Women Trust Fund (NWTF, 2024). Kazeem et al. (2010) documented that Nigerian woman possess at least 51% of bachelor's degrees yet major disparities exist regarding their sectoral distribution. The current gender inequality in corporate leadership positions and key decisions persist from established societal perceptions that minimize female representation especially in male-driven industries like manufacturing. Both social attitudes and a lack of clear regulations about gender diversity restrict Nigeria's ability to achieve equal representation of male and female directors at board level. Nigerian settings prove suitable because the country demonstrates weak adherence to voluntary regulations (Amodu, 2017). The country exhibits a low gender diversity ratio on its boards even though women represent approximately half of its population and workforce and university student enrollment (Wahua et al., 2018; Olufemi, 2021) and its female population includes many educated individuals (Mohammed & Agwai, 2021).

This study offers several contributions together with practical implications. This study advances both theory and literature through empirical testing of tokenism and critical mass hypotheses which previous research in Nigeria has seldom investigated. This research examines how female directors affect firm performance by using firm leverage as a unique performance measurement to enhance research findings. This study highlights the need for Nigerian manufacturing firms to reach substantial women directorship levels because it improves both corporate governance and financial management practices thus stakeholders must establish policies that support women's advancement into leadership positions for sustainable financial strategy development. The study confirms that female directors function as outsiders until their numbers reach a critical threshold. Women directors in the traditionally male-dominated manufacturing industry face challenges when proposing financial strategies because their ideas can only receive serious consideration only when their presence reaches critical mass. This study demonstrates why organizations must prioritize gender diversity while implementing boardroom procedures to enhance women directors' ability to share their perspectives.

This paper is structured into five sections. Section 1 has presented the introduction. Section 2 reviews the relevant literature on the study's subject matter. Section 3 addresses the methodological procedures and the measurement of the study variables. The results and discussion are presented in Section 4. Finally, Section 5 concludes the study and offers suggestions for future research.

Conceptual Framework

Corporations use debt financing as a strategic practice to obtain capital through loans or bond issuance while retaining full ownership control rather than selling company shares through equity financing. The core principle of debt financing requires companies to repay their borrowed funds along with interest payments according to predetermined payment schedules. The importance of debt financing in corporate strategy lies in its ability to provide firms with immediate access to funds without diluting ownership, which allows them to fuel growth, pursue expansionary projects, or restructure existing operations without involving external stakeholders in decision-making (Gleißner et al., 2022).

Debt is often classified into long-term and short-term categories based on maturity periods, providing companies with flexibility in matching their financial obligations with their operational and strategic needs (Myers, 2019). A critical aspect of debt financing lies in the tax advantage it provides; interest payments are typically tax-deductible, which lowers the company's taxable income and ultimately reduces the overall cost of borrowing (Anis & Utama, 2016). However, while debt offers these benefits, it simultaneously increases the company's leverage, introducing heightened financial risk, especially during periods of economic volatility or declining profits. This risk is often measured through debt ratios, such as the debt-to-equity ratio, which assesses the firm's financial health and its capacity to manage its obligations (Rabinovich & Reddy, 2024). Moreover, corporate debt can impact relationships with stakeholders, as lenders closely scrutinize a company's performance and may impose restrictive covenants to ensure debt repayment. Therefore, managing debt financing effectively is a balancing act that necessitates careful evaluation of the firm's capital structure, cost of capital, and potential risks associated with leverage, especially in light of changing market conditions (Hamrouni et al., 2020).

Board women directorship or board gender diversity has emerged as a fundamental principle of corporate governance that focuses on increasing female involvement in corporate board decision-making processes. Conceptually, Board gender diversity pertains to the representation of both genders in governance structures,

with a particular focus on enhancing women's participation. Theories of social justice and equality together with organizational inclusiveness support diverse leadership because it enhances decision quality and stakeholder representation (Hyun et al., 2016).

Boardroom diversity that includes women results in better governance outcomes through enhanced oversight and strategic decision-making processes because women bring unique perspectives to discussions (Laridon, 2018). Gender diversity on boards refers to the balanced representation of men and women in directorship roles, challenging historical patterns of male-dominated leadership. The extant literature underscores that board diversity goes beyond tokenism, requiring structural commitments to ensure that female directors are empowered to influence corporate governance substantively (Watson, 2025). The discourse on board gender diversity aligns with broader global movements towards gender equality, with regulatory frameworks in many jurisdictions now mandating gender quotas to encourage more inclusive corporate boards (Singhania & Panda, 2023). Organizations now recognize that gender diverse boards better address complex challenges because they are able to foster innovation and improve organizational legitimacy within socially conscious markets.

Theoretical Framework

Critical Mass Theory

The critical mass theory which emerged from nuclear physics now serves social science research through Granovetter's (1978) examination of collective behavior. This theory provides essential insights into how group dynamics evolve when minority group sizes such as women on corporate boards transform. According to the critical mass theory the nature of group interactions transforms when minority groups reach a specific threshold at which their influence becomes stronger. The growing size of the minority population strengthens their control over the larger group which ultimately changes institutional cultural norms and values (Norris & Lovenduski, 2001; Granovetter, 1978; Norris and Lovenduski, 2001; Konrad et al., 2008; Jiraporn et al., 2012). A significant number of female members on corporate boards greatly influences the board's actions and leads to improved performance. Konrad et al. (2008) find that having sufficient female directors on a board improves performance by combining their experience and leadership styles.

The board's diverse makeup pushes organizational boundaries as it improves strategic decision-making specifically related to risk management and financial oversight. Jiraporn et al. (2012) demonstrate how gender-diverse boards using critical mass theory affect corporate debt strategies. Women directors who typically view risk differently while working collaboratively tend to approach debt financing with greater responsibility which leads to reduced financial risks and enhanced long-term organizational success. The involvement of women directors at critical mass levels improves financial decision oversight which results in wiser debt management practices. According to the critical mass theory both the critical importance of having female directors on corporate boards and the positive impact of boardroom gender diversity on governance quality emerge. This diversity improves board oversight capabilities as well as financial decisions through better performance. This theory best suits this study as it provides insights towards strategies which manufacturing companies can employ to overcome governance problems and improve managerial oversight while strengthening financial policies to enhance long-term performance.

Empirical Framework

a. Women Directorship Tokenism and Debt Financing

Research shows that female directors in minority positions lack sufficient influence over corporate decisions because their numbers remain small (Fryxell & Lerner 1989; Brieger et al. 2019; Lu and Herremans 2019). The social identity perspective (Ashforth & Mael 1989; Hogg & Terry 2000; Huse et al. 2011) shows that low female board member representation transforms them into 'out-group' directors (Groysberg & Bell 2013) which leads to discrimination and bias against minority group members. According to proponents of this theory 'out-group' directors show reluctance to actively contribute opinions because 'in-group' members frequently dismiss their ideas (Westphal & Khanna 2003). The evaluation process of director contributions shifts to subgroup membership categories instead of merit-based assessment (Fiske & Taylor 1991).

The decision-making processes of boards are influenced by 'in-group' directors who assign more importance to negative 'out-group' characteristics which include female behaviors and traits. The 'out-group' position of women directors on boards makes it difficult for them to impact firm decisions and their corresponding outcomes (Arena et al. 2015; Greed 2000; Van Knippenberg & Schippers 2007). Women who possess valuable knowledge and skills for board strategic tasks face barriers to boardroom participation despite their potential value. Women overcome this barrier when they achieve significant representation within a group. From the foregoing, an insignificant effect of tokenism on debt financing is expected, hence hypothesis one is stated as,

H₁ *Women directorship does not significantly favor leverage usage when they represent only a token on the board of listed manufacturing firms in Nigeria.*

b. Women Directorship Critical Mass and Debt Financing

Kanter (1977, 1987) suggested that the number of female directors is more important for women's influence on organizational results than how they were appointed. At a certain point, women move from being seen as tokens to having real influence in male-led groups (Torchia et al., 2011). With more women on the board, gender would no longer be an obstacle to being accepted and understood. Because their opinions are more likely to be supported by the majority, women directors have a stronger impact on the outcome (Cook & Glass 2017). The study agrees with the critical mass theory by arguing that achieving a critical mass would help a firm perform better in its capital structure and financial strategies. If at least three women directors are present on the board, it will help improve the company's risk management and financial decisions. Additionally, such policies are likely to lead to more balanced financial and investment decisions, resulting in smarter and more valuable choices (Torchia et al., 2011; Konrad et al., 2008). Once the female gender reaches a critical mass on the board, they are confident and not at all hesitant to influence financial decisions (Joecks et al., 2013; Liu et al., 2014). Accordingly, ideas suggesting prudent and innovative financing decisions supported by women directors are bound to be translated more easily into policy, especially if critical mass exists (Bear et al., 2010). From the foregoing, a significant negative effect of critical mass on debt financing is expected, hence hypothesis two is state as:

H₂ *Women directorship significantly favors lesser leverage usage when they represent a critical mass on the board of listed manufacturing firms in Nigeria.*

Research Methodology and Model Specification

The hypotheses of this study were empirically tested on a sample of listed manufacturing firms in Nigeria over the period 2014–2023. Key among the focus on listed manufacturing firms is that manufacturing firms face challenges in debt financing due to high-interest rates, which increase the cost of borrowing and limit access to affordable capital (Ebenezer, Williams & Oludare, 2022). The weakening and devaluation of the Nigerian currency coupled with economic instability that has been raging particularly since year 2023 also raise the risks for lenders, making financing terms less favorable. Additionally, regulatory and infrastructural inefficiencies further complicate the ability of firms to secure long-term funding needed for growth. In this study, the population is identified as all sixty-two manufacturing firms that are on the Nigerian Exchange Group (NGX). From the population, non-probability purposive sampling technique was employed to remove sixteen firms due either to inadequate listing year (after 2014) or found to be inactive or suspended at the time of this study. On the final analysis, the sample size remained at 46 firms which is about 76% of the population good enough for adequate conclusion and generalization (Schmidt, et al., 1988). In the final step of the sampling procedure, all observations that had none (zero) female director on its board during the 2014 to 2023 period were deleted to ensure appropriateness in the distribution of board female gender tokenism reflecting only boards with one or two female director/s. All data were collated from sampled firms' annual financials and compiled and analyzed with the aid of Microsoft Excel and Stata version 17 econometric and statistics software.

In this study, bootstrap regression analysis estimator was employed to determine the effect of the independent variables on the dependent variable. Notably, bootstrap regression provides more reliable estimates than ordinary least squares (OLS) regression in the presence of heavily tailed data because it is non-parametric, robust to outliers, and does not rely on strict distributional assumptions (Neal & Simons, 2007; Bravo & Godfrey, 2012). OLS is sensitive to extreme values, as it minimizes the sum of squared residuals, which can lead to biased estimates when outliers are present (Martin & Simin, 2003). In contrast, bootstrap regression repeatedly resamples the data, averaging the results to reduce the influence of outliers and better capture the true variability and distribution of the data. This approach produces more stable estimates, accurate confidence intervals, and better reflects the empirical distribution, making it particularly useful when the data deviates from standard assumptions like normality.

Measurement of Variables

Two independent variables—board female gender tokenism, and board female gender critical mass—were identified as determinants of firms' debt financing practices. Additionally, this study included two control variables, i.e., firm profitability, to account for its influence on the main relationships. According to the Pecking Order Theory (Myers & Majluf, 1984), firms prefer internal financing (i.e., using retained earnings) over external financing (debt or equity). Therefore, highly profitable firms are likely to rely less on debt, as they have sufficient internal funds. By including profitability, the model adjusts for a firm's internal financing capacity, ensuring that any observed relationship between women directorship and debt strategy is not confounded by this factor.

Table 1. Measurement and description of variables

S/N	Variables	Measurements	Sources	Apriori Sign
Dependent Variable				
1	Debt Financing	Computed in percentages as total debt divided by total asset	Huynh, et al., (2022).	
Independent Variables				
1	Board Female Gender Tokenism	Computed as the total number of female director/s on the board not exceeding two (2)	Qayyum, et al., (2021).	+
2	Board Female Gender Critical Mass	Computed as the total number of female director/s on the board equal to three (3) or greater	Bello, (2023), Lawal, (2024).	+
3	Control Variable Profitability	Computed in percentages as profit after tax divided by total asset	Gong, et al., (2021).	+

Note: Variables are defined as follows: Debt Financing (DFIND), Board Female Gender Tokenism (BFGTOKIN), Board Female Gender Critical Mass (BFGCMAS), Profitability (PROFIT)

Model Specification

The model specified by Ahmed and Atif, (2021) was modified to suit the purpose of establishing the effect of the independent variables on the dependent variable captured in this study. The econometric form of the modified model is expressed as follows.

$$DFIND_{it} = \delta_0 + \delta_1 BFGTOKIN_{it} + \delta_2 BFGCMAS_{it} + \delta_3 PROFIT_{it} + \mu_{it}$$

Where the firm and time are denoted by the subscripts i and t, respectively; δ is the explanatory variable's coefficient; and μ_{it} is the error term.

Data Presentation, Analysis, and Findings

Descriptive Statistics

The descriptive analysis provides essential information about how debt financing relates to women directorship. The information on debt financing decision (DFIND) reveals that sampled manufacturing firms maintain an average debt-to-assets ratio of 59.70% while showing a standard deviation of 20.44% which indicates their assets are financed by 59.70% debt on average. Leverage strategies employed by sampled manufacturing firms show significant variation since the minimum value stands at 3.55% while the maximum reaches 206.82%.

Table 2. Summary of Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
DFIND	286	59.6985	20.44245	3.55	206.82
BFGCMAS	286	.2342657	.4242814	0	1
BFGTOKIN	286	1.452055	.4988361	1	2
PROFIT	286	5.526014	10.78155	-58.01	53.96

Note: Variables are defined as follows: Debt Financing (DFIND), Board Female Gender Tokenism (BFGTOKIN), Board Female Gender Critical Mass (BFGCMAS), Profitability (PROFIT)

In comparison to prior studies, these values appear relatively high. For instance, Okoye et al. (2020) report a lower average debt ratio for Nigerian firms, indicating that the manufacturing sector may be particularly reliant on debt financing due to capital-intensive operations. In terms of women directorship, two indicators were employed: Board Female Gender Critical Mass (BFGCMASS) and Board Female Gender Tokenism (BFGTOKIN). The descriptive statistics results show BFGCMASS has a mean value of 0.234 which demonstrates that boards with at least three female directors exist in only 23.43% of observations thus indicating limited gender diversity at critical mass level. The standard deviation of 0.42 indicates that numerous companies fail to reach their target of gender diversity in board membership. Comparatively, the mean value of BFGTOKIN is 1.45. the control variable Profitability (PROFIT), measured as return on total assets, shows a mean value of 5.53%, though the large standard deviation of 10.78% and the range from -58.01% to 53.96% reveal significant disparities in the firms' financial performance. This variation aligns with existing literature that suggests profitability in manufacturing sectors in developing economies is highly sensitive to external economic factors, such as inflation and exchange rate volatility (Ujunwa, 2012).

Normality of Data Analysis

The Shapiro-Wilk normality test in table 3 examined the data distribution patterns of debt financing, board female gender critical mass, board female gender tokenism, and profitability. The z-value of 6.780 and p-value of 0.000 from the debt financing test indicate a significant deviation from normality. The distribution pattern of debt financing deviates from normality. A significant z-value at this level implies that debt financing practices among the sampled firms may exhibit non-normal patterns, likely due to variations in debt levels across the firms. This outcome is consistent with studies that observe skewness in financial leverage among firms, particularly in emerging markets where firms may exhibit more extreme reliance on debt (Abor, 2017). Similarly, for profitability variable, a z-value of 7.838 with a p-value of 0.000 indicates that profitability is also not normally distributed. In contrast, board female gender critical mass variable, presented a z-value of 2.778 with a p-value of 0.00274.

Table 3: Data Normality Analysis

Variable	Obs	W	V	z	Prob>z
DFIND	286	0.91146	18.081	6.780	0.00000
BFGCMASS	286	0.98397	3.274	2.778	0.00274
BFGTOKIN	286	0.99872	0.207	-3.637	0.99986
PROFIT	286	0.86087	28.412	7.838	0.00000

Note: Variables are defined as follows: Debt Financing (DFIND), Board Female Gender Tokenism (BFGTOKIN), Board Female Gender Critical Mass (BFGCMASS), Profitability (PROFIT)

Although the z-value is lower than that of debt financing and profitability, it still indicates a significant deviation from normality, suggesting that gender diversity at the critical mass level is not uniformly distributed across firms. The results suggest that boardrooms did not uniformly implement gender diversity policies. The z-value of -3.637 and p-value of 0.99986 from board female gender tokenism measurement show no significant deviation from normality. This suggests that the distribution of board female gender tokenism is approximately normal, implying a more consistent pattern across firms regarding the inclusion of one or two female directors

on corporate boards of listed manufacturing firms in Nigeria. This finding aligns with prior research suggesting that token representation of women on boards is more common across firms in emerging markets (Adams & Ferreira, 2009). This study utilizes regression analysis despite Shapiro-Wilk test results showing non-normal distribution because the Central Limit Theorem allows using parametric tools when sample sizes reach sufficient levels (Lumley et al., 2002). Therefore, given that the dataset for this analysis includes 286 observations, this is sufficiently large to mitigate concerns about non-normality and thus allows for the use of parametric methods.

Multivariate Regression Result

This section presents the variables BFGCMAS and BFGTOKIN to explain how female directors affect corporate debt financing within the theoretical framework of critical mass and tokenism.

Table 4. Bootstrap Regression Result

	Pool Least Square Model (BFGTOKIN)	Linear Bootstrap Model (BFGTOKIN)	Pool Least Square Model (BFGCMAS)	Linear Bootstrap Model (BFGCMAS)
_CONS.	65.164 (0.000) ***	65.164 (0.000) ***	64.513 (0.000) ***	64.513 (0.000) ***
BFGTOKIN / BFGCMAS	-0.445 (0.875)	-0.445 (0.871)	-4.514 (0.091)	-4.514 ** (0.040)
PROFIT	-0.681*** (0.000)	-0.681** (0.002)	-0.679 *** (0.000)	-0.679 (0.002) **
F-STAT/WALD STAT	17.56*** (0.0000)	9.81** (0.0074)	22.26*** (0.0000)	11.86 (0.0027) **
R- SQUARED	0.1999	0.1399	0.1359	0.1359
VIF TEST	1.06	1.0		

Note: P values are in parenthesis; **, *, 5% and 1% Levels of Significance Respectively**

Note: Variables are defined as follows: Debt Financing (DFIND), Board Female Gender Tokenism (BFGTOKIN), Board Female Gender Critical Mass (BFGCMAS), Profitability (PROFIT)

Discussion

The findings of this study indicate that board female gender critical mass has a significant negative association with debt financing, supporting H₂ that women directorship significantly favors lesser leverage usage when they represent a critical mass on the board. According to critical mass theory a minimum of three female leaders creates stronger voice representation which enables them to shape corporate strategies including financing decisions. The tokenism theory maintains that female director representation measured by BFGTOKIN fails to produce meaningful decision-making effects because such numbers primarily serve symbolic purposes while lacking authority to effect change (Kanter, 1977). Based on the results of the linear bootstrap regression analysis, firms with a high number of female directors tend to choose conservative financial strategies, including borrowing less. This is consistent with global studies that link critical mass with prudent decision-making, as women on boards tend to prioritize long-term stability over aggressive financial strategies (Joecks, et al., 2013). Following conservative financial practices will help the Nigerian manufacturing sector recover, as it is often affected by risk and economic changes and high debt worsens financial stress when markets are unpredictable. By having a critical mass of women in leadership, these firms may enhance their resilience and financial sustainability.

On the other hand, the insignificant effect of Female Gender Tokenism on financing decision reflects the limitations of tokenism policy. In many cases, listed Nigerian manufacturing firms may appoint one or two

female directors to meet superficial diversity expectations without granting them real power or influence on the board. Studies have shown that token female representation does little to shift corporate governance or financial policies, as women are often marginalized in decision-making processes (Joecks, et al., 2013). In the context of Nigerian manufacturing firms, this token representation does not appear to contribute meaningfully to debt reduction nor other critical financial decisions. The disparity between critical mass and tokenism is particularly relevant in the Nigerian corporate landscape, where there is growing pressure to improve gender diversity on boards, but meaningful change requires a shift from tokenism to achieving a critical mass that can drive substantive financial and strategic reforms.

Control Variable

By including profitability as a control variable, the study seeks to ensure that observed differences in debt financing strategies are not merely artifacts of a firm's financial health, but more directly attributable to the presence of women on the board. It thus helps isolate the causal or correlational impact of gender diversity in corporate governance on financial policies.

Conclusion

Discussions on women directors' influence on debt financing stands within the gender diversity framework of corporate governance with critical mass theory as its theoretical foundation. According to critical mass theory three or more female directors on a corporate board create a transformative effect that leads organizations to adopt more conservative financial strategies by avoiding excessive debt (Abbott, et al., 2012). Therefore, in emerging economies like Nigeria, where manufacturing firms are mostly susceptible to threatening economic conditions, the critical mass of women might be important for corporate organizations to adopt more prudent decisions concerning leverage usage. The findings from this study confirm the broader research which demonstrates how female director representation at a critical threshold reduces debt utilization but token female directors fail to achieve meaningful outcomes.

Implication

This outcome suggests that stakeholders of Nigerian listed manufacturing firms should push for genuine female board representation beyond symbolic inclusion while working toward reaching critical thresholds. A minimum of three female directors on corporate boards leads to financial decisions that are both sustainable and conservative for proper debt management. This will not only enhance corporate governance but also strengthen the firms' resilience in navigating the volatile economic environment in Nigeria, reducing the financial risks associated with excessively high debt levels. Also, stakeholders, including regulators, investors, and board members, should prioritize gender diversity as a strategic asset that can improve overall firm performance and long-term stability.

Limitations and Suggestions for Future Related Studies

Albeit this outcome, there is room for improvement to this study as future studies could explore the impact of gender diversity on other aspects of corporate financial decision-making beyond debt financing, such as equity financing and investment strategies. Additionally, future research could examine how the presence of a critical mass of women on corporate boards interacts with other board characteristics, such as industry expertise and tenure, to influence financial outcomes. Expanding the scope to other sectors beyond manufacturing, and

conducting comparative analyses across different emerging markets, could also provide deeper insights into the role of gender diversity in corporate governance.

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