Article

Moderating Role of Governance Regulatory Compliance on Board Diversity and Voluntary Disclosure of Non-Financial Firms in a Developing Country

Ali Shariff Kabara [1,*] , **Dewi Fariha Abdullah** [2] , **Saleh F. A. Khatib** [2,*] , **Ayman Hassan Bazhair** [3] **and Hamzeh Al Amosh** [4]

1   Department of Accounting, Faculty of Social and Management Sciences, Federal University Birnin-Kebbi, Kalgo 862104, Kebbi, Nigeria
2   Faculty of Management, Universiti Teknologi Malaysia, Johor Bahru 81310, Malaysia
3   Department of Economics and Finance, Faculty of Business Administration College, Taif University, Taif 21974, Saudi Arabia
4   Ministry of Education and Higher Education Qatar, Doha 35111, Qatar
*   Correspondence: ali.kabara@fubk.edu.ng (A.S.K.); f1991@graduate.utm.my (S.F.A.K.); Tel.: +234-8060577022 (A.S.K.); +60-1117736582 (S.F.A.K.)

Abstract: The main aim of this paper is to investigate the moderation influence of CG regulatory compliance on the relationship between board diversity and voluntary disclosure (VD) of Nigerian listed firms since the literature on disclosure studies has concentrated principally on examining a direct relationship between internal governance mechanisms, neglecting the external regulations. Being an ex post facto design, a sample of 67 firms listed in the Nigerian stock exchange for the period 2012–2017 is used. A system GMM approach (being the best and most contemporary panel approach) is employed. The study revealed that the interaction of regulatory code compliance with board gender and ethnic diversity has a significant positive impact on the firms' voluntary disclosure. The result also indicates that ethnic diversity shows a positive and significant association with voluntary disclosure. To the best of the researchers' knowledge, this study is among the few attempts at explicitly examining the effect of CG regulatory compliance on board diversity and VD in CG studies, especially in a developing economy such as that of Nigeria. Additionally, it is among the few attempts that provide empirical results using superior dynamic panel models. This study provides a strong practical implication for business firms, policymakers, future research, and society. For instance, the findings have direct implications for Nigerian firms in the selection of directors in order to comprise well-educated people of different ethnic backgrounds and be inclusive of females.

Keywords: board diversity; generalized method of moments (GMM); corporate governance compliance; voluntary disclosure; Nigeria

1. Introduction

Firms' inadequate disclosure because of the ineffectiveness of corporate governance characteristics, such as corporate board diversity (gender, ethnic and educational diversities), was highlighted among the primary reason for many corporate financial failures in the world [1–7]. For the past few decades, capital market regulators, investors, and academicians have been searching for the reasons behind the frequent corporate financial distress around the world since the prominent case of Enron and Anderson was exposed. According to Ferrari et al. [8], the scandals mentioned above could have been prevented if a boardroom was diversified by incorporating a significant number of women as executives in these companies. In the same vein, Fidanoski et al. [9] found that, on average, companies with well-educated board members, especially in account and finance, are more profitable and overvalued in the market. In addition, it has been widely accepted that

board diversity is very little explored in corporate governance literature, mainly in the developed capital market, with inconsistent results, and it has been highlighted as a future research topic [4,10]. Nonetheless, there is a need to probe whether it has any significant impact on developing economies such as that of Nigeria due to a disparity in economic development [9,11]. A recent systematic literature review conducted by Khatib et al. [12] reported that voluntary disclosure and governance association had been overlooked.

Voluntary disclosure (VD) denotes the free choices on the part of managers in the release of information to users in the annual reports. It comprises social, environmental, and intellectual capital disclosures. More precisely, it includes different types of information, such as financial, social, historical, environmental, and intellectual capital information [12,13]. However, VD improves the quality of mandatory disclosure, as it is in the best interest of all users of financial reports, in addition to reducing information asymmetry, and thus reducing the cost of external financing through reduced information risk, and enhancing its market value [14]. However, even with many current developments, some studies proved that many countries still lagged behind in VD practices that draw the attention of regulators and other stakeholders [15–17]. For instance, a comprehensive study of Nigerian quoted firms discovered that the level of voluntary disclosure reported from Nigerian listed companies was low, with the average index for 2014 being 45% [18].

Nigeria is a federal republic in West Africa, neighbouring Chad and Cameroon in the east, Benin in the west, and Niger in the north. It contains 36 states, and Abuja as the Federal Capital Territory. Nigeria accounts for almost one-fourth of Sub-Saharan Africa's population and is the world's 20th largest economy, with more than USD 5900 billion and USD 1 trillion in terms of nominal GDP and purchasing power parity, respectively, as of 2017. Furthermore, Nigeria is Africa's largest producer and holds the second-highest level of oil reserves on the continent, after Libya [19], and ranks 13th in the world in terms of oil production. This study's emphasis is on the Nigerian context because certain ethnicities dominate specific areas. For example, Hausa/Fulani control politics, and Igbo people dominate business and economics, while Yoruba people dominate the civil service sector. Therefore, having directors from all three of the main ethnic groups, including Hausa/Fulani, Igbo and Yoruba, is beneficial for commercial reasons. Nigeria is an extremely ethnically diverse multinational state with over 250 ethnic groups and over 500 languages [20]. Therefore, ethnically diverse boards are able to bring different ideas and solutions to ethnic issues. Board members have a responsibility to link the disclosure decisions offered by the firm with investors' behaviour and background. This is because investors belong to many ethnicities that have their own beliefs, cultures, and values regarding investment decisions. The situation becomes worse when boards are unable to understand their investors' backgrounds and beliefs, which may lead to poor disclosure decision making.

Nigeria started to promulgate CG laws, legislation, and code relating to disclosure, transparency, and accountability in 2003, following the enactments of similar acts in many countries, such as the Cadbury Report, 1992, in the UK, and the Sarbanes–Oxley Act 2002 in the US. Compliance with the code of CG helps to prevent corporate scandals, fraud, and potential civil and criminal liability of the organization. It also enhances the reputation of the organization and makes it more attractive to customers, investors, suppliers, and other stakeholders [21]. Unfortunately, according to the report of the ROSC Team of the World Bank in 2011, Nigeria's entities are considerably non-compliant with accounting standards. In contrast, Okike et al. [22] suggested that despite the variety of policies and regulatory interventions, Nigerian firms' practice of corporate governance in Nigeria is grossly inadequate. However, many studies highlighted some factors responsible for the weakness of the CG, which include weak CG regulatory and enforcement mechanisms in Nigeria. Hence, conducting a study on CG code compliance is imperative. This is because it is strongly believed that weak corporate governance can allow opportunistic behaviour from managers, while, strong CG is expected to resolve any possible agency problem, such as managerial opportunism.

Codes of CG are the set of best practices' recommendations regarding boards issued to address deficiencies in country governance systems by recommending a set of norms aimed at improving transparency and accountability among top managers and directors and reduce risk taking [23,24]. The current research model arises from the understanding of the literature implying that there is a need for more studies to be carried out in BD areas. Future research was encouraged to incorporate other intervening variables within the association between BD and VD. For instance, Denis and McConnell [25] suggested that examining the interrelationships between external and internal corporate governance mechanisms could provide a complete understanding of firm-specific internal governance mechanisms, such as the board. Consequently, improvement in the research framework can be counted as one of the significant contributions of the study. While the incorporation of a moderation analysis is rarely found in the area of BD research, this research proposes a ground for future research by demonstrating that it is possible to explore beyond a direct relationship. Thus, the model explains how CG code compliance interacts with BD, and thus possesses an impact on VD.

Other contributions include the ability to discover the VD level, the compliance level to CG code, and more important factors determining the VD level of the Nigerian listed companies. In addition, the link between BD and VD is relatively new in Nigeria. Most of the studies conducted focused on the UK, United States of America, Canada, India, South Africa, and Malaysia. Hence, findings from this study will assist in building a comprehensive international understanding of the linkage between corporate board diversity and firms' voluntary disclosure as a continuously growing concept. Furthermore, Nigeria was chosen to investigate this issue because the legal system and cultural practices differ among the nations [26]. While some countries share a single culture and language, others such as Nigeria have more than 200 ethnic backgrounds. Hence, the effects of CG practices on voluntary disclosure can be expected to differ between developing and developed countries.

To date, there is a lack of evidence that links the CG regulatory code compliance within VD studies. However, the present studies followed a few previous studies that used CG code compliance as a moderator variable in CG studies. For instance, García-sánchez [27] conducted a study titled: "Do financial experts on audit committees matter for bank insolvency risk-taking? The monitoring role of bank regulation and ethical policy". After using regulatory code compliance as a moderator in their study, it concludes that the association between the existence of financial experts on audit committees is stronger when the banking sector CG compliance is weaker. In the same vein, Kabara et al. [28] investigated the moderating effect of CG code compliance on the relationship between the audit committee (AC) and VD. However, both studies focused on AC and financial disclosure. Cheng and Courtenay [29] also maintained that the presence of an external corporate mechanism, the regulatory regime, enhances the strength of the association between the proportion of independent directors and the level of voluntary disclosure. Finally, some scholars believed that CG compliance could strengthen the quality of management disclosure reports [14,30–32]. Nevertheless, some studies used CG code compliance as an independent variable in CG and disclosure studies [33].

Thus, this research is unique in the sense that it tries to associate an explicit role of CG code compliance in companies when evaluating the relationship between corporate governance variables. Moreover, analysis in Nigeria can be achieved using advanced econometric methodologies to explore the moderating effect and the causality of corporate board diversity, as well as its impact on voluntary disclosure. To address this gap, the current study proposed that CG compliance (measured via index) could moderate the association between BD (as explanatory variables) and VD (the dependent variable).

The paper is sketched as follows: Section 2 reviewed the relevant literature from previous empirical research, showing how the variables used in this study related and influenced one another. We discuss the study variables' methods, data, and measures in

Section 3 and demonstrate the empirical results and discussions in Section 4. We present the findings of the study in Section 5 and conclude in Section 6.

2. Literature Review and Hypotheses Development

2.1. Effect of Gender Diversity on Voluntary Disclosure

Board diversity can broadly be defined as the variety amongst the members of boards of directors concerning characteristics such as kinds of expertise, gender, education and values, managerial background, personality, and learning style [34]. In the new global economy, over the last few decades, gender diversity has become a crucial and challenging issue in academia. According to Valsan [35], gender diversity in the boardroom, especially in Europe's large corporations, has become an important topic of corporate governance. Many empirical studies have established the existence of a relationship between gender diversity and voluntary disclosure, especially in the developed capital market and some Asian economies in which the results are mixed [36]. While some revealed a positive relationship (e.g., [5,37–40]), others revealed negative relationships (see, [41,42]). At the same time, some empirical evidence shows no relationship between gender diversity and VD [5–7]. For instance, Ben-Amar et al. [37] investigated the effect of female representation within the board of directors on the corporate response to stakeholders' demands for increased public reporting about climate change-related risk. They found that having women on the boards influences an increase in voluntary climate change disclosure.

Moreover, in line with the agency theory, several studies have reported the gender diversity of the boardroom to mitigate the information asymmetry between insider (management) and outsiders (stakeholders) emerging from the agency conflict, and enhance the VD of companies [43]. Nadeem [44] argued that companies' communication with the external environment to secure vital resources improved with a more diverse boardroom. Thus, based on the above studies, the hypothesis is:

Hypothesis 1a (H1a). *There is a significant relationship between gender diversity and the extent of VD.*

2.2. Effect of Education Diversity on Voluntary Disclosure

Educational diversity also leads to a better ability to process information and the ability to observe ideas [45]. Similarly, directors with a good background in either finance, business or accounting education are expected to report voluntary information to display accountability [46]. Several empirical studies on educational diversity and disclosure have provided contradictory results. Studies [47,48] revealed positive results. For instance, Katmon et al. [48], after using OLS and 2SLS instrumental variables (IV) methods on the data of 200 listed Malaysian firms, revealed a positive and significant association between education diversity and the quality of CSR disclosure. Moreover, AbuRaya [49], from the UK, studied the relationship between CG and each of the quantity and the quality of corporate environmental disclosures in the UK, among which educational background was used as a component of board diversity and measured according to the proportion of directors on the board with a business, accounting, and/or finance educational background. Conversely, Haniffa and Cooke [46] found a positive but insignificant relationship between the board of directors' educational background and the extent of voluntary disclosure in Malaysian listed companies.

Therefore, educational diversity is essential for effective decision making, which invariably increases shareholder wealth. Barako and Brown [50] provided empirical evidence that the quality of corporate disclosure is significantly improved with the existence of educational diversity in the boardrooms. Thus, based on the above studies that indicated positive results, the hypothesis is:

Hypothesis 1b (H1b). *There is a significant relationship between educational background diversity and the extent of VD.*

2.3. Effect of Ethnic Diversity on Voluntary Disclosure

Some empirical studies conducted recently in some developed and emerging economies reported a significant association between ethnic diversity and the extent of voluntary disclosure [51–53]. Conversely, other empirical shreds of evidence presented (e.g., [5,54]) have all shown a negative influence on firms' voluntary disclosure. For instance, Bravo [55] empirically investigated whether ethnic diversities have any influence on corporate disclosure and suggested that the disclosure of crucial information in the capital markets is significantly improved by ethnic diversity. Improving disclosure practices by influencing the decisions of the boardroom, the ethnically diverse board can better serve stakeholders' needs. It has been argued that regulators need to pursue governance reforms that enhance the ethnic diversity of board compositions, as it leads to better monitoring practices [56] and more openness to new ideas and viewpoints [50]. Hence, the next hypothesis is formulated:

Hypothesis 1c (H1c). *There is a significant relationship between the presence of ethnic diversity and the extent of VD.*

2.4. The Moderating Role of CG Regulatory Compliance in the BD and VD Association

A study conducted by Singhvi and Desai [57], from the US, was the first study that investigates whether regulations (as an external CG mechanism) have any influence on the extent of disclosure. Their analysis using chi-square and descriptive statistics revealed that the listing status was a major explanation of the disclosure level in accounting. Similarly, Collett and Hrasky [33] found that stock exchange regulation influenced listed firms to disclose their CG practices. However, some studies found dissimilar results [58,59]. Denis and McConnell [25] suggested that examining the interrelationships between external and internal corporate governance mechanisms could provide a complete understanding of firm-specific internal governance mechanisms such as the board.

According to LaPorta et al. [60], the regulatory system is the most fundamental corporate governance mechanism. Linck, Netter, and Yang [61] found that the board is improved due to the new regulations. Inconsistently, a study conducted by Hossain, Prevost, and Rao [62] revealed no significant results that could be attributed to a change in the regulatory environment. Cheng and Courtenay [29] from Singapore opined that the "board's monitoring of firm disclosure is more active under a disclosure-based regulatory regime. The result provides evidence that firms may voluntarily disclose more information in reaction to a regulatory regime change and imply that when external regulatory bodies emphasize firm governance, boards accordingly align their monitoring objectives to those of the external regulatory body (p. 30)". In contrast, Inchausti [63] offers empirical evidence on the influence of regulation, where he found that time as a surrogate for regulation explains the level of information disclosure. Conclusively, the adoption or compliance of CG regulation was confirmed to be having an essential effect of strengthening the level of relationship between the board independence and the extent of VD [30,31]. In light of agency theory and the pursuance of the above empirical evidence proving the existence of a positive relationship, we expect a positive relationship and hypothesized as below:

Hypothesis 2 (H2). *CG code compliance moderates the relationship between board diversity and the extent of voluntary disclosure.*

Previous studies have established a link between board diversity and the extent of voluntary disclosure. However, this study is also interested in examining the interaction effect on the relationship between board diversity dimensions (gender, education, and ethnicity) and the extent of voluntary disclosure. Therefore, this study further hypothesizes:

Hypothesis 2a (H2a). *CG code compliance moderates the relationship between gender diversity and voluntary disclosure.*

Hypothesis 2b (H2b). *CG code compliance moderates the relationship between education diversity and voluntary disclosure.*

Hypothesis 2c (H2c). *CG code compliance moderates the relationship between ethnic diversity and voluntary disclosure.*

2.5. Theoretical Framework

From the theoretical background, agency theory is the key theory in this study that describes both dependent and independent variables. It is established that voluntary information in the annual reports is released with the intent of decreasing the information asymmetry, enhance the firm market value, reduce the capital costs, and signal their quality and performance to their market at a lower cost [64], as the cost of capital is generally influenced by disclosure [65]. The key concept of this theory is that CEOs may not act in a way that maximizes shareholder value unless an appropriate governance structure is in place to protect owners' interests [66,67]. Governance frameworks can regulate management's opportunistic conduct by using the monitoring mechanism to align the interests of owners and management.

Accordingly, of all the importance of these codes and principles, board diversity is the best strategy for resolving this conflict of interest resulting from the agency relationship [68]. Without agency problems, the preparation of reliable and qualitative financial reports will not be an issue, as managers will not be motivated to manipulate financial information. The essence of having diverse corporate boards with different gender and educational backgrounds is to make boards much more effective in discharging their supervisory functions, including reducing agency problems between managers and shareholders, and reducing the information asymmetric by disclosing more information to stakeholders. According to Hassan et al. [69], a high financial reporting quality can only be achieved with an effective board. Hence, VD has become a signalling means, where firms disclose more information beyond the compulsory requirement to signal that they are better [70]. Furthermore, compliance with governance regulation and codes is a responsibility of owners and management that leads to higher information disclosure. However, this research supports agency theory and signalling theory to develop the research hypotheses.

3. Research Methodology

This paper adopts an ex post facto research design. Hence, annual reports of 67 companies listed in the Nigerian stock exchange from 2012 to 2017 were used as a sample to investigate the effect of CG code compliance in the relation between gender, education, and ethnic diversity (independent variables) and VD (dependent variable). The independent variables were measured on a ratio scale basis with the exception of ethnic diversity, which is based on a dichotomous scale. To measure voluntary disclosure, a checklist was prepared by the authors based on Meek, Roberts, and Gray's work [71], which has been widely utilized in prior studies [72,73]. The study checked individual components of the VD from onset alongside the mandatory regulations in Nigeria. Therefore, modifying the existing index was necessary to attain the checklist with items applicable to the Nigerian situation (see Appendices A and B). Meek's VD checklist was subjected to a thorough selection to remove those that are mandated. The list was then sent to the experts (senior academics and professional accountants) for selection and validation. Lastly, 27 items were screened as a result of their response, which became the final list consistent with Adelopo [74], who used only 24 disclosure items to conduct a study on VD practices on Nigerian listed firms. Therefore, the expected disclosure from individual companies is 162, (i.e., 27×6), which is then expressed in percentage. The total voluntary disclosure index (TVDI) is then computed for each sample firm as a ratio of the total disclosure score to the maximum possible disclosure by the firm. Moreover, each disclosure item was given equal weight in the index, consistent with prior studies [75].

Similarly, the moderating variable is the level of firms' compliance with Nigeria's CG code of 2011. The requirements of the code were used to construct a compliance index, the total of which provided the moderating variable of the study. The compliance checklist consists of 14 items from three components of laws as follows: First, the board of directors (composition and structure)—four items; second, board committees (i.e., audit committee)—six items; and lastly, accountability and reporting (disclosures)—four items, thus making up the fourteen items. The choice of a few compliance requirement items is consistent with previous researches on compliance, such as that of Mariri and Chipunza [76], who used only nine items to study the impact of code compliance on the sustainability of South African companies. Moreover, using the unweighted method, the total number of points expected from each firm for the adoption of the Nigerian Code of CG of 2011 is 84 (14 × 6 items) scores, coding one '1' if the company adopts it, and zero '0' otherwise, which is consistent with the work of Larcker et al. [30]. The CG compliance checklist followed the same procedure for validating the VD index.

3.1. Sampling

There were 116 non-financial listed firms available on the Nigerian stock exchange website as at 31 December 2017. The non-financial firms used for the data are from the following sectors of the Nigerian economy: agriculture, conglomerate, construction/real estate, consumer goods, healthcare, ICT, industrial goods, natural resources, oil and gas, and services. This study used the secondary source of data from 67 non-financial firms that were extracted for six years 2012–2017 (i.e., 402 firm–year observations) using a purposive sampling technique. The sample of 67 firms arrived after deducting 16 companies that did not provide financial reports as of 31 December 2017 and 33 firms without complete necessary data for this study from the 116 non-financial firms listed. These firms were excluded from the sample due to the unavailability of the annual reports. Given that this information was not readily available from the published annual reports, these missing values could not be obtained feasibly from other sources. The exclusion of these firms from the sample is unlikely to affect the conclusions of this study on the basis that the remaining firm–year observations were still sufficient to construct a large sample, as shown in Table 1 below.

Table 1. Samples selection (firm–year observations).

Sector	No. Company	Freq. (Obs.)	Percentage
Agricultural Goods	3	18	4.478
Conglomerate	5	30	7.463
Construction Industries	2	12	2.985
Consumer Goods	18	108	26.866
Health	7	42	10.448
IT	2	12	2.985
Industrial Goods	13	78	19.403
Natural Resources	2	12	2.985
Oil and Gas	7	42	10.448
Services	8	48	11.940
Total	67	402	100

3.2. Variables

This study uses VD as the dependent variable, with gender, education, and ethnic diversities as independent variables, board size and leverage as control variables, and CG regulatory code compliance as a moderating variable. Gender (GD) is measured as the proportion of female directors in the boardroom [77]. Education (ED) is the proportion of directors on the board with business, accounting, and or finance backgrounds [46,78]. Ethnic (ETHD)-dummy variable is 1 if the board consists of both Northern and Southern Nigerians, and 0 otherwise [52,79]. Control variables include board size (BODSIZE), which is equal to the total number of directors in the boardroom [16,80]. Another control is leverage, which is measured as long-term debts divided by capital equity [81].

The dependent variable: voluntary disclosure (VD) is measured as the total number of points awarded for VD, i.e., strategic, financial, and non-financial information (coding one "1" if the company discloses and zero "0" otherwise) [71,72]. The moderating variable (CG regulatory code compliance (REG)) is the total number of points awarded for the Nigerian code of CG regulatory compliance of 2011 (coding one "1" if the company adopts it and zero "0" otherwise).

Control variables: this study controls for the firm CG characteristics board size and leverage because various studies have reported their influence on VD [3,81–84]. The fact is that VD can vary widely across industries; hence, the study included year dummies and firms' effect (size) in the GMM analysis. In addition, the adoption of the GMM analysis approach by this study was meant to account for the biased results. The details for the measurements are reflected in Table 2 below.

Table 2. Operational definition of variables' measurement.

Variables	Measured by
Dependent Variables:	
Voluntary Disclosure (VD)	The total number of points awarded for VD, i.e., strategic, financial, and non-financial information (coding one "1" if the company discloses and zero "0" otherwise)
Independent Variables:	
Gender (GD)	The proportion of female directors in the boardroom.
Education (ED)	The proportion of directors on the board with business, accounting, and or finance backgrounds
Ethnic (ETHD)	Dummy variable 1 if the board consists of both Northern and Southern Nigerians, and 0 otherwise
Moderating Variables:	
CG Regulatory code compliance (REG)	The total number of points awarded for the Nigerian code of CG regulatory compliance of 2011 (coding one "1" if the company adopts it and zero "0" otherwise)
Control Variables:	
Board Size (BODSIZE)	Total number of directors in the boardroom
LEVERAGE	Leverage is measured as long-term debts divided by capital equity

3.3. Justifications for Choice of the Analysis Technique

The major reason this study employed the dynamic GMM approach, which is superior to the standard fixed effects estimate, is that when the dynamic relation between the variable of interest and the independent variables is significant, standard fixed-effects estimators are biased [85]. In addition, it is argued that any corporate financial decisions are likely to be dynamic. For instance, past action may be important firm attributes that may determine current action. Nguyen et al. [86] argue that GMM estimation methods provide the most reliable empirical evidence, especially when investigating the effects of corporate governance on financial disclosure performance. This study based its justification on the premise that the voluntary CG disclosure behaviour may be jointly and dynamically influenced by unobserved company-specific heterogeneities [87], which simple OLS regression may fail to ascertain. However, the justification for the suitability of applying the GMM approach in this study is based on the arguments from the literature that described that the application of traditional the ordinary least squares methods to estimate parameters in a dynamic model that includes firm-specific effects and a lagged dependent variable would produce biased coefficients [88]. Therefore, this study applies the panel system GMM because it is recognized as one of the best methods to estimate parameters of the target voluntary disclosure in the presence of firm-specific effects and a lagged dependent variable [88]. Moreover, the Hausman test has been conducted and the results confirm the existence of endogeneity (Prob > chi^2 = 0.5639).

Similarly, two-step GMM is asymptotically more efficient than the one-step estimation, as it controls the measurement errors by incorporating the orthogonality settings on the variance–covariance matrix [89]. Moreover, endogeneity in the relationship between corporate governance and disclosure can result from unobservable heterogeneity (that arises due to unobservable factors that affect the disclosure level and all explanatory variables). Furthermore, VD_{it-1}, GD_{it}, ED_{it}, $ETHD_{it}$, $BODSIZE_{it}$, $LEVERAGE_{it}$ are used as instruments.

This study used a panel dataset that has a short time dimension (T = 6) and a larger company dimension (N = 67), which in line with the requirements of using GMM estimation. Moreover, many previous researches in reputable journals on CG and disclosure also used GMM analysis techniques (see recent studies on CG [86,90–92]).

It should be noted that, in order to confirm that the CG regulatory compliance is really a moderating variable in this study, the effects of the independent variables on the intervening have been tested as suggested and the result indicated that the null hypotheses are not rejected in all the variables with exception of the relationship between the ETHD (independent) and REG (moderator).

3.4. Model Specification for the Study

In order to measure the direct effect and the moderation analysis, the equations below were designed:

First model equation (direct relationship):

$$VD_{it} = \alpha + \gamma VD_{it-1} + \beta_1 GD_{it} + \beta_2 ED_{it} + \beta_3 ETHD_{it} + \beta_4 BODSIZE_{it} + \beta_5 LEVERAGE + \theta_i + \eta_i + \varepsilon_{it} \tag{1}$$

Second model equation (indirect relationship):

$$VD_{it} = \alpha + \gamma VD_{it-1} + \beta_1 GD_{it} + \beta_2 (GD \times REG)_{it} + \beta_3 ED_{it} + \beta_4 (ED \times REG)_{it} + \beta_5 ETHD_{it} + \beta_6 (ETHD \times REG)_{it} + \beta_7 BODSIZE_{it} + \beta_8 LEVERAGE_+ \theta_i + \eta_i + \varepsilon_{it} \tag{2}$$

where:

VD = voluntary disclosure index (total number of voluntary items disclosed by a firm) that are for firm i in period t, respectively.

VD_{it-1} = the lag value of the voluntary disclosure index (total number of voluntary items disclosed by a firm) that are for firm i in period t, respectively.

GD = gender diversity for firm i in period t,

ED = educational diversity for firm i in period t,

ETHD = ethnic diversity for firm i in period t,

BODSIZE = board size for firm i in period t,

LVRG = leverage for firm i in period t,

REG = CG code compliance for firm i in period t,

GD × REG = interaction between CG compliance index with gender diversity

ED × REG = interaction between CG compliance index with educational diversity

ETHD × REG = interaction between CG compliance index with ethnic diversity.

θ_i = industry effects.

η_i = the unobservable firm-specific effects, consistent with Matemilola et al. [92].

α is the intercept while γ, β, and δ are the primary coefficients to be estimated, and ε_{it} is the error term.

4. Results

4.1. Descriptive Statistics and Analysis

Table 3 shows that the mean of gender diversity is 11.6%, which indicates that the sample firms are less diversified in terms of gender. In addition, a minimum value of zero and a maximum value of 37.5% reveal a small dispersion in firms' gender ratios. The education diversity mean is 33.3%, implying that about one-third of the sample firms' directors had business, accounting, and finance backgrounds. Similarly, the mean of ethnic diversity is 66.2%, which indicates that more than half of the sample firms comprise both northerners and southerners in their boardroom. The mean board size is eight, which asserts that sample firms have an average of eight directors each, up to the maximum of sixteen directors for some firms. The table also shows that the mean leverage is 49.6%, indicating that the sample firms are not highly leveraged firms and do not suffer debt

problems. In addition, a minimum value of 0 and a maximum value of 100% reveal a large dispersion in firms' debt ratios. The mean of the CG compliance variable is 90.6%, which infers that the majority of the sample firms adhere to the regulations of the CG code. In addition, the minimum value of CG code compliance variables is 71.4%, and the maximum value is 100%, which indicates a small dispersion that most of the sample firms have high compliance with CG code of conduct rules.

Table 3. Descriptive statistics results.

Variables	VD	Gender	Education	Ethnic	Board Size	Leverage	CG Compliance
N	402	402	402	402	402	402	402
Mean	0.692	0.116	0.333	0.662	8.943	0.497	0.906
SD	0.060	0.135	0.273	0.364	2.573	2.707	0.082
P25	0.666	0	0.083	0.45	7	0	0.857
P50	0.703	0.100	0.318	0.717	9	0.051	0.928
P75	0.740	0.181	0.571	1	10	0.32	1
Min	0.444	0	0	0	5	0	0.714
Max	0.777	0.375	0.875	1	16	1	1

4.2. Correlation Matrix

Correlation explains the relationship between the dependent and independent variables, whether it is negative or positive. Table 4 below shows the results of the pairwise correlation details that involve the effect of gender, education, ethnicity, leverage, and CG compliance on voluntary disclosure. The results show that gender, ethnic, leverage and CG compliance are positively correlated with coefficients of 0.039, 0.226, 0.042 and 0.245, respectively. While education shows an inverse relationship, board size revealed significant negative correlations. On the other hand, education diversity shows insignificant negative results. However, an array of the above matrix showing the correlations between all the variables suggests a low correlation between almost all of them at a 5% level of significance. Therefore, no special attention is needed when including the variables in the model since the highest correlation between the independent variables is 22.56%; this is between the firm ethnic diversity and the voluntary disclosure. However, a multicollinearity problem exists when the correlation between the independent variables exceeds the 0.80 threshold [93]. Moreover, the table displays an absence of perfect multicollinearity as evident by the mean variance inflation factor (VIF) value of 1.25. The VIF value of 10 and above is a sign of perfect collinearity among the independent variables [94,95]. The rule of VIF values according to Hair et al. [96] establishes that multicollinearity problems exist whenever the independent variables show VIF values greater than 10 or tolerance values lower than 0.10.

Table 4. Pairwise correlation matrix.

Variables	VD	GD	ED	ETHD	BODSIZE	LEVRG	CG COMPL
Voluntary Disclosure	1.000						
Gender Diversity	0.0394	1.000					
Education Diversity	−0.0680	−0.6037 ***	1.000				
Ethnic Diversity	0.2256 ***	−0.0322	−0.0725	1.000			
Board Size	−0.1421 ***	−0.1506 ***	0.1588 ***	0.0057	1.000		
Leverage	0.0424	0.0716	−0.0088	−0.0909	−0.0588	1.000	
CG Compliance	0.2455 ***	0.0064	−0.0217	0.1423 ***	0.0247	−0.0690	1.000
VIF	-	1.60	1.60	1.03	1.02	1.01	1.25
Tolerance	-	0.623	0.624	0.971	0.984	0.992	-

Source: Authors' calculation, based on data (2012–2017). *** Significant at $p < 0.01$.

4.3. Generalized Method of Moments (GMM) Results

Model I entails the investigation of impact of board diversity (GD, ED, and ETHD) on the level of voluntary disclosure. Table 5 revealed that the lagged dependent (L1vdit-1)

variable is significant at the 1% level and its magnitude reveals that voluntary disclosure levels change only slowly over time and depend on previous levels. This result also justifies the dynamic model specification and the employment of the system GMM approach because of the problem of the weak instrument associated with difference GMM when the series is highly persistent.

The results of the direct relationship in the Table 5 using the two-step system GMM suggest that gender diversity has a negative and insignificant influence on VD. The result indicates that increasing the number of women directors on the board does not have any significant influence on VD. Therefore, H1a is rejected. This result is consistent with those of prior studies (i.e., [41,42,97]). Similarly, the result of education diversity reveals a negative and significant association with voluntary disclosure scores (1% level of significance). The result implies that board diversity in terms of educational background (account and finance) has a strong incentive to reduce the VD information to the external users even though it may be necessary, thus suggesting that a firm's capability on education diversity is not a priority in emerging markets for improving VD quality. Therefore, the H1b hypothesis, that there is a relationship between educational background diversity and voluntary disclosure, is rejected. The result is in agreement with the findings of Loukil et al. [98], and Haniffa and Cooke [46], who found a similar result.

Table 5. Regression results of the GMM model (I) relationship between BD attributes and voluntary disclosure.

Variables	System-2 GMM
$L_1(vd_{it-1})$	0.411 (0.011) ***
Gender diversity	−0.002 (0.003)
Education diversity	−0.023 (0.009) ***
Ethnic diversity	0.020 (0.009) **
Board size	−0.0009 (0.0005) *
Leverage	−2.28 (8.47) ***
Constant	−2.321 (2.672) **
Sargan test	0.511
AR (1) test (*p*-value)	0.007
AR (2) test (*p*-value)	0.675
No. Instruments	29
No. Groups	67
Year Dummies	Yes
Firms Effect	Yes
Industry effects	Yes

*** Significant at $p < 0.01$, ** significant at $p < 0.05$, * significant at $p < 0.10$.

However, ethnic diversity shows a positive and significant association with voluntary disclosure scores (at the 5% level of significance); therefore, the existence of both southern and northern directors on the board would enhance monitoring, and monitoring improves the level of voluntary disclosure. This means that ethnic diversity may generate quality ideas that lead to better voluntary disclosure decisions. However, the H1c hypothesis, that there is a relationship between ethnic diversity and voluntary disclosure, is accepted. The result is consistent with those of AL-Dhamari et al. [51], Rasul and Rogger [99], and Abdullah and Ismail [52], who found a positive and significant relationship between ethnic diversity and disclosure reporting.

The results for the control variables shown in the table revealed negative and significant influence (at the 5% level) between the board size and VD, which indicates that a larger board size does not influence VD, which is consistent with the results of prior studies [82]. In addition, leverage reveals a negative and significant influence on VD. However, the two-step system GMM estimation result is acceptable as it satisfied the reliability and validity tests. The AR (1) and AR (2) tests show no evidence of autocorrelation at conventional levels of significance for any of the specifications in these tables (AR (1) *p*-value is 0.007

(which is significant), and AR (2) *p*-value is 0.675 (above 0.05)). The Sargan test of overidentifying restrictions is checked with the joint null hypothesis that instrumental variables are valid (i.e., uncorrelated with error terms). *p*-value is 0.511 (which is above 0.05). It means there is no problem regarding instruments, and they are not correlated with the errors. Generally, these post-estimation results show that the dynamic model is a practically good specification for the disclosure model.

Model 2 entails the investigation of the relationship of independent variables and moderated variables with voluntary disclosure of the yearly reports published by the listed companies in Nigeria. Further, the outcomes following the addition of the interaction term (e.g., gender × moderator variable) to the equation are already shown in the model. The results in the last column of Table 6, which is based on the two-step system GMM, reveal that the interaction of CG compliance with gender diversity is positive and significant at the 1% level ($\beta_2 = 0.120$, $p < 0.009$) for VD. This indicates that CG compliance strengthens the influence of GD of the Nigerian listed firms to provide more VD information to external users. Hence, Hypothesis 2a, that CG code compliance positively moderates the relationship between gender diversity and voluntary disclosure, is accepted. Conversely, the interaction of CG compliance with educational diversity revealed a negative and insignificant relationship with voluntary disclosure. The result suggests that the interaction of CG compliance and education diversity has less incentive to influence more VD information to external users. Hence, Hypothesis 2b, that CG code compliance positively moderates the relationship between education diversity and voluntary disclosure, is rejected. Furthermore, the interaction of CG compliance with ethnic diversity reveals a positive and significant relationship with VD at the 1% level ($\beta_2 = 0.279$, $p < 0.004$). This indicates that CG compliance strengthens the influence of ethnic diversity of the Nigerian listed firms' voluntary disclosure. Hence, Hypothesis 2c, that CG code compliance positively moderates the relationship between ethnic diversity and VD, is accepted. It is consistent with previous arguments by Denis and McConnell [25], who opined that examining the interrelationships between external (i.e., regulations) and internal corporate governance mechanisms could provide a complete understanding of firm-specific internal governance mechanisms such as the board. In addition, Bravo [55] empirically found that the disclosure of crucial information in the capital markets is significantly improved by ethnic diversity.

Table 6. Regression results of the GMM model (II) relationship between BD and the interaction test (REG and BD) and voluntary disclosure.

Column (1)	(2)	(3)
Variables	**Pool OLS/ With Moderator)**	**System Two-Step GMM**
$L_1(vd_{it-1})$	-	0.664 (0.059) ***
Gender diversity	−0.100 (0.035) ***	−0.111 (0.042) ***
Gender diversity × CG compliance	0.109 (0.038) ***	0.120 (0.046) ***
Education diversity	0.060 (0.146)	0.108 (0.157)
Education diversity × CG—compliance	−0.084 (0.158)	−0.115 (0.173)
Ethnic diversity	0.358 (0.008) ***	−0.228 (0.079) ***
Ethnic diversity × C—compliance	−0.365 (0.093) ***	0.279 (0.098) ***
Board size	−0.034 (0.007) ***	−0.026 (0.004) ***
Leverage	0.036 (0.007) ***	0.000 (3.05) ***
Constant	0.000	0.221 (0.045) ***
Adj R-squared	0.204	-
F-test	7.83 (0.000)	-
Sargan test	-	0.493
AR (1) test (pvalue)	-	0.003
AR (2) test (pvalue)	-	0.405
No. Instruments	-	25
No. Groups	-	67
Year Dummies	Yes	Yes
Firms Effect	Yes	Yes
Industry effects	Yes	Yes

*** Significant at $p < 0.01$.

However, the two-step system GMM estimation result is acceptable as it satisfied the reliability and validity tests as shown in Table 6. The AR (1) and AR (2) tests show no evidence of autocorrelation at conventional levels of significance for any of the specifications in these tables (AR (1) *p*-value is 0.003 (which is significant), and AR (2) *p*-value is 0.405 (above 0.05)). The Sargan test of overidentifying restrictions is tested with the joint null hypothesis that instrumental variables are valid (i.e., uncorrelated with error terms). *p*-value is 0.493 (which is above 0.05). This means there is no problem regarding instruments, and they are not correlated with the errors. Generally, these post-estimation results show that the dynamic model is a practically good specification for the disclosure model.

4.4. Additional Analysis for Robustness Check

As a robustness check, this study re-runs the analysis using the traditional method of ordinary least squares (OLS) regression based on the research objective in order to see if the results deviate from the main result using the system GMM approach. The analysis combines the direct and indirect relationship, which estimates whether a CG code compliance interacts with the relationship between the board diversity attributes (such as gender, education, and ethnic) and the voluntary disclosure level.

The results of the supplementary analyses that build on the above Table 6 (Column 2) almost show similar results with the GMM approach with respect to gender and board size, which indicated a negative and significant relationship with VD ($\beta_2 = -0.100$, $p < 0.001$; $\beta_2 = -0.034$, $p < 0.000$, respectively). Ethnic diversity also revealed the same positive significance at the 1% level ($\beta_2 = 0.358$, $p < 0.004$) as that of GMM result. In addition, education diversity revealed positive but insignificant results unlike the GMM results, which showed positive significance at the 5% level ($\beta_2 = 0.236$, $p < 0.020$).

In the same vein, the interaction results using OLS regression indicated a positive and significant relation with GD similar to the GMM result, which also revealed a positive and significant relation with VD at the 5% and 1% levels ($\beta_2 = 0.109$, $p < 0.019$) ($\beta_2 = 0.120$, $p < 0.000$), respectively. Similarly, while the interaction results of education diversity using OLS revealed a negative and insignificant result ($\beta_2 = -0.084$), likewise, the GMM result indicated negative and insignificant results at the 1% level (-0.115, $p < 0.000$). Conversely, the reverse is the case with the interaction effect of ethnic diversity: while OLS revealed negative significance at the 1% level (-0.365, $p < 0.000$), the GMM result indicated a positive significant relation with VD.

5. Discussion and Implications

The system dynamic panel GMM analysis (Tables 5 and 6) supports the findings of this paper. It is also consistent with a previous study by Larcker et al. [30], who provide empirical evidence that CG compliance have an important effect of strengthening the level of relationship between board attributes such as independence and the extent of VD. In addition, the theoretical approach used in this study reinforces the validity of agency theory and signalling theory in explaining the impact of board diversity, CG compliance and corporate disclosure. By examining the interaction effect of corporate governance compliance on board diversity, the result indicated that, in Nigeria, regulatory compliance played a significant role in enhancing the relationships between board diversity (i.e., gender and ethnic) and voluntary disclosure. Likewise, it affirmed the existence of a positive and significant relationship between the board diversity attributes and VD.

Board diversity could decrease the agency problem, asymmetry of information, and the possibility of collusion through management using their role of monitoring and controlling management practices effectively, thus improving voluntary disclosure. Additionally, VD has become a signalling means, where firms disclose more information beyond the compulsory requirement to signal their good compliance with the regulation and better performance, which is in line with arguments of agency and signalling theories. Specifically, the results of the direct relationship (from model 1) provide evidence on the positive and significant association between ethnic diversity and VD, while the second model

revealed the positive influence of educational background diversity on voluntary disclosure. Hence, Nigerian investors will expect more transparency through supplementary disclosure from firms with a well-diversified board of directors. Conversely, the result of a direct relationship in the first model indicated the existence of a negative insignificant relationship between GD and VD. This result is consistent with those of Akpan and Amran [100], who examined the relationship between board characteristics and company performance in Nigeria and reported that the appointment of women is window-dressing as the percentage is too small for a meaningful positive effect on company performance. Additionally, some scholars such as Matsa and Miller [94] reported that the negative influence of gender diversity is attributable to the lack of professional and talented women in certain sectors and specialization.

Correspondingly, this study has provided a great picture of how CG compliance enhances the relationship between board diversity and firms' VD. The empirical findings have direct implications for Nigerian firms in the selection of directors that comprise different ethnic backgrounds, are well-educated and inclusive of females. Since voluntary disclosure is becoming a global phenomenon, the listed firms in the Nigerian market may have to do more by following the regulatory codes of corporate governance, and it is equally important to disclose their contribution on social and environmental matters. Thus, it is in the firms' best interest that qualified and competent women are co-opted onto boardrooms to realise benefits related to such diversity of the board.

In this regard, policymakers and regulators could encourage companies to have more diversity on the boards. Although the overwhelming majority of CG codes around the world enforce companies to include female directors on the board, our result emphasises the significance of another type of diversity role in upgrading the level of corporate disclosure. Another point to be considered as social and empirical contributions of this study is that it brings more awareness to aid investors. This is mainly through access to the company's additional information, which can give prospective investors a better chance to make investment decisions wisely, i.e., by revealing strategic information such as disclosure of specific external factors affecting firm prospects, in addition to the capital market data. Moreover, as the study revealed the level of VD of the Nigerian listed firms in their annual reports, it may help the government to ascertain the level of CG activities among Nigerian firms. Hence, organizations may gain a strategic edge from the result of this study, and it provides a potential benefit to businesses, policymakers, and the entire stakeholders.

6. Conclusions

This paper discovered the impact of CG compliance on the relationship between board diversity and voluntary disclosure. The study's second contribution will be through concrete findings. We use a system GMM that is robust and a superior approach, and a sample of 67 firms listed in the Nigerian stock exchange for the period 2012–2017. Based on the findings, we conclude that CG compliance enhances the significant positive influence of board diversity on the firms to increase the level of voluntary disclosure of more information in their annual report. Therefore, it is recommended that board diversification (especially in terms of ethnic background and education) and CG compliance should be encouraged in firms to obtain more voluntarily disclosed information, which invariably boosts the confidence of all users of accounting information in addition to reducing information asymmetry and thus reducing the cost of external financing through reduced information risk, as well as enhancing their market value. To the best of the researchers' knowledge, the current study is among the few attempts at explicitly examining the effect of CG regulatory compliance on board diversity and voluntary disclosure in corporate governance studies, especially in a developing economy such as that of Nigeria.

Nonetheless, this study has some limitations, among which the non-inclusivity of unlisted and financial organizations in the study is the foremost. Financial institutions were excluded because they have their distinct CG regulations. Since this study was conducted exclusively on non-financial listed firms, the results should be interpreted thoughtfully.

Moreover, the study period is only six years, which is small compared to the size and age of the Nigerian capital market. The study also used a few boards' diversity proxies. However, future research shall extend the present study by considering other relevant determinants of board diversity such as the financial experience of a female director, integrity, and commitment of director, among others. Future research may also consider including both unlisted and financial firms into their model with an extended scope of more than six years for more robust results.

Appendix A. Voluntary Disclosure Checklist

Items	1. General Corporate Information (Strategic Information)
1	Mission statement
2	Brief history of firm
3	Profitability ratio (i.e., ROA, ROE)
4	Description of corporate structure
	2. Information about directors (Strategic Information)
5	Picture of chairperson only
6	Picture of all directors
7	Academic qualifications of directors
8	Position or office held by executive directors
9	Identification of senior management
10	Functions of senior management
	3. Capital market data (Financial Information)
11	Stock exchanges (code, name)
12	Volume of shares traded (trend)
13	Volume of shares traded (year end)
14	Share price information (trend)
15	Share price information (year end)
16	Domestic and foreign shareholding
17	Distribution of shareholding by type of shareholders
18	Acquisition and disposal
	4. Future prospects (Strategic Information)
19	General discussion of future industry trend
20	Disclosure of specific external factors affecting the firm's prospects (economy)
21	Discussion of firm's prospects (general)

	5. Social reporting and value added information (Non-financial information)
22	Community programs (health, education)
23	Environmental policies
24	Employees' appreciation
25	Discussion on employees' welfare
26	Corporate policy on employee training
27	Nature of training

Appendix B. Corporate Governance Compliance Checklist

Items	1. The Board of Directors (Composition and Structure)
1	Membership of the board is not less than five.
2	The board consists of executive and non-executive directors headed by a Chairman.
3	Non-executive directors constitute the majority, with at least one independent director.
4	The Chairman of the Board is a non-executive director and does not serve as Chief Executive Officer of the same company.
	2. Board Committees (i.e., Audit Committee)
5	Members of the audit committee have basic financial literacy and can read financial statements.
6	At least one board member of the audit committee is financially literate.
7	In addition to the audit committee required by CAMA, there exists a governance/remuneration committee and a risk management committee.
8	Governance/remuneration committee is comprised solely of non-executive directors.
9	Only directors constitute members of board committees.
10	The board meet at least once every quarter as an oversight function and to effectively monitor management's performance.
	3. Accountability and Reporting (Disclosures)
11	The company engaged in increased disclosure beyond the statutory requirements in the CAMA in order to foster good corporate governance.
12	The company's annual report includes a corporate governance report that conveys clear information on the strength of the company's governance structures, policies and practices to stakeholders.
13	The annual report described the director's responsibilities in connection with the preparation of the financial statements.
14	The annual report contained details of accounting policies utilised and reasons for changes in accounting policies.

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