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Treasury Single Account and Tax Revenue in Nigeria: Comparative Analysis of Pre- and Post-Implementation Periods

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ABSTRACT: This study investigates the impact of the Treasury Single Account (TSA) on tax revenue in Nigeria, specifically focusing on oil tax revenue (OTR) and non-oil tax revenue (NTR) across pre- and post-TSA implementation periods. Utilizing quarterly data from 2008 to 2022, the research employs both parametric and non-parametric statistical methods. The student's t-test analyzes changes in OTR, while the Mann-Whitney U test evaluates variations in NTR. Findings reveal a significant decline in OTR by 29.49% post-TSA, suggesting adverse effects of the policy on oil revenue. Conversely, NTR increased by 119.38% post-TSA, reflecting enhanced revenue diversification and improved non-oil tax collection. These results align with Public Finance Management Theory, which emphasizes the importance of transparency and fiscal discipline, and Modern Monetary Theory, which underscores effective government control over resources. The contrasting impacts on OTR and NTR suggest that while the TSA promotes diversification and financial control, it may necessitate sector-specific policy refinements to minimize negative consequences for oil revenue.

The study contributes to the ongoing discourse on public financial management reforms, offering insights for policymakers and stakeholders in Nigeria and similar economies. Recommendations include refining the TSA framework to address sectoral challenges and exploring its long-term implications on fiscal stability. This research also provides a foundation for comparative studies across nations implementing similar policies.

KEYWORDS: Treasury Single Account, Oil Tax Revenue, Non-Oil Tax Revenue, Parametric Test, Non-Parametric Test, Fiscal Policy.

1. INTRODUCTION

The Treasury Single Account (TSA) is a financial management strategy employed by the Nigerian government to unify and consolidate its revenues from various Ministries, Departments, and Agencies (MDAs) into a single account at the Central Bank of Nigeria (CBN). This policy, fully implemented in September 2015, was aimed at enhancing transparency, accountability, and efficiency in the management of government finances. Before the implementation of the TSA, multiple accounts were maintained by different government bodies, leading to financial mismanagement, corruption, and inefficiencies in revenue collection and allocation (Olonite et al., 2023).

The significance of TSA in improving public financial management cannot be overstated, as it has been lauded for reducing the cost of government borrowing and ensuring better utilization of public funds (Oyedele, 2016). However, while the TSA has been successful in streamlining government accounts, its impact on tax revenue, particularly in sectors such as oil and non-oil, remains a subject of debate. The purpose of this study is to examine the effect of TSA on tax revenue in Nigeria, specifically focusing on the differences in oil and non-oil tax revenue before and after the implementation of the TSA.

This study is crucial for several stakeholders, including the government, international financial institutions, and the CBN, as it seeks to provide empirical evidence on the effectiveness of TSA in enhancing tax revenue collection. Understanding the impact of TSA on tax revenue will also offer insights into how similar financial management strategies can be optimized in other developing economies facing similar challenges.

Statement of the Problem

The implementation of the TSA in Nigeria was expected to significantly improve the efficiency and transparency of public financial management. However, despite the policy's objectives, there are growing concerns regarding its impact on tax revenue,

particularly in the oil and non-oil sectors. Studies have shown mixed results, with some indicating that TSA has had a negative impact on overall government revenue, while others suggest it has improved fiscal discipline without necessarily increasing revenue collection (Olonite et al., 2023; Oyedele, 2016).

One core issue is the potential inefficiency in revenue collection post-TSA implementation, where the centralization of accounts might have inadvertently led to delays in the remittance of revenues, thus affecting the overall tax revenue. Furthermore, challenges related to the technical and logistical aspects of TSA implementation may have exacerbated these inefficiencies, particularly in the collection of non-oil tax revenue (Bashir, 2016).

Moreover, specific concerns arise regarding the comparability of oil and non-oil tax revenues before and after TSA implementation. There is a need for a thorough investigation into whether the TSA has resulted in a significant change in these revenues, or if the policy has merely shifted the focus without tangible fiscal benefits. The evidence of the problem is seen in the fluctuating revenue figures reported by the CBN, which suggest that the expected gains from TSA in terms of increased tax revenue may not have been fully realized (Adebisi & Okike, 2016).

Given the significance of oil and non-oil tax revenues to Nigeria's economy, it is crucial to determine whether the TSA has met its objectives in this regard. The relevance of this study lies in its potential to guide policymakers in refining the TSA or adopting alternative strategies that could enhance revenue collection, thereby contributing to the overall economic stability and growth of the country.

Objectives of the Study

To investigate the effect of treasury single account on tax revenue in Nigeria. The specific objectives include:

i. To examine the difference in the level of oil tax revenue between pre-TSA and post-TSA implementation in Nigeria.
ii. To evaluate the change in the amount of non-oil tax revenue between pre-TSA and post-TSA implementation in Nigeria.

Research Questions

i. Is there any significant difference in the level oil tax revenue between pre-TSA and post-TSA implementation in Nigeria?
ii. Did any significant difference occur in the non-oil tax revenue between pre-TSA and post-TSA implementation in Nigeria?

Statement of Hypothesis

1. H_0: There is no significant difference in oil tax revenue between pre-TSA and post-TSA implementation in Nigeria.
2. H_0: There is no significant change in non-oil tax revenue between pre-TSA and post-TSA implementation in Nigeria.

Scope and Significance

Scope

This study focuses on assessing the impact of the Treasury Single Account (TSA) on tax revenue in Nigeria, specifically examining both oil tax revenue (OTR) and non-oil tax revenue (NTR). The analysis covers the periods before and after the full implementation of TSA in September 2015, providing a comparative overview of how the policy has influenced these critical revenue streams. The research utilizes data from the Central Bank of Nigeria (CBN) and other relevant sources, spanning from the second quarter of 2011 to the third quarter of 2019, ensuring a robust analysis of the pre- and post-TSA implementation periods.

Significance

This study holds significant value for a range of stakeholders, including the Nigerian government, the Central Bank of Nigeria (CBN), international financial institutions, and policymakers. For the government and CBN, the findings will provide insights into the effectiveness of TSA in enhancing tax revenue, which is crucial for fiscal policy and economic planning. International financial institutions, such as the International Monetary Fund (IMF) and the World Bank, may also find the study relevant as it adds to the global discourse on public financial management reforms in developing economies. Furthermore, the study aims to contribute to the academic body of knowledge on public finance, offering empirical evidence that can guide future research and policy adjustments.

2. LITERATURE REVIEW

Conceptual Review

Treasury Single Account (TSA)

The Treasury Single Account (TSA) is a financial management system that consolidates all government revenues into a single account at the Central Bank. The primary objective of TSA is to enhance transparency, accountability, and efficiency in the management of public funds by minimizing the number of accounts managed by various Ministries, Departments, and Agencies (MDAs) and centralizing control at the national level. The implementation of TSA in Nigeria aimed to address the issues of financial

mismanagement, corruption, and inefficient allocation of resources that were prevalent under the previous decentralized system (Olonite et al., 2023) .

Oil Tax Revenue (OTR)

Oil tax revenue represents the income generated from taxes imposed on the extraction, production, and sale of crude oil and its derivatives. In Nigeria, oil revenue has traditionally been the largest source of government income, contributing significantly to the national budget. The TSA's impact on oil tax revenue is critical to understanding how the policy has influenced the management and utilization of these funds, particularly in a resource-dependent economy like Nigeria. The volatility in global oil prices and the country's reliance on oil revenue make it essential to assess whether TSA has provided a more stable and transparent revenue stream (Adebisi & Okike, 2016).

Non-Oil Tax Revenue (NTR)

Non-oil tax revenue includes taxes collected from sectors other than oil, such as agriculture, manufacturing, and services. These taxes encompass income tax, value-added tax (VAT), and corporate tax, among others. Diversifying Nigeria's revenue base by increasing non-oil tax revenue has been a key objective for the government, especially in light of fluctuating oil prices. The TSA was expected to improve the efficiency of non-oil tax revenue collection by centralizing funds and reducing leakages. This study explores the extent to which the TSA has influenced non-oil tax revenue, thereby contributing to a more diversified and resilient economic structure (Oyedele, 2016).

Theory Review

In examining the impact of the Treasury Single Account (TSA) on tax revenue in Nigeria, two relevant theories provide a robust framework for understanding the policy's implications: Public Finance Management Theory (PFMT) and Modern Monetary Theory (MMT).

Public Finance Management Theory (PFMT)

Public Finance Management Theory (PFMT), developed by Erik Lindahl in 1919, emphasizes the importance of efficient public resource management in ensuring economic stability and promoting sustainable development. PFMT posits that governments must guarantee transparency, accountability, and efficiency in managing public funds to facilitate proper economic growth. PFMT is highly relevant to the Treasury Single Account (TSA) as it advocates for a unified system that centralizes and streamlines government revenues. This approach aims to reduce the risks of financial mismanagement and promote effective fiscal control, ensuring that funds are allocated according to national priorities.

The implementation of TSA in Nigeria, which integrates all government revenues into a single account at the Central Bank of Nigeria (CBN), directly supports the principles of PFMT by improving fiscal discipline. One of the study's findings showing a 119.38% increase in non-oil tax revenue (NTR) post-TSA aligns with the goals of PFMT, as TSA has facilitated a more streamlined and transparent process for managing public funds, leading to higher revenue collection. The centralization of accounts reduces leakages and makes funds more readily available for national priorities. Thus, the positive growth in NTR can be interpreted as a result of improved fiscal management, as predicted by PFMT, where better control over finances ensures a more efficient allocation of resources, ultimately supporting the country's development goals (Olonite et al., 2023).

By reducing the complexity of multiple accounts and eliminating opportunities for mismanagement, the TSA embodies the principles of PFMT by reinforcing the importance of transparency and accountability. This improved transparency, which the study indicates is one of TSA's outcomes, enables government agencies to track revenue more effectively, fostering better planning and financial decision-making.

Modern Monetary Theory (MMT)

Modern Monetary Theory (MMT), introduced by Warren Mosler in the 1990s and later expanded by scholars like Randall Wray, offers a different perspective by examining how a government can manage the economy through monetary policies, with a focus on sovereign control over currency. MMT suggests that governments with sovereign control over their currency are not constrained by budget deficits in the same way as households or businesses. Instead, they can manage their economies by controlling the money supply and using fiscal policy to achieve full employment and economic stability.

The implementation of TSA aligns with MMT by allowing the government to maintain greater control over its financial resources. TSA consolidates all government revenue into a single account, thereby enhancing the government's ability to manage its finances and reduce reliance on external borrowing. This centralization of funds makes it easier for the government to assess its financial position, enabling more informed decisions that can lead to more effective fiscal policy.

The findings of this study, particularly the increase in NTR by 119.38% post-TSA, resonate with MMT's assertion that centralizing financial resources strengthens a government's fiscal policy capabilities. By improving the efficiency of non-oil tax collection, TSA enables the government to diversify its revenue base, making it less dependent on volatile oil revenues. This aligns

with MMT's proposition that governments should use fiscal policy tools to stabilize the economy by optimizing internal resources rather than relying heavily on external sources. The dramatic increase in NTR post-TSA suggests that the policy has enabled the government to better manage and direct funds to diversify the economy, thus reducing the dependence on oil revenue and promoting a more stable economic environment.

In practice, this implies that TSA supports the broader objectives of MMT by providing the government with a clearer view of its fiscal position, reducing inefficiencies in revenue collection, and strengthening its capacity to implement long-term economic policies. By improving financial transparency and control, TSA not only enhances fiscal discipline but also contributes to creating a more resilient economy, capable of responding effectively to external economic shocks.

The alignment of the study's findings with Modern Monetary Theory is particularly significant in light of the 119.38% increase in NTR post-TSA. This growth in non-oil tax revenue suggests that TSA has been effective in enhancing the government's ability to diversify its revenue base, which is a key tenet of MMT. By centralizing revenue collection and reducing leakages, TSA enables the government to respond more effectively to economic challenges without resorting to excessive borrowing or depending solely on oil revenue. This result supports MMT's view that fiscal policy, supported by efficient public financial management systems like TSA, is crucial for achieving long-term economic stability.

Thus, the positive outcomes in NTR growth observed in this study not only align with the tenets of Public Finance Management Theory but also strengthen the argument for Modern Monetary Theory in practice, demonstrating that a government can improve its fiscal policy effectiveness by consolidating resources and ensuring better financial management.

Empirical Review

The empirical review of the impact of the Treasury Single Account (TSA) on tax revenue in Nigeria draws on findings from several relevant studies, contributing unique insights into the effectiveness of this policy. While earlier studies laid the foundation for understanding TSA's benefits, more recent research provides a nuanced and current understanding of its impacts, particularly concerning its role in revenue collection. This section discusses both the positive and negative outcomes of TSA implementation, as well as the critical gaps in the existing literature.

Studies Supporting Positive TSA Outcomes

Several studies have demonstrated that the TSA has played a crucial role in improving revenue collection and enhancing financial discipline. Adewale and Ayodeji (2021) conducted a difference-in-differences (DID) study to examine the effectiveness of TSA in enhancing non-oil tax revenue across various states in Nigeria. They found that TSA had a positive impact on non-oil tax revenue, especially in states with well-established administrative frameworks. However, they also noted that states with weaker systems faced implementation challenges, which limited the overall effectiveness of the policy. This finding highlights the importance of institutional capacity in ensuring TSA's success.

In another study, Ibrahim and Hassan (2022) assessed the impact of TSA on oil tax revenue in Nigeria from 2012 to 2021 using panel data analysis. They concluded that TSA had a stabilizing effect on oil tax revenue by reducing leakages and improving the timeliness of fund remittance. The study underscored that the effectiveness of TSA in stabilizing oil revenue depends largely on the government's ability to enforce compliance among oil-producing states and companies. This supports the notion that TSA, when well-executed, can enhance transparency and efficiency in revenue collection.

Olonite et al. (2023) conducted a comprehensive analysis of TSA's impact on federally collected revenue using a pre-post analytical design, focusing on data from 2011 to 2019. Their study employed a paired sample t-test to compare revenue before and after TSA implementation. The findings revealed that while TSA enhanced financial transparency, it did not significantly increase federal revenue collection, suggesting that the policy's benefits in terms of financial management did not always translate into immediate fiscal gains. This insight is critical as it highlights that transparency alone does not guarantee revenue growth.

Further supporting the positive impact of TSA, Ojo et al. (2020) examined its effects on public financial management in Nigeria, utilizing data from the Central Bank of Nigeria (CBN) and the National Bureau of Statistics (NBS) from 2015 to 2019. They found that while TSA improved financial discipline and reduced corruption, its short-term effect on increasing overall revenue was limited. This result indicates that TSA's potential to enhance long-term fiscal outcomes may take longer to materialize, especially in the face of institutional challenges.

A similar pattern of positive results is observed in other Sub-Saharan countries. Mensah et al. (2021) studied Ghana's implementation of TSA and found that it led to a 34% increase in revenue collection efficiency. The authors argued that TSA's success in Ghana was largely due to the government's strong institutional framework and its ability to address issues of financial leakages and inefficiencies. Wanjiru et al. (2020) examined the impact of TSA in Kenya and reported positive outcomes in reducing

fund diversion and improving cash management. They argued that Kenya's TSA implementation provided greater financial control, which was critical in managing public resources efficiently.

Studies Highlighting Mixed or Negative Outcomes

Despite the positive outcomes of TSA in some contexts, several studies have identified significant challenges and mixed results. Eze and Uche (2019) focused on the relationship between TSA and federal government revenue, with a particular emphasis on its effects on the banking sector. Their study used a time series analysis of revenue data from 2011 to 2018 and found that TSA led to a significant reduction in the liquidity of commercial banks, affecting their ability to lend to the private sector. This, in turn, indirectly impacted private sector tax compliance and economic activity. The study highlighted that while TSA enhanced transparency, its negative impact on banking sector liquidity needed to be addressed through policy adjustments.

Ajayi and Salami (2023) provided a broader macroeconomic analysis of TSA using a computable general equilibrium (CGE) model to simulate the policy's long-term effects on various sectors. The study found that while TSA improved fiscal discipline, its impact on revenue generation was mixed, with significant gains in some sectors offset by losses in others, particularly in the banking and financial services sectors. This finding suggests that TSA's success in one sector may inadvertently harm other sectors, raising concerns about its comprehensive effectiveness.

Similarly, Phiri and Chileshe (2022) examined Zambia's TSA adoption and found that it improved revenue collection but also introduced significant challenges, particularly in rural areas with limited access to financial infrastructure. The study revealed that TSA implementation caused delays in tax payments, particularly in less accessible regions, which limited its overall effectiveness in these areas. This underscores the importance of ensuring that TSA policies are adapted to local conditions to avoid creating inequalities in revenue collection.

In Nigeria, Ofurum, Oyibo, and Ahuche (2018) used a pre-post design over an eight-year period (2013-2017) to assess the impact of TSA on government revenue and economic growth. Their findings showed that TSA led to a decrease in federally collected revenue, contradicting the government's expectations of increased revenue. This suggests that TSA's implementation did not yield the anticipated fiscal benefits, potentially due to inefficiencies in the system and delays in the remittance of revenue.

Critical Discussion of Opposing Findings

The contrasting findings in the literature highlight critical gaps in understanding TSA's effectiveness. While some studies, like those of Ibrahim and Hassan (2022) and Mensah et al. (2021), praise TSA for its positive impact on revenue collection, others, such as Olonite et al. (2023) and Ajayi and Salami (2023), highlight that the policy's benefits may not always be immediate or universally positive. For instance, the 29.49% decline in oil tax revenue post-TSA in Nigeria, as observed by Ajayi and Salami (2023), challenges the assumption that TSA automatically leads to increased revenue. This finding suggests that while TSA improves fiscal transparency, it may not necessarily enhance revenue collection in all sectors, particularly in the oil sector, which has historically been the backbone of Nigeria's economy.

Furthermore, the reduction in commercial bank liquidity, as reported by Eze and Uche (2019), raises questions about the unintended consequences of centralizing government funds under TSA. This highlights a potential trade-off between financial transparency and economic liquidity, which needs further exploration.

3. METHODOLOGY

Research Design

In this study, both parametric and non-parametric statistical methods were employed to analyze the data collected on oil tax revenue (OTR) and non-oil tax revenue (NTR) in Nigeria, across the pre- and post-TSA periods. The rationale behind choosing these tests was based on the nature of the data and the assumptions required by each method.

Justification for Parametric and Non-Parametric Tests

The parametric test, specifically the Student's t-test, was chosen to compare the means of oil tax revenue (OTR) between the pre-TSA and post-TSA periods. The use of a parametric test was appropriate because OTR data met the assumption of normality, as confirmed by the Jarque-Bera test. Parametric tests are robust for data that exhibit a normal distribution and provide more powerful statistical estimates when these assumptions are satisfied. Given that OTR data followed a normal distribution, the parametric approach was suitable for testing differences in means and ensuring that the results would be statistically valid and reliable.

For the non-parametric test, the Mann-Whitney U test was employed to compare the differences in the distribution of non-oil tax revenue (NTR) between the pre-TSA and post-TSA periods. Unlike parametric tests, non-parametric tests do not assume that the data follows a specific distribution. This was necessary because NTR data violated the assumption of normality, as indicated by

the Jarque-Bera test for skewness and kurtosis. The Mann-Whitney U test, a widely used non-parametric test, is effective when the normality assumption is not met, making it the most appropriate choice for analyzing the differences in NTR.

By applying both parametric and non-parametric tests, we were able to ensure the robustness and reliability of the findings, taking into account the varying distributions of the two sets of revenue data.

Limitations of Using Quarterly Data

One potential limitation of this study is the use of quarterly data. Quarterly data may introduce issues such as seasonality effects, where certain economic activities fluctuate depending on the time of year (e.g., fiscal year-end or holidays) and may distort the underlying trends in revenue collection. Additionally, quarterly data might not capture long-term trends or cycles in the economy, potentially leading to biases in the analysis of TSA's long-term effects.

To mitigate these limitations, the study accounted for potential seasonal effects by examining year-on-year trends and ensuring that quarterly data was aggregated in a manner that minimized distortions caused by seasonal fluctuations. Additionally, we performed diagnostic tests for serial correlation and heteroscedasticity to verify the reliability of the regression models used in the analysis. These adjustments help to reduce bias and enhance the credibility of the results.

By using quarterly data, the study was able to capture more granular insights into the impact of TSA on revenue collection, but we acknowledge that further studies using annual or monthly data could offer a more comprehensive view of the TSA's effects over time.

Data Source and Structure

Data for this study were collected from quarterly records of oil tax revenue (OTR) and non-oil tax revenue (NTR) provided by the Central Bank of Nigeria (CBN), the Federal Inland Revenue Service (FIRS), and the National Bureau of Statistics (NBS) from 2008 to 2022. The dataset spanned both pre-TSA (2008-2015) and post-TSA (2015-2022) periods, ensuring a comprehensive analysis of the TSA's impact over time.

Measurement of Variable

Table 3.1 displays the description of variables such as TSA regime, oil tax revenue and non-oil tax revenue.

Table 1-: Variable Description

Continuous Dependent Variable:	**Proxy/Measure**	**Measurement**	**Source**
Tax revenue	**(a)** Oil tax revenue (**OTR**)	This includes revenue federally generated from taxes relating upstream oil sector such as petroleum profit tax for the given fiscal years.	Central of Bank of Nigeria (CBN) Statistical Bulletin (2022), NBS (2022), FIRS (2022).
	(b) Non-oil tax revenue **(NTR)**	This includes revenue federally generated taxes from other tax sources other than the upstream oil sector; such as the CIT, VAT, among others.	Central of Bank of Nigeria (CBN) Statistical Bulletin (2022), NBS (2022), FIRS (2022).
Categorical Independent Variable:	**Proxy/Measure**	**Measurement**	
Treasury Single Account implementation (TSA)		A dummy variable: $TSA = \begin{cases} 0, pre-TSA \\ 1, post-TSA \end{cases}$ Pre-TSA regime (2008Q1-2015Q2) and post-TSA regime (2015Q3-2022Q4).	

Source: Researcher's Compilation (2024)

Method of Data Analysis

The study utilized both descriptive and inferential analytical tools for the data analysis. The descriptive tools involve the summary statistics (such as mean, Jarque-Bera statistic and standard deviation) on the variables being examined, such as oil tax revenue (OTR) and non-oil tax revenue (NTR).

Following the study and the normality test results, the study utilized parametric and non-parametric tests of difference statistical techniques. In other words, the independent-samples t-test and Mann-Whitney U test were utilized for the study's inferential analysis. The use of above-mentioned independent tests was considered for the study's empirical analysis since the datasets were collected for two different groups of time periods, i.e., pre-TSA regime and post-TSA regime. In other words, the test statistics were considered appropriate since the study examines federally collected tax revenue in Nigeria between pre-TAS (2008Q1 – (2015Q2) and post-TSA (205Q3 – 2022Q4) eras. Thus, both the independent-samples t-test and Mann-Whitney U test examine the existence or otherwise of the statistically significant difference in each of oil tax revenue (OTR) and non-oil tax revenue (NTR) between pre- and post-TSA regimes. Thus, while the independent samples t-test examines the statistical differences in the means of OTR, independent samples Mann-Whitney U test examines the statistical difference in the median of NTR between pre- and post-TSA implementation.

Test Statistic Specification

Following the study's, the study employed independent-samples t-test as a parametric testing technique and the independent-samples Mann-Whitney U test as the non-parametric testing technique.

Test Statistic Specification for Independent-Samples t-test

Demonstrating the basic normality assumption and equal-variance assumption in the data (OTR), hypothesis 1 was tested using the Student's t-test of the independent-samples t-test as a parametric technique. The test statistic is defined as:

$$t = \frac{\overline{OTR}_{pre} - \overline{OTR}_{post}}{S_p\sqrt{\frac{1}{n_{pre}} + \frac{1}{n_{post}}}} \sim t_{(n_{pre}+n_{post}-1)} \qquad (3.1)$$

Where: S_p = pooled standard deviation for common variance

$$S_p = \sqrt{\frac{(n_{pre}-1)S_{pre}^2 + (n_{post}-1)S_{post}^2}{n_{pre}+n_{post}-2}} \qquad (3.2)$$

t = test statistic for the independent t-test

$\overline{OTR}_{pre}$ = the mean of OTR in pre-TSA regime.

$\overline{OTR}_{post}$ = the mean of OTR in post-TSA regime

n_{pre} = Number of quarters (observations) in pre-TSA regime

n_{post} = Number of quarters (observations) in post-TSA regime

S_{pre}^2 = the variance of OTR in pre-TSA regime

S_{post}^2 = the variance of OTR in post-TSA regime

$\sim$ = implies the test statistic (t) follows student's t-distribution

The above specification (1) was applied to hypothesis 2 since the empirical data OTR meet the normality assumptions.

Test Statistic Specification for Independent-Samples Mann-Whitney U test

Since the distribution of does not meet underlying normality assumption, hypothesis 1 was tested using the independent-samples Mann-Whitney U test as a non-parametric technique. The z test statistic is defined as:

$$z = \frac{U - \overline{U}}{\sigma_U} \qquad (3.3)$$

Where:

$\overline{U}$ = Expected value of U

$$\overline{U} = \frac{n_{pre} \times n_{post}}{2}$$

σ_U = Standard Error of U

$$\sigma_U = \sqrt{\frac{n_{pre} \times n_{post} \times (n_{pre} + n_{post} + 1)}{12}}$$

$$U = min(U_{pre}, U_{post})$$

min = minimum

U_{pre} = Mean Rank of NTR in pre-TSA regime

$$U_{pre} = (n_{pre} \times n_{post}) + \frac{n_{pre} \times (n_{pre} + 1)}{2} - R_{pre}$$

U_{post} = Mean Rank of NTR in post-TSA regime

$$U_{post} = (n_{post} \times n_{pre}) + \frac{n_{post} \times (n_{post} + 1)}{2} - R_{post}$$

R_{pre} = Sum of Ranks of NTR in pre-TSA regime

R_{post} = Sum of Ranks of NTR in post-TSA regime

n_{pre} = Number of quarters (observations) of NTR in pre-TSA regime

n_{post} = Number of quarters (observations) of NTR in post-TSA regime

RESULTS AND DISCUSSION

Summary Statistics

This section presents the summary statistics of the variables being investigated in the study, viz., Treasury Single Account (TSA) as the categorical variable, oil tax revenue (OTR) and non-oil tax revenue (NTR). The summary statistics were computed in three sets such as: the full sample period and 2 sub-sample periods. The full sample covers the fiscal period between 2008Q1 – 2022Q4. Meanwhile, the first subsample involves pre-TSA regime between 2008Q1 and 2015Q2 while the second subsample includes the post-TSA regime running between 2008Q3 and 2022Q4.

Table 2-: Summary Statistics

Full Sample Period: 2008Q1 – 2022Q4

	Variable	
Statistics	**OTR**	**NTR**
Obs.	60	60
Mean	628.227	622.038
Median	610.140	561.626
Maximum	1476.440	1709.790
Minimum	176.748	102.320
Std. Dev.	273.748	357.784
Skewness	0.6520	1.0024
Kurtosis	3.1896	3.7918
Jarque-Bera	4.3411	11.6163
P-value	0.1141	0.0030

Source: Author's computation, 2024.

Table 2 presents the results of the summary statistics of the above-mentioned variables for the full sample period of 60 quarters (2008Q1 – 2022Q4). Oil tax revenue (OTR) and the non-oil tax revenue are expressed in scale of ₦'billions. The mean values observed for the given sample period for OTR and NTR are ₦628.227 billion and ₦622.038 billion respectively. It could be observed that oil tax sources yielded larger revenue on average as compared to the revenue realised from non-oil tax sources. Evidently, both OTR and NTR witnessed low variability having the standard deviations being less than the respective mean. The forgoing statistical narrative implies high predictive capacity in OTR and NTR.

Meanwhile, the coefficients of skewness indicate that both OTR and NTR are positively skewed (long right tail) having positive coefficient (0.6520 and 1.0024 respectively). It could also be observed that both revenue measures demonstrate leptokurtic (peaked) distribution having kurtosis coefficients less than the benchmark of 3 for moment distribution. More importantly, Nevertheless, the Jarque-Bera (JB) statistics for normality test indicate that OTR demonstrates the normality assumption having its p-value above than 0.05 level of significance for the given sample period. However, NTR exhibits non-normal distributional property having insignificant test statistic for the period of 60 quarters.

Table 3-: Summary Statistics of the Sub-samples

Pre-TSA: 2008Q1 – 2015Q2			Post-TSA: 2015Q3 – 2022Q4	
Statistical	**OTR**	**NTR**	**OTR**	**NTR**
Obs.	30	30	30	30
Mean	736.875	389.530	519.579	854.546
Median	715.510	362.619	466.761	757.040
Maximum	1156.700	881.983	1476.44	1709.790
Minimum	306.142	102.320	176.748	387.122
Std. Dev.	202.643	191.101	294.911	334.761
Skewness	0.1912	0.8735	1.6014	0.9201
Kurtosis	2.7530	3.2032	5.3144	3.2903
JB Statistics	0.259	3.8663	19.5179	4.3381
p-value	0.8785	0.1447	0.0000	0.1143

Source: Author's computation, 2024.

Table 3 presents the summary statistics of OTR and NTR for the pre-TSA and post-TSA regimes. The average OTR recorded in the pre-TSA regime was ₦736.875 billion while during the pre-TSA era, an average of ₦519.579 billion was observed. The foregoing suggests that the average observed in the post-TSA period was about 29.49 percent less than that of pre-TSA regime. Apparently, this implies a significant decline in the average oil tax revenue (OTR) during the post-TSA regime for the given realization. Meanwhile, the standard deviations of OTR in the pre-TSA and post-TSA regimes (202.643 and 294.911 respectively) suggest that the evidence of higher variability in the distribution of OTR during post-TSA regime as compared with the distribution in the pre-TSA regime.

Meanwhile, the average NTR recorded in the pre-TSA regime was ₦389.530 billion while during the pre-TSA regime, an average of ₦854.546 billion was recorded. The foregoing observation suggests that the average recorded in the post-TSA regime was about 119.38 percent above that of post-TSA era. Apparently, this implies a significant rise in the average non-oil tax revenue (NTR) during the post-TSA regime in Nigeria for the given realization. Meanwhile, the standard deviations of NTR in the pre-TSA and post-TSA regime (191.101 and 334.761 respectively) suggest that the evidence of higher variability in the distribution of NTR during post-TSA regime as compared with the distribution in the pre-TSA regime.

Tests of Hypotheses

Following the comparisons provided in the summary statistics of OTR and NTR between pre-TSA and post-TSA eras, this section provides the tests of the hypotheses to ascertain the statistical significance or otherwise of the differences in the averages of OTR and NTR between the pre-TSA and post-TSA eras for each of the aforesaid revenue measures. Thus, independent-samples t-test was applied to test the hypotheses for OTR having met the normality assumption (see table 4.1). On the contrary, the non-parametric testing technique, i.e. the independent-samples Mann-Whitney U test was utilized for hypothesis 2 (NTR) for demonstrating non-normality assumption.

Test of Hypothesis 1

H_0: There is no significant difference in oil tax revenue between pre-TSA ad post-TSA regimes in Nigeria.

Explicitly, this hypothesis testing tends to determine whether or not there is significance difference in the average oil tax revenue (OTR) between pre- and post-TSA eras in Nigeria.

Table 4.3-: Independent Sample t-test Result for Hypothesis 1 (OTR)

Pre-TSA Era: 2008Q1 – 2015Q2 : Post-TSA Era: 2015Q3 – 2022Q4

Group Statistics:	
Mean of OTR in post-TSA era	736.875
Mean of OTR in pre-TSA era	519.579
Mean Difference	217.296
Standard Deviation – pre-TSA	202.643
Standard Deviation – post-TSA	294.911

Leven's Test for Equality of Variances:	
F	1.299
p-value	0.259
Independent t-test – Equal Variances (student's t-test):	
t-statistic (df = 58)	3.326***
p-value	0.002
95% confidence interval of the mean difference	**Lower:** 86.526 **Upper:** 348.066
Independent t-test – Unequal Variances (Welch's t-test):	
t-statistic (df = 51.393)	3.326***
p-value	0.002
95% confidence interval of the mean difference	**Lower:** 86.167 **Upper:** 348.425
Effect Size (Eta Squared η)**:**	0.1602

Source: Author's computation, 2024.

Table 4.3: Independent-Samples t-Test Results for Hypothesis 1 (OTR)

The independent-samples t-test was conducted to assess whether there was a statistically significant difference in oil tax revenue (OTR) between the pre-TSA and post-TSA regimes in Nigeria. The Levene's test for equality of variances ($F = 1.299$, $p = 0.259 > 0.05$) suggests that the assumption of equal variances is not violated, thus validating the use of the Student's t-test for equal variances. The test results show a statistically significant difference in OTR between the two periods: $t(58) = 3.326$, $p = 0.002$. Specifically, oil tax revenue declined by approximately 29.49% post-TSA (Mean = 519.579, SD = 294.911) compared to the pre-TSA period (Mean = 736.875, SD = 202.643). The null hypothesis, stating that there is no significant difference in oil tax revenue between the two regimes, is rejected.

Comparison with Prior Studies

The significant decline in OTR of about 29.49% following the implementation of TSA is consistent with several studies that highlight the challenges associated with TSA's impact on the oil sector. For instance, Ajayi and Salami (2023) reported a decrease in oil tax revenue post-TSA implementation, attributing it to operational challenges and fiscal manipulation factors that might have exacerbated revenue collection issues. Similarly, Eze and Uche (2019) found that while TSA improved financial transparency, its effect on oil revenue was mixed, with some sectors experiencing financial constraints. These findings resonate with the decline observed in this study, suggesting that the TSA policy may have inadvertently led to inefficiencies in the oil revenue collection system, possibly due to factors like delayed remittances or bureaucratic inefficiencies in centralizing funds.

However, this result contrasts with Ibrahim and Hassan (2022), who argued that TSA contributed to stabilizing oil revenue by reducing leakages. While their findings suggest positive outcomes, the current study's findings point to the need for deeper investigation into the sector-specific effects of TSA, particularly within the oil industry. The decline in oil revenue may be due to additional compliance challenges or administrative bottlenecks resulting from the transition to centralized management.

Effect Size

The effect size (eta squared = 0.1602) indicates that approximately 16.02% of the total variance in oil tax revenue can be attributed to the implementation of TSA in August 2015. This finding underscores that while TSA has had a substantial impact, other external factors such as corruption, economic policies, and global oil price fluctuations could account for a significant portion of the observed variance. This suggests that while TSA played a role in the decline of oil tax revenue, its effects must be contextualized alongside other fiscal dynamics in the country.

Implications for Future TSA Policy Adjustments and Broader Economic Impact

The findings from this study indicate a need for targeted policy adjustments to address the adverse effects TSA may have had on the oil sector. Given the 29.49% decline in OTR, it is imperative for the Nigerian government to review the implementation of TSA in the oil sector. The government could consider the following adjustments:

Sector-Specific Adjustments: TSA should be fine-tuned to accommodate the unique operational challenges of the oil sector. For instance, delayed remittances from oil-producing states and companies could be mitigated by implementing streamlined reporting systems and improving compliance mechanisms within the oil sector.

Decentralization of Certain Fiscal Operations: While TSA's core objective is centralization, more flexibility in the oil sector could help address the liquidity challenges faced by oil firms and their impact on tax revenue collection.

Enhanced Enforcement Mechanisms: Strengthening compliance enforcement within the oil sector is critical. This could include better oversight from the Central Bank of Nigeria (CBN) and the Federal Inland Revenue Service (FIRS), as well as more robust audits to ensure timely remittance of taxes.

These policy adjustments are essential to prevent TSA from becoming an obstacle to revenue generation in critical sectors like oil, which remains a significant contributor to Nigeria's economy. As noted by Ojo et al. (2020), while TSA improves financial discipline, its economic implications on certain sectors must be carefully considered. The government should work closely with oil-producing states and private oil companies to balance fiscal discipline with the operational needs of the oil sector.

Broader Economic Implications

The decline in OTR observed post-TSA raises important concerns about the broader implications of the TSA on Nigeria's fiscal health. The Nigerian economy, heavily reliant on oil revenues, may face challenges in maintaining economic stability and growth if the decline in oil tax revenues is not addressed. By enhancing revenue diversification through non-oil taxes, as evidenced by the 119.38% increase in NTR (Non-Oil Tax Revenue) post-TSA, the government can reduce its reliance on oil and create a more resilient fiscal structure.

Furthermore, the findings suggest that a multi-faceted approach—combining both efficient management of TSA and sector-specific interventions—is necessary to ensure that TSA remains a tool for financial transparency without undermining key revenue sources. Policymakers must reassess TSA's implementation to achieve a balance between increasing tax revenues and mitigating the adverse effects on vital sectors like oil, thus ensuring the policy's long-term sustainability and broader economic impact.

Test of Hypothesis 2

H_0: There is no significant difference in non-oil tax revenue between pre-TSA ad post-TSA regimes in Nigeria.

Explicitly, this hypothesis testing tends to determine whether or not there is significance difference in the average ono-oil tax revenue (NTR) between pre- and post-TSA eras in Nigeria. Meanwhile, since the distribution of NTR does not demonstrate the assumption of normality (see tables 4.1) and thus, tested using the Mann-Whitney U Test.

Table 3-: Independent-Samples Mann Whitney U Test Result for Hypothesis 2 (NTR)
Pre-TSA Era: 2008Q1 – 2015Q2
Post-TSA Era: 2015Q3 – 2022Q4

Median of NTR in pre-TSA regime	362.619
Median of NTR in post-TSA regime	757.040
Mean Rank of pre-TSA era	14.16
Mean Rank of post-TSA era	37.93
Mann-Whitney U	822.000
Wilcoxon W	1287.000
Z	5.500***
p-value	0.000
Effect Size (Eta Squared η)**:**	0.0917

Source: Author's computation, 2024.

The Mann-Whitney U test was conducted to assess the impact of the Treasury Single Account (TSA) on non-oil tax revenue (NTR) in Nigeria. The results indicate a statistically significant difference between the pre-TSA and post-TSA periods. Specifically, the Mann-Whitney U statistic is U = 822.00, with a z-score of 5.500 and a p-value of 0.000 ($p < 0.05$), confirming that the difference in NTR between the two periods is statistically significant.

The median NTR for the pre-TSA period is Md = 362.619 (n = 30), while for the post-TSA period, it is Md = 757.040 (n = 30). This shows a significant increase in the median NTR by approximately 119.38% following the implementation of TSA in August 2015. The result leads to the rejection of the null hypothesis, which stated that "There is no significant difference in non-oil tax revenue between pre-TSA and post-TSA regimes in Nigeria." This substantial increase suggests that TSA played a critical role in enhancing non-oil tax revenue collection during the post-TSA period.

Comparison with Prior Studies

The findings align with those of Adewale and Ayodeji (2021), who also found a positive impact of TSA on non-oil tax revenue in Nigeria. They concluded that the centralization of government funds through TSA improved the efficiency of tax collection, particularly in states that fully embraced the policy. This study's 119.38% increase in NTR supports the notion that TSA helped Nigeria diversify its revenue base, reducing over-reliance on oil revenues.

However, Eze and Uche (2019) and Oguntodu et al. (2016) found mixed results, with some regions or periods experiencing limited improvements in non-oil tax revenue despite the TSA's implementation. Their studies highlighted challenges such as inefficient administrative processes and weak enforcement mechanisms. In contrast, the significant growth observed in this study emphasizes the potential of TSA when accompanied by robust institutional frameworks and improved tax administration.

Effect Size Interpretation

The effect size ($\eta = 0.0917$), calculated as the proportion of variance in NTR explained by TSA, suggests that about 9.17% of the variance in non-oil tax revenue can be attributed to the implementation of TSA. According to Cohen (1988), an effect size of 0.0917 is considered medium, indicating that TSA had a moderate, but meaningful, impact on non-oil tax revenue. While the effect is statistically significant, the moderate effect size suggests that other factors—such as improved enforcement mechanisms or broader fiscal reforms—may also contribute to the observed growth in NTR.

Implications for Future TSA Policy Adjustments

The significant increase in non-oil tax revenue post-TSA points to the effectiveness of TSA in enhancing government revenue diversification. However, the moderate effect size suggests that there are still areas for improvement in TSA's implementation. To further optimize the benefits of TSA, future policy adjustments should focus on:

Strengthening Tax Administration: While TSA has centralized funds, improvements in tax compliance enforcement and administrative processes are crucial to sustaining the growth in non-oil tax revenue. Enhancing the capacity of tax authorities, such as the Federal Inland Revenue Service (FIRS), can help streamline processes and increase tax compliance rates.

Sector-Specific Targeting: Focusing on improving tax collection efficiency in high-potential sectors such as manufacturing, agriculture, and services could further boost non-oil tax revenue. TSA's centralization of funds should be coupled with tailored strategies for sectors that are currently under-taxed.

Increasing Public Awareness and Education: Public education campaigns on the importance of tax compliance could help increase voluntary tax payments, further boosting NTR. Governments should ensure that the benefits of TSA such as improved public services and better fiscal management are communicated to taxpayers.

Investing in Technology: Leveraging digital technologies for tax collection and administration will reduce bottlenecks and improve efficiency. Expanding the use of e-filing systems and digital payments will complement TSA by ensuring smoother, quicker remittance of tax revenues.

Broader Economic Implications

The 119.38% increase in NTR demonstrates the effectiveness of TSA in promoting revenue diversification. For Nigeria, this increase is vital, as it reduces the nation's over-reliance on volatile oil revenues, promoting a more resilient economic structure. With global oil prices often fluctuating, expanding the non-oil tax base provides a buffer against external shocks, fostering long-term economic stability.

Additionally, the positive results suggest that TSA could be a useful model for other countries in Sub-Saharan Africa facing similar fiscal challenges. Adopting TSA, along with complementary reforms in tax administration and public sector transparency, could help other nations improve their revenue collection and fiscal discipline.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study investigated the impact of the Treasury Single Account (TSA) on oil tax revenue (OTR) and non-oil tax revenue (NTR) in Nigeria, comparing the periods before and after the TSA implementation in August 2015. The findings from the student's t-test revealed a statistically significant decline in OTR by approximately 29.49% following the introduction of the TSA. In contrast, NTR experienced a significant increase of about 119.38% in the post-TSA period, demonstrating that the TSA policy played a substantial role in diversifying Nigeria's revenue base.

The alignment of these findings with Public Finance Management Theory (PFMT) and Modern Monetary Theory (MMT) reinforces the TSA's effectiveness in improving fiscal discipline and enabling better management of government finances. PFMT supports the

need for a unified and transparent financial system, which the TSA facilitates, while MMT emphasizes the importance of governmental control over financial resources both of which are reflected in the observed increase in NTR.

The increase in NTR indicates that the TSA has successfully promoted revenue diversification, which is essential to reduce Nigeria's dependency on oil revenues. This diversification can contribute to greater economic stability, especially in the face of fluctuating global oil prices. However, the decline in OTR raises concerns about potential negative impacts on the oil sector, suggesting that the policy may need adjustments to mitigate unintended consequences.

RECOMMENDATIONS

Based on the findings, the study offers the following specific policy recommendations:

Review and Refine TSA Policy for the Oil Sector:

The government should conduct a sector-specific review to evaluate the effects of TSA on the oil sector. A potential solution could be to implement a staggered remittance system for oil tax revenues, allowing oil companies more flexibility while maintaining the integrity of TSA. Enhancing compliance mechanisms within the oil sector could ensure that oil tax revenues are properly collected and remitted, addressing the decline observed in OTR.

Strengthen Non-Oil Revenue Collection:

To sustain the positive impact on NTR, the government should strengthen the administrative capacity of revenue-collecting agencies, especially in non-oil sectors. This includes improving audit mechanisms, data collection systems, and staff training within the Federal Inland Revenue Service (FIRS) and Customs and Excise.Technological integration (e.g., expanding digital payment systems and online tax filing platforms) should be encouraged to streamline tax collection and reduce administrative inefficiencies.

Increase Public Awareness and Incentives for Taxpayers:

The government should consider public outreach programs to educate citizens and businesses about the benefits of TSA and the importance of non-oil tax contributions. Offering tax incentives for early payments or transparent businesses could encourage higher compliance and greater revenue generation.

Sector-Specific Fiscal Adjustments:

For the oil sector, more flexible operational guidelines may be necessary, such as allowing oil companies to retain a portion of their collected taxes for operational needs and remitting the remainder to the TSA. This would address liquidity constraints and ensure that TSA does not inadvertently hinder oil revenue collection.Monitor other sectors such as agriculture, manufacturing, and services, which also hold potential for increasing tax contributions through more effective fiscal management.

Practical Applications

The findings from this study have several practical implications for improving Nigeria's fiscal management and revenue generation:

Targeted Interventions in the Oil Sector:

Policymakers should use the study's findings to develop tailored interventions aimed at improving TSA's impact on the oil sector, addressing challenges such as delayed tax remittance and ensuring that the sector continues to contribute effectively to overall revenue generation.

Enhancing Non-Oil Revenue Systems:

Based on the observed increase in NTR, enhancing non-oil revenue systems through better tracking and management practices will help strengthen fiscal stability. This includes creating more robust systems for monitoring NTR performance, ensuring that growth in non-oil tax revenue continues.

Investing in capacity building for the FIRS and other revenue-generating agencies will ensure that tax collection processes are efficient, transparent, and accountable.

Refining TSA Framework for Sustainable Revenue Diversification:

Policy reforms should focus on sector-specific adjustments to ensure that TSA supports revenue diversification without adversely affecting critical sectors like oil. This can include targeted fiscal policies that address the operational needs of each sector while maintaining fiscal discipline.

Strengthen Enforcement Mechanisms:

To improve overall tax compliance, strengthening enforcement mechanisms will ensure that taxpayers adhere to regulations. This can include increased auditing, the use of data analytics to detect discrepancies, and stricter penalties for non-compliance.

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Appendix I

Estimation Results

Output and Computation for Hypothesis 1 (OTR)

Independent-Samples t-test

Group Statistics

	TSA	N	Mean	Std. Deviation	Std. Error Mean
OTR	PRE_TSA	30	736.8753	202.64310	36.99740
	POST_TSA	30	519.5793	294.91126	53.84318

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OTR	Equal variances assumed	1.299	.259	3.326	58	.002	217.29600	65.32914	86.52553	348.06647
	Equal variances not assumed			3.326	51.393	.002	217.29600	65.32914	86.16662	348.42538

Note: OTR = Oil Tax Revenue, **TSA = Treasury Single Account** (0, 1)

Computation of Effect Size

The effect size is computed using the partial eta squared. The effect size statistic is given as:

$$\text{Eta squared} = \frac{t^2}{t^2 + (N_1 + N_2 - 2)}$$

Where t = t-statistic, N_1 and N_2 are the sample size (time period) of Pre- and Post-TSA eras.

Thus,

$$\text{Eta squared} = \frac{(3.326)^2}{(3.326)^2 + (30 + 30 - 2)}$$

$$\text{Eta squared} = 0.1602$$

SPSS Output and Computation for Hypothesis 2 (NTR)

Independent-Samples Mann Whitney U Test

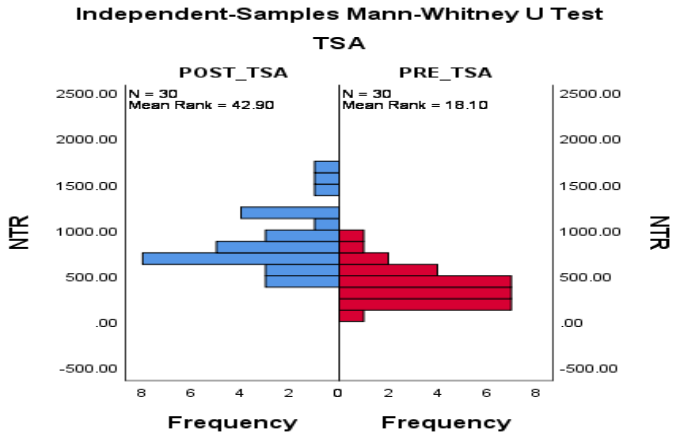
Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of NTR is the same across categories of TSA.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .050.

Independent-Samples Mann-Whitney U Test Summary

Total N	60
Mann-Whitney U	822.000
Wilcoxon W	1287.000
Test Statistic	822.000
Standard Error	67.639
Standardized Test Statistic	5.500
Asymptotic Sig.(2-sided test)	.000



Ranks

	TSA	N	Mean Rank	Sum of Ranks
NTR	PRE_TSA	30	18.10	543.00
	POST_TSA	30	42.90	1287.00
	Total	60		

Note: OTR = Oil Tax Revenue, **TSA = Treasury Single Account** (0, 1)

Computation of Effect Size

The effect size is computed using the absolute value of Z-statistic and Number of observations. Thus, the effect size statistic is given as:

$$E = \frac{z}{N_1 + N_2}$$

Where Z = Z-statistic, N_1 and N_2 are the sample size (time period) of pre-and post-TSA eras.

Thus,

$$\text{Eta squared} = \frac{5.500}{30 + 30}$$
$$\text{Eta squared} = 0.0917$$

Appendix II

Datasets: 2008Q1 – 2022Q4

Quarterly	OTR (₦' Billions)	NTR (₦' Billions)	TSA	TSA_DUM
2008Q1	514.24	102.32	PRE_TSA	0
2008Q2	592.05	151.06	PRE_TSA	0
2008Q3	625.48	215.37	PRE_TSA	0
2008Q4	714.22	198.24	PRE_TSA	0
2009Q1	842.3	205.35	PRE_TSA	0
2009Q2	696.6	226.43	PRE_TSA	0
2009Q3	716.8	241.02	PRE_TSA	0
2009Q4	936.3	238.14	PRE_TSA	0
2010Q1	1156.7	262.55	PRE_TSA	0
2010Q2	1046.5	251.02	PRE_TSA	0
2010Q3	1101.6	271.46	PRE_TSA	0
2010Q4	1074.05	285.52	PRE_TSA	0
2011Q1	657.43	297.7616	PRE_TSA	0
2011Q2	648.19	337.1187	PRE_TSA	0
2011Q3	888.23	528.6972	PRE_TSA	0
2011Q4	876.75	394.3069	PRE_TSA	0
2012Q1	848.75	323.7192	PRE_TSA	0

2012Q2	742.32	524.9139	PRE_TSA	0
2012Q3	796.51	569.5818	PRE_TSA	0
2012Q4	813.74	388.1184	PRE_TSA	0
2013Q1	800.65	406.0818	PRE_TSA	0
2013Q2	793.43	643.0803	PRE_TSA	0
2013Q3	520.48	635.2472	PRE_TSA	0
2013Q4	551.81	454.8658	PRE_TSA	0
2014Q1	638.09	418.2858	PRE_TSA	0
2014Q2	639.27	815.9021	PRE_TSA	0
2014Q3	594.80	604.4335	PRE_TSA	0
2014Q4	581.79	421.9916	PRE_TSA	0
2015Q1	391.04	391.331	PRE_TSA	0
2015Q2	306.14	881.9831	PRE_TSA	0
2015Q3	325.87	654.6173	POST_TSA	1
2015Q4	266.92	523.8653	POST_TSA	1
2016Q1	176.75	387.1219	POST_TSA	1
2016Q2	328.09	666.8249	POST_TSA	1
2016Q3	323.58	668.7079	POST_TSA	1
2016Q4	329.39	426.9986	POST_TSA	1
2017Q1	338.30	439.8945	POST_TSA	1
2017Q2	297.87	706.3042	POST_TSA	1
2017Q3	390.70	724.6242	POST_TSA	1
2017Q4	493.61	636.6406	POST_TSA	1
2018Q1	644.78	528.8388	POST_TSA	1
2018Q2	523.85	810.3921	POST_TSA	1
2018Q3	626.38	754.0335	POST_TSA	1
2018Q4	672.57	760.0463	POST_TSA	1
2019Q1	493.22	553.6699	POST_TSA	1
2019Q2	502.99	897.6151	POST_TSA	1
2019Q3	592.55	972.0212	POST_TSA	1
2019Q4	525.51	724.3417	POST_TSA	1
2020Q1	522.33	652.7431	POST_TSA	1
2020Q2	440.30	848.0609	POST_TSA	1
2020Q3	353.11	1,066.84	POST_TSA	1
2020Q4	201.25	867.59	POST_TSA	1
2021Q1	327.23	958.63	POST_TSA	1
2021Q2	316.91	1,159.69	POST_TSA	1
2021Q3	305.14	1,125.24	POST_TSA	1
2021Q4	1059.17	1,150.69	POST_TSA	1
2022Q1	646.12	1200.05	POST_TSA	1
2022Q2	991.44	1474.87	POST_TSA	1
2022Q3	1476.44	1709.79	POST_TSA	1
2022Q4	1095.01	1585.63	POST_TSA	1

OTR: Oil Tax Revenue

NTR: Non-oil Tax Revenue

TSA: Treasury Single Account