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ORIGINAL ARTICLE

# Corporate governance and risk disclosures in Nigerian banks

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## Abstract

**Purpose:** This study examines the impact of corporate governance on risk disclosures in Nigerian deposit money banks. **Methodology:** The study adopts the ex-post facto research design and employs secondary data generated from annual reports of a sample of fifteen (15) money deposit banks with data covering the period 2009–2018. The study used a combination of both bootstrapped ordinary least square (OLS-B) regression, fixed effects (FE) estimation, and quantile regression to examine the impact of corporate governance variables across the risk types and consistency of the results across methods. **Findings:** For Credit risk disclosures, the OLS bootstrapped (OLS-B) estimation reveals that the effect of board size (BDS) is insignificant and this also holds for the FE. The OLS-B shows board independence (BIND) is insignificant but significant for FE. The effect of board gender diversity (BGD) and institutional ownership (INSTOWN) is significant for OLS-B and FE. Finally, the effect of audit committee is significant for OLS-B but not significant for FE. In the case of Market risk disclosures-Index, BDS is significant for OLS-B but not insignificant for FE. BIND is not significant for both OLS-B and FE. For BGD is insignificant for OLS-B and similarly for FE. The effect of INSTOWN is significant for both OLS-B and FE. Finally, the effect of audit committee (AUDC) is significant for OLS-B though not significant for FE. The quantile regression results also provide unique and supporting outcomes. The study concludes that there are cases of significant differences between the OLS-B and FE results but on the overall, corporate governance is instrumental in improving corporate risk disclosures and hence the study recommends the need for stronger corporate governance systems in banks. **Originality of the Study:** Unlike other studies that make use of single estimation approach majorly panel regression and without paying attention to consistency of estimates, this study examines the effect of corporate governance on risk disclosure using a combination of both bootstrapped OLS-B regression, panel regression, and quantile regression to examine the consistency of the results across methods. **Implication of the Study:** The study provides insight into the extent to which corporate governance can be effective in influencing risk disclosures in Nigerian banks.

**Key words:** Corporate governance, financial crises and bootstrapping, risk disclosures

## INTRODUCTION

After the global financial crisis of 2007–2008, a lot of attention has now focused on the role of corporate governance in firm risk with several fingers pointing to the weakness in corporate governance as setting the precedence for the crisis. Thus, the concept and practice of corporate governance have gradually become the central focus for academics, managers, and policymakers (Elamer et al., 2018; Fatima et al., 2018; Nyombi, 2018; Srivastava et al., 2018). As the

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demand for corporate risk disclosures increases, a stronger emphasis is now been placed on corporate governance mechanism. This is because governance is responsible for management monitoring and for pushing for best practices in the organization. Several of the leading definitions of corporate governance, such as World Bank (2002) and Organization of Economic Cooperation and development (OECD, 1999), have placed management control to ensure best practices as the key role of corporate governance. Corporate governance structures could reduce investors' uncertainty by alleviating information asymmetry between insiders and outsiders through enhancing risk disclosure (Ntim et al., 2013).

Consequently, the focus of the study is to empirically examine the impact of corporate governance on risk disclosures in deposit money banks in Nigeria. Unlike other studies (Ntim et al., 2013; Elzahar and Hussainey, 2012; Dionne and Triki, 2012; Manab et al., 2010; Bufarwa et al., 2020; Lotfi and Mohammadi, 2014; Connelly et al., 2010; Elshandidy et al., 2013 and Hasan et al., 2020) that make use of single estimation approach majorly panel regression and without paying attention to consistency of estimates which is one of the causes of mixed and inconclusive findings in the literature; this study examines the effect of corporate governance on risk disclosure using a combination of both bootstrapped ordinary least square (OLS-B) regression, panel regression, and quantile regression to examine the consistency of the results across methods. Since the evolvement of bootstrap procedure proposed by Efron (1979) for statistical analysis of independent and identically distributed (i.i.d.) observations, it has become increasingly used in statistical estimations. Bootstrapped test statistics are always then useful if we do not trust the distributional assumptions underlying standard test procedures or if the sample size is small to allow an asymptotic argument. However, to control for unobserved firm heterogeneity, the study also employs the panel regression estimation and the quantile regression estimates. Thus, the study presents results comparing the advantages of asymptotic estimates from OLS-B against the significance of controlling for unobserved firm effects and this may provide clues regarding the gap of conflicting findings in this regard.

Therefore, the broad objective of the study is to examine the impact of corporate governance on risk disclosures in Nigerian deposit money banks. The specific objectives are to examine the effect of board size (BDS), board independence (BIND), board gender diversity (BGD), institutional ownership (INSTOWN), and audit committee size on risk disclosures in Nigerian banks.

In view of the specific objectives of the study, the following hypotheses were evaluated;

$H_{01}$: BDS has a significant effect on risk disclosures in deposit money banks in Nigeria.

$H_{02}$: BIND has a significant effect on risk disclosures in deposit money banks in Nigeria.

$H_{03}$: BGD has a significant effect on risk disclosures in deposit money banks in Nigeria.

$H_{04}$: INSTOWN has a significant effect on risk disclosures in deposit money banks in Nigeria

$H_{05}$: Audit committee size (AUDC) has a significant effect on risk disclosures in deposit money banks in Nigeria.

## LITERATURE REVIEW

### Conceptual Review

#### *Corporate governance*

The concept of corporate governance constantly remains a germane issue as far as businesses are concerned. It is also an area that has enjoyed robust attention and thus several definitions of the concept exist in extant literature. For example, Liu et al., 2013, view corporate governance as an internal mechanism to improve shareholders interest and managers accountability. This is also the position of Shukeri and Aminul (2012) though the place importance on management control as a vital function of corporate governance and the ultimate aim being to ensure longevity of the enterprise. Alawattage and Wickramasinghe (2004) take a wider view of the concept noting that corporate governance covers institutional rules, norms, and laws. World Bank (2002) and the Organization of Economic Cooperation and Development (OECD, 1999) listed several corporate governance mechanism both internal and external that are similar to the view of (Shukeri and Aminul, 2012; Hopt, 2011; Fatimoh, 2012; Sanda et al., 2005). However, this study focuses on internal corporate governance mechanisms with particular attention to board characteristics variables and INSTOWN. These variables have been used over time in extant governance literature (Ghabayen, 2012; Fich and Slezak, 2008; Elzahar & Hussainey, 2012; Srivastava et al., 2018; Dionne and Triki, 2012; Manab et al., 2010) to measure corporate governance.

#### *Risk disclosures*

According to Miihkinen (2010) risk disclosures typically refer to that information that provides insight into the risks faced by companies and the potential implications on the overall financial and non-financial outlook of the firm. Beretta and Bozzolan (2004) define risk disclosures as the communication of information concerning a firm's

characteristics, strategies, operations, and other factors that may alter expected outcomes. The 2007–2009 global financial crises appeared to have put light on the extent to which managers display appetite for risk without recourse to how this will affect shareholders which has led to significant concerns regarding risk disclosures in the aftermath of the crisis (Rezaee, 2016). Corporate risk disclosure has become top most priority across all spectrums of stakeholders in the environment of business. The signaling attempted to spell out what managerial motives for risk disclosures could be and the theory pointed out the need to reduce or avoid problems with adverse selection (Ng and Rezaee, 2015). Firms face several types of risk in the course of their operations. For our study, we have considered two categories of risks (credit risk and market risk) disclosure in annual reports. The selection is based on the focus of this study on deposit money banks.

## Empirical Review

### *BDS and risk disclosures*

The relationship between BDS and risk disclosures has largely been based on two theoretical perspectives. First there is the resource dependence theory and the key point here is that boards with more members tend have some advantages over smaller boards because they provide the firm with a large pool of resource and information due to the large BDS (Ghabayen, 2012). From this perspective, the size of the board would be positively related to the extent of risk disclosures. Although it suffices to point out that large boards also come with their challenges due to the varied interest of board members, (Mohammad, Zaid), the other perspective is that which relates to the efficiency of smaller boards in ensuring quick decision making in the corporate process and from this perspective, smaller boards will be more effective in the implementation of mechanisms for corporate and transparency (Fich and Slezak, 2008). Empirical testing of the relationship from (Ntim et al. 2013) revealed that BDS is positively related to the extent of risk disclosure. However, Elzahar and Hussainey, 2012, finding reveals the absence of any significant relationship between BDS and risk disclosures.

### *BIND and risk disclosures*

The relationship between BIND and risk disclosures is still very ambivalent empirically. For example, Srivastava et al. (2018) found that BIND is significantly linked with enterprise risk management disclosures. Although, the authors pointed that there are several organizational and contextual variables that influence the relationship. The findings of (Yatim, 2009) also go in a similar direction from the survey of Malaysian listed firms as the results supports the view of the presence of a significant relationship between BIND and risk disclosures. On the contrary, the findings of (Dionne and Triki, 2012) examined this relationship using firms listed on the Tehran stock exchange. Their findings show that the presence of an insignificant relationship between BIND and risk disclosures. A similar finding is also provided by Manab et al. (2010) which focused on the investigating the effect of BIND on risk disclosures with results showing that BIND has an insignificant effect.

### *BGD and risk disclosures*

The idea of BGD in corporate governance is all about ensuring inclusivity in corporate boards. It is believed that board diversity improves the quality of board interactions and the overall decision-making process. This is mainly because it provides a wider platform for participation and opinion sharing (Mishra and Jhunjhunwala, 2013). Ntim et al. (2013) affirmed that in particular, gender diversity is a board characteristic that has positive potentials for improving board performance. In relation to the relationship between BGD and risk disclosures, (Barako and Brown, 2008) found that voluntary disclosures are positively influenced by board diversity; while (Ntim and Soobaroyen, 2012) pointed out from their study there is a significant difference in risk reporting between firms that have more and those that have less observe diverse boards. Ntim et al. (2013) observe that "corporate boards that are made up of diverse gender backgrounds tend to increase the probability of there being more voluntary disclosures. Using listed firms in the UK, (Bufarwa et al., 2020), examined linkages between governance and risk disclosures and the finding revealed that BGD has a positive effect on the level of risk disclosure.

### *INSTOWN and risk disclosures*

INSTOWN is a very influential force in shaping corporate practices (Taylor, 2011) and can particularly flatten the level of information asymmetry between management and shareholders. Solomon (Solomon et al., 2000) have argued that institutional stockholders place premium attention on risk disclosures and understand that it is one of the most critical information they need in making investment decisions. Several studies have examined the relationship between INSTOWN and risk disclosures with varying results. For example, (Abraham and Cox, 2007), discovered that there was a significant relationship between risk disclosure and long-term institutional investors in the UK. Similarly, (Connelly et al., 2010), affirmed that there exists a significant relationship with risk. The presence of a significant relationship between INSTOWN and BIND

is also supported (Elshandidy et al., 2013). On the other hand, (Lotfi and Mohammadi, 2014), covering 642 firms listed in Tehran Stock Exchange from 2007 to 2013, found the absence of any significant relationship between risk disclosures and INSTOWN. In the same vein, (Taylor, 2011), showed from their study that the relationship between INSTOWN and risk disclosures is not significant using listed firms in Australia.

### *Audit committee and risk disclosures*

Board committees are set up as a sub-set of the board to enhance board performance and the audit committee is one of such subsets (Ittner and Keusch, 2015). McNulty et al., (2013) pointed out that the audit committee in particular provides additional corporate monitoring to management and ensures full disclosure of material information to stakeholders. The audit committee has as part of its primary responsibility, the monitoring of financial reporting, internal audit risk, internal control systems, and the implications that risks will have on corporate financials. Hasan et al. (2020) examined corporate governance mechanism and risk disclosure by Islamic banks in Indonesia and found that the number of audit committee members has a significant relationship with risk disclosure by Indonesian Islamic banks.

### Theoretical Framework

This section discusses the theoretical framework for the study which is the agency theory.

### *Agency theory*

The agency relationship which is the baseline for the theory is seen as a contractual relationship that holds between the principal which are the owners of the firm and agent which is management (Jensen and Meckling 1976). The relationship is defined or bounded by expectations of principal from the agent who largely based on the grounds that the agent will act in the best interest of the owners of the business. However, in the process of both agent and principal trying to optimize their positions, conflicts of interest are unavoidable. The theory posits that in trying to address and minimize surge of this divergence in interest between agent and principal, the principal has to introduce monitoring and hence incur the monitoring costs. Linsley and Shrives (2000) pointed out that in most cases, information asymmetry is one of the common issues that create tension in the agency relationship and risks disclosure is one of those areas where managers can be economical with disclosures. In which case a situation exist where shareholders are now less informed in comparison to management regarding how, for example, the business risks is affecting the outlook of business and what management is doing to address such. Shrives and Linsley (2003) argue that based on the agency theory, the extent of risk disclosures by management is thus a function of the monitoring cost incurred by management in the form of corporate governance.

## METHODOLOGY

The ex-post facto research design was used for this research. The data were retrieved from corporate annual report of the sampled banks quoted on the Nigeria Stock Exchange companies for the period 2009–2018 financial years. The sample for the study covers the 15 listed deposit money banks with available data for the period under review. The effect of corporate governance on risk disclosure is analyzed using a battery of econometric methods. First the bootstrapped OLS regression is employed in the estimation. Since the evolvement of bootstrap procedure proposed by Efron (1979) for statistical analysis of i.i.d. observations, it has become increasingly used in statistical estimations. The justification for bootstrapping is because the confidence level of *t*-tests for OLS depends on normality assumptions or asymptotic arguments. Bootstrapped test statistics are always then useful if we do not trust the distributional assumptions underlying standard test procedures or if the sample size is small to allow an asymptotic argument. However, to control for unobserved firm heterogeneity, the study also employs the panel regression estimation and finally to generate distributional dynamics for risk disclosures, the quantile regression estimating is also employed. Quantile regression can produce estimates for all conditional quantiles of the distribution of a response variable, whereas OLS regression only estimates the conditional mean effects of a response variable. Moreover, quantile regression is better able to handle violations of the standard assumptions of normality, homoscedasticity, and absence of outliers.

### Model Specification

The model for the study examines the impact of corporate governance on risk disclosures. The model builds on that of Bufarwa et al. (2020). The model for the study is specified below;

$$\text{Risk-D}_{it} = f\ (\text{Corporate Governance}) + \mu_{it} \qquad (1)$$

Decomposing both the governance and risk variables, we have;

$$\text{CR-Index}_{it} = \partial_0 + \partial_1 \text{BDS}_t + \partial_2 \text{BDIND}_{it} + \partial_3 \text{BGD}_{it} + \partial_4 \text{INSTOWN}_{it} + \partial_5 \text{AUDC}_{it} + \mu_{it} \quad (2)$$

$$\text{MR-Index}_{it} = \psi_0 + \psi_1 \text{BDS}_t + \psi_2 \text{BDIND}_{it} + \psi_3 \text{BGD}_{it} + \psi_4 \text{INSTOWN}_{it} + \psi_5 \text{AUDC}_{it} + \mu_{it} \quad (3)$$

Where; CR-Index = Credit risk index, MR-Index= Market risk Index, BDS= Board Size, BIND = Board independence, BGD = Board gender diversity, INSTOWN = Institutional ownership and AUDC = Audit committee size. $\mu_{it}$ = random error. Measurements of variables are provided in Appendix 1.

Aprori signs: $\partial_1 - \partial_5 > 0$ and $\psi_1 - \psi_5 > 0$.

## PRESENTATION OF RESULT

The descriptive statistics is presented in Table 1 and as observed, BDS has mean 8.26 and a standard deviation of 1.971 with maximum and minimum values of 15 and 4, respectively. BDIND has mean ratio of 0.652 and a standard deviation of 0.147 with maximum and minimum values of 0.91 and 0, respectively. The mean for BGD has a ratio of 0.0704 and standard deviation of 0.094 with maximum and minimum values of 0.4 and 0, respectively. For INSTOWN, the mean stood at 49.13% with a standard deviation of 0.258 while the maximum and minimum values stood at 0.63% and 0%, respectively. The average AUDC stood at approximately 6 with maximum and minimum values of 6 and 4, respectively. Both the credit risk index (CR-Index) and market risk index (MR-index) have average scores of 0.545 and 0.264, respectively. The standard deviation, maximum, and minimum values for CR-Index stood at 0.17, 0.95%, and 0.18%, respectively, while for MR-Index, we have 0.150, 88%, and 11%, respectively.

Table 2 shows the Pearson correlation results reveal that BDS is negatively correlated with CR-Index (r = −0.049) though not significant at 5% ($P$=0.5496) but positively and significantly correlated with MR-Index (r = 0.187, $P$ = 0.0226). A similar positive correlation is observed between BDIND and MR-Index (r = 0.1313) though not significant at 5% ($P$ = 0.1105) while a negative correlation is seen between BDIND and CR-Index (r = −0.1652) which is significant at 5% ($P$ = 0.0441). BGD is negatively correlated with CR-Index and significant (r = 0.1772, $P$ = 0.044) at 5% ($P$ = 0.3776) and negatively correlated with MR-Index (r = −0.0212) though not significant at 5% ($P$ = 0.0797). INSTOWN and CR-Index are negatively and significantly correlated (r = −0.3225, $P$ = 0.001) while MR-Index is negatively though not significantly correlated with INSTOWN (r = −0.0257, $P$ = 0.7558) at 5%. AUDC and CR-Index are negatively and significantly correlated (r = −0.2867, $P$ = 0.000) while MR-Index is negatively and significantly correlated with AUDC (r = −0.4003, $P$ = 0.00) at 5%. However, correlations do not necessarily imply functional dependence and causality in a strict sense and regression analysis and more suitable for that purpose.

Before conducting the regression analysis, multicollinearity was tested by employing the variance inflation factor (VIF) to detect any noises in the model. The VIF's are all less than 10 and hence are free from multicollinearity (Naser et al., 2006). (Table 3)

The regression analysis is presented in Table 4 and the OLS bootstrapped estimates are presented alongside the panel regression results. Since the evolvement of bootstrap procedure proposed by Efron (1979) for statistical analysis of i.i.d. observations, it has become increasingly used in statistical estimations. The justification for bootstrapping is because the confidence level of standard $t$-tests in OLS depends on normality assumptions or asymptotic arguments. If the variates are not normally distributed, the argument still holds asymptotically in large samples as long as the dependent variable is continuous and residuals are i.i.d. Bootstrapped test statistics are always then useful if we do not trust the distributional assumptions underlying standard test procedures or if the sample size is small to allow an asymptotic argument. Another important advantage of the bootstrap is that it then leads to conclusions with accurate confidence and improves the accuracy of statistical estimations (Hansen, 2007). Supporting this, Bertrand et al. (2004) document inference problems with the use of standard OLS inference. They show that neglected heterogeneity and temporal correlation lead to spurious findings and thus bootstrap methods are used to correct this problem.

The OLS bootstrapped estimation has an adjusted $R^2$ of 20.3% and the F-statistics (21.796) and $P$ = 0.000 confirms that the hypothesis of no significant linear relationship between the dependent and independent variables is rejected at 5%. The performance of the variables reveals that the effect of BDS is negative and insignificant at 5% (−0.0049, $P$ = 0.4823) and a similar outcome is seen for BIND % (−0.0569, $P$ = 0.4823). For BGD, a positive effect on CR-Index is observed and this is significant at 5% (0.4393, $P$ = 0.0016). The effect of INSOWN is negative and significant at 5% (−0.1844, $P$ = 0.0004) and the effect of AUDC is also negative and significant at 5% (−0.0949, $P$ = 0.0001). However, the Wald test $\chi^2_{\text{Wald test}}$ (3046, $P$ = 0.00) revealed that the corporate governance variables used in

**Table 1: Descriptive statistics**

| | Mean | Maximum | Minimum | Std. Dev. |
|---|---|---|---|---|
| BDS | 8.261745 | 15 | 4 | 1.97072 |
| BDIND | 0.652013 | 0.91 | 0 | 0.14695 |
| BGD | 0.070403 | 0.4 | 0 | 0.09462 |
| INSTOWN | 0.491369 | 0.63 | 0 | 0.25804 |
| AUDC | 5.812081 | 6 | 4 | 0.54981 |
| CR-Index | 0.545034 | 0.95 | 0.18 | 0.17184 |
| MR-Index | 0.26443 | 0.88 | 0.11 | 0.15002 |

Source: Researcher's compilation (2020). CR-Index: Credit risk index, MR-Index: Market risk index, BDS: Board size, BIND: Board independence, BGD: Board gender diversity, INSTOWN: Institutional ownership, AUDC: Audit committee size

**Table 2: The Pearson correlation results**

| Probability | BDS | BDIND | BGD | INSTOWN | AUDC | CR-Index | MR-Index |
|---|---|---|---|---|---|---|---|
| BDS | 1 | | | | | | |
| BDIND | 0.333 | 1 | | | | | |
| *P*-value | 0.00 | | | | | | |
| BGD | −0.229 | −0.1697 | 1 | | | | |
| *P*-value | 0.0049 | 0.0385 | | | | | |
| INSTOWN | 0.0137 | 0.2167 | 0.0809 | 1 | | | |
| *P*-value | 0.8674 | 0.0079 | 0.3266 | | | | |
| AUDC | −0.27233 | −0.0154 | 0.2119 | 0.1805 | 1 | | |
| *P*-value | 0.0008 | 0.8525 | 0.0095 | 0.0276 | | | |
| CR-Index | −0.049 | −0.1652 | 0.1772 | −0.3225 | −0.2867 | 1 | |
| *P*-value | 0.5496 | 0.0441 | 0.0306 | 0.0001 | 0.0004 | | |
| MR-Index | 0.1867 | 0.1313 | −0.0212 | −0.02569 | −0.4003 | 0.211 | 1 |
| *P*-value | 0.0226 | 0.1105 | 0.7973 | 0.7558 | 0.000 | 0.0097 | |

Source: Researcher's compilation (2020). CR-Index: Credit risk index, MR-Index: Market risk index, BDS: Board size, BIND: Board independence, BGD: Board gender diversity, INSTOWN: Institutional ownership, AUDC: Audit committee size

**Table 3: Multicollinearity test**

| | Coefficient Variance | Variance inflation factor |
|---|---|---|
| C | 0.027447 | NA |
| BDS | 5.10E-05 | 1.245785 |
| BDIND | 0.008895 | 1.208364 |
| BGD | 0.019637 | 1.106028 |
| INSTOWN | 0.002616 | 1.095928 |
| AUDC | 0.000605 | 1.150072 |

Source: Researcher's compilation (2020). BDS: Board size, BGD: Board gender diversity, INSTOWN: Institutional ownership, AUDC: Audit committee size

this study can be considered, as a whole, determinants of CR-Index structure. With regards to diagnostics, as noted earlier, neglected heterogeneity, and temporal correlation that lead to spurious findings are corrected by bootstrap method (Bertrand et al., 2004).

However, the failure of OLS bootstrapped estimations to incorporate and account for firm-specific heterogeneity, provides room for panel estimation methods. Hence, to account for unobserved firm specific effects, the study also conducts panel regression estimates. The Hausman test ($\chi^2_{Hausman}$ = 0.04) indicates that the fixed effect (FE) estimation is appropriate for the study and as observed, the adjusted $R^2$ of 74.5% which indicates that corporate governance accounts for huge component of the systematic variations in credit risk disclosures in banks with a significant F-statistics (19.87). The performance of the variables reveals that the effect of BDS is positive and insignificant at 5% (0.0015, *P*=0.06619) but in the case

**Table 4: Credit risk and corporate governance regression result**

| Variable | Aprori sign | Ordinary least square bootstrapped estimates | Fixed effects estimates | Random effects estimates |
|---|---|---|---|---|
| C | | 1.2359*<br>(0.1624)<br>{0.000} | 0.1433<br>(0.1772)<br>{0.4200} | 0.6436*<br>(0.2595)<br>{0.0143} |
| BDS | + | –0.0049<br>(0.007)<br>{0.4823} | 0.0015<br>(0.003)<br>{0.6619} | 0.0053<br>(0.0083)<br>{0.5239} |
| BDIND | – | –0.0569<br>(0.0926)<br>{0.5207} | –0.1413*<br>(0.0454)<br>{0.0023} | –0.1113*<br>(0.0851)<br>{0.1930} |
| BGD | + | 0.4393*<br>(0.1362)<br>{0.0016} | 0.3806*<br>(0.1896)<br>{0.0468} | 0.5796<br>(0.1648)<br>{0.001} |
| INSOWN | + | –0.1844*<br>(0.0505)<br>{0.0004} | 0.3551*<br>(0.1503)<br>{0.0196} | –0.1009<br>(0.1142)<br>{0.3785} |
| AUDC | - | –0.0949*<br>(0.0242)<br>{0.0001} | 0.0482<br>(0.0350)<br>{0.1712} | -0.0105<br>(0.0396)<br>{0.7908} |
| $R^2$ | | 0.230 | 0.745 | 0.087 |
| Adjusted $R^2$ | | 0.203 | 0.708 | 0.055 |
| S.E. of regression | | 0.1533 | 0.1144 | 0.118 |
| F-stat (Prob) | | 21.796(0.00) | 19.87(0.00) | 2.747(0.021) |
| Durbin Watson | | 0.784 | 2.4 | 1.097 |
| $\chi^2_{Hetero}$ | | | 0.2738 | |
| $\chi^2_{Serial/Corr}$ | | | 0.4252 | |
| $\chi^2_{Norm}$ | | 0.2738 | 0.2738 | |
| Ramsey-Reset | | 0.2318 | | |
| $\chi^2_{Wald\text{-}F\text{-}test}$ | | 0.739 | | |
| $\chi^2_{Hausman}$ | | | | 11.53(0.04) |

Source: Researcher's compilation (2020) standard error ( ) *P*-values { }

of BDIND, a negative and significant effect on CR-index is observed (−0.1413, $P$ = 0.0023). For BGD, a positive effect on CR-Index is observed and this is significant at 5% (0.3806, $P$ = 0.046). The effect of INSOWN is positive and significant at 5% (0.0196, $P$ = 0.0196) and the effect of AUDC is also positive though not significant at 5% (0.0482, $P$ = 0.1712). The diagnostics for the estimation reveal the absence of serial correlation ($\chi^2_{Serial/Corr}$ = 0.4252) and confirms that the errors exhibit homoscedastic properties ($\chi^2_{Hetero}$ = 0.2738). The residual normality ($\chi^2_{Norm}$ =0.5362) reveals that the residuals are normally distributed.

For further insight into the relationship between corporate governance and risk disclosure in Nigerian banks, we contribute to the debate by suggesting quantile estimation as an advanced estimation method in the corporate governance literature, arguing that this can be instrumental in reconciling the seemingly conflicting findings from studies applying OLS regression and its many offsprings. Quantile regression has been widely applied in different literatures (Goel and Ram, 2004; Barreto and Hughes 2004; Knight and Ackerly 2002). Quantile regression appears more insightful than the standard linear OLS and FE regression by producing separate estimates for all conditional quantiles of a response variable's distribution. It provides a more comprehensive picture of the set of relationships between a response variable and explanatory variables, depending on the value of the response variable. (Table 5)

This is different from the OLS and FE estimation which estimates only a conditional mean effect of a response

**Table 5: Credit risk and corporate governance quantile outlook**

| Variable | Quantile 0.05 | Quantile 0.30 | Quantile 0.50 | Quantile 0.75 | Quantile 0.95 |
|---|---|---|---|---|---|
| C | 0.4945<br>(0.3832)<br>{0.1990} | 1.4418*<br>(0.1642)<br>{0.000} | 1.2309*<br>(0.2015)<br>{0.000} | 1.1893*<br>(0.1765)<br>{0.000} | 0.8343*<br>(0.2916)<br>{0.0049} |
| BDS | 0.0058<br>(0.0069)<br>{0.4039} | −0.0097<br>(0.0069)<br>{0.1608} | 0.0036<br>(0.0114)<br>{0.7486} | −0.0061<br>(0.0096)<br>{0.5254} | −0.0172<br>(0.0151)<br>{0.2543} |
| BDIND | −0.3232*<br>(0.0954)<br>{0.001} | −0.0768<br>(0.1114)<br>{0.4910} | 0.0151<br>(0.1101)<br>{0.8914} | -0.1726<br>(0.1095)<br>{0.1168} | 0.3357<br>(0.2416)<br>{0.1668} |
| BGD | 0.1560<br>(0.3159)<br>{0.6221} | 0.5519*<br>(0.1447)<br>{0.000} | 0.4887*<br>(0.1531)<br>{0.0017} | 0.3832**<br>(0.1995)<br>{0.056} | −0.1073<br>(0.288)<br>{0.7110} |
| INSOWN | −0.0540<br>(0.3158)<br>{0.3785} | −0.1017*<br>(0.0505)<br>{0.0458} | −0.1779*<br>(0.0754)<br>{0.0197} | −0.3664*<br>(0.0924)<br>{0.000} | −0.5623*<br>(0.1736)<br>{0.0015} |
| AUDC | −1.68e-17*<br>(0.0543)<br>{0.000} | −0.1436*<br>(0.0241)<br>{0.000} | −0.1169*<br>(0.0312)<br>{0.0003} | −0.0802*<br>(0.0282)<br>{0.0051} | 0.0289<br>(0.0322)<br>{0.3691} |
| Pseudo $R^2$ | 0.178 | 0.178 | 0.189 | 0.207 | 0.131 |
| Adjusted $R^2$ | 0.149 | 0.149 | 0.1615 | 0.179 | 0.100 |
| S.E. of regression | 0.666 | 0.1758 | 0.155 | 0.1849 | 0.324 |
| Quasi-LR statistic | 9.447 | 42.062 | 47.737 | 47.524 | 16.924 |
| Prob. (Quasi-LR stat) | 0.095 | 0.000 | 0.000 | 0.000 | 0.0046 |

Source: Researcher's compilation (2020) Standard error ( ) *P*-values { }

variable. Another advantage of quantile regression is that it works well under assumptions more relaxed than those associated with OLS regression, being able to handle skewed data, unequal variance (heteroskedasticity), and existence of outliers (Johnston and DiNando, 1997). Quantile regression estimates the conditional quantiles of a response variable in a linear model, providing a complete view of the possible causal relationships between a response variable and explanatory variables (Koenker, 2005). Hence, compared to OLS regression, which only estimates the conditional mean of a response variable.

As observed, the distributional dynamics for CR-Index, the result reveals that both for firms in the low CR-Index region ($Q_{0.05}$ and $Q_{0.30}$), the effect of BDS is not significant at 5% though it is positive (0.0058) for $Q_{0.05}$ and negative (-0.0097) for $Q_{0.30}$. For firms in the median CR-Index region ($Q_{0.50}$), the effect of BDS is not significant at 5% though it is positive (0.0036). For firms in the high and very high CR-Index region ($Q_{0.75}$ and $Q_{0.95}$), the effect of BDS is also not significant at 5% though negative in both quantiles. For firms in low CR-Index regions ($Q_{0.05}$ and $Q_{0.30}$), the effect of BDIND is significant at 5% at $Q_{0.05}$ with a negative coefficient (-0.3232) and also negative (−0.0768) for $Q_{0.30}$ though not significant. For firms in the median CR-Index region ($Q_{0.50}$), the effect of BDIND is not significant at 5% though it is positive (0.0151). For firms in the high and very high CR-Index region ($Q_{0.75}$ and $Q_{0.95}$), the effect of BDIND is also not significant at 5%.

For firms in the low CR-Index region ($Q_{0.05}$ and $Q_{0.30}$), the effect of BGD is not significant at 5% though it is positive (0.1560) for $Q_{0.05}$ but significant and positive (0.5519) for $Q_{0.30}$. For firms in the median CR-Index region ($Q_{0.50}$), the effect of BGD is significant at 5% and positive (0.4887). For firms in high and very high CR-Index regions ($Q_{0.75}$ and $Q_{0.95}$), the effect of BGD is also not significant at 5% in both quantiles. For INSOWN, it is significant for firms in $Q_{0.30}$ and negative (-0.1017) though not significant for firms in $Q_{0.05}$. For firms in the median CR-Index region ($Q_{0.50}$), the effect of INSOWN is significant at 5% though it is negative (0.1779). For firms in high and very high CR-Index region ($Q_{0.75}$ and $Q_{0.95}$), the effect of INSOWN is significant at 5% and negative in both quantiles. For AUDC, it is significant for firms in low CR-Index region ($Q_{0.05}$ and $Q_{0.30}$) with negative coefficients. For firms in the median CR-Index

region ($Q_{0.50}$), the effect of AUDC is significant at 5% though with a negative (-0.1169) coefficient. For firms in high and very high CR-Index region ($Q_{0.75}$ and $Q_{0.95}$), the effect of AUDC is significant for $Q_{0.75}$ but at 5% but not for firms in $Q_{0.95}$.

The OLS bootstrapped estimation has an adjusted $R^2$ of 15.9% and the F-statistics (5.444) and $P = 0.000$ confirms that the hypothesis of no significant linear relationship between the dependent and independent variables is rejected at 5%. The performance of the variables reveals that the effect of BDS is negative and significant at 5% (−0.0288, $P = 0.005$). The effect of BDIND on MR-Index is negative and though not significant at 5% (−0.1060, $P = 0.3563$). For BGD, a negative and insignificant effect on MR-Index is observed at 5% (−0.3220, $P = 0.1335$). The effect of INSOWN is positive and significant at 5% (0.3492, $P = 0.00$) and the effect of AUDC is in its case negative and significant at 5% (−0.0422, $P = 0.0206$). With regards to diagnostics, as noted earlier, neglected heterogeneity and temporal correlation that lead to spurious findings are corrected by bootstrap method (Bertrand et al., 2004). However, the failure of OLS bootstrapped estimations to incorporate and account for firm-specific heterogeneity, provides room for panel estimation methods. Hence, to account for unobserved firm specific effects, the study also conducts panel regression estimates.(Table 6)

The Hausman test ($\chi^2_{Hausman} = 0.013$) indicates the FE estimation is appropriate for the study and as observed, the adjusted $R^2$ of 45.6% which is less that for MR-Index and thus suggest that corporate governance accounts for more of MR-Index than for MR-Index. The performance of the variables reveals that the effect of BDS is negative and insignificant at 5% (−0.0015, $P = 0.1758$) but in the case of BDIND, a negative and also insignificant effect on MR-index is observed (−0.0217, $P = 0.4271$). For BGD, a negative effect on MR-Index is observed and this is significant at 5% (−0.0127, $P = 0.7161$). The effect of INSOWN is positive and significant at 5% (0.1720, $P = 0.007$) and the effect of AUDC is also positive though not significant at 5% (0.0126, $P = 0.5337$). The diagnostics for the estimation reveal the absence of serial correlation [$\chi^2_{Serial/Corr} = 0.4252$] and confirms that the errors exhibit homoscedastic properties ($\chi^2_{Hetero} = 0.2738$). The residual normality ($\chi^2_{Norm} = 0.5362$) reveals that the residuals are normally distributed.

As observed, the distributional dynamics for MR-Index, the result reveals that both for firms in the low MR-Index region ($Q_{0.05}$ and $Q_{0.30}$), the effect of BDS is not significant at 5% and negative for both. For firms in the median MR-Index region ($Q_{0.50}$), the effect of BDS is not significant at 5%. For firms in high and very high MR-Index region ($Q_{0.75}$ and $Q_{0.95}$), the effect of BDS is significant at 5% and negative in both quantiles (−0.0299 and −0.0374). For firms in low MR-Index regions ($Q_{0.05}$ and $Q_{0.30}$), the effect of BDIND is significant at 5% at $Q_{0.05}$ with a negative coefficient (−0.2989) and also negative (−0.0873) for $Q_{0.30}$ though not significant. For firms in the median MR-Index region ($Q_{0.50}$), the effect of BDIND is not significant at 5% though it is positive (0.0078). For firms in the high and very high CR-Index region ($Q_{0.75}$ and $Q_{0.95}$), the effect of BDIND is also not significant at 5%.

For firms in the low MR-Index region ($Q_{0.05}$ and $Q_{0.30}$), the effect of BGD is not significant at 5% and negative for both. For firms in the median MR-Index region ($Q_{0.50}$), the effect of BGD is also significant at 5%. For firms in high and very high MR-Index regions ($Q_{0.75}$ and $Q_{0.95}$), the effect of BGD is significant at 5% in both quantiles and negative (−0.8077 and −0.8302). For INSOWN, it is significant for firms in $Q_{0.05}$ and positive (0.2164) though not significant for firms in $Q_{0.30}$. For firms in the median MR-Index region ($Q_{0.50}$), the effect of INSOWN is significant at 5% and positive (0.0257). For firms in high and very high MR-Index region ($Q_{0.75}$ and $Q_{0.95}$), the effect of INSOWN is significant at 5% and positive in both quantiles. For AUDC, it is significant for firms in low MR-Index region ($Q_{0.05}$ and $Q_{0.30}$) with negative coefficients. For firms in the median MR-Index region ($Q_{0.50}$), the effect of AUDC is significant at 5% and also with a negative (-0.0635) coefficient. For firms in high and very high MR-Index region ($Q_{0.75}$ and $Q_{0.95}$), the effect of AUDC is not significant at 5%. (Table 7)

## Discussion of Results and Test of Hypotheses

For credit risk disclosures, on the overall, the OLS bootstrapped (OLS-B) estimation reveals that the effect of BDS is insignificant at 5% ($P = 0.4823$) and for the FE, the effect of BDS is insignificant at 5% ($P = 0.06619$) but looking at the entire distribution the effect of BDS is not significant across all quantile. In the case of MR-Index, BDS is significant at 5% ($P = 0.005$) for OLS-B but not insignificant at 5% ($P = 0.1758$) for FE but for the entire distribution for firms in high and very high MR-Index region ($Q_{0.75}$ and $Q_{0.95}$), the effect of BDS is significant at 5%. Although the OLS-B and FE results are in similar for the CR-Index, the estimates vary for the MR-Index indicating that controlling for unobserved firm effects is significant for the outcomes. The findings thus reveal that the effect of BDS varies with respect to the particular type of risk disclosures and thus we fail to reject $H_{01}$.

**Table 6: Market risk and corporate governance regression result**

| Variable | Aprori sign | OLS bootstrapped estimates | Fixed effects | Random effects |
|---|---|---|---|---|
| C | + | 0.5093*<br>(0.1489)<br>{0.0008} | −0.0247<br>(0.1254)<br>{0.8441} | 0.0714<br>(0.2044)<br>{0.7273} |
| BDS | + | −0.0288*<br>(0.0101)<br>{0.0050} | −0.0015<br>(0.0011)<br>{0.1758} | −0.0012<br>(0.0129)<br>{0.9269} |
| BDIND | − | −0.1060<br>(0.1146)<br>{0.3563} | −0.0217<br>(0.0272)<br>{0.4272} | −0.1360<br>(0.0932)<br>{0.1470} |
| BGD | + | −0.3220<br>(0.2134)<br>{0.1335} | −0.0127<br>(0.0348)<br>{0.7161} | −0.1407<br>(0.2447)<br>{0.5662} |
| INSOWN | + | 0.3492*<br>(0.0732)<br>{0.000} | 0.1720*<br>(0.0623)<br>{0.0067} | 0.4663*<br>(0.1618)<br>{0.0046} |
| AUDC | − | −0.0422*<br>(0.0180)<br>{0.0206} | 0.0126<br>(0.0202)<br>{0.5337} | -0.0148<br>(0.0182)<br>{0.4162} |
| $R^2$ | | 0.159 | 0.456 | 0.064 |
| Adjusted $R^2$ | | 0.130 | 0.376 | 0.032 |
| S.E. of regression | | 0.235 | 0.1475 | 0.2015 |
| F-stat (Prob) | | 5.444(0.00) | 5.444(0.00) | 1.963(0.087) |
| Durbin Watson | | 0.784 | 0.837 | 1.134 |
| $\chi^2_{Hetero}$ | | 0.2391 | 0.2738 | 0. |
| $\chi^2_{Serial/Corr}$ | | 0.4252 | 0.4252 | 0.4252 |
| $\chi^2_{Norm}$ | | 0.2738 | | |
| Ramsey-Reset | | 0.2318 | | |
| $\chi^2_{Wald\text{-}F\text{-}test}$ | | 0.739 | | |
| $\chi^2_{Hausman}$ | | | | 14.457(0.013) |

Source: Researcher's compilation (2020) Standard error ( ) *P*-values { }

Extant literature on the relationship between BDS and risk disclosures is quite inconclusive mainly because there are identified benefits favoring the existence of large boards (Ghabayen, 2012) and those pointing to the superiority of smaller boards (Fich and Slezak, 2008, Mohammad et al., 2018) and those indicating the neutrality of BDS (Elzahar & Hussainey 2012).

The OLS-B estimates for CR-Index and MR-Index are consistent showing BIND is not significant (p=0.4823) and (p=0.3563). The FE estimates are also consistent CR-Index ($P$ = 0.0023) and MR-Index ($P$ = 0.4271). Looking at the entire distribution, the effect of BDIND is significant at $Q_{0.05}$ and for CR-Index and MR-Index regions. Therefore, in this case, we find close similarities in the behavior of BDIND in influencing risk disclosures and also accounting for unobserved firm effects produce significantly different results and thus we fail to reject $H_{02.}$ Independent directors, due to diverse background and independence, offer independent alternative views to the board and linkages to external stakeholders that control the firm's access to resources. Thus, higher representation of outside directors on board enhances strategic decision-making (McNulty and Pettigrew, 1999), which, in turn, enhances firm's survival by addressing risk management issues. The finding is in tandem with (Desender 2007; Yatim, 2009; Dionne and Triki, 2012 and Manab et al. 2010).

For BGD, the effect on CR-Index is significant at 5% ($P$ = 0.0016) for OLS-B and for FE, it is also significant at 5% ($P$ = 0.046) and then for MR-Index, BGD is insignificant at 5% ($P$ = 0.1335) for OLS-B and similarly

**Table 7: Market risk and corporate governance quantile outlook**

| Variable | Quantile 0.05 | Quantile 0.30 | Quantile 0.50 | Quantile 0.75 | Quantile 0.95 |
|---|---|---|---|---|---|
| C | 0.8876* | 1.0264* | 0.8864* | 0.9024* | 0.9338* |
| | (0.1898) | (0.1588) | (0.1772) | (0.1596) | (0.1509) |
| | {0.000} | {0.000} | {0.000} | {0.000} | {0.000} |
| BDS | −0.0047* | −0.0066 | −0.0197** | −0.0299 | −0.0374* |
| | (0.0072) | (0.0069) | (0.010) | (0.0098) | (0.0094) |
| | {0.5122} | {0.4119} | {0.0523} | {0.0029} | {0.000} |
| BDIND | −0.2989* | −0.0873 | 0.0078 | −0.2573** | −0.2672 |
| | (0.0874) | (0.1077) | (0.1169) | (0.1455) | (0.1732) |
| | {0.0008} | {0.4190} | {0.9470} | {0.0791} | {0.1251} |
| BGD | 0.1664 | −0.0232 | −0.0279* | −0.8077* | −0.8302* |
| | (0.1193) | (0.1557) | (0.2622) | (0.1979) | (0.2481) |
| | {0.1653} | {0.8815} | {0.9151} | {0.000} | {0.0010} |
| INSOWN | 0.2164* | 0.0405 | 0.1819* | 0.28056* | 0.3864* |
| | (0.0967) | (0.0775) | (0.0807) | (0.0680) | (0.0711) |
| | {0.0269} | {0.6026} | {0.0257} | {0.000} | {0.000} |
| AUDC | −0.0938* | −0.1062* | −0.0635* | −0.0017 | 0.0109 |
| | (0.02607) | (0.0235) | (0.0270) | (0.0231) | (0.0223) |
| | {0.000} | {0.000} | {0.0201} | {0.9429} | {0.6232} |
| Pseudo $R^2$ | 0.153 | 0.036 | 0.0716 | 0.0494 | 0.281 |
| Adjusted $R^2$ | 0.123 | 0.002 | 0.039 | 0.0162 | 0.256 |
| S.E. of regression | 0.2779 | 0.1758 | 0.1663 | 0.2135 | 0.279 |
| Quasi-LR statistic | 20.281 | 6.184 | 13.634 | 8.992 | 46.631 |
| Prob(Quasi-LR stat) | 0.001 | 0.288 | 0.0181 | 0.0109 | 0.000 |

Source: Researcher's compilation (2020) Standard error ( ) *P*-values { }

for FE at 5% ($P = 0.7161$). On the overall, the results reveal that both the OLS-B and FE results are in similar for the CR-Index and also consistent for MR-Index. Although, looking at the entire distribution BGD is significant for firms in $Q_{0.30}$ and for firms in the median CR-Index region ($Q_{0.50}$) but for firms in high and very high MR-Index regions ($Q_{0.75}$ and $Q_{0.95}$), the effect of BGD is significant at 5% and thus we fail to reject $H_{03.}$ The agency theory proposes that firms can improve their managerial monitoring and BIND by having a board that is diverse in terms of gender (Elzahar and Hussainey, 2012; Ntim et al., 2013). Barako and Brown (2008) and (Ntim et al. 2013) also suggest that voluntary disclosures are positively influenced by board diversity. Furthermore, Bufarwa et al. (2020) confirms that female members disclose more information than male members on the board of directors.

In relation to CR-Index, INSOWN is significant at 5% (−0.1844, $P = 0.0004$) for OLS-B and also significant for FE at 5% ($P = 0.0196$) and in relation to MR-Index, the effect of INSOWN is significant at 5% ($P = 0.000$) for OLS-B and also for FE at 5% (0=0.007). The findings indicate that both the OLS-B and FE estimates yield similar results and thus we fail to reject $H_{04}$. The finding is in tandem with (Taylor 2011; Lotfi and Mohammadi 2014; Taylor 2011 and Elshandidy et al. 2013). And finally, the effect of AUDC is significant at 5% ($P = 0.0001$) for OLS-B but not for FE in relation to CR-Index while it is significant at 5% ($P = 0.0206$) for OLS-B though not significant for FE in relation to MR-Index. The estimates vary depending on the estimation type and thus confirm the significant effect of accounting for firm specific heterogeneity on the estimation outcomes. The performance of AUDC is also similar for both MR-index and CR-Index and thus indicating possible consistency across the risk categories and thus we fail to reject $H_{05}$.

## CONCLUSION

The focus of the study is to examine the impact of corporate governance on risk disclosures in Nigerian banks. The study adopts the ex-post facto research design and employs secondary data generated from annual reports of a sample of 15 money deposit banks with data covering the period 2009–2018. The corporate

governance variables examined are BDS, BDIND, BGD, INSOWN, and AUDC. The study used a combination of both bootstrapped OLS-B regression and the FE estimation and quantile regression analysis to examine the consistency of the results across methods and also identify consistency of corporate governance variables across the risk types. The results reveal that for credit risk disclosures, the OLS bootstrapped (OLS-B) estimation reveals that the effect of BDS is insignificant and this also holds for the FE. The OLS-B shows that BIND is insignificant but significant for FE. For BGD, the effect is significant at 5% for OLS-B and for FE. INSOWN is significant at 5% for OLS-B and also for FE at 5%. Finally, the effect of AUDC is significant at 5% for OLS-B but not significant for FE. In the case of market risk disclosures-Index, BDS is significant at 5% for OLS-B but not insignificant at 5% for FE. BDIND is not significant at 5% for OLS-B and for FE. For BGD is insignificant at 5% for OLS-B and similarly for FE at 5%. The effect of INSOWN is significant at 5% for OLS-B and also for FE at 5%. Finally, the effect of AUDC is significant at 5% ($P$ = 0.0206) for OLS-B though not significant at 5% ($P$ = 0.5337) for FE. The study concludes that there are cases of significant differences between the OLS-B and FE results but on the overall, corporate governance is instrumental in improving corporate risk disclosures and hence the study recommends the need for stronger corporate governance systems in banks.

## CONFLICTS OF INTERESTS

There is no financial support and sponsorship for this research. There is no conflict of interest to declare.

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## APPENDIX

| Appendix 1 Variable | Description | Measurement | | Aprori. sign |
|---|---|---|---|---|
| | Bank risk disclosure | Market risk disclosure | B. Market disclosure index score<br>In this regard, market risk is measured using a constructed index score with the following equally weighted items;<br>i. Definition or motivation<br>ii. Quantitative or qualitative data on exposure to equity risk<br>iii. Quantitative or qualitative data on exposure to commodity risk<br>iv. Quantitative or qualitative data on exposure to foreign exchange risk<br>v. Credit spread risk<br>vi. Quantitative or qualitative notes on implications of entire set of market risks | |
| | | Credit risk disclosure | B. Credit disclosure index score<br>In this regard, credit risk is measured using a constructed index score with the following equally weighted items;<br>i. Definition or motivation<br>ii. Quantitative or qualitative data on exposure to credit risk<br>iii. Classification of customers' obligations in terms of their creditworthiness (rating)<br>iv. Aging schedule of accounts receivable<br>v. Comparison with previous years<br>vi. Alternative credit classification (by activity, geographical area, and others)<br>vii. Notes on the concentration of credit | |
| BDS | Board size | Number of individuals on the board | | |
| BDIND | Board independence | The ratio of non-executive directors to total board directors | | |
| BGD | Board gender diversity | The board female to male ratio | | |
| INSTOWN | Institutional ownership | Proportion or % of stock ownership by institutions | | |
| AUDC | Audit committee size | Number of individuals on the audit committee | | |