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A dynamic panel data approach of corporate tax avoidance and debt financing in Nigeria

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ABSTRACT

This study examines the influence of corporate tax avoidance on the debt financing of listed conglomerate firms in Nigeria. The study utilized documentary data collected from the annual reports and accounts of the sampled companies from 2010 to 2021. The data were analyzed using the Generalized Method of Moments (GMM). The results of the main analysis indicate that CETR and BTD have a negative and strong association with debt policy, proxied by debt to equity and debt to total assets. These findings imply that tax avoidance is positive and therefore more likely to increase the debt capital of listed companies in Nigeria. Hence, it is recommended that the management of conglomerate firms strive to strike a balance between non-debt tax shields and a tax shield in its effort to reduce its taxable income, as the cost of conventional debt is lower.

1. Introduction

The financial mix of a company is often made up of equity and debt, each of which has tax implications. Modigliani and Miller (1958) posit that a firm's capital structure is irrelevant in the absence of taxes and bankruptcy costs, among other assumptions. However, realizing that a world of no tax rarely exists, MM (1963) made a technical correction by reversing their earlier position in 1958 and further argued that since most tax systems favor debt finance over equity, firms may be more disposed to the former. A wrong capital structure decision can have profound implications for the cost of capital, riskiness and performance of a firm (Danso et al., 2021). This finding has been corroborated by Gropp (2002), Gordon and Lee (2001), Cantos (2005), Gertler and Hubbard (1990), Seetharaman et al. (2001), Strulik and Trimborn (2012), Furlong (1990), and Rangazas and Abdullah (1987). Against this backdrop, corporate tax has become a central focus in capital structure or debt policy.

Corporate taxation has emerged as one of the significant government policies and globally recognized as a major source for government revenue that drive the growth and development of the economy. Away from the revenue generation role, taxation is also useful device that can address both social,

economic, and political outcomes. On the other hand, taxes as cost of doing business usually erode after-tax income available for distribution to shareholders, thus, corporate taxpayers engage in legal means to reduces taxes and increase their after-tax earnings, this is done through tax avoidance activities. Tax avoidance activities is done to save taxes by capitalizing on the loopholes on relevant tax laws, the aim is not to evade taxes, but to adjust firm tax burden. Further, as noted by Madugba et al. (2020) that no tax laws available compelling taxpayers to pay more than required, thus, a rational taxpayer may wish to utilize weakness in the tax laws to reduces its tax liabilities.

A major area of divergence between debt and equity finance lies in the tax treatment of the returns to the holders, while dividends accruing to shareholders are not tax deductible in arriving at or determining tax liabilities, indicating that the rate of return on equity increases with an increase in leverage or debt level. Thus, Diamond (1994) argues that if debt finance does not have its attendant consequences (i.e., bankruptcy cost), an all-debt firm is preferable; however, in the presence of bankruptcy costs and where no benefit accrues from the tax deductibility of interest, a firm is better off if financed entirely by equity. This necessitates a trade-off of the debt tax deductibility of interest; a firm is financed by both equity and debt.

It is a firm's discretion and legal prerogative to decide the level of debt finance it requires in its capital structure, which in turn legalizes the effect of such decisions on the tax status or position of firms. All these are means of avoiding tax, which is described as the ability to pay less tax in relation to earnings before tax (Dyreng et al., 2008) or contriving transactions and structures to reduce tax in ways that are contrary to the policy or spirit of tax laws (Jain et al., 2013). This reinforces the common view that tax avoidance involves leveraging loopholes in tax laws to minimize tax. Thus, a firm's debt policy can be influenced by its desire to avoid tax. In the international context, several studies have investigated the relationship between corporate tax avoidance and debt policy (Masri and Martani (2014); Blaylock (2016); Tang et al. (2022). In practice, managers used rational approach to increase their after-tax income. Therefore, tax avoidance activities are regarded as value-generating management practice as it led to the transfer of wealth from the state to shareholders (Santa & Rezende, 2016).

Further, as noted by Madugba et al. (2020) that no tax laws available compelling tax payers to pay more than required, thus, a rational taxpayer may wish to utilize weakness in the tax laws to reduces its tax liabilities. However, corporate tax avoidance activities prevent government from generating enough revenue through corporate tax (Khanh & Khuong, 2019). Equally, Khuong et al. (2020) argued that tax management schemes resulted in significant decreases in the government revenue, thus affecting government spending in discharging its responsibilities. On the other hand, Tax avoidance activities are regarded as a value-generating management practice as it led to the transfer of wealth from the state to shareholders (Santa & Rezende, 2016).

Tax avoidance activities might be affected by the firm's choice of capital structure (Pangestu & Bimo, 2018). This is due to the fact that financial leverage reflects the entity's debt capital used in financing firm's total assets. Increases in debt capital usually resulted in an increase of interest expenses. Furthermore, the empirical relationship that link tax avoidance with capital structure remained inconclusive, though in the mainstream, Salehi and Salami (2020) argued that corporate managers to achieved optimal capital structure and attained maximum revenue through striking balances between tax shelters and financial leverage. Also, Danso et al (2020) argued that in relation to non-debt tax shield, interest expenses led to decrease in the amount of income tax liabilities payables since interest on debt capital in Nigeria is tax deductible.

However, to minimize the impact of tax avoidance activities on revenue generation, Nigerian government through finance Act, 2019 amend section 24 of CITA 2004 as amended to limit the amount of interest that corporate taxpayer can enjoyed as tax incentives to thirty per cent (30%) of earnings before interest, tax, deprecations and amortization (EBITDA), with the excess interest disallowed and treated as tax-deductible for a maximum of five years (CITA, 2007 As Amended). The restriction of 30% has left companies with no option than to engage in tax avoidance activities through managing their cash flow and project when the tax liabilities to be paid. Although prior studies document several findings on tax avoidance, e.g (Abdul Wahab et al., 2018; Chen et al., 2014; Elmagrhi et al., 2018; Hasan et al., 2014; Jin, 2021; Kimea et al., 2023; Nebie & Cheng, 2023; Shevlin et al., 2020; Wardani et al., 2022), yet, none of

these studies relate tax avoidance with capital structure. The study of Lee et al. (2023) focused on developed countries with strong institutional setting, thus indicating dearth of similar studies conducted on the effect of corporate tax planning and debt capital from emerging country. Thus, this study fills this gap by using listed conglomerates in Nigeria.

Our study provides the followings unique contributions. First, to the best of our searching, this paper is among the earliest that employed both cash and non-cash proxies of tax avoidance activities. Secondly, our study is among the pioneers' research that examine the association between tax avoidance and debt policy of conglomerate companies in Nigerian. Third, our finding also shows that companies engage in tax avoidance to offset the associated cost of debt. Thus, tax avoidance is more likely to increase the debt capital. Fourth, evidence from this research established that companies adopted both CETR and BTD in their bid to minimize the level of tax liabilities. Finally, in our analysis, we used Generic Method of Moments GMM to examine the association between tax avoidance and debt capital, the essence of using the GMM is to curtail the potential effect of endogeneity and to control for issues such as auto/serial correlation.

To accomplish the objectives of this study, the rest of the paper is structured as follows: Section 2 reviews related empirical studies, Section 3 focuses on the methodology of the study, Section 4 presents the results and discussion, and Section 5 covers the conclusion and recommendations.

2. Background to the study

Corporate taxation has emerged as one of the significant government policies and globally recognized as a major source for government revenue that drive the growth and development of the economy. Taxation is useful device that address both social, economic, and political outcomes. In Nigeria, companies' income tax (CIT) is reported as [1]$3.383 between 2021-2022 year of assessment (Ejechi, 2023). A report by the national bureau of statistics indicates that 31% of this comes from non-financial companies (Conglomerate). Despite the huge amount generates via company income tax. Alkausar et al. (2023) document that tax avoidance may lead to agency conflict between managers and tax authorities. Corroborating the above position, Nigeria filed a first tax avoidance case against Chevron petroleum. The document indicates that Chevron employed various tax planning strategies including Dutch letter box. (OECD, 2018, October,).

Therefore, corporate taxpayers engage in legal means to reduces taxes and increase their after-tax earnings, this is done through tax avoidance activities. Tax avoidance activities is one way of reducing the level of tax liabilities and increase the after-tax income (Lee et al., 2023; Shevlin et al., 2020).

In Nigeria, companies paid taxes using different rates, for example companies from agriculture sector and ICT enjoyed tax holidays of at least 5 years under the pioneer legislations. However, conglomerate companies in Nigerian paid 30% of their total earnings as tax. Additionally, the amended finance Act of 2019 limit the amount of interest that corporate taxpayer can enjoyed as tax incentives to thirty per cent (30%) of earnings before interest, tax, deprecations and amortization (EBITDA)(CITA, 2007 As Amended). These changes may push firms to engage in tax avoidance activities by managing their cash flow and project to down the level of tax liabilities. To test this effect, we included CETR and CFETR as our explanatory variables. This is to test if companies used flexible approach in their bid to maximize after tax profit through tax planning. In addition to 30% statutory rate, companies are also required to pay additional 3% of their profit as education tax. These multiple taxes may likely push the companies to used alternative approach of tax avoidance.

3. Theoretical literature review

According to Desai and Dharmapala (2006) and Alkurdi and Mardini (2020) tax avoidance may result in opportunistic managerial behavior, which makes it difficult for shareholders to assess managers' performance due to their actions regarding tax planning activities. This is because external monitoring is necessary to lower the agency costs that result from tax avoidance. From the viewpoint of Chen et al. (2014) and Desai and Dharmapala (2009), tax avoidance activities can serve as alternative for interest expenses

and in shaping a firm's capital structure. While the direct impact of tax avoidance is to enhance the after-tax profit, these influence by the potential opportunistic behavior of managers. As urged by recent scholars like Hanlon and Heitzman (2010) that tax avoidance can reflect a dual decision of both managers and shareholders, as there are possibilities that tax can be use by managers to choose the financing pattern and address the desired of the firm's financing decision. Therefore, agency theory predicts that tax avoidance is associated with more manager– shareholder conflicts and lower share values (Hong et al., 2023).

The trade-off theory of capital structure also argues that firms choose an optimal capital structure by balancing the tax benefits of debt with the present value of financial distress. Accordingly, most firms that use tax management strategies tend to use more debt in their capital structures due to interest deductibility. Previous studies have predicted a positive relationship between tax avoidance and debt policy. For instance, Wang et al. (2018) posit that a tax management strategy can minimize the costs of debt servicing and improve firm performance. According to Wardani et al. (2022), firm can achieve an optimal capital structure if cost of capital is counterbalanced by the associated tax saving. This suggest that companies will use tax avoidance strategies in offsetting raising cost of debt or capital thereby netting down any marginal cost of capital. Another perspective has been provided by Graham (2003) that interest is a deduction on corporate income tax and is therefore payables from net income of companies based on statutory tax rate. Thus, dividend, interest and capital gain are also tax in the hand of investors. The importance decision rule for capital financing is to invest as along as the marginal cost benefit exceed its associate cost. Therefore, the required cost capital determine it cost of capital and corporate taxes create a first order incentive to finance its debt (Hanlon & Heitzman, 2010).

According to Lee et al. (2023), tax avoidance may affect firms' capital structure in both rational and behavioral reasons. This is because irrational managers may rely on GAAP ETR and may not bothered the consequence of marginal effective tax rate in the trade of between debt financing or equity financing. In this regard, Hasan et al. (2014) and Shevlin et al. (2020) suggested that companies with higher tax avoidance are more likely to have increased after-tax cash flows and higher risk profile. This is because fixed debt borrowers are particularly concern about the risk position and the ability of the firms to pay back the borrowed resources. The lenders especially banks perceive tax avoidance as risky and therefore demands higher returns for lending to cover the associated risk (Lee et al., 2023)

4. Empirical literature review and hypothesis development

4.1. Tax avoidance and capital structure

Behavioralist assume that managers are less concern on the marginal tax rate rather they react directly to the effective tax rate (Lee et al., 2023). Building on the above view, The effective tax rate represents the average rate of tax payable by an organization as a tax liability. Managers are more interesting to use tax avoidance activities to trade off debt and equity capital. Lee et al. (2023) and Shevlin et al. (2020) document that the choice of higher or lower debt capital due to tax avoidance depends on behavioral or rational factors as well as managerial biased.

Hanlon and Heitzman (2010) urged that corporate managers take aggressive tax avoidance to increase the after-tax profit and to satisfy the interest of the shareholders. Extracting from the agency theory, Desai and Dharmapala (2009) opined that tax avoidance activities are the tools used by managers to complete the accounting process and provide ways through tax shield like interest for self-serving benefits. Effective tax rate is an importance tool of measuring tax avoidance activities. Lee et al. (2023) suggests that managers are more likely to capitalize on ETR to take financing decision rather than theoretically focused on marginal ETR. Although prior studies established that corporate tax avoidance is about reducing the level of tax liabilities using different techniques and strategies (Desai & Dharmapala, 2009; Lee et al., 2023; Wardani et al., 2022). The question of perfect measurement is still debated in the literature. Book-tax difference (BTD) has been suggested as proxy for tax avoidance (Abdul Wahab & Holland, 2012). BTD represents the difference between accounting profit and taxable profit.

Feng et al. (2019) defined BTD as the difference between pre-tax accounting income and total expenses, including deferred tax expenses scaled by the total pre-tax accounting income. It is a common

measure of tax avoidance activities: a lower BTD indicates higher tax avoidance activities and a lower tax burden (Masri & Martani, 2014). However, Desai and Dharmapala (2009) argued that BTD could be due to opportunistic managerial behavior; thus, any measure of tax avoidance activities needs to control for differences that may arise as a result of earnings management. Previous studies on the relationship between book and tax differences and capital structure yield positive relationship. For instance, Khanh and Khuong (2019), using a dynamic Generalized Method of Moments (GMM) model, find that tax avoidance is negative and significantly related to financial leverage in Vietnam. Jin (2021) also established that tax aggressiveness has a significantly negative impact on a firm's capital structure, implying that aggressive tax planning reduces firms' leverage. Some scholars also established a positive association between tax avoidance and debt capital using ETR as it proxies that captures the quantum of tax avoidance activities (Lin et al., 2014; Wang et al., et al., 2018 and Alkurdi & Mardini, 2020). In this regard, Rezaei (2015), analyzed the relationship between tax avoidance and debt in companies listed on Tehran Stock Exchange over a period of ten years ranging from 2002 to 2011. The empirical results indicate a negative and significant relationship between the tax avoidance debt policy, as well as the relationship between tax avoidance and cost of debt. Wang et al. (2018) employed the ETR and ETR differential (DTAX) to capture the level of tax avoidance activities and reported that tax avoidance negatively influences capital structure.

However, Prabowo (2020) found that the debt-to-equity ratio has a positive and significant influence on Indonesian palm oil companies' corporate tax avoidance. Similarly, Khanh and Khuong (2019) found that tax avoidance is significantly positively related to financial leverage in Vietnam. Adegbite and Bojuwon (2019) examined corporate tax avoidance practices among twenty (20) listed firms between 2006 and 2017. The study reveals that debt to total assets ratio has a positive and significant impact on tax avoidance activities. Recently, Lee et al. (2023)studied whether tax avoidance determine cost of debt using 30,343 observations. The findings present a new direction that tax avoidance influence firms to issue equity rather than debt financing. Therefore, this finding lent it support to rational choice of managers to issued equity when the associated of debt capital is greater than tax saving. Given Nigeran setting where government emphasis more tax regulations along with enforcement of multiple taxes on corporate entity. The agency theory may provide better postulate to examine the link between corporate tax avoidance and cost of debt. In contrast, Kluzek and Schmidt-Jessa (2022) find that ETR has no influence on capital structure decisions. In addition, Lin et al. (2014) reported that the cash effective tax rate had no impact on the debt policy of US listed firms. Ogbeide et al. (2022) find that financial leverage has no significant effect on D_BTD. Thus, the level of tax aggressiveness cannot be influenced by the proportion of debt in their equity structure. Salehi and Salami (2020) examine the impact of corporate tax aggression and debt among listed firms in Iran. They find that leverage has a negative and insignificant impact on corporate tax aggression (BTD). Thus, the differences between income reported to the tax authority and income to capital markets are not influenced by capital structure decisions.

Overall, the position of Lee et al. (2023) that tax avoidance may influence capital structure decision based on behavioral or rational reason of the firms. This position has not been tested from emerging economy like Nigeria. Based on these reasons, we propose the following hypotheses:

H1a Cash flow effective tax rate (CFETR) has a significant relationship with debt policy.

H1b Cash effective tax rate (CETR) has a significant relationship with debt policy.

H1c Book-tax differences has a significant relationship with debt policy.

5. Research design

5.1. Sample and data

The populations constitute 105 listed non-financial companies between 2010 and 2021. Table 1 presents the procedure adopted in the sample selection. From the total of 105, 23 companies were delisted, 24 ICT and services companies were eliminated because their characteristics and tax bases are different from those doing integrated business, we also removed 14 companies from agricultural sector and

Table 1. Sample and selection procedure.

Initial sample size before elimination 105
Companies Delisted after 2011 (23)
ICT and Services Companies (24)
Agricultural and natural resources (14)
Negative profit before income tax (18)
Final sample size 26
Observation period (2010–2021) 12yrs
Number of observations 312

Table 2. Variables definition and their measurement.

Variables	Measurement	Source
Panel A: Dependent variables		
Total Debt/Total Assets	Total interest-bearing debt divided by total assets.	Sani et al. (2020), Al-Absy (2022). (Elmagrhi et al., 2018)
Total Debt/ total Equity	Total debt divided by total equity	Sunardi et al. (2020)
Panel B: Independent Variables		
Cashflow effective tax rate (CFETR).	Tax expenses divided by operational cashflow.	Alkurdi and Mardini (2020)
Cash effective tax rate(cETR)	Cash tax paid scaled by pre-tax income	Alkurdi and Mardini (2020).
Book-tax difference (BTD).	Pre-tax income minus taxable income.	Khanh and Khuong (2019)
Panel C: Control variables		
Total Accrual (TA)	Net income minus operating cash flow scaled by total assets.	Jaffar et al. (2021), Abdul Wahab et al. (2018).
Profitability (ROE)	Profit after tax scaled by shareholders' fund.	Santa and Rezende (2016)
Tangibility (TAN)	Total non-current assets divided by total assets.	Bayraktaroglu et al. (2019); Al-Absy and Hasan (2023)
Firm size	Natural of Logarithm of total assets.	Razali et al. (2018)
Industry dummy (IND)	Dummy variables 1 = services, 2 = manufacturing	Razali et al. (2018); Sani' et al. (2021)

natural resources sub-sector, because companies in this sector are given tax holidays as enshrined in companies and allied matters 1990 as amended. In addition, we removed 18 companies with a negative income before tax. Finally, we used a sample of 26 firms for 12 years period leading to 312 firm year observations. Table 1 provide summary of the sample process.

5.2. Dependent variable

We measure debt policy in two ways to show the proportion of debt in the capital structure of the sampled firms. The first is total debt to total assets (TD/TA). It measures total interest-bearing debt divided by total assets (Sani et al., 2020; Lee et al., 2023). Our second measure is the debt-to-equity ratio, measured as total debt scaled by total equity (Ogbeide et al., 2022).

5.3. Independent variables

In this study, we measured tax avoidance activities using three proxies: CFETR, CETR, and BTD. CFETR measures tax expenses divided by operational cash flow (Alkurdi & Mardini, 2020), whereas CETR is measured as cash tax paid scaled by pre-tax income. Finally, BTD refers to the difference between accounting profit and taxable profit, where taxable profit is obtained by dividing current tax expenses by the statutory tax rate (Desai & Dharmapala, 2006; Rego & Wilson, 2012; Hoseini & Safari Gerayli, 2018; Ebimobowei, 2022).

5.4. Control variables

To capture the well-documented factors affecting firms' debt policy, we used four control variables: total accruals (TA), firm size (Fsize), profitability (ROE), tangibility (TAN), and industry sector dummy (IND). These variables were considered as control because studies have shown the variables are directly related to debt financing (Bliss & Gul, 2012; Lee et al., 2023; Shevlin et al., 2020; Abdul Wahab et al., 2018). We use total assets, with the transformation of the natural logarithm, as a proxy of firm size. Profitability is

measured as return on assets. Firm age is the difference between the date of listing on the floor of the Nigerian group exchange and the date of the observations. Profitability and firm age represent firm characteristics are suggested as major determinant of capital structure (Abdul Wahab et al., 2018; Danso et al., 2021; Nebie & Cheng, 2023). In terms of the industry sector, we created a dummy variable of 1 if it is the manufacturing sector and a value of 2 if it is the service industry. Table 2 provides a summary of the variables used in the study together with the sources of the measurements used.

6. Empirical models and construction of variables

To examine the relationship between the dependent and explanatory variables, this study proposed the following econometric models:

$$TDTA_{it} = \beta_0 + \beta_1 L.TDTA_{it+} \beta_2 CFETR_{it} + \beta_3 CETR_{it} + \beta_4 BTD_{it} + \beta_5 TA_{it} + \beta_6 Fsize_{it} + \beta_7 ROE_{it} + \beta_8 IND_{it} + \varepsilon_{it} \quad (1)$$

$$TDTE_{it} = \beta_0 + \beta_1 L.TDTE_{it+} \beta_2 CFETR_{it} + \beta_3 CETR_{it} + \beta_4 BTD_{it} + \beta_5 TA_{it} + \beta_6 Fsize_{it} + \beta_7 ROE_{it} + \beta_8 IND_{it} + \varepsilon_{it} \quad (2)$$

Where TD/TA stand for total debt to total assets, TDTE stands for total debt to total equity, L.TD/TA Stands for lag of total debt to total assets, L.TD/TE Stands for lag of total debt to total equity, CETR, cashflow Effective tax rate, CETR stand for cash effective tax rate, BTD stand for book tax difference, TA mean total accruals, Fsize stand for firm size, ROE means return on assets, IND industry dummy, and finally ε_i stands for error terms.

6.1. Descriptive statistics

Table 3 Presents the described the study variables. It shows that, on average debt policy (TDTA) has a mean value of 11. 9 percent suggesting that 11.9 per cent represents debt in the capital formation of listed firm in Nigeria during the period of the study with minimum and maximum value of 0 per cent and 49.9 per cent respectively. In term of independent variables, the mean values for CFETR and CETR are 28.1 per cent and 2.7 per cent. Thus, the Nigerian listed firms favor CFETR strategy. BTD has a mean value of 3.9 per cent implying that listed firms in Nigeria, on average report more accounting income than taxable income, this is higher than 0.5 percent reported by Abdul Wahab et al. (2018). The average value for total accruals (TA) is -0.044 and maximum value of 13 per cent.

Presentation of descriptive statistics for all study variables for the 312 firm year observations of the sampled companies during the years (2010–2021). Regarding the control variables, the average firm size (Fsize) is 10.29bn. We also note that TAN is 37.1%, implying that the sampled firms are not capital-intensive. The coefficient of the ROE was 1.123, with a minimum value of 0.079. Finally, the industry dummy is 1.654.

6.2. Univariate analysis

Table 4 presents the Pearson correlation matrix for the study variables. From the matrix, CFETR and CETR have negative coefficients with debt policy. However, BTD, TA, Fsize, TAN, ROE, and IND are positively

Table 3. Descriptive statistics.

Variable	Obs	Mean	SD	Min	Max
TDTA	312	0.119	0.131	0.000	0.495
TDTE	312	0.471	0.463	0.849	0.902
CFETR	312	0.281	0.319	−0.288	1.200
CETR	312	0.027	0.026	0.000	0.090
BTD	312	0.039	0.082	−0.332	0.373
TA	312	−0.044	0.094	−0.240	0.131
Fsize	312	10.290	0.777	8.931	12.412
TAN	312	0.371	0.187	0.021	0.822
ROE	312	1.123	1.404	0.079	4.549
IND	312	1.654	0.477	1.000	2.000

Table 4. Correlation matrix.

TDTA	CFETR	CETR	BTD	TA	Fsize	TAN	ROE	IND	VIF
TDTA	1.000								
CFETR	−0.131	1.000							
CETR	−0.239	0.239	1.000						
BTD	0.069	0.024	−0.447	1.000					
TA	0.073	0.227	0.010	−0.002	1.000				
Fsize	0.124	−0.169	−0.015	0.199	−0.073	1.000			
TAN	0.183	−0.080	−0.183	0.088	−0.198	−0.141	1.000		
ROE	0.009	0.053	0.275	0.152	−0.076	0.367	−0.011	1.000	
IND	0.276	−0.052	0.173	0.116	−0.043	0.263	0.131	0.136	1.000

Table 5. Regression results of tax avoidance and interest bearing liabilities (Model 1).

	Coeff	z-value
L.TD/TA	**0.696**	**13.48*****
CFETR	−0.008	−0.97
CETR	−0.412	−2.45**
BTD	−0.134	−2.59**
TA	2.243	3.86***
Fsize	0.016	3.48***
TAN	0.035	2.07**
ROE	−0.003	−1.18
IND	0.146	1.33
Const		
Wald Chi²	0.4695	
AR1	0.001	
AR2	0.428	
Hansen test	0.764	
Hausman	0.005	
Modified Wald Test	0.000	
Woodridge test	10.6***	

Notes: Model 1= Debt to Total Assets, CFETR=Cashflow effective Tax Rate, BTD=Book to Tax Differences, TA=Total Accruals, FSize=firm size, TAN=tangibility, ROE=return on equity, IND=industry type.
***, **, and *indicate 1, 5%, and 10% levels, respectively.

associated with debt policy. Furthermore, the results of the correlation matrix show that the highest correlation coefficient between ROE and Fsize is 0.367. This is less than the threshold of 0.8 suggested by Hair et al. (2014), which suggests the absence of multicollinearity problems. This assertion is confirmed by the variance inflation test carried out, as the mean of individuals is less than 5. Thus, the data were free from the multicollinearity problems.

6.3. Dynamic regression results model 1

Table 5 shows the regression results for the impact of corporate tax avoidance on debt policies. Being cross-sectional and time-series variants. We carried out a modified Wald test for group-wise heteroscedasticity, cross –sectional dependency, and the Wooldridge test for autocorrelation to eliminate biased inferential statistics.

Although the Hausman specification test favors the fixed effect (FE) model, we cannot use the FE model because our data are characterized by the problems of heteroscedasticity and first-order (AR1) autocorrelation. To overcome these problems and control for potential endogeneity among the variables of this study. This study employed a dynamic panel data regression model of the GMM. The dynamic GMM model can handle the problem of heteroscedasticity and autocorrelation, which could affect the validity of statistical inferences (Khuong et al., 2020).

From Table 5, the results of the Hensen test prove that our instruments are valid, and the results from the first- and second-order serial correlation indicate that the error terms are not serially correlated after the GMM.

In Table 5 the regression estimates indicate that CFETR is negative and statistically insignificant related to TDTA ($\beta=-0.008, p=0.333$), implying that cash flow effective tax rate (CFETR) had no influence in shaping capital structure decision in the case of listed firms in Nigeria is not determines by tax burden. This finding is consistent with those of Kluzek and Schmidt-Jessa (2022) and Ogbeide et al. (2022). However, this contradicts the work of Khanh and Khuong (2019), Ernawati et al. (2021), and Jin (2021). This finding

supports our hypothesis that CFETR is negatively related to capital structure but is statistically insignificant. This is consistent with the findings of Lee et al. (2023) who tested the effect of tax avoidance on the capital structure choices and the outcome of the regression shows that companies preferred more of equity than debt capital.

However, the coefficients of the regression estimates show that CETR and BTD have a significant and negative influence on capital structure decisions (β=-0.412, p=0.014; β=-0.134, p=0.010). This finding suggests that capital structure decisions positively affect tax avoidance activities. These findings are in line with the work of Khanh and Khuong (2019), Salehi and Salami (2020), and Wang et al. (2018). Hasan et al. (2014) suggest that high tax avoidance potentially increase the level of debt and fixed bond issuance and likewise increases the after-tax income. In this regard, Abdul Wahab et al. (2022) document that Book-tax differences (BTD) measure the extent to which firms' taxable income diverges from their book income. At the country level, BTD can directly contribute to the emergence of a 'tax gap'. The magnitude of the 'tax gap' explains the differences between tax theoretically due and tax collected. Our findings however contradict the positions of Ogbeide et al. (2022) and Kluzek and Schmidt-Jessa (2022) who found insignificant correlation on this stream of relationship.

The regression results show that total accruals (TA) and tangibility (TAN) have a significant and positive relationship with debt capital, indicating that larger companies are less likely to have more debt capital in terms of fixed assets. Similarly, companies that manage their earnings are likely to have less debt capital because they enjoy a low burden through earnings management activities. Finally, the results for ROE and IND are found to be insignificant, suggesting that they cannot influence firms' choice of structure.

The results in Table 6 show that CETR and BTD are both negative and statistically significant with debt policy, implying that the cash flow effective tax rate (CFETR) and book-to-tax difference have significant influence in shaping capital structure decisions in the case of listed firms in Nigeria. This finding supports our hypothesis that CFETR and BTD are negatively related to debt policies. This outcome is similar to the findings of Khanh and Khuong (2019) and Ernawati et al. (2021) Jin (2021) who suggest that tax avoidance negatively impacts debt policy. Closely related, the coefficient of the regression estimates shows that CFETR is negative but statistically insignificant, implying that cash flow effective tax rate (CFETR) had no influence in determining debt policy of firms in Nigeria. This finding is consistent with those of Kluzek and Schmidt-Jessa (2022) and Ogbeide et al. (2022). This finding partially supports our hypothesis that CFETR is negatively related to debt capital but statistically insignificant.

6.4. Robustness checks using alternative estimation techniques

In this section, we robust our main analysis by using Panel Corrected Standard Error (PCSE) as an alternative method of estimation as shown in Table 7. This is consistent with previous scholars like Minh Ha et al. (2021) who established that PCSE correct the model error and provide statistical inferences appropriate for hypothesis test. This is considered critical for validating whether the results are robust to

Table 6. Regression results tax avoidance and debt equity ratio (Model 2).

	Coeff	z-value
L.TD/TE	0.0283	4.97***
CFETR	−0.0027.	−0336
CETR	−1.0382	−6.71***
BTD	−0.1668	−4.04***
TA	0.1908	5.67***
Fsize	0.0087	0.71
TAN	0.0989	2.17**
ROE	−0.0179	−3.8***
IND	0.0744	3.71***
Const	−0.1156	−0.93
Wald Chi^2	343.33	
AR1	0.01	
AR2	0.281	
Hansen test	0.03	
Modified Wald Test	0.0000	

Notes: Model 2 = Debt to Total Equity, CFETR = Cashflow effective Tax Rate, BTD = Book Tax Differences, TA = Total Accruals, FSize = firm size, TAN = tangibility, ROE = return on equity, IND = industry type.
***, **, and *indicate 1, 5%, and 10% levels, respectively.

Table 7. Regression results (PSCE) additional analysis.

	Model 1 (TDTA)		Model 2 (TDTE)	
	Coeff	t-value	Coeff	z-value
Cons	−0.094	−1.65*	−0.0812	−0.48*
CFETR	−0.017	−0.71	−0.812	−0.33
CETR	−1.792	−3.94***	−23.364	−4 .70***
BTD	−0.255	−2.12**	−4.858	−3.75***
TA	0.187	2.50**	0.842	0.92
Fsize	0.01	1.6	0.619	0.85
TAN	0.086	2.38**	0.945	11.83***
ROE	0.008	1.39	0.275	1.59
IND	0.087	7.30***	−0.408	−0.46
Model Summary				
Wald Chi^2	131.95***		516.27***	
Adjusted R^2	0.2072	0.4695		
Hausman	0.005	0.014		
LM test	684.25***	684.25***		

Notes: Model 1 = Debt to Total Assets, Model 2 = debt to equity; CFETR = cash flow effective tax rate; BTD = book-to-tax differences; TA = total accruals; FSize = firm size; TAN = tangibility; ROE = return on assets; IND = industry type.
***, **, *indicate 1, 5, and 10% levels, respectively.

Table 8. Regression result using lag variable (debt to total assets).

	Coeff	z-value
CFETR	−0.016	−0.01
CETR	−0.961	−3.16***
BTD	−0.102	−1.30***
TA	0.153	3.09***
Fsize	0.005	0.25
TAN	0.215	5.14**
ROE	0.009	1.68*
IND	0.067	1.41
Const	−0.094	−0.43

CFETR = cash flow effective tax rate; CETR = cash effective tax rate, BTD = book-to-tax differences; TA = total accruals; FSize = firm size; TAN = tangibility; ROE = return on assets; IND = industry type.
***, **, *indicate 1, 5, and 10% levels, respectively.

Table 9. Regression result using lag variable (debt to equity).

	Coeff	z-value
CFETR	0.202	−0.75
CETR	−23.70	−4.68***
BTD	−5.280	−4.09***
TA	0.734	0.81
Fsize	0.092	0.92
TAN	0.700	1.94*
ROE	0.92	10.58***
IND	0.258	1.38
Const	−0.468	−0.49

CFETR = cash flow effective tax rate; CETR = cash effective tax rate, BTD = book-to-tax differences; TA = total accruals; FSize = firm size; TAN = tangibility; ROE = return on assets; IND = industry type.
***, **, *indicate 1, 5, and 10% levels, respectively.

alternative estimation techniques. The results obtained in Table 7 were broadly similar to those previously analyzed. Our findings confirm the negative and significant impact of CETR and BTD debt capital, while CFETR is negative but statistically insignificant in both Model 1 and Model 2.

7. Robustness check using lagged variables

To further robust our main result, we use a lagged of all the studied variables. Table 8 presents the outcome of the analysis between tax avoidance and debt to total assets while Table 9 disclose the robustness of tax avoidance against debt to total equity. The essence of using lagged variables is to control for serial correlation and potential endogeneity problems. Interestingly, the findings of variable of interest CFETR, CETR, BTD and TA for both TD/TA and TD/TE as shown in Tables 8 and 9 show no substantial changes from the outcome of the main regression.

7.1. Summary and conclusion

This study examines the nexus between tax avoidance and debt policy. Existing studies on debt policy could not justify whether tax avoidance led to higher or lower debt capital from emerging countries. Thus, this study explored the link between CFETR, CETR, and BTD and debt capital in Nigeria. The results of the main analysis suggest that CETR, and BTD are strongly associated with Nigeria's debt policy. This means that tax avoidance may increase the level of debt capital. Our findings also indicate that benefit of tax planning through tax avoidance strategy is what influence managers to subscribe for more debt. These findings were confirm using multi-method approach of Lagged variables and testing the relationship using static regression methods. More interesting, is the finding that CETR and BTD were strongly and negatively correlated in both models. Our findings document supportive evidence that capital structure theory, especially trade off theory can be applied in Nigerian content. Finally, our findings add value to existing body of knowledge by providing evidence on the association between tax avoidance and capital structure from emerging economy using a dynamic regression model.

7.2. Research implication

The relationship between tax avoidance and debt financing has been generating serious concern because of enormous fact that companies utilize the loopholes of tax systems to minimize tax liabilities. This study found that CETR and BDT have negative and strong association with debt policy of listed conglomerate companies in Nigeria. The implication of this findings is that tax avoidance can increase and encourages firms to increase their debt capital. This suggests that tax avoidance influences firms' desire to increase debt financing, which decreases the level of tax burden because interest expenses reduce information asymmetry. It also means that in Nigeria, cash flow and non-cashflow measures of tax avoidance are associated with debt policy.

7.3. Limitation and suggestion for future

Our study is limited to conglomerate companies listed on the floor of Nigerian Exchange Limited and, as such, companies such as financial and oil and gas companies are not covered. This is because those sectors are guided by different legislations and oil and gas companies are taxed differently. Therefore, future researchers can focus on oil and gas, and financial sectors in determining the link between tax avoidance activities and debt financing pattern of the firms. Our research tested only the link or association between tax avoidance and debt capital without deepening to find the causality implicat ion, future scholars could explore causal effect between the studied variables.

Note

1. This is figure was translated to dollar from the sum of NS2.83 trillion using an official rate of N845 to a dollar.

Author contributions

Authors contribution in the paper has been specified as follows: **"Conceptualization**, MLM and A.A S.; Literature Review, G.K; **Methodology**, M S.Al-Absy and A. A S.; software, H. B and A. A. S and I Data Analysis, I.U.K and MS Al-Absy; Draft Written and Conclusion: S.G

Consent statement

Informed consent was obtained from all subjects involved in the study.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

The data presented in this study will be available upon request from the corresponding author.

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