



THE MODERATING ROLE OF FIRM SIZE ON BOARD INDEPENDENCE AND LIQUIDITY OF LISTED MANUFACTURING FIRMS IN NIGERIA

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Abstract

The effect of board independence on the liquidity of manufacturing firms has been a subject of increasing research interest. While some studies suggests that independent boards often have superior financial management and reporting standards, and boosting liquidity, some others differ on this proposition. This study examined the moderating role of firm size on board independence and liquidity of listed manufacturing firms in Nigeria. The study has a population of 50 listed manufacturing firms and a sample of 31 listed firms which was arrived at based on a criterion that only listed manufacturing firms that met the selection criteria over the 15 years period of the study (2009-2023) were considered. This study used secondary sources of data gathering that were collected from the annual reports and accounts of the listed manufacturing firms that were sampled. The multiple regression technique was used to evaluate the data gathered. Therefore, this study found that board independence has a negative significant effect on the liquidity of listed manufacturing firms in Nigeria. However, the interaction of firm size on board independence has a negative significant effect on liquidity. This study concluded that the moderating role of firm size on board independence and liquidity of manufacturing firms in Nigeria has a significantly negative effect and therefore no policy implication in relation to the boards of listed Nigerian manufacturing firms.

Keywords: board independence, firm size, liquidity, listed manufacturing firms, Nigeria

1. Introduction

Liquidity signifies a firm's capacity to fulfill its short-term financial commitments. Companies with high liquidity are more capable of managing expenses, seizing new business opportunities, and enduring economic challenges (Ajunwa et al., 2025; Nkasi & Philemon, 2025). Previous studies by Nkasi and Philemon (2025), Taristy et al. (2022), Al-Homaidi (2020) indicate that liquidity plays a crucial role in assessing a company's financial stability and risk of failure.

Firms with low liquidity are at a higher risk of financial troubles, as they may find it difficult to satisfy their short-term responsibilities. Hence, various studies have sought to analyze the relationship between liquidity and manufacturing firms (Ajunwa et al., 2025; Nkasi & Philemon, 2025; Kajola et al., 2019; Okoro, 2016; Akinleye & Ogunleye, 2019).

The manufacturing sector has been faced with severe liquidity problems at various challenging economic eras. For example, during the recent naira redesign in Nigeria, between 2023 and 2024, many manufacturing companies encountered different levels of liquidity constraint, which affected the smooth running of their firms (Punch, 2024). The possible role that board independence could play during such challenging period to mitigate the impact of this dwindling liquidity position inspired this study (Ajunwa et al., 2025).

The role of board independence on liquidity in manufacturing firms has been assessed by studies that sought to establish a link between the variables (Abdullah et al., 2022; Nahar et al., 2022). Though some studies have tried to establish a direct cause-and-effect relationship between board independence and liquidity, their studies imply that firms with independent boards often exhibit superior financial management and reporting practices, which can enhance liquidity. Independent board members can offer oversight and advice on financial management, ensuring the company maintains sufficient liquidity and effectively manage its financial assets (Abdullah et al., 2020; Nahar et al., 2022).

Firm size and liquidity are critical for manufacturing companies in Nigeria to make well-informed strategic choices and pursue sustainable development. Therefore, grasping the intricate connections between firm size and effectively managing liquidity levels is vital for sustaining profitability, as larger corporations often hold an edge in liquidity management and attaining greater profitability (Dang et al., 2018; Nkasi & Philemon, 2025; Ajunwa et al., 2025).

This study aims to illustrate how board independence impacts liquidity, with firm size playing a moderating role. Previous studies (Alams et al., 2025; Chen et al., 2022; Iliyasu et al., 2020) evaluated the interactions between board qualities and other variables. The specific variables of board independence and the liquidity of Nigerian listed manufacturing businesses, as influenced by firm size, were not combined in any of the past studies.

Understanding how the independent composition of the board impacts liquidity in manufacturing companies remains crucial amongst other things, since the industry is vital to the creation of jobs and the overall health of the economy. Nigerian manufacturing companies occasionally struggle with liquidity, which is essential to their ability to continue operating according to Eberechi (2024).

Numerous manufacturing companies in Nigeria have struggled with cash, which has impacted their ability to continue as a going concern and ultimately resulted in their liquidation Ajunwa et al. (2025). As a result, it is now essential to conduct this research and evaluate how board independence and liquidity interact with manufacturing companies. Hence, a study on the liquidity of listed manufacturing firms is beneficial to the companies and stakeholders because a sufficient level of liquidity for these manufacturing firms could support financial stability, which is essential for operating a profitable business in any location (Ajunwa et al., 2025; Vu et al., 2020). Therefore, if the board is operating effectively to keep the company's liquidity sufficient, the firm's size will inevitably increase and it will be more difficult to fail.

This study looks at the moderating role of firm size on board independence and the liquidity of Nigerian listed manufacturing firms in an effort to close this gap. Another differentiating factor in this research is that most past studies (Rehman et al., 2023; Zhang & Li, 2022; Chen et al., 2022; Abdullah et al., 2022; Khan et al., 2020; Singh et al., 2020)

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were done based on western contexts and had little research on emerging markets like Nigeria.

By concentrating on Nigerian manufacturing enterprises, this study aims to close that context-specific gap. Therefore, to address the literature gap giving that most previous research concentrated on other countries manufacturing sector, rather than the Nigerian manufacturing industry, this study focused on how the variables relates with the Nigerian manufacturing firms (Ajunwa et al., 2025).

Furthermore, a solid data set was employed in this study to address the gap in the number of years used by past studies (Adeyemi & Salawu, 2018; Alhassan & Ibrahim, 2019) having fewer years, compared to this study. Nevertheless, a theoretical gap was identified, where most similar past studies had relied more on the repetitive agency theory, another explicit theory like the Upper Echelon Theory was adopted. Therefore, to examine this study, the following research questions have been proposed to be answered:

- (i) What is the effect of board independence on the liquidity of listed manufacturing firms in Nigeria?
- (ii) How does the moderating role of firm size affect board independence on the liquidity of listed manufacturing firms in Nigeria?

The objectives of this study are:

- (i) Assess the effect of board independence on the liquidity of listed manufacturing firms in Nigeria.
- (ii) Evaluate the moderating role of firm size on the effect of board independence on the liquidity of listed manufacturing firms in Nigeria.

Based on these objectives, the following hypotheses was formed and tested in this study.

H₀₁: Board independence has no significant effect on the liquidity of the listed manufacturing firms in Nigeria

H₀₂: Firm size does not significantly moderate the effect of board independence on the liquidity of listed manufacturing firms in Nigeria

This study examines board independence and liquidity of listed manufacturing firms in Nigeria, drawing on a comprehensive dataset spanning from 2009 to 2023. This time frame will be used to fill the existing time gap in past literatures (Adeyemi & Salawu, 2018; Alhassan & Ibrahim, 2019).

2. Literature Review

Conceptual Review

Liquidity

Liquidity can be determined as the simplicity and convenience with which assets can be transformed into cash without much delay when the need arises, allowing a corporate organization to be able keep up with their daily cash flow demands (Nkasi & Philemon, 2025; Ajunwa et al., 2025; Taristy et al., 2022).

According to (Nkasi & Philemon, 2025; Ajunwa et al., 2025; Taristy et al., 2022), liquidity is crucial to the financial wellness of an enterprise especially with regards to return on assets. They argued that a high liquidity level allows for a quick reaction to meet expenses as they arise during the course of running the manufacturing firms, as these expenses and financial obligations to suppliers and other important production process

could facilitate the successful production process in a sector that requires a smooth cash flow. Furthermore, they noted that a good current ratio, signals that the firm has more current asset than current liabilities which is a good indicator for the going concern of the firms (Nkasi & Philemon, 2025; Ajunwa et al., 2025).

Board Independence

The combination of independent non-executive directors on a company's board is used to quantify board independence. It is calculated as the sum of independent non-executive members divided by the total number of directors on the board at year end (Kolawole et al., 2022). Since impartiality will be a crucial consideration and the board's capacity to monitor and oversee management will also play a significant role in the decision-making process, the number of directors on the board will have a big impact. The public perceives companies with many independent non-executive directors as being more independent in their decision making (Abdullah et al., 2022).

Board independence is the extent to which directors can act in the organization's and its stakeholders' best interests without being subject to conflicts of interest or undue influence. If the majority of the board members are independent, which means they have no significant business ties to either the company or its management, the board is said to be independent. Independent directors are considered to be more impartial and capable of giving unbiased monitoring of the firm's operations (Abdullah et al., 2022).

Also, they are more likely to disagree with management choices and offer diverse viewpoints on important subjects. Regulatory laws dictate a minimum level of board independence for listed companies in many nations, including Nigeria. To further expatiate, the Nigerian Exchange Group mandates that independent directors of a company's board be composed of at least one-third of the company's board (Hussain et al., 2016). A number of variables, such as the board's composition, the company's ownership structure, and the legal environment where in the firm operates, can have an impact on a board's independence. Higher levels of board independence are often regarded as stronger governing organizations that are less likely to participate in unethical or unlawful activities.

According to (Jensen & Meckling, 1976, cited in Hussain et al., 2016), the presence of independent directors on a board can help to separate the management and control responsibilities of a corporation, which is believed to mitigate the unethical behavior of inside members. Additionally, independent directors frequently participate in deeper and longer conversations with significant stakeholder groups (Wang & Dewhirst, 1992), and they tend to have a broader viewpoint that may develop into a greater sensitivity to performance expectations (Rupley et al., 2012). Despite widespread support for independent directors on corporate boards, debates about the independent directors' ability to balance managerial interests with those of shareholders and their capacity for value creation quality for corporate performance to be maintained. Hence, an independent board can influence management in prudent liquidity management (Nwaobia et al., 2019).

Huang (2010) deduced that independent directors behave as a monitoring mechanism which guarantees that companies are appropriately managed by corporate management in addition to working towards increasing corporate image and performance. According to (Zhang et al., 2013) study on a sample of US corporations, independent directors have more varied backgrounds and speak for the interests of the company's external stakeholders. In contrast to their counterparts in the boardroom, they are fundamentally more oriented toward superior operating tactics. Kaur et al., (2016)

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indicated a positive association between board independence and improved business performance after looking into the studies by Sharif and Rashid (2014).

Firm Size

Firm size refers to the scale of an organization's operations, often measured by total assets, sales, or workforce (Nkasi & Philemon 2025; Ajunwa et al., 2025). It is calculated as the natural log of the value of the assets of the company, which means that larger businesses are more diversified, which implies that they have greater returns and lower risk as opined by Nkasi and Philemon (2025). However, larger businesses may also be more susceptible to market changes or economic shocks, and subject to extra rules and compliance requirements. Since larger firms have economies of scale, they can attract additional investment and increase the cost of the market share (James 2020; Ajunwa et al., 2025).

Theoretical Review

This study is grounded in the upper echelon theory because it aligns with this research, since having independent directors on board could bring a different perspective to how the firm's resources is being managed.

Upper Echelon Theory

The Upper Echelons Theory (UET), formulated by Hambrick and Mason in 1984, reshapes the understanding of organizational behavior and effectiveness by emphasizing the influence of top management on strategic decision-making. Prior to UET, organizational theories like institutional theory and population ecology suggested that organizations were mainly driven by external environmental factors, with minimal input from managers.

In contrast, UET highlights that senior executive, particularly CEOs and their close teams, shape strategic choices based on their personal experiences, biases, and perceptions. These subjective viewpoints significantly impact how leaders interpret opportunities and challenges, thereby affecting organizational performance. Overall, UET illustrates the critical role that the characteristics of top management teams play in guiding an organization's strategy and effectiveness.

Empirical Review

Board Independence and Liquidity

Abdullah et al., (2022) examined the impact of board independence and gender diversity on liquidity in Malaysian listed firms. They analyzed a total of seventy listed Malaysian companies for a time frame of 2016 to 2020, using a multiple regression data analysis technique. They found that board independence; board size and board gender had a significantly positive influence on the firm's financial performance. They opined that having more independent directors, more board members and female directors on the board resulted in higher financial performance, which positively influenced the liquidity position of the firm. Although, using an increased time frame in their study could have exploited a longer time frame than the five years that their study used. The findings of their study aligned with those of the study of Foo and Zain (2010).

Khan et al., (2020) carried out a study on the impact of board characteristics on the stock liquidity of Pakistani listed non-financial firms. They used the fixed-effect regression model on a total of one hundred and seventy non-financial firms from 2007 to 2016. Their study found that board independence is positively related to liquidity as they used fixed-effects regression model, lagged structure and two-stage least square on a sample of 170

non-financial firms listed on the Pakistani Stock Exchange. They also found that board foreign diversity, board gender diversity, board meetings, directors' board meeting attendance, and the number of board subcommittees had a positive influence on stock liquidity. The large number of companies used as the sample size and the extended number of years is an indicator that their results were deduced from a robust data analysis which is usually more reliable and encouraged in research.

Foo and Zain (2010) examined the relationship between board independence, board diligence and liquidity in Malaysia. In their study, liquidity was represented by three measures; relative quoted depth, relative volume and proportion of zero-returns. Having analyzed a sample of 481 listed firms in Malaysia, they found that many independent and diligent boards were positively correlated with higher liquidity. Evidentially, the studies of (Abdullah et al., 2022; Khan et al., 2020; Foo & Zain 2010) found that board independence has a positive influence on liquidity of firms.

Firm Size and Liquidity

Nkasi and Philemon (2025) carried out a study on “Firm Attributes and Financial Performance of Listed Manufacturing Companies in Nigeria”. Their study sought to find the link between firm characteristics and the financial performance of publicly listed manufacturing firms in Nigeria. Their study used the fixed effect regression technique to analyze data obtained from manufacturing firms from 2015 to 2023 and they found that firm size has a positive significant effect on return on assets, which they attributed to the possibility of larger firm ability to reach more market and navigate through optimized processes that would not have been possible with a smaller firm. Furthermore, they also found that liquidity had a significantly positive effect on return on assets, arguing that firms with a good liquidity position are equipped to navigate various liabilities they encounter in the course of carrying out their businesses and make more profits. Consequently, they opined that an ideal firm size and a diligent liquidity management could enhance firm's performance. While they analyzed their data with the fixed effect regression tool, it would have benefited from a detailed discussion of potential confounding factors and robustness checks.

Idogho et al. (2024) conducted a study on the moderating effect of firm size on firm characteristics and profitability of listed industrial goods companies in Nigeria. Their study utilized data gathered from the annual reports of ten industrial goods firms that were listed on the Nigerian exchange group from 2013 to 2022. They used the random effect model to analyze their data and found that liquidity has a negatively significant effect on profitability but when moderated by firm size, they discovered that liquidity had a positive and insignificant result on profitability. However, their study covers a relatively few industrial goods firms, which might not adequately represent the general population of that sector in Nigeria. Moreover, having some representation from other manufacturing sector in addition to the industrial sector they used in their study would have benefitted the findings of their study.

3. Methodology

This study used ex post facto research design because the data is a historical data and has been used in some similar studies in the past (Ajunwa et al., 2025; Kolawole et al., 2022; Selven et al., 2021). It used the multiple regression statistical analysis to explain the relationships amongst firm size, board independence and liquidity of manufacturing firms

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in Nigeria. Fifty (50) manufacturing firms listed in the Nigerian Exchange (NGX) Group from 2009 to 2023 made up the population of this study and the adjusted filter sampling method was used to arrive at a sample size of thirty-one (31) to represent the population.

Model Specification

In view of the fact that the data analysis methods used in the two studies were similar, this study modified the models described in (Ajunwa et al., 2025; Kolawole et al., 2022) respectively. To make room for the extra variables, certain changes have been made to the variables. Equation 1 and 2 provide the following mathematical expression for the model in use:

$$L_{i,t} = \alpha + \beta_1 BIN_{i,t} + \beta_2 FSIZE_{i,t} + e_{i,t} \quad (1)$$

$$L_{i,t} = \alpha + \beta_1 BIN_{i,t} + \beta_2 FSIZE_{i,t} + \beta_3 BIN * FSIZE_{i,t} + e_{i,t} \quad (2)$$

Where: LQ = Liquidity (Dependent variable); i = Firm; t = Time; α = Constant; β_1 - β_5 = Coefficient; BIN = Board Independence (Independent variable); FSIZE = Firm size (moderating variable); e = Error; α , the constant term; β , the coefficient of the function. BIN is the value of the independent variable; e, error term. Thus, regression equation becomes: $L_{i,t} = \alpha + \beta_1 BIN_{i,t} + \beta_2 FSz + \beta_3 (BIN \times FSIZE)_{i,t} + e$ - - - - - (3)

The study made use of secondary data that was retrieved through content analysis, mostly from the Nigerian Exchange Group website's annual reports of the selected companies.

Table 1

Variables, Definition, Measurement and Sources

Variables	Definition	Measurement	Sources
Dependent Variable			
Liquidity (LQ)	The ease with which an asset can be easily turned into cash is liquidity.	It is measured as the ratio of current asset to current liability at year end.	Nkasi et al.(2025)
Independent variables			
Board Independence (BIN)	Proportion of independent non-executive directors on corporate boards.	Calculated from the number of independent non-executive directors divided by the total number of directors on board at year end.	Faatihah et al. (2016); Mejabi, (2022)
Moderating Variable			
Firm size (FSIZE)	The sum total of assets.	The sum total of assets at year end.	Nkasi et al. (2025)

Source: Field Work (2025)

Methods of Data Analysis

This study uses descriptive statistics to analyze the data, which characterizes the fundamental factors of this study. As a result, it provided basic summaries of the sample and the measures in terms of kurtosis, skewness, standard deviation, mean, minimum and maximum. This study also uses a panel data estimate technique to investigate how listed manufacturing firm's liquidity is affected by board independence (Ajunwa et al., 2025).

The STATA 15 software has been used for data analysis. A panel data estimate technique is used in the investigation as well as the multiple regression, the diagnostic and pre-estimation test, the multicollinearity test, the heteroskedasticity test, the test for coefficient of determination, test for normality of residuals, the outliers test, the linearity additivity test, the model specification test, and the Hausman test was used.

4. Results and Discussion

Table 2

Descriptive Statistics

Variables	Obs	Mean	Std. Dev	Min.	Max
LQ	465	1.286872	0.7396813	0.0157	3.7899
BIN	465	0.162608	0.1422027	0	0.67
FSIZE	465	9.408581	2.251703	4.09	14.46

Source: STATA 15 output (2025)

With reference to Table 2, the liquidity as the dependent variable of this study reveals a minimum and maximum values of 0.0157 and 3.7899 respectively. Furthermore, the mean value of the liquidity of the sampled manufacturing firms in Nigeria is 1.286872 with the standard deviation of 0.7396813. This shows there is a low level of dispersion from the liquidity data of this study. While board independence maintains a mean value of 0.162608, a standard deviation value of 0.1422027, minimum 0 and maximum 0.67 respectively. This means, on the average 16.2% is the proportion of independent board members, while the minimum proportion level is 0. The maximum level of proportion of board independence is 67%.

Table 3

Variance inflation factor (VIF)

VARIABLES	VIF	1/VIF
FSIZE	1.06	0.945090
BIN	1.01	0.990809
MEAN VIF	1.04	

Source: STATA 15 output (2025)

From table 3, the VIF of 1 indicates that there is no correlation among the predictors and hence the variance is not inflated. The test reveals that there is no multicollinearity problem evident because VIF below 10 and the tolerance value is less than 1 (one), this reveals that the independent variable is appropriate and well fitted into the model. The

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normality test done showed that the data are normally distributed, given that the p-values are insignificant at 5% for the study's variables.

Multicollinearity test also unveiled the fact that the variables are not affected by multicollinearity because the tolerance values are higher than 0.10 and the VIF is less than 10. Furthermore, the tolerance value (1/VIF) is within the acceptable range of less than 1. Heteroskedasticity test showed that there is no evidence of heteroskedasticity and the Hausman specification test indicates that random effect could be used on the models.

Table 4

Correlation results

VARIABLES	LQ	BIN	BFD	FSIZE
LQ	1.0000			
BIN	0.0123	1.0000		
	0.7916			
FSIZE	0.0481	0.0844	-0.2235	1.0000

Source: STATA 15 output (2025)

From table 4, the results reveal the relationship existing amongst the variables. It shows how board independence and the moderating role of firm size inter-relate with the firm's liquidity. From the result, if board independence changes by 1%, the liquidity will change by 0.0123. This outcome shows that board independence has a negative significant effect on liquidity of manufacturing firms in Nigeria.

Table 5

Regression results

LQ	Coef.	Std. Err.	T	P> t	[95% conf. Interval]
BIN	0.0612051	0.2423877	0.25	0.801	-0.4151166 0.5375268
FSIZE	0.0212035	0.0156735	1.35	0.177	-0.0095968 0.0520038
Cons	0.8993118	0.2069875	4.34	0.000	0.4925559 1.3060680

Source: STATA 15 Output (2025)

From Table 5, the results shows that board independence and firm size have no significant effect on the liquidity of the selected listed manufacturing firms in Nigeria reporting with P-value of 0.801 and 0.177 respectively. This means that a 1 % change in any of the given variables will result in a proportionate increase in the level of liquidity. For example, a 1% increase in board independence and firm size will lead to a 0.0612051 and 0.0212035 increase in liquidity respectively.

The coefficient of determination R –squared (R^2), reveals that the impact of the independent variable on the dependent variable is less than 2%. This simply means that all the variables combined have a total impact of less than 2% on the liquidity. The remaining 98% impact comes from variables not included in the model. With reference to the above analysis board independence has a significantly negative effect on liquidity and this finding aligns with the study of (Nurwulandari et al., 2021) but contradicts with the study of (Abdullah et al., 2020; Khan et al., 2020; Foo & Zain 2010), which found a significantly positive effect.

Firm size moderation on liquidity was found to be negative and insignificant, which is in alignment with the study of (James 2020) that found that firm size cannot moderate

liquidity. Subsequently opposing the findings of (Nkasi & Philemon 2025; Oshinowo et al., 2022), that found that firm size positively moderates liquidity.

5. Conclusion and Recommendations

This study reveals that board independence has a negative significant effect on the liquidity of listed manufacturing firms in Nigeria. This shows that the presence of independent board members on board does not improve the liquidity of firms. The finding further indicates that the moderating role of firm size on board independence has no effect on liquidity in these firms.

Based on the conclusion, this study suggests that board independence does not increase liquidity in listed manufacturing firms in Nigeria. Therefore, the focus should be on how to efficiently utilize the liquidity of these firms on business activities that would yield profitable returns. The moderating role of firm size on board independence and liquidity revealed that there is no effect of firm size on liquidity of listed manufacturing firms in Nigeria. Hence, any increase or decrease in the firm size could not affect the liquidity of listed manufacturing firms in Nigeria.

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