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Moderating Effect of Value-Added Intellectual Capital on the Nexus Between Board Independence and Sustainability Disclosure of Listed Firms in Nigeria

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Abstract

The study investigated board independence and sustainability disclosures of firms listed on the Nigerian Exchange Group by examining how value-added intellectual capital influences the interaction between board independence and sustainability disclosure of listed firms. The study made use of the Global Reporting Initiative (GRI) disclosure index to extract environmental, social and economic disclosure information from the corporate sustainability reports of 50 firms listed on Nigerian Exchange group. An ex post facto research design was adopted, data was sourced and collected from annual report of sampled firms for a period of eleven (11) years spinning across 2012-2022. Board independence (BIND) measured as the proportion of non-executive directors on the board was used to determine the effect on sustainability disclosure {Environmental sustainability (ENSD), Social sustainability (SSD) and Economic sustainability disclosure (ECSD)} of listed firms. To examine the effect described in the study, the method of moment quantile regression analysis was performed using stata 17 analytical software. Findings from the regression analysis reveals that board independence was found to only have an influence on SSD even though its effect was not sustained in the third (highest) quantile. The findings also demonstrated that value added intellectual capital (VAIC) has no considerable favorable effect to moderate the relationship between board independence and sustainability disclosure of listed firms. We therefore recommend amongst others that listed firms should increase the number of independent board members which will foster the increase in board monitoring quality while also working to meet the needs of stakeholder to advancing sustainability disclosure practices in Nigeria.

1. INTRODUCTION

Background to the study

In Recent times, firms have been called upon to fulfill the needs of wide range of stakeholders who pay attention to company's value. They are interested in understanding the approach and performance of company in managing the sustainability issues such as economic, environmental and social as well as corporate governance aspect, including the potential for value created from managing sustainability (Chikwendu, Okafor, Jesuwunmi & Caleb, 2022). Many companies now publish an annual sustainability report for a variety of reasons, but these reports are primarily meant to serve as "vessels of transparency and accountability." A corporation must publish nonfinancial statements in addition to financial information for shareholders. This demonstrates that firms owe stakeholders an annual accounting of their economic, social, and environmental performance, in addition to the financial information they provide to shareholders.

Gnanaweera, Kunori & Ntim, (2018) defined Sustainability reporting as the mechanism through which sustainability information pertaining to firms' sustainability performance is conveyed to stakeholders, while, Daub 2007 on the other hand sees SR as the level to which the report provides valid and reliable data to satisfy information needs of stakeholders which will act as their decision-model to assess the organization. Thus, the main goal of a sustainability report is to offer acceptable information to stakeholders and to provide transparency on the company's contribution to sustainability development.

With rising technological innovation however, global challenges, and intense market competition, intellectual capital remains a critical component for firm success (Ozkan, Cakan, & Kayacan, 2017). This is because companies require significant strategies, policies, and the application of intellectual capabilities (Value- Added Intellectual Capital- VAIC) in market development (Hejazi, Ghanbari & Alipour, 2017).

Presently, concerned stakeholders are more knowledgeable regarding the significance of IC in sustainability and firm value addition. Organizations are focused on IC management to address the competing needs of diverse stakeholder groups. According to one survey, notable companies such as Google and Microsoft invest more in IC than in tangible and financial assets (Ong, Yeoh & Teh, 2011). As a result, this supports the thesis that a company's performance in the economy focused on knowledge is linked to VAIC. Nonetheless, academics say that because of the indirect relationship with business performance, the role of IC is more akin to a black box (Li & Zhao, 2018). In other words, it benefits the corporation despite paying significant costs. Dalwai and Salehi (2021) emphasize the indirect relationship between IC and all-round performance.

According to Asif, Ting, and Kweh (2020), IC is an additional expense to the company. It is reported as an expense and has the capacities to threaten enterprise value (kweh, Ting & Teh, 2019). In such instances, the role of management (board independence) becomes critical in determining the threshold of VAIC investment for a significant impact.

It is widely believed and suggested by researchers that in today's dynamic and complex business environment, board independence is likely to influence corporate sustainability disclosure as well as corporate profitability and overall performance. Corporate sustainability involves two types of administrators: those who work within the industries/ organisation and those who work outside of it. Internal administrators are the management team (Board of Directors), whilst external administrators are government bodies in charge of implementing sustainability policies (Anazona, Egbunike & Gunardi, 2018). It is therefore, pertinent to state that the board characteristics of firms, moderated by intellectual capital holds a strategic responsibility in promoting the level of sustainability disclosure within an organization which will in many ways also contribute to better reporting on sustainability performance.

The present study presents a new concept of intellectual capital as a moderating factor in the relationship between board characteristics and sustainability disclosure, with regard. This moderating variable is critical due to its role in decision making and utilization of firm's resources.

Statement of the Problem

The hazardous effects of companies' activities have sparked the increasing need from stakeholders for transparent and trustworthy report on sustainability issues. Evidence still exists of inadequate sustainability disclosure reporting in Nigerian listed businesses, which has been linked to concerns about corporate governance systems (board independence).

The demands from corporate organization have gone beyond the maximization of the shareholder's wealth to the need of other stakeholders of the firms which includes the employee, community and the environment (SousaFilho, Wanderley, Gomez & Farache, 2010). This is due to the effects of the firm's activities on community, employees and the environment. Hence, it is necessary for firms to take a broader viewpoint on their reports by incorporating sustainability information essential to meeting these goals and reducing information asymmetric. What led to carrying out the study is the question as to why the annual report does not detail or disclosure performance on sustainability issues that affect our environment, social, corporate governance as well economic activities.

Another problem is that associated with loss of investors' confidence. If a firm fails to disclosure its sustainability activities in a true, transparent and accountable format, the investor will lose confident in such firm and this is attributed to poor operations and corporate governance failure/ issues hence the firm will run into untimely collapse, merger and/ or acquisition.

For a firm to consistently impact and advance societal development through sustainability activities, it would develop a business strategy that should align social, economic and environmental costs disclosure with its corporate objectives. This would involve the setting of standards, monitoring, measurement and execution and disclosure within a specified period. The pertinent question is whether firms can dependably continue to monitor, execute and disclose its sustainability performance with that potency as it pursues the corporate objectives.

Objectives to the study

The main objective is to evaluate the moderating effect of value- added intellectual capital on the nexus between board independence and sustainability reporting in Nigeria.

Specifically, the study seeks to:

i. Ascertain the effect of board independence on environmental sustainability disclosure
ii. Determine the effect of board independence on social sustainability disclosure of listed firms
iii. Investigate the effect of board independence on economic sustainability of firms listed on the Nigerian exchange group.
iv. Evaluate the interacting effect of value-added intellectual capital on the relationship between board independence and sustainability disclosure of listed firms in Nigeria.

2. REVIEW OF RELATED LITERATURES

Conceptual Framework

Sustainability disclosure/ reporting

A sustainable organization is one that can continue operating incessant and must consider stakeholders in terms of environmental, social, and economic factors to achieve sustainable development goals.

Environmental disclosure

It is the disclosure of information regarding companies' interaction with the environment and the immediate community. The issue of environmental disclosure has attained a height to the extent of prosecution of corporate officers in developed economics like the US (McMahon, 1995) for offenses in relation to the environment. The objective of environmental disclosure includes the need for society to know about the extent of materials covered, determine an organizations' relationship with stakeholders and attracting foreign direct investment

Social sustainability disclosure

The social dimension of sustainability is concerned with how a company influences the social framework within which it operates. Among the indicators are labor practices, human rights, society, and product responsibility (SRG, 2011).

Economic disclosure

The economic facet of sustainability is concerned with the organization's effects on its stakeholders' economic conditions as well as financial systems at the local, national, and global levels. The economic indicators show the flow of capital among various stakeholders as well as the organization's overall economic influence on society.

Board independence

Directors on corporate boards have different values, interest and time horizons (Post, Rahman & Rubow, 2011). Independent directors, in particular, appear to be less attached to economic performance and more concerned with company's sustainability initiatives (Baba & Abdul-Manaf, 2017). They have a higher chance of supporting investments in the long-term sustainability of a company even if such investment conflict with short-term economic performance goals.

This is obvious as independent directors may feel attending to sustainability reporting issues is in the best interest of all stakeholders. As a result, a corporate board with a higher share of independent directors is expected to increase board monitoring quality while also working to meet the needs of all stakeholders. This means that a firm will be more concerned and pay more attention to sustainability disclosures if it has a higher share of independent directors on its corporate board.

Value added intellectual coefficient (VAIC)

It is belied to be the value added of intellectual capital due to the combination and or summation of the two sub-indicators of intellectual capital which is capital employed efficiency and Intellectual Capital Efficiency which is sub divided in (human capital efficiency and structural capital efficiency) used as a measure for the valuation of intellectual capital.

Value added: is the extra amount on the cost for intellectual capital. It is the improvement or addition a business makes to its goods or services prior to offering them to clients. The two sub-components of VAIC form the proxy for the moderating variables in this study. Equation (1) formalizes the VAIC relationship algebraically:
VAIC = CEE + HCE + SCE---------- [Equation (1)]

Where:

VAIC = VA Intellectual Capital Coefficient of the firms,

CEE = Capital Employed Efficiency coefficient of the firms,

HCE = Human Capital Efficiency coefficient of the firm and

SCE = structural capital efficiency of the firms.

VA = Value Added by each year for the firms.

The stronger the VAIC coefficient, in accordance with Pulic (2000), the more efficient VA is in respect to a firm's total resources. The total VA of a company is the initial step in calculating CEE, HCE, and SCE. This calculation is defined by the following algebraic equation:

VA = I + DP + D + T + M + R + WS ---------- [Equation (2)]

Where: VA (value added) for the banks are computed as the totality of interest expenses (I); depreciation expenses (DP); dividends (D); corporate taxes (T); equity of minority shareholders in net income of subsidiaries (M); and profits retained for the year (R) wages and salaries. Pulic (2000) as cited in Onuche, Jones & Nmesirionye (2019), states that capital employed (CE), which is the book value of a company's net assets, is equal to the ratio of total VA divided by the entire amount of capital employed (CE).

Influence of the interacting effect of value-added intellectual capital on the relationship between board independence and sustainability disclosure

Board independence is a distinctive of the board that perfectly represent the interest of stakeholders (Garcia-Sanchez, Cuadrado-Ballesteros & Sepulveda, 2014). Independent directors are professionals outside the firm, whose prestige is strongly align with their actions on the board. Their main responsibility is to demonstrate the fulfillment of rules and responsible behaviors in companies (Haniffa & Cooke, 2005). They guarantee essential checks and balances to improve board effectiveness in controlling companies' activities (Michelon & Parbonetti, 2012). Aside, independent directors increase the focus on sustainability issues and information disclosure (Barako & Brown, 2008). They ensure that companies pursue benefits of various stakeholders other than just shareholders. Independent directors unveil superior concern for sustainability issues by being more sensitive to stakeholders' demands, thereby ensuring the legitimacy of their actions and resources (MartinezFerrero *et al.*, 2017). However, prior studies provided evidence that board independence influences the disclosure of companies' sustainability information. However, the impact of board independence on sustainability reporting can be improve with efficient utilization of intellectual capital strategies and processes.

Intellectual capital strategies such as human relations, feedbacks, technologies, R&D can be deployed by independent directors to support socially related disclosure (Al-Musali & Ismail, 2015). Therefore, it is more likely that investment in intangible assets like knowledge and skills will result in creative solutions that enhance the way sustainability disclosure information is presented. As a result, careful investment in intellectual capital procedures is expected to improve the efficiency of sustainability reporting practices. Based on the foregoing, the current study believes that the deployment of intellectual capital will strengthen the connection amid board independence and sustainability disclosure.

Theoretical underpinning

The signaling theory is a conceptual structure that studies the content disclosed in sustainability reports, with the belief that corporations can change stakeholders' opinions, generate a competitive advantage, and favorably influence their corporate image by signaling. Camouflage, intent, and necessity are the three forms of signals. The Signaling Theory has been utilized (Legendre & Coderre, 2013) to analyze and objectively evaluate the reporting patterns that firms use. Current literature references suggest a research of sustainability based on the Signaling Theory (Bae & Masud, 2018). Although there is empirical evidence on this latter point, several authors have advocated for broadening and expanding its use to investigate the disclosure process in corporate

sustainability reports (Ching & Gerab, 2017) because signaling assists companies in influencing stakeholders' perceptions, creating a competitive advantage, and positively impacting their corporate image (Moratis, 2016). Companies can also conceal information and avoid recognition of the true growth of their sustainability programs (Corbett, Webster & Jenkin, 2018).

Empirical Review

Arniati and Muslichah (2023) investigated the influence of the board of directors in mining company performance: a mediating analysis of intellectual capital and sustainability reporting. The research looked at mining businesses that went public on the Indonesia Stock Exchange between 2019 and 2021. We examined a sample of 30 such businesses. The role of the board of directors is the independent variable, and the company's performance as dependent variable. They looked into intellectual capital and sustainability reporting as potential moderators. They used the Partial Least Squares approach with the Smart PLS version 3 software for analysis. While independent board directors do not directly influence a firm's performance, they do have a substantial impact on its intellectual capital, which includes knowledge, expertise, intellectual property, and personnel talents. The firm's performance is directly influenced by intellectual capital, implying an indirect route via which independent directors contribute to the firm's success. In addition, the firm's sustainability reporting—which divulges consequences for the economy, the environment, and society—is directly influenced by independent directors. Sustainability reporting, like intellectual capital, has an impact on corporate performance, giving another indirect channel for independent directors to influence performance. As a result, intellectual capital and sustainability reporting act as intermediaries between independent directors and business performance, highlighting the critical, albeit indirect, role these directors play in accelerating a firm's success.

Amahulu and Osonwa (2023) investigated the link between board qualities and market value added of listed service firms in Nigeria over a fourteen-year period from 2008 to 2021. Board size, board gender diversity, and board independence were employed as proxy variables for board characteristics, with market value added serving as the dependent variable. Three hypotheses were developed in accordance with the study's aims. The ex-post facto research design was used. For this study, twelve (12) listed service firms made up the sample size. Secondary data were gathered from the sampled firms' annual reports and accounts and evaluated utilizing E-Views 10.0 statistical software. Descriptive and inferential statistics were employed in the study, such as Panel Least Square (PLS) regression analysis and Pearson correlation. The empirical findings revealed a significant and positive relationship between board size and market value added ($\beta1=0.472095$; p-value = 0.00000.05); a significant and positive relationship between board gender diversity and market value added ($\beta2=0.854378$; p-value = 0.00090.05); and a significant and positive relationship between board independence and market value added ($\beta3=0.331410$; p-value = 0.00000.05) of listed services. Lastly, the market value added of listed service companies in Nigeria is strongly correlated with the characteristics of the board. Among other things, it was suggested that company boards should have an independent majority, as this is more likely to prioritize the best interests of shareholders, foster independent decision-making, and mitigate

potential conflicts of interest, given the positive effect of board characteristics on market value added.

Githaiga and Kosgei (2023) evaluated the impact of board features on sustainability reporting in East African listed enterprises. The analysis analyzed data from 2011 to 2020 and a sample of 79 listed corporations taken from East African stock markets. The Global Reporting Initiative is used to monitor sustainability reporting, and the data is analyzed using three-panel data estimate models - fixed effect, random effect, and the generalized method of moments. Their studies demonstrated that board gender diversity, board financial knowledge, and board independence are all connected with sustainability reporting in a favorable and meaningful way. Board size, on the other hand, has a negative and considerable impact on sustainability reporting.

Orumwense and Osa-Izeko (2023) looked into how disclosure of environmental sustainability in Nigerian oil and gas companies was affected by board diversity. Oil-producing communities in Nigeria's Niger Delta region have experienced ongoing oil spills, resulting in an unbearable economic condition. The goal of the study is to ascertain whether environmental sustainability disclosure in Nigerian oil and gas companies is influenced by board size, gender, nationality, and independence. In order to examine the cause-and-effect relationship between the independent and dependent variables, the study used an ex-post facto research methodology. Eight oil and gas companies from the Nigerian Exchange Group were surveyed. Panel multiple regression analysis and secondary data from 2011 to 2020 were used to analyze the data. According to the findings, there was a negative relationship between board size (BSZ) and environmental sustainability disclosure but a significant relationship between board gender diversity (BGD) and environmental sustainability disclosure. Additionally, there was a negative relationship between board independence (BIND) and environmental sustainability disclosure but an insignificant relationship with environmental sustainability disclosure. According to the study, Nigerian oil and gas companies will disclose more information about environmental sustainability if their boards are smaller. Even if there is a negative correlation between independent variables and environmental sustainability disclosure, board diversity is still believed to have a major influence on information disclosure. It is advised that both the government and corporate management recognize their roles in maintaining and conserving the natural environment.

Baba and Abdul-Manaf (2017), explored the scope and drivers of sustainability disclosure in Nigeria with the second goal been to see if intellectual capital efficacy moderates the association between board governance procedures and sustainability disclosure. During the course of the research, content analysis was used to extract sustainability disclosure information from the annual reports of 80 Nigerian Stock Exchange-listed companies. The study lasted from 2010 to 2015. As predictors of sustainability disclosure, board size, independence, diversity, and board meetings were evaluated. For the regression study, the sustainability disclosure index and board governance metrics were computed. The percentages were used to describe the type and level of sustainability disclosure among the companies in the sample. To examine the associations described in the study, a multiple regression analysis was performed. The descriptive study found a low level of disclosure of sustainability information in company annual reports. According to the regression study, board

size, board independence, and board diversity all improve the sharing of sustainability information. The board meeting, on the other hand, was shown to be insignificantly associated to sustainability disclosure. The findings also show that intellectual capital has a considerable positive impact on the relationship between board size, independence, diversity, and sustainability disclosure. However, it does not appear that intellectual capital moderates the association between board meetings and sustainability disclosure.

3. Methodology

Data Collection: The companies selected for analysis were those listed on the Nigerian Exchange Group (NGX). The data for this study was derived from companies' annual reports and stand-alone sustainability reports. The study's population is the entire 154 firms listed on the NGX across eleven (11) sectors as at 31st December, 2022 out of which a sample size 50 where selected from 10 sectors excluding the service sector because firm in the sector do not have an homogenous characteristics.

Variable measurement: A content analysis was used to extract information on companies' sustainability disclosure using an un-weighted disclosure index. Based on the unweighted disclosure index, "1" indicates the presence of sustainability information and "0" otherwise (Chau & Gray, 2002; Haniffa & Cooke, 2005; Mohd Ghazali, 2007; Monteiro & AibarGuzmán, 2010). The nature and trend of sustainability disclosure were assessed using a sentence-counting method similar to Michelon and Parbonetti (2010). GRI G4 standard was used as the checklist. Based on the checklist, social disclosure has a total of 31 points while the environmental disclosure has a maximum of 17 points and economic 7 points. Therefore, each annual report has the chances of scoring a minimum of 0 and a maximum of 55 points for both social, environmental and economic disclosures. Data for the independent variable (board independence) and the moderating variable (VAIC) were hand collected from the sampled companies' annual reports.

Models and Techniques for Analysis: This study adopted a method of moment quantile regression approach in analyzing the data collected from companies' annual reports using stata 17 analytical software. Both descriptive and inferential analysis were performed using Eviews 10 analytical software. A descriptive statistic was performed basically to summarize the data into a manageable form with the view to make it more concise and to provide a summary of the sample and measurements. A multiple regression was applied to test the hypothesis based on the research models specified below. Moderation model tests whether the prediction of a dependent variable by independent variable differs across the level of a third variable. Moderation effect tends to exist when the interaction term explains a statistically significant amount of variance in the dependent variable. In this case, this study tested to determine whether inclusion of value-added intellectual capital as a moderator variable led to a significant variation in the effect of independent variables on the dependent variable.

MODEL 1

$SD = \beta_0 + \beta_1 BINDit + \beta_2 VAICit\ ei \ldots\ldots\ldots\ldots\ldots\ldots i$

MODEL 2

$SD= \beta 0 + \beta_1 BINDit + \beta_2 VAICit + \beta_3 BIND*VAICit + ei…ii$

Where;

SD = Sustainability disclosure (made up of environmental, social and economic sustainability dissclosures)

BIND= Board independence

VAIC= Value added intellectual capital

B0= beta coefficient

ei= error term

4. FINDINGS AND DISCUSSION

Descriptive Statistics

	SD	ENSD	SSD	ECSD	BIND	VAIC
Mean	0.941643	0.304161	0.328499	0.376904	0.309243	124.4043
Median	0.596384	0.117647	0.142857	0.285714	0.285714	6.052240
Maximum	2.785714	1.000000	1.000000	1.000000	1.000000	8679.525
Minimum	0.066667	0.000000	0.000000	0.000000	0.066667	-8695.216
Std. Dev.	0.772401	0.384884	0.370508	0.381590	0.172035	1008.897
Skewness	0.966771	1.019730	0.926333	0.553499	1.090182	3.524426
Kurtosis	2.470480	2.305832	2.240055	1.744400	4.567811	45.70529
Jarque-Bera	92.10157	106.3623	91.89325	64.21195	165.2754	42932.73
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	517.9037	167.2885	180.6744	207.2973	170.0837	68422.37
Sum Sq. Dev.	327.5352	81.32629	75.36475	79.94031	16.24828	5.59E+08
Observations	550	550	550	550	550	550

Table 4.1 above reviews that the mean values for SD, ENSD, SSD and ECSD are 0.94163, 0.304181, 0.328499 and 0.376904 respectively for the period covered by the study, indicating that the average value of SD of the series is 0.9%, ENSD is 0.3% while SSD is 0.3% and 0.3% also for ECSD. The higher the percentage for SD implies that the firm have higher SD performance. The standard deviation (Std. Dev.) indicates the dispersion from or spread in the series from their mean values. VAIC has the highest dispersion of 1008.897, however SD, ENCS, SSD, ECSD, BIND, FBM and FGD have low dispersion from their means of 0.772401, 0.384884, 0.370608, 0.381590, respectively.

Skewness which depicts the asymmetry of the distribution around the mean reveals that all the variables under study have a long right tail (positive skewness). The peakness or flatness of the distribution of the series is indicated by kurtosis. Statistics reveal that BIND, and VAIC, are not

normally distributed as their values exceed the acceptable 3 and are thus presumed to be peaked (leptokurtic) relative to the normal, while SD, ENCS, SSD and ECSD with values less than 3 are presumed to be flat (playtykurtic) relative to the normal.

The statistical significance for the Jarque-Bera statistics of all the variables are less than 0.05, hence, we reject the null hypothesis that the series are normally distributed. Thus, the series failed to meet the assumption of normality which is an indication of uncertainty in trend of the distribution of the data set collected for the study. Again, the panel data is a short panel with the time period (11 years covering 2012 to 2022) less than the number of cross-sessions (50 listed firms).

Table 4.2: Augmented Dickey- Fuller (ADF) Unit Root Test Results on the Study Variables.

Variables	Order	t-statistics	p-values	Remarks on order of integration
SD	Level	-8.384631	0.000	*1*(0)
ENSD	Level	-8.396097	0,000	*1*(0)
SSD	Level	-8.551615	0.000	*1*(0)
ENSD	Level	-8.180067	0.000	*1*(0)
BIND	Level	-7.636993	0.000	*1*(0)
VAIC	Level	-6.116377	0.000	*1*(0)

Source: Researcher's computation from annual reports of selected listed firms using Eviews version 10, (2023).

From the ADF unit root in Table 4.1 above, all the individual variables have negative t-statistic coefficient values. We therefore ascertain whether the variables are stationary or non- stationary by testing the hypothesis at the desired a level of significance.

The null hypothesis; Ho:∂=0(i.e., there is a unit root or the time series in non-stationary or it has a stochastic trend). Where ∂=p-1.

Alternative hypothesis; H1:∂=<0(i.e., the time series is stationary, possibly around a deterministic trend).

The ADF test follows the same asymptotic distribution as the DF statistic. If the estimated t value is greater than the critical t value at the chosen α level of significance, then the null hypothesis will not be accepted and the time series is therefore said to be stationary. However, this study adopted using the probability value of the t-statistic to determine the stationarity. From the above result, it was established that all the variables have probability values of less than 5% level of significance. We therefore reject the null hypothesis and conclude that all the variables are stationary.

This implies that the mean, variance and auto covariance of the series do not vary systematically over time. Evidently, the result also indicates that all the variables are stationary at 1(0) order of integration and are therefore assumed to be co-integrated. Variables are said to be co-integrated where the linear combination are stationary. According to park (1992), a relationship between 1(1) variables is said to be "statistically co-integrated" if it is trend stationary while "deterministic co-integration" refers to the case where the co-integration relationship is level stationary.

Method of Moment Quantile multiple (dynamic method of moments) regression (MMQreg)

The quantile multiple dynamic method of moments regression is a regression quantile that allows the use of methods that are only valid in estimation of conditional means while still providing information on how the regressors affect the entire conditional distribution. Unlike regular linear regression which uses the method of least squares to calculate the conditional ***mean*** of the target across different values of the features, quantile regression estimates the conditional ***median*** of the target. Dye, (2020) states that Quantile regression is an extension of linear regression that is used when the conditions of linear regression are not met (i.e., linearity, homoscedasticity, independence, or normality). The Dynamic model is therefore required because the data is a short panel and quantile regression is used because the data is not normally distributed. The extract of the results of the quantile multiple regression MMQ are thus presented below and details shown in appendices 3-5

Effect of board independence on ENSD of firms listed on NGX

Table 4.3 provides the summary of the MMQreg test of the effect of board characteristics on environmental sustainability disclosure of listed firm in Nigeria.

Table 4.3: Method of Moment Regression Analysis for ENSD Model

	25%		50%		75%	
Variable	**Coef.**	**Z/ P values**	**Coef.**	**Z/ P values**	**Coef.**	**Z/ P values**
BIND	-.0875493	-1.58(0.114)	-.1212528	-1.72(0.008)	-.1579154	-1.52 (0.129)
VAIC	-.0000214	-2.42(**0.016**)	-.000024	-2.13 (**0.033**)	-.0000269	-1.62(0.106)
C	-.0853649	-3.61(0.000)	0269335	0.87 (0.382)	.1490914	3.12 (0.002

Source: **Extract from MMQREG estimation output for ENSD model**

Evidence from the estimated quantile regression shows that BIND was found to be inversely related to ENSD implying that an increase in BIND by one percent reduces the value of ENSD in the firms under survey/study. The moderating variable was however found to be statistically insignificant at the 25 quantiles. This implies that at the lower quantile VAIC has a negative but significant effect on ENSD.

As we move up the quantile, BIND remained negative across all quantiles with the variables to be statistically nonsignificant across all quantiles. The implication is that BIND will not be a major determinant of ENSD despite the negative relationship. This finding is also true for all quantile classes. Observing the moderating variable VAIC, we observed that the estimated model indicates a negative and significant effect of the variable on ENSD at 25 and 50 quantiles respectively. At 75% VAIC was found to be negative and nonsignificant.

Effect of board characteristics on SSD of firms listed on NGX

Table 4.4 provides the summary of the MMQreg test on the effect of board characteristics on social sustainability disclosure of listed firm in Nigeria.

Table 4.4: Method of Moment Regression Analysis for SSD Model

	25%		**50%**		**75%**	
Variables	**Coef.**	**Z/ P values**	**Coef.**	**Z/ P values**	**Coef.**	**Z/ P values**
BIND	.2025073	3.74 **(0.000)**	.1957331	2.91 (0.004)	.1849525	1.64(0.100)
VAIC	.0000123	-1.51 (0.130)	.0000188	-1.87 **(0.062)**	.0000293	-1.74(0.083)
C	.1556826	-6.81(0.000)	.0435355	-1.50(0.133)	.1349371	2.82 (0.005)

Source: Extract from MMQreg estimation output for SSD model

With evidence from the estimated quantile regression result displayed above, the BIND have a positive and statistically significant effect on SSD at the 25% and 50% quantiles. The study established that all things being equal an increase in the predicative variables BIND by 1 unit will cause an increase in SSD by 20%. The moderating variable however exhibited a statistically insignificant effect at the 25th quantile. This implies that at the lower quantile VAIC has a negative and nonsignificant effect on SSD.

As we move up the quantile, we discover that the Board Independence remained positive across all quantiles with the variables to be statistically significant at 25% and 50% quantiles but could not sustain its effect on the highest quartile (75%). By implication BIND will not be considered a major determinant of SSD since its effect was not sustained at the third quantile.

Looking at the moderating variable VAIC, we observed that the estimated model indicates a negative and also not significant on the SSD variable at 25, 50 and 75 quantiles respectively.

The positive significance between BIND and SSD could be as a result of independence granted to the board to judiciously carryout its functions without insiders' interference or intimidation or threat to their objectivity on sustainability matters. This also implies that a more independent board membership is crucial in insuring social sustainability disclosure practices which also could be as a result of the liberty gained in carry out the duties.

Effect of board characteristics on ECSD of firms listed on NGX

Table 4.5 provides the summary of the MMQreg test of the effect of board characteristics on economic sustainability disclosure (ECSD) of listed firm in Nigeria.

Table 4.5: Method of Moment Regression Analysis for ECSD Model

	25%		50%		75%	
Variable	**Coef.**	**Z/ P values**	**Coef.**	**Z/ P values**	**Coef.**	**Z/ P values**
BIND	-.072627	-8.83 (0.408)	-.0487306	-0.53(0.593)	-.0100688	-0.08 (0.933)
VAIC	7.58e-06	0.62 (0.536)	-.0000121	-0.92(0.356)	-.0000439	-2.57**(0.010)**
C	-.0380811	-1.10 (0.271)	.1486196	3.49 (0.000)	.4506814	8.66(0.000)

Source: Extract from MMQREG estimation output for ECSD model

From the outcome of the estimated quantile regression above, it is obvious that BIND was found to be inversely related to ECSD implying that an increase in BIND reduces the worth of ECSD in the firms under survey/study.

Moving upward the quantile, we discover that BIND remained negative across all quantiles with the variables to be statistically nonsignificant across all quantiles. The implication is that BIND will not be a major determinant of ECSD despite the negative relationship. This finding is also true for all quantile classes.

Looking at the negative and non-significant attribute of BIND on ECSD, it could be attributed to the fact independent board members are not judicious in carrying out their duties as agents to act in the interest of outsiders/ stakeholders. Such display can also be attributed to lack of independence as a result of threat to objectivity.

MODERATING EFFECT OF VALUE-ADDED INTELLECTUAL CAPITAL ON THE RELATIONSHIP BETWEEN BOARD INDEPENDENCE AND SUSTAINABILITY DISCLOSURE

The moderating effect of value-added intellectual capital (VAIC) on sustainability disclosure of firms listed on the Nigerian Exchange Group is reported below;

Interacting effect of VAIC on the association between board independence and sustainability disclosure of listed firms in Nigeria

Table 4.6: Moderating Effect of VAIC on the Association between Board independence and Sustainability Disclosure of Listed Firms in Nigeria.

	Un-moderated VAIC Model	Moderated VAIC Model

Details	**Coefficient**	**t-statistics**	**Sig**	**Coefficient**	**t-statistics**	**Sig**
(Constant)	.008	.304	.761	.013	.453	.651
McBIND	1.053	6.651	.000	1.072	6.672	.000
McVAIC	-4.775	-1.802	.072	-9.673	-.163	.870
McBIND-mcVAIC				.000	.830	.407
F-Statistic		76.853			43.934	
F-stat (Prob.)		.000			.000	
R2		.361			.362	
R2 change			.001			
F-change statistics			.388			
Sig. F-change			.762			
Durbin- Watson			.572			
VIF value range			1.028	3.526		

Source: Extracted from MMR results on SD Model

Table 4.6 provides Moderated Multiple Regression (MMR) results on two models (unmoderated and moderated) with the moderated model containing an interaction term for Value added intellectual coefficient (VAIC) on each component of the board independence used as focused independent variable (BIND_VAIC). The Durbin Watson (DW) statistic of 0.586 is not within the acceptable range of 1 to 3 suggested by Field (2009) and this evidences that the problem of auto correlation is unlikely not to exist in the series. The computed value of Variance Inflation Factor (VIF) ranges from 1.022 to 3.189 and fails within the desirable (VIF values < 10). The results for both DW and VIF confirms the absence of multicollinearity problem and accordingly considered to be reliable and meaningful for interpretation.

The table shows identical direction of the effect of board independence on sustainability disclosure, with all having positive influence on SD before and after moderation. The pre and post moderation results indicate that the components of explanatory variable have significant influence on sustainability disclosures. The effects of the interaction terms (BIND_VAIC) on the relationship between board independence and sustainability disclosure however indicate no significant interaction effect (with its p-values of 0.207 being greater than 0.05).

TEST OF HYPOTHESES

Testing for the effect of board independence (BIND) on environmental sustainability disclosure (ENSD) of listed firms in Nigeria

The null hypothesis is restated as follows:

$H0_1$: The effect of board independence on the environmental sustainability disclosure (ENSD) of listed firms in Nigeria is not statistically significant.

HA_1: The effect of board independence on the environmental sustainability disclosure (ENSD) of listed firms in Nigeria is statistically significant.

The result on table 4.3 also indicates the t statistics for board independence across the three quantiles. At 5% level of significance, it was observed that BIND is negative and not statistically significant across all the three quantiles. We therefore fail to reject the null hypothesis with the conclusion that BIND has no significant effect on the ENSD of listed firms in Nigeria.

Testing for the effect of board independence (BIND) on social sustainability disclosure (SSD) of listed firms in Nigeria.

The null hypothesis is restated as follows:

$H0_2$: The effect of board independence on the social sustainability disclosure (SSD) of listed firms in Nigeria is not statistically significant.

HA_2: The effect of board independence on the social sustainability disclosure (SSD) of listed firms in Nigeria is statistically significant.

From the result on Table 4.4 it is clear to state that BIND is significant at the first and second lower quantiles. We there reject the null hypotheses, concluding that BIND has a significant effect on social sustainability disclosure of firm even though it was not sustained at the third level of distribution.

Testing for the effect of board independence (BIND) on economic sustainability disclosure (ENSD) of listed firms in Nigeria

The null hypothesis is restated as follows:

$H0_3$: The effect of board independence on the economic sustainability disclosure (ECSD) of listed firms in Nigeria is not statistically significant.

HA_3: The effect of board independence on the economic sustainability disclosure (ECSD) of listed firms in Nigeria is statistically significant.

As we can observe on table 4.5, BIND revealed a negative and non-significant effect on ENSD. The result also indicates that the coefficient of BIND declaims as we move up the quantiles. Accordingly, we fail to reject $H0_9$ and conclude that BIND has no significant influence on ECSD of sampled firms listed on the Nigerian Exchange Group for the period under survey.

Testing for the moderating effect of value-added intellectual capital on the relationship between board independence and sustainability disclosure of listed firms in Nigeria.

The null hypothesis is restated as follows:

$H0_4$: Value-added Intellectual Capital (VAIC) does not have any significant moderation effect on the relationship between board independence and sustainability disclosure (SD) of listed firms in Nigeria.

HA_4: Value-added Intellectual Capital (VAIC) does not have any significant moderation effect on the relationship between board independence and sustainability disclosure (SD) of listed firms in Nigeria.

In appraising the interaction effects of VAIC on the relationship between board independence components and aggregate sustainability disclosure, reliance was placed on change statistic results reported in table 4.6 As can be read from the table, R^2 marginally increased from 0.361 in Model 1 to 0.362 in Model 2, resulting to R^2 change statistic of 0.001. R^2 change statistic shows the statistical significance of the interaction term, and this indicates the extent by which the VAIC moderates the relationship between board independence and sustainability disclosure. The R^2 change of 0.001 (that is, 1%) shows the proportional increase in variation explained by the addition of the interaction terms.
This indicates that the addition of the interaction terms resulted to increase of 1% in SD. This increase resulted to F-change statistic of 0.388 which is indicated to be statistically non-significant at 5% probability level (P = 0.762> 0.05). Accordingly, we fall to reject the null hypothesis (HO_{11}) and conclude that value added intellectual capital (VAIC) has no significant interaction effect on the nexus between board independence and sustainability disclosures of listed firms in Nigeria.

DISCUSSION OF FINDINGS

Effect of board independence (BIND) on environmental sustainability disclosure ENSD of listed firms in Nigeria

The result established that board independence on environmental sustainability disclosure of listed firms in Nigeria is statistically not significant at 5% level. The conclusion is on the Nwaigwe, Ofoegbu, Dibia and Nwaogwugwu (2022), decreasing coefficient and non-significant at 5% level with its p values greater than 0.005 at each of the three quantiles. This result does not conform to a priori expectation. Having an independent board who is not an employee or a trustee of the firm where they serve should induce a significant effect on environmental sustainability performance as it is the responsibility of the independent director to oversee the company's affairs and make sure its mission is fulfilled and in ensuring environmental disclosure practices in sampled listed firms.

On the other hand, the non-significance of the model may be attributed to the fact that the independent director may not have independence to their objective by way of a threat to their objectivity. The findings are in line with the findings of several researchers among which are (Bala *et al.*, 2023; Arniati *et al.*, 2023; Miaad *et al.*, 2020; Anazonwu *et al.*, 2018; Emeka-Nwokoyi, 2023; Orunwense, *et al.*, 2023; Chukwu *et al.*, 2022) who find no association between Board independence and environmental sustainability disclosure. The findings however, is in contrast with those of (Githaiga & Kosgei, 2023; Adabosa & Udeh 2023; Ashfaq *et al.*, 2019; Modozie &

Amahalu, 2022; Onuorah *et al.*, 2018). The study findings also refute that of Erin *et al.* (2022) who states that board independence has a significant impact on improving disclosure quality and increasing family ownership in disclosure and that it reduces the detrimental impact of block holder and managerial ownership on ESG disclosure.

Effect of board independence (BIND) on social sustainability disclosure SSD of listed firms in Nigeria

The result on table 4.4 reviewed that board independence on social sustainability disclosure of listed firms in Nigeria is statistically significant at 5% level over the first and the second quantiles but could not sustain its significance in the third quantile. The conclusion is on the decreasing coefficient at each of the quantiles and non-significance at 5% level with its p values greater than 0.005 in the third quantiles. This result conforms to a priori expectation that having an independent board who is not an worker or a representative of the firm where they serve induces a substantial outcome on social sustainability performance as it is the obligation of the independent director to superintend over the firm's activities and to ensure its mission is satisfied as well as guaranteeing disclosure on social practices in sampled listed firms.

Independent board members work towards ensuring a balance between the interest of shareholders, stakeholders and the generality of society. Therefore, a higher proportion of independent directors on corporate boards will lead to effective monitoring of boards, resulting in more disclosure of sustainability information in companies' annual report.

The results correspond with prior findings of Amahulu & Osonmo (2023); Hamzeh, & Saleh (2022), Erin, Adegboye & Bamigboye (2022), Oyekale, Olaoye & Nwaobia (2022b). Based on the evidence presented above, the present study validates the proposition that independent directors bring objectivity and external awareness to corporate boards. Therefore, the presence of more independent directors on corporate board leads to increase in social sustainability disclosure and also bring transparency in companies' functioning (Onuorah *et al.,* 2018). The findings however, is in contrast with those of Githaiga *et al.* (2023); Yahaya, Mohammed & Mohammed (2022); Aslem, Makki, Mahmood & Amin, (2019), Anazonwu, Egbunike & Gunardi (2018) who observe a negative association with sustainability disclosure components and also affirm with Salehnezhad *et al.* (2023), who studied the effect of ownership structure on corporate sustainability performance using independent board of director as a moderator. Their findings reviewed that independent board of directors does not have a significant interaction effect on the relationship between ownership structure and corporate sustainability performance by reporting the company's sustainability performance in social dimensions.

Effect of board independence (BIND) on economic sustainability disclosure ECSD of listed firms in Nigeria

The finding on $H0_3$ recognized that the association between board independence and economic sustainability disclosure of listed firms in Nigeria was found to be statistically not significant across the three quantiles at 5% level of significance with its p values greater than 0.005 at each

of the three quantiles. The conclusion is on the fact that the coefficients where found to be decreasing at the upper level quantiles. The findings are in line with that of Shakhawat (2022), Nwaigwe, Ofoegbu, Olayinka (2021); Dibia and Nwaogwugwu (2022). This result does not conform to a priori anticipation. Having an independent board who is not an employee or a trustee of the firm where they serve should induce a significant effect on economic sustainability performance not otherwise; as it is the obligation of the independent director to oversee the company's affairs and make sure its mission is fulfilled and to ensure disclosure of economic performance in sampled listed firms.

The likely reason for the lack of significant association between BIND and economic sustainability disclosure (ECSD) could be as a result of the fact that independent directors are viewed as a check and balance mechanism to ensures that companies act in the best interest of not just owners, but to other stakeholders as well through disclosure of sustainability information (Erin, et al, 2022) by this, the independent board members objectivity may be threaten and hence independence not guaranteed. This disagreement conforms with the findings of Kolsi, Muqattah, & Al-Hiyari (2022); Ashfaq & Rui (2019); Onuora, Egbunike & Gunardi (2018). These researchers found a significant association between BIND and ECSD.

Moderating effect of value-added intellectual capital on the relationship between board independence and sustainability disclosure (SD) of firms listed on the Nigerian Exchange group

Result on the Moderating Effect of value-added intellectual capital on the relationship between board independence and sustainability disclosure (SD) of listed firms in Nigeria reviewed an F-Statistics 0.388 which was indicated to be statistically insignificant at 5% probability level (P= .762 > 0.05) and thus concluded that VAIC has no significant moderation effect on the relationship between board independence and sustainability disclosure (SD) of listed firms in Nigeria. This result does not conform to apriori expectation. It was expected that the inclusion of VAIC as a moderator variable to board independence and the aggregate sustainability disclosure should strengthen the disclosure sustainability information and practices of listed firms. The VAIC attempts to measure the degree that a company produces added value based on intellectual capital or intellectual resources (which comprises the Human capital efficiency—HCE, Structural Capital Efficiency (SCE) and Capital Employed Efficiency.

The findings of this study correspond with Baba and Baba (2021), whose study examined the effect of ownership structure variables on social and environmental disclosure practices in Nigeria. Their paper also investigates the moderating impact of intellectual capital disclosure on the relationship between ownership structure elements, social and environmental disclosure. They found that intellectual capital disclosure has a significant positive effect on the relationship between management ownership, foreign ownership and dispersed ownership, social and environmental disclosure. However, intellectual capital disclosure does not moderate the relationship between block ownership, social and environmental disclosure. The findings is likewise linked with those of Salvation *et al.* (2022) and Salehi & Zimon (2021).

On the other hand, the findings contradict with Arniati & Muslinchah (2023); who revealed that the firm's sustainability performance have a substantial impact on its intellectual capital, implying an indirect route via which independent directors contribute to firms's success. Rebordo & Sowaity (2022); Shah *et al.* (2021); Jaturat *et al.* (2021); Pangaribuan *et al.* (2019) unanimously find a signification moderating effect of the variables of study. Baba and Abdul-Manaf (2017) precisely, explored the scope and drivers of sustainability disclosure to see if intellectual capital efficiency moderates the association between board governance mechanism and sustainability disclosure. They found a significant moderating effect between the independent variables (board size, board independence and women board diversity) and sustainability disclosure except for board meeting which does not reflect a significant interacting effect with IC. Thus, the study appear that intellectual capital moderates the association between board governance mechanism and sustainability disclosure of firms in Nigeria.

It is needful to justify the bases of the variables observed in some of the conclusions reached by others study on the ground highlighted as follows: the current study meticulously carried out pre estimation diagnostic test as unit root test, and other required procedures to determine the appropriate analytical techniques adopted. On the bases of which MMQ Reg which uniquely differ from other study was chosen. The age of the study likewise differs and could account for differences in the results as this study made use of the most current data obtained from NGX to undertake the research; the context of the study could as well account for variations as this was carried out in Nigeria.

CONCLUSION

Based on the above research findings, the study concluded that BIND was consistently found to be negative and insignificantly associated with environmental disclosure and economic sustainability disclosures across all the three quantiles. BIND was found to be statistically significant only with SSD at the first and second quantiles but failed to sustain its significance at the highest quantile. Regardless of the effectiveness in value added intellectual capital policies and strategies, it will not be able to support the relationship between board independence and sustainability disclosure of listed firms in Nigeria. Overall, the findings from this study provide a new and fresh perception on the relationship between board independence apparatuses and sustainability disclosure in Nigeria.

RECOMMENDATIONS

Based on the findings of this research work, it is recommended that;

i. Firms should increase the proportion of board independence as it is an effective leverage for firm because board intendance can reduce both agency problems and send signals to appropriate stakeholders and enhance SD performance.
ii. They recommend the implementation of FRCN sustainability disclosure guidelines for a consistent integrated reporting structure for Nigerian enterprises as well as heterogeneous board composition, which can capitalize on board independent membership wide set of capabilities on social sustainability matters.

iii. Management should ensure that there are a suitable number on non-executive directors on the board and establish the relevant advisory committees to assist the board in carrying out its responsibilities and driving better economic sustainability disclosure.
iv. Lastly, the study recommends that VAIC does not moderate the relationship between board characteristics and sustainability disclosures in Nigeria. Firms should provide adequate training, develop system, increase intellectual capital, organize research and development programs for their employee as well as promote a more comfortable atmosphere and environment to trigger value added intellectual capital which will bring above effectiveness in significantly moderating the association between board independence and sustainability disclosure of listed firms in Nigeria.

SUGGESTIONS FOR FURTHER RESEARCH

There is obviously vast scope to which much study that can broaden the understanding on board characteristics and sustainability disclosure can be explored for more policy recommendations.

i. This study adopted a method of moment quantile regression (MMQREG) the regress the variable as extracted from the NGX. Additional investigation is required to investigate the effect of board characteristics on sustainability disclosures on a sector by sector consideration by so doing it will help to avoid generalization.
ii. This study viewed sustainability disclosure using the GRI model. Other research can explore the FRSC to determine the disclosure effect.
iii. The study focuses on listed firm in NGX. Further studies could incorporate firms in different stock exchanges in west Africa.

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APPENDICES

. mmqreg ensd bind vaic, q(0.25 0.5 0.75)

MM-qreg Estimator

Number of obs = 550

Quantile: .

ensd	Coefficient	Std. err.	z	P>|z|	[95% conf. interval]
location					
bind	.0742236	.1045143	0.71	0.478	-.1306206 .2790678
vaic	-.000037	.0000141	-2.63	0.009	-.0000645 -9.41e-06
_cons	.2858066	.0339582	8.42	0.000	.2192499 .3523634
scale					
bind	.159675	.0889608	1.79	0.073	-.014685 .334035
vaic	-.0000341	.000012	-2.85	0.004	-.0000575 -.0000106
_cons	.2782618	.0289046	9.63	0.000	.2216097 .3349138
qtile__25					
bind	-.066756	.0446747	-1.49	0.135	-.1543168 .0208047
vaic	-6.90e-06	5.99e-06	-1.15	0.249	-.0000186 4.83e-06
_cons	.0401249	.0141452	2.84	0.005	.0124007 .0678491
qtile__5					
bind	-.019434	.0603416	-0.32	0.747	-.1377014 .0988334
vaic	-.000017	8.13e-06	-2.09	0.037	-.0000329 -1.06e-06

_cons | .1225918 .0202255 6.06 0.000 .0829505 .1622331

----------+----------

qtile__75 |

bind | .2102536 .1807668 1.16 0.245 -.1440428 .56455

vaic | -.000066 .0000249 -2.65 0.008 -.0001148 -.0000171

_cons | .5228628 .0762893 6.85 0.000 .3733385 .6723872

. mmqreg ssd bind vaic, q(0.25 0.5 0.75)

MM-qreg Estimator

Number of obs = 550

Quantile: .

----

ssd | Coefficient Std. err. z P>|z| [95% conf. interval]

----------+----------

location |

bind | .3941789 .1072336 3.68 0.000 .1840049 .6043529

vaic | -.0000333 .0000133 -2.50 0.012 -.0000593 -7.22e-06

_cons | .2107414 .0329211 6.40 0.000 .1462171 .2752657

----------+----------

scale |

bind | .2571315 .0843004 3.05 0.002 .0919057 .4223572

vaic | -.00003 .0000105 -2.87 0.004 -.0000505 -9.49e-06

_cons | .2299944 .0258806 8.89 0.000 .1792694 .2807193

----------+----------

qtile__25 |

bind | .1469582 .0550171 2.67 0.008 .0391266 .2547898

vaic | -4.46e-06 6.86e-06 -0.65 0.516 -.0000179 8.99e-06

_cons | -.0103882 .0168679 -0.62 0.538 -.0434486 .0226723

----------+----------

qtile__5 |

bind | .2550594 .0736969 3.46 0.001 .1106162 .3995026

vaic | -.0000171 9.08e-06 -1.88 0.060 -.0000348 7.35e-07

_cons | .0863043 .0242627 3.56 0.000 .0387502 .1338584

----------+----------

qtile__75 |

bind | .6009869 .1761112 3.41 0.001 .2558153 .9461585

vaic | -.0000574 .0000216 -2.66 0.008 -.0000997 -.000015

_cons | .3957234 .0603167 6.56 0.000 .2775048 .513942

---

mmqreg ecsd bind vaic, q(0.25 0.5 0.75)

MM-qreg Estimator

Number of obs = 550

Quantile: .

----

ecsd | Coefficient Std. err. z P>|z| [95% conf. interval]

----------+----------

location |

bind | .0801364 .0976632 0.82 0.412 -.11128 .2715529

vaic | -.0000285 .000014 -2.04 0.041 -.0000559 -1.14e-06

_cons | .3556695 .0337393 10.54 0.000 .2895417 .4217972

----------+----------

scale |

bind | .0510696 .0533802 0.96 0.339 -.0535536 .1556928

vaic | -.0000339 7.63e-06 -4.43 0.000 -.0000488 -.0000189

_cons | .3241709 .018441 17.58 0.000 .2880273 .3603146

----------+----------

qtile__25 |

bind | .0235682 .074832 0.31 0.753 -.1230999 .1702363

vaic | 8.99e-06 .0000106 0.85 0.395 -.0000117 .0000297

_cons | -.0034048 .0232757 -0.15 0.884 -.0490244 .0422148

----------+----------

qtile__5 |

bind | .0647465 .0882714 0.73 0.463 -.1082623 .2377554

vaic | -.0000183 .0000128 -1.43 0.154 -.0000435 6.85e-06

_cons | .2579801 .0362172 7.12 0.000 .1869957 .3289646

----------+----------

qtile__75 |

bind | .1334227 .1402807 0.95 0.342 -.1415225 .4083679

vaic | -.0000638 .0000205 -3.12 0.002 -.0001039 -.0000237

_cons | .6939108 .0584691 11.87 0.000 .5793135 .808508
