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Board diversity and earnings' quality of the listed insurance companies in Nigeria

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Abstract: This study examines the relationship between board diversity (in term of percentage of female board members, educational qualification, independent directors, interlocking directorship, and financial literacy) and earnings quality of listed insurance companies in Nigeria. The study used secondary data from the stock exchange fact books and audited financial statements of the selected companies. We adopted a quantitative research design in which data were analyzed using descriptive and inferential statistics. Three variants of regression model, namely pooled ordinary least square, fixed effects and random effects models were estimated. Results revealed that significant differences exist in board diversity and earnings quality across the listed insurance companies in Nigeria. Also, the impact of board diversity on earnings quality is positive and strong. That is, the higher the company's board diversity the better the ability to generate quality earnings. The results suggest than insurance companies with large number of women on the board are more likely to generate higher quality earning than those dominated by men. The paper draws the attention of management of listed insurance companies to the need to comply with the code of corporate governance on board diversity to increase the number of women on the board and ensure that the board consists of educationally qualified members, and financial literate members. The study also draws the attention of Nigeria Stock Exchange Group (NSGG) and other regulatory authorities to the need for regulation that will make disclosure of directors' personal information a regulatory disclosure.

Keywords: board diversity; interlocking directorship; financial literacy; earnings quality

1. Introduction

This study investigates whether board diversity proxied with percentage of female board member, educational qualification, independent directors, interlocking directorship, and financial literacy has any relationship with earnings' quality of the insurance companies quoted on the Nigerian stock exchange. Thought previously as a matter of image building and social issue, board diversity is now gradually being perceived as a strategy for value-driven in corporate organization (Oyerogba and Ogungbade, 2020). As documented in previous studies, agitation for board diversity in the corporate governance structure was initiated by Robinson and Dechant (2007) who posit that board structure, characteristics and composition improves the strategic decisions making process of the board, which in turn affects enterprise productivity, earnings' quality, and the market value of an enterprise. Also, Erhardt et al. (2003) argue that an important factor, that is generating widespread interest and a high degree of contestation in the discourse on corporate governance in relation to the board strategic role, centers on diversity, defined as the range of gender and ethnic

representation on the boards of directors.

The quality of earnings is particularly important in rapidly developing capital markets and emerging economy where investors rely on financial statements/annual reports as the main single source of reliable information for investment decision (Leventis et al., 2005). An ideal situation is that earnings reported by a company refer to the proportion of income attributable to the main operating activities of a company which is equally a measure of business success (Rusmin and Evans, 2017). This does not happen because of management involvement in the use of accounting deception such as the aggressive use of accounting rules, the elimination of last in first out (LIFO) inventory management, the sale of assets for a gain, delay in recognizing expenses to temporarily boost the earnings etc. Therefore, prevention of earnings manipulation requires strong oversight over managerial decision and activities. Hence, the need for board independence through diversity.

To enhance the board independence, Hussin et al. (2018), Habib et al. (2018) posits that company board should have an independent majority. To achieve independent majority and allow directors to perform their oversight role Oyerogba et al. (2017) argue that a significant number of women directors should be allowed to participate in strategic decision making by serving on the board. By enhancing the board independence, protection of the public investors would substantially be improved without undermining the ability of the board to set the firm's strategy. We observed that many studies have examined the link between the earnings quality and percentage of insiders on the board (Agrawal and Knoeber, 1996), education qualification of the board members (Dezo and Ross, 2012; Oyerogba et al., 2016) and very recently directors' characteristics such as gender and ethnicity (Adwally, 2016; Francoeur et al., 2007; Robinson and Dechant, 2007). However, amongst the many possible board characteristics that have been surveyed, understanding how board diversity in terms of interlocking directorship, financial literacy and age differential of the directors' influence earnings quality suffers the highest neglect.

The aim of this paper is therefore to investigate whether board diversity influences the quality of earnings with the use of data from the audited annual reports of the 23 insurance companies quoted on the Nigeria Stock Exchange Group (NSEG), covering ten years period (2011 to 2020). Specifically, the study investigates whether directors' age. Educational qualification, financial literacy, gender, and interlocking directorship improve the earnings' quality of firms covered in the study sample. Therefore, our explanatory variables form the basis for the formulation of the study objectives.

Some management of listed companies and stakeholders in insurance activities perceived a positive relationship between gender diversity and earnings quality of the firm (Ahern and Dittmar, 2012; Oyerogba et al., 2013, 2020). "They center their arguments on the presumption women possess special talents in preservation of the traditions, legacy and values of any organization" (Raposo et al., 2021). Also, it is believed that women are masters of opportunity management as they possess natural leadership skill (Bohren and Staubo, 2014). "Some argued that corporate women are in an advantage positioned to interact with the consumer markets perceive to be dominated by women (CED, 2012; Madichie et al., 2021). In contrast, Adwally (2015), using critical mass theory which emphasized the critical number of personnel

needed in an organization to affect policy and make a change documented how the presence of women on the board can weaken the decision-making process. Other components of board diversity such as financial literacy and directors' age have conflicting and difficult to reconcile results in prior literature (Andrew et al., 2018; Wie and Xie, 2014). Bohren and Staubo (2014) call for additional research on the link between financial literacy, directors age and earnings quality. We respond to this call and extend board diversity research by providing additional empirical evidence on the link between financial literacy, directors age and earnings quality.

Using a panel data set, we estimate three variants of the regression model, namely fixed effects, random effects, and pooled effects regression models in this study. We used current discretional accrual as proxy for earnings quality. Consistent with Masud et al. (2021), the quarterly current discretionary accruals were computed. The result provides evidence that directors' education, directors' financial literacy and gender diversity consistently influence earnings quality in the "base line" model and the other two alternative models in the robustness analysis. The study proceeds as follow: section 2 reviews the previous studies on the related topics. The methodology and variables used in the study were explained in the third section. Section four reports the data analysis and the major findings of the study. Conclusion and recommendation were presented in section five.

2. Literature review

2.1. Board diversity

Board diversity has been viewed in different ways by different scholars from different field of studies. According to Oyerogba and Ogungbade (2020), possessing the optimal mix of expertise, experience and skills is paramount to ensuring that the board as a collective body is equipped to guide the strategy and business of the company. Business unit heads, academics, regional leaders, government agencies, entrepreneurs, and other non-executives can create a wider, more diverse pool involving many talented and experienced individuals capable of bringing insightful and interesting perspectives into the boardroom (Wie and Xie, 2014). Therefore, board diversity can be viewed as the development mandatory in the composition of the board; that can be calculated in several important ways (Campbel and Minguez-Vera, 2019). According to Campbel and Minguez-Vera (2019), board diversity is of two aspects: structural or statutory and demographic.

In describing board functions Campbel and Minguez-Vera (2019), "states that the board provides oversight on management activities and regulates strategic decision, connect the firm to external resources critical to the company's activities. Also, for control and monitoring, it is often a matter of the rule with the completely fascinated attention on statutory or structural diversity directed toward ensuring that the managerial interests in a company are aligned with stockholders rather than management and this is the bedrock of agency theory (Goh and Li, 2013)". In other word, the role is often directed towards enhancing effective organization's management for the advancement of overall interest of all the stakeholders. For other resource provisions and advice, attention is focused on the desire for diversity of knowledge, experience, skills, intelligence, perspectives, and connections that aligns

the provision of resource dependence theory (Bohren and Staubo, 2014).

Other scholars (Andrew et al., 2018; Adwally, 2015) argued that for the effective performance of board functions, its composition must be adequately diverse in forms of the personal attributes; and in forms of the structural attributes of the directors including educational qualification, gender, professional qualification, age, nationality, culture, and ethnicity. For clarity, scholars (Ahern and Dittmar, 2012; Bohren and Strom, 2010; Goh and Li, 2013; Massud et al., 2022; Nryi, 2022; Oyerogba and Ogungbade, 2020) have classified board functions into supervisory (monitoring) and management (resource allocation) in line with the dual responsibilities required of a sole or unitary board structure that exists in many multinational economy like Australia, Nigeria, Brazil, Egypt, Canada, India, Japan, Italy, Malaysia, Philippines, Norway, Singapore, South Korea, South Africa, Sweden, Turkey, Thailand, USA, Zimbabwe, Ukraine, United Kingdom, and a host of other countries in contrasts with separation of the two roles in a dual (two-tier) board structure such as practiced in Austria, China, Belgium, Croatia, Denmark, Czech Republic, Estonia, Germany, Georgia, Holland, Latvia, Indonesia, Mauritius, Spain, Poland, and Taiwan. The mixed system has been embraced by countries like Finland, Bulgaria, Switzerland and France and Switzerland in which companies are at liberty to select between the" two-tier" and sole board structure. The classification aligned with Robinson and Dechant (2007) where board roles are classified into fiduciary and advisory. As discussed extensively in literature, the discussion on the fiduciary role emphasizes the control and monitoring functions of the board which helps mitigate excessive risk taking and hedges the business against any practices or demands that may be prejudicial to the achievement of the company's goals. To discharge these functions, the directors have a responsibility to participate actively in the company's decision-making processes which is the hallmark of the board's control and monitoring function. This function goes with the obligation to evaluate, scrutinize, and regulate management functions (Medel-gonzález, 2021; Moses et al., 2020). Hence, the thrust of the supervisory function includes advising and provisions of necessary resource for expansion and growth (Moses et al., 2020).

Furthermore, similar to the practice of the two-tier board structure, in a single "tear" board structure which is the practice in Nigeria, the two roles seem to be complementary and not operate in isolation (Maroufkhani et al., 2021). The structural diversity focuses on achieving efficiency in the fiduciary role of the board like discharge of oversight functions, while demographic diversity complements the fiduciary role through provision of the superior advisory capability to the management in the effective discharge of their functions because information provided while discharging the advisory roles enhance the monitoring process (Oyerogba and Ogungbade, 2020). The system is put in place and act in synergy to promote business growth and profitability which in themselves are disincentives to earnings management and which proselytize a conducive atmosphere for persistent reliable corporate earnings disclosure useful for investment decision-making. The significance of accurate and reliable corporate earnings disclosure does not only lie with investment decision-making (Mahood et al., 2022). It also serves as a control and monitoring tool (Moses et al., 2020; Nryi, 2022). board diversity.

2.2. Earnings quality

Due to the relative importance of earnings quality in firm valuation, several authors have provided different definition for earning quality. According to Schipper and Vincent (2003) earnings quality refers to the proportion of the income accruing from the core operating activities of a company. Thus, if a company is reporting an increase in profits due to increase in sales revenue or reduction in operating cost, earnings quality is perceived to be high (Hannifa and Hudaib, 2006). Conversely, a business can have low-quality earnings when changes in the business earnings relate to other issues, such as the aggressive use of accounting rules, sales of assets for a gain, the elimination of LIFO inventory layers, increase in business risk or inflation (Hartley and Belts, 2010). In general, any use of accounting intrigue to temporarily increase earnings affects the quality of earnings.

Financial statements are of high earnings quality by reporting truthful, timely, useful, and relevant information (Harison and Klein, 2007). Pend and Ford (2014) stated that three elements underline the quality of earnings. These include strict compliance with matching concept, involving a clear indication of on-going costs and revenues, clear evaluation of performance of the organization's core business as well as a direct correlation of earnings with cash. With this approach, high quality earnings per share would be a relatively true representation of what the business produced (cash generated) (Lee and Fargher, 2013). In agreement with this, Heijltjes et al. (2003) stated that quality earnings should agree with reported profits of listed firms. Hence, quality earnings are earnings that are controllable, repeatable, and are efficient in generating cash. Therefore, quality growth in business earnings is achieved through sustainable increase in sales revenue and sustainable reduction in operating costs rather than one-off event or actions (Harrison and Klein, 2007).

The growth of earnings quality and earnings manipulation is a function of the factors within the control of the management and the board rather than the result of macroeconomic variables (Hartley and Betts, 2010). To prevent earnings manipulation, the board must be strengthened to perform her functions, which may be done through diversification of board membership (Hannifa and Hudaib, 2006). The main board diversity variable in the prior literature reviewed is gender diversity. Scholars have examined the influence of gender diversity the quality of earnings and documented that the women's presence on the board of director yields better board dynamics and improves the reported earnings quality (Adams and Ferreira, 2009; Hartley and Betts, 2010; Hili and Affes, 2012). Their findings imply that having more female directors on the board has positive influence on earnings quality. Unfortunately, not much evidence has been found in literature in support of interlocking directorship, directors age and financial literacy.

2.3. Relationship between board diversity attributes and earnings quality

An overwhelming study has been produced from a leading strand of research on earnings quality, that was initiated about three decades ago, mainly utilizing a composite index approach to analyze the drivers of earnings quality (Afolabi et al., 2021; Agrawal and Chadha, 2005; Al-Shaer and Zaman, 2021; Almoneef and Samontary, 2019; Gangi et al., 2018). Using a meta-analysis, Almoneef and

Samontary (2019) posit that the drivers of earnings quality may be classified into the following categories: corporate governance variables, internal control adequacy, firm-related factors, and board diversity variables. In this article, we focus on board diversity and adopted a granular approach in analyzing the relationship between board diversity and earnings quality. In the meta-analysis, Afolabi et al. (2021) noted that board diversity variables have received little or no attention in earnings quality research and should benefit from future research which forms the basis for this study.

Gangi et al. (2018) find that only board diversity variables (i.e., directors' age, educational qualification, and interlocking directorship) are associated with earnings quality. Black et al. (2021) observes a significant relationship between earnings quality and directors' age, financial literacy, and gender. Boyds et al. (2017) reported that large boards with quality experience and education are associated with increase in firm earnings. Surprisingly, Anazonwu (2022) asserted that firms with boards with high degree of diversity are prone to poor earnings based on the notion that they are likely going to incur higher cost on board activities. Akinloye et al. (2019) find that the quality of earnings is higher in firms with a financial expert member on the board. According to Asuquo et al. (2018), boards with directors serving on the board of other companies (interlocking director) are associated with higher earnings.

Al-Shaer and Zaman (2021) found gender diversity with experience and financial literacy leads to an increase in firm earnings. Almoneef and Samonteral (2019) established a significant relationship between board financial literacy and earnings quality. By contrast, Black et al. (2021) believes that having many financial experts on the board may be a potential source of conflicts with the management and may hinder them from engaging in some investing activities which may lower the firm's earnings. As discussed, using agency theory, large number of women on the board provides an incentive for conflicts which may hinder managerial activities (Afolabi et al., 2021). Board with inadequate proportion of old and young directors may be characteristic with ineffectiveness in handling financial and control weaknesses which may affect the firm's ability to generate income.

3. Methodology

To determine the effects of board diversity on earnings' management, a quantitative research design was adopted. Oyerogba et al. (2016) "posit that a quantitative research design enables research to determine the effects of one variable on the other through an inferential statistical analysis". Since, the primary objective of this study is to ascertain whether board diversity has a significant effect on earning' quality this design is perceived adequate. The study population is made up of 58 insurance companies in Nigeria. However, the sample for this study consists of only the 23 insurance companies listed on the Nigeria Stock Exchange as at July, 2021. Data were extracted for a period of 10 years, from 2011–2020, being a period immediately after adoption of the international financial reporting standards (IFRS).

3.1. Board diversity

For this study, data were sourced from the audited annual reports and financial statements of the insurance firms quoted on the Nigerian Stock Exchange Group

(NSEG). The 2011 Security and Exchange Commission (SEC) code of corporate governance requires all the listed firms in Nigeria to disclose detail information about the directors on the board of the companies in the company's audited annual reports. Therefore, all the data needed for the study are available in the financial statements. Board diversity was proxied with directors' age, educational qualification, financial literacy, gender, and interlocking directorship. The study used binary dummy for measurement of board diversity. In line with the life cycle grouping (Adwally, 2015), we classified director's age, into young and old directors.

Directors between ages 20–40 years were classified as young directors while those from 40 years upward were classified as old directors. We assigned1 to a company dominated by young directors and 0 to those dominated by the older directors. For directors' education, consistent with Oyerogba et al. (2017), a company scored one if half of the directors possesses a bachelor's degree and zero if otherwise. To capture financial literacy, we assigned one to a company with at least a chartered accountant on the board and zero to those without the presence of a chartered accountant. Financial literacy has been defined by the Canada's Security Commissions as the "ability to read and understand a set of financial statements that present a breadth and level of complexity of accounting issues that are reasonably comparable to the breadth and complexity of the issues that can reasonably be expected to be raised by the issuer's financial statements." (Ogungbade and Oyerogba, 2020). As enshrined in the SEC code of corporate governance, the presence of a chartered accountant on the board implies that there is a financial expert on the board and the board cannot be deceived by the management (SEC, 2011; Abu et al., 2018). Similarly, to capture gender diversity, we drew inspiration from the SEC (2011) corporate governance code and assigned one to a company with 33% female directors and zero if otherwise. This approach is consistent with Hashim and Ahmed (2019). Again, for interlocking directorship, we assigned one to company if majority of the directors are serving on the board of another company and zero if otherwise.

There are two major reasons in support of this decision. First, our primary objective is to determine the effects of board diversity on earnings quality, which implies that earnings of two distinct groups of companies be evaluated. Economic theories provide certain explanation on how board diversity can improve the firm's earnings. This includes strengthening the oversight functions. Oyerogba and Ogungbde (2020) argued that a more diverse board is an independent board and board independence is a strong instrument for reducing managerial discretion especially on disclosure pertaining to earnings management in an organization. Second, literature focusing on earnings quality have received heavy criticism for inability to control for heterogeneity in the data for analysis (Dezo and Ross, 2012; Khan and Vieito, 2013). Hence, it is believed that by group the firm into different groups, a more homogeneous sample will emerge for this study.

3.2. Earnings quality

For earnings quality, we computed the current discretionary accruals as a measure of earning quality because in most cases earnings' manipulation by the

management is done through the current discretionary accruals (Khan and Vieito, 2013). The quarterly current discretionary accruals (DCA_{jtq}) were computed in conformity with the method used by Matsumoto (2002). The only feasible difference between Matsumoto (2002) and the modified Jones model is the addition of fourth quarter dummy as the control for the fourth quarter difference. The current discretionary accruals for the industry are calculated as the lagged asset weighted average of discretionary accruals for all the companies in a particular sector.

3.3. Estimation model

For this study, the dependent variable is earnings quality expressed as a function of independent variables, (directors' age, educational qualification, financial literacy, gender, and interlocking directorship) selected from existing literature. The functional form of the model is expressed as follows:

$$EQUAL_{at} = \beta_0 + \beta_1 DAGE_{it} + \beta_2 DQUAL_{it} + \beta_3 FLIT_{it} + \beta_4 DGEN_{it} + \beta_5 INTRD_{it} + \varepsilon$$

where EQUAL is the earnings quality measured by current discretional accrual, DAGE represents the director's age, DQUAL, FLIT, DGEN and INTRD represents the director's qualification, financial literacy, gender, and interlocking directorship respectively. A panel ordinary least square regression (pooled OLS, fixed effects, and random effects models) and Two-Steps System Generalized Method of Moments (GMM) estimation were estimated. An important distinction of pooled OLS is the increased precision in estimation arising from the increased in number of observations because of panel data (addition of time series and cross sectional) (Moses et al., 2020). However, omitted variable bias prevalent in pooled often increase the chance of other two variants of OLS (random and fixed effects) (Nryi, 2022). If there are no omitted variables or if the omitted variables are not correlated with the independent variables in the regression equation, a random effects model may be the best (Oyerogba and Ogungbade, 2020). It may generate unbiased coefficient estimate by using all the available and produce very small standard error (Adwally, 2015). By contrast, when there are omitted variables, and they are correlated with the variables in the regression equation, fixed effects models will produce better estimates since the subjects serve as a control on their own in a fixed effects model (Oyerogba et al., 2017).

An array of literature on earnings quality inspired about three decades ago, mainly utilizing pooled OLS regression to determine the drivers of earnings quality has produced conflicting and difficult to reconcile results (Adams and Ferreira, 2009; Dezo and Ross, 2012; Hartley and Betts, 2010; Hili and Affes, 2012; Khan and Vieito, 2013; Oyerogba, et al., 2016). This forms the basis for this study. Hausman specification test was conducted, and the result informed the use of random effect model in the regression analyses. Also, the panel GMM estimation technique was specifically adopted for this study due to the nature of the data utilized where $N > T$, i.e., the number of group in this case companies (23) exceed the number of periods (10 years). As illustrated in Arellano and Bond (1991), the GMM estimator basically explains the linear moment restrictions arising from the serial correlation assumption in the regression errors, in a model containing lagged dependent variables, individual effects and weak exogenous variables.

4. Results and discussion

4.1. Descriptive statistics

In **Table 1**, it can be found that significant difference exists in earnings quality of the listed insurance companies in Nigeria. From **Table 1**, the mean score for director's age was 0.913 while the highest was 1.000. The result implies that majority of the insurance companies have more young directors than old since the mean is closer to 1 which is the dummy for young director. It is informative to state that out of the 23 insurance companies considered; only two had higher number of older directors than the younger directors. It can therefore be concluded that insurance companies in Nigeria seems to have vibrant board. Other variables including educational qualification, financial literacy, directors' gender, and interlocking have their respective means as 10.00, 8.97, 4.55 and 8.25 respectively. The mean value of 10.00 for educational qualification implies that majority of the directors of all the companies sampled have the basic education needed for effectiveness as a board member.

In like manner, the mean score of 8.97 for financial literacy suggests majority of the companies in the sample have at least one qualified accountant on the board which means that can take an informed decision about the performance and financial adequacy of the company. It also means that they cannot by manipulated by the management. Also, the mean value of 8.25 for interlocking directorship revealed that there are more experience directors on the board of insurance companies in Nigeria. In contrast, the mean value of 4.55 for directors' gender implies that the proportion of female directors on the board is very low. This aspect of board diversity requires significant improvement. In terms of the shape of the probability density of each variable as accounted for by Jarque-Bera statistic, all the variables are found to follow normal distribution given the low probability values of the Jarque-Bera statistic.

Table 1. Descriptive statistics results for earning's quality and board diversity.

	Mean	Std. Dev	Min.	Max.	Obs.	Kurt	J-Bera
Earnings' quality	0.38	0.09	0.25	0.97	230	0.333	0.207
Director's age	0.91	0.03	0.8	1.00	230	1.441	0.140
Educational qualification	1.00	0.01	1.00	1.00	230	1.997	0.221
Financial literacy	0.89	0.05	0.00	1.00	230	1.332	0.423
Directors' gender	0.45	0.83	0.00	1.00	230	1.182	0.226
Interlocking directorship	0.82	0.75	0.70	1.00	230	2.388	1.097

4.2. Diagnostic test

To ensure that important classical OLS assumptions are not violated in this study, three diagnostic tests were conducted in this study. The tests are heteroscedasticity, serial correlation, and multicollinearity tests. Heteroscedasticity was ascertained using the Bruish-Pagan test. Durbin-Watson statistic was used to test for autocorrelation, while multicollinearity was tested with the variance inflation factor. Heteroskedasticity occur when the variance of the regression residuals is

uniform over a range of measured values which results in an unequal scatter of the residuals (Isa and Farouk, 2018). Whenever, unequal scatter of residuals is obtained in a regression analysis, it implies that the data collected for the regression analysis contains unequal variance (Madichie et al., 2022), and the regression results may be invalid. Particularly, if there is increase in the variance of the error term over time, confidence intervals for out-of-sample predictions will tend to be unrealistically narrow (Oyerogba, 2016). Therefore, it is important for data to be homoscedastic before accepting it for a panel regression analysis. The result of heteroscedasticity test presented in **Table 2** produced a test statistic of 204.7127 while the *p*-value was 1 indicating that the data collected was not heteroscedastic in variance and can be relied on for a regression analysis.

Similarly, the results in **Table 3** satisfy the rule of thumb that values of $1.5 < d < 2.5$ show that there is no autocorrelation in the data (Barley, 2009). It can therefore be concluded that earnings quality for the year 2012 is not a function of earnings quality for the year 2011 and so on. In like manner, while a strong correlation was found among all the study variables, the variance inflation factor (VIF) results reported in **Table 4** is lower than 2 for all the variables in our regression models, thereby suggesting the absence of multicollinearity.

Table 2. Bruisch pagan test for homoscedasticity.

Test statistics	Degree of freedom	*P*-value
205.9717	4	1.000

Table 3. Durbin Watson statistics for autocorrelation.

Lag	D. W. Statistics	*P*-value
1	1.585234	0.425
2	1.986433	0.368
3	1.640301	0.317

Table 4. Rank order correlation matrix and VIF.

	DAGE	DQUAL	FLIT	DGEN	INTRD	VIF
DAGE	1					1.842
DQUAL	0.392	1				1.282
FLIT	0.535	0.475	1			1.776
DGEN	0.476	0.226	0.349	1		1.525
INTRD	0.355	0.416	0.397	0.334	1	1.281

Note: DAGE—age, DQUAL—directors' qualifications, FLIT—financial literacy, DGEN—directors' gender and INTRD—interlocking directorship.

4.3. Inferential statistics

Table 5 presents the estimation results of regression model adopted in this study. Three variants of the model namely pooled ordinary least squares, fixed effects and random effects models were estimated and tested. The second, third and fourth columns of the table provide the estimates of the models respectively for each estimated variable coefficient. While the regression estimates for pooled OLS and

random effects models are similar, a Hausman test was carried out to determine the appropriate choice of model between fixed effects and random effects model under the null hypothesis that random effects are uncorrelated with one or more of the regressors. However, the Hausman test statistic provides us with evidence of the non-rejection of the null hypothesis since the probability of obtaining a chi 2 value of as much as 5.98 or higher is not practically significant. Hence, we reject the fixed effects model in favour of the random effects model.

Table 5. Regression analysis results.

	Fixed effect	**Random effect**	**Pooled OLS**
DAGE	−15.452** (30.457)	−15.999** (32.032)	−18.452** (10.457)
DQUAL	5.531** (2.9023)	6.961** (3.8504)	2.804** (2.9503)
FLIT	4.852** (8.7356)	4.952** (9.3305)	5.258** (8.7356)
DGEN	3.307** (8.440)	3.537** (9.512)	2.306** (8.474)
INTRD	1.441 (0.727)	1.565 (0.761)	0.443 (0.723)
R-squared	0.571	0.515	0.421
Adj R-squared	0.513	0.501	0.412
F-statistic	14.87	13.88	
Prob (F-statistic)	0.00	0.00	
Wald chi 2 (Prob)			69.47 (0.0000)
Hausman (chi 2), Prob > chi 2			5.98 (0.1097)

Note: DAGE—age, DQUAL—directors' qualifications, FLIT—financial literacy, DGEN—directors' gender and INTRD—interlocking directorship.

While the coefficient estimates of all the explanatory variables, but DAGE is correctly signed as expected, only four explanatory variables DAGE, DQUAL, FLIT and DGEN are statistically significant. This result suggests that the major determinants of earnings quality in the listed insurance companies are directors' age, directors' education, directors' financial literacy and gender balance. This result is similar to that of Oyerogba and Ogungbade (2020). With this empirical evidence, we inferred that a unit increase in the age of the directors will result in about 16% reduction in earnings quality of the manufacturing companies in Nigeria. It can therefore be concluded that ceteris paribus companies with younger directors should have better earnings that those managed by older directors. Similarly, a unit increase in the directors' educational qualification will produce about 7% rise in the company's earnings.

The estimated effects of financial literacy on earnings quality were about 5%. The result suggests that board with a chartered accountant as a director will have about 5% increases in their earnings than those with the presence of a qualified accountant. Evidently, gender balance is also a predictor of earnings management in the listed insurance companies. Based on the results in **Table 5**, insurance companies with appropriate ratio of male to female director will have about 4% improvement of

their earnings. Although the impacts of other explanatory variable (interlocking directorship) are statistically non-significant, the model is well-behaved given its coefficient of determination. Essentially, about 52% of the variation in the dependent variable (earnings management) is explained by the model. Therefore, the impact of listed insurance company's bord diversity on earnings quality is positive and strong. That is, the higher the company's bord diversity the better the ability to generate earnings.

5. Robustness check

5.1. Self-selection bias

Prior research on earnings quality has established that self-selection bias arises due to the fact that management of listed companies self-select favorable methods from the array of measures (ranging from asymmetric loss recognition, earnings persistence, smooth earnings, predictability, magnitude of accruals, absolute value of discretionary or abnormal accruals, income-decreasing accruals, and the extent to which accruals map into future and past cash flows) available for earnings quality determination (Clikeman, 2003; Schipper and Vincent, 2003). This results in biased OLS regression results. Consistent with Penman and Zhang (2002), we applied Kothari and Garg (2014) approach to deal with self-selection bias in the regression analysis. To achieve this, we computed Two-Steps System GMM estimation approach due to several advantages it has over other panel estimation techniques.

The GMM estimator possesses many advantages over the pooled, fixed and random panel estimators in that it controls for omitted variable bias, endogeneity of the lagged dependent variable, unobserved panel heterogeneity, and measurement errors (Jacob and Ford, 2014; Lee and Fargher, 2013). It also helps to eliminate dynamic panel bias prominent in other dynamic panel estimation techniques (Penman and Zhang, 2002; Roodman, 2009). The results presented in **Table 6** are consistent with the previous findings except that only three board diversity variables have statistically significant influence on earnings quality. More specifically, we found a positive and significant relationship between director's educational qualification and earnings quality (coefficient = 0.263, *z*-value 2.13).

Table 6. Two-Steps System GMM regression results.

Variable	Estimates	Std error	*z*-value	*P*-value
EQUAL(−1)	0.798	0.118	6.724	$P < 0.01$***
DAGE(−1)	−0.101	0.093	−1.085	0.278
DQUAL	0.263	0.123	2.131	0.013**
FLIT	0.314	0.166	2.267	0.026**
DGEN	0.229	0.085	2.714	0.011**
INTRD	0.845	0.593	1.431	0.188

Note: DAGE—age, DQUAL—directors' qualifications, FLIT—financial literacy, DGEN—directors' gender and INTRD—interlocking directorship.

Similarly, a positive and significant relationship was found between financial literacy and earnings quality, it is shown that for every 1% increase (decrease) in

financial literacy, earnings quality measured with discretionary accrual, changes directly by about 26% in the short run on average, ceteris paribus. The relation between director' gender and earnings quality are significant, thereby suggesting that the higher the change in the number of female directors, the higher the quality of firm's earnings. Explicitly, a 1% increase in the number of female directors results in about 23% change in earnings quality of the firm in the short run, on average, ceteris paribus. Earnings quality was also found to be dependent on its past realizations as the coefficient of the lagged value of earnings quality (EQUAL) is found to be positive and statistically significant at the chosen significance level (5%). This implies that the higher the quality of earnings of the firm in a particular year, the more valuable it's likely to become in the following year, all other things being equal.

5.2. Alternative measure of earnings quality

Inspired by Dichev et al. (2013) who reported that high quality earnings should be consistent and supported by cash flows, in order to reflect reliable reporting system over time using a survey of 169 chief financial officers of listed firms about earnings quality, we replaced the discretional accrual with the Q test earnings quality model developed by Putman et al. (2005). The Q test is calculated as the total of five accounting ratios calculated from the accounting information from the three important elements of financial statements under regulatory disclosure. The information includes sales revenue for the current and previous accounting period, receivable for the current and previous accounting period, cash flow from operating activities, total liabilities and net income, income from continuing operations, profits before interest and taxes.

We justified the inclusion of the three major financial statement elements on the provision of signaling theory and threshold theory. According to threshold theory cash flow margin divided by sales revenue is a measure of effectiveness of cash collections from sales. Hence, violations of generally accepted accounting principles (GAAP) in relation to recognition of sales revenue are a dominant factor for material misstatements (Rahman and Anwal, 2014). Again, the company's ability to generate cash from its business operations can be evaluated using the cash flow from operating activities (Oyerogba and Ogungbade, 2020). Lastly, higher leverage may be an incentive for opportunistic managers for earnings manipulation (Roodman, 2009), hence a leverage ratio was introduced to the model.

Table 7. Regression analysis results for Q test.

	Fixed effect	Random effect	Pooled OLS
DAGE	−17.249** (28.931)	−18.720** (35.153)	−14.198** (26.843)
DQUAL	3.722** (1.3825)	4.133** (2.6694)	2.177** (1.6248)
FLIT	2.9884** (1.7356)	4.952** (2.1405)	3.842** (5.249)
DGEN	3.118** (0.8729)	2.8724** (0.2983)	2.179** (3.228)

Table 7. (*Continued*).

	Fixed effect	Random effect	Pooled OLS
INTRD	1.183 (0.5227)	1.998 (0.6295)	0.973 (1.483)
R-squared	0.429	0.417	0.379
Adj R-squared	0.395	0.386	0.334
F-statistic	11.62	11.13	
Prob (F-statistic)	0.00	0.00	
Wald chi 2 (Prob)			53.95 (0.000)
Hausman (chi 2), Prob > chi 2			6.22 (0.1482)

Note: DAGE—age, DQUAL—directors' qualifications, FLIT—financial literacy, DGEN—directors' gender and INTRD—interlocking directorship.

The result in **Table 7** is closely related to the result of previous regression analysis. However, R-square was relatively lower for all the three variants (pooled effects, random effects, and fixed effects) of regression models than what was obtained for the base line regression. The result for the coefficients remains as previously reported.

6. Conclusion

This study investigates the correlation between board diversity and earnings management of the quoted insurance firms in Nigeria. Specifically, the study investigated the impact of directors' age, educational qualification, financial literacy, gender, and interlocking directorship on discretional accrual. The sample for this study consists of only the 23 insurance firms quoted on the Nigeria Exchange Group as of July 2021, purposively drawn from the 58 insurance companies in Nigeria. Data were analyzed, using both descriptive and inferential statistics. The descriptive statistics are the mean, standard deviation, minimum, median, and maximum value for the data. For inferential statistics three variants of regression model, namely pooled effects, random effects, and fixed effects models were estimated and tested.

From the results of descriptive statistics, it was established that significant difference exists in earnings quality across the quoted insurance firms in Nigeria. It was also established that all the variables follow the normal distribution given the low probability values of the Jarque-Bera statistic. Inferential statistics results shows that about 52% of the variation in the dependent variable (earnings quality) is explained by the model. Therefore, the impact of listed insurance company's bord diversity on earnings quality is positive and strong. That is, the higher the company's bord diversity the better the ability to generate earnings. More importantly, we found a strong negative relationship between director's age and earnings management, suggesting that firms managed by younger directors are more likely to report quality than those with old directors. This relationship can be explained in two ways. On the one hand, the versatility associated with young age may help in revealing, spotting, and removing any anomalies, one-time events, and accounting tricks that may skew the accounting figures (Maroufkhani et al., 2021). On the other hand, younger director may be proactive to deriving higher earnings from higher sales or lower costs of sales than the older directors (Madichie et al., 2022).

Another interesting finding is that both qualification and financial literacy significantly influence the quality of earnings. The practical implication of this is that firms with financial literate board members are generally less vulnerable to financial and other forms of fraud associated with earnings management (Masud, 2022). Finally, another crucial finding is that regarding gender diversity. We found a positive and significant relationship between gender diversity and earnings quality, which reinforce the argument that a gender balanced board is associated with higher transparent financial reporting process and quality earnings (Nryi, 2022; Moses et al., 2020).

The paper draws the attention of management of listed insurance firms in Nigeria to the need to comply with the code of corporate governance on board diversity to improve the composition of directors on the board. The study also draws the attention of Nigeria stock exchange and other regulatory authorities on the need for regulation that will make disclosure of directors' personal information a regulatory disclosure rather than voluntary disclosure which is the current practice. The study also documents that that the major determinants of earnings management in the listed insurance companies are directors' age, directors' education, directors' financial literacy and gender balance.

7. Limitations and areas for future research

This study is robust but not without certain limitations. First, the study used data from a quoted companies in a single sector. Further empirical evidence is needed to enhance the generalization of the results. Second, although majority of the board characteristics data can be extracted from the audited financial statements and other secondary sources, it may be enriching to embark on a survey by conducting interview with the management and board members to dig deeper into other unobservable board characteristics that can drive earnings quality which are usually not reported in the financial statements. Future research can focus on this. From our literature reviewed, we observe that adjusted R-square ranges between 13.8% to 71.4%, with a typical literature reporting an adjusted R-square of 33.5%. This suggests that the explanatory power of the regression model can be improved be including some other important variables.

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