Corporate Tax Avoidance and Cash Holdings of Quoted Non-Financial Firms in Nigeria

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Abstract
This study investigates if there is any relationship between tax avoidance and cash holding cash holdings of non-financial listed firms in Nigeria. It uses secondarily sourced panel data over the period from 2005 to 2020 of 75 such firms listed on the floor of the Nigerian Exchange Group (NXG). The generalized method of moments (GMM) results reveal that nine (9) of the variables (LGCAT, HS, SHT, CT, ED, PD, PBTD, DBTD and TO) are positively and statistically significant with CH1; three variables (LGCUT, BTD and CTO) are negatively and statistically significant with CH1 while seven of the variables (CUT, LCUT, CAT, LCAT and BTDL) are statistically not significant. The study concludes with recommendations.

Keywords: *Tax Avoidance, Cash Holdings, Quoted Non-Financial Firms, GMM, NXG.*

1.0 Introduction

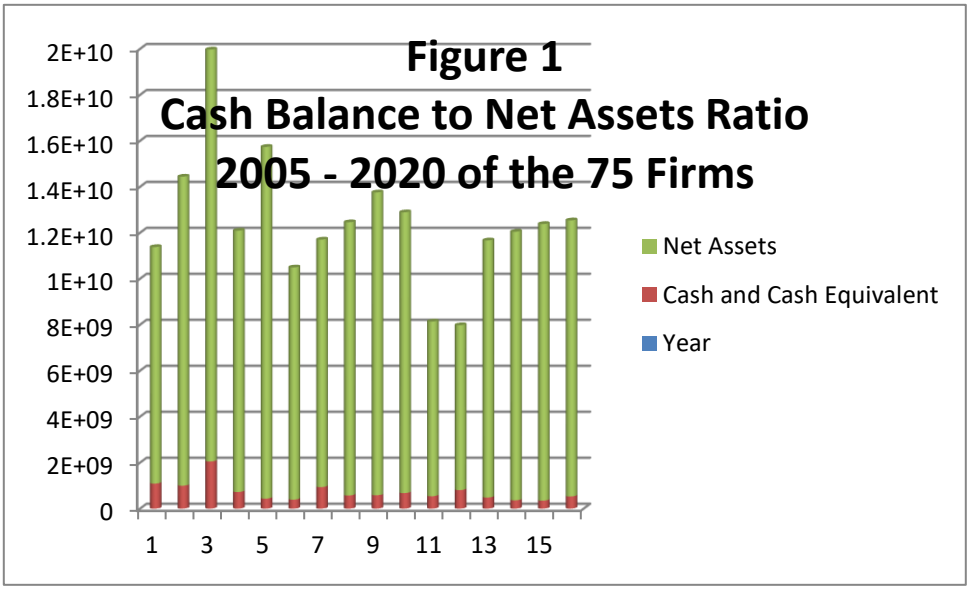
Governments need a lot of money, whether they are in developed or developing nations, to continue the running of the affairs of the state. Employment, transportation, healthcare, educational facilities, electricity, good roads, portable water, clean and clear air, security, retirement benefits, and other necessities that improve everyone's economic and social standard of living are expected to be covered by the necessary funds raised. While paying taxes, especially corporate income tax (CIT), is widely regarded as a citizen's duty and their entitlement to take part in the state's adequate funding of socially prosperous development, some companies see taxes as an extra cost and try to minimize or completely avoid them (Andhitiyara and Dameria, 2022). They therefore deny the government of necessary funds to carry on its economic and social functions so as to minimize income inequality among the citizenry (Setyawan et al., 2021). Even though complete tax compliance may be a symbol of good citizenship, it affects firms' cash flows and profits, which puts further strain on them. As a result, they try to use tax law exceptions or open tax provision infractions to lower or completely eliminate its tax obligation (Saputri & Husen, 2020). The tax tactics used by payers to reduce their taxes are referred to by a number of names, including: tax avoidance, tax aggressiveness, tax planning, tax sheltering, tax management, and so forth. Tax avoidance (TA) therefore refers to the legal-bound tactics, plans, or methods used by taxpayers to

make sure that their tax obligations—which are meant to represent their fair part of the public's overall tax burden—are minimized.

This definition is in line with Saffe's (2013) suggestion that TA not only reduces government revenue but also questions the concept of taxes, i.e., the assumption that everyone of us must pay our fair share to keep the state operating. According to Fisher (2014) as cited in Ahmed (2019), TA practices include paying taxes on profits earned in one country but reported in another, paying taxes on profits earned somewhat later than when they were actually earned, and paying less tax than would be expected under a country's ordinary interpretation of its laws.

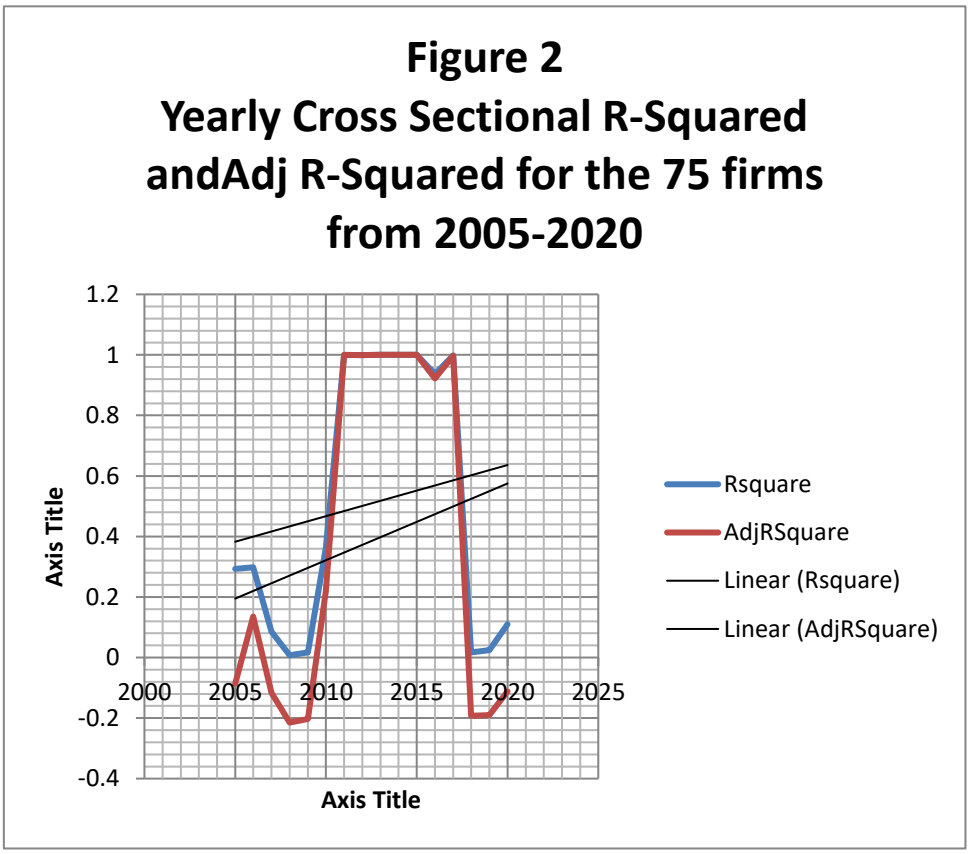
The public views TA as unacceptable, despite the fact that numerous judicial rulings view it as not being criminal. This may have a detrimental impact on the company's overall worth due to reputational damage, fines paid in cash, political expenses, poor financial reporting, etc. Tax liability constitutes a huge expense to firms and reduces significantly the cash flow available for viable projects which should have in turn increased their profitability and values. Literature on cash holdings has identified transaction cost motive, precautionary motive and agency motive as reasons why firms hold cash. Cash holding due to TA is a preventive measure because tax uncertainty may lead firms to hoard more cash than they otherwise would. This is particularly true in circumstances where the complexity and contradictions of tax regulations may lead to differences in the tax authorities' evaluation of the firm's actual taxes (Hanlon et al., 2017).

Firms' cash reserves have increased dramatically over the last several decades; some have held more cash than necessary due to various factors such information asymmetry, prospective future investment opportunities, and other factors (Al Rubaye et al., 2024). Generally, cash and marketable securities hold a significant share of the company's assets worldwide.



Source: Researcher's Computations (2024) Using Microsoft Excel.

Figure 1 above shows that Nigerian firms keep a large portion of their assets in cash or tradable securities. Data available for this study reveals that percentage of cash-to-net assets is 6.13% for the entire sampled periods (2005-2020) with the lowest being 2009 (2.85&) and the highest being 2017(11.45%).



Source: Researcher's Computations (2024) Using Eviews 13 and Microsoft Excel.

From the result of the yearly cross-sectional regression in Figure 2 above using R-squared (R^2) and the adjusted R-squared (Adj. R^2), the entire sampled firms held more cash for the periods between 2009 and 2017. Using the adjusted R-squared (Adj. R^2) statistic from available data, the firms held less cash in 2008(-0.214931276) and more cash in 2011(0.999992533).

Studies on TA and cash holding are very rare in Nigeria for out of the empirical literatures reviewed in this study, none is on Nigeria except that Udeh and Eze (2021) examined the impact which TA on firms' operating cash flows.

However, several studies that have linked TA and cash holding found strong relationship between them both in developed economy (Li, 2012) and developing economy (Al Rubaye et al., 2024) with mixed outcomes. For examples, while some found a positive relationship (Benkraiem et al., 2023); Setyawan et al. (2021); others found a negative relationship (Al Rubaye et al. (2024);

Eldawayaty (2022); or still no relationship at all (Kurniawan & Nuryanah, 2017). For as much as the results from previous studies have shown mixed outcomes, the main objective of this study is to investigate the impact which TA may have on cash holdings of quoted non-financial firms in Nigeria. This study differs from others in that it uses seventeen (17) variables to measure tax avoidance. While Khuong et al. (2019) used three measures of tax avoidance which are current effective tax rate, cash effective tax rate (CETR) and book-tax-difference; Eldawayaty (2022) used both the book tax difference ratio (BTD) and the current effective tax rate (ETR) as measures of tax avoidance. This study uses a time span from 2005 to 2020 apart from Benkraiem et al. (2023) who used a time span from 2005 to 2018. We, therefore, hypothesized that all the various TA measurements considered in this study have no significant relationship with cash holdings represented by the value of excess cash of quoted non-financial firms in Nigeria. Following this introduction, the rest of the paper is divided into five sections with the literature review in section two, methodology in section three, discuss of results in section four and the fifth section concludes this paper with recommendations.

2.0 Review of Related Literature.

2.1 Theoretical Underpinning.

2.1.1 Hoffman Tax Planning Theory.

Hoffmann Tax Planning Theory: This theory, propounded in 1961 by Hoffmann, advocates that firms should make deliberate and determined efforts to reduce their tax burden (costs). He noted that as a result of ambiguities from unclear intentions in tax laws, there are loopholes which tax payers can catch in on to successfully obtain some tax savings. According to Zachariah (2019), tax payers can take advantages of the unavoidable loopholes in the tax laws to divert cash from tax authorities due to sophistications in the tax structures and processes. For as much as tax liabilities are based on accounting income, a tax payer can legally intensify those activities so as to attained a maximum tax savings which, otherwise would have flown to the government (Olurankinse & Mamidu, 2021). The theory advocates flexibility in tax planning schemes such that it can easily blend with changes in tax laws, easily resolve conflict with other interested parties, be honest and time conscious (Zachariah, 2019) because the savings generated from tax planning enhances the performance and growth of the firm.

Four principles important for effective planning stressed by Hoffmann are that:

- a properly handled tax planning process is simple.
- if a tax planning follows a formalized procedure, there is a great chance of obtaining much gain.
- many tax planners do not take the full advantage of practicing tax planning.
- many tax payers who could have benefitted from tax planning are ignorant of its advantage (Akintoye et al., 2020)

2.2 Empirical Literature

Al Rubaye et al. (2024) carried out an empirical assessment if there is any relationship between tax avoidance and cash holdings in Oman. Secondarily sourced panel data obtained from the Muscat Stock Exchange on some non-financial firms spanning the period from 2011 to 2020 for 20 firms making a total of 300 firm-year observations was used. The results of the ordinary least squares (OLS) regression showed that tax avoidance represented by current effective tax rate (CETR) was negatively significant with cash holdings. This means that as firms reduces their effective tax rate (avoid tax) or as less of cash was paid to the tax authorities, cash balances increased from cash tax saved.

Eldawayaty (2022) carried out an empirical analysis whether tax avoidance and firm's life cycle had impact on cash holdings In Egypt. A panel data on 126 non-financials listed on the Egyptian stock market spanning the period 2012 to 2019 making a total of 711 firm-year observations was used in the study. Results of the pooled OLS showed that tax avoidance represented by both the book tax difference ratio (BTD) and the current effective tax rate (ETR) was negatively significant with cash holdings. That is, as managers tried to dodge more tax by reducing the ETR or as tax avoidance increased, more cash is saved for future uses.

Benkraiem et al. (2023) studied the relationship, if any, that existed between tax avoidance and excess cash value in 39 developed and developing countries. An annual secondary panel data of selected 41,535 firm-year observations over the period from 2005 to 2018 was used. The OLS regression result revealed that tax avoidance proxied by current ETR was positively significant with excess cash value. This means that firms engaging in tax avoidance will have a higher ETR and therefore a lower value of excess cash.

Udeh and Eze (2021) examined the impact which tax avoidance has had on firms' operating cash flows in Nigeria. Secondarily sourced data from the annual reports of listed 62 non-financial firms totaling 733 firm-year observations obtained from the Nigerian Exchange Group (NXG) was used. The results of the generalized least squares (GLS) estimation technique showed that tax avoidance represented by current ETR had a positive but insignificant relationship with OCF.

Setyawan et al. (2021) , in a research study, sought to verify if at all the tax avoidance of firms improves cash holdings in Indonesia. Using a secondarily sourced annual data obtained from 106 listed manufacturing firms on the floor of the Indonesia Stock Exchange (IDX) was used. Results of the pooled OLS showed that tax avoidance represented by both the book tax difference ratio (BTD) and the cash effective tax rate was negatively significant with cash holdings. This means that as managers tried to dodge more tax by reducing the ETR or as tax avoidance increased, more cash is saved for future purposes.

Khuong et al. (2019) studied how cash holdings can be influenced by tax avoidance in Vietnam. A sample made up of 875 firm-year observations consisting of 125 non-financial firms' data spanning the periods from 2010 to 2016 obtained from the Vietnamese's stock market was used. The results of the generalized method of moments (GMM) showed that all three tax avoidance measurements- current effective tax rate, cash effective tax rate (CETR) and book-tax-difference-

were positively significant with cash holdings. This means that managers were not disposed to dodge more tax by reducing the ETR or the ETR is equal to or more than the statutory tax rate (STR). Thus, more cash is paid to the tax authorities by not reducing the ETR and less cash saved for future purposes.

Kurniawan and Nuryanah (2017) investigated whether tax avoidance represented by cash ETR had any effect on cash holdings in Indonesia. The study used secondary data collected from the annual reports of 46 non-financial firms spanning the period from 2009 to 2016. The results of the OLS revealed that cash ETR had a negative but insignificant relationship with cash holdings for the period under review.

Li (2012) empirically tested the extent to which tax avoidance represented by book-tax difference (BTD) on cash holdings in the United States of America. A panel data on certain firms over the period 1993 to 2011 was used and analyzed with the OLS regression method. The results revealed that BTD had a positively significant relationship with cash holdings. This means that there was probably a decrease in total cash balance for as much as the BTD was equal to or greater than the STR.

3.0 Methodology

3.1 Research Design

Using the ex-post facto research design, often referred to as the descriptive or correlational research design, the study investigates if there is any relationship between ownership structure and firm performance of companies in Nigeria. The population of the study consists of 106 non-financial enterprises listed on the floor of the Nigerian Exchange Group (NXG). In order to conduct this study, secondary data from 75 out of 106 organizations' annual reports were gathered over a period of sixteen (16) years, from 2007 to 2022, totaling 1,200 observations.

3.2 Measurement and Definitions of Variables.

Table1

S/N	Variables Names	Definitions	Variable Types	Measurements	Authorities
1	CH1	Cash Holdings	Dependent	See 3.2.1 for Details	
2	CUT	Current Effective Tax Rate (Current ETR)	Independent	See 3.2.2 for Details	Al Rubaye et al. (2024)
3	LCUT	Long-Run Current ETR	Independent	See 3.2.2 for Details	None used it in this study
4	LGCUT	Lagged Current ETR	Independent	See 3.2.2 for Details	None used it in this study

5	CAT	Cash Effective Tax Rate (Cash ETR)	Independent	See 3.2.2 for Details	Setyawan et al. (2021)
6	LCAT	Long-Run Cash ETR	Independent	See 3.2.2 for Details	None used it in this study
7	LGCAT	Lagged Cash ETR	Independent	See 3.2.2 for Details	None used it in this study
8	HS	Henry and Sansing's (2014) Measure.	Independent	See 3.2.2 for Details	None used it in this study
9	SHT	Tax Shelter Score	Independent	See 3.2.2 for Details	None used it in this study
10	CT	Conforming Tax Avoidance	Independent	See 3.2.2 for Details	None used it in this study
11	ED	Etre Differential	Independent	See 3.2.2 for Details	None used it in this study
12	BTD	Book-Tax-Differences (BTD)	Independent	See 3.2.2 for Details	Eldawayaty (2022)
13	BTDL	BTD Lagged Total Assets	Independent	See 3.2.2 for Details	None used it in this study
14	PD	Permanent Difference	Independent	See 3.2.2 for Details	None used it in this study
15	PBTD	Total Permanent Book-Tax-Differences (BTD)	Independent	See 3.2.2 for Details	None used it in this study
16	DBTD	Discretionary Book-Tax-Differences (BTD) or Abnormal Book-Tax-Differences	Independent	See 3.2.2 for Details	None used it in this study
17	TO	Tax Expense/Operating Cash Flow	Independent	See 3.2.2 for Details	None used it in this study
18	CTO	Cash Tax Expense Paid/ Operating Cash Flow	Independent	See 3.2.2 for Details	None used it in this study

Source: Researcher's Computations from Extant Literature.

3.2.1 Derivation of the Dependent Variables (Cash Holdings)

$$CH1 = \left(\frac{Cash\ \&\ Cash\ Equivalent}{Total\ Assets}\right)$$

3.2 Alternative Cash Holdings Measurements.

To test the robustness of the results obtained from CH1, we carry out additional tests with different measures of cash holdings.

Thus, we re-estimate equation

above using the following alternative cash holdings measurements: (a) log of the ratio of cash-to-sales, (b) log of cash-to-net assets, (c) log of one plus the ratio of cash-to-net assets, and (d) log of cash-to-assets.

$$CH2 = \left(\frac{Cash\ \&\ Cash\ Equivalent}{Net\ Assets}\right)$$

$$CH3 = Log\left(\frac{Cash\ \&\ Cash\ Equivalent}{Net\ Assets}\right)$$

$$CH4 = Log\left(\frac{Cash\ \&\ Cash\ Equivalent}{Sales}\right)$$

$$CH5 = Log\left(1 + \frac{Cash\ \&\ Cash\ Equivalent}{Net\ Assets}\right)$$

where Net Assets = Total Assets – Cash & Cash Equivalents. Log = Natural Logarithms of Numbers.

CH6 = Excess Cash = is the residuals obtained from the estimation of the equation below.
$LnCash_{it} = \beta o + \beta_1 SalesG_{it} + \beta_2 Size_{it} + \beta_3 FCF_{it} + \beta_4 NWC_{it} + \beta_5 IndSigma_{it} + \beta_6 R\&D_{it} + \beta_7 Div_{it} + \beta_8 Lev_{it} + \beta_9 Capex_{it} + \beta_{10} Idum_{it} + \beta_{11} Ydum_{it} + \varepsilon_{it}$

where LnCash = is the natural logarithm of cash and cash equivalents divided by net assets; SalesG = three years sales growth; Size = the natural logarithm of net assets; FCF = operating income minus interest and taxes, divided by net assets or operating cash flow minus capital expenditure divided by net assets; NWC = current assets less current liabilities divided by net assets; IndSigma = five years industry average of the standard deviation of cash flow to net assets; R&D = research and development costs divided by net assets; Div = dividend divided by net assets; Lev = total debts divided by net assets; Idum = Industry dummy = A dummy variable which takes the value '1' for each industry; Ydum = Years dummy = A dummy variable which takes the value '1' for each year.

3.2.2 Derivation of the Independent Variables

3.2.2.1 Current Effective Tax Rate (Current ETR)
The current tax is the item of tax payable shown in the financial statement of a firm which is determined by the generally accepted accounting principles (GAAP). It is made up of current year tax expense only. Current effective tax rate is usually calculated as the current tax expense in a particular year divided by pre-tax book income or profit before tax in that year

$$Current\ ETR\ = \left(\frac{Current\ year\ tax\ expense}{Pre{-}Tax\ Income\ or\ PBT}\right)$$

Current ETR = Current Year Tax Expense
Pre-Tax Income or Profit Before Tax

3.2.2.2 Cash Effective Tax Rate (Current ETR)
The cash tax is the actual tax paid or payable to the Federal Inland Revenue Services (FIRS) which is based on the reported amount on FIRS's tax return each year. The book tax and the cash tax do produce different results due to differences in policy objectives, and this lead to the concept of timing differences which are temporary difference and permanent difference. Cash effective tax rate is usually calculated as the cash tax expense paid in a particular year divided by pre-tax book income or profit before tax in that year

Cash ETR = Cash Tax Expense Paid
Pre-Tax Income or Profit Before Tax

3.2.2.3. Long-Run GAAP ETR = Total Sum of Book Tax Expense Paid over n (3,5,10) years
Total sum of Pre-Tax Income or Profit Before Tax

This is the cumulative number of book tax payable shown in the financial statement of a firm which is determined by the generally accepted accounting principles (GAAP)

3.2.2.4.Long-Run Current ETR=Total Sum of Current Year Tax Expense Paid over n (3,5) years
Total sum of Pre-Tax Income or Profit Before Tax

This is the cumulative number of current year tax payable shown in the financial statement of a firm which is determined by the generally accepted accounting principles (GAAP)

3.2.2.5.Long-Run CASH ETR = Total Sum of Cash Tax Expense Paid over n (3,5,10) years
Total sum of Pre-Tax Income or Profit Before Tax

This is the cumulative number of the actual tax paid or payable to the Federal Inland Revenue Services (FIRS) which is based on the reported amount on FIRS's tax return each year.

3.2.2.6.Lagged GAAP ETR = Book Tax Expense or Total Income Tax Expense

Lag1 of Pre-Tax Income or Profit Before Tax_{t-1}

Lagged book effective tax rate is usually calculated as the total tax expense in a particular year divided by pre-tax book income or profit before tax of the immediate previous or preceding year

3.2.2.7.Lagged Current ETR = Current Year Tax Expense / Lag1 of Pre-Tax Income or Profit Before Tax_{t-1}

Lagged current effective tax rate is usually calculated as the current tax expense in a particular year divided by pre-tax book income or profit before tax of the immediate previous or preceding year

3.2.2.8.Lagged Cash ETR = Cash Tax Expense Paid / Lag1 of Pre-Tax Income or Profit Before Tax_{t-1}

Lagged cash effective tax rate is usually calculated as the cash tax expense paid in a particular year divided by pre-tax book income or profit before tax of the immediate previous or preceding year.

3.2.2.9.Conforming Tax Avoidance (TaxC)

Conforming tax avoidance measurement is the residuals (ε) obtained from either of the following regression equations:

Taxes paid/Total assets $= \beta 0 + \beta 1 \text{Cash\_Etr}_{it} + \beta 2 NOL_{it} + \beta 3 \Delta NOL_{it} + \varepsilon_{it}$

OR

Taxes paid/Total assets $= \beta 0 + \beta 1 \text{Cash\_Etr}_{it} + \varepsilon_{it}$

where NOL = net operating loss and equals 1 NOL is non-zero.
ΔNOL = change in net operating loss.

3.2.2.10. HS (Henry and Sansing's 2014) Measure.

$$HS = \frac{\Delta}{MVA} = \frac{\text{Cash Tax Paid} - (\text{Statutory Tax Rate} * \text{Profit Before Tax})}{MVA}$$

where MVA = book value of assets + (market value of equity -book value of equity) = BVA+ (MV E - BV E)

Book-Tax-Differences (BTD) Based Measures

3.2.2.11. $$BTD = \text{Profit Before Tax(PBT)} - \frac{\text{(Current Tax Expense)}}{\text{Statutory Tax Rate}}$$

3.2.2.12. $$BTDLaggedTA = \frac{\text{Book-Tax-Differences}}{\text{Lagged Total Assets or Total Assets}_{t-1}}$$

3.2.2.13. Discretionary Book-Tax-Differences (BTD) or Abnormal Book-Tax-Differences

$$\frac{\text{Book-Tax-Differences}}{\text{Total Assets}_{t-1}} = \beta 0 + \beta 1 * \frac{\text{Total Accruals}}{\text{Total Assets}_{t-1}} + \varepsilon_{it}$$

3.2.2.14. Total Permanent Book-Tax-Differences (BTD)

a) $$\text{Total Permanent BTD} = \text{Total BTD} - \frac{\text{(Deferred Tax Expense)}}{\text{Statutory Tax Rate}}$$

OR

b) Total Permanent BTD = (Statutory Tax Rate – Effective Tax Rate)* PBT

3.2.2.15. ETR Differential Measures.

ETR Differential = Statutory Income Tax Rate – Firms' Effective Tax Rate.

3.2.2.16. Discretionary permanent differences (DTAX) can be derived through the estimation and extraction of the residuals or error terms from the following regression equation:

a) $PERMDIFF = \beta o + \beta_1 INTANG + \beta_2 UNCON + \beta_3 MI + \beta_4 CSTE + \beta_5 \Delta NOL + \beta_6 LAGPERM + \varepsilon_{it}$

where:

$$PERMDIFF = PBT - \frac{\text{(Current Tax)}}{\text{Statutory Tax Rate}} + \frac{\text{(Current Foreign Tax)}}{\text{Statutory Tax Rate}} - \frac{\text{(Current Deferred Tax)}}{\text{Statutory Tax Rate}}$$

INTANG = Goodwill and other intangibles; UNCON = Income (loss) reported under the equity method; MI = Income (loss) attributable to minority interest; CSTE = Current state income tax expense; NOL = Change in net operating loss carryforwards; LAGPERM = One-Year Lag of PERMDIFF or $PERMDIFF_{t-1}$

That is, the portion of the ETR differential which is usually unexplained

b) It can also be derived as the error term extracted from the following regression equation:
ETR differential*Pre-tax book income (PBT) = $\beta 0 + \beta 1$Controls + ε_{it}

Thus, while the ETR differential measures the difference between a firm's statutory income tax rate and its effective tax rate (ETR), DTAX which is the discretionary permanent difference measures the unexplained portion of ETR differential as developed by Frank et al. (2009).

3.2.2.17. SHELTER :

a) This is an indicator variable used when a firm is accused of engaging in any tax shelter activity

b) Alternatively, the probability that a firm may be engaged in tax sheltering can be computed as follows:

Tax Shelter Score (TSS) = -4.30 + 6.63 ∗ BTD - 1.72 ∗ LEV + 0.66 ∗ SIZE + 2.26 ∗ ROA + 1.62 ∗ FOREIGN INCOME + 1.56 ∗ R&D
where: BTD = Book-Tax-Differences = Profit Before Tax – (Current Tax Expense) / Statutory Tax Rate

LEV = Leverage = Total Debts / Total Assets; SIZE = Log of Total Assets; ROA = PBT/Total Assets; Foreign Income = Income earned outside the shores of Nigeria; R&D = Research & Development Expenditures / Total Assets.

3.2.2.18. Tax Expenses-To-Operating Cash Flow = Tax Expenses / Operating cash Flow

3.2.2.19. Cash Tax Expenses Paid-To-Operating Cash Flow = Cash Tax Expenses Paid / Operating cash Flow

3.3 Model Specification

The functional equation of cash holdings to test the seventeen (17) hypotheses specified is as stated in equation 1 below:

CH1 = f (CUT, LCUT, LGCUT, CAT, LCAT, LGCAT, HS, SHT, CT, ED, BTD, BTDL, PD, PBTD, DBTD, TO, CTO)
Eq1

The functional testable model will be derived as:

$$CH1 = \beta o + \beta_1 CUT + \beta_2 LCUT + \beta_3 LGCUT + \beta_4 CAT + \beta_5 LCAT + \beta_6 LGCAT + \beta_7 HS + \beta_8 SHT + \beta_9 CT + \beta_{10} ED + \beta_{11} BTD + \beta_{12} BTDL + + \beta_{13} PD + \beta_{14} PBTD + \beta_{15} DBTD + \beta_{16} TO + \beta_{17} CTO + \varepsilon$$ Eq2

Since we are using panel data, the model will be specified in the appropriate form as:

$$CH1_{it} = \beta o + \beta_1 CUT_{it} + \beta_2 LCUT_{it} + \beta_3 LGCUT_{it} + \beta_4 CAT_{it} + \beta_5 LCAT_{it} + \beta_6 LGCAT_{it} + \beta_7 HS_{it} + \beta_8 SHT_{it} + \beta_9 CT_{it} + \beta_{10} ED_{it} + \beta_{11} BTD_{it} + \beta_{12} BTDL_{it} + \beta_{13} PD_{it} + \beta_{14} PBTD_{it} + \beta_{15} DBTD_{it} + \beta_{16} TO_{it} + \beta_{17} CTO_{it} + \varepsilon_{it}$$ Eq3

By including the lagged value of the dependent variable, that is, $CH1_{it-1}$, due to unobserved heterogeneity transforms the static model to a dynamic one. That means, including the lagged dependent variable to equation 3, we have equation 4 below:

$$CH1_{it} = \beta o + \beta_1 CH1_{it-1} + \beta_2 CUT_{it} + \beta_3 LCUT_{it} + \beta_4 LGCUT_{it} + \beta_5 CAT_{it} + \beta_6 LCAT_{it} + \beta_7 LGCAT_{it} + \beta_8 HS_{it} + \beta_9 SHT_{it} + \beta_{10} CT_{it} + \beta_{11} ED_{it} + \beta_{12} BTD_{it} + \beta_{13} BTDL_{it} + \beta_{14} PD_{it} + \beta_{15} PBTD_{it} + \beta_{16} DBTD_{it} + \beta_{17} TO_{it} + \beta_{18} CTO_{it} + \varepsilon_{it}$$ Eq4

where the definitions are as stated in Table2 above.

β_1 to β_{18} are the beta coefficients of the instrumental, independent and control variables. From this study, we expect β_1 to β_{18} to be greater than zero.

ε_{it} = Error term for year 'i' in year 't'

This study is anchored on the model previously used by ……. who also used the dynamic generalized method of moments (GMM).

4.0. Method of Data Analysis

Data collected are analyzed using EViews 13 in the following order: bivariate data analysis; unit root test; endogeneity test; estimation of the models; performance of some additional analysis and diagnostics tests.

4.1 Bivariate Data Analysis of Multicollinearity (Variance Inflation Factor)

4.3. Unit Root Test.

Once the EViews workfile has been structured in panel data form, we can go ahead and perform a panel data unit root test as shown in Table 2 below.

Table 2

Variables	Augmented Dickey Fuller test-Statistic	Phillip-Perron test-Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Order of Integration or stationarity
CH1	-26.5911	-26.6518	-3.9657	-3.4135	-3.1288	I(0) stationary
CUT	-12.5909	-18.3695	-3.9657	-3.4135	-3.1288	I(0) stationary
LCUT	-12.5466	-17.5046	-3.9657	-3.4135	-3.1288	I(0) stationary
LGCUT	-12.7665	-22.6580	-3.9657	-3.4135	-3.1288	I(0) stationary
CAT	-19.9244	-29.5555	-3.9657	-3.4135	-3.1288	I(0) stationary
LCAT	-19.7777	-28.4866	-3.9657	-3.4135	-3.1288	I(0) stationary
LGCAT	-17.2035	-22.9464	-3.9657	-3.4135	-3.1288	I(0) stationary
HS	-14.9164	-19.9034	-3.9657	-3.4135	-3.1288	I(0) stationary
SHT	-7.1931	-11.5287	-3.9657	-3.4135	-3.1288	I(0) stationary
CT	-13.9908	-14.1531	-3.9657	-3.4135	-3.1288	I(0) stationary
ED	-12.5368	-17.4934	-3.9657	-3.4135	-3.1288	I(0) stationary
BTD	-8.6383	-11.4511	-3.9657	-3.4135	-3.1288	I(0) stationary
BTDL	-34.2654	-34.2654	-3.9657	-3.4135	-3.1288	I(0) stationary
PD	-9.61106	-41.5848	-3.9657	-3.4135	-3.1288	I(0) stationary
PBTD	-8.7554	-25.9247	-3.9657	-3.4135	-3.1288	I(0) stationary
DBTD	-33.6753	-33.6753	-3.9657	-3.4135	-3.1288	I(0) stationary
TO	-11.2367	-28.9174	-3.9657	-3.4135	-3.1288	I(0) stationary
CTO	-8.7322	-18.7586	-3.9657	-3.4135	-3.1288	I(0) stationary

Source: Researcher's Computations (2024) Using EViews13 Software.

The results of the Augmented Dickey Fuller (ADF) test-Statistic as well as that of the Phillip-Perron (PP) test-Statistic for all the variables of interest are reported in Table 4 above. The results showed that the two test statistics (ADF & PP) are greater than all the tabulated critical values at the 1% Critical Value, 5% Critical Value and 10% Critical Value. This means that all the variables of interest are I(0), that is, stationary at levels. When variables are not stationary, it means that they can drift apart on the long run and the regression results obtained can be spurious or nonsensical. Thus we can use the ordinary least squares (OLS) method of estimation.

4.4 Regression Models Estimation Results.

Table 3. Dependent Variable: CH1

Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 01/09/24 Time: 21:46
Sample (adjusted): 2005 2020
Periods included: 16

Cross-sections included: 75
Total panel (unbalanced) observations: 1200
White period (period correlation) instrument weighting matrix
White period (cross-section cluster) standard errors & covariance (d.f.
corrected)
Standard error and t-statistic probabilities adjusted for clustering
Instrument specification: @DYN(EXCESS_CASH,-2)
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CUT	2.139834	4.934185	0.433675	0.6658
LCUT	-2.152140	4.934467	-0.436144	0.6640
LGCUT	-153.9836	26.91157	-5.721837	0.0000
CAT	-8.167581	18.21944	-0.448289	0.6553
LCAT	8.531082	18.22494	0.468099	0.6411
LGCAT	56.84103	15.56070	3.652858	0.0005
HS	81.83884	14.23717	5.748252	0.0000
SHT	9.74E-08	2.13E-08	4.568197	0.0000
CT	7.746327	0.466188	16.61632	0.0000
ED	0.002341	0.000419	5.592958	0.0000
BTD	-7.05E-07	1.47E-07	-4.801180	0.0000
BTDL	1.29E-10	1.30E-08	0.009956	0.9921
PD	1.88E-08	3.16E-09	5.940214	0.0000
PBTD	8.82E-11	1.35E-11	6.510027	0.0000
DBTD	0.041833	0.004500	9.296981	0.0000
TO	0.574548	0.096149	5.975589	0.0000
CTO	-0.717002	0.117604	-6.096728	0.0000

Effects Specification

Cross-section fixed (first differences)

Mean dependent var	0.111352	S.D. dependent var	25.53736
S.E. of regression	67.31509	Sum squared resid	4748824.
J-statistic	53.42103	Instrument rank	75
Prob(J-statistic)	0.645989		

Source: Researcher's Computations (2024) Using EViews13 Software.

Table 3 above show the regression estimation results of the relationship between tax avoidance and cash holdings of 75 listed non-financial firms in Nigeria based on equation 1above.

4.5 Discussion of the Regression Estimation Results and Hypotheses Testing.

From Table 3 above, looking at the independent variables (CUT, LCUT, LGCUT, CAT, LCAT, LGCAT, HS, SHT, CT, ED, BTD, BTDL, PD, PBTD, DBTD, TO and CTO) reveal that nine of the variables (LGCAT, HS, SHT, CT, ED, PD, PBTD, DBTD and TO) are positively and statistically significant with CH1. The results means that the higher the levels of cash holdings, the higher the firms' effective tax rate. This concludes that firms with increasing cash holding levels are not likely to engage in any tax avoidance activity. Three variables (LGCUT, BTD and CTO) are negatively and statistically significant with CH1. The results means that the higher the levels of cash holdings, the lower the firms' effective tax rate. This concludes that firms with increasing cash levels are more likely to engage in tax avoidance activity. Seven of the variables (CUT, LCUT, CAT, LCAT and BTDL) are statistically not significant. This means that there is no link between tax avoidance and the level of cash holdings.
Specifically, LGCAT relationship with CH1 is positively significant with a coefficient of 56.84103, a t-Statistic of 3.652858 and a p-value of 0.0005. This suggests that an increase in LGCAT will increase CH1. The results means that the higher the levels of cash holdings, the higher the firms' lagged cash effective tax rate. This concludes that firms with increasing levels of cash are not likely to engage in any tax avoidance activity. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between LGCAT and CH1.

HS relationship with CH1 is positively significant with a coefficient of 81.83884, a t-Statistic of 5.748252 and a p-value of 0.0000. This suggests that an increase in HS will increase CH1. The results mean that the higher the levels of cash holdings, the higher the firms' HS effective tax rate. This concludes that firms with increasing levels of cash are not likely to engage in any tax avoidance activity. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between HS measure of ETR and CH1.

SHT relationship with CH1 is positively significant with a coefficient of 9.74E-08, a t-Statistic of 4.568197 and a p-value of 0.0000. This suggests that an increase in SHT will increase CH1. The results mean that the higher the levels of cash holdings, the higher the firms' SHT effective tax rate. This concludes that firms with increasing levels of cash are not likely to engage in any tax avoidance activity. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between SHT measure of ETR and CH1.

CT relationship with CH1 is positively significant with a coefficient of 7.746327, a t-Statistic of 16.61632 and a p-value of 0.0000. This suggests that an increase in CT will increase CH1. The results mean that the higher the levels of cash holdings, the higher the firms' CT effective tax rate. This concludes that firms with increasing levels of cash are not likely to engage in any tax

avoidance activity. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between CT measure of ETR and CH1.

ED relationship with CH1 is positively significant with a coefficient of 0.002341, a t-Statistic of 5.592958 and a p-value of 0.0000. This suggests that an increase in ED will increase CH1. The results mean that the higher the levels of cash holdings, the higher the firms' ED effective tax rate. This concludes that firms with increasing levels of cash are not likely to engage in any tax avoidance activity. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between ED measure of ETR and CH1.

PD relationship with CH1 is positively significant with a coefficient of 1.88E-08, a t-Statistic of 5.940214 and a p-value of 0.0000. This suggests that an increase in PD will increase CH1. The results mean that the higher the levels of cash holdings, the higher the firms' PD effective tax rate. This concludes that firms with increasing levels of cash are not likely to engage in any tax avoidance activity. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between PD measure of ETR and CH1.

PBTD relationship with CH1 is positively significant with a coefficient of 8.82E-11, a t-Statistic of 6.510027 and a p-value of 0.0000. This suggests that an increase in PBTD will increase CH1. The results mean that the higher the levels of cash holdings, the higher the firms' PBTD effective tax rate. This concludes that firms with increasing levels of cash are not likely to engage in any tax avoidance activity. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between PBTD measure of ETR and CH1.

DBTD relationship with CH1 is positively significant with a coefficient of 0.041833, a t-Statistic of 9.296981 and a p-value of 0.0000. This suggests that an increase in DBTD will increase CH1. The results mean that the higher the levels of cash holdings, the higher the firms' DBTD effective tax rate. This concludes that firms with increasing levels of cash are not likely to engage in any tax avoidance activity. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between DBTD measure of ETR and CH1.

TO relationship with CH1 is positively significant with a coefficient of 0.574548, a t-Statistic of 5.975589 and a p-value of 0.0000. This suggests that an increase in TO will increase CH1. The results mean that the higher the levels of cash holdings, the higher the firms' TO effective tax rate. This concludes that firms with increasing levels of cash are not likely to engage in any tax

avoidance activity. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between TO measure of ETR and CH1.

LGCUT relationship with CH1 is negatively significant with a coefficient of -153.9836, a t-Statistic of -5.721837 and a p-value of 0.0000. This means that as LGCUT decreases, CH1 increases. This suggests that the more firms reduce their lagged current effective tax rate, the more cash managers are likely to hold on to. The sign or direction as well as the size or magnitude is aligned with our expectations. We, therefore, reject the null hypothesis of no significant relationship between the LGCUT and CH1 and accept the alternative that LGCUT has a significant relationship with CH1.

BTD relationship with CH1 is negatively significant with a coefficient of -7.05E-07, a t-Statistic of -4.801180 and a p-value of 0.0000. This means that as BTD decreases, CH1 increases. This suggests that the more firms reduce their book tax difference, the more cash managers are likely to hold on to. The sign or direction as well as the size or magnitude is aligned with our expectations. We, therefore, reject the null hypothesis of no significant relationship between the BTD and CH1 and accept the alternative that BTD has a significant relationship with CH1.

CTO relationship with CH1 is negatively significant with a coefficient of -0.717002, a t-Statistic of -6.096728 and a p-value of 0.0000. This means that as CTO decreases, CH1 increases. This suggests that the more firms reduce their CTO effective tax rate, the more cash managers are likely to hold on to. The sign or direction as well as the size or magnitude is aligned with our expectations. We, therefore, reject the null hypothesis of no significant relationship between the CTO and CH1 and accept the alternative that CTO has a significant relationship with CH1.
Finally, CUT, LCUT, CAT, LCAT and BTDL are statistically insignificant with CH1; and so we accept the null hypothesis.

4.6 Regression Diagnostics Test

Table 4. Arellano-Bond Serial Correlation Test
Equation: Untitled
Date: 01/09/24 Time: 21:48
Sample: 2005 2020
Included observations: 1200

Test order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	NA	-1830184.58	NA	NA
AR(2)	-0.010402	-55172.7	5304032.9	0.9917

*Standard errors could not be computed. Try different covariance matrix options
Source: Researcher's Computations (2024) Using EViews13 Software

4.6.1 Arellano and Bond Serial Correlation Diagnostic Tests of AR (1) and AR (2).
When an estimator uses lags as instruments with the assumption that the disturbance or error term is white noise, such an estimator would produce inconsistent results if the disturbance terms are indeed serially correlated (Arellano & Bond, 1991). Thus, it is very necessary to be sure of no autocorrelation by carrying out test statistics of no serial correlation by validating the instrumental variables through a second-order residual serial correlation test (Arellano & Bond, 1991). The AR (1) may be or may not be significant but AR (2) must never be insignificant at all. AR (2) is more important in evaluating our results as it shows whether there is second-order serial correlation. If AR (2) is significant, it indicates that some of the lagged dependent variables which might be used as instrumental variables are bad instrument and thus endogenous. Since the p-values of AR (1) = NA(Not Available) and AR (2) = 0.9917 in Table 4 above are greater than 0.05, we then accept the null hypothesis that there is no serial correlation.

4.7 Additional Analysis for Robustness Checks for Comparative Analysis of the Five Regression Models Estimation Results.

To test the robustness of our results, we consider five additional models and then observe the pattern of regression results for comparison.

Table 5

Probability Values of the Models at 5% Levels of Significance					
VARIABLES	CH2	CH3	CH4	CH5	Excess Cash
CUT	0.3667	0.0175	0.4522	0.9527	0.0068
LCUT	0.3804	0.0177	0.4603	0.9511	0.0067
LGCUT	0.0637	0.2096	0.4158	0.0126	0.6493
CAT	0.6637	0.0232	0.1951	0.7771	0.3967
LCAT	0.5594	0.0211	0.2257	0.7682	0.3251
LGCAT	0.0038	0.0143	0.0000	0.0899	0.0000
HS	0.2805	0.1844	0.0688	0.0005	0.0000
SHT	0.0000	0.0723	0.1852	0.0017	0.0022
CT	0.0000	0.6427	0.0002	0.0043	0.0002
ED	0.2018	0.0162	0.76	0.7139	0.5947
BTD	0.0000	0.0526	0.1165	0.0011	0.0009
BTDL	0.1438	0.0400	0.4452	0.1044	0.1499
PD	0.0017	0.1223	0.0463	0.0128	0.8212
PBTD	0.2273	0.1885	0.0308	0.0632	0.1755
DBTD	0.0289	0.0396	0.0269	0.1026	0.5297

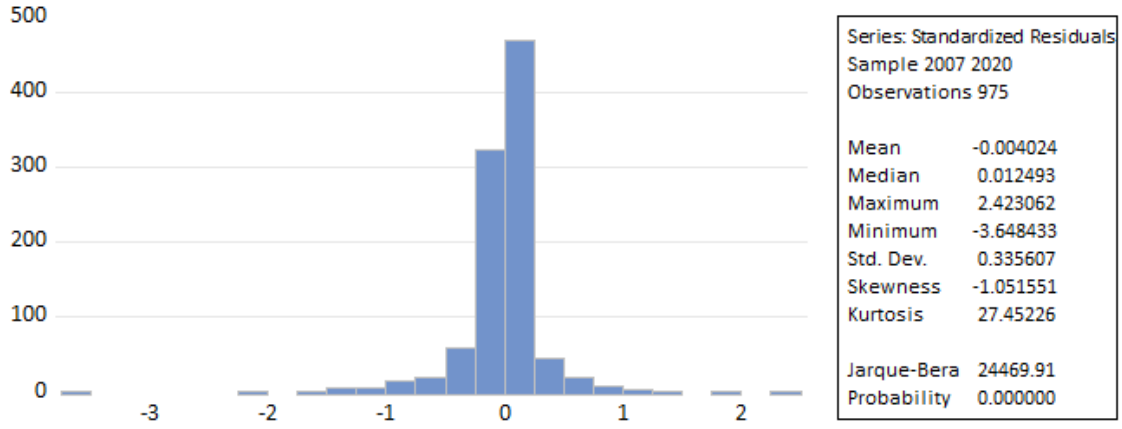
TO	0.542	0.3818	0.0100	0.0104	0.0000
CTO	0.0021	0.6213	0.8789	0.003	0.0567
Prob(J-statistic)	0.34765	0.400256	0.296761	0.292061	0.478578

Source: Researcher's Computations (2024) Using EViews13 Software.

The results from Table 5 above showing the five models above (CH2, CH3, CH$, CH5 and Excess Cash) reveal that at least one of the independent variables of interests (CUT, LCUT, LGCUT, CAT, LCAT, LGCAT, HS, SHT, CT, ED, BTD, BTDL, PD, PBTD, DBTD, TO and CTO) is significant with at least one of the dependent variables (CH2, CH3, CH4, CH5 and Excess Cash) CH2 has 7 variables statistically significant; CH3 has 9 variables statistically significant; CH4 has 6 variables statistically significant; CH5 has 8 variables statistically significant while Excess Cash has 9 variables statistically significant. It is also worthy to note that their Prob(J-statistic) are within the acceptable thresholds recommended by Roodman(2009). Since the p-values of Sargon statistic or J-Statistic are higher than the threshold of 5% and 10% or even the 25% or more suggested by Roodman (2009), our model is free from the problem of instruments proliferation.

4.7. Normality Test

Table 6



Source: Researcher's Computations (2024) Using EViews13 Software.

The purpose of the normality test is to determine if the distribution of data within a group of data or variables is regularly distributed or not. Data that has been collected in a normal distribution or taken from a normal population can be identified using the normality test. In data analysis, normalcy assumptions are used by descriptive statistics, correlation, regression, ANOVA, t tests, etc. This normality assumption should be upheld despite the sample size because choosing the incorrect data set representation will result in an incorrect interpretation (Mishra et al., 2019).

Again, it is essential to check for non-normal errors in regression models since the assumption of normality is crucial for the validation of inference techniques, forecasting, and model specification tests, both conceptually and methodologically (Alejo et al., 2015). However, Ghasemi and Zahediasl (2012) noted that, in accordance with the central limit theorem (CLT), violating the normality assumption shouldn't be a significant problem once the sample size is 100 and above. From the value of Jarque-Bera statistic and its probability value in Table 6 above, the data used in analyzing the regression model are not normally distributed since the p-value is less/lower than 0.05, that is, 5%. This is not a problem because the number of observation is large at 1200.

Conclusion and Recommendations

This study investigates if there is any relationship between tax avoidance and cash holding cash holdings of non-financial listed firms in Nigeria. It uses secondarily sourced panel data over the period from 2005 to 2020 of 75 such firms listed on the floor of the Nigerian Exchange Group (NXG). The generalized method of moments (GMM) results reveal that nine (9) of the variables (LGCAT, HS, SHT, CT, ED, PD, PBTD, DBTD and TO) are positively and statistically significant with CH1; three variables (LGCUT, BTD and CTO) are negatively and statistically significant with CH1 while seven of the variables (CUT, LCUT, CAT, LCAT and BTDL) are statistically not significant.
Based on the results above, the study recommends the followings.

- The Nigerian tax laws should be regularly kept up-to-date and proactive measure applied in pursuing tax avoidance cases to a logical conclusive end.
- Knowledge of how tax avoidance strategies works can help policymakers to design future tax systems and accounting standards so as to be able to bridge the gap between financial income and taxable income.
- Lawmakers and governments can draft new enforcement guidelines to prevent managers from abusing corporate resources and using entrenchment strategies. The economy as a whole will gain from increased investments and possible production growth as a result of this.
- Managers should exercise caution when implementing aggressive tax techniques since they can damage a company's image and reputation.
- Shareholders and other investors should be aware that tax avoidance can hurt their interests by accelerating the depletion of cash assets held by the company due to managers' opportunistic rent extraction and diversion behaviour and thus lowering its valuation.

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