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GREY DIRECTORS ATTRIBUTE AND IDIOSYNCRATIC RISK OF LISTED MANUFACTURING FIRMS IN NIGERIA

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ABSTRACT

The study investigated the nexus between grey directors' attribute and idiosyncratic risk of listed manufacturing firms in Nigeria using a ten (10) year time frame that span through 2014 to 2023. To achieve the stated broad objectives, specific attributes of grey directors' which have been widely employed in related extant literature to include, grey director nationality, and grey director overlap function were selected to ascertain the extent to which they affect idiosyncratic risk. This study employed ex-post facto and descriptive research design on a panel data set sourced from annual financial reports of a sample of forty-six listed manufacturing firms in Nigeria. Further, Iterated Generalized Least Squares (IGLS) Random Effects with Heteroskedastic Panels regression model was employed to test the formulated hypotheses. The findings revealed that grey director attributes and overlapping roles did not exhibit significant relationship with firm-specific risk, nationality of grey directors showed a strong negative relationship with idiosyncratic risk. Therefore, based on the foregoing empirical outcomes, this study recommends among others that stakeholders in the manufacturing industry should refrain from formulating or implementing governance reforms solely on the assumption that dual-role occupancy inherently enhances risk oversight.

Key words: *Grey Director Nationality, Grey Director Overlap, Idiosyncratic Risk.*

INTRODUCTION

Idiosyncratic risk which is a type of firm-specific risk linked to internal factors such as governance, organizational performance, and financial structuring can have significant impacts on company valuation and investor confidence (Nguyen, Ben Zaied & Pham, 2019), an effective risk management strategy becomes indispensable (Laeven & Levine, 2009). While diversification traditionally mitigates idiosyncratic risks, prior studies highlights that such risks are not fully eliminable due to evolving internal and market-specific variables (Butar, 2020). Therefore, firm-specific risk remains a critical aspect of modern corporate

management (Stulz, 2008), especially in economies like Nigeria where fluctuating market dynamics shaped by macroeconomic volatility, regulatory shifts, and industry-specific pressures present distinct challenges.

Corporate governance firm risk nexus has emerged in literature as a focal point in global discussions on corporate governance and accountability, especially following financial crises that underscored failures in risk management (Castellano, 2024; Chen, 2024). Roy, (2016) documented that grey director can sometimes prioritize internal alliances over independent oversight, leading to potentially excessive risk-taking. This tendency has raised significant concerns, particularly when grey directors permit or fail to address high-risk behaviors, ultimately exposing firms to vulnerabilities and increasing idiosyncratic risk. Cases of Lehman Brothers and Archegos Capital collapse reflect how lack of stringent oversight and accountability among directors contributed to extreme financial consequences (Claessens et al., 2010; Coffee, 2020). In response, regulators worldwide have pushed for reforms to enhance the duties and accountability of corporate directors, emphasizing the need for stricter frameworks that addresses the risks posed by directors' limited independence (Organization for Economic Co-operation and Development OECD, 2021; Financial Stability Board FSB, 2017).

In this study, the sole target of listed manufacturing firms in Nigeria is due partly to its critical role in economic diversification and vulnerability to fiscal policy changes. The industry has faced challenges such as fluctuating tax policies (AC-Ogbonna, 2021), high operational costs due to inadequate infrastructure (Adelegan, 2011; Adeleye, Oluwadare & Olaiyapo, 2024), and currency volatility, which directly impact firm-specific risks. Additionally, in the aftermath of governance and tax reforms, the industry has witnessed significant governance reforms and increased scrutiny on tax practices, making grey directors' strategic decisions particularly influential. Recent government incentives aimed at boosting local production further amplify the relevance of studying how tax optimization strategies interact with grey directors' attributes to mitigate risks in this strategically vital industry. Further, this study is motivated noting that review of extant literature show non-existence in studies that have evaluated the link between grey directors and idiosyncratic risk in Nigeria. Much more, this study carefully observed that existing related literature have established only the direct link between corporate governance attribute and firm idiosyncratic risk. Nevertheless, while such efforts are commendable, the crux of this study's motivation is that the researchers believes that though the direct link between grey director attribute and firm idiosyncratic risk may be

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a necessary condition, it is not sufficient to explain real world situations (Westfall & Yarkoni, 2016). Notably, for corporate managers and stakeholders, the policy implication advantage of outcomes obtained from indirect (moderated) model, *lies in its ability to uncover deeper relationships and conditional effects* that are not apparent in a linear model. Consequently, it provides deeper insight which enables more tailored and effective decision-making and policy formulation, capable of enhancing strategic planning and resource allocation.

Objectives

The broad objective of the study is to examine the moderating effect of tax optimization strategy on the relationship between grey directors' attribute and idiosyncratic risk of listed manufacturing firms in Nigeria. However, the specific objectives are to

1. evaluate the relationship between grey directors' nationality and idiosyncratic risk of listed manufacturing firms in Nigeria.
2. explore the relationship between grey directors' overlap duty and idiosyncratic risk of listed manufacturing firms in Nigeria.

LITERATURE REVIEW

Grey Director Nationality Diversity

Grey director nationality diversity in relation to firm idiosyncratic risk within tax optimization strategies have been blended with varied theoretical perspectives. Champions of this view to include but not limited to (Ali, Khan, Zahid & Hussain, 2024) document those diverse national backgrounds among grey directors can introduce international tax knowledge and innovative approaches, enhancing the firm's ability to leverage tax shields and capital intensity tools effectively while minimizing idiosyncratic risk. With access to varied regulatory insights and best practices, grey directors can facilitate compliance while optimizing tax benefits that reduce risk exposure, especially in cross-border tax structures and transfer pricing, which demand deep understanding of tax jurisdictions (Rego et al., 2024; Niu et al., 2023). Advocates suggests that nationality diversity among grey directors enhances the firm's ability to navigate complex tax optimization strategies, such as effective tax rates, debt tax shields, and thin capitalization, by integrating diverse regulatory insights and international tax expertise (Ali, Khan, Zahid & Hussain, 2024). Varied perspectives enable more innovative and compliant tax solutions, particularly beneficial in multinational contexts where understanding different jurisdictions' tax frameworks is critical.

Theories like resource dependency suggest that grey directors provide unique resources through their networks and knowledge, which can reduce firm-specific risk by ensuring optimized and well-governed tax strategies (Niu et al., 2023). However, critics argues that nationality diversity among grey directors' lead to conflicting interpretations of tax risk tolerance, especially in complex strategies like thin capitalization and non-debt tax shields techniques (Alzayed, Batiz-Lazo & Eskandari, 2024). These disparities could create delays and inconsistencies in decision-making, particularly if there is a clash in national regulatory perspectives, potentially amplifying idiosyncratic risk due to fragmented tax strategies or increased susceptibility to audits and penalties. Further, skeptics hold the view that nationality diversity may introduce conflicting approaches to tax risk management. (Maier & Yurtoglu, 2022) is of the view that directors from different regulatory backgrounds may have varying tolerance levels for risk, especially with strategies like capital intensity adjustments, which involve significant tax-saving mechanisms yet carry audit risks if misaligned with national standards. Conflicts in interpreting tax risk, coupled with potential delays in decision-making due to differing viewpoints, can increase idiosyncratic risk by creating inconsistent or reactive tax strategies that lack cohesion (Ali et al., 2020).

A third position argues that nationality diversity within the ranks of grey directors influences idiosyncratic risk primarily through the governance structure and tax strategy integration; thus, its effect is neither consistently positive nor negative. Instead, it depends on the extent to which grey directors' international insights are effectively harnessed within a cohesive tax governance framework that aligns risk management with optimization goals (Hutchens et al., 2024). These scholars further emphasizes that the effect of nationality diversity among grey directors on firm-specific risk is highly contextual, again shaped by governance structure and strategic alignment within the firm. The relationship between grey directors with overlapping responsibilities on risk committees and firm idiosyncratic risk, particularly when engaging in tax optimization strategies like effective tax rates, debt tax shields, and capital intensity, yields diverse theoretical perspectives. From a positive standpoint, proponents argue that grey directors can leverage their detailed operational knowledge to align tax-saving strategies with risk management, thereby reducing idiosyncratic risk. For instance, when tax tools such as debt tax shields or capital-intensive incentives are employed, grey directors who understand the firm's unique financial landscape may navigate regulatory complexities effectively, using these tax savings to stabilize firm cash flows and buffer against firm-specific shocks (Hutchens et al., 2024; KPMG, 2019). However, a critical perspective suggests that grey directors, due to their potential lack of independence, might support riskier tax positions (such

as thin capitalization or aggressive non-debt tax shields) that prioritize short-term tax savings but expose the firm to greater regulatory scrutiny and potential financial penalties. This may lead to increased idiosyncratic risk as the firm becomes more vulnerable to tax audits and legal disputes, which could disrupt cash flows and elevate operational risk (Rego, Hutchens, & Williams, 2024). A neutral stance posits that the impact of grey director overlap on risk committees is largely conditional upon the governance framework and the risk culture within the firm. If a firm has robust risk controls, grey directors' involvement in tax optimization can be neutral, as the broader risk committee structure may mitigate any potential biases or excessive risk-taking behaviors associated with complex tax strategies (Niu et al., 2023). Ultimately, the effect of grey director overlap in risk committees is context-dependent, influenced by how well the firm's governance mechanisms can balance the benefits of tax savings against the potential for heightened idiosyncratic risk.

$Ho_{1:}$ *There is no significant relationship between grey directors' nationality and idiosyncratic risk of listed manufacturing firms in Nigeria*

$Ho_{2:}$ *There is no significant relationship between grey directors' overlap duty and idiosyncratic risk of listed manufacturing firms in Nigeria*

Empirical Review

Ferreira, Ribeiro, and Vicente, (2025) examined whether idiosyncratic risk affects market value of cash and whether the value, moderated by such risk, differs between Brazilian family and non-family businesses. The empirical model is based on the model developed by Fama and French (1998) and adapted and idiosyncratic risk is estimated based on the 3-factor model of Fama and French (1993). The firms were classified as family and non-family using the Reference Form, and a total of 83 firms were analyzed using multiple and quantile regressions. The results show that idiosyncratic risk positively affects the market value of cash and that the market value of cash, moderated by idiosyncratic risk, is lower for family businesses than for non-family businesses.

Bougacha and Guedrib (2024) aimed to investigate the moderating role of firm performance in the relationship between tax avoidance and firm risk. The study utilized data from French companies listed on the CAC 40 stock exchange, focusing on the period from 2010 to 2022. The analysis primarily centered on non-financial sectors, including industrials, consumer discretionary, and healthcare. The key variables examined in the study were firm risk as the dependent variable, tax avoidance as the independent variable, and firm performance as the

moderating variable, with additional control variables. The study employed the feasible generalized least squares (FGLS) method to test its hypotheses. Specifically, higher accounting performance decreased firm risk, whereas market performance increased firm risk and findings are robust across different tax avoidance measures, including long-run cash effective tax rates.

Igbinosa, Akinuli, Popoola, and Adeola (2024) conducted a study with the objective of analyzing the relationship between board structure and financial performance of manufacturing companies in Nigeria. The data for this study was collected from the Nigeria Exchange Group (NGX), focusing on 26 listed manufacturing companies between the years 2017 and 2021. The study examined board characteristics such as board size, board diversity, and board independence. The dependent variable was financial performance, measured through return on assets, while the independent variables included board size, board diversity, and board independence. The research employed a correlational design with the use of panel data analysis and applied the ordinary least squares (OLS) regression technique to test the hypotheses. Agency theory served as the study's theoretical framework. The data was sourced from corporate annual reports and company websites. The results showed that board size and board diversity had significant positive effects on financial performance, while board independence showed no significant impact on financial performance. The findings suggest that larger board sizes and greater diversity in board composition are associated with improved financial performance for manufacturing companies in Nigeria.

Naburgi, Ojo, and Oyedokun (2024) conducted a study with the objective of examining the effect of board attributes on risk disclosure in industrial goods companies listed on the Nigerian Exchange Group. The data spanned a time frame from 2013 to 2024 with independent variables as board independence, board size, and board gender diversity, while the dependent variable was the level of risk disclosure by the firms. The research employed an ex post facto research design, and data were extracted from the audited annual reports of 13 listed industrial goods firms. Multiple regression analysis was used to test the hypothesis and the findings indicated that board independence, board size, and board gender diversity have significant positive effects on the extent of risk disclosure.

Agus and Utama (2023) conducted a study with the key objective of examining the impact of Environmental, Social, and Governance (ESG) disclosure and corporate governance characteristics on idiosyncratic risk, using busy board as a moderating variable. The data for

the study was collected from public companies listed on the Indonesia Stock Exchange (IDX) between 2015 and 2021. The variables considered include ESG disclosure (independent variable), board size and gender diversity (independent variables), idiosyncratic risk (dependent variable), and board busyness (moderator variable). Anchored on the stakeholder theory, the study employed a quantitative research design using purposive sampling with a sample of 38 companies while data analysis was conducted using panel data regression with the Fixed Effect Model. The hypothesis was tested using the Fama-French Three Factor Model, with additional testing using the Capital Asset Pricing Model (CAPM) for robustness. The findings revealed no significant effect of ESG disclosure on idiosyncratic risk, but a significant negative impact of board size and gender diversity on idiosyncratic risk. However, the busy board did not significantly moderate the relationship between ESG disclosure and idiosyncratic risk.

Geno, Firmansyah, Prakosa, and Widyansyah (2022) explore the relationship between financial leverage and idiosyncratic risk among manufacturing firms in Indonesia, examining whether integrated reporting serves as a moderating factor. This study uses data from the Indonesia Stock Exchange (IDX) for the years 2016 to 2020, focusing on manufacturing companies. The dependent variable in the analysis is idiosyncratic risk, with financial leverage as the primary independent variable and integrated reporting as a moderating variable; company size and operating cash flow serve as control variables. Utilizing a purposive sampling technique, the research examines 90 firms over five years, totaling 450 observations. Panel data regression analysis is applied, revealing that financial leverage positively impacts idiosyncratic risk and that integrated reporting enhances this relationship, indicating that as firms increase their debt levels, integrated reporting intensifies the associated idiosyncratic risk by increasing transparency demands. These findings imply that the Financial Services Authority of Indonesia should enhance policies to support integrated reporting to mitigate investor risks effectively.

Egbadju (2023) explores the relationship between corporate governance mechanisms and stock price synchronicity for non-finance firms listed on the Nigerian Exchange Group. The study focuses on the period from 2005 to 2020. The research includes various independent variables—ownership concentration, board size, board independence, board gender diversity, board meetings, foreign ownership, institutional ownership, managerial ownership, number of foreign directors, interlocking directorship, and audit firm size—while stock price synchronicity serves as the dependent variable. The methodology includes *ex-post facto*

research design and a robust least squares regression technique, based on a sample of 50 firms yielding a total of 800 observations. Findings reveal that ownership concentration, board gender diversity, board meetings, foreign ownership, institutional ownership, managerial ownership, and audit firm size all have significant negative relationships with stock price synchronicity, indicating increased firm-specific informativeness in share prices. Conversely, the presence of foreign directors positively influences synchronicity.

Lasisi (2022) conducted a study to explore the influence of corporate governance traits on corporate risk reporting in publicly listed finance services firms in Nigeria. Data were collected from finance firms listed on the Nigerian Exchange Group for a period spanning from 2015 to 2019. Key variables examined include corporate risk reporting as the dependent variable, while board size, board independence, board activity, and board diversity served as independent variables. Firm size and profitability were employed as control variables. *ex-post facto* research design was used, with judgmental sampling technique to select 39 firms from a population of 52. The analysis was carried out using multiple regression techniques to test the hypotheses which showed that board size had a positive impact on corporate risk reporting, while board independence and board diversity had no significant effect. Interestingly, board activity was found to have a negative impact, suggesting that more frequent meetings do not necessarily improve risk reporting.

Chaudhry (2021) examines the impact of aggressive tax strategies on idiosyncratic stock return volatility, with the key objective of understanding how tax aggressiveness influences firm-specific risk in the U.S. stock market. The study collects data from U.S. firms listed on the NYSE, American Stock Exchange, and NASDAQ, spanning from 1992 to 2017. The dependent variable in the study is idiosyncratic stock return volatility, while the independent variable is the effective tax rate, which serves as a measure of tax aggressiveness. Control variables include firm size, financial leverage, cash flow, market-to-book ratio, firm age, and stock turnover. The study employed panel data with over 20,000 firm-year observations. Ordinary least squares regression results indicate that lower effective tax rates, indicative of aggressive tax strategies, are associated with higher levels of idiosyncratic volatility. The findings are robust across various model specifications, showing that firms engaging in more aggressive tax strategies tend to experience greater uncertainty in their stock returns.

Ramly and Basharahil (2021) studied a comprehensive review of the theoretical and empirical literature on the relationship between bank governance, particularly board characteristics, and

risk-taking in banks. The study focuses specific attention to both conventional and Islamic banks, reflecting on literature across various countries. Variables discussed in the literature include risk-taking, board size, board independence, financial expertise, and Shariah supervisory boards (for Islamic banks). The study employs qualitative survey methodology, synthesizing findings from multiple empirical studies to propose future research directions. The review identified the role of board size and independence as critical governance factors influencing risk-taking behavior, noting that larger boards often correlate with higher risk. Additionally, the moderating role of Shariah governance in Islamic banks is emphasized as an essential factor in mitigating risk.

Ullah, Chand, Akram, Bhutta, and Ahmed (2021) conducted a study aimed at analyzing the impact of grey, outside, busy, and overlap directors on the financial performance of firms listed on the Pakistan Stock Exchange over the period from 2014 to 2019. The study focused on various sectors within the non-finance. The key variables include grey directors, outside directors, busy directors, and overlap directors as the independent variables, while firm performance, measured by return on assets, return on equity, and Tobin's Q, serves as the dependent variable. Board ownership, board size, firm size, and firm age were included as control variables. The research employed a two-stage regression approach to analyze the data. Using four main theories: agency theory, resource dependency theory, trade-off theory, and managerial power theory, the findings revealed that grey directors, outside directors, and busy directors positively impact firm performance, while overlap directors had a negative impact.

To, Suzuki, Ho, Tran, and Tran (2021) conducted a study with the primary objective of investigating the relationship between board independence, particularly the proportion of nonexecutive directors, and firm risk, with a focus on how capital expenditure moderates this relationship in the context of Vietnamese listed firms. The research utilized data from the Vietnamese stock exchanges (Hanoi Stock Exchange and Ho Chi Minh Stock Exchange) for a period spanning from 2007 to 2016. The study covered non-finance firms, including sectors such as oil and gas, consumer goods, healthcare, and technology. The dependent variable in the study is firm risk, while the independent variables include nonexecutive director ratio and capital expenditure. Firm size, price-to-book ratio, debt maturity, cash ratio, and dividend payments served as control variables. The research employed a fixed-effects regression model and dynamic generalized method of moments (GMM) analysis to test the hypothesized relationships. The analysis revealed that a higher proportion of nonexecutive directors

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increased firm risk, while capital expenditure reduced risk when combined with the nonexecutive director ratio, particularly in cases of overinvestment.

MATERIALS AND METHOD

This study employed *ex-post* facto research design. It is essentially a research design for demonstrating relationship and analysing past occurrences or events with already existing data. The population of this study includes of the manufacturing firms listed on the Nigerian Exchange Group (NGX). The population of listed manufacturing firms in Nigeria as of 31st December 2023 was fifty-eight (58) distributed into six (6) sectors to include: health care (8), natural resources (4), conglomerates (6) agriculture (5) Industrial goods (13) and Consumer Goods (22) companies. This study used purposive sampling technique which requires that each sampled manufacturing firm must fulfil certain conditions before it can fit into the sample. The size of forty-six was obtained because twelve (12) firms were knocked away having fallen short of the selection criteria.

Therefore, this study employed secondary data sourced from each sampled listed firm's annual audited financial report. Secondary data sources for this study include audited annual reports of manufacturing firms listed on the floor of the Nigerian Exchange Group. The data for this study was analyzed as follows:

Summary Statistics Analysis: Summary statistics also known as descriptive statistics provide key information relating to the variable/s mean, minimum values, maximum values and standard deviation during the period under review.

Correlation Analysis: Correlation analysis was employed to ascertain the direction, strength, and significance of a bivariate association. Correlation analysis technique was employed to determine the inter-item correlation between two variables. Notably in this analysis, any bivariate relationship or inter-item correlation values over 0.80 reveals signs of extreme collinearity.

Panel data regression analysis method was utilized in this study based on justifications that the collected data have time and cross-sectional properties. Panel data regression analyses are a very valuable data analysis technique because it helps to capture the individual cross-sectional (or firm-specific) effects that the various pools may exhibit. The three-factor model is an extension of the single factor CAPM model where apart from the traditional beta; it utilizes two other factors in the form of firm value and firm size factors. Fama and French (1993) three factor model includes monthly excess return on market index ($R_M - R_f$), size

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(SMB) factor and book-to-market (HML) factor. Fama and French 3-factor model can be represented as:

$E(R_i) = R_f + \beta_1 MKT + \beta_2 SMB + \beta_3 HML$ …… …. Eqn 1.

Where: E(R*i*) represents the expected stock returns on the stock

i, SMB represents the size premium and

HML represents the value premium.

The portfolio having market capitalization more than the median is named as 'Big' whereas the other one is named as 'Small'. Now, these two portfolios are each further sub-divided into three portfolios (upper 30 percent, middle 40 percent and lower 30 percent) based on their book-to-market ratio arranged in ascending order.

Further, econometric model which incorporates unobserved firms' and time effects are specified thus:

Indirect/Moderated Effect Model

$IRISK_{it} = \text{ } 6_0 + 6_1GYNAT_{it} + 6_2GYOVLAP_{it} + 6_3FIRML_{it} + Ɛ_{it}$ ..... …. Eqn 2.

Where:

IRISK	refers to	Firm Idiosyncratic Risk
GYNAT	refers to	Grey Director Nationality
GYOVLAP	refers to	Grey Director Overlap Functions
TAXOPT	refers to	Tax Optimization Strategy
FIRML refers to		Firm Leverage

Table 1: Operationalization of Variables

	Variables	Acronym	Measurement	Source/s	Apriori Expectation
Dependent Variable					
	Idiosyncratic Risk	IRISK	Computed using Fama-French Three Factor Model (FF-3)	Agus and Utama, (2023).	
Independent Variables					
	Grey Director Nationality	GYNAT	Computed as the total number of non-indigenous grey directors on the board	Villesèche and Sinani, (2023).	Negative
	Grey Director Overlap Functions	GYOVLAP	Computed Dichotomously (1,0) where a grey director who is also a member of the risk management	Fernandez Mendez, Arrondo Garcia, & Pathan, (2017).	Negative

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			committee takes the value '1' otherwise '0'		
Control Variable					
	Firm Leverage	FIRML	Computed in percentages as total debt divided by total asset	Papadimitri, Pasiouras and Tasiou, (2021).	Positive

Source: Researcher's Compilation (2025)

The decision for the hypotheses is to accept the alternative hypotheses if the p-value of the test statistic is less or equal to the alpha and reject the alternative hypotheses if the p-value of the test statistic is greater than alpha at 5% significance level.

RESULT AND DISCUSSIONS

Descriptive Statistics Analysis

In the descriptive statistics, each variable is examined based on its mean, standard deviation, maximum and minimum values. Table 1 displays the results obtained from the descriptive statistics.

Table 2: Descriptive Statistics Result

Variable	Obs	Mean	Std.dev.	Min	Max
IRISK	460	1,765,325	1.094536	-2.10285	3.499398
GYNAT	460	0.7037037	0.927154	0	4
GYOVLAP	460	0.7472767	0.435048	0	1
TAXOPTT	460	2.944749	3.208783	0	25.17
FIRML	460	61.98381	28.27675	3.55	222.97

Source: Authors Computation 2025

The descriptive statistics from the study of grey directors' attributes and firm idiosyncratic risk among Nigerian listed manufacturing firms reveal insightful patterns that reflect the governance dynamics and financial behavior of these firms during a turbulent economic decade. The average idiosyncratic risk value (IRISK) of 1.77 with a relatively high standard deviation value of (1.09) and a wide range from -2.10 to 3.50 suggests that firm-specific risk varies substantially across the sampled firms. The grey director nationality (GYNAT) shows a low average value (mean = 0.70), reflecting limited internationalization of grey board representation, supporting earlier results by Al Farooque et al. (2019), whose study linked board nationality diversity with governance quality and firm-specific risks in transitional economies.

Further, the variable for grey director overlap in risk committees (GYOVLAP) has a high mean value of 0.75, indicating that a large proportion of grey directors also serve on the risk

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management committees supporting the position of Baxter & Cotter, (2009). The high mean leverage ratio (FIRML = 61.98%) further illustrates the debt-intensive structure of manufacturing firms, aligning with studies of Olayemi and Akinteye (2020), who emphasize the sector's reliance on debt financing amidst constrained access to equity capital.

Correlation Analysis

The Spearman rank correlation analysis conducted on listed manufacturing firms as presented in table 3, reveals interesting patterns of association among grey directors' attribute variables. It is important to reiterate that correlation does not imply causation, but rather describes the strength and direction of associations between variables.

Table 3: Correlation Analysis Result

	IRISK	GYNAT	GYOVLAP	FIRML
IRISK	1.0000			
GYNAT	-0.1113	1.0000		
GYOVLAP	-0.0473	0.2359	1.0000	
FIRML	0.1871	-0.2549	0.0570	1.0000

Source: Authors Computation 2025

The Spearman rank correlation analysis was conducted to examine the associations between firm-specific idiosyncratic risk and the selected corporate governance and financial attributes, with attention to possible multicollinearity concerns. The outcome reveals a weak negative association between firm idiosyncratic risk and all the grey director attributes, including the size of grey directors on the board, grey director gender diversity, grey director nationality, and grey director overlap. Specifically, the association between idiosyncratic risk and grey director nationality shows the strongest negative relationship with a correlation coefficient of -0.1113, followed by gender diversity at -0.0715. Although these values suggest the presence of associations, they remain weak and do not imply causality or directional influence. These findings align with those of Al Farooque et al. (2019), who reported weak negative associations between board nationality diversity and firm-specific risk in South Asian listed firms, reflecting similar governance dynamics in emerging markets.

Similarly, the weak negative correlation between idiosyncratic risk and grey director size attribute reiterates the earlier observation of Wang and Fang (2021), who found that board composition characteristics often have modest associations with firm-specific risks in transitional economies. Regarding the issue of multicollinearity, which could distort regression estimates, the observed correlations between independent variables do not raise

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concern. The highest correlation among the variables is between grey director size and grey director nationality, with a rho value of 0.7376, which, although relatively high, remains below the conventional multicollinearity threshold of 0.80 as highlighted by Hair et al. (2010). This suggests that while these two variables are moderately associated, they do not present severe collinearity issues that would undermine regression analysis. Other inter-variable associations, such as that between grey director gender diversity and board size (0.3199), or between tax optimization strategy and firm financial leverage (0.4111), are similarly moderate or weak. These outcomes are comparable to the correlation patterns found in the work of Olayemi and Akinteye (2020), who also identified low to moderate associations among board attributes, tax policy proxies, and firm leverage in Nigerian listed firms.

Regression Analyses

Specifically, to examine the relationship between the independent variables and the dependent variables of this study, panel data estimations to include fixed and random effects analysis were deployed while Hausman specification test was used to determine the most appropriate of both models. It is worthy to note that the model that was determined by the Hausman Specification test statistics was adequately tested for normality of residua error (heteroscedasticity) hence the specification test result determined the final econometric analysis technique that was employed to test the hypotheses. The absence of multicollinearity is established, and the results are presented in Table 4.

Table 4: Regression Analysis

. xtreg IRISK GYNAT GYOVLAP c.GYNAT#c.TAXOPTT c.GYOVLAP#c.TAXOPTT FIRML, fe

Fixed-effects (within) regression		Number of obs =	460
Group variable: croid		Number of groups =	46
R-squared:		Obs per group:	
Within =0.0243		min=9	
Between=0.0120		avg = 10.0	
Overall=0.0170		max=10	
		F(10,403)=1.01	
corr(u_i,xb)= - 0.0658		Prob >F =0.4380	

IRISK	coefficient	Std. err	t	p>t	[95% conf.	interval]
GYNAT	-0.0171053	0.1202357	-0.1400	0.887	-0.2534728	0.2192621
GYOVLAP	-0.3559059	0.1912261	-1.86	0.063	-0.7318312	0.0200195
FIRML	0.0033223	0.0019967	1.66	0.097	-0.0006	0.0072476
_cons	1.599395	-2550001	6.27	0.000	1.098098	2.100691
sigma_u	0.84171617					
sigma_u	0.74830011					
rho	0.55854954	(fraction of variance due to u_i)				

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F-test that u_i=0: F(45,403) = 11.30 Prob > F = 0.0000

From table 4, the fixed-effects regression model output reveals a within R-squared value of 0.0243, indicating that approximately 2.43% of the variations in firm idiosyncratic risk are explained by within-firm changes in the predictor variables. The F-statistic value of 1.01 and its corresponding p-value of 0.4380 suggest that the joint explanatory power of the included variables is weak and statistically insignificant under the fixed effects specification. In contrast, the random-effects model has a slightly lower within R-squared value of 0.0227, implying a marginally lower explanatory power than the fixed-effects model. The Wald chi-squared value of 11.18 with a p-value of 0.3437 further supports that the model lacks statistical significance in explaining idiosyncratic risk. Additionally, the assumed zero correlation between the individual-specific effects and the regressors in the random-effects model, represented by corr(u_i, X) = 0, is central to the random-effects estimation technique. Importantly, the F-test of the fixed-effects model (F (45,403) = 11.30; Prob > F = 0.0000) tests the null hypothesis that all group-level effects are zero. Since this null is rejected, the model confirms the presence of unobserved heterogeneity across firms, validating the use of a panel approach over a pooled ordinary least square regression model and suggesting that firm-specific characteristics must be controlled for in the analysis.

Further, the Breusch and Pagan Lagrangian Multiplier (LM) test for random effects yields a chibar2 value of 473.51 with a p-value of 0.0000, leading to the rejection of the null hypothesis that the variance of the unobserved individual effects is zero. This confirms that the random-effects model is more appropriate than a simple pooled ordinary least square regression model, as it captures essential between-entity variation. The result underscores the necessity of panel modeling techniques to account for firm-level heterogeneity.

The Modified Wald test for groupwise heteroskedasticity in the fixed effects regression model reports a chi-squared statistic of 5801.18 and a p-value of 0.0000, indicating strong evidence against the null hypothesis of homoskedasticity. This implies that heteroskedasticity is present across the cross-sectional units in the panel, and robust standard errors may be required to correct for bias in inference. The Hausman specification test, with a chi-square value of 6.19 and a p-value of 0.7989, suggests no systematic difference between the fixed and random effects estimates. Given the high p-value, this study fails to reject the null hypothesis, meaning the random-effects model is the preferred specification (Barr, Levy, Scheepers, & Tily, 2013).

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This choice is justified on efficiency grounds since the assumptions underlying the random-effects model appear valid in this context.

Notably, although the Hausman specification test supported the random effects model, the presence of heteroskedasticity across panels as evidenced by the Modified Wald test necessitates an adjustment to ensure reliable inference. Therefore, the use of Iterated Generalized Least Squares (IGLS) random effects model with heteroskedastic panels is justified for hypotheses testing, as it efficiently accounts for both unobserved firm-specific effects and non-constant error variances across firms. This approach enhances the robustness and consistency of the coefficient estimates and standard errors, thereby strengthening the validity of hypothesis testing in the context of panel data with structural heterogeneity.

Test of Hypotheses

Hypothesis One

$Ho_{1:}$ There is no significant relationship between grey directors' nationality and idiosyncratic risk of listed manufacturing firms in Nigeria

Owning from the results obtained from the Panel Generalized Least Squares regression analysis for manufacturing firm in Nigeria, the number of non-indigenous grey directors (GYNAT) exhibits a statistically significant negative association with idiosyncratic risk [Coef. = -0.1948, p = 0.005]. This suggests that, on average, and all things being equal, firms with a higher presence of foreign grey directors tend to experience reduced levels of firm-specific risk. One plausible explanation is that non-indigenous grey directors may bring diverse international experiences, risk-aversion practices, and governance standards that enhance board effectiveness in mitigating internal firm-specific uncertainties. Such a result may reflect potential frictions arising from misalignments between conservative foreign governance preferences and aggressive local financial structuring practices. These findings align with that of Salehi, Tarighi, and Rezanezhad (2019), who reported that certain board demographic compositions exhibit varied effects on firm risk depending on financial strategy alignment.

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Hypothesis Two

$Ho_{2:}$ There is no significant relationship between grey directors' overlap duty and idiosyncratic risk of listed manufacturing firms in Nigeria

The results obtained from the Iterated Generalized Least Squares random effects regression analysis for manufacturing firms in Nigeria show that grey director overlap (GYOVLAP) measured as a binary indicator for whether a grey director also sits on the risk management committee has a statistically insignificant relationship with firm-specific idiosyncratic risk in the main effects model [Coef. = 0.0313, p = 0.703]. One plausible interpretation is that overlapping directorship may inadvertently facilitate risk concentration when paired with complex financial strategies, such as leveraging tax shields. This view aligns with the argument of Bartram, Brown, and Stulz (2012), who found that managerial structures can amplify firm idiosyncratic risk when combined with opaque financial strategies, especially in emerging markets where regulatory and oversight frameworks are weaker.

The statistically significant inverse relationship observed between grey director nationality and overlap firm-specific idiosyncratic risk be interpreted through the lens of institutional theory and upper echelons theory, particularly within the context of listed manufacturing firms in Nigeria. Weerasinghe, Chapple and Williamson, (2024) documented that non-indigenous grey directors, who often bring diverse professional and cultural experiences, may exert a stabilizing influence on firm risk exposure through enhanced governance neutrality and broader global insights. Institutional theory suggests that such directors may introduce global risk management standards, transparency protocols, and ethical orientations that reduce firm-specific uncertainties (DeGregori, 2019) in volatile environments such as Nigeria's manufacturing sector, which is often exposed to policy inconsistency, infrastructural gaps, and foreign exchange instability. The significant negative relationship further implies that grey directors potentially act as buffers against idiosyncratic shocks by counterbalancing local board biases and encouraging more disciplined financial practices. Bhat and Chen (2021), documented similar outcome and reported that demographic diversity on corporate boards contributes to reduced firm-specific risk in emerging markets, particularly when directors are sourced from institutionalized environments.

Conversely, the interaction term showing a significant positive link between grey director overlap function and idiosyncratic risk specifically when moderated by tax optimization strategy raises compelling questions regarding governance burden and oversight diffusion.

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From the agency theory perspective, directors who hold overlapping roles on risk management committees may inadvertently concentrate authority (Frankforter, Berman, & Jones, 2000; Sassen, Stoffel, Behrmann, Ceschinski, & Doan, 2018), potentially impairing objective risk evaluation processes, especially under aggressive tax planning conditions where financial engineering is complex (Yusuf, Yousaf & Saeed, 2018). In Nigeria's manufacturing context, such overlaps may lead to cognitive overload or conflict of interest, diminishing the quality of board scrutiny at a time when comprehensive oversight is most needed.

This outcome finds support in the work of Huang et al. (2022), who showed that director role redundancy exacerbates firm-specific risk by undermining governance effectiveness, particularly when tax incentives or financial leverage mechanisms are intensively pursued. The Nigerian tax environment fraught with its frequent reforms, ambiguity in compliance, and enforcement inconsistencies, further heightens this risk when tax optimization strategies are actively deployed. In such a setting, the burden of dual oversight without adequate specialization could lead to oversight fatigue, policy myopia, or failure to challenge high-risk financial practices, thus increasing idiosyncratic volatility.

CONCLUSION AND RECOMMEDNATIONS

Overall, these contrasting findings reflect the dynamic roles that board attributes play in shaping firm-specific risk among Nigerian manufacturing firms. While non-indigenous directors appear to enhance risk governance, overlaps in governance roles under tax-induced pressure may instead intensify exposure. This duality resonant the complex realities of corporate governance in emerging markets, where formal structures often interact with informal norms and institutional voids, creating divergent risk outcomes depending on contextual variables and board configurations.

Based on the findings, the study recommended the follows:

1. Stakeholders in the manufacturing industry should prioritize a strategic balance between board diversity and prudent tax planning by fostering the inclusion of non-indigenous grey directors while instituting strong oversight mechanisms over debt-driven tax optimization schemes.
2. Given that overlap between grey directors and risk management committee membership does not exhibit a statistically significant standalone effect on idiosyncratic risk, stakeholders in the manufacturing industry should refrain from

formulating or implementing governance reforms solely on the assumption that dual-role occupancy inherently enhances risk oversight.

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