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EFFECT OF BOARD ATTRIBUTE ON PROFITABILITY OF LISTED AGRICULTURAL COMPANIES IN NIGERIA

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ABSTRACT

This study examined the effect of board attributes on profitability of listed agricultural companies in Nigeria. The study used a sample size of five (5) agricultural companies listed on the Nigerian Exchange Group (NGX) as at December 2023. Relevant data for the study was extracted from the annual reports and accounts of the sampled companies for a period of fourteen (14) years (2010-2023). The data generated was analyzed using descriptive statistics, Correlation matrix, Ordinary Least Square (OLS) and Generalized Least Square (GLS) regression. The findings reveal that board size, board gender diversity and board meeting have significant effect on profitability of listed agricultural companies in Nigeria while board composition has insignificant effect on profitability. The study therefore recommended that board size should be maintained at an average size in order to optimize firm performance. More so, management should increase as much as possible the board size bearing in mind Nigeria Securities and Exchange Commission corporate governance Code requirement of minimum of five and maximum of fifteen members. Also, both gender (male and female) should be appointed into board of directors providing that they are qualified and willing to serve. However, the optimal board size in relation to the scale of the firm's operation and legal provisions should always be taken into consideration in deciding the ultimate board size.

Key words: *Board Attributes, Firm Profitability, Listed Agricultural Firms, Nigeria.*

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1. INTRODUCTION

Profitability is of vital importance to corporations as well as scholars because it varies overtime and among companies; as a consequence, variation in profitability forms the core focus of all profit making entities. It is pertinent to note that, profit-seeking corporations are primarily established to maximize shareholders' wealth; this primary objective was found to be a function of their performance. Generally, corporations that keep churning out bad performances after a while are bound to fail the survival threshold for all newly established corporations; consequently, they also fail to meet the target for growth and development that warrants corporate perpetuity. Corporate performance is conceived as a multidimensional

model that encompasses diverse piece and metrics such as financial performance, profitability, operational effectiveness which is said to be how a company can be able to carry out its operations efficiently while in business. This aids business to execute their main business activities in order to maximize waste and reduce cost while maintaining high quality standards (Wallstreetmojo & Vaiddya, 2023). Poor corporate governance's practice in term of board attribute is a cankerworm that has affected companies profit and has led to the collapse of private and public entities across the economic sectors, thereby impairing overall economic performance (Okeye et al., 2020). Fakile and Adigboke (2019) defined board attributes as the attributes of the corporate board which can be used as a way of promoting their effectiveness and efficiency in managing the activities of the firm. Effective board attributes would increase the possibility that shareholders' fund utilization would be monitored well indirectly through the board of directors which definitely would safeguard the shareholders' investment (Nwankwo & Uguru, 2022).

Board of Directors' attributes is viewed as the variation of the age, race, ethnicity, gender, and social/cultural identities among employees within a specific organisation. The financial stability and continuity of agricultural companies in Nigeria, since the company contribute to development goals is believed to be very much dependent on the strength and qualities of the board in terms of its size, the level of independence from management and the number of times meetings are held to take maximizing decisions. In addition, the composition of the board of directors in terms of foreign nationals and gender representation on board to a greater extent is believed to account for improved financial performance of the organization (Farouk et al., 2022). The profitability of listed agricultural companies in Nigeria is increasingly critical as the sector plays a vital role in the country's economy. However, there is a noticeable gap in understanding how specific board attributes such as diversity, independence, and expertise affect financial performance within this context. Existing research often focuses on broader industries, neglecting the unique challenges and dynamics of the agricultural sector. This lack of tailored insights raises questions about the effectiveness of current governance structures in driving profitability. Moreover, the agricultural sector in Nigeria faces unique regulatory, economic, and environmental challenges that may influence the impact of board attributes differently than in other industries. Without a thorough investigation into these factors, stakeholders may miss opportunities to optimize governance and enhance profitability.

For all companies operating in Nigeria, the Nigerian Federal Government issued a unified corporate governance code known as "the Nigerian Code of Corporate Governance 2018" in January 2019. The code's principal objectives were to ensure best practices in corporate governance in Nigeria in order to promote investors' confidence in the Nigerian economy and provide a sustainable business environment for the investors to operate. It approves a mix of Executive Directors (EDs) and Non-Executive Directors (NEDs), as well as corporations' ability to decide the size and composition of their board of directors according to sector-specific norms. Equally, the code requires annual independent consultants' evaluation of the Board and its committees' performance (Etomi, 2018). Therefore, the code emphasizes the importance of ensuring effective board of directors in every company in Nigeria. Researches about the factors that affected the profitability has increased significantly within the last two decades due to several factors (including weak corporate governance, agency conflicts, level of debts, lack of auditor's independence, extensive earnings management, poor audit quality among other) which affect and erode investors' confidence on their expected returns. Board attributes is particularly important in the Nigerian agricultural companies because a number of past frauds, financial failures and questionable business practices had adversely affected investors' confidence. In an attempts to restore investors' confidence in the capital market, the relationship between board attributes and firm profitability have attracted interest from key stakeholders, particular government, policy makers/regulators, the public and academia. Therefore, board attributes are prone to various intervening factors that led to scandals and corporate failures in both developed and developing economy (Assenga et al., 2018). Thus, a good corporate governance policy is necessary to guide top management in making effective profitability decisions that will aid in achieving the financial goal of the firm because failure to achieve that have consequences to the health and long-term survival of organisations.

At international arena, a number of studies have investigated the relationship between board attribute on profitability. Notably, Alotaibi et al. (2024), Aernan et al. (2023), Appah and Tebepah (2023), Assenga et al. (2018), Koech and Ogollah (2018) and Somathilake (2018) examined the impact of board attributes on financial performance (profitability measurement) individual documented mix findings. In Nigeria, most of the studies, notably, Oshim and Igwe (2024), Eni-Egwu et al. (2022), Nwankwo and Uguru (2022) and Fakile and Adigbole (2019) examined the relationship between board attribute and firm profitability. However, most studies (national and international) documented a very strong relationship between board attributes and profitability. Although, some studies show that the variables (such as board size, board composition, and board gender diversity and board meetings) that determined

profitability have positive or negative relationship. While some studies concluded that there is positive and significant relationship between the variables (Appah & Tebepah, 2023; Farouk et al., 2022; Nwankwo & Uguru, 2022; Assenga et al., 2018; Koech & Ogollah, 2018; and Alaryan, 2017). Others documented a negative and significant relationship (Eni-Egwu et al., 2022; and Fakile & Adigbole, 2019). On the other hand, Aernan et al. (2023), Davies (2023), Nwankwo and Uguru (2022), Rafinda et al. (2018) and Somathilake (2018) investigated the effect of board characteristics (board size, board composition, board gender diversity and board meetings) documented insignificant impact on company performance.

More so, corporate governance has attracted a multitude of studies to examine the relationship between board attributes and firm profitability (Nwankwo & Uguru, 2022; Okoye et al., 2020; Assenga et al., 2018). Even though there is a growing body of literature on impact of board attributes on profitability, there is a diversity of results due to the different theoretical perspectives applied, selection of methodologies, measurement of variables, conflicting views on board attribute composition in decision making and the contextual nature of individual firms. However, these studies relate to more widely researched developed countries and cannot be generalised on developing countries such as Nigeria due to the differences in corporate governance structures and cultures on board attributes practices. Therefore, in resolving the gap in knowledge, this study considered board attributes as against prior studies that focused on profitability thereby, resolving the variable gap. Again, the fiscal year gap was bridged by considering 2023 as part of the financial period, as against prior studies that the scope of its financial period ended in 2022, hence, the need for this study. Thus, the study extends and contributes to the body of the research by investigating the likely effect of board attributes on profitability of listed agricultural companies in Nigeria.

1.1 Objectives

The main objective of the study is to examine the effect of board attributes on profitability of listed agricultural companies in Nigeria. The specific objectives of the study are to examine the effect of:

1. board size on profitability of listed agricultural companies in Nigeria.
2. board composition on profitability of listed agricultural companies in Nigeria.
3. board gender diversity on profitability of listed agricultural companies in Nigeria.
4. board meetings on profitability of listed agricultural companies in Nigeria.

1.2 Hypotheses

Based on the objective of the study, the following null hypotheses were formulated and tested:

H_{01}: Board size has no significant effect on profitability of listed agricultural companies in Nigeria.

H_{02}: Board composition has no significant effect on profitability of listed agricultural companies in Nigeria.

H_{03}: Board gender diversity on has no significant effect on profitability of listed agricultural companies in Nigeria.

H_{04}: Board meeting has no significant effect on profitability of listed agricultural companies in Nigeria.

2. LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Firm Profitability

Every investor undertakes investment carefully with the motive of earning returns on his investment. One of the main objectives of a firm therefore is to make good profit. Profit backed up with cash will make it possible for management to distribute dividend to the investors (Kurawa, 2011). According to Sohail et al. (2011), profitability refers to the ability of a firm to earn returns on investment made in its assets that has a positive net present value. A financial action that has a positive net present value will create wealth for shareholders and is therefore desirable. A financial action resulting in a negative net present value should be dropped because it will endanger share holders' wealth. Akinlo (2009) describes firm's profitability as the ability to generate revenue in excess of the cost of generating such revenue. It is a relative term measurable in terms of profit and its relation with other elements that can directly influence the profit. Profitability measures management efficiency in the use of organizational resources in adding value to the business. As commonly used measures of financial performance, profitability analysis focuses on the relationship between revenues and expenses and on the level of profits relative to the size of investment in the business. Among useful measures of profitability are the rate of return on assets and the rate of return on equity (Hansen & Mowen, 2005). Return on Assets (ROA) explains how efficient a company is in utilizing its available assets to generate profit. Return on asset is a good internal management ratio because it measures profit against all of the assets divisions used to make those earnings. Hence, it is a way to evaluate the division's profitability, performance, and effectiveness. This ratio may give an indication of good or bad neighbor management in implementing cost control or management of his property. It is often used as a tool to measure the rate of return

on total assets after interest expense and taxes. The high Return on Assets (ROA) will be good for the company.

2.1.2 Board Attributes

Board of directors consists of individuals who are nominated by the firm's shareholders in order to oversee the firm and its management. The board of directors, usually referred to as the board is central in corporate governance and the highest governing body in an organization. The board is responsible for safeguarding the interest of different stakeholders through the dissemination of information, with the main aim to reduce information asymmetry problems and also to prevent opportunistic behavior in an organization (Aifuwa & Embele, 2019; and Isa & Muhammad, 2015). Board attributes is also seen as one of the internal corporate governance mechanisms, which expatiates on the features of the board. Additionally, the board is also charged with the responsibility of facilitating changes that support the mission of the organization (Bairathi, 2009). For the board to execute its functions effectively, scholars concur on the importance of a competent board that contributes to the sustainability of the firm (Eni-Egwu et al., 2022). The attributes of the board include size, meeting, independence, composition, diligence, diversity (age, gender, nationality, expertise, educational and functional background), and committee structure. For the purpose of this study, four board attributes (board size, board composition, board gender diversity and board meeting) are considered.

Board size refers to the entire number of directors in the firm for an accounting year. It has been identified as an important determinant of corporate governance effectiveness in theoretical articles by Jensen (1993). There are no definite regulations as to the number of directors expected to be on the board and there is no ideal board size as well. The board size cannot be specified at the country level as the countries differ in their legal, social, economic, and corporate environment. One size cannot be fit for all. However, according to Khudhair et al. (2019), board size is simply the total number of directors sitting in an organization's board at a particular time. It is often said to be an imperative element in determining the viability of the board. More so, board composition is the ratio of non-executive directors to the total number of members on the board of an organization. Agency theory advocates the participation of independent non-executive directors to promote the independence of the board from management. The reason for this suggestion is not far from the fact that if the majority of the board members are executives of the firm, the board will be more prone to be maneuvered by the managers and the decisions made by the board may be biased which may

favor the interest of the management, and not the shareholders. Therefore, non-executive directors should be the key members of the board. They should bring independent judgment as well as necessary scrutiny to the proposals and actions of the management and executive directors especially on issues of strategy, performance evaluation and key appointments.

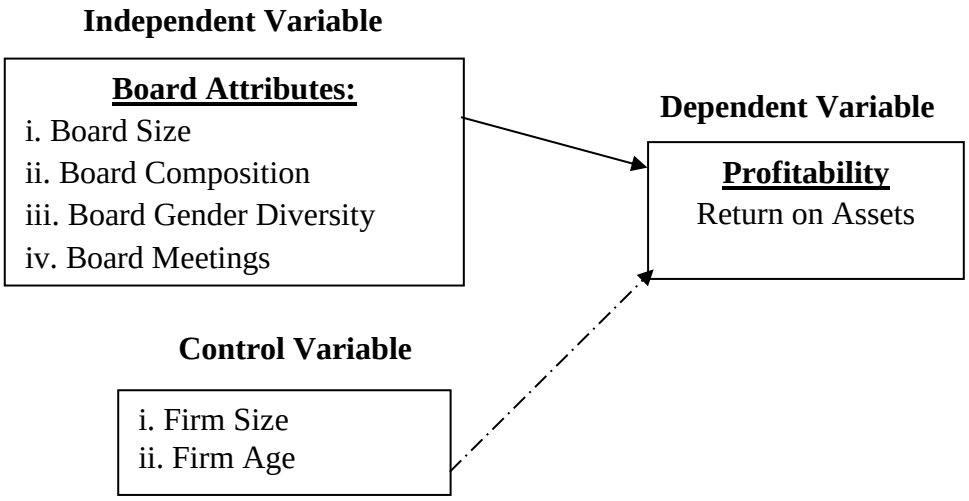
The composition of the board of directors is expected to play an important role in synchronizing the interest of the managers and that of the shareholders. Corporate governance structure in Nigeria requires that number outside directors on the board should be more than that of the executive directors. Also, the non-executive directors must comprise of independent directors appointed on the basis of experience and competence. Since the outside directors do not possess any interest regarding the shareholding of the firm, in order to maintain their reputation, they are expected to act in such a manner that maximizes the value of the firm.

Gender representation on the corporate boards of directors refers to the proportion of men and women who occupy board member positions. Good corporate decision-making require the ability to hear and consider different points of view, which comes from people who have different backgrounds, experiences, and perspectives. It is widely believed that firms with women directors and executive officers lead by example. As they normally send a clear message that value the diversity of though and experience. Women on boards bring different perspectives to the difficult issues facing today's firms because the diversity of thought results in better decision making. Female directors are believed to improve the efficiency of the board monitoring function; thus, they have a strong tendency of hiring a high-quality auditor to protect their reputation and sustain the confidence of the stakeholders of the organization (Ilaboya & Lodikero, 2017). In the same vein, boards of directors' meetings are the number of regular meetings held by the board during each fiscal year. The meetings refer only to those held in person, excluding telephone meetings. It indicates the level of the board of director's activities and the degree of communication among the directors in the firms. The more frequent the directors meet; the firm may gain more critical information from board discussions since the board of directors consist of independent outside directors and inside directors from many links. Many studies revealed the higher the frequency of the board meeting, the lesser the possibility of low performance.

2.1.3 Conceptual Framework

The conceptual framework of this study shows how board attributes influence profitability diagrammatically in Figure 1.

Figure 1: Conceptual framework



Source: Developed by Researcher, 2024

A conceptual framework is a schematic presentation of the variables under investigation. In this study the effect of board attributes on profitability is summarized as shown in Figure 1 above. The study uses four board attribute proxies: board size, board composition, board gender diversity and board meeting. The dependent variable is profitability proxied by return on assets while the control variables are firm size and firm age.

2.2 Theoretical Review

2.2.1 Agency Theory

One of the theories that have been used widely in corporate governance is the agency theory. It evolved from the concept of separation of ownership from management in modern firms (Berle & Means 1932). As a result of the separation between ownership and management or control, agency theory has been used to explain the relationships within organizations. The theory deals with the contractual relationship between agent and principal under which shareholders delegate responsibilities to the board of directors to run the business. The agency theory is based on the notion that board of directors will not always act in the best interest of the shareholders. It provides a valuable lens through which to examine how board attributes such as board size, composition, gender diversity, and meeting frequency impact the profitability of listed agricultural firms in Nigeria.

For board size, agency theory suggests that an appropriately sized board can enhance oversight and decision-making efficiency. A larger board may bring diverse expertise, leading to more effective monitoring of management actions, which can positively influence firm profitability. However, excessively large boards may lead to coordination difficulties and diluted accountability (Jensen, 1993). Therefore, finding the optimal board size is critical for enhancing firm performance. For board composition, agency theory emphasizes the importance of having a significant proportion of independent directors on the board. Independent directors can provide unbiased oversight and reduce potential conflicts of interest between management and shareholders. This alignment of interests is crucial for ensuring that managerial decisions reflect the best interests of shareholders, thereby promoting profitability (Fama & Jensen, 1983). Research has shown that boards with a higher percentage of independent directors tend to perform better financially (Abubakar, 2023 and Nwankwo & Uguru, 2022)

Similarly, agency theory suggests that diverse boards in term of gender diversity can lead to improved decision-making due to a broader range of perspectives. Gender diversity, in particular, has been linked to better risk management and innovation, which can enhance profitability. Studies indicate that firms with gender-diverse boards may experience improved performance due to enhanced collaboration and reduced groupthink (Abubakar, 2023; Nwankwo & Uguru, 2022 and Meme, 2017). This aligns with the notion that a variety of viewpoints can lead to more effective oversight and strategic decision-making. More so, the frequency of board meetings is a critical factor in ensuring effective governance. Regular meetings provide opportunities for directors to engage with management, review performance, and make strategic decisions. Agency theory posits that increased interaction between the board and management can lead to better oversight and more informed decision-making, ultimately contributing to improved profitability (Huse & Gabrielsson, 2012). Research has shown that firms with more frequent board meetings tend to have better financial performance (Magai et al., 2024; Oshim & Igwe, 2024 and Rabiu, 2023). This review illustrates how agency theory underpins the impact of board attributes on the profitability of listed agricultural firms in Nigeria, emphasizing the importance of effective governance structures and alignment of interests.

2.3 Empirical Review

2.3.1 Board Size and Return on Assets

The size of the board is the total number of board members comprising executive directors, non-executive directors and independent directors in an organization. There is considerable debate over the ideal size of a board of directors. Several studies have indicated that boards should contain between 7 to 15 directors (Nwankwo & Uguru, 2022). However, in the empirical position of studies, the ideal board size is between 7 to 8 people (Mak & Kusnadi, 2005). These support Jensen's (1993) claim that improved financial performance results from smaller boards. Additionally, once a board has more than 7 to 8 members, its effectiveness declines, and control passes to the chief executive officer. The size of a firm varies in many ways and it's essential to consider how the size affects firms' profitability.

Several reasons exist to prove a negative relation between board size and firms' profitability as explained by (Somathilake, 2018). On the other side, a positive relation exists on the impact of board size on profitability (Ado et al., 2024; Saro & Wiwa, 2023; Farouk et al., 2022; Johl et al., 2022; Mohammed & Oladejo, 2022; Nwankwo & Uguru, 2022; and Kaur & Vij, 2017). However, Oshim and Igwe (2024) concluded that board size does not have a strong relationship with return on assets (ROA). This result cannot be generalized to other sector such as agricultural firms in Nigeria.

2.3.2 Board Composition and Return on Assets

Researchers have investigated the relationship between board composition and profitability. Indeed, composition of board and profitability are essential aspects of the components of corporate governance and finance. Studying the two subjects helps investors to make informed decisions on their investment. Some studies found positive relationship between board composition and profitability some found negative relationship, while others found mix result with regards to the relationship between board composition and profitability.

Gambo et al. (2018) examined the effect of board size, board composition and board meetings on financial performance of listed consumer goods in Nigeria and found that smaller board size are more effective than larger board size and are likely to enhance the return on asset of the firm. Some findings showed mixed reactions; Ipigansi and Michael (2024), Abubakar (2023), Saro and Wiwa (2023), Nwankwo and Uguru (2022) and Johl et al. (2022) found a positive relationship between board composition and profitability. On the other hand, Ado et al. (2024), Farouk et al. (2022) and Ilaboya and Ashafoke (2017) found a negative relationship

between board nationality and firms' profitability. Davies (2023) concluded that there is no significant relationship between board composition and profitability.

2.3.3 Board Gender Diversity and Return on Assets

Board gender diversity refers to the percentage of female directors on the board of a company. Customarily, boardrooms are dominated by men, leaving little or no room for women to contribute their distinctiveness to firms' governance (David & Okenwa, 2021). Similarly, Nick et al. (2013) maintains that gender diversity may bring access to a wider pool of human and social capital that reduces conflicts and creates more space to address potential threats to survival, and better treasury management. Ubeh, Okoye, Nwoye and Amahalu, N.N. (2024) noted that gender diversity is advantageous to firms as women are generally risk-averse and help mitigate uncalculated risks male dominated boards might be skewed to take.

The findings on the influence of board gender diversity on profitability are inconclusive; for example Aziekwe and Okegbe (2024), Abubakar (2023), Johl et al. (2022), Gemu (2017), Meme (2017), Muller et al. (2018) and Rafinda et al. (2018) find a positive relationship between board gender diversity and profitability measured by firms' ROA. More so, the findings have proved that board gender diversity has negative effect on firm profitability (Davies, 2023 and Saro & Wiwa, 2023). However, there are other studies who concluded that board gender has insignificant negative effect on firms' profitability (Nwankwo & Uguru, 2022; and Fakile & Adigbole, 2019).

2.3.4 Board Meetings and Return on Assets

An essential element of efficient corporate governance is a board meeting. The agency theory suggests that several board meetings may impact company success. Increased meeting frequency encourages discussion to solve agency issues and encourages idea exchange and performance transparency. Gemu (2017) investigated the impacts of board meetings, women directors and board independence on performance of foods and beverages companies' in Nigeria from the period of 2007 to 2013. The sample size of the population is nine companies. A correlational research design was used. Multiple regressions were used as a technique of data analysis and result was interpreted using fixed effect regression. The results revealed that the impact of frequency of board meetings on performance was found to be negative and statistically significant.

Some studies have examines the relationship of board meeting and firm profitability; Magai et al. (2024), Rabiu (2023), Gambo et al. (2018) found a positive relationship between board

meeting and firms profitability. Similarly, Ipigansi and Michael (2024), Oshim and Igwe (2024) and Mohammed and Oladejo (2022) revealed that board meeting has insignificant effect on firm profitability. The study concluded that board meeting is not crucial for firms' performance. Others studies (Kakanda et al., 2017) found that board meeting have a significant and negative effect on firm profitability (ROA).

On the evidence given from the above empirical studies, the gaps identifies are scope, sector, methodology and conceptual gap. This is because most of the studies seen and reviewed were conducted outside Nigeria with different scope; sectors, methodology and concepts, and the findings may not be generalized in wider perspectives. From the empirical literature reviewed, most empirical studies on board attributes and profitability in Nigeria focus on broader sectors like banking, manufacturing, or consumer goods, with limited research specifically targeting the agricultural sector. The unique challenges and characteristics of agriculture, such as seasonality, climate dependence, and subsidy policies, remain underexplored. Hence, addressing these empirical gaps provided more comprehensive insights into how board attributes influence profitability in the Nigerian agricultural sector, paving the way for more effective governance practices.

3. MATERIAL AND METHODS

This research adopted non-survey research designs and was carried out based on historical panel data through the use of an ex-post-facto. The choice of this design is informed by the fact that, it investigate the effect of variables that has already occurred and to estimate the effect of one variable (independent variable) on another (dependent variable), so as to establish a causal relationship or otherwise among the variables. Data for the study was extracted from the annual report and account of listed agricultural companies in Nigeria. The design is set to be adequate and appropriate for the measurement of the impact of board attributes on profitability of the companies under consideration. The population of this study comprises of five (5) agricultural companies listed on the NGX as at 31st December, 2023. This include able 3.1 presents the population of this study.

Table 1: Population and Sample Size

S/No.	Firms	Listed	Incorporated	Sample Size
1	Ellah Lakes Plc.	2010	1980	Qualify
2	Ftn Cocoa Processors Plc.	2008	1991	Qualify
3	Livestock Feeds Plc.	1978	1963	Qualify
4	Okomu Oil Palm Plc.	1997	1979	Qualify
5	Presco Plc.	2002	1991	Qualify

Source: Nigerian Exchange Group Website as at 31st December, 2024

For a company to qualify as sample for the study, the following criteria were established: (i) the firm must have been in operation for the whole periods of study (2014-2023), (ii) the firm must remain quoted without being delisted between the periods covered. As a result of these two filters, all the five companies meet up with criteria. Hence, Table 3.2 below presents the study sample.

This study adapted and modified the model of Alotaibi et al. (2024), Oshim and Igwe (2024), Abubakar (2023), Davies (2023, Rabiu (2023), Saro and Wiwa (2023) and Farouk et al. (2022) which are modified to include firm age.

ROA = f(BS, BC, BGD, BM, FZ and FA)…….....Eqn 1.

From the above equations, the study proposes a model to test the hypotheses of the study. The study will adopted a model used by Nwankwo and Uguru (2022) and Fakile and Adigbole (2019) which are modified to include firm age.

$ROA = a + \beta_1 BS_{it} + \beta_2 BC_{it} + \beta_3 BGD_{it} + \beta_4 BM_{it} + \beta_5 FZ_{it} + \beta_6 FA_{it} + \varepsilon$……Eqn 2.

Where:

ROA_{it} is the return on assets for firm i in period t.

BS_{it} is the board size for firm i in period t.

BC_{it} is the board composition for firm i in period t.

BGD_{it} is the board gender diversity for firm i in period t.

BM_{it} is the board meetings for firm i in period t.

FZ_{it} is the size of firm for firm i in period t.

FA_{it} is the firm age for firm i in period t.

$\beta_1 - \beta_6$ represent the coefficient of the explanatory variables.

i denote the number of firm in the panel.

t denote the time period of the panel data.

ε is the error term.

Descriptive statistics was used in this study to describe the basic features of the data, computing the summary statistics that describe the central tendency as well as how the data are spread out. Descriptive Statistics shows the characteristics of variables which include mean, minimum, maximum and standard deviation. More so, correlation shows the strength and the degree of association between the values of variable. In other words, it is employed to show the inter-relationship between the independent variables among themselves and the dependent variables under study so as to understand the degree of their association before regression them. Furthermore, regression is a statistical technique that attempts to "explain" movements in one variable, the dependent variable as a function of movements in a set of other variables, called the independent (or explanatory) variables, through the quantification of a single equation (Brooks, 2008). There are often be several explanatory variables in a given situation. In a multiple regression it can be find the best relationship between the response and the different explanatory variables. Ordinary Lease Square (OLS), Fixed Effect (FE) and Random Effect (RE) will be using. Similarly, a post estimation test such as Multicollinearity Test, Heteroskedasticity Test and Normality Test will also be conduct.

Table 2: Summary of the Variables and Measurement

Variable	**Abbreviation**	**Measurement**	**Source**
Return on Assets	ROA	Earnings Before Tax and Interest/Total Assets	Oshim and Igwe (2024), Abubakar (2023); Appah and Tebepah (2023) and Davies (2023).
Board Size	BS	Counting total number of directors of a corporation and participate in board meeting a year.	Oshim and Igwe (2024), Abubakar (2023), Davies (2023, Rabiu (2023), Farouk et al. (2022), Nwankwo and Uguru (2022) and Fakile and Adigbole (2019).
Board Composition	BC	Proportion of independent non-executive director divided by total number of directors on the board.	Davies (2023), Saro and Wiwa (2023), Farouk et al. (2022), Nwankwo and Uguru (2022) and Somathilake (2018).
Board Gender Diversity	BGD	Percentage of number of women on the board to	Alotaibi et al. (2024), Oshim and Igwe (2024), Abubakar

		total number of the board of directors	(2023), Johl et al. (2022) and Nwankwo and Uguru (2022).
Board Meetings	BM	Number of meetings held during the fiscal year.	Oshim and Igwe (2024), Abubakar (2023), Rabiu (2023), Somathilake (2018), Kakanda et al. (2017) and Gemu (2017).
Firm Size	FZ	Natural Log (Total Assets)	Alotaibi et al. (2024), Abubakar (2023), Davies (2023), Farouk et al. (2022) and Kakanda et al. (2017)
Firm Age	FA	Year of Incorporation	Rabiu (2023), Saro and Wiwa (2023), Nwankwo and Uguru (2022) and Fakile and Adigbole (2019).

Source: Author (2025)

4. RESULT AND DISCUSSIONS

4.1 Descriptive Statistics

This provides some basic insight into the nature of the data upon which analysis is done. The descriptive statistics is presented in Table 3 below:

Table 3: Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
ROA (%)	70	0.0401	0.1788	-0.8038	0.3866
BS	70	8.6143	2.4453	4	13
BC	70	0.5030	0.1036	0.3333	0.7143
BGD	70	0.1273	0.0983	0	0.2857
BM	70	4.2857	1.4758	1	9
FZ	70	9.9843	0.6178	9.0321	11.1968
FA	70	35	11.1256	19	60

Source: Stata 14.2 Output

The descriptive statistics in Table 3 above shows that average value of return on assets as 0.0401 (4%), with minimum and maximum values of -0.8038 (80%) and 0.3866 (39%) respectively. This shows that there is a variation in return on assets of sampled agricultural companies as portrayed by the standard deviation of 0.1788 (18%), which is means that there

is much wide value. The negative minimum value indicates that some sampled downstream oil and gas companies reported loss at a particular period. Similarly, Table 3 indicates an average value of board size is 9, which indicates the average board size for firms in the sample size with minimum and maximum values of 4 and 13 respectively with a standard deviation of 2.

Table 3 further shows that the board composition has an average value of 0.5030 of the size of board of directors with a standard deviation of 0.1036. This indicates that on average 50% of board members of Nigerian listed agricultural companies were non-executive directors. The minimum and maximum percentage of non-executive director is 33% and 71%, respectively. Furthermore, Table 3 further shows that board gender diversity has a mean value of 0.1273 (13%) with a standard deviation of 0.0983 (9%), which suggests that, on the average, boards in the sample size have about 13% of directors as females with maximum and minimum values of 0.2857 (29%) and 0, respectively.

The mean value of frequency board meeting is 4.2857 with a standard deviation of 1.4758 and also reveals that companies conduct approximately 1 meeting per year and a maximum of 9 meetings. Firm size was measured as a logarithm of total assets and has a mean of 9.9843 with a minimum of 9.0321 and maximum value of 11.1968. The standard deviation of 0.6178 suggests a wide dispersion in the total assets among the sampled agricultural companies in Nigeria. Lastly, the average firm age is approximately 35 years. This shows that, on the average, the sampled agricultural companies are 35 years with a standard deviation of 11 years and minimum and maximum values of 19 and 60 years, respectively. This indicates that whereas some of the agricultural companies were incorporated Nigeria in 1991, some were incorporated since 1963. This gives an insight as to whether being incorporated earlier will result in companies generating more profit.

4.1.2 Correlation Results

The result of correlation matrix of the dependent variables (profitability- ROA) and explanatory variables (board size, board composition, board gender diversity, board meeting, firm size and firm age), is presented in Table 4. The correlation measures the strength and direction of relationship between all pair of variables of the study.

Table 4: Correlation Matrix

Variables	ROA	BS	BC	BGD	BM	FZ	FA	VIF
ROA	1.0000							
BS	0.6448	1.0000						1.51
BC	0.1041	0.0961	1.0000					2.63
BGD	-0.1952	0.0746	03559	1.0000				1.82
BM	0.3723	0.3603	0.4147	0.4038	1.0000			2.08
FZ	0.5060	0.4668	-0.1460	-0.4145	0.1972	1.0000		1.98
FA	0.0090	0.0532	0.7818	0.4360	0.5623	-0.1668	1.0000	3.41

Source: STATA 14.2 Output.

Table 4 shows the correlation matrix between the variables of the study. The values of the correlation coefficient vary from -1 to 1. The sign of the correlation coefficient indicates the bearing of the relationship whether positive or negative, the complete values of the correlation coefficient indicates the strength, with larger values indicating stronger relationships. The correlation coefficients on the main diagonal are 1.0000, because each variable has an absolute positive linear relationship with itself.

The correlation coefficient of all the independent variables and dependent variable (Return on Assets) are positive correlated as shown in Table 4.2, BS (0.6448), BC (0.1041), BM (0.3723), FZ (0.5060) and FA (0.0090) with exception of BGD (-0.1952) has negative coefficients far from zero which indicates that, decrease/increase in those variables lead to increase/decrease in the profitability (ROA) of listed agricultural companies in Nigeria. Meanwhile, to determine the presence of Collinearity problem, a Variance Inflation Factor (VIF) Tolerance test was carried out, the results of which provided evidence of the absence of Collinearity. This is because the results of the VIF test ranges from a minimum of 1.51 to a maximum of 3.41, which suggests absence of Multicolleanirity in the model (Muhammad, 2009). This is because, all the VIF values are less than 10 and the mean VIF is just 2.24.

4.1.3 Regression Analysis

This subsection presents the regression result of effect of board attributes on profitability. Table 5 presents the Regression with Driscoll-Kraay standard errors result for the model. The regression analysis is used to assess the effect of board attributes on profitability of the listed agricultural companies in Nigeria. This is determined and estimated using Panel Data Techniques.

Table 5: Regression

Panels Corrected Standard Errors (PCSEs)				
Variables	**Coef.**	**Std. Err.**	**T**	**P>/t/**
BS	0.0371	0.0075	4.92	0.000
BC	0.3438	0.2245	1.53	0.126
BGD	-0.5808	0.2141	-2.71	0.007
BM	0.0421	0.0140	3.00	0.003
FZ	0.0175	0.0327	0.54	0.592
FA	-0.0035	0.0021	-1.70	0.090
_CONS.	-0.6079	0.3225	-1.88	0.059
Number of Obs.	70			
R-squared	0.5685			
Wald Chi2(6)	82.34			
Prob>F.	0.0000			
Hettest	0.0000			
Hausman Test		Prob>chi2 =	0.0288	

Source: STATA 14.2 Output.

From Table 5, the multiple linear regressions equation becomes

$ROA_{it} = -0.6079 + 0.0371\mathbf{BS}_{it} + 0.3438\mathbf{BC}_{it} - 0.5808\mathbf{BGD}_{it} + 0.0421\mathbf{BM}_{it} + 0.0175\mathbf{FZ}_{it} - 0.0035\mathbf{FA}_{it} + e_{it}$

Drawing from Table 4.3, the following subsection discusses the regression model fitness as well as analyses of the regression result.

The p-value indicates fitness and reliability of the model to show statistically significant relationship between explanatory and dependent variables. Hence, the p-value of (0.0000) provides evidence that the model was fit in the model. The cumulative R^2 is 57% (0.5685) in model, which gives cumulative effect of explanatory variables jointly on the dependent variable. This means that 57% of the total variation in profitability proxied by return on assets of listed agricultural companies in Nigeria is caused by board size, board composition, board gender diversity, board meeting, firm size and firm age while the remaining 43% of the total variation in the profitability is caused by other variables not included in the model. Table 4.3 also shows the regression result of the dependent variable (ROA) and independent variables (board size, board composition, board gender diversity and board meeting).

4.2 Test of Hypotheses

The regression results as shown from Table 5 show all the variables of the study with the directional values of their coefficients (positive or negative), the p-value as well as their effect on the dependent variable at their independent level of significance. From the results, the formulated hypotheses of the study can now either be rejected or fail to be rejected. Table 4.4 provides the summary of the test of the hypothesis.

Table 6 Summary of the Tested Hypotheses

Hypotheses		**Coef.**	**Std. Err.**	**Z**	**P>/z/**	**Decision**
BS —> ROA	i.	0.0371	0.0075	4.92	0.000	Rejected
BC —> ROA	iii.	0.3438	0.2245	1.53	0.126	Fail to Reject
BGD—> ROA	ii.	-0.5808	0.2141	-2.71	0.007	Rejected
BM—> ROA	iv.	0.0421	0.0140	3.00	0.003	Rejected

Source: Researcher's Compilation, 2024

Based on the hypotheses stated earlier in this study, the results suggested that hypothesis one, three and four are rejected while hypothesis two is fail to reject as shown in Table 4.4.

4.2.1 Hypothesis One

The regression result in Table 4.4 shows that board size has significant and positive effect on profitability (ROA) of listed agricultural companies in Nigeria with a coefficient value of 0.0371 and p-value of 0.000. Hence, failing to accept the hypothesis one of the study, which states that board size has no significant effect on profitability of listed agricultural companies in Nigeria. This finding is consistent with Abubakar (2023), Davies (2023), Rabiu (2023), Saro and Wiwa (2023), Farouk et al. (2022), Johl et al. (2022) and Nwankwo and Uguru (2022) who established that board size has significant effect on profitability (Return on Assets) but contradicting the findings by Oshim and Igwe (2024), Fakile and Adigbole (2019), Somathilake (2018) and Kaur and Vij (2017) who concluded that board size does not influence profitability.

4.2.2 Hypothesis Two

Board composition has insignificant and positive impact on Return on Assets (ROA) of listed agricultural companies in Nigeria with a coefficient value of 0.3438 and p-value of 0.126. Thus, fail to reject the null hypothesis two of the study, which state that board composition has no significant effect on profitability of listed agricultural companies in Nigeria. This

finding is in line with the studies conducted by Oshim and Igwe (2024), Abubakar (2023), Jalih (2023) and Fakile and Adigbole (2019) but inconsistent with the results documented by Davies (2023), Saro and Wiwa (2023), Farouk et al. (2022), Johl et al. (2022) and Nwankwo and Uguru (2022) who concluded that board composition has significant impact on profitability.

4.2.3 Hypothesis Three

Board gender diversity has insignificant and positive impact on profitability of listed agricultural companies in Nigeria with a coefficient value of -0.5808 and p-value of 0.007. Therefore, fail to accept the null hypothesis three of the study, which states which state that board gender diversity has no significant effect on profitability of listed agricultural companies in Nigeria. This finding is consistent with those of Abubakar (2023), Davies (2023), Saro and Wiwa (2023), Johl et al. (2022), Muller et al. (2018) and Meme (2017) but contradicts the results documented by Nwankwo and Uguru (2022), Fakile and Adigbole (2019) and Gemu (2017) who documented insignificant relationship between board gender diversity on profitability.

4.2.4 Hypothesis Four

Board meeting has significant and positive impact on profitability of listed agricultural companies in Nigeria with a coefficient value of 0.0421 and p-value of 0.003. Thus, fail to accept the null hypothesis four of the study, which states that board meeting, has no significant effect on profitability of listed agricultural companies in Nigeria. This finding is in line with the studies conducted by Abubakar (2023), Davies (2023), Rabiu (2023), Kakanda et al. (2017) and Gemu (2017) but inconsistent with the results documented by Oshim and Igwe (2024) and Fakile and Adigbole (2019) who documented that board meeting has insignificant effect on profitability.

For the control variables, the result in Table 4.3 shows that firm size and firm age have insignificant effect on profitability of listed agricultural companies in Nigeria. In summary, the board size, board gender diversity and board meeting have significant effect on profitability of listed agricultural companies in Nigeria while board composition has insignificant impact on profitability of listed agricultural companies in Nigeria.

5. CONCLUSION AND RECOMMENDATIONS

This study assessed the effects of board attributes on profitability of listed agricultural companies in Nigeria for a period of fourteen (14) years (2010-2023) and limited to listed agricultural companies in Nigeria. The independent variable (board attributes) was proxied by board size, board composition, board gender diversity and board meeting while profitability which is the dependent variable was measured using return on assets. The study obtained data from annual account and publications of the sampled firms that operated during the period under study. With the aid of STATA 14.2, descriptive statistics of this study was applied, while correlation matrix showed the level of association between IV and DV, and among IVS and Panel Least Square regression analysis were employed. Specifically, this study revealed that board size, board gender diversity and board meeting has a significant effect on profitability of listed agricultural companies in Nigeria while board composition does not influence profitability. This is an indication that board size, board gender diversity and board meeting are the major determinant of listed agricultural companies in Nigeria for the period under study.

In the light of the conclusions of the study, the following recommendations are offered:

a. Based on the finding that board size has a significant and positive effect on profitability of listed agricultural companies in Nigeria. The management of listed agricultural companies in Nigeria should aim to maintain an optimal board size that balances diverse perspectives with effective decision-making. This may involve regularly assessing board performance and composition to ensure it aligns with the company's strategic goals.

b. More so, board composition does not influence profitability of listed agricultural companies in Nigeria. Management should prioritize enhancing operational efficiency and management practices, as these may have a more significant impact on profitability than board composition.

c. Furthermore, concerning the finding that board gender diversity has a significant and negative effect on the profitability of listed agricultural companies in Nigeria, companies should strive for a balanced approach to gender representation on boards, ensuring that while diversity is promoted, it does not compromise decision-making efficiency and financial performance.

d. With regards to significant impact of board meeting on profitability, management of listed agricultural companies in Nigeria should consider to compliance with the Nigerian

Code of Corporate Governance on the minimum number of meeting to hold in a year to ensure timely decision-making and effective oversight of strategic initiatives. By implementing this recommendation, listed agricultural companies in Nigeria can enhance the effectiveness of their board meetings, thereby leveraging this governance tool to drive improved profitability.

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