MPRI-JHLAR | INTERNATIONAL JOURNAL OF HUMANITIES, LITERATURE AND ART RESEARCH
VOL. 02 NO. 1 OCT-2023 ISSN: 1116 - 2619

ENVIRONMENTAL ACCOUNTING AND CORPORATE TAX GAPS IN MANUFACTURING COMPANIES IN NIGERIA

DISU, SAMSON ADEWALE[1], SOMOYE, RUSSEL OLUKAYODE CHRISTOPHER[2] AND AKINTOYE, ISHOLA RUFUS[3]

[1,2]Olabisi Onabanjo University, Ago-Iwoye, Nigeria. [3]Babcock University, Ilishan-Remo, Nigeria.

Abstract

The Companies and Allied Matters Act 2020 requires all quoted companies to prepare and publish an annual report and present the audited financial statements to the shareholders. Thus, this study examined the effect of environmental accounting on corporate tax gaps of some listed manufacturing companies in Nigerian Exchange Group. Using Global Reporting Initiative G4 Guidelines on Sustainability Reporting, environmental accounting is grouped into environmental information disclosure and environmental cost. Corporate tax gap was proxied by deriving the difference between the deferred tax and actual tax paid. Ex-post facto research design was adopted while the data gathered through annual audited financial statements of ten (10) sampled and quoted manufacturing companies for a period of eleven (11) years from 2010 to 2020; hence the study had 110 observations with 340 data set. There was no cross-sectional dependence or correlation, the study adopted Pooled Ordinary Least Square, Flexible Generalised Least Square, and Within Group-Variance Covariance estimation techniques to draw inferences. The results showed that environmental protection disclosure has positive influence on corporate tax gap in both overall and large periods (coefficient of 8.92 and 0.16). Loss on disposal of plant, property and equipment [redacted] positively influence corporate tax gap in all the periods (1.41, 0.34, and 4.16). Safety related measure disclosure has negative influence in low and large periods (-12.38 and -0.22). The study recommended that Government should ensure the enactment and enforcement of laws on environmental protection disclosure with a view to reducing the corporate tax gap. The accelerated tax payment programmes with incentives should be instituted.

Keywords: Environmental Accounting, Environmental information disclosure, Environmental Cost, Corporate Tax Gap.

Introduction

Taxation is an important tool which generates revenue to the government; in return the government uses the resources it generates from taxation to provide public products such as roads, schools, hospitals, security, etc. Taxation programme can also be used to redistribute income, correct market failure, encourage consumption of merit goods, discourage consumption of demerit goods and internalise externalities. One of the challenges facing many states governments in Nigeria is to collect taxes as prescribed by the relevant tax laws of the country.

Globally, environmental issues are continuously gaining much consideration and which has made Nigeria no exception according to the National Institute for Environmental Protection and Research, (ISPRA) 2022. A large part of global climate change and the greenhouse effect is due to carbon dioxide (CO_2) emissions and

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other greenhouse gases (Lee and Chung, 2009). The carbon dioxide emissions are considered as the source of 90% of all emitted greenhouse gases (GHGs) in the transportation field (Nocera and Cavallaro, 2011). Therefore, carbon dioxide emissions have received considerable attention regarding reduction of polluting gases.

The concept of environmental accounting has been explained by Schaltegger and Burritt (2010) as a field of accounting that includes those activities, methods and systems that record, analyse and report on the environmental problems of a given economic system or on the economic impacts of environmental protection activities. Environmental accounting systems is by measuring in natural units and expressing in terms of money, as (opposed to traditional accounting) non-monetary and qualitative factors. By focusing on the company's financial and management dimensions, environmental accounting systems ignore the impact of corporate activities on society.

In the historical analysis on environmental accounting, Goodland (1995) stated that environmental accounting is the maintenance of natural capital which is connected to social sustainability and economic sustainability. In addition, Goodland and Daly (1996) were of the view that environmental accounting refers to the maintenance of natural capital (i.e. the natural environment), which serves as the foundation for achieving sustainable development. Ensuring environmental sustainability is the seventh goal of the United Nations Millennium Development Declaration which ranges from sanitation to clean air in global atmosphere. The study derived its topic from this declaration made in September 2000 by the world leaders at Millennium Summit which Nigeria was part of the summit (UNWCOED, 1987).

Globalization according to Shahbaz *et al.* (2013) encourages technical innovation, boosts environmental standards, improves the environmental conditions, if well managed, and enhances total production by increasing trade activities and rising economic activities via foreign direct investment and transactions of advanced technology. Globalization also enables governments to enforce international trade policies by reducing trade barriers to the import of energy-efficient technologies (Shahbaz *et al.* 2017). On the other hand, Snyder (2008) stated that globalization is harmful to the environment. It accelerates the transfer of pollution to nations via trade of non-renewable energy sources where there are inadequate environmental regulations. Thus, globalization is also negatively related with growth and positively associated with carbon dioxide emissions.

The objective of the study is to examine whether environmental protection disclosure relate to tax gap and to investigate the extent to which loss on disposal of property, plant and equipment to the environment influence the tax gap.

LITERATURE REVIEW

Conceptual Review

The term sustainability was first defined in the Brundtland Report in 1987 as "… development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations World Commission on Environment and Development, 1987). It is seen as fulfilling the present demand without neglecting the needs of future generations (Odewole *et al.* 2018). Environmental Sustainability makes corporation conscious of their environment, it enables them incorporate the triple bottom line objective of economic, social and environmental sustainability (Jang *et al.* 2017).

As the natural environment and business functions have become inextricably linked, environmental sustainability in an organization has become the mantra of several management theorists and forward-thinking practitioners since the early 1990s. The concept of environmental sustainability was first conceived by World Bank researchers who adopted the term 'environmentally responsible development' (World Bank, 1992). Later, Serageldin & Streeter (1993) extended their idea into the concept of 'environmentally sustainable development 'which later metamorphosed into the concept of 'environmental sustainability' (Goodland, 1995). Environmental sustainability aims at sustaining global life-support systems indefinitely. Basically, it comprises strategies intended to improve human welfare by safeguarding raw material sources and minimizing wastage whilst preventing harm to humans (Goodland, 1995). The arguments of these authors pointed to the fact that a firm's role with respect to environmental practice and strategies evolves over time. Additionally, a key portion of the philosophical content of these concepts includes stakeholder theory which integrates environmental concerns in accounting and taxation for stakeholder's concerns (Bremmers, *et al*. 2007; Starik, 1995). As the new millennium progresses, profitability, productivity, and environmental consciousness are increasingly integral to the long-term goals of all firms (Sarkis, 2001).

Previous studies indicate that it pays to be green for some firms (Hart & Ahuja, 1996). A firm's operations are core and critical to its role in the eco-centric (Shrivastava, 1995), eco-efficient (Schmidheiny, 1992), and/or eco-

effective (McDonough & Braungart, 1998) organization in the new millennium. All these theories basically advocate for the incorporation of the natural environment in organizational strategy and operational decisions. Thus, the eco-centric theory postulates that an organization represents one element of, and is subservient to, the natural environment. Additionally, these theories offer a description of a firm and its operations as a closed-loop system rather than a linear system. Indeed, the natural resource-based view (Hart, 1995) also supports these theories by stressing that a firm can incorporate environmental friendliness into its performance functions and simultaneously achieve superior performance (Amankwah-Amoah *et al.*2018).

Environmental Accounting Disclosure

Industries all over the world are using more natural resources and continuously emitting greenhouse gases. This can be linked to the industrial revolution in the late 18th century, when manufacturing replaced agriculture as the primary economic activity in many regions. The traditional sites of production, the home and thatched workshops were replaced by factories. Most citizens in industrialized societies experience economic improvement as a result of the industrial revolutions. There are costs associated with these economic advances. Industrialization resulted in manufacturing pollution and increased land use, both of which were detrimental to the environment because it required the use of natural resources, especially energy (Dibua & Onwuchekwa, 2015). Today's global environmental degradation and atmospheric pollution, notably in Nigeria, serve as evidence of this. However, as it is generally understood, sustainable development prioritizes the production of wealth and prosperity while taking into account the true significance of social and environmental factors, enabling private and public organizations to achieve the triple bottom line in management and conservation (Eze, Nweze & Enekwe, 2016).

Additionally, environmental and social responsibility are means that allow businesses to give back to the communities in which they operate (Olowolaju & Adelola, 2020). Nigeria is not an exception when it comes to the global prominence of the environmental accounting issue. The corporate sector is now receiving more support in the media for adopting best practices in environmental initiatives and assuming greater social responsibility. Therefore, environmental accounting disclosure is a type of disclosure that deals with a company's stance on issues like energy efficiency, sanitation, reforestation, pollution and wastes. Both internal and external stakeholders can obtain environmental information via environmental accounting. External function of environmental accounting is to offer information to stakeholders or external parties, one of its internal functions is to provide information to management to help it improves the company's environmental performance. Ngwakwe (2018) stated that environment accounting system give rise to environmental disclosure, this serves as the component of the company's comprehensive disclosure of environmental information. The management of emissions and effluents into the environment is known as environmental disclosure. It entails using specific products, procedures, or methods to lessen, stop, or completely stop the production of wastes or pollutants. It entails techniques that consume less energy, water, harmful materials, and other resources (Ijeoma, 2015).

Environmental accounting

Environmental accounting as a concept according to Alexander, Brogan, Chay and Stanko (2006) deals with identifying, measuring, allocating and the subsequent integration of environmental costs into day to day business activities and then communicating this information to the organisation's stakeholders.

Many organisations recognise that long term economic growth must be environmentally sustainable. Environmental Management Accounting (EMA) has attracted increasing attention leading to the enactment of environmental regulations requiring management to become more conscious of the environmental implications of virtually every decision facing their companies (Ijeoma, 2015).

The countries with environmental accounting activities include Australia, Canada, Denmark, Finland, France, Germany, United Kingdom, United States as well as developing countries like Botswana, Chile, Korea, Nambia, Philippies, South Africa and Nigeria. Meanwhile, there has been little progress in developing a practical environmental accounting system that can be integrated with the national economic accounts.

Ijeoma, 2015 therefore states that environmental accounting advocates the identification, prioritization, quantification or qualification and incorporation of environmental cost into business decision, including informing decision related to product mix, product retention and product pricing.

Adams (2004), Okoye and Ngakwe (2004) stated that there is a growing demand by the stakeholders for environmental accounting on the part of the organisations to assess, and put together accounting reports that will take care of raw materials consumed, energy and natural resources that have continuously

contributed to environmental degradation that is demanding for an ethical, social and environmental account. This demand arises from the increased impacts of companies on the environment and the society.
Identification, measurement, and allocation of environmental expenses as well as their integration into business operations and the dissemination of this information to stakeholders are all covered by environment accounting. This makes it a thorough strategy for ensuring excellent corporate governance, which also incorporates transparency in its societal actions. Performance falls short of expectations due to some types of unserious attitudes and lack of respect for environmental accounting. This is due to the fact that environmental accounting aids in the firm's ability to record all environmental costs paid by the company, which helps it identify ways to lower those costs (environmental expenses) so that the company may boost profit. Additionally, environmental accounting aids in revealing a company's environmental friendliness to the public. Pramanik, Shil, and Das (2007) list the following as some of the unique concerns (issues) with environmental accounting and reporting:

1. Determination of environmental expenses and costs
2. Cost capitalization
3. Determining environmental responsibilities
4. Calculation of liabilities

Corporate Tax Gap

The Corporate Gross Tax Gap is the difference between tax liability in any year and the amount of that tax paid voluntarily and on time. The gross tax gap has three components – non-filing, underreporting of tax owed, and underpayment. The three components are mutually exclusive and add up to the total tax gap. The non-filing is the tax not paid on time by the tax payers who have legal requirement to file tax returns, but do not file them on time. The underreporting gap is the tax owed by tax payers who file returns on time, but underreport the amount of tax they owe. The underpayment gap is the loss of revenue owed by taxpayers who file returns on time, but do not pay their reported tax due on time (Toder, 2007).
The gross tax gap is measured net of overpayments of tax liability. That is if a tax payer whose return is examined in a tax gap study is found to have reported and paid too much tax, his or her overpayment is subtracted from the measure of the gross tax gap. In calculating the gross tax gap, the Revenue Service also nets out withholding taxes paid by individuals who fail to file tax returns on time (Toder, 2007).
A tax gap may arise either because of assessment risk or collection risk (Villos, 2012). Assessment risk is the difference between tax that is due and tax actually assessed by the tax authorities as owing by the taxpayer. This includes the gap attributable to taxpayers underreporting their income and not lodging their tax returns. The major portion of the tax gap is caused by assessment risk (around 90% of the overall tax gap in developed economies). Collection risk is the difference between tax payments received and tax actually assessed by the taxpayer. In the US, this difference is largely caused by accidental non-compliance and employers' failure to withhold income and employment taxes.
Danquah and Osei-Assibey (2016), defined tax gap as the difference between tax revenues collected and those that would be theoretically expected to be collected in the absence of any evasion or late payment. Another approach which is commonly used by authors in identifying the tax gap is by first defining the 'hidden economy' or 'hidden income' - income that is earned but is hidden from the tax authorities and, usually, official statisticians – and then the hidden income is multiplied by a suitable tax rate to obtain the tax gap (Giles, 1999).
Meanwhile,, a distinction is made between the gross tax gap and the net tax gap. Thus, the gross tax gap is the difference between tax liability in any year and the amount of tax that is paid voluntarily and timely. Whilst the net tax gap is the gross tax gap in any tax year less payments of that year's tax liability that come in later through either voluntary late payments or enforcement activities of the tax authorities. However, payments of interest and penalties associated with late payments or underreported tax liability are not counted in either the gross or net tax gap measures. The gross tax gap has three components — non-filing, underreporting of tax owed, and underpayment. The three components are mutually exclusive and add up to the total tax gap. The non-filing gap is the tax not paid on time by taxpayers who have a legal requirement to file a tax return, but do not file on time. The underreporting gap is the tax owed by taxpayers who file returns on time, but underreport the amount of tax due. The underpayment gap is the loss of revenue owed by taxpayers who file returns on time, but do not pay their reported tax due on time (Toder, 2007; Mazur & Plumley, 2007).
It is also worthy to note that even though the tax gap is usually studied within the context of the underground economy (informal economy), it is not synonymous with the latter; there might be some overlapping. The

underground economy in some respect comprises illegal activities which are not considered in the estimation of the tax gap (Mazur & Plumley, 2007).
According to Murphy (2014), the tax gap is made up of three parts : Tax debt (non-collection; tax that is not paid by someone who knows that he owes it, but who doesn't pay, or delays payment), Tax avoidance (tax that is lost when a person claims to arrange his affairs to minimise tax within the context of tax law), and Tax evasion (tax that is lost when a person or company deliberately and unlawfully fails to declare income that he knows is taxable or claims expenses that are not allowed).
Tax Gap should be considered also from the perspective of both positive economics (the way it is), and normative economics (the way it should be). The main reason behind it is the dual character of public finance as funds are both accumulated and spent, whereas tax gap is a direct determinant of the budget deficit, public debt as well as the possibilities of performing the statutory state tasks. There are various definitions of tax gap adopted in the practice of operation of tax authorities in different countries and many means of its measurement too. Based on the general definition by the Internal Revenue Service (IRS), which corresponds with the one used by Her Majesty, Revenue and Customs in UK, one may assume that tax gap is "the degree to which the taxpayer evades taxation, which results in undue reduction of the tax base and a decrease in due contributions to the state budget"(Raczkowski *et al*. 2015).
Some researchers (Plumley 2005) believed that tax gap features could be aggregated into three components:

1. Failure to file a return;
2. Under-reporting of income and overstating of deductions; and
3. Under-payment, e.g. failure to fully pay taxes owed to the state.

The definition of tax gap offered by Giles (1999) is based on the use of the notions of "shadow economy" and "hidden income". Hidden income is revenue generated (earned) by the taxpayer, which has not been disclosed to the tax authorities and not captured in the statistical registration. In such a context, the Tax Gap is defined as the amount of hidden income multiplied by an appropriate (i.e. adequate for a given taxpayer and the level of income) tax rate. Such an approach poses many conceptual and methodological problems, e.g. what are the components of hidden income and what does "appropriate" tax rate mean (Gemmell & Hasseldine, 2012).

Theoretical Framework
Stakeholder Theory
Stakeholder theory has its foundation in strategic management literature (Abrams, 1951; Ackoff, 1974; Ansoff, 1965; Cyert & March, 1963; Rhenman, 1968). The basic tenet of the stakeholder theory suggests that stakeholders are critical for a firm's success as they affect the firm's long-term strategic goals (Aarseth *et al.* 2011). Therefore, by integrating stakeholder interests into a firm's strategic decisions is critical for the firm's success (Theodoulidis *et al.* 2017).
The theory creates the awareness that there are other vested interests outside the actual shareholder concept in which the organisations should include into their decision making process; hence, the specific interest of these stakeholders should be taking into consideration. Meanwhile, there is no consensus as to what the term stakeholder means (Miles, 2012). This is partly attributed to scholars placing varying emphasis on the inclusiveness of who constitutes a stakeholder (Derry, 2012). Stakeholders are groups or individuals who are influenced by or can influence corporate activities; the continuous survival of the organisations depends on the kind of relationship it has with the stakeholders (Bassey *et al.* 2013). Moreover, conflict of interest between managers and stakeholders or among the stakeholders themselves may exist to blur the definition and roles (Eskerod, 2015).
On the other hand, Mitchell *et al.* (1997) argued for the prioritization of identified stakeholders on three key attributes: power, legitimacy, and urgency. An urgent request from a powerful and legitimate stakeholder requires significant and prompt management attention relative to one from a stakeholder lacking these three attributes. Freeman (1984) advocated a need to pay greater consideration to primary and secondary stakeholders for purposes of effectively allocating management's scarce resources. Primary stakeholders are classified as vital to a firm's survival and well-being, particularly where the firm is highly dependent on stakeholder contributions (financial and non-financial resources) for specific issues (Savage *et al.* 1991). This argument is in line with the resource dependency theory (Frooman, 1999; Pfeffer & Salancik, 2003), which completely emphasizes stakeholders' influence on an organization rather than how stakeholders are affected by the organization (Eskerod, 2015).

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The theory is said to be divided into two segments (Deegan, 2009; Eltaib, 2012) which are managerial segment and ethical segment. The managerial aspect deals about stakeholder's power, having the understanding that the organization as a part of the society, it identified the different stakeholder groups in existence in the society and how they should be handled to achieve the survival of the organization. The ethical aspect deals about stakeholder's importance having the right to information about the organization (Deegan, 2009; Donaldson & Preston, 1995; Hasnas, 1998).

It has also been suggested that prioritisation leaves a considerable gap between what a focal organization understands as stakeholders' interests and what stakeholders themselves perceive are their interests (Bryson, 2004). This dichotomy can be the cause of unanticipated resistance from stakeholders during the implementation of management decisions (De Gooyert *et al.* 2017). Rowley (1997) therefore suggested the concept of 'stakeholder multiplicity' which stressed that management must acknowledge stakeholders as part of a network rather than 'a dyadic image'. This created the foundation for a clearer understanding of the exchanges between stakeholders and their potential for communicating and starting coalitions and consequently expanding their organizational power. Thus, the typology of stakeholder integration necessitates a distinction between informing, consulting, and co-deciding (Green & Hunton-Clarke, 2003). The acknowledgment of the significance of misperceiving stakeholder interests championed the advancement of substantial literature on stakeholder integration. The evidence suggests that certain strategic decisions may prove to require discussions with stakeholders to warrant better understanding due to their complexity (Calton & Payne, 2003). Although, integration inherently represents a morally neutral practice (Greenwood, 2007), it facilitates the creation of lasting and mutually beneficial relationships (Maak, 2007) and may lead to greater financial returns (Henisz *et al.* 2014). The concept of stakeholder integration is relevant to this research because it pitches the probable existence of different stakeholders with similar or complementary claims on the focal organization, and therefore either intensifying the gravity of their claims or complementary the stakeholder's task due to conflicting claims, and consequently affecting the firm's financial performance.

Benefit Received Theory

The benefit received theory states that there is an exchange relationship between taxpayers and the State. Government provides certain amenities to the citizens and that contributes to the cost of these supplies in proportion to the benefit received (Bhartia, 2009). Tax is not a *quid pro quo* expenditure, implying that tax paid may not be at par with benefits received from government. It is hoped that responsible government should utilise taxpayers' funds (to a reasonable extent) for the provision of general goods and the welfare of the entire citizenry (Onyekachi *et al.* 2018) The theory establishes the link between tax liability and state activities (Onyekachi *et al*. 2018). It proposes that tax imposition should be done in consideration of its relevance to the execution of government projects; and as such, the absence of such taxes will inhibit government ability to discharge its responsibility (Chigbu *et al*. 2012).

Classical benefit-based taxation shows how a single modification of the standard Mirrleesian optimal tax model enables us to formalize classical benefit-based taxation (hereafter, CBBT) and characterize optimal policy in terms of simple, potentially observable statistics.

The model

A population of individuals differs in their abilities to earn income. In conventional models, these abilities are interpreted as innate and fixed relative to public goods. The innovation in this paper is that individuals' income-earning abilities are functions of both endowed ability and public goods funded by tax revenue. As mutually exclusive categories, endowed ability and public goods can be thought of as, respectively, the genetic or other endowments not affected by the size and scope of the state and the broad set of activities with which the state supports the functioning of an economy. Note that this paper takes only the first, most basic, step toward modeling the effect of these public goods on individuals' abilities by leaving unexplored their composition. Future research may show how the mix, design, and implementation of public goods matter, as well.

Formally, income-earning ability $w_i = f(a_i, G)$, where $i \in I$ indexes endowed ability types $a_i, G \geq 0$ is the level of spending on public goods, and $f(\cdot)$: $\mathbb{R}^+ \times \mathbb{R}^+ \longrightarrow \mathbb{R}^+$ is a differentiable ability production function. The conventional model is a special case in which $f(a_i, G) = a_i$ for all $i \in I$ and any G.

An individual of type i derives utility according to

$U(c_i, l_i) = u\left(c_i, \frac{y_i}{f(a_i, G)}\right)$, ... 2.10

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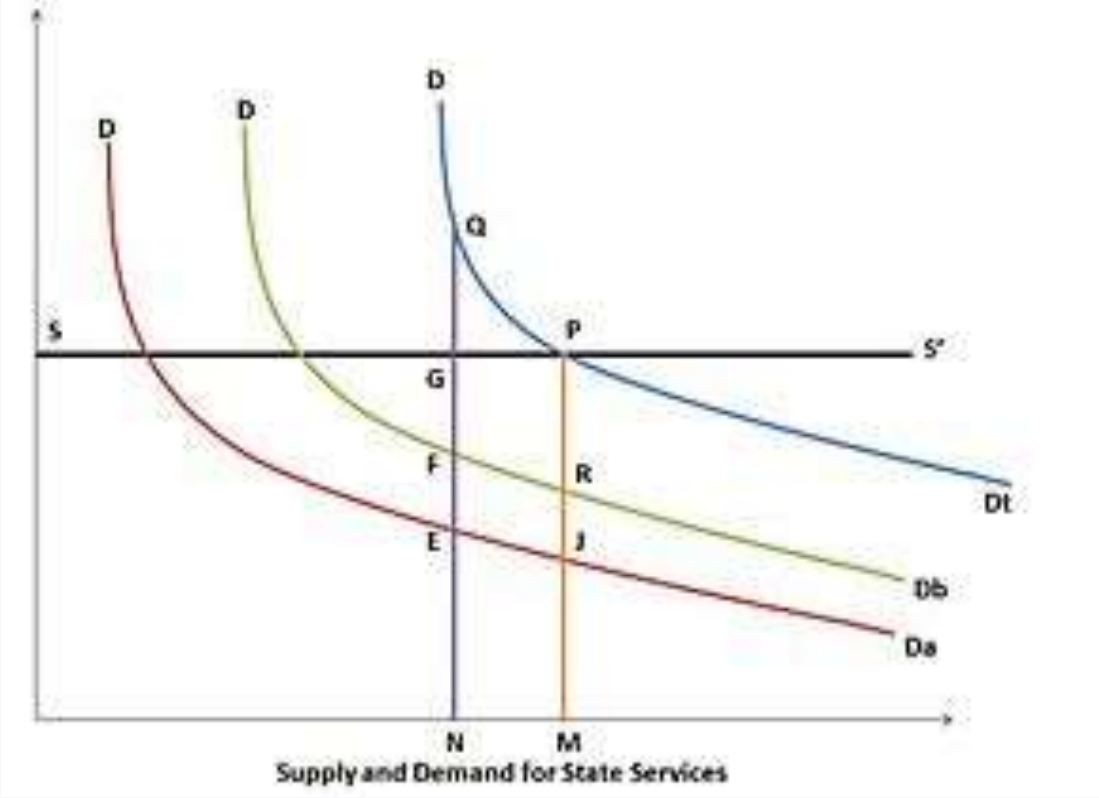
Where c_i is private consumption for individual i and y_i is $i's$ income, so that $\frac{y_i}{w_i}$ is work effort. Denote partial derivatives of this utility function with respect to consumption and effort with $u_c\left(c_i, \frac{y_i}{f(a_i,G)}\right)$ and $u_l\left(c_i, \frac{y_i}{f(a_i,G)}\right)$. Note that this utility function does not assume additive separability between the utility from consumption and the disutility from effort, a simplifying assumption often made in optimal tax models.
A social planner chooses a tax system, including an optimal G^*. Individual takes that system as given and maximize their own utility, yielding equilibrium consumption and income allocations $\{c_i^*, y_i^*\}_{i=1}^{l}$ and utility levels

$$U_i^* = u\left(c_i^*, \frac{y_i^*}{f(a_i,G^*)}\right) \quad \ldots 2.11$$

For all $i \in l$. note that there may be multiple optimal policy equilibria. At this point, it may be worth noting that the simple change of making income-earnings ability depend on public goods raises a number of questions that for conventional Mirrleesian optimal taxation that could be pursued in further research.
The benefit received theory is also propounded through Lindahl's model of public finance as shown below in figure 2.7.

Lindahl's model



Supply and Demand for State Services

Lindahl tries to solve three problems:
Extent of state activity
Allocation of the total expenditure among various goods and services
Allocation of tax burden

In the Lindahl model, if SS' is the supply curve of state services it is assumed that production of social goods is linear and homogenous. DDa is the demand curve of taxpayer A, and DDb is the demand curve of taxpayer B. The Horizontal summation of the two demand curves results in the community's total demand schedule for state services. A and B pay different proportions of the cost of the services which is vertically measured. When ON (O = graph origin, at axes intersection) is the amount of state services produced, A contributes NE and B contributes NF; the cost of supply is NG. Since the state is non-profit, it increases its supply to OM. At

this level, A contributes MJ and B contributes MR (the total cost of supply). Equilibrium is reached at point P on a voluntary-exchange basis.
The Lindahl equilibrium proposes that individuals pay for the provision of a public good according to their marginal benefits in order to determine the efficient level of provision for public goods. In the equilibrium state, all individuals consume the same quantity of public goods but may face different prices because some people may value a particular good more than others. The Lindahl equilibrium price is the resulting amount paid by an individual for his or her share of the public goods.

Empirical Literature Review

The impact of environmental accounting disclosures on the tax-aggressiveness of listed firms in Nigeria was empirically studied by Fabian, Onuora and Onyeka (2022). Their study is important because it illustrates how much environmental accounting disclosures affect businesses' tax-aggressiveness. Waste management disclosure (WMD), environmental remediation disclosure (ERD), and pollution control disclosure (PCD) were used by the researchers as proxies for environmental accounting disclosures. They used the GRI G4 on content score to extract these variables, whereas they used the effective rate of taxation as a proxy for tax aggressiveness (ETR). The researchers proposed three hypotheses which are meant to address the objectives of their Ordinary Least Square regression model run by STATA Version 15 to conduct the analysis and obtain values for the model parameters. Data for the study was gathered from the public annual financial reports of three sectors in Nigeria. The data obtained were from all ICT enterprises, oil & gas companies and healthcare companies registered under Nigerian Exchange Group (NGX) for the period 2013 to 2020, using an ex post facto design. The researchers found that environmental remediation, pollution control, and waste management disclosure all have significant and direct effects on firm's tax aggressiveness as measured by its effective tax rate (ETR). The rate of significant of the findings is at a level between 1 and 5 percent. The authors concluded that the listed corporations' tax aggression is determined by environmental accounting disclosures. That is environmental accounting disclosures has a positive and significant effect on tax. Thus, they recommended that businesses adopt environmental friendly strategies and publicly release more information about their commitment to long-term sustainable economic growth in their annual reports because the degree of disclosure of information has an impact on businesses' tax aggressiveness over time.
The impact of accounting costs on the estimated tax income was studied by Naser, Latif, and Abed (2020) using a case study of the Al-Fedaa state company/Tammuz plant. The study's objectives are to address the knowledge bases of accounting costs and explain their impact on the calculated tax income, with a focus on modern methods that can be used to measure accounting costs accurately in a way that enhances the calculated tax income as well as the returns of the company. According to the study's hypothesis, precise accounting cost measurement raises the economic units' overall net profit and has a favorable effect on the amount of tax revenue that is computed. The General Redemption Company and Tammuz Factory, both subsidiaries of the Iraqi Ministry of Industry and Minerals, were utilised by the authors. The study period is on December 31, 2017. The researchers claim that these organizations measure their costs using more conventional approaches, whereas their rivals assess their expenses using more contemporary procedures. This is a sign that both the computed tax income and the ultimate net profit have been negatively impacted. Modern methods for assessing accounting costs were used, and their impact on the tax income calculated for the organizations used in this study in order to test the research hypothesis. The researchers came to the conclusion that cost measurement methods will aid in providing relevant and precise information about product costs, since this has a positive effect on the estimated tax income and raises the firm's net final profit. They also stated that since it relies on the creation of procedures and policies that enable financial management to maximize the amount of the tax liability to be reduced or increased while taking advantage of legal privileges, the use of accounting costs to improve calculated tax income and improve returns is far from tax evasion.
Using book value of equity and market pricing, John-Akamelu, Ofor and Anichebe (2019) assessed the impact of accounting information on deferred taxes in Nigerian deposit money institutions. Data were gathered using

an ex post facto research design and were taken from the annual reports and accounts of Nigerian deposit money institutions. The formulated hypotheses were tested using pooled multiple regression analysis. Based on the analysis, the authors discovered that book value of equity has a statistically significant negative impact on the dependent variable, deferred tax. The authors also discovered a positive relationship between market price and the dependent variable, deferred tax, although this relationship had not been significant statistically during the study period.

The article by Vokshi (2018) addressed crucial concerns pertaining to the depiction of the economic situation in Kosovo, where the accounting-taxation relationship exists when creating financial statements has an impact based on its level of intensity. This paper summarizes the reporting regulatory framework in both reporting areas based on the research findings and highlights the correlation between financial and fiscal reporting in the creation of financial statements, categorizing this relationship in one of the five categories recognized in international literature: thus, there is a significant relationship between accounting and taxation.

A corporate social and environmental disclosure empirical study is presented by Setyorini and Ishak (2012) in Indonesia. The study examined a sample of 911 businesses that were listed on the Indonesia Stock Exchange between 2005 and 2009. The sectors of the listed firms on the Indonesia Stock Exchange were sampled with purpose. The relationship between return on asset, business size, and firm earnings management and corporate social and environmental disclosure were estimated using regression analysis. Long-term debt/book value of equity at the end of the fiscal year, the national logarithm of market capitalization, discretionary accruals, and return on assets were the four qualities that were considered. The regression findings indicate that corporate social and environmental disclosure in Indonesia is related to return on assets (ROA), business size, and firms' profit management.

Hussein et al. (2020) looked at accounting information systems and their function in the General Authority for Taxation, a service provider that offers numerous services to individuals and businesses, and their impact on tax excellence. When it came to their tax performance and the rise in tax collections, inventiveness, future vision, and the development of human relationships all played a role. According to the researchers, an efficient information system helps to deliver accurate and trustworthy information in a timely manner. What are the accounting information systems and how prepared is the General Authority for Taxes to use them? What are the contributing aspects that assist accounting information systems become more advanced? Finally, the findings demonstrated that accounting information systems and their role in tax differentiation have a favourable and positive impact. This provides a useful indication of how accounting information systems affect the effectiveness of the General Authority for Taxes.

In a research published in 2014, Al Frijat explored the effects of accounting information systems on the efficiency of tax audit and collection in Jordan. The author examined the ensuing goals. (1) The impact of human resources on Jordan's tax audit and collection efficacy. (2). The impact of computer technologies on Jordan's tax audit and collection efficiency. (3) The impact of the system's control mechanisms on the efficiency of Jordan's tax audit and collection. The author discovered that the accounting information system employed by the Jordanian Income Tax Department is run by qualified human resources and a cutting-edge computer system, and that it complies with the standards of sound control systems that aid in enhancing the effectiveness of tax audit and collection. The researcher suggests that the tax department focus on enabling the accounting information system, as this would help raise the efficiency of tax audit and collection above what it is at the moment.

Olatunji and Olaoye (2015) used primary data collected from a sample of one hundred (100) respondents using a questionnaire, together with a number of descriptive and inferential statistical analyses, to study the developmental effects of environmental taxes in Nigeria. The study concluded that environmental taxation is associated with better environmental quality, that it has no effect on the cost-effectiveness of Nigerian businesses, and that it has not resulted in a rise in the standard of living in the nation.

In the study of Castiglione, Infante, Minervini, and Smirnova (2016), they looked at the factors that influence environmental taxation in European economies. They examined numerous sets of factors impacting

environmental taxes pertaining to production and consumption, environmental performance and the level of governance in European countries, taking into account their heterogeneity, using a pooled panel data. They contended that for environmental taxation policy to be effective, there should be a positive interaction between institutional enforcement and economic growth, which strengthens the process of environmental revival.

Okubor (2017) studied on the function of environmental taxes as tools for environmental improvement and as a source of funding for economic development. It examines the broad justification for environmental levies as well as the specific problems that result from their implementation. It also talks about how such taxes might be politically acceptable if tax revenue is tied to the objective of economic growth. With a focus on a carbon tax, the revenue potentials of environmental levies are assessed. It has been determined that this tax alone has the ability to generate enough income to support government objectives.

According to Odewole (2017) in Bebbington (2001), Adams & Zutshi (2004), there is an increasing trend towards the inclusion of environmental sustainability in the corporate financial reports besides the economic reports of accounting and taxation.

METHODOLOGY

Model Specification

In the spirit of Fabian, Onuora and Onyeka (2022), González *et al* (2020), Vokshi (2018) and Hussein *et al* (2020), the researcher introduces panel data econometric equations with little modification to address the research questions for this study. Thus, by definition.

$taxgap_{it} = a_o + a_1 ldppe_{it} + \mu_{il} + €_{it1}$ 3.1

$$taxgap_{it} = b_0 + b_1 srmd_{it} + b_2 enpd_{it} + \mu_{i2} + \varepsilon_{it2} \quad 3.2$$

Where:

TAXGAP = tax gap,

LDPPE = loss on disposal of property, plant and equipment to the environment,

SRMD = safety related measure disclosure,

ENPD = environmental protection disclosure.

$\mu_{i1}, \ldots, \mu_{i6}$ are the heterogeneity or specific errors, which are either fixed or random and

$\varepsilon_{it1}, \ldots, \varepsilon_{it6}$ are the unconditional time invariant disturbance term with Gaussian properties.

The researcher now states the model in the general form and expressed its non-linear version as.

$$y_{it} = \theta + x_{it}^{'}\phi + \mu_i + \varepsilon_{it} \quad 3.3$$

Where y is the response variable and x' is the vector of predictors already presented above.

Methodological Gap

It is observed that the specifications of Fabian, Onuora and Onyeka (2022), González *et al.* (2020) and Hussein *et al.* (2020) are panel specifications but they have inherent shortcomings, which are: They are static pooled regression model, and they do not account for panel-collearity, autocorrelation with panels and heterogeneity across panels. In order to deal with these econometric issues, particularly in a small sample, the researcher employed Within Group (WG) transformation under the Variance Covariance (VC) robust estimation mechanism and flexible Generalized Least Squared (GLS) technique.

Estimation Procedure

Estimation technique under the assumption that the individual variances are linearly dependent on the covariates ($E(u_i x_{it}) \neq 0$). This is likely an endogeneity problem, and the effects need to be removed by the demeaning transformation method. This is called the within-group (WG) or fixed effects (FE) estimation technique.

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From equation 3.3, the researcher constructs a within-sample average benchmark linear model as:

$$\bar{y}_i = \bar{x}_i' B + z_i + \bar{w}_i \quad 3.4$$

Where the group means are defined as:

$$\bar{y}_i = \frac{1}{T}\sum_{t=1}^{T} y_{it}; \bar{x}_i' = \frac{1}{T}\sum_{t=1}^{T} x_{it}'; \bar{w}_i = \frac{1}{T}\sum_{i=1}^{T} w_{it} \quad 3.5$$

Subtract 3.4 from 3.3

$$y_{it}^{bal} - \bar{y}_i = (x_{it} - \bar{x}_i)' B + w_{it} - \bar{w}_i \quad 3.6$$

Moment condition in this regard is given as

$$E(w_{it} - \bar{w}_i, x_{it} - \bar{x}_i) = 0 \quad 3.7$$

Now motivate the OLS estimation procedure as

$$E[(x_{it} - \bar{x}_i)(y_{it} - \bar{y}_i - (x_{it} - \bar{x}_i)' B)] = 0$$

$$E[(x_{it} - \bar{x}_i)(y_{it} - \bar{y}_i) - ((x_{it} - \bar{x}_i)(x_{it} - \bar{x}_i)')B]$$

$$\hat{B}_{WG} = E[(x_{it} - \bar{x}_i)(x_{it} - \bar{x}_i)']^{-1} E[(x_{it} - \bar{x}_i)(y_{it} - \bar{y}_i)$$

$$\hat{B}_{WG} = \sum_{i=1}^{N}\sum_{t=1}^{T}[(x_{it} - \bar{x}_i)(x_{it} - \bar{x}_i)']^{-1} \sum_{i=1}^{N}\sum_{t=1}^{T}[(x_{it} - \bar{x}_i)(y_{it} - \bar{y}_i)] \quad 3.8$$

The fixed effect estimator or within-group estimator makes use of variations across time. Therefore, the time-invariant elements are differenced out, though the nature of the demeaned error ($w_{it} - \bar{w}_i$) is non-classical, yet the fixed effect estimators are efficient.

RESULTS AND DISCUSSIONS

Estimation Tests

The estimation methods used to test the hypotheses of this study are based on Pooled OLS, WG with VC robust and FGLS. The results of the test are reported for the overall period, low tax-gap regime and large tax-gap regime periods.

Test of Hypotheses for the Overall Period

The doctrine of this work is based on three relationships or paradigms. To iterate, these are 1 tax-gap has linear and significant relationship with loss on disposal of property, plant and equipment; 2 tax-gap and environmental protection disclosure are significantly related, and 3 influence or causation runs from waste management disclosure to tax-gap. The following tables report the results of the tests of these hypotheses.

Table 1.1

Test based on Pooled OLS for the Tax Gap-Environmental Cost Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
ldppe	1.4116	.5569	2.53	0.011
cons	557800.8	989286.4	0.56	0.573

The coefficients of loss on disposal of property, plant and equipment. This suggests that tax gap is positively influenced by this variable. Meaning that any increase in loss on disposal of property, plant and equipment, led to a rise in tax gap.. This result is confirmed by the WG with VC estimation and FGLS methods.

Robustness Checks for the Pooled OLS Results based on Tax Gap-Environmental Cost Nexus for the Overall Period

Robustness checks are used to confirm the certainty of parameters across different methods. In this regard, the results of the hypotheses tested above are confirmed by two other techniques. Tables 1.2 and 1.3 present the outputs of these results.

Table 1.2
Test based on WG with VC Estimation Method for the Corporate Tax Gap-Environmental Cost

Regressor	Coef.	Std. Err.	Z-stat	P-value
ldppe	1.0373	0.3114	3.33	0.009
cons	3169612	697756.9	4.54	0.001

The results based on the within group (WG) Variance Covariance Estimation method are reported in table 1.2 The coefficients of loss on disposal of property, plant and equipment is 1.04. This confirms the results of the benchmark method, pooled OLS, thus, there is evidence to support the findings that tax-gap increases with any rise in loss on disposal of property, plant and equipment.

Table 1.3
Test based on Flexible GLS Method for the Tax Gap-Environmental Cost Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
ldppe	1.2166	0.7171	1.70	0.090
cons	179143.5	70368.36	2.55	0.011

Table 1.3 reports the results of the flexible GLS method. As shown in the table, the results have not changed. Loss on disposal of property, plant and equipment exerts positive influence on tax gap. In view of this, there is strong evidence that environmental accounting in the form cost incurred by disposing property, plant and equipment to the external environment significantly influence tax gap in the Nigerian manufacturing industry.

Table 1.4
Test based on Pooled OLS for the Tax Gap-Environmental Information Disclosure Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
srmd	8.5239	5.3039	1.61	0.108
enpd	8.9299	5.3192	1.68	0.093
cons	-10.5663	5.0832	-2.08	0.038

Note that srmd-safety related measure disclosure, enpd-environmental protection disclosure and taxgap is the regressand

The pooled OLS results in Table 1.4 reveal that the coefficients of srmd and enpd are 8.52 and 8.93 respectively, with corresponded probabilities of 10% and 9%. The two variables are marginally significant at 10 percent level. This suggests that a 1 percent increase in environmental safety related measure disclosure Granger causes tax gap growth rate to increase by 8.52 percent. In the same vein, a 1 percent rise in environmental protection disclosure leads to about 8.93 percent increase in tax gap growth rate. Thus, we have evidence of positive and significant relationship between tax gap growth rate and environmental accounting proxy by environmental protection disclosure and environmental safety related measure disclosure. These results are confirmed by the outputs yielded by the WG-VC robust estimation and flexible GLS techniques.

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Table 1.5
Test based on WG with VC Estimation Method for the Corporate Tax Gap-Environmental Information Disclosure Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
srmd	10.4089	7.2603	1.43	0.185
enpd	4.6474	2.8115	1.65	0.133
cons	-9.2205	5.0800	-1.82	0.103

Note that srmd-safety related measure disclosure, enpd-environmental protection disclosure and taxgap is the regressand

The results of the pooled OLS is quiet similar to the results reported above in Table 1.5. The coefficients of srmd and enpd are still positive (10.41 and 4.65). This is a clear confirmation that there is presence of positive relationship between environmental safety related measure disclosure and tax gap growth rate and the direct link between environmental protection disclosure and tax gap growth rate does not change.

Table 1.6
Test based on Flexible GLS Estimation Method for the Corporate Tax Gap-Environmental Information Disclosure Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
srmd	.2379	1.3736	0.17	0.863
enpd	.2045	1.3793	0.15	0.882
cons	-.7065	1.3511	-0.52	0.601

Note that srmd-safety related measure disclosure, enpd-environmental protection disclosure and taxgap is the regressand

The results yielded by the flexible GLS method on the nexus between tax gap and environmental protection/safety disclosure are presented in Table 1.6 for the overall study period. The position of these results is in tandem with the benchmark method. The only difference is that the benchmark method reports larger coefficients more than the flexible GLS. Therefore, there is overwhelming evidence to support the hypothesis or exertion that tax gap growth rate is positively influenced by environmental protection disclosure, and safety related measure disclosure. In view of this, the doctrine is that the growth rate of tax gap declines, whenever environmental protection reduces. Analogously, environmental safety related measure is an explicit determinant of tax gap growth rate in Nigerian manufacturing industry.

Post Estimation Tests for the Overall Period Model Specifications

The three models (the pooled regression, Fixed Effects and Random Effects) adopted in this study are subjected to post estimation tests based on their coefficient of determination, Wald's test statistic and Modified Wald's test statistic for group-wise heteroscedasticity. The results of these tests are summarized in Table 1.7.

Table 1.7
Post Estimation Tests for the Overall Period Model Specifications

Model	R-sq	Wald Test	Modified Wald Test
Tax Gap-Environmental Cost Nexus:			
Pooled OLS	0.39	66.1(0.00)	-
WG-VC Estimation	0.36	1.83e+06(0.00)	1.9e+09(0.00)
Flexible GLS	-	117.3(0.00)	9.9e+08(0.00)
Tax Gap-Environmental Information Disclosure Nexus:			

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Pooled OLS	0.05	4.59(0.10)	-
WG-VC Estimation	0.04	1.40(0.30)	2.0e+05(0.00)
Flexible GLS	-	0.04(0.98)	3.6e+06(0.00)

Note the figures in parentheses are the probability values.

The coefficients of determination or R-squares for Tax Gap-Environmental Cost Nexus with respect to the pooled OLS and WG-VC estimate are 0.39 and 0.36 respectively. This suggests that the pooled OLS has a better predictive power for the tax gap-environmental cost relationship than the WG-VC estimation. Equally, for the tax gap-environmental information disclosure nexus, the two models display very low coefficient of determination.

The Wald test statistic for each of these techniques with respect to tax gap-environmental cost nexus associates with 0 percent probability. This shows that the models have good fit and the data are well capture. In the case of tax gap-environmental information disclosure, the Wald test reveals very poor fit except for the pooled OLS that is marginally significant at 10 percent.

The modified Wald test for both relationships reveals the presence of heteroscedasticity characterizing the residuals of the model employed in this study.

Test of Hypotheses for the Low Tax Gap Regime

The hypotheses tested for the overall period are repeatedly tested for the low tax gap and large tax gap regimes. The results of the tests for the low tax gap regime are reported in the Table below.

Table 1.8

Test based on Pooled OLS Method for the Corporate Tax Gap-Environmental Cost Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
ldppe	.3442	.3116	1.10	0.269
cons	1396317	913396.4	1.53	0.126

As shown in the Table above the coefficients of ldppe 0.34. This means during the low tax gap regime (that is a regime that coincides with very small proportion of deffered tax) loss on disposal of property, plant and equipment maintains positive impact on tax gap. The empirical stance established here is as tax gap increases during low tax gap regime/system, loss on disposal of property, plant and equipment. This stance or doctrine is subjected to revalidation using the WG-VC estimation and flexible GLS methods.

Table 1.9

Test based on WG-VC Estimation Method for the Corporate Tax Gap-Environmental Cost Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
ldppe	.0223	.7338	0.03	0.977
cons	2845729	936745.2	3.04	0.019

There is overt difference between the results of the benchmark model and Fixed Effects model. In the benchmark model, , there is potential similarity between the models, the coefficient of ldppe is positive in both models. This means there is strong evidence that loss on disposal of property, plant and equipment drives tax gap positively.

Table 1.10

Test based on Flexible GLS Method for the Tax Gap-Environmental Cost Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
ldppe	.9084	.2461	3.69	0.000
cons	66021.96	253609	0.26	0.795

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It seems there is no rich difference between the benchmark model and the random effects model, Therefore, the positive relationship between tax gap and loss on disposal of property, plant and equipment is supported by the results of the flexible GLS.

Table 1.11
Test based on Pooled OLS Method for the Tax Gap-Environmental Information Disclosure Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
srmd	-12.3892	9.3271	-1.33	0.184
enpd	-12.1097	9.7419	-1.24	0.214
cons	14.4052	7.5908	1.90	0.058

According to the pooled OLS, coefficients of srmd and enpd are -12.39 and -12.11 respectively. These outputs are indications that there is strong negative relationship between tax gap growth rate and environmental protection disclosure, in the same vein, environmental safety related measure disclosure influences tax gap growth rate negatively during the regime of low tax gap. This position is confirmed using the regression outputs yielded by the WG-VC estimation and flexible GLS methods.

Table 1.12
Test based on WG-VC Estimation Method for the Corporate Tax Gap-Environmental Information Disclosure Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
srmd	3.2498	.2465	13.18	0.000
enpd	3.3416	.2794	11.96	0.000
cons	2.2517	.0118	190.62	0.000

There is a sharp difference between the results reported by the benchmark model and the ones reported by the Fixed Effects model. The coefficients of srmd and enpd are negative as presented by the pooled regression, while they appear to be positive as given by the WG-VC estimation method. This extreme position is further verified using the flexible GLS.

Table 1.13
Test based on Flexible GLS Method for the Corporate Tax Gap-Environmental Information Disclosure Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
srmd	1.1601	5.0401	0.23	0.818
enpd	.9795	5.0513	0.19	0.846
cons	-.7678	5.0150	-0.15	0.878

The flexible GLS results is in tandem with WG-VC estimation method, since the coefficients of both srmd and enpd are positive (1.16 and 0.98 respectively). This means there is more evidence to suggest that tax gap growth rate is positively influenced by environmental protection and environmental safety related measure disclosures during the regime of low tax gap.

Table 1.14
Post Estimation Tests for the Low Tax Gap Regime Model Specifications

Model	R-sq	Wald Test	Modified Wald Test
Tax Gap-Environmental Cost Nexus:			
Pooled OLS	0.25	14.16(0.00)	-

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WG-VC Estimation	0.21	885689.30(0.00)	
Flexible GLS	-	26.15(0.00)	-
Tax Gap-Environmental Information Disclosure Nexus:			
Pooled OLS	0.07	2.20(0.33)	-
WG-VC Estimation	0.07	-	6.1e+07(0.00)
Flexible GLS	-	0.08(0.96)	4.2e+07(0.00)

Note the figures in parentheses are the probability values.

The R-squares yielded by pooled OLS and WG-VC estimation methods for the tax gap-environmental cost nexus are 0.25 and 0.21 respectively. This shows that the OLS has better explanatory power than the WG-VC estimation method. However, the explanatory power of the two methods is relatively very small for the tax gap-environmental information disclosure nexus. The Wald's test statistics for the three techniques in respect of the tax gap-environmental cost nexus are statistically significant, implying that models have good fit. However, the modified Wald test reveals the presence of heteroscedasticity in each of the models.

Test of Hypotheses for the Large Tax Gap Regime

Lastly, the proposed hypotheses of this study are tested using the three techniques for the regime of large tax gap. The results are reported in the following tables.

Table 1.15

Test based on Pooled OLS Method for the Corporate Tax Gap-Environmental Cost Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
ldppe	4.1682	13.9076	0.30	0.764
cons	-3703	4800798	-0.77	0.441

As shown in the table above, the coefficients of ldppe 4.17. Meaning that during the regime of large tax gap, loss on disposal of property, plant and equipment positively related to tax gap growth rate.

Table 1.16

Test based on WG-VC Estimation Method for the Tax Gap-Environmental Cost Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
ldppe	3.0721	1.5612	1.97	0.081
cons	-2566299	697184.8	-3.68	0.005

There is no any difference between the results yielded by the benchmark model and those delivered by the Fixed Effects model. The coefficient of ldppe still remain positive. Therefore, there is strong evidence to document that tax gap is positively driven by loss on disposal of property, plant and equipment.

Table 1.17

Test based on Flexible GLS Method for the Corporate Tax Gap-Environmental Cost Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
ldppe	2.4385	2.5873	0.94	0.346
cons	-95480.83	127941.2	-0.75	0.455

As shown in the table above, it seems there no difference in the results of the OLS and the flexible GLS. Thus, in this study, we ascertain that tax gap increases with a loss on disposal of property, plant and equipment.

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Table 1.18
Test based on Pooled OLS Method for the Corporate Tax Gap-Environmental Information Disclosure Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
srmd	-.2172	.3330	-0.65	0.514
enpd	.1644	.3634	0.45	0.651
cons	.4114	.4140	0.99	0.320

Table 1.18 shows that the coefficients of srmd and enpd are -0.22 and 0.16 respectively with very large probabilities. This is an indication that during the regime of large tax gap, environmental protection disclosure influences tax gap positively, while any increase in safety related measure disclosure leads to a decline in tax gap growth rate.

Table 1.19
Test based on WG-VC Estimation Method for the Corporate Tax Gap-Environmental Information Disclosure Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
srmd	-.2623	.5196	-0.50	0.627
enpd	-.1500	.2612	-0.57	0.582
cons	.6575	.4160	1.58	0.153

The Fixed Effects model result depicted in Table 1.19 reveals negative coefficients for both srmd and enpd. Meaning that tax growth rate is negatively influenced by safety related measure disclosure and environmental protection disclosure, which contradicts the position obtained by the benchmark model.

Table 1.20
Test based on Flexible GLS Method for the Corporate Tax Gap-Environmental Information Disclosure Nexus

Regressor	Coef.	Std. Err.	Z-stat	P-value
srmd	-.0506	.2315	-0.22	0.827
enpd	.3704	.2143	1.73	0.084
cons	.0372	.2481	0.15	0.881

As seen in the table above there is no contradiction in the results obtained by OLS and those of the flexible GLS. This means the hypothesis that negative relationship exists between tax gap and safety related measure disclosure is strongly supported. Also, there is much evidence in support of the positive relationship between tax gap growth rate and environmental protection disclosure during the large tax gap regime.

Table 1.21
Post Estimation Tests for the Large Tax Gap Regime Model Specifications

Model	R-sq	Wald Test	Modified Wald Test
Tax Gap-Environmental Cost Nexus:			
Pooled OLS	0.53	6.52(0.16)	-
WG-VC Estimation	0.47	10270.33(0.00)	-
Flexible GLS	-	101.67(0.00)	-
Tax Gap-Environmental Information Disclosure Nexus:			
Pooled OLS	0.03	1.50(0.47)	-
WG-VC Estimation	0.01	0.19 (0.83)	1.4e+07(0.00)
Flexible GLS	-	8.72(0.01)	4.4e+06(0.00)

Note the figures in parentheses are the probability values.

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The R-squares with respect to OLS and WG-VC estimation methods are approximately above average, suggesting that tax gap-environmental cost relationship has sound explanatory power and the Wald test also reveals that the relationship has good fit except in the case of pooled regression model. However, the tax gap-environmental information disclosure does have good fit except for the flexible GLS.

Discussions of findings

The connection between environmental accounting cost and tax gap has been constituting research concern in extant studies thus this research aimed to review the effect of environmental accounting costs on corporate tax gap using sample of 10 companies for period of 11 years. In contrast to other studies, this research identified three tax gap regimes – overall, low and large. Also, the study separated environmental disclosure into environmental information disclosure and environmental cost nexus.

Furthermore, environmental information disclosure was decomposed into environmental protection disclosure and safety related measure disclosure while environmental cost nexus was decomposed into loss on disposal of property, plant and equipment, The study finds that, in the overall regime, environmental protection disclosure, safety related measure disclosure, loss on disposal of property plant and equipment are all positive determinants of corporate tax gap showing that an increase in any of these variables will lead to increase in tax gap. This is in agreement with the submission of Fabian, Onuora and Onyeka (2022). Whereas in the low regime, environmental protection disclosure, safety related measure disclosure, all have negative impact on corporate tax gap. This supported the findings in John-Akamelu, Ofor and Anichebe (2019) works. Reviewing the large regime, it was found that environmental protection disclosure, loss on disposal of property plant and equipment are all positively affecting corporate tax gap thus corroborating the findings of Hussein et al. (2020). However, safety related measure disclosure is a negative determinant of corporate tax gap meaning that an increase in this mixture of environmental disclosures and costs could also have negative impact on corporate tax gap. This is in contrast to the finding of Ane (2012) where the effect was concluded to be minimal.

The study recorded that, loss on disposal of property, plant and equipment has positive influence on tax gap in all the three regimes. The implication of this is that any loss on sale of property, plant and equipment will widened the corporate tax gap.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Firstly, in the overall regime, it was found that any increase in loss on disposal of property, plant and equipment led to a rise in corporate tax gap. It was also shown from the findings that environmental protection disclosure and environmental safety related measure disclosure have positive influence on corporate tax gap growth rate. Thus, the corporate tax gap would be widened by the increase in disclosures on environmental and safety measures.

Secondly, in the low tax gap regime, corporate tax gap increases with the rise in loss on disposal of property, plant and equipment. Also, there is sturdy adverse link between tax gap growth rate and environmental protection disclosure, in the same vein, environmental safety related measure disclosure has negative influence on tax gap growth rate negatively.

Lastly, during the regime of large tax gap, an increase in the loss on disposal of property, plant and equipment, results into proportionate rise in corporate tax gap growth rate. Furthermore, environmental protection disclosure influences tax gap positively, while any increase in safety related measure disclosure leads to a decline in tax gap growth rate.

Conclusion

The study has outlined three major findings based on the specific objectives to establish veritable empirical evidences on the relationship between corporate tax gap and environmental accounting. In view of this, the following conclusions are stated:

The interaction between corporate tax gap and loss from disposal of property, plant and equipment has been investigated. But the theoretical sign still left debatable. In the light of finding on this interaction or relationship, we conclude that loss from disposal of property, plant and equipment is a positive driver of corporate tax gap in both low-tax and large-tax regimes. Tax regime does not matter in determining the impact of loss from disposal of property, plant and equipment on corporate tax gap. Therefore, what matters in this relationship is the sensitivity or magnitude of the loss incurred by the companies.

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In this study, it is concluded that tax regime switching does not matter in the relationship between corporate tax gap and environmental protection disclosure. There is a fixed positive relationship existing in-between disclosure of environmental protection and corporate tax gap.
Finally, the study concludes that negative influences or causations run from environmental safety related measure disclosure to corporate tax gap in the regime of low tax, while during large tax regime, increase in the disclosure of environmental safety related measure disclosure causes tax gap to rise.

Recommendations

In tandem to the above conclusions and with respect to the major findings, the following recommendations are made with their corresponding policies required to actualize them.
The management of the Nigerian manufacturing companies should ensure that the aggregate loss accrued from the disposal of property, plant and equipment is reduced and optimally minimized in both low-tax and large-tax regime. To achieve this, they should initiate and sustain the policy of cyclical economy against the linearity model. That is they should reach an uncompromised decision to engage in recycling their machineries or equipment instead of disposing them.
The authorities in the appropriate quarters should embrace the practice of disclosing their safety related measure or environmental protection promptly without deception and with due consideration to environmental protection policy.
Government should ensure that the implementation of extant tax laws especially around deferred tax provisions with a view to reducing the tax gap. Enactment and enforcement of laws on environmental protection and related disclosure has become necessary so as to reduce the tax gap.

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