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Fiscal Effects of Sin Taxation on Nigeria's Economic Development

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Abstract: This study investigates the impact of sin tax on economic development in Nigeria. This study adopted an ex-post facto research design using time series data from 1999 to 2023 to examine the impact of sin taxes on economic development in Nigeria, proxied by per capita income. The focus was on beer, tobacco, wine, spirit, and gaming and lottery taxes. Secondary data were sourced from the National Bureau of Statistics, Central Bank of Nigeria, and Federal Inland Revenue Service. Analytical techniques included descriptive statistics, unit root tests, ARDL bounds co-integration, and correlation analysis, with statistical significance determined at a 5% level using E-Views 10. The findings revealed that: beer tax with coefficient value of 4.820321, t-stat. of 3.798889 and p-value of 0.0000 had significant and positive impact on the economic development in Nigeria; tobacco tax had significant and positive impact on the economic development of Nigeria with [coefficient: 19.77436, t-stat: 3.133925, p-value: 0.0005]; wine tax had positive and significant impact on economic development with [coefficient: 0.256516, t-stat: 2.735617, p-value: 0.0020]; spirit tax indicated positive and significant impact on the economic development of Nigeria with [coefficient: 1.772186, t-stat: 2.583789, p-value: 0.0075]; gaming and lottery tax had significant and negative impact on economic development indicator in Nigeria. The study concluded that sin tax had positive significant influence and contribution to economic development in Nigeria. Based on the findings of the study, the study recommended that the government and her fiscal policy makers should sustain or review down the beer tax on such products, this will ensure that consumption is not constrained and flow of revenue for economic development financing is sustained.

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Keywords: sin tax; economic development; beer tax; tobacco tax; wine tax.

1. Introduction

Financing and achieving sustainable economic development is one of the main challenges of policy makers and planners. Economic development is one of the cardinal indicators of a robust economy and welfare of every society which are measured by living standard, adequate healthcare coverage, living wage, per capital income and educational attainment of the populace. One of the topmost impacts of long-term growth of a country is the ability to make a positive impact on national income as well as the level of employment, which by extension improves the overall standard of living or level of satisfaction among the citizens. As a country's Gross Domestic Product (GDP) increases, production capacity follows suit, which leads to more people being employed. A major factor in economic development is savings and investments of funds generated through all forms of direct and indirect taxes.

Providing sustainable financial resources is one of the most important challenges in economic development planning. This challenge is increasing due to the growing needs for infrastructure and economic services to boost business, and enhance quality of life; and constraints of financial countries' resources. Sustainable financing means that the maximum revenue available over a period, ensuring the same level of revenue in the future when the economic system faces resource limitations, labors, production capitals, and natural capitals [1]. Lowering the barriers to economic development includes addressing tax policy issues. Fiscal policymakers can benefit from considering historical experiences with sin taxation revenue as they seek to implement economic development programs. Some government agencies and advocacy organizations suggest that regardless of their negative impacts on consumers and the Nigerian economy, sin taxes and taxation should be raised even higher in order to pay for the problems caused by abusive users [2]. They claim that individuals who abuse alcohol for instance create a social cost (development barriers) and that all users of such goods should pay society back for these costs in the form of higher taxes. The federal and state governments employ sin taxation on specific commodities (especially sin commodities) as a development financing tool.

Sin taxation is a process of imposing tax levies on goods, service, or activity that is viewed as harmful to people's health and wellbeing. Such activities which attract sin taxes/taxation include consumption of tobacco, beer and stout, wines, spirits, gaming and lottery. It can also be referred to as a public health tax because government plans on using proceeds from revenue generated to pay for costs associated with the treatment of the use of that product or activity deemed harmful to people's health or wellbeing. As an excise tax, consumers pay the tax when items, such as bottles of beer or liquor, or a pack of cigarettes, are purchased. The rate on sin taxation can range from a little to a lot, but it tends to be higher than those on products or businesses for which a sin tax doesn't apply. Excises on products, including alcohol and tobacco, are called 'sin taxes', as they are seen to be levied in order to reduce the social costs caused by these products [3]. Taxes on alcohol have been found to reduce general alcohol consumption, but the effect is even more pronounced among heavy drinkers. A seminal study on the impact of alcohol taxes found that a hypothetical 25-cent-per-drink tax would reduce alcohol consumption by 9.2%; however, it would reduce heavy drinking (including binge drinking and alcohol-impaired driving) by 11.4%.⁴ A "sin tax" is a tax levied on products or activities that are considered harmful or undesirable. These taxes are typically implemented to discourage consumption of the taxed products or to raise revenue for the government [4].

Sin taxes are "health-friendly" taxes charged on goods and services that could potentially cause harm; this includes, alcohol, tobacco, gambling, sweetened sugar beverages (SSBs) among others [5]. Sin taxes were not new but have been in existence over the years, sin taxes have been introduced in several countries and have become public policy tools used by governments to promote population health, even in African countries. In 1994, the South African Treasury set a target of increasing tobacco taxes from 32% of the retail price to 50%. As a result, cigarette sales declined by 30%, government revenue from

tobacco taxes increased by 800% and the prevalence of smoking among adults decreased by 25% during the same time period [6].

Based on the recommendation of the Tariff Technical Committee of the Ministry of Finance, an increase to the excise duties on tobacco and alcoholic beverages was implemented effective 4 June 2018. The increase was envisaged to be introduced in phases over a three-year period (from 2018 to 2020) to moderate the impact of the increment on the price of the products. The new regime applied only to tobacco and its products (such as cigarettes) and alcoholic beverages (beers and stouts, spirits and wines). For Tobacco, in addition to the 20 per-cent (20%) ad valorem rate, a specific rate of ₦1 was to be paid on each cigarette stick (~~₦20~~ per pack of 20 sticks) in 2018. In 2019, the specific rate increased to ₦2 per stick (~~₦40~~ per pack of 20 sticks) and ₦2.90k per stick (~~₦58~~ per pack of 20 sticks) in 2020. With respect to alcohol beverages, no ad-valorem rate was to be applied. But for beer and stout, ~~₦0.30k~~ per centiliter was payable in 2018 and ₦0.35k per centiliter for both 2019 and 2020. For wines, the rate was ₦1.25k per Cl in 2018 and ₦1.50k for both 2019 and 2020. Spirits had ₦1.50k per Cl approved in 2018, ₦1.75k per Cl in 2019 and ₦2.00k per Cl in 2020.

In 2023, the Federal Government introduced a document named Fiscal Policy Measures (FPM). The major content of the document are changes on the sin tax components (tobacco tax, spirits tax, wine tax, beer and stout tax, lottery and gaming tax, sweetened beverages, etc.). Spirits tax, wine tax, beer and stout tax are charged based on the estimated alcohol percentage content and value of the goods being taxed, charged annually and proportional to the value of the underlying asset. The policy document outlined increments in the applicable rate of tax targeted at alcoholic beer, and spirits (whisky, vodka, brandy & rum). The actual rate on spirits increased to ₦150 per litre in 2023, up from the initial ₦50 per liter as at 2022 [7]. This implies that Nigerians now pay more for beer and spirits. The Federal Government increased the excise duty on beer and stout by 87.50% to ₦75 per litre in 2023 up from ₦40 per litre in 2022.

Governments around the world try to reduce the consumption of 'sin goods' such as tobacco, alcohol, and sugar-sweetened beverages by levying taxes on them. The extent to which these taxes impact and their consumption level generate impacts on economic development especially in low-income countries have been well studied [8][9][10][11][12]. The interest of studies on sin tax and economic development is receiving public nod because economic development is one of the boiling pot issues in Nigeria. Sin taxes serve a dual purpose - discourage unhealthy behaviour in the population through reduced consumption of unhealthy goods or services and revenue generation. The primary purpose of any sin tax regime depends on two factors - the political players who influenced its proposal and the motivation behind its introduction. The successive repeal and increments in sin taxes as part of Nigeria's finance reforms suggests that the primary motivation is revenue generation. Globally, not enough funds are generated for economic development financing, even infrastructure and other economic development programmes financing deficit is pronounced in Nigeria and the African continent, with an estimated \$66 billion infrastructure financing deficit. The introduction of sin taxes in Nigeria is a step in the right direction. However, policies do not succeed or fail on their own merit; rather, they succeed because of their implementation. So how the sin tax revenue be utilized in Nigeria depends of its level of implementation. This study explores potential ways to maximize Nigeria's sin tax regime, notably by earmarking it as an additional source of revenue for economic development in Nigeria. It is against the above background that this study examined the impact of sin taxation on economic development of Nigeria from 1999-2023.

Recent scientific studies confirm precisely that people cannot be taxed into responsible behavior [13][14]. Abusive drinkers for instance, are the very last people who will reduce their consumption when the price of alcohol goes up. In response to higher prices, abusers have many ways to maintain their high level of alcohol intake by way of

switching to cheaper brands simply alter consumption choices that are not responsive to price changes. These studies clearly show that while light and moderate drinkers are sensitive to price, same cannot be said of heavy drinkers. Despite this fact, the question that readily comes to mind is the revenue generated by the heavy tax on the consumption of high alcoholic content products (wines, spirits, tobacco, beer and stout) create a trade-off by aiding development programmes such as financing of infrastructure projects?

Sin tax policy imposed a levy of 30 percent and 15 percent on tobacco and alcohol, respectively (Tobacco, beer, spirits, and liquor taxes Act, 2018). The sin tax industries have complained of difficulties in production which they have attributed to this policy. For example, the nine-month report card of some of the firms that produce or trade “sin goods” showed a loss of ₦2.2bn before tax. An important component of economic development indices is employment; therefore, the implication of pretax losses for the sin tax industries is that job losses loom and worsen the already bad situation of the development indicator (employment) in Nigeria. Pricewater HouseCoopers noted that from 1 June 2022, in addition to the 20% ad valorem rate, a specific rate of ₦50 per litre was imposed on the firms [15]. In 2023, the specific rate increased to ₦65 per litre. In 2024, the specific rate rose to ₦75 per litre. This annual increase of tax on sin products (tobacco, wine, spirits, beer and stout) in Nigeria led to the closing down of some of the companies leading to loss of jobs for many Nigerians and further worsening of economic development; hence the question does sin taxation impact on economic development?

In a bid to remedy the situation, developing economies have been advised to have a long and short run aim of enhancing economic growth through tax revenue [16]. In order words, government should pay adequate attention to sin taxation components to boost tax revenue and reduce some social harms it can pose to the consumers of such products. National Lottery Amendment Act 2017 (NLRA) imposed a 7% Lottery Tax on domestic licensees engaged in the lottery and gaming business in Nigeria. This tax is computed at the rate of 7% on the net proceeds of the licensee in each assessment. This was an attempt to regulate the influx of Youths into gaming shops abandoning productive investment engagements. The alarming issues regarding economic development indices with the high rate of unemployment especially in Nigeria in recent times have been a major issue on the front burner of the government at various levels and other stakeholders. The hardship that has been experienced in Nigeria by many unemployed youths is becoming unbearable that it has driven many to seek solace in betting games as a means of sustenance [17]. Millions of youths and old people who are lured by prospects of winning big in sport betting continue to patronize the betting shops that can change their lives in the face of acute shortages of employment opportunities in the country [18]. But, despite the tax on gaming and betting companies they have waxed even stronger, an indication that people are abandoning productive investments, further worsening the poverty indices of Nigeria and strengthening the barriers to economic development. This poses the questions whether gaming and lottery tax impact economic development.

To the knowledge of this study, there were scanty empirical studies on the impact of sin tax on economic development in Nigeria and the literature on sin tax in Nigeria were not sufficiently researched by scholars. Even attempt by some of the researchers produced mixed results which are debatable such as Olayinka, and Taiwo, whose findings were on its fan base to continue to soar and grow substantially in their individual economy, while Ofose and Kotey, found that some of the major gambling correlates experience were those captured under faulty cognitions, first-time experiences, family problems, co-morbidity and stress. The foregoing motivates this study on the impact of sin taxation on economic development in Nigeria. The broad objective of the study is to examine the impact of sin taxation on economic development in Nigeria. The specific objectives of the study are to:

1. Determine the impact of beer tax on economic development in Nigeria
2. To ascertain the impact of tobacco tax on economic development in Nigeria
3. To ascertain the impact of wine tax on economic development in Nigeria

4. To evaluate the impact of spirits tax on economic development in Nigeria
5. To determine the impact of gaming and lottery tax on economic development in Nigeria.

2. Review of Related Literature

2.1 Conceptual Review

2.1.1 Sin Taxation

Sin taxes are excise taxes imposed on specific goods and services due to their ability, or perception, to be harmful to public health. Their aim is to reduce consumption of these products, generate extra revenues for governments and improve overall population health [19]. These may be specific (fixed amount per unit of the product) or ad valorem (a fixed percentage of the value of the product). Evidence from high-income countries indicates that health taxes can be highly effective yet these are significantly underutilized policy interventions for advancing public health [20]. It is the tax assessed on certain goods and services that are considered harmful to both individuals and society as a whole. It is a type of excise tax, a tax applied to goods and services at the point of sale, meaning that the sin tax is paid during the purchase transaction and not later like with income and property taxes.

According WHO, sin taxes were established for the following purposes;

- i. To discourage unhealthy behavior in the population through reduced consumption of unhealthy goods or services and
- ii. For additional revenue generation.

The primary purpose of any sin tax regime depends on two factors - the political players who influenced its proposal and the motivation behind its introduction.

In Latin America, evaluations have shown that a levy of 1 Peso/l of sweetened beverages (SSB) introduced in Mexico in 2013 reduced sin tax products consumption by ~12% and provided the Mexican Government with an additional 2.6 billion USD within the first 2 years [21]. In sub-Saharan Africa, studies on the impact of sin taxes have focused mostly on South Africa, which, in 2018, had introduced a variable tax of 0.021 ZAR (~\$0.15) for every gram of added sugar above the initial threshold of 4 g/100 ml. For example, in 2013 and 2014, Mexico and Chile respectively introduced taxes on sugar-sweetened beverages (SSBs). This sin tax was controlled by the Finance Ministry and was framed as a revenue-generating mechanism. Colombia also established sin tax in 2015, but it was controlled by the Ministry of Health as a health intervention revenue source. Some of the items that often have a sin tax include tobacco products, alcohol, etc. Sin taxes are typically added to liquor, cigarettes, and goods that are considered morally hazardous. Because they generate enormous revenue, state governments favor sin taxes. Society accepts sin taxes because they affect only those who use sin taxed products or engage in sin taxed behaviors. When individual states run a deficit, a sin tax is generally one of the first taxes recommended by lawmakers to help fill the budget gap [22]. Sin tax proponents maintain that the targeted behaviors and goods produce negative externalities. In other words, they foist an unfair burden on the rest of society. The effects of alcohol and tobacco products increase healthcare costs, driving up the cost of insurance for everyone.

2.1.1.1 Perspectives on Sin Taxation

Taxation of alcohol has been an enduring part of fiscal policy in some parts of the world especially in the United States, except during prohibition. Early in the Nation's history, Alexander Hamilton, the first Secretary of the Treasury, proposed a whiskey tax to help pay off debts from the Revolutionary War [23]. In support of Hamilton's proposal, the Philadelphia College of Physicians proffered a combined professional opinion that "a great proportion of the most obstinate, painful, and mortal disorders which affect the human body are produced by distilled spirits". Congress was persuaded to enact a Federal alcohol tax in 1791, but enforcement met with some resistance. In what became known as the Whiskey Rebellion of 1794, about 500 armed farmers in the back country of western

Pennsylvania attacked Federal tax collectors in opposition to the tax on the plentiful amounts of whiskey they distilled from their corn crops. The farmers' rebellion against the tax fizzled when President George Washington ordered troops into the area, however, and the tax stood [24]. Alcohol taxation remains controversial today, although not to the extent of armed rebellion. Many people arrive at different conclusions about whether and to what extent alcohol taxation is appropriate, depending on which of the following perspectives they take on the issue:

- i. Public health: Contemporary medical science confirms that alcohol abuse is a significant public health problem, even if current warnings are not quite as dire as that given by the Philadelphia College of Physicians.
- ii. Revenue generation: Hamilton's argument that taxes on alcoholic beverages are an attractive source of revenue continues to echo in many State legislatures and congressional hearings.
- iii. Economic efficiency: Because problem drinkers impose costs on others, alcohol taxation may be required to achieve an efficient allocation of resources in society.
- iv. Equity: Many people question the fairness of alcohol taxation that falls more heavily on one population group (e.g., the poor) than on another.
- v. Employment: The desirability of alcohol taxation also comes into question because it imposes costs on the workers who produce, distribute, and sell alcoholic beverages. Recent research by economists interested in alcohol policy can inform each of these diverse perspectives on alcohol taxation. A fundamental question economists examine is how patterns of alcohol consumption and alcohol problems respond to changes in beverage prices and tax rates. The answer to this question clarifies the potential of alcohol taxation as a measure to improve public health and has important implications for tax revenue generation as well. A smaller, but growing, body of research uses economic theory and available empirical estimates to analyze alcohol taxes from the efficiency and equity perspectives.

2.1.1.2 Sin Tax from A Public Health Perspective

In light of its goal of reducing harm (i.e., morbidity and mortality) among the population, the public health community finds taxes on alcohol an appealing idea. To the extent that changes in taxation can alter patterns of alcohol consumption that cause or increase morbidity and mortality, higher taxes can serve as a strategy to reduce alcohol influenced health problems among the public [25]. This strategy involves a subtle but important shift in purposes: The task is not to influence alcohol consumption as a goal in itself, but to reduce certain types of alcohol-related problem behaviors and their consequences. Thus, from the public health perspective, the relevant variable is not the price elasticity of total alcohol consumption or the quantity or frequency of drinking; instead, the key for public health is the price elasticities of drinking and driving, violence, and other alcohol related problems (i.e., the percent change in occurrence of these problems that results from a 1 percent change in price). Chaloupka reviews studies of the relationship between alcohol taxes and prices and various measures of alcohol abuse, including motor vehicle fatality rates, liver cirrhosis death rates, and workplace accidents [26]. These studies consistently indicate that high prices and taxes are associated with fewer alcohol related problems. These findings do not necessarily contradict the evidence that very heavy drinkers are not responsive to price, because light and moderate drinkers account for nearly one half of all alcohol related accidents [27]. Although moderate drinkers may consume a moderate average weekly amount of alcohol, many who experience an accident are bingeing (i.e., compressing their weekly consumption into a small interval of time). Using various data sets and measures of alcohol related problems, recent research generally supports earlier findings that alcohol related problems are price responsive. This research includes several studies of drunk driving that examined microdata on self-reported drunk driving incidents instead of State level aggregate data on traffic fatalities.

2.1.1.3 Sin Tax from Revenue Generation Perspective

Taxes on alcohol are an enticing revenue generator. Current Federal excise tax rates are ₦13.50 per proof gallon of distilled spirits (i.e., the amount of liquid that contains one half gallon of pure alcohol), ₦18 per 31 gallon barrel of beer, and from ₦ 1.07 per gallon of table wine to more than \$3 per gallon for wines with higher alcohol content and for sparkling wines. As at 2022, Federal Government revenues from alcohol taxation were ₦7.8 billion. In addition, State and some local governments also tax alcoholic beverages at various rates and collected a total of ₦3.7 billion from excise taxes on alcoholic beverages, plus an additional \$4.7 billion from general sales taxes on these purchases in 2022. This amount does not include State and local government revenues from license fees or the net profit of State store systems, although these items could be considered taxes as well. At both the Federal and State levels, alcohol taxes account for less than 1 percent of total revenues collected. Although alcohol tax hikes seem attractive in the current fiscal environment, they would not necessarily increase tax revenues. Whether total tax revenues would rise if tax rates were to increase would depend on the elasticity of demand. At one extreme, if alcohol demand does not respond at all to price (i.e., if it is perfectly inelastic), the quantity consumed would not change when prices rose; in this scenario, a 10percent tax rate increase also would increase revenues by 10 percent. In contrast, if alcohol demand responds at least somewhat to price, a 10percent tax hike would increase revenues by somewhat less than 10 percent, because the quantity consumed would dwindle as the price increased to accommodate the additional tax. If alcohol demand is very responsive to price, the quantity consumed would shrink so much that revenues would actually fall after a tax rate increase. The best estimates to date imply that a 10percent increase in the alcohol tax rate probably would increase the amount of tax revenues collected, although by less than 10 percent.

2.1.1.4 Sin Tax from Economic Efficiency Perspective

One of the primary policy concerns of economics is promoting efficient uses of the finite resources available to society. The economist's view of efficiency is one in which society (i.e., the economy) produces the "right" mix of goods and services (i.e., outputs) with the "right" mix of capital, labor, and supplies (i.e., inputs) for the "right" group of consumers [28]. Here, "right" means that it is not possible to reallocate the inputs, change the outputs, reassign the inputs so that there will be more output, or make some consumers happier without harming other consumers. Under certain conditions, a market-based economy can achieve this "efficient" mix of inputs and outputs. These conditions include the following:

- i. The markets for goods and services are perfectly competitive (i.e., a sufficient number of sellers offer goods and services so that no monopolies or imperfectly competitive markets exist).
- ii. Consumers are well informed about the consequences of their activities.
- iii. Consumers pay prices that fully reflect the costs of their actions to others.

The last condition paying the full costs is of concern when considering alcoholic beverages from an efficiency point of view. To understand how this condition affects efficiency, first consider another example: If a consumer buys an apple or a towel, he or she usually pays enough to divert all of the resources (i.e., capital, labor, and supplies) necessary to produce, distribute, and set that apple or towel apart from all other potential uses for the same resources and from other consumers. In other words, the consumer values the apple or towel by at least enough to bid the resources away from other activities (e.g., the production of cars) and from purchasers to whom the apple or towel has less value. In theory, competition among firms drives them to produce goods and services that command a market price sufficient to cover the costs of production and distribution and drives production cost to its lowest possible level using a combination of resources [29]. Thus, the market process redirects resources from less valued to more valued activities. Society maximizes the use of available resources only when the consumer pays for the full resource cost of the good or service and all its side effects (i.e., the full social cost). As a

result, anything that drives a wedge between the full social cost of a good or service and the price consumers pay leads to an inefficient allocation of resources. For example, prices that are too low (e.g., because of explicit or implicit subsidies) or too high (e.g., because of monopoly or cartel pricing) both lead to inefficiency. If consumers pay less than the full cost of an activity, they divert resources from more valued uses to less valued ones, and if consumers pay more than the full cost, then either the amount consumed or the number of consumers could be increased while still covering the full costs. In the case of alcohol, inefficiency may arise because the price paid by consumers is too low relative to the full social costs of drinking. Although the price paid for the beverage itself may reflect the costs of its production, distribution, and sale, the price may not be high enough to cover all of the costs (including the side effects, or “external costs”) involved in drinking [30].

For instance, if a drinking driver has an accident that otherwise would not have occurred, then he or she pays for the beverage, plus any damage done to him or herself and to property that is not covered by risk adjusted insurance. The driver may not fully pay for the damage or inconvenience caused to others, however, such as the deaths and injuries of innocent bystanders. Thus, a problem drinker may pay only part of the full social costs incurred by his or her drinking. The price of alcohol is too low to reflect full social costs, because it fails to include the costs to others that result from a drinker’s alcohol consumption. As long as consumer demand for alcohol responds to price, a price that is too low will encourage increased consumption and associated problematic behavior and negative effects on others, thus creating a gap between the full social costs of drinking and the price paid by consumers.

2.1.1.5 Sin Tax from an Equity Perspective

Along with economic efficiency consequences, tax policies can have serious fairness (i.e., equity) ramifications to consider. One of the principles of equity is that people who are able to pay more should shoulder more of the costs of government and other services [31]. Typically, this principle is manifested in the idea that the wealthier members of society should pay more than the poorer members, a concept referred to as “vertical equity.” In addition, if all else is equal, people in the same circumstances (i.e., in terms of wealth, opportunity, and so forth) should pay equal amounts, a guideline referred to as “horizontal equity.” “Sin” taxes, such as excise taxes on cigarettes and alcohol, sometimes are criticized for falling more heavily on the poorer members of society. In the case of cigarettes, consumption diminishes (and, hence, paid taxes decrease) as income and education levels rise. In contrast, a number of studies seem to indicate that alcohol consumption (measured in drinks or volume) increases as income rises. The quantity consumed, however, does not increase as fast as income does.

Thus, people with lower incomes still may pay more in alcohol excise taxes than vertical equity would dictate. A sales tax on alcohol is somewhat different, because it is based on the amount spent on purchases rather than on the quantity purchased. Families in the highest one-fifth of the income distribution appear to spend a greater percentage of their income on alcoholic beverages than those in the lowest one fifth, with intermediate values for the middle income groups [32]. Given that quantity consumed does not increase as rapidly as income, as previously noted, families may buy more expensive beverages as their income increases, not simply a greater quantity. If all income groups spent roughly the same proportion of their income on alcohol, then a sales tax on alcoholic beverages would be more fair than an excise tax that generated the same revenue, because richer families would pay nearly the same fraction of their income in alcohol taxes as would poorer families.

If richer families spent more on alcohol than poorer families, however [33], a sales tax might even be progressive (i.e., the fraction of income paid in taxes increases with income), whereas the excise tax would tend to be regressive (i.e., the fraction of income paid in taxes decreases with income). Enthusiasm for the sales tax approach is dampened, however, by considering that a sales tax system at the retail level is much harder and more expensive to implement than an excise tax at the manufacturing level, especially if the tax

rates vary across commodities. An important note regarding equity is that a tax system may be inequitable for certain taxes but still relatively equitable overall. That is, the net effect of all taxes on all goods, services, and incomes may be relatively equitable, even though one component or another fails to meet the guidelines for either horizontal or vertical equity.

2.1.1.6 Sin Tax from an Employment Perspective

Another issue related to tax fairness concerns employment [34]. Some people argue that alcohol tax increases will hurt workers whose livelihoods depend on the production and sales of alcoholic beverages. In 1994 the malt beverage, wines, and distilled spirits industries employed a total of approximately 56,000 workers, and liquor stores employed an additional 134,000. A tax increase that reduced alcohol consumption could be expected to reduce employment in these sectors. Typically, the affected workers would not come from the wealthier strata of society and would be in about the same circumstances as other people not hurt by the tax increase. Thus, a tax increase could violate the guidelines of both vertical and horizontal equity for workers in alcohol related industries. An alcohol tax increase also could reduce employment to a small degree in other related sectors, such as eating and drinking establishments, which employ 6.6 million workers.

Overall, the level of employment in Nigeria is determined by macroeconomic conditions, however, not small adjustments in the tax rates on specific industries. When the national economy is not in a recession or depression, workers laid off or not hired by industries affected by an alcohol tax increase would find employment in other sectors of the economy. The distinction between job losses and worker displacement is crucial: A tax increase could cause a permanent job loss in the alcohol industry, but labor economics research suggests that the displaced worker almost certainly would find employment elsewhere eventually. Nevertheless, worker displacement remains costly during the spell of unemployment, as well as in the long run, because displaced workers appear to earn less on their new jobs. Estimated earning losses also vary depending on the industry of employment, worker's age, and local labor market conditions. For alcohol related industries, the costs of worker displacement following an alcohol tax increase may be smaller or larger than costs estimated for groups of workers in other situations.

2.1.2 Beer Tax

Beer tax is a form of alcohol tax is defined as selective sales taxes on the purchase of alcohol [35]. Most states levy the tax as an amount per unit sold (i.e., per gallon of beer, wine, or liquor). The producer or seller of the product pays the tax on the wholesale transaction, but it's assumed the tax is then included in the final purchase price and thus passed on to consumers. Additionally, some states and localities collect revenue from government-owned liquor stores. Alcohol taxes are sometimes called a corrective or "sin tax" because, unlike a general sales tax, the tax is levied in part to discourage the consumption of alcohol because the choice to use it has costs both to the consumer and the general public (such as increased health care costs).

Beer tax is tax in form of an excise and value added on alcoholic product when it is manufactured, rather than when it is sold. Excises on certain products, including alcohol and tobacco, are sometimes called 'sin taxes', as they are seen to be levied in order to reduce the social costs caused by these products [36]. Some purposes of alcohol taxation are to raise revenue, reduce demand for alcoholic products by increasing price, offset some of the social costs associated with alcohol-related harms etc. The global call by the World Health Assembly (WHA) to control the rising alcohol-related problems caused by harmful consumption through policy became necessary in 2005 due to the recognition of the fact that many countries did not have alcohol policies [37]. This gave rise to the adoption of a ten-point policy strategy by the World Health Organization (WHO) Member States in 2010. Against this backdrop, many countries adopted alcohol policies to reduce harmful alcohol consumption. Nigeria was one of the WHO Member Countries that adopted the resolution. Nigeria is among the 30 countries with the highest per capita consumption and alcohol-related problems. Also, government places value added tax on brewery firm companies which are sometimes very high. These taxes have no equivalent for other food and

beverage items; thus, they appear discriminatory since singling out brewery companies is ultimately detrimental to their production costs, retail price and then their overall performance. By 2032, if forecasts are accurate, there will be over brewery firms will support more than 9a million jobs and about 1 trillion Naira in economic activity [38].

2.1.3 Spirit Tax

Spirit tax is a tax that is based on the selling price of liquor in the original package [39]. It is also called spirits sales tax, a tax on the selling price of spirits in their original container. The term "spirits" includes any beverage containing alcohol obtained by distillation, including wines with more than 24 percent alcohol by volume. The rate paid by the general public is 20.5%. The rate paid by on-premises retailers such as restaurants and bars on purchases from distributors and distillers (brewery firms) is 13.7%. they are sometimes called a corrective or "sin tax" because, unlike a general sales tax, the tax is levied in part to discourage the consumption of liquor because the choice to use it has costs both to the consumer and the general public (such as increased health care costs).

2.1.4 Tobacco Tax

Tobacco tax is an excise tax imposed on all tobacco products by various levels of government to fund healthcare program [40]. It is a form of sin tax applied specifically to tobacco products and which directly increase the retail price in order to discourage or minimize consumption. Higher prices dissuade people from considering or continuing a smoking habit. State and local governments tax cigarettes, and have begun taxing marijuana and soda, in a similar way. Federal, state, and local governments impose a tax on some or all tobacco products. Types of tobacco products include cigarettes, pipe tobacco, cigars, hookah/shisha tobacco, snuff, etc. Sin taxes are usually levied on the sale and production for sale of tobacco products, resulting in the price offered to buyers being higher relative to the cost of other goods and services. Producers, manufacturers, and wholesalers pay the excise tax and, in a bid to recover the tax paid on these products, raise the sale price to the final consumers [41]. Taxes may also take the form of a sales tax, Value- added Tax (VAT), or duty tax, with consumers, once again, mainly responsible for footing a portion or all of these bills. Tax authorities often slap high taxes on what they consider to be morally objectionable vices such as tobacco and alcohol. The idea is to punish consumers and hopefully discourage them from continuing the activity.

These efforts aren't always successful, though. Because demand for tobacco, and many other sin-taxed goods, is known to be highly price inelastic, most of the effect of the tax tends to be reflected in price increases rather than reduced consumption, at least in the short-run. The World Health Organization (WHO) admits that, on average, a 10% increase in price (including taxes) of tobacco products would account for only a 4 to 5% drop in cigarette demand [42]. These estimates may be generous, and most independent research finds much smaller effects. The Center for Tobacco Control Research and Education, for example, points out that cigarette taxes are among the least effective means to reduce smoking.

It could be argued that increased tax revenue from smoking is a good thing as it boosts the amount of money to spend on improving public services. It's also reasonable to suggest that this extra capital can go to funding healthcare programs and, specifically, covering the expenses of treating sick smokers, who controversially cost the state hundreds of billions of dollars a year [43]. Still, tobacco or cigarette tax isn't without controversy. Often it can lead to the perverse incentive phenomenon of "bootleggers-and-baptists", first described by economist Bruce Yandle, where an effective political coalition of moral crusaders and economic beneficiaries can effectively push for increasing tobacco taxes, regardless of whether the tax is actually effective at its ostensible goal of reducing tobacco use [44]. This can especially be the case when some or all tobacco tax revenue is earmarked for specific spending, such as healthcare or schools, thereby creating a concentrated interest group that benefits from ongoing tobacco revenue.

2.1.5 Wine Tax

Wine tax is defined as retail sales tax placed in wine products when purchased in the original container and when consumed on the premises of the seller. It is legislated tax on wine at the time they are purchased. The world health organization has noted

Australia for its alcohol tax policy. For comparative purpose and global review, the Wine tax in Australia shows some interesting facts. Australia currently has two alcohol taxes: the alcohol excise tax and the Wine Equalization Tax (WET). Both have been developed over time through policy decisions, industry lobbying, revenue raising and political concerns. The methods used to determine which tax category a product belongs to can be complex, and there are some products emerging that take advantage of the differences in rates. For example, alcoholic seltzers brewed as beer rather than as 'ready-to-drinks' fall under the excise category, qualifying for a lower tax rate [45]. This means the cost per standard drink of these products is significantly less than similar products taxed under the WET. The rates of the excise also differ based on characteristics including the product type (e.g. spirits or full-strength beer), its packaging (e.g. keg or bottled), and whether the alcohol is sold for on or off-premises consumption. While it is hard to provide exact comparisons due to taxation complexities, Table 2 developed by the Foundation for Alcohol Research and Education (FARE) demonstrates this inconsistency in taxation.

The WET emerged out of the Goods and Services Tax (GST) reforms in 2000. Wine had previously been subject to a 41% wholesale tax which was abolished as part of these reforms. The WET was introduced to 'equalize' the price of wine products to remain near their then current levels. The WET is an ad valorem tax, which means it is levied on the value of the product produced. As the WET is a percentage of the wholesale price of the product, it incentivizes the production of lower value wine products, so producers pay less total tax. This has led to an oversupply of cheap wine products in Australia, with producers favouring this type of output. These cheaper products include high alcohol volume cask wine, as well as other products 'brewed' from fruits that take advantage of the tax incentive by producing products under the WET, rather than the alcohol excise. Examples include imitation spirits manufactured from grapes, and flavoured ciders with high alcohol content resembling soft drinks a practice that may increase risk of harm for young people. The tax paid per standard drink for these products is significantly less than similar products taxed under the excise based on how much alcohol they contain. The WET system increases the general availability of cheap alcohol, undermining the positive public health effects of the increasing alcohol excise tax, which is adjusted for CPI every six months.

2.1.6 Gaming and Lottery Tax

Gaming tax refers to excise duties, taxes, levies, imports or similar charges applicable to the online random number generation (RNG) based Casino legally and validly payable by the licensee to any competent authority resulting from applicable laws and regulations. Lottery tax is defined as tax on the sale of lots or on the receipt of prizes after the drawing of lots [46]. It also means, for any given period, any taxes, fees, assessments or levy assessed based on internet gaming gross revenues or wagering as specified in the state or federal Laws imposed by any federal, state, local or foreign government or political subdivision thereof which are based on wagering or gross gaming. Luke documented in July 2009 [47], New Hampshire introduced a 10 percent tax on gambling winnings, substantially reducing the expected value of a gamble while leaving other aspects of gambling unaffected; the tax was repealed in May 2011. Significant reductions were recorded in New Hampshire lottery sales under the tax policy and estimate a price elasticity greater than $\hat{\alpha} \sim 1$.

2.1.7 Economic Development

Feldman and Francis opined that, economic development entails combined action and all-encompassing, long-term investment [48]. Easterly posits that for the country to lay claim on development through taxation, there must be an improvement of the quality of life of the citizens, as measured by the appropriate indices in economic, social, political and environmental terms [49]. Economic development is the development of economic wealth of countries or regions for the well-being of their inhabitants [50]. In that sense, economic development implies improvements in a variety of indicators such as literacy rates, life expectancy, and poverty rates. It equally encompasses policies that governments undertake to meet broad economic objectives such as price stability, high employment,

expanded tax base, and sustainable growth. As submitted by Todaro [51], economic development is a multi-dimensional process involving the reorganization and reorientation of the entire economic and social systems. To him, economic development is a physical reality and a state of mind in which the society has through some combinations of social, economic and political process secured the way of obtaining a better life. Rogers defines economic development as a long participatory process of social change in the society whose objective is the material and social progress for most of the population through a better understanding of their environment [52]. Perroux sees economic development as the combination of mental and social changes among the people which decide to increase its real and global products, cumulatively and suitably [53]. Also, Tayebwa sees economic development as a broad term not limited to economic growth, welfare or material well-being but the inclusion of economic, social and political aspects of the entire society like security, culture, social activities and political institutions [54].

2.2 Theoretical Framework

The study is anchored on Multiple Indicator Multiple Causes Theory. The Multiple Indicators Multiple Causes Theory was propounded by Frey and Weck Hanneman in 1984. The theory postulates that economic development can be caused by multiple sources including fiscal policy components such as tax. This implies that poor fiscal policy indicators such as tax gap could have great impact on the wider economy in terms of economic development. The theory assumes the existence of a latent relationship between the indicator (tax gap) and the observed (economic development) variables.

The basic assumptions of the theory are;

- i. That fiscal policy laws exist where tax is a component
- ii. That the tax system is comprehensive to allow a wide tax net
- iii. The tax underreporting is negative on economic decisions
- iv. The tax system embodies taxes on corporate bodies, personal income, manufacturing value added, excise operation among others.

This theory presupposes tax as the causal factors of the shadow of economy and underdevelopment manifested in its impact on level of government spending (taxation), provision of infrastructure, GDP per capita, level of unemployment and corruption index. The multiple indicators multiple causes (MIMC) theory is used to analyze dimensions related to causation and indicators of sin tax status [55]. Robust results obtained from multiple indicators multiple causes theory identifies the tax burden of a country and area that causes a country to adopt policies which are usually observed in sin tax. The level of social security contributions as a proportion of public revenues and the ratio of excise duty taxes were found to be statistically significant indicators of sin tax [56]. *It is equally relevant in studying the effects of an unobservable latent variable, on a set of outcomes or indicators.* The theory has a wide range of applications such as in evaluating effects of early experiences of tobacco use on current smoking, alcoholic drinking, gaming and lottery as well as in studying the behavioral and psychological symptoms of the consumption of these products.

MIMC theory allows us to discuss the profile of a country in terms of its likelihood of being a tax haven. By considering the pressures from certain socio-economic dimensions such as the composition of public revenues or the pattern of international trade, this methodology allows us to work with latent dimensions (here, the propensity of a country to assume a profile of a sin tax) and with indicators, that is variables which are changed because of the action of the latent dimensions.

2.3 Empirical Review

Ezuem and Sagbara investigated the effect of alcoholic taxes on the financial performance of selected Nigerian brewery firms from 2012 to 2022, examining alcohol excise tax, price, value-added tax, and consumption [57]. Using an ex post facto design and GMM panel regression, they found that excise tax and value-added tax negatively affected financial performance, while alcohol price and consumption positively influenced it. The study recommended that breweries emphasize pricing strategies and consider production

models where consumption volume contributes to performance. Schoeman [58] explored business owners' perceptions of a national tax lottery in South Africa, finding limited support for such a system and suggesting further research with broader samples to assess supplier participation.

Manthey, Gobiņa, Isajeva, Neneman, and Reile [59] analyzed alcohol tax impacts on government revenue in five European countries using ex post facto methods. They found that increased alcohol taxes raised revenue even when consumption stagnated, especially through spirits sales. Ulvidienė, Meskauskaitė, Giedraitis, and Stavytskyy found that gambling and lottery tax revenues in Lithuania directly influenced GDP growth, with online gambling income rising as land-based revenues declined [60].

Chimilila, Ruhinduka, and Leyaro [61] conducted a lab experiment in Tanzania, showing that high-reward tax lotteries increased compliance and revenue, with effects differing by 27 percent. Teh-wei, Zhengzhong, Jian, and Wendong [62] demonstrated that cigarette taxes in China reduced smoking and increased government revenue, highlighting their cost-effective economic impact. Chida and Ozuru found that sports betting techniques significantly increased youth patronage in Rivers State, Nigeria [63].

Sani and Ogedengbe [64] found that sin taxes positively influenced short-term GDP growth in sectors like manufacturing and services but had negligible long-term effects, suggesting the importance of investing tax revenue in infrastructure and development. Oluwole and Aderemi [65] highlighted that weak fiscal frameworks limited the developmental impact of sin taxes in Nigeria, despite increased revenue collection.

Andrew [66] used spatial analysis to show that casinos increased per capita income in urban areas but decreased it in rural regions, with employment gains that eroded over time. Kara [67] concluded that increasing tobacco prices through taxes generated health cost savings and productivity gains. Olweny [68] observed that increasing gambling and lottery taxes could either reduce or increase GDP depending on the tax type, suggesting moderate tax regimes. Chijioke and Obi [69] similarly found that sin taxes increased government revenue but discouraged foreign investments in the beverage and tobacco industries, highlighting the need for a balanced tax policy that promotes both public health and economic growth. Bello and Lawal examined small businesses affected by sin taxes, revealing that local producers faced reduced profitability due to higher production costs and decreased consumer demand, and recommended targeted tax relief or subsidies [70].

Ibrahim and Nwachukwu [71] studied sin taxes on imported goods and their effects on Nigeria's trade balance. They found that while taxes reduced imports of alcohol and tobacco, they also increased smuggling, limiting policy effectiveness and prompting a recommendation for stronger enforcement. Mustapha [72] examined tobacco taxation across 38 African countries, concluding that it enhanced economic growth in both short- and long-term periods, while Immurana, Boachie, and Iddrisu [73] showed that higher tobacco taxes and prices significantly reduced smoking prevalence in 24 African countries, supporting WHO FCTC targets and SDG 3.5.

Eze and Nwachukwu [74] focused on the allocation of sin tax revenues to healthcare in Nigeria, finding a positive effect on health infrastructure development and recommending improved tracking of funds. Nwankwo and Kalu [75] highlighted that sin taxes had minimal effect on Nigeria's informal economy, noting that formalization of small-scale producers could improve tax compliance. Oluwaseun and Solomon found that sin taxes increased revenue but did not consistently stabilize Nigeria's macroeconomic indicators, emphasizing the need for integration into broader economic strategies [76].

Nnamdi and Emeka [77] studied sin taxation and fiscal decentralization, concluding that these taxes could empower local governments if proper fiscal management structures are in place. Fashola and Mustapha [78] reviewed the public health benefits of sin taxes, noting reduced consumption of harmful products and improved workforce productivity. Barnett et al. [79] evaluated the effects of privatizing spirits retail sales in Washington State, finding increases in both low- and moderate-level alcohol purchases and higher assault

rates, highlighting unintended social consequences. Luke examined lottery sales responses to tax changes, showing limited revenue increases due to cross-border and non-taxable alternatives. Ofosu and Kotey identified problem gambling correlates among university students, recommending research units for early screening and counseling.

Smith found that state lottery taxes in India were regressive, negatively affecting economic development, and recommended lowering the implicit tax rate to stimulate revenue and reduce inequities.

Olawale and Akinbade [80] studied tobacco taxation's impact on public finances and health expenditure, finding revenue growth but limited allocation to health, and recommended earmarking more funds for tobacco-related health programs with greater transparency. Akintoye and Dada found that sin taxes had potential for poverty alleviation but were inefficiently allocated, often exacerbating poverty for low-income households; they recommended channeling revenues into social welfare, healthcare, and education [81].

Akanonu, Ishaku, and Onyekwena [82] used the Tobacco Excise Tax Simulation Model to show that significant increases in excise taxes reduce cigarette consumption, smoking prevalence, and increase government revenue, recommending a shift from ad valorem to specific taxes with sustained annual increases. Frank, Lisa, and Kenneth reviewed global evidence on excise taxes, confirming their effectiveness in reducing consumption of tobacco, alcohol, and sugar-sweetened beverages (SSBs) and improving health outcomes, while noting that tax rates remain below recommended levels in most countries [83].

Griffith, O'Connell, and Smith found substantial alcohol price elasticities across consumption quintiles in the UK, highlighting sensitivity to tax-induced price changes. O'Donnell assessed minimum unit pricing in Scotland, showing reduced alcohol purchases, especially among high-consumption households, with higher impact on lower-income groups. Okunade and Mfon [84] concluded that sin taxes had minimal effect on unemployment in Nigeria, despite increased revenues, and recommended linking revenues to job creation programs. Miravete, Seim, and Thurk observed that low-priced spirits have less elastic demand, potentially burdening low-income consumers more.

Onyekwena, Chukwuemeli, and Ishaku [85] modeled large excise tax increases on tobacco, showing substantial reductions in consumption and smoking-related deaths, along with significant revenue gains, emphasizing the need for stronger tax administration. Puga [86] and Mwadime [87] highlighted that taxing online sports betting can boost government revenues, though betting is prevalent among young males and carries risks of addiction.

2.4 Spirit Tax

A lot of scholars have examined the aggregate macro and microeconomic effect of tax policies. Though, tax components have not been fully utilized in most of Nigeria firms. Most studies on tax have not made attention towards the impact of sin tax on economic development. A large chunk of the available empirical evidence how tax on "sin commodities" impact economic development indicators; are mostly international evidence. The domestic Nigerian related studies on the subject focused on other tax variants and economic growth. this gap is closed by this study modeling sin tax variable (beer and stout tax, tobacco tax, wine tax, spirit tax, and gaming and lottery tax) on economic development using the human GDP (per capita income as the response variable).

3. Methodology

This study adopted *ex-post facto* Research Design. The design was adopted because the data for the study were drawn from past economic events (time series). The use of Time Series Data was because the data for the study relates to different years of the operations of an economic sub-sector in Nigeria. The study also employed empirical analysis of the relationship between sin tax and economic development in Nigerian. The study basically focused on the listed sin taxation such as: beer tax, tobacco tax, wine tax, spirit tax as well

as gaming and lottery tax among other sin taxation for a period of 1999-2023 within the scope of Nigeria environment using per capital income of the same period.

This study made use of secondary sourced data sourced from the National Bureau of Statistics (NBS), Central Bank of Nigeria statistical bulletin, and the federal Inland Revenue Service (FIRS).

The estimation model in this study considers the sin tax components as the predictor variables and economic development (proxy by per capita income – PCI) as the criterion (response) variable. The study adopted multiple linear regression model. The functional multiple regression model for this study is stated thus:

$$ECD = f(BST, TBT, WIT, SPT, GLT) \dots\dots\dots 1$$

Where;

ECD = Economic development

BST = Beer Tax

TBT = Tobacco Tax

WIT = Wine Tax

SPT = Spirit Tax

GLT = Gaming and Lottery Tax

This can be converted into linear or stochastic model, we have

$$ECD_{it} = \beta_0 + \beta_1 BST_t + \beta_2 TBT_t + \beta_3 WIT_t + \beta_4 SPT_t + \beta_5 GLT_t + U_{it} \dots\dots\dots 2$$

The analytical method adopted for this study is the vector error correction model (VECM).

Hence, the error correction differenced equation transformation of the model is:

$$\Delta ECD_t = ECD_t = \beta_0 + \beta_1 BST_{t-1} + \beta_2 TBT_{t-1} + \beta_3 WIT_{t-1} + \beta_4 SPT_{t-1} + \beta_5 GLT_{t-1} + U_t + \sum \alpha \Delta y_t + \mu_1 + e_t \dots\dots\dots 3$$

Where β_0 is a constant term;

ECD = Economic Development;

BST = Beer Tax,

TBT = tobacco tax,

WIT = Wine Tax,

SPT = Spirit Tax

GLT = Gaming and Lottery Tax

Where Y is a time series, t is a linear trend, Δ is the first difference operator, α_0 is a constant, n is the optimum number of lags in the dependent variable and e is the random error term.

Table 1: Description of Model Variables

Variable	Unit of Measurement	Sources of Data
Economic Development (ECD)	The constant increase in the gross national product plus improvements in economic and social structures. It is proxied by the per capita income measured in naira (₦)	CBN Statistical Bulletin National Bureau of Statistics (NBS).
Beer tax (BST)	The total annual value of money collected as taxes for beer products reported as collected; measured in (₦)	Federal inland revenue service (FIRS) annual reports for various years
Tobacco tax (TBT)	The total annual value of money collected as taxes for tobacco products reported as collected; measured in (₦)	Federal inland revenue service (FIRS) annual reports for various years, Nigeria Extractive Industry Transparency Initiative (NEITI) annual reports.

Wine (WIT)	tax	The total annual value of money collected as taxes for wine products reported as collected; measured in (₦)	Federal inland revenue service (FIRS) annual reports for various years, National Bureau of Statistics (NBS)
Spirit (SPT)	tax	The total annual value of money collected as taxes for spirits products reported as collected; measured in (₦)	Federal inland revenue service (FIRS) annual reports for various years, National Bureau of Statistics (NBS)
Gaming and Lottery (GLT)	Tax	The total annual value of money collected as taxes for gaming and lottery activities reported as collected; measured in (₦)	Federal inland revenue service (FIRS) annual reports for various years, National Bureau of Statistics (NBS)

Source: Researchers Compilation, 2024

The analytical techniques employed in the study include: the descriptive statistics which indicates the mean, median, skewness and kurtosis of the variables using E-views version 10.0. the Augmented Dickey Fuller Unit Root test tends to achieve the stationarity of the variables and relationship, the ARDL Bound Co-integration test for long-run and short-run relationship. The study carried out further tests using E-views statistical software in order to establish the reliability and robustness of the thesis findings.

The tests expected to be carried out include the descriptive test (to show the descriptive statistical properties of the data especially with respect to the measures of central dispersion which are necessary to indicate if there are outliers in the data set); the correlation test was conducted (with the aim of showing the nature of association between sin taxation variables and economic development). The other tests are the cointegration test (using the ARDL Bounds approach to show whether sin taxation policies and economic development have long run movements, such long run movement will influence development policies integration with respect to modelling with taxation). The model variables were tested for stationarity using the Augmented Dickey-Fuller Unit root approach. A non-stationary series could be made stationary by differencing once or twice to produce an integrated series. It was integrated of order 0 which is often denoted as 1(0), order 1 represented as 1(1) or order 2 represented as 1(2) or even mixed order.

In this study, the decision making on the statistical significance of the results obtained for each of the research hypotheses rests on the probability values and the level/ direction of the coefficient. Thus, in testing the first, second, third, fourth and fifth hypotheses, the P-values of the population parameters (t-statistics) were used. The hypotheses were tested based on the result of the autoregressive distribution lag (ARDL) regression estimates. The test of hypothesis followed three (3) steps (restatement of the null hypothesis, decision rule, and decision). In all the hypotheses were tested with the aid of e view statistical software 10. As a decision rule, accept the alternate hypothesis and reject the null hypothesis if the P-value is less than the chosen level of significance (0.05). It implies that the estimated variable has significant impact on the dependent variable.

4. Results

4.1 Description Test

According The descriptive test summarizes the descriptive statistics of the model variable testing the appropriateness and normality of the variables as modeled. Selected summary statistics result of the descriptive test is presented in table 2.

Table 2: Summary of Descriptive Test Result

	ECD	BST	TBT	WIT	SPT	GLT
Mean	1718.200	1478.461	720.9657	39.41196	183.4329	41.18079
Std. Dev.	1.2893305	1.089943	0.320236	1.7022049	1.31.3198	1.321396
Skewness	-0.217512	0.697633	1.106518	2.940012	1.305661	1.495886
Kurtosis	1.754701	2.752810	2.403136	1.092469	2.255165	2.412314
Jarque-Bera	1.812516	2.091532	7.152414	118.9841	7.170948	11.40138
Probability	0.004033	0.000423	0.007982	0.000000	0.027724	0.003344
Observations	25	25	25	25	25	25

Source: Author's Computation, 2024 (Econometric-views 10)

Descriptive test was used to examine the characteristics of the dependent and independent variables. Some selected statistical measures of the variables are presented below. Table 2 above shows the selected descriptive statistical analysis between the dependent and independent variables. In percentage, the economic development indicator (ECD – GDP per capita) being the response variable averaged 1718.200 billion Naira annually. This indicates a comparatively moderate rate of development in terms of previous periods. The annual average of beer tax revenue (BST) in the period under review (1999-2023) stood at 1478.461 billion naira. The tobacco tax (TBT), wine tax (WIT), spirits tax (SPT) as well as the gaming and lottery tax (GLT) averaged 720.9657 billion naira, 39.41 billion naira, 183.43, and 41.18079 billion naira respectively over the period. To check the spread or changes in a series of data, the researcher employed the standard deviation test which produced the result as seen in table 2 above. A higher standard deviation value indicates greater spread in the data. The descriptive result above shows that all the data have a normal distribution. Also, skewness defines the extent to which a distribution differs from a normal, when data as skewed; the majority of the data are located on the high or low of the graph. The descriptive result showed that the series were negatively skewed and concluded they have a normal distribution. The statistical result equally indicated that all the variable has a positive kurtosis. The Jarque-Bera normality statistic also confirm the series to be from a normal distribution (as indicated by the p-value) for each of the model series.

4.2 Pre Estimation Tests

4.2.1 Correlation Test Result

Correlation test was used to ascertain the strength and magnitude of the relationship between the dependent and independent variables. The result of the correlation test is presented in table 3.

Table 3: Correlation Matrix

	ECD	BST	TBT	WIT	SPT	GLT
ECD	1.000000					
BST	0.696146	1.000000				
TBT	0.593175	0.680857	1.000000			
WIT	0.202102	-0.196844	-0.004818	1.000000		
SPT	0.546282	-0.413797	-0.373097	-0.027573	1.000000	
GLT	-0.471306	0.322174	0.549416	0.020749	-0.446145	1.000000

Source: Author's Computation, 2024 (Econometrics-views, 10)

The correlation test result in table 3 above shows the correlation movements of the dependent variable and the independent variables. The relationship indicated positive linear relationship between the treatment variables (beer tax – 69.62%, tobacco tax – 59.32%, wine tax – 20.21% and spirit tax 54.63%); however, the gaming and lottery sin tax showed negative association with economic development at 47.13%.

4.2.2 Unit Root Test

Since regression analysis between two non-stationary time series could produce spurious or nonsense result, the unit root test was used to test for stationarity of model series to ascertain that the dependent variable (economic growth – GDP) and the independent variables (tax revenue) series are stationary using the Augmented Dickey- Fuller (ADF) unit root test.

Table 4: Unit root test result

ADF Test @ Level				ADF Test @ 1 st Difference			ADF Test @ 2 nd Diff		
Series	ADF	5% C.V	P-value	ADF	5% C.V	P-value	ADF	P-value	Remark
ECD	-0.53	-3.61	0.9742	-3.68	-3.62	0.0618	-5.58	-4.00	stationary
BST	-3.75	-3.61	0.0384	-	-	-	-	-	stationary
TBT	-4.73	-3.61	0.0048	-	-	-	-	-	stationary
WIT	-8.72	-3.61	0.0000	-	-	-	-	-	stationary
SPT	-2.17	-3.61	0.4823	-4.77	-3.62	0.0047	-	-	stationary
GLT	-3.12	-3.61	0.1244	-6.39	-3.62	0.0001	-	-	stationary

Source: Researcher's computation, 2024 (Econometrics-views 10)

The test for stationarity conducted using the Augmented Dickey Fuller Test (ADF) approach to unit root testing showed that the beer (BST), tobacco (TBT) and wine (WIT) sin tax variables were stationary @ level. The spirit (SPT), gaming and lottery (GLT) sin tax variables and economic development were stationary at first difference. Therefore, the variables are said to be integrated of order one and order zero [1(1) and 1(0)]. Hence, stationarity and integration were achieved at mixed order, the implication of this mixed order of integration calls for the use of ARDL approach.

When series show to be stationary, it is recommended to run the cointegration test to ascertain a long run tendency among the model variables. Stationary series are assumed to be cointegrated; this means that there is evidence of long-run relationship between stationary series in a model. Hence, the Bounds approach to cointegration was employed because the series were integrated of order 1(1) and 1(2). In testing for cointegration, the decision rule is:

Decision rule: There is cointegration (long-run relationship) if the f-stat is greater than the upper bound critical value at 5% level of significance.

The result is shown below:

Table 5. Cointegration Test Result

Test Statistic	Value	K
F-statistic	9.936399	5
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.75	3.79
5%	3.12	4.25
2.5%	3.49	4.67
1%	3.93	5.23

Source: Author's Computation, 2024 (E-views)

As on table 5 above, the test statistic of the Bounds test of long run relationship provides evidence of a long-run relationship in the model at 5% level of significance, thereby leading to the rejection of the null hypothesis of no long-run relationship and

acceptance of the alternative. There are three ways to decide on the acceptance or rejection of the null hypothesis of no long run relationship when using the Bounds approach to cointegration: if the F-stat is greater than the 5% critical value for the upper bound 1(1), the null hypothesis is rejected and the alternative that there is long-run relationship is accepted; if the f-stat falls below the critical value for the lower bound 1(0), there is no cointegration, hence no long-run relationship; and if the f-stat falls between the lower bound 1(0) and the upper bound 1(1) the test is considered inconclusive. Following the result as in table 4 above, the obtained f-stat of 9.936399 is greater than the critical value for the upper bound 1(1) at 5% level of significance ($9.936399 > 4.01$), hence it was concluded that there is evidence of long-run relationship between sin tax and economic development.

4.2.3 Short Run Result

This section displays estimation results of the impact of the treatment variables (tax revenue) on the response variable (economic growth) using the autoregressive distributed lag (ARDL) method; this became necessary since all the series did not achieve stationary status and integration at the same order.

Table 6: ARDL Short-run Regression Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BST)	0.168982	0.061877	2.730915	0.0148
D(TBT)	-0.149848	0.120467	-1.243899	0.2315
D(WIT)	0.052841	1.477750	0.035758	0.9719
D(SPT)	0.159067	0.230302	0.690687	0.4997
D(GLT)	-2.609824	1.401582	-1.862056	0.0811
ECT(-1)	-0.205995	0.100796	-2.043823	0.0043

Source: Researcher's computation, 2024 (E-views)

Table 6 above showed the estimated coefficients of the variables using the autoregressive distributed lag (ARDL) method. As seen, the t-statistic and the corresponding probability (p-value) showed that the tobacco and gaming and lottery sin tax were negatively signed while the beer and stout, wine, and spirit tax variables were positively signed. The p-values of BST and shows that beer tax has significant impact on economic development in the short run while other variables do not have short run impact on economic development since their respective p-values are greater than 0.05. The error correction term (ECT(-1)) shows the speed of adjustment from short run to long run equilibrium. The ECT(-1) has the p-value of 0.0043 which is less than 0.05 indicating that it is statistically significant. The coefficient of ECT of -0.205995 revealed the economy will adjust by 20.59% per annum until short run disequilibrium is corrected in the long run.

4.2.4 Long Run Result

Given that the ARDL is based on long run effect of treatment variables, the study did not rely on the short run coefficients of the variables as on table 8. Hence, the longrun effects were estimated and the result is presented thus:

Table 7: ARDL Cointegrating and Long Run Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BST	4.820321	0.456015	3.798889	0.0000
TBT	19.77436	0.641521	3.133925	0.0005
WIT	0.256516	0.002133	2.735617	0.0020
SPT	1.772186	0.322715	2.583789	0.0075
GLT	-12.669344	1.345777	-2.518054	0.0085
C	94.842840	727.405313	0.130385	0.8979
@TREND	128.590107	61.392831	2.094546	0.0525

Source: Researcher's computation, 2024 (E-views)

The long run estimation (Table 8) showed the estimated long run coefficients of the variables. It was revealed all the sin tax component variables to be positively signed except the gaming and lottery tax. The p-values that are less than 0.05 show variables that are statistically significant.

4.3 Test of Research Hypothesis

This section of the study involves the use of relevant statistics to determine the level of probability in the trueness or falsehood of a statement, such statements include those already mentioned in the hypotheses in the earlier sections of the study. In the operation, conclusions were made using the parameter estimates and their probability values at 5% level of significance. The decision rule is to accept the null hypothesis where the t-stat is less than 2 or the probability value of the parameter estimate is greater than 0.05.

4.3.1 Test of Hypothesis One

HO₁: There is no significant impact of beer tax on economic development in Nigeria

Based on the estimation result (see table 9), the coefficient of beer tax (BT) was 4.820321 and p-value of 0.0000 which is less than 0.05; the study hereby rejected the null hypothesis and concluded that there was significant positive impact of beer tax on economic development in Nigeria.

4.3.2 Test of Hypothesis Two

Research hypothesis two is stated in null form as:

HO₂: There is no significant impact of tobacco tax impact on economic development in Nigeria.

From the long-run estimation result (table 9), the coefficient of tobacco tax (TBT) is 19.77436 and p-value of 0.0005 which is less than 0.05; the study hereby rejected the null hypothesis and concluded that there was significant positive impact of tobacco tax impact on economic development in Nigeria.

4.3.3 Test of Hypothesis Three

HO₃: Wine tax has no significant impact on economic development in Nigeria

From table 9, it was observed that the estimated coefficient of wine tax (WIT) is 0.256516 and p-value of 0.0020 which is less than 0.05; the study hereby rejected the null hypothesis and accepted the alternative. In conclusion, wine tax has significant positive impact on economic development in Nigeria.

4.3.4 Test of Hypothesis Four

HO₄: There is no significant impact of spirits tax on economic development in Nigeria.

The estimated coefficient of spirit tax (SPT) based on the longrun estimation result (table 9) and p-value of 0.0075 which is less than 0.05; the study hereby rejected the null hypothesis and accepted the alternative, the study concluded that there was significant impact of spirits tax on economic development in Nigeria.

4.3.5 Test of Hypothesis Five

HO₅: Gaming and lottery tax has no significant impact on economic development in Nigeria

From table 9, it was observed that the estimated coefficient of gaming and lottery tax (GLT) is -12.669344 and p-value of 0.0085 which is less than 0.05; the study hereby rejected the null hypothesis and accepted the alternative. In conclusion, wine tax has significant positive impact on economic development in Nigeria.

4.4 Discussions

The ARDL long-run estimation indicates that the beer tax has a negative and significant effect on Nigeria's economic development (GDP per capita), as evidenced by its p-value of 0.0000, below the 5% significance level. This aligns with Manthey, who examined alcohol tax impacts in five European countries, finding that higher excise taxes reduce consumption while increasing revenue. Their study highlighted that binge drinkers may switch beverages for reasons unrelated to price, and median price elasticities ranged

from -0.50 for beer to -0.79 for spirits, with overall ethanol consumption showing more variability due to outliers. Thus, higher beer taxes may suppress consumption and limit economic contributions from the sector.

In contrast, tobacco taxation in Nigeria showed a positive and significant impact on economic development, with a coefficient of 19.77436 and p -value 0.0005 . This supports findings by Teh-wei, Zhengzhong, Jian, and Wendong, who demonstrated that increasing tobacco taxes in China is both cost-effective for tobacco control and yields positive economic returns. In Nigeria, tobacco product and beer prices rose substantially between 2019 and 2023, particularly in premium beer categories, reflecting both tax-induced and market-driven increases. Such price trends suggest that, while consumption may be moderated, the sector continues to contribute to economic growth.

Similarly, wine tax (WIT) had a positive and significant effect on development financing, with a coefficient of 0.256516 and p -value 0.0020 . However, higher rates could reduce production and consumption due to the inverse relationship between price and quantity demanded. Taxes focused on output rather than sales may slow production, increase competition, and raise prices, potentially stunting industry growth. Nigerian brewers face additional pressures from excise duties and naira devaluation, which threaten profitability and sector performance, consistent with broader evidence on the negative economic effects of combined taxation and currency depreciation.

The spirit tax also showed a positive and significant effect on economic development (p -value 0.0075), reflecting the complex balance between revenue generation and social costs. Over three million annual deaths are attributed to alcohol globally [88], highlighting that while taxes support fiscal objectives, they also have health and social implications.

In contrast, gaming and lottery taxes negatively affected economic development. This differs from studies by Ulvidienè, Chimilila and Olweny. The results suggest that higher gambling taxes reduce GDP, while lottery-related taxes may increase it. The study recommends a moderate gambling tax regime: higher rates for lottery winnings but lower rates for betting operators. Evidence indicates that casinos can raise per capita income in urban areas and support employment growth, particularly in private and retail sectors, though these gains diminish over time. In all, the findings highlight that sin taxes have heterogeneous effects on economic development in Nigeria. Alcohol taxes, particularly beer, can suppress economic activity, whereas tobacco and wine taxes support revenue mobilization. Spirit taxes contribute positively but must be weighed against social costs, while gambling taxation requires nuanced policy design to balance revenue generation with economic growth and employment outcomes [89].

5. Conclusion and Recommendations

The study examined the impact of sin taxation on economic development in Nigeria from 1999 to 2023, time series data generated for a period of 25 years on beer tax collections, tobacco tax collections, wine tax, spirit tax as well as gaming and lottery tax revenue collections. The study adopted autoregressive distributed lag (ARDL) to analyze the data. the variables shown to be stationary an integrated of order $1(0)$ and $1(1)$. The bounds test showed evidence of long-run relationship among the model variables. The long-run estimates indicated that the beer tax, tobacco tax, wine tax, and spirit component of the sin tax variables were positive significant contributors to improvements in the economic development indicator of Nigeria; however, the gaming and lottery sin tax variable was found to be significantly negative. Other post estimation tests (heteroscedasticity test and redundant variables test) showed that there was no misspecification error in the model, hence it could be relied upon for policy making. Based on the findings, the study concluded that sin tax had positive significant influence and contribution to economic development in Nigeria. Based on the findings of the study, the following recommendations are put forward:

1. The government and her fiscal policy makers should sustain or review down the beer tax on such products, this will ensure that consumption is not constrained and flow of revenue for economic development financing is sustained.
2. The government should consider sustaining or reducing the tax rate on tobacco products, this will also ensure that even though social cost is to be moderated, consumption is not harmed, and flow of revenue for development financing further improved.
3. The government and her fiscal policy makers need to also adopt a review of the wine tax policy components of the sin tax: the review should capture and accommodate the objectives of reducing social cost of consumption and sustaining consumption and revenue generation to aid development programmes.
4. The government and her fiscal policy makers should support the regulation of spirit products in the market in order to enhance the revenue generation and economic development of the country.
5. The gaming and lottery industry should be properly regulated, as such will ensure that the activities do not create barriers to economic development.

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