

Effect of Tax Avoidance on Cost of Capital in Nigeria

Sebil Olalekan Oshota[†]

Abstract

The study explored the relationship between tax avoidance and the cost of capital among publicly listed firms in Nigeria from 2010 to 2022. Using a simple random sampling technique, the sample included 30 firms across five sectors. Secondary data were sourced from annual reports of the selected firms and fact books from the Nigerian Stock Exchange (NSE). The cost of capital, comprising cost of equity and cost of debt, was analyzed with tax avoidance measured by the firm's cash effective tax rate. Control variables included leverage, return on assets, return on equity, firm size, and board size. A panel fixed effects panel regression analysis, selected after a Hausman pre-test, was employed alongside "Driscoll-Kraay standard errors" to address heteroscedasticity and autocorrelation issues. Results from the panel fixed effects analysis indicated that tax avoidance significantly and positively affects both the cost of equity and the cost of debt, highlighting tax avoidance as a key factor in firms' financing decisions and investors' choices. Further analysis using system GMM two-step estimators confirmed the panel fixed effect results, underscoring their robustness and revealing a bidirectional relationship between tax avoidance and cost of debt, suggesting reverse causality. To address these implications, policymakers are urged to implement regulatory measures encouraging voluntary tax compliance and clear tax law interpretations to curb aggressive tax avoidance, thereby reducing firms' cost of capital. Additionally, firms should enhance transparency by disclosing operational details to shareholders, fostering investor confidence and influencing their perceptions of risk and the associated cost of capital.

Keywords: Tax Avoidance; Cost of capital; Return on Assets; Return on Equity; Leverage

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[†] Economic and Business Policy Department, Nigerian Institute of Social and Economic Research (NISER), Ibadan, Email: oshota4real@gmail.com

1. Introduction

Tax avoidance has become a focal point of discussion in recent years, drawing attention for its perceived economic repercussions. This practice involves companies strategically minimizing tax burdens while adhering to legal regulations, sparking extensive discourse within corporate finance circles aimed at maximizing shareholder value. Scholars, policymakers, and industry experts have closely examined the role of tax planning in achieving this objective (Chun, Kang, Lee and Yoo, 2019). Central to this discussion is the exploration of how tax avoidance strategies impact the cost of capital, a critical metric guiding investment decisions and determining firm valuations (Shi and Woo, 2017).

The optimal funding structure of a company is reflected in its utilization of both debt and equity. By striking a balance between the advantages and drawbacks of operating capital, particularly debt, the company can achieve an optimal mix (Purwaka, Firmansyah, Qadri, Dinarjito and rfiansyah, 2022). Incorporating debt into the capital structure can result in tax savings through a tax shield mechanism, wherein interest payments serve as deductible costs, thereby reducing taxable income (Indriyani & Trisni 2020). Tax avoidance, as a strategic choice made by management, not only impacts the accuracy of financial statements but also influences the cost of capital. It can affect financing decisions in several ways. Firstly, tax avoidance may alter the relative costs associated with equity and debt capital.

By potentially increasing future expected cash flows, tax avoidance might decrease the cost of equity (Goh et al., 2016). However, it could also lead to heightened risk, consequently elevating both the cost of equity and debt (Shevlin, Urcan, and Vasvari, 2020; Lee, Shevlin and Venkat, 2023). Secondly, tax avoidance may influence financing decisions due to managerial biases. By legally leveraging tax regulations to reduce liabilities, companies enhance after-tax cash flows for shareholders, stimulating investment and distribution (Pasternak and Rico, 2008; Ghelichli, Gerayli & Garkaz, 2017; Shin & Woo, 2017). However, this strategy introduces uncertainty for investors, who often demand a higher cost of capital to compensate for increased risk. For example, a study by Mills (1998) found that firms with higher tax avoidance levels tend to have higher costs of debt, reflecting the risk perception of lenders. Conversely, engaging in tax avoidance exposes firms to potential sanctions and reputational damage, prompting debt holders to impose higher costs in the form of elevated interest rates as a risk mitigation measure. A study by Desai and Dharmapala (2006) supports this notion, suggesting that firms engaging in aggressive tax planning face higher costs of equity due to increased perceived risk

Further, corporate taxes establish the government as a significant participant in a firm's investments, acting as an implicit partner. A higher tax rate signifies a greater stake held by the government in the firm, resulting in reduced residual profits flowing to shareholders during periods of profitability. Conversely, in times of loss, a higher government stake implies that the government, rather than shareholders, bears a larger portion of the losses. Essentially, as the tax rate escalates, the variability of a firm's after-tax performance diminishes (Sikkes and Verrecchia, 2016). Additionally, tax avoidance can augment a firm's cash flows on one hand, but concurrently escalate agency costs, information risk, and the likelihood of scrutiny by tax authorities on the other. These opposing forces have divergent impacts on the cost of debt (Sánchez-Ballesta and Yague, 2023).

The corporate income tax landscape in Nigeria imposes substantial costs on businesses, presenting challenges such as investment disincentives and reduced distributable profits for incorporated entities (Nwokoye & Rolle, 2015). Given that reported distributable profit serves as a performance indicator for managers, firms often resort to cost-cutting measures to maintain

a favourable image. Exploiting loopholes in Nigeria's tax administration system is one such tactic employed to minimize tax liabilities (Salawu, 2018). Despite achieving profitability objectives, tax avoidance introduces risks and costs, especially amid governmental and regulatory concerns regarding strained public revenue. In response to these challenges, governments have identified various methods of tax avoidance, prompting the enactment of new and stringent anti-avoidance regulations that may elevate costs and tarnish firms' reputations. The implications, both financial and non-financial, of tax avoidance pose threats and risks to investors, influencing firms' cost of capital based on investors' perceptions of tax avoidance.

While numerous studies have delved into the connection between tax avoidance and the cost of capital, the bulk of these investigations have focused on countries other than Nigeria. Within Nigeria, research on tax avoidance has predominantly revolved around its impact on overall firm financial performance indicators such as profitability, liquidity ratios, market values, or shareholders' returns, with limited attention given to its implications for the cost of capital (Igbinovia & Ekwueme, 2018; Oboh & Nosa, 2021; Ogunmakin et al., 2020). Furthermore, despite extensive research on tax avoidance and the cost of capital in other countries, there remains a dearth of conclusive findings on the matter. This lack of conclusiveness can be attributed to the unique environmental factors that influence research outcomes, as well as the obscured definition of the scope and metrics of tax avoidance. Moreover, the use of different models to estimate the cost of capital has contributed to this inconclusiveness. For instance, Bhuiyan & Nguyen (2019) employed the Capital Asset Pricing Model in their study, which may not accurately determine the BETA factor due to the challenges and lack of available data in Nigeria. To mitigate estimation bias, this study opts for the dividend discounted model to ascertain the cost of equity and cost of debt, as the data required for these estimations can be readily extracted from published financial statements of firms operating in Nigeria. Hence, this study seeks to examine the impact of tax avoidance on cost of capital in the case of Nigeria.

The structure of this study unfolds as follows: the subsequent section delves into pertinent literature, followed by the development of hypotheses in the third section. The research model is expounded upon in the fourth section, while the fifth section delineates our empirical findings. Finally, the study concludes.

2. Literature Review

The empirical literature on the effects of tax avoidance on cost of capital has been inconclusive, particularly with regards to the parameters of cost of capital used against the measures of tax avoidance. Very few of the study considered both cost of equity and cost of debt as a singular measure of cost of capital. Most studies on tax avoidance were carried out with either cost of equity or cost of debt as dependent variable. Nonetheless, the results are not conclusive.

From a general view, Sikes & Verrecchia (2016) examined the relationship between tax avoidance and cost of capital in US public firms within a period of 1988-2007. They identified a positive relationship between tax avoidance and cost of capital. According to their study, the more firms engage in tax avoidance, the higher their cost of capital. The result is from the idea that firms share risk with the government via taxation and the lower the tax rate applied to a firm's earnings; the more risk is borne by its shareholders. Chun, et al (2019) examine the relationship between firm's tax avoidance activities and cost of equity capital across 17 countries categorized into strong or weak investor protection countries. The result of the study revealed that firm's tax avoidance in a strong investor protection country is negatively associated with its cost of equity capital. This implies that strong investor protection induces investors to perceive firm's tax avoidance activities as the results of efficient tax planning to

reduce tax liabilities. Conversely, they also found that firm's tax avoidance is positively associated with its cost of equity capital within weak investor protection countries. This suggests that investors impose equity risk premium on firm's tax avoidance activities in weak investor protection countries.

Goh, Lee, Lim & Shevlin (2016) examined 5,610 to 26,781 firms from 1993 to 2010 using a cross sectional regression analysis. They discovered that the cost of equity is lower for tax-avoiding firms. They further observed that the effect of tax avoidance on cost of capital is stronger for firms with better external monitoring. This means that investors believe that firms are likely to realize higher marginal benefits from tax savings as a result, demand a lower expected rate of return due to the positive cash flow effects of corporate tax avoidance. In another development, Chun et al (2019) found a negative correlation between a firm's tax avoidance and its equity capital cost in countries with robust investor protection, while a positive relationship was observed in countries with weaker protection, suggesting investors impose an equity risk premium on firms engaging in tax avoidance. In order to examine the direct and significant impact of tax avoidance on the cost of debt and equity, Lee, Shevlin, and Venkat (2023) used a logit regression. They discovered that tax avoidance positively affects the likelihood of issuing equity, which helps to partially explain the main effects. Additionally, they discovered oblique proof that managers' attention to the GAAP effective tax rate calculates the debt's after-tax cost.

Ghelichli, Gerayli & Garkaz (2017) observed that tax avoidance has a negative relationship with the cost of equity capital by examining 84 firms listed on the Tehran Stock exchange from 2011-2015. Consistent with the result of Goh, Lee, Lim & Shevlin (2016), investors are seen to believe that the proceeds from tax avoidance improve their cash flow benefits therefore lower the equity cost of capital. On the other hand, Dewiyanti & Burhan (2020), using abnormal book tax difference as a measure of tax avoidance against cost of equity as the dependent variable, revealed that tax avoidance has a significant positive effect on cost of equity. This study is carried out with the population of all manufacturing companies listed on the Indonesia Stock Exchange from 2012-2016. Pulido and Barros (2017) showed in their study of the relationship between tax avoidance and cost of equity, through a regression analysis that the effect of tax avoidance on cost of equity depends on investors understanding of tax avoidance. Examining over 1000 firms in European countries from 2005 to 2014, they provided that when low-tax avoidance firms engage in greater tax avoidance, the ex-ante equity cost of capital appears to decrease. While when high-tax avoidance firms undertake greater levels of tax avoidance, the ex-ante equity cost of capital appears to increase.

Cost of debt, another component of cost of capital has been considered with tax avoidance and similar to the results obtained in the study of tax avoidance and cost of equity, there exist no conclusions. Kholbadalov (2012) carried out a study on the relationship between tax avoidance and cost of debt in 110 listed firms in Bursa Malaysia, during the year 2005 – 2009. The revealed that a negative relationship exists between tax avoidance and the cost of debt. This suggests that corporate tax avoidance activity can reduce the cost of debt of the firms. The result is premised on the assumption that tax avoidance can serve as a substitute for the use of debt, which is consistent with trade – off theory. Kholbadalov (2012) study further shows that institutional ownership has no moderating effect on the relationship between tax avoidance and cost of capital. Similarly, Lim (2011) in his study discovered that a negative relationship exists between tax avoidance and the cost of debt, which also support the trade-off theory. Supportively, Isin (2018) carried out a descriptive analysis on the relationship between tax avoidance and cost of capital using loan spread as a measure of cost of debt and cash effective tax rate as a measure of tax avoidance. The result revealed that a negative relationship exists

between the two variables. The result was premised on the assumption that access to public debt financing, and informational environment minimizes potentially escalated agency costs associated with corporate tax avoidance. This is also consistent with the beliefs of Desai & Dharmapala (2006).

On the contrary, Trisnawati & Nasser (2017) examined the effect of tax avoidance on cost of debt using a secondary data from 35 companies for 4 years, 2009 to 2012. The results show that tax avoidance can impact positively and significantly on the cost of debt. Also, Masri & Martani (2014) find that tax avoidance is positively correlated with cost of debt, and this is due to the level of risk created by avoiding tax after examining sample manufacturing firms listed on the Indonesia stock exchange for a period between 2008 and 2010. In the same light, Shin Shin & Woo (2017) investigates the relationship between tax avoidance and cost of debt in Korea. The regression analysis of the study indicates that tax avoidance has a positive effect on cost of debt. This means that the higher the tax avoidance of firms in Korea, the higher interest rate on debt facility. Additionally, they carried out a finding on whether profitability has a moderating influence on the connection between tax avoidance and capital costs, the results of the findings revealed that profitability boosts the beneficial relationship between tax avoidance and loan capital costs. When a company's profitability is favorable, this suggests that the cost of financing capital rises as tax avoidance rises. Tax avoidance is seen as a symptom of rising information risk, prompting investors to seek a greater rate of return. They also discovered that when the debt ratio is large, the favorable relationship between tax avoidance and the cost of loan capital diminishes. Consistent with Trisnawati & Nasser (2017) and Shin & Woo (2017) results, Hasan, Hoi, Wu & Zhang (2014) in their study find that firms with greater tax avoidance incur higher loan spread when obtaining debt finance.

Taking a different path from the earlier reviewed literature, Sugiyanto, Febrianti & Suropto (2020) examined the effect of tax avoidance, board of committees and managerial ownership on cost of debt using a multiple regression model and they found out that the variables collectively have significant influence on cost of debt. They examined 28 manufacturing companies quoted on the Indonesian stock exchange over a period covering 2015-2019. However, adopting good corporate governance as a moderating variable, they observed that the relationship between tax avoidance, managerial ownership, board of committees and cost of capital is strengthened.

In another development, there are on-going debate in finance literature about the effect of tax avoidance on the cost of capital which is theoretically based on the reverse causality hypothesis (Hasan et al., 2014; Beladi et al., 2018; Isin, et al, 2018). Studies like Hasan et al. (2014) acknowledge that firms facing a high cost of debt might be incentivized to engage in more tax avoidance activities. This is a coping mechanism to improve cash flow and facilitate debt servicing. By reducing their tax burden, firms can potentially free up resources to meet debt obligations. In affirmation, Beladi et al (2018) and Isin et al (2018) suggest that firms with a high cost of debt might be driven to engage in more tax avoidance to improve cash flow and manage their debt burden. Isin et al (2018) maintained that the Tax avoidance can be mitigated through loan-specific risk mitigation and simultaneous access to private and public debt financing, allowing firms to reduce corporate tax liabilities without incurring material agency costs.

The above revealed that the empirical evidence regarding the relationship between tax avoidance and the cost of capital is generally mixed and inconclusive. This ambiguity arises from variations in the measures of tax avoidance and cost of capital used across different studies, as well as differences in estimation techniques. These empirical inconsistencies

underscore the need for further investigation into the impact of tax avoidance on the cost of capital, particularly within the context of emerging markets like Nigeria. To address this gap, this study employs the signalling theoretical model proposed by Michael Spence (1973), in his paper "Job Market Signalling." According to this theory, firms utilize various actions to communicate information about their intrinsic value or future prospects to investors. In the context of tax avoidance, firms engaging in such practices may be signalling their financial health and managerial competence to investors. For example, if a company effectively employs tax avoidance strategies, it signals to investors that the firm is financially adept and capable of maximizing shareholder value by minimizing tax obligations within legal boundaries. Consequently, investors may perceive such firms as lower risk and assign a lower cost of capital. Conversely, if tax avoidance is viewed as risky behaviour or indicative of poor governance, it may lead to higher perceived risk and, consequently, a higher cost of capital. Therefore, by applying the signalling theory, this study seeks to elucidate how tax avoidance activities influence investors' perceptions of firm value and subsequently impact the cost of capital in the Nigerian context.

Against the backdrop outlined above, this study aims to empirically investigate the influence of tax avoidance on firms' capital structure utilizing the signalling theoretical framework. The sole hypothesis posited for this study is:

H1: Tax avoidance is significantly positively associated with the cost of capital

3. Methodology

3.1 Data

The scope of study encompasses the years 2010 to 2022 and focuses on thirty listed companies on the Nigerian Stock Exchange. This timeframe was selected based on data availability and to the firms' annual report data. Notably, significant tax-related events occurred during this period. For instance, the Personal Income Tax Act Amendment, which addressed non-compliance, was passed in 2011. Subsequently, in 2016, a new national tax policy was implemented with the goal of fostering a culture of compliance among taxpayers and resolving uncertainties in the Nigerian tax framework. Furthermore, in 2019, anti-avoidance regulations were integrated into the Company Income Tax Act by the Nigerian government to ensure the accuracy of tax payments. Finally, in 2020, a new Finance Act was enacted to streamline tax payment procedures and mitigate tax avoidance and evasion.

Moreover, the selected listed companies operate within various sectors, including industrial, conglomerates, consumer goods, oil and gas, and telecommunications. Financial services and investment firms were deliberately excluded from the study due to differences in reporting requirements and higher regulatory oversight, aligning with the approach adopted in previous studies. To ensure consistency in the data among the chosen firms, a total of six firms were randomly selected from each of the five sectors, resulting in a sample size of thirty (30) publicly listed firms. This study utilized secondary data obtained from the annual reports of the selected listed companies and the fact books published by the Nigerian Stock Exchange (NSE).

3.2 Methods of Estimation

This study applies a panel regression model to test the proposed hypothesis. Drawing from the work of Kovermann (2018) and Dewiyanti & Burhan (2020) and in fulfilment of the objective of the study, which is to assess the effect of tax avoidance on cost of capital in Nigeria, the following equation is specified:

$$COC_{i,t} = \alpha_0 + \beta_1 TAV_{i,t} + \beta_2 ROA_{i,t} + \beta_3 ROE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SIZE_{i,t} + \varepsilon_{it} \quad (1)$$

Where in equation (1) *COC* is the cost of capital made up of cost of equity and cost of debt; *TAV* is tax avoidance, measured by the firm's cash effective tax rate, while *LEV* (leverage), *ROA* (return on assets) (*ROA*) and *ROE* (return on equity) are incorporated into the model as control variables that can affect cost of capital. α_0 represent the constant term and $\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 are unknown parameters that must be estimated. The subscript *i*, and *t* represent the cross section of firm *i* at time *t*, while ε is the standard error.

Dependent Variables

Cost of capital (COC): This is measured as the total of cost of debt and cost of equity. The cost of equity is computed using the Dividend discount model, that is, the ratio of proposed dividend to current market price plus estimated growth rate.

$$k_e = \frac{d_1}{p_0} + g$$

Where *Ke* = Cost of equity, *d₁*= Dividend payment, *p₀* = Current stock price, *g* = Growth rate, The cost of debt on the other hand is expressed as the ratio of interest expense to total debt capital of the firms considered.

$$k_d = \frac{\text{Interest Expense}}{\text{Total Debt}}$$

These measurements are consistent with other research studies (Magnanelli & Izzo, 2017; Ivascu & Barbuta-Misu, 2017).

Independent and Control Variables

Tax avoidance: In computing tax avoidance, the cash effective tax rate is used. This is computed as the ratio of cash taxes paid to pre-tax income for a period. This measurement agrees with other studies (Cook, Moser & Omer, 2017; Chun, Kang & Yoo, 2019). A metric between 0 and 1 is used to indicate firms with tax avoidance. According to Chun, et al, (2019), a lower effective tax rate compared to the statutory tax rate of firms indicates tax avoidance.

$$ETR = \frac{\text{Cash Taxes Paid}}{\text{Pre-Tax Income}}$$

Leverage (LEV): This is the ratio of firms' total debt to total capital; sum of total debt capital and equity capital (Cook, Moser & Omer, 2017)

$$\frac{\text{Total Debt}}{\text{Total Capital}}$$

Return on asset (ROA): This is used to measure how much a company is able to earn from its assets. It is calculated as the ratio of profit before tax to total asset

$$\frac{\text{Profit before Tax}}{\text{Total Asset}}$$

Return on equity (ROE). ROE measures a company's capacity to generate income on investments of its shareholders. It is calculated by dividing profit after tax by total shareholder's equity.

$$\frac{\text{Profit after Tax}}{\text{Shareholder's Equity}}$$

Firm Size (Size): This is calculated as the natural logarithm of total assets

Board Size: Refers to the total number of directors or members that constitute the board of directors of a company

Table 1 summarises the variables, their measurements and sources of data

Table 1: Variables Measurements and Sources

Variables	Definitions/Measurements	Previous Authors
<i>Dependent</i>		
Cost of Equity (COE)	Ratio of proposed dividend to current market price plus growth rate	Bhuiyan& Nguyen (2019)
Cost of debt (COD)	Ratio of total interest expense to total debt capital	Bhuiyan& Nguyen (2019)
Cost of capital (COC)	Sum of the weighted average cost of equity and cost of debts	Sikes &Verrecchia (2016)
<i>Independent</i>		
Tax avoidance (Cash Effective Tax Rate)	Ratio of cash tax paid to Pre-tax income	Cook, Moser & Omer (2017); Chun, Kang &Yoo (2019); Pulido & Barros (2017)
<i>Control Variable</i>		
Return of Asset (ROA)	Ratio of PAT to Total Assets	Ge & Liu (2015); Gong, Huang, Wu, Tian, Li (2021)
Return on Equity (ROE)	Ratio of PAT to Total Equity	Cen, Tung & Sun (2017)
Leverage (LEV)	Ratio of total debt to total capital	Gong, Huang, Wu, Tian, Li (2021); Ge & Liu (2015).
Firm Size (FSIZE)	Natural logarithm of total assets	Company Annual report
Board size (Bsize)	Natural logarithm of number of boards	Company Annual report

4. Empirical Results

4.1 Descriptive Statistics

Table 2 describes the summary statistics for the series used in the analysis. The table shows that the mean and median values of the variables in the dataset are within the maximum and minimum values, indicating a high tendency for the normal distribution. The variables are all skewed to the right. Kurtosis statistics revealed that variables such as ROA, Firm size, and Board size are platykurtic, indicating that their distributions are flat in comparison to a normal distribution (values less than 3). Other variables including COE, COD, TAV, ROA, ROE, and LEV with values greater than 3 are leptokurtic, implying that their distribution are larger than normal distributions. The Jarque-Bera statistics show that, with the exception of FSIZE, the majority of the series are normally distributed because the p-values for all of the series are not statistically significant at the 5% level. As a result, we must accept the alternative hypothesis that the majority of the variables are normally distributed.

Table 2: Descriptive Analysis

	COE	COD	TAV	ROA	ROE	LEV	FSIZE	BSIZE
Mean	0.360	7.474	0.381	0.113	0.137	0.256	25.130	9.529
Median	0.240	0.315	0.165	0.100	0.130	0.070	25.568	8.000
Maximum	2.070	144.840	6.560	0.370	0.440	1.370	29.041	15.000
Minimum	0.040	0.000	0.000	-0.030	-0.030	0.000	20.562	6.000
Std. Dev.	0.388	28.498	1.103	0.097	0.114	0.399	2.522	2.608
Skewness	2.651	4.109	5.389	0.987	0.958	1.787	-0.176	0.902
Kurtosis	12.084	18.789	30.707	3.379	3.619	4.801	2.031	2.397
Jarque-Bera	156.718	448.825	1252.107	5.723	5.744	22.680	1.506	5.130
Probability	0.000	0.000	0.000	0.057	0.057	0.000	0.471	0.077
Sum	12.240	254.130	12.970	3.850	4.670	8.690	854.420	324.000
Sum Sq. Dev.	4.967	26800.820	40.172	0.309	0.428	5.249	209.948	224.471

Source: Author's computation from E-view 10

4.2 Correlation Matrix

The correlation matrix presented in Table 3 indicates that tax avoidance has a positive correlation with cost of equity and cost of debt. The correlation between tax avoidance and cost of equity is stronger than that of tax avoidance and cost of debt. ROE and ROA have negative association with cost of equity and cost of debt. The correlation between COD, COE, TAV, ROA, and ROE is positive but seems to be weak. Leverage (LEV), Firm size (FSIZE) and board size (BSIZE) showed a negative, and a weak relationship with COE, COD and TAV. There is a strong negative association between firm size, return on equity and return on asset. Although these correlations provide a good initial description of variable interrelationships, they do not imply causality in either direction. Finally, the correlation matrix also indicates that the data has no multicollinearity problem. The rule of thumb in econometrics is that the coefficient of correlation in absolute be less than 0.8.

Table 3: Correlation Matrix

	COE	COD	TAV	ROA	ROE	LEV	FSIZE	BSIZE
COE	1.0000							
COD	-0.0674	1.0000						
TAV	0.1497	0.0794	1.0000					
ROA	0.0549	0.1238	-0.2961	1.0000				
ROE	0.0157	0.1456	-0.3034	0.9362	1.0000			
LEV	-0.0983	-0.1295	-0.0986	-0.1074	0.1675	1.0000		
FSIZE	-0.1926	0.3490	-0.2272	-0.5085	-0.5103	-0.0095	1.0000	
BSIZE	-0.2875	0.4498	-0.1595	-0.2077	-0.1748	0.2957	0.6111	1.0000

Source: Author's computation from E-view 10

4.3 Data Analysis and Discussion

4.3.1 Baseline Regression: Effect of Tax Avoidance on Cost of Capital

This study employed panel data regression, which takes into account the dataset's cross-sectional and time-series dimensions. In addition, prior to testing panel data regression, a diagnostic test was performed using the Hausman test. The first step before running the Hausman test is to run the fixed and random effects to determine which of the models will be used for the analysis. Table 4 shows that the Hausman specification test is significant in all models, leading to the acceptance of the alternative hypothesis and the rejection of the null hypothesis. Hence, the use of a panel fixed effects model in this study was justified. As a result, the fixed effect is used as an analytical model to investigate the relationship between tax

avoidance and cost of capital. The "Driscoll-Kraay standard error" was used in the model to account for heteroscedasticity and autocorrelation.

Table 4: Hausman Model Specification Test

	Model 1	Model 1	Model 1
Chi2	15.64	12.93	18.27
Prob. > chi2	0.0286	0.009	0.014
Justification	FEM	FEM	FEM

Source: Author's computation from E-view 10

Table 5 shows the effects of tax avoidance on cost of capital components; cost of equity and cost of debt. With significance measured at a 0.01 significance level, the regression result revealed that the relationship between tax avoidance and cost of equity and cost of debt, respectively is significant. This implies that an increase in tax avoidance by 1% would result to a 2.65% increase in cost of equity and 1.437% increase in cost of debt. This result is consistent with most empirical findings, for instance, Trisnawati & Nasser (2017); Cen, Tung & un (2017); Dewiyanti & Burhan (2020); Sikes & Verrecchia (2016); Chun, et al (2019); Cook, Moser & Omer (2017) and Kimeal, Mkhize & Maama (2023) found in their studies that firms that avoid taxes are exposed to a higher level of cost of equity and debt capital. This simply means that tax avoiding firms are perceived riskier by investors, leading them to expect a higher level of return on their investments with such tax avoiding firms.

The controlling variables revealed contrary results with the dependent variables. ROA has a positive and significant effect on cost of equity and debt. This implies that a one percentage increase in ROA would result to 1.728% increase in cost of equity but a reduction in the cost of debt by 3.052%. On the other hand, LEV has a negative significant influence on cost of equity and debt. A percentage increase in LEV will result to a 5.409% and 2.124% decrease in the cost of equity and debt, respectively.

Table 5: Fixed Effects estimation of the Effect of Tax Avoidance on Cost of Capital

	Dependent var = Cost of equity			Dependent var = Cost of debt		
	Coefficient	t-stats	Probability	Coefficient	t-stats	Probability
TAV	2.650***	2.737	0.001	1.437***	3.084	0.000
ROA	1.728*	1.898	0.076	-3.052**	2.110	0.045
ROE	5.202	6.480	0.441	2.381	7.301	0.751
LEV	-5.409***	5.271	0.000	-2.124***	-5.939	0.000
FSIZE	0.678	2.485	0.154	1.519	-1.885	0.051
BSIZE	-0.049	0.154	0.758	-0.126	-0.174	0.485
C	-16.115**	2.187	0.053	23.239***	3.210	0.004
Firm	Yes			Yes		
Year	Yes			Yes		
No. of Observation	390			390		
R-Sqd	0.6999			0.6335		
Prob. > F	0.0000			0.000		
Hausman test	FEM (Fixed Effect Model)			FEM (Fixed Effect Model)		
Autocorrelation	H0is rejected (p-value = 0.0065*)			H0is rejected (p-value = 0.00048**)		
Heteroskedasticity	H0is rejected (p-value = 0.0000***)			H0is rejected (p-value = 0.0074*)		

Source: Author's computation using E-view 10

The robustness of the model estimates was further ascertained by the outcome of the various diagnostic tests. The adjusted explanatory power of the models relatively ranges between 0.69 and 0.63 implying that tax avoidance and other explanatory variables of the models explain approximately 63 to 69 percent of the total variation in Nigerian firms' cost of capital. The significant value of the F-Stat further confirmed the fitness of the model. In order to further determine the appropriateness of the models, the Discroll-Kraay standard errors are used to deal with potential heteroscedasticity and autocorrelation problems. The significant p values indicate that the models are free from heteroscedasticity and autocorrelation problems.

4.3.2 Issue of Reverse causality

The literature has established the possibility of reverse causality between tax avoidance and the cost of capital. This means the relationship between these two factors might be influenced by endogeneity, arising from potential reverse causality (Hasan et al., 2014; Goh et al., 2016; Beladi et al., 2018; Isin, 2018). For instance, firms facing higher debt costs might engage in aggressive tax avoidance to generate cash flow and alleviate financing constraints, creating a feedback loop that complicates causal inference from a positive association between tax avoidance and the cost of debt. Similarly, equity investors might demand a lower expected rate of return due to the positive cash flow effects of corporate tax avoidance. Therefore, it is crucial to consider the possibility of reverse causality to avoid biased results and incorrect conclusions.

Unlike previous analyses, which used firm fixed effects to control for unobservable heterogeneity based on time variation in the variables, this section focuses on addressing reverse causality. This is done using the dynamic panel General Method of Moments (GMM) technique of Arellano and Bond (1991). The system GMM two-step estimators with robust standard errors are applied to examine the effect of tax avoidance and cost of capital on one another. The primary advantage of this method is that it allows the independent variable of interest (cost of capital) to be treated as endogenous, correcting for simultaneity (or reverse-causality) bias. Roberts and Whited (2013) highlighted that endogeneity is a common issue in empirical finance research.

Table 6 presents the estimated results from the two-step GMM. To validate the instruments used in the two-step GMM approach, the first-differenced lagged value of the dependent variable is utilized alongside their prior levels. For model diagnostics, the study conducts the Sargan test (which tests over-identifying restrictions under the null hypothesis that "the instruments as a group are exogenous") and the Arellano–Bond test for serial correlation (AR (2)) whereas the Hansen J-statistic evaluates the orthogonality condition of the instrument factors. The results indicate rejection of all null hypotheses, confirming the appropriateness of the instruments and the absence of serial autocorrelation.¹

Model 1 in Table 6 aims to capture the effect of tax avoidance on cost of equity and debts (measures of cost of capital) while model 2 captures the reverse impact of cost of capital on tax avoidance. As observed in the baseline regression specifications, tax avoidance has a significantly positive impact on both the cost of equity ($p < 0.01$) and cost of debt ($P < 0.05$). The findings buttress the fact that aggressive tax avoidance might increase perceived risk among investors and creditors due to potential legal issues, penalties, or reputational damage (Kimeal et al., 2023). As a result, investors demand a higher return for the increased risk, and creditors charge higher interest rates, leading to an increased cost of capital (Sinaga & Firmansyah, 2022).

¹ The Arellano–Bond AR(1) test result is less than 10%, while the AR(2) test result is greater than 10%. Additionally, the Hansen test results are also greater than 10%. All tests indicate absence of autocorrelation

The coefficient of cost of equity and cost of debt in model 2 show contrasting results. While the cost of equity has a negative but not significant coefficient (-0.567 with t-stat -0.950), suggesting no significant direct impact of the cost of equity on tax avoidance, the cost of debt has a positive and highly significant coefficient (6.008*** with t-stat 2.800), indicating that higher cost of debt is associated with increased tax avoidance. This aligns with the hypothesis that firms facing higher financing costs may engage in tax avoidance to improve their financial position (Hasan et al., 2014, Isin, 2018, Sánchez-Ballesta & Yagüe, 2023). The results indicate a bidirectional relationship between tax avoidance and the cost of debt, illustrating the possibility of reverse causality. Specifically, tax avoidance can raise the cost of debt, while a higher cost of debt can drive firms to engage in tax avoidance. This dynamic is influenced by various factors, including costs associated with information asymmetries and agency problems (Medhioub and Boujelbene, 2024).

Table 6: System GMM Estimation of the effect of Tax avoidance on cost of Capital

	Model 1				Model 2			
	Dependent variable = Cost of Capital				Dependent variable = Tax Avoidance			
	Equity (COE)		Equity (COD)		Coeff.	t-stats	Coeff.	t-stats
Coeff.	t-stats	Coeff.	t-stats					
COE (-1)	0.135**	2.520						
COD (-1)			0.253**	2.390				
TAV (-1)					-0.293***	-0.740	-0.084	-0.240
TAV	0.128***	6.010	0.165**	2.320				
COE					-0.567	-0.950		
COD							6.008***	2.800
ROA	0.290	0.190	0.955**	2.210	0.019**	0.030	-5.738	-3.740
ROE	-0.173*	-1.780	0.013	0.360	-4.867	-2.400	-1.074	-0.590
LEV	-0.548	-1.240	0.035	0.630	-0.067	-0.220	2.399	0.540
FSIZE	0.256	0.590	-0.003**	-0.040	-0.052*	-0.070	-1.056	-0.580
BSIZE	0.462	0.860	-0.516	-0.700	0.050*	0.090	-0.116	-0.490
C	-3.354***	-2.560	4.253	0.390	2.376**	2.140	12.225***	3.620
No. of Obs.	360	360	360	360	360	360	360	360
AR(1)		0.088		0.093		0.024		0.097
AR(2)		0.311		0.198		0.903		0.429
Hansen J p-value		0.927		0.659		0.994		0.984
Sargan		0.998		0.854		0.996		0.988

Source: Author's computation using Stata 15: Note: ***, ** and * Means a significant effect at 1%; 5% and 10%

5. Conclusion

This research investigated the relationship between tax avoidance and the cost of capital in Nigerian firms from 2010 to 2020, utilizing the fixed effect panel data regression analysis as a preferred choice after the Hausman test. The panel fixed effects estimation technique, was used along the "Driscoll-Kraay standard error" to address heteroscedasticity and autocorrelation issues. The empirical findings on the relationship between tax avoidance and cost of capital indicate that tax avoidance significantly and positively impacts both the cost of equity and the cost of debt, which are key components of the cost of capital. Consequently, tax avoidance emerges as a determinant of firms' financing decisions and investors' investment choices. The system GMM two-step estimators that was further applied to examine the reverse causality effect of tax avoidance and cost of capital on one another also confirmed the panel fixed effect estimates, indicating that the findings are robust for policy formulation. Beyond this, the GMM as a robustness check provides an indication into the bidirectional relationship between tax avoidance and the cost of debt, illustrating the possibility of reverse causality. To address these implications, policymakers are urged to devise regulatory measures that promote voluntary tax compliance among firms and ensure transparent interpretations of tax laws. This can reduce the incidence of aggressive tax avoidance practices, thereby helping to lower the overall cost of capital for firms. Furthermore, firms are encouraged to enhance transparency by disclosing operational details to shareholders, including investment requirements and rationale behind strategic decisions. This transparency fosters investor confidence and shapes their perceptions of risk and the cost of capital associated with investments in these firms.

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