ANALYSIS OF THE FISCAL SYNCHRONIZATION HYPOTHESIS IN SELECTED SUB-NATIONALS IN NIGERIA

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ABSTRACT
Policymakers in developing countries like Nigeria that operate a fiscal federalism system have increasingly become concerned about fiscal sustainability and deficit, especially at the subnational level. Unsurprisingly, while these issues have been largely researched at the federal level, they have been less discussed at the state level and this is primarily due to the paucity of publicly available fiscal data. The World Bank's State Fiscal Transparency Accountability and Sustainability lending program (2019) which leans on the 22-point Fiscal Sustainability Plan of the Federal Government (2016) has reversed this development. The program which sought to improve transparency in public financial management at the subnational level has led to a remarkable improvement in the publication of audited financial statements by state governments. In this paper, the fiscal synchronization hypothesis and determinants of subnational fiscal deficit in Nigerian states are tested using panel data for 12 states from 2011 to 2021. Utilizing panel data analysis, the results show that the fiscal synchronization hypothesis holds in states. The results also show that state external borrowing and economic size are the major drivers of fiscal deficit at the subnational level in Nigeria. Two main policy insights are discernible from the findings. First is the need for state governments to urgently enhance state revenue mobilization efforts; and second, the preparation of realistic budgets that minimize the deviation between the approved budget expenditure and actual spending. We conclude that sound fiscal management and restraint by state governments would be required for sustainable revenue and expenditure management.

Keywords: Fiscal, Revenue, Expenditure, Debt, Sub-national, Panel data analysis
JEL Codes: H2, H5, H62

1 INTRODUCTION

Effective management of fiscal policy instruments such as government spending and revenue is crucial for sustainable macroeconomic stability. Gootjes and de Haan (2022) posit that fiscal policy should be contractionary in good times and expansionary in bad times to dampen business cycle fluctuations. This implies that policymakers keep a close eye on key fiscal indicators such as revenue and expenditure as well as their potential determinants. The literature on the validity or otherwise of the fiscal synchronization hypothesis remains largely inconclusive. An obvious gap in extant studies such as Omoshoro-Jones (2020), Tashevska, Trenovski, Trpkova-Nestorovska (2020), Aregbeyen and Ibrahim (2012), Ibrahim (2018) and Mawejje and Odhiambo (2020) is that they did not consider the fact that some countries like Nigeria operate under a fiscal federalism system that determines how revenue is generated,

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allocated and redistributed between the centre and federating units (state and local governments). The Revenue Mobilization Allocation and Fiscal Commission revised the 1992 revenue allocation formula on April 7, 2022. The new vertical revenue allocation formula reduced federal allocation from 52.7% to 45.2% while state allocation increased from 26.7% to 29.8% and local governments from 20.6% to 21%.[2] These changes have serious implications for public financial management, especially at the subnational level where dependence on statutory revenue and critical service delivery spending needs remain high.

Emerging economic pressures from domestic and external disruptions magnify fiscal risks. For example, Kamo, Andohol and Anjade (2022) observed that debt service as a share of recurrent expenditure has increased from 23.92% in 2010 to 36.58% (2015) and 58.92% in 2021. The authors and others such as Kolawole (2019) opine that high debt servicing needs amidst overstretched revenue have contributed to unsustainable debts. This has worsened the government's fiscal stance. This conforms with extant literature such as Oligbi (2020) who found that fiscal decentralization in Nigeria has not contributed to, macroeconomic stability. The benefits of fiscal decentralization and the drive among developing and transition countries to decentralize their expenditures and revenues to sub-national government as part of a broader objective for enhancing public sector efficiency (ibid.), The importance of this paper is driven by the emerging fiscal challenges and risks emanating from contemporaneous recessionary pressures induced by oil shocks and the slow recovery from the covid-19 pandemic. This has heightened concerns over the government's constrained capacity to meet increased demand for public services (Afonso, Jalles, Venâncio, 2021).

According to a World Bank (2011), states were found to be heavily reliant on federal transfers with internally generated revenue accounting for less than 10% on average in all of them. With a high expenditure profile dominated by recurrent spending, the consequent deficits created would require financing which, in turn, leads to debt accumulation. A cursory look at the recent fiscal profile of states shows that there are emerging fiscal imbalances and risks. According to 2021 public financial statistics from the CBN,[3] total state revenue stood at N3.7 trillion up from N3.6 trillion in 2020 while expenditure in 2020 was about N4.8 trillion and increased to N5.2 trillion in 2021. The combined effect culminated in a deficit of N1.1 trillion and N1.4 trillion in 2020 and 2021 thereby increasing financing needs and potentially expanding the debt stock (ibid.). These issues have in recent times occupied the centre stage of public discourse following the warning by the Minister of Finance, Budget and National Planning that "urgent action is needed to address the nation's revenue challenge and expenditure efficiency at both the national and sub-national levels as the excess crude account has not been credited in the last 4 years."[4] "According to details of the 2022 fiscal performance report for January through April, Nigeria's total revenue stood at N1.63 trillion while debt servicing stood at N1.94 trillion, showing a variance of over N300 billion." (ibid.)

Because fiscal sustainability has over the years and particularly in more recent times occupied the forefront of economic policy discourse. There is an extensive body of literature on this subject but in a national or aggregate context. This implies that limited attention has been given to fiscal sustainability in subnational governments which, largely contributes to macroeconomic stability and fiscal policy of the country. While some studies have shown that revenue drives expenditure (Fasano and Wang, 2002), others have shown that expenditure drives revenue (Chang and Chiang, 2009). Another strand of the literature remains inconclusive (Takumah, 2015) while some others such as Ibrahim (2018) have shown that methodology

[2] https://guardian.ng/business-services/fg-allocation-to-shed-3-33-in-new-revenue-sharing-formula/
[3] https://www.cbn.gov.ng/documents/Statbulletin.asp
[4] https://www.premiumtimesng.com/regional/nwest/544216-nigeria-broke-as-debt-payment-exceeds-revenue.html, https://www.thecable.ng/its-for-security-purposes-zainab-ahmed-speaks-on-depletion-of-excess-crude-account, https://www.youtube.com/watch?v=eOq80MC99ew

matters for the government revenue-expenditure nexus. An obvious lacuna in these studies especially in the Nigerian context is the non-consideration of sub-nationals where fiscal imbalances magnify risks. Therefore, this paper broadly looks into the fiscal sustainability of states in Nigeria and specifically seeks to; (i) examine whether the fiscal synchronization holds at the subnational level; (ii) investigate the drivers of subnational fiscal deficit in Nigeria. The outcome of this paper is expected to provide insights for policymakers on how to mitigate fiscal risks and improve public financial management.

Predicated on the fiscal synchronization hypothesis, the empirical strategy draws from the works of Chang and Chiang (2009) and Ibrahim (2018). The estimation strategy is carried out in three stages. Following the preliminary data diagnostics, the first stage is the use of Granger non-causality tests in heterogeneous and homogeneous panels proposed by Dumitrescu and Hurlin (2012) and Juodis, Karavias and Sarafidis (2021), respectively to ascertain the validity of the fiscal synchronization hypothesis in Nigeria. The advantage of these approaches is that they account for cross-sectional heterogeneity and exhibits good finite sample properties, even when both T and N are small. The second stage is the regression estimation of the fiscal deficit model using pooled ordinary least squares because the state-specific effect in the model is a random variable that is correlated with the independent variables. Finally, we check the robustness of our findings using a fixed effect model because it addresses omitted variable bias (state-specific effects) associated with cross-sectional regressions. The random effect model is also considered because cross-sectional heterogeneity is assumed to be random and uncorrelated with the independent variables

The paper relies on panel data for 12 states between 2010 and 2021. The states are Lagos, Oyo, Delta, Rivers, Benue, Niger, Kano, Kaduna, Anambra, Abia, Borno, and Adamawa. These states were selected because they have the largest GDP as of 2010. The state revenue and expenditure data are extracted from the state's Audited Financial Statements and state-approved budget (available on the state websites). The other variables used to investigate the determinants of state-level fiscal deficit are inflation and state GDP sourced from the National Bureau of Statistics (NBS) while state debt stock is sourced from the Debt Management Office (DMO). The theoretical and empirical aspects of the fiscal synchronization hypothesis will be described in a subnational context. The potential drivers of fiscal deficit at the state level will be identified. Finally, the paper provides recommendations on how to enhance fiscal sustainability and manage the persistent fiscal deficit at the state level.

The sequence of the paper is as follows: Following this introductory part, section 2 highlights the fiscal profile of the state and federal governments. Section 3 presents the literature review while Section 4 dwells on the methodology. The focus of Section 5 is on the outcome of the empirical analysis and discusses the findings. Section 6 concludes, highlights some policy implications, and lays out some limitations of the paper.

2 SITUATIONAL ANALYSES: STATE AND FEDERAL FISCAL PROFILE

Nigeria operates a fiscal federalism system that comprises 3 tiers of fiscal administration: Federal, State and Local governments. The country is made up of 36 states, the Federal Capital Territory (FCT), and 774 local governments. Historically, the country has operated a unitary system due to successive federal military administrations that controlled economic policy from the centre. However, the start of democracy and the adoption of the 1999 constitution led to more devolution of powers across the 3 tiers. The role of the federal, state and local governments is clearly defined in the constitution. While there seems to be some omnipotence on expenditure arrangements albeit state control of local government budgets, the revenue arrangement especially concerning oil revenue and taxes that accrue to the federation account are shared between the Federal (54.7%), State (24.7%), and Local (20.6%) governments.

Despite this legal and institutional arrangement in place, the fiscal disequilibrium due to revenue and expenditure imbalance remains rife. This is a reflection of the weak public financial management systems at the subnational level as the majority of the states rely heavily on federal transfers and generate very little revenue internally. Consequently, the states are unable to meet their high expenditure outlays particularly due to a poor and unrealistic budgeting system which in turn worsen the deficit and force states to borrow more. The state government are no doubt an important part of Nigeria's fiscal puzzle. Indeed, the last few years have seen a similar movement of state government revenue and expenditure albeit major declines in 2016 and 2019. This coincided with the combined oil price and production shocks at the time (See Panel C, Figure 1).

Notably, Panel D in Figure 1 shows that the state government deficit and financing have moved in the opposite direction. In other words, as the deficit persisted during the review period, the financing increased over time from about N132 billion in 2011 to an alarming N1.4 trillion in 2021. The precarious subnational fiscal position is unsustainable and could trigger an already emerging crisis as a significant portion of the deficit is being financed by domestic borrowing through deposit money banks. This implies that debt servicing could crowd out public investment in requisite capital and social spending required to drive economic growth at the sub-national level. In addition, the state governments are under pressure from their citizens to deliver on their constitutionally assigned expenditure mandates and see massive increases in spending as the main instrument for achieving this (World Bank, 2003, p.13).

The weak public financial management system at the subnational level magnifies the poor fiscal coordination between the federal and state governments. Figure 1 Panel A shows that federal government revenue has been volatile during the review period and this mirrors international crude oil market conditions as oil constitutes over 90% of total revenue. The chart seems to show a deviation between federal revenue and spending for the period 2011-2021 but for most of the years, the government recorded a surplus. However, 2016 and 2020 and 2021 recorded deficits of about N242 billion, N956 billion, and N1.4 trillion, respectively. Concomitantly, the FG financing began to rise from 2014 onwards and reached its peak at N6.2 trillion in 2020 and N7.1 trillion in 2021; reflecting amongst others, increased covid-19-related spending (See Figure 1 Panel B).

These issues have occupied recent fiscal policy debates, especially over the last few years characterized by revenue shortfalls, and huge expenditure outlays driven by debt servicing. Indeed, the fiscal performance at the federal and subnational level have been suboptimal. Despite the revenue and expenditure expansion, the persistent deficit remains a major source of concern, vulnerability, risks and unstable finances. While decades of oil boom masked the weak fiscal position of governments, the gloomy oil market outlook in addition to domestic supply-side constraints makes fiscal and macroeconomic management even more challenging and important. These issues make this paper timely as they would contribute to the debate and provide new insights into the emerging fiscal challenges at the subnational level.

Figure 1: Synoptic Profile of Federal and State Governments

Source: Central Bank of Nigeria, Statistical Bulletin (online)

3 LITERATURE REVIEW

Conceptual and Theoretical Perspectives

The trajectory of spending and revenue by governments is largely used to assess fiscal sustainability. While government spending refers to money that all levels of government use to provide goods and services for its citizens, government revenue refers to the financial resources that accrue to the government through various economic activities. Thus, it is expected that government revenue at all times should match its spending needs but in cases where these two accounts do not match, the government runs a deficit which needs to be financed through borrowing or debt accumulation. Kamo et al. (2022) used the two-gap model to look at how the savings-investment deficit led to higher public debt through the revenue channel. Although closely linked to fiscal sustainability, they focused more on the public debt component and revenue channel thereby ignoring the spending channel. Nggada et al. (2021) opine that government investment is necessary for the eradication of poverty and other similar social and economic functions performed by the state among which are the production of public

goods which is capable of reducing the cost of private production as well as for the improvement in the general welfare of the citizens.

The revenue profile is primarily made up of tax and non-tax receipts. In Nigeria, government revenue is dominated by oil export earnings thereby amplifying vulnerability to external shocks. The expenditure is mainly on recurrent and capital with the former playing a more dominant role. The combined effect of low domestic revenue mobilization, oil export dominance and its volatility, and high spending needs especially towards recurrent spending in addition to the costly subsidy regime has magnified fiscal risks both at the federal and subnational levels. Although the transmission channel in the revenue-expenditure nexus is clear at the federal level, there is very limited evidence at the sub-national level where fiscal imbalances remain a source of concern. Many countries are still struggling to collect sufficient revenues to finance their development.[5] Countries collecting less than 15% of GDP in taxes must increase their revenue collection to meet the basic needs of citizens and businesses (ibid.).

The theoretical literature on the revenue-expenditure nexus is dominated by 4 main hypotheses. First is the revenue-expenditure hypothesis which postulates that government revenue inflows determine the level of absorption. Proposed by Friedman (1978), this approach implies that raising taxes creates more room for government spending. The second hypothesis proposed by Peacock and Wiseman (1979) opines that expenditure drives revenue. The pursuit of expansionary fiscal policy to address recessionary pressure could prompt higher tax adjustments to meet spending obligations. This postulation is in line with the Ricardian equivalence hypothesis which suggests that spending cuts lead to a reduction of the deficit. The third approach is the fiscal synchronization hypothesis ala Meltzer and Richard (1981) is predicated on the notion that fiscal sustainability could be achieved by making revenue and expenditure decisions in a coordinated manner. Finally, Baghestani and McNown (1994) propose the institutional separation hypothesis which opines that the revenue and expenditure decisions of the government are independent of one another.

Despite the significant theoretical developments and applications in the literature, very few studies have considered the fiscal synchronization hypothesis in the context of subnational governments which, play a vital role in economic growth and development. Indeed, the fiscal profile of the state could influence the overall fiscal position of the country given the fiscal federalism system being operated. To our knowledge, this paper is the first attempt to empirically test the validity of this hypothesis using subnational datasets in Nigeria.

Empirical Review

An expedition of the plethora of empirical literature offers different insights into the nature of the relationship between government revenue and expenditure. The outcomes have generally been mixed and remain largely inconclusive due to differences in the country considered, data, estimation techniques, degree of temporal aggregation, and control variables considered (Tashevska et al., 2020, p.8). While some studies have focused on time series analysis for country-specific assessments (Yinusa and Adedokun, 2017, Yinusa, Aworinde and Oseni, 2017, Uche and Ogbonna, 2018, Ibrahim, 2018, for Nigeria; Kaya and Aslan, 2020 for Turkey; Adnan and Jalil, 2010 for Romania; Omoshoro-Jones, 2020 for Free state province South Africa; Narayan, 2005 for nine Asian countries); some others have explored panel data approach (Tashevska et al., 2020 for six South-East European countries; Narayan and Narayan, 2006 for a group of developing countries; Chang and Chiang, 2009 for 15 OECD countries; Magazzino, 2013 for ECOWAS countries).

The foregoing suggests that the vast majority of studies have focused on cross-country and country-specific contexts while attention on sub-nationals seems to be nonexistent. Unlike Nigeria, very few attempts have been made such as Ram (1988) for federal, state and local

[5] https://www.worldbank.org/en/topic/taxes-and-government-revenue

governments but focused on aggregated data and Westerlund et al. (2011) and Holtz-Eakin et al. (1989) on local governments in the United States. An understanding of fiscal sustainability in sub-nationals is critical in countries like Nigeria that operate under fiscal federalism with clearly defined roles for the central government and federating units. The scantness of this kind of study especially in Nigeria emanates from severe data limitations in terms of frequency and quality at the state level. Akujuobi and Akujuobi (2003) note that state governments in Nigeria are saddled with a lot of responsibilities that require huge expenditure outlays that are often overwhelming, especially when compared with their limited financial resources. Using regression analysis, the authors found that federal allocation, internally-generated revenue and stabilization funds, were significant sources of financing state government expenditure in Nigeria.

In a more recent study of local government finances, Babarinde (2022) investigates the validity of the fiscal neutrality hypothesis in Nigeria at the local government level. Based on cointegration and Granger causality tests on data for the period 1993Q1-2019Q4, the findings showed that there was no causal linkage between expenditure and revenue in local governments in Nigeria. This is quite surprising given the fact that local government dependency on intergovernmental transfers is quite high. A plausible explanation for this result is that state governments largely determine transfers to the local governments.

The evidence from a group of country assessments presents mixed results. In an assessment of 15 OECD countries between 1992 and 2006, Chang and Chiang (2009) used panel data cointegration and causality test to examine fiscal sustainability in 15 OECD countries. The authors show that there is a bidirectional causal association between revenue and expenditure, suggesting that the fiscal synchronization hypothesis hold. This is also in line with the findings of Yien et al. (2019) who show that there is a bidirectional causation between government spending and revenue in Indonesia. Tashevska (2020) examines the government revenue-expenditure nexus using data between 1999 and 2015 for 6 Southeast European countries. Utilizing the bootstrap Granger causality technique, the results showed that government revenue causes spending in Albania, Bulgaria, Serbia, and Slovenia but found that fiscal synchronization (bidirectional causality) holds in Macedonia.

Karlsson (2019) examines the causal link between government revenue and expenditures in China by taking into account structural breaks related to the budgetary cycle. Findings from the Granger causality using wavelet decomposition on quarterly data between 1980 and 2015 show that government revenue Granger causes government expenditure which validates the tax-and-spend hypothesis in the wavelet scales of two to four quarters. The results also show that bidirectional causality between government revenue and expenditure exists in line with the fiscal synchronization in the wavelet scale of eight to sixteen quarters. Using a different approach, Afonso, et al. (2021) investigate the effect of structural tax reforms on government spending efficiency in a sample of 18 OECD economies over the period 2006–2017. The results show that an increase in tax rates negatively affects public sector efficiency and this holds even after controlling for endogeneity bias. However, during boom periods, the authors found that increasing company income tax and reducing personal income tax positively affect public sector efficiency relative to recessionary periods.

Another strand of the literature has focused on country-specific contexts. Narayan and Narayan (2006) investigate the link between government expenditure and revenue for 12 developing countries using time series modelling approaches. The causality tests reveal that revenue drives expenditure in Mauritius, El Salvador, Chile and Venezuela while neutrality was found for Peru, South Africa, Guatemala, Uruguay, and Ecuador. They found that fiscal synchronization holds in Haiti. Kaya and Arslan (2020) used an asymmetric causality approach to show that fiscal synchronization holds in Turkey. Magazzimo (2013) investigates the nexus between government revenue and expenditure for 15 ECOWAS countries for the period 1980-

2012. They find that revenue drives expenditure in Gambia, Liberia, Nigeria, Niger, and Sierra Leone while spending drives revenue in Burkina Faso, Senegal, Togo, Cape Verde, and Guinea. Although they show that fiscal synchronization holds in Mali, they document evidence of revenue and expenditure neutrality in Benin, Côte d'Ivoire, Guinea-Bissau, and Ghana.

There are several studies on fiscal sustainability in Nigeria. Obioma and Ozughalu (2010) investigate the link between government revenue and expenditure using a time series approach to analyze data from 1970-2007. The study established the existence of a long-run association between revenue and expenditure while a one-way causal link was found to run from revenue to government spending. Based on the Toda-Yomamoto causality approach that considers revenue and expenditure specifications with and without structural breaks, Ibrahim (2018) shows that fiscal synchronization holds in the case of the former while a unicausal association running from expenditure to revenue was observed in the case of the latter case, suggesting that structural breaks may matter for the different hypotheses. Lawrence and Apinran (2018) examine subnational fiscal management and its implication for development in Nigeria between 2010 and 2017. Utilizing descriptive analysis, the study found that despite the revenue shortfalls in Nigeria, state spending has persistently exceeded revenue inflows. in an assessment of the revenue-expenditure nexus in Nigeria using the granger causality technique, Uche and Ogbonna (2018) show that expenditure drive revenue thereby validating the tax-spend hypothesis.

In sum, the robust literature that investigates the government spending and revenue nexus remains highly aggregated and thus limited. This is due to the focus on the general government (federal in the case of Nigeria) with very few attempts to investigate the nexus at the state level. Looking at this issue through the lens of states is important because the states constitute a significant share of government size and this has important implications for sustained inclusive growth and development which, in recent times has continued to elude policymakers. Therefore, an attempt is made to contribute to the debate by using a new fiscal dataset sourced from states' audited financial statements. Another value addition lies in the panel data approach that accounts for endogeneity bias and cross-sectional (state) heterogeneity within a panel causality framework.

4 EMPIRICAL STRATEGY

Transmission Channel

The analytical foundation is based on the fiscal synchronization hypothesis which seeks to understand whether simultaneously, revenue drives spending and spending drives revenue. This is a very crucial issue at the subnational level in Nigeria where states are heavily reliant on federal transfers (monthly FAAC allocations). In the face of an oil shock that induces recessionary pressure, many states in Nigeria face outright bankruptcy and this is due to inadequate domestic revenue mobilization efforts by state governments. In other words, the reality in Nigeria is that oil prices have historically driven revenue inflows and thus distribution across the three tiers of government (federal, state and local). These entities especially the state and local governments rely heavily on monthly statutory allocations from the federal government for capital and recurrent spending. Therefore, it is expected that revenue inflows should drive expenditure. However, the reverse could also be the case as expenditure could drive revenue since spending stimulates economic activity thereby creating opportunities to tax economic agents. However, most states (perhaps excluding Lagos and some oil-producing states) have not been able to generate adequate revenue internally thereby magnifying fiscal risks and vulnerabilities. Against this backdrop, the empirical framework would be predicated on a panel causality framework that seeks to understand whether revenue drives expenditure or expenditure drives revenue at the subnational level in Nigeria.

Model and estimation procedure

The fiscal synchronisation hypothesis forms the basis of the empirical analysis and this is predicated on the notion that government revenue and expenditure decisions are coordinated. This presupposes that a bidirectional causality or feedback effect exists between the two fiscal indicators. As pointed out by Karlsson (2019), this scenario implies that the fiscal authorities of government should raise revenue and decrease expenditure concurrently in other to address the budget deficit and attain fiscal sustainability.

This paper extends the models proposed by Aregbeyen and Ibrahim (2012) and Ibrahim (2018) based on a panel dataset that is analyzed using the Granger non-causality tests in heterogeneous panels developed by Dumitrescu and Hurlin (2012). This is used to examine the causal link between sub-national government revenue and expenditure. The statistical procedure for validating such a hypothesis implies a rejection of the null hypothesis which states that there is no causal relationship between the variables. The data from one cross-section are modelled as lagged values from the next cross-section such that all the coefficients are different by cross-sections. The model is specified as follows;

$$\mathrm{SEXP}_{i,t} = \alpha_i + \sum_{k=1}^{K} \gamma_i^{(k)} \mathrm{SEXP}_{i,t-k} + \sum_{k=1}^{K} \beta_i^{(k)} \mathrm{SREV}_{i,t-k} + \varepsilon_{i,t} \qquad (1)$$

Where SEXP and SREV denote the natural logarithm of government expenditure and government absorption, respectively; observed for 12 states (i=1,…,12) and T periods (t=1,…,2021) while $K \in \mathbb{N}^*$ and $\beta_i = (\beta_i^{(1)}, \dots, \beta_i^{(K)})'$. The individual effects (α_i) are fixed across time. The initial conditions $(\mathrm{SEXP}_{i,-K}, \dots, \mathrm{SEXP}_{i,0})$ and $(\mathrm{SREV}_{i,-K}, \dots, \mathrm{SREV}_{i,0})$ of both the independent processes for the variables $\mathrm{SEXP}_{i,t}$ and $\mathrm{SREV}_{i,t}$ are given and observable. The lag orders K are identical for all states of the balanced panel. The autoregressive parameter $\gamma_i^{(k)}$ and the regression coefficient slope $\beta_i^{(k)}$ differ across groups and are assumed to be constant (Dumitrescu and Hurlin, 2012).

The null hypothesis is: $H_0: \beta_i = 0 \ \forall i = 1, \dots, N$. Note that β_i may vary across groups under the alternative (model heterogeneity).[6] The alternative hypothesis is: $H_1: \beta_i \neq 0 \ \forall i = N_1 + 1, N_1 + 2, \dots, N$. Where N_1 is unknown but satisfies the condition $0 \leq N_1/N < 1$.[7]

This is complemented by the Xiao et al. (2021) test for Granger non-causality. This technique provides more superior size and power performance relative to other approaches because of the use of a pooled estimator that has a faster $\sqrt{NT}$ convergence rate (ibid.). They also note that the test applies to multivariate systems and accounts for both homogeneous and heterogeneous alternatives. The bias-corrected linear dynamic panel data model is similar to Eqn 1 but the major difference is in the structure of the hypothesis. Following Juodis et al. (2021), under the null hypothesis, $\beta_i^{(k)} = 0$ for all *i* and *p.* That is, the model is homogenous in the feedback coefficient.[8]

Furthermore, we conduct baseline regressions using pooled ordinary least square (POLS) regression to understand the potential drivers of fiscal deficit. In this type of regression, the individual-specific effect is a random variable that is correlated with the explanatory variables. Next, we estimate the fixed effects (FE) and random effects (RE) models. While the FE model is used because it eliminates the effect of time-invariant features (that are unique to different cross-sections) to better understand the nature of the relationship, under the RE model

[6] Also, some of the individual vectors are allowed to be equal to zero to account for the non-causality assumption.

[7] The ratio N_1/N is necessarily inferior to one, since if $N_1 = N$ there is no causality for any of the individuals in the panel, which is equivalent to the null. Conversely when $N_1 = 0$ there is causality for all the individuals in the sample.

[8] Notably, in view of the so-called "Nickel bias" Juodis et al. (2021) propose that this bias is corrected using the half-panel jackknife method of Dhaene and Jochmans (2015).

the cross-sectional heterogeneity is assumed to be random and uncorrelated with the explanatory variables. In other words, differences in the explanatory variables across states could affect the fiscal deficit. The Hausman test is used to determine the preferred model.

Data and preliminary checks

The revenue, expenditure, and fiscal deficit as well as its potential determinants are sourced from the states' audited financial statements and approved budgets all published on the state websites while the debt data is obtained from the Debt Management Office (DMO). Information on the state-level composite price index (inflation) and GDP are both obtained from the National Bureau of Statistics (NBS) website. The data used covers 12 states between 2011 and 2021. The states were selected based on data availability and economic size and they are Lagos, Oyo, Abia, Anambra, Benue, Niger, Adamawa, Borno, Rivers, Delta, Kano, and Kaduna.[9]

There are some caveats regarding the state GDP data because the NBS only released state GDP data for 22 states between 2013 and 2017. This implies that values for the 2010-2012 period and projections for the period 2018-2019 would also be required to complete the data for the missing years. While for all the states, 2010 data was sourced from Wikipedia,[5] only 7 (Anambra, Delta, Kaduna, Kano, Niger, Oyo, and Rivers) out of the 12 states considered had complete data for the period published by NBS (2013-2017). Therefore, the missing years were estimated using the annual national nominal GDP growth rate.

Descriptive statistics for the series are presented in Table 1 and it shows that average government expenditure exceeds government revenue in the selected states. This implies that the states have consistently grappled with fiscal deficits which recorded a mean of N6.8 billion with the largest deficit of N346 billion and a minimum (surplus) of N3.46 trillion. The debt indicators (external and domestic debt stock) portray a worrisome trend given the average of N99.8 billion domestic debt which is higher than the average domestic debt of N48.6 billion. The high standard deviation of domestic and external debt stock suggests that subnational debt is putting pressure on the country's debt profile. The average state CPI is 235 and exceeds the standard deviation of 92 indicating significant spatial disparity of consumer prices across states. The overall average state GDP is N3.3 trillion with Lagos state recording a maximum value of N15.3 trillion in 2021 and a minimum of 795 billion recorded by Adamawa state in 2011.

Table 1: Summary Statistics

Variable		Mean	Std. Dev.	Min	Max	Obs.	
srev	overall	1.53E+11	1.37E+11	4.03E+10	7.71E+11	N =	132
	between		2.53E+10	1.24E+11	1.87E+11	n =	11
	within		1.35E+11	3.28E+10	7.37E+11	T =	12
sexp	overall	2.20E+11	3.86E+11	5.77E+10	4.03E+12	N =	132
	between		1.33E+11	1.46E+11	6.10E+11	n =	11
	within		3.65E+11	-3.12E+11	3.64E+12	T =	12
sgdp	overall	3.31E+12	2.54E+12	7.95E+11	1.53E+13	N =	132
	between		1.01E+12	2.08E+12	5.02E+12	n =	11
	within		2.35E+12	3.59E+11	1.35E+13	T =	12
scpi	overall	234.8442	91.75449	114.5	436.98	N =	132
	between		95.54687	121.3583	414.1192	n =	11
	within		7.500358	209.5351	257.7051	T =	12
sdef	overall	-6.78E+10	3.61E+11	-3.85E+12	3.46E+11	N =	132
	between		1.19E+11	-4.23E+11	-1.48E+10	n =	11

[9] https://en.wikipedia.org/wiki/List_of_Nigerian_states_by_GDP

	within		3.42E+11	-3.49E+12	6.85E+11	T =	12
sdomd	overall	9.98E+10	1.11E+11	1.68E+09	6.59E+11	N =	132
	between		4.45E+10	3.91E+10	1.59E+11	n =	11
	within		1.02E+11	-1.34E+10	5.99E+11	T =	12
sextd	overall	4.68E+10	9.90E+10	1.97E+09	5.51E+11	N =	132
	between		2.83E+10	1.29E+10	9.49E+10	n =	11
	within		9.52E+10	-3.99E+10	5.03E+11	T =	12

Source: Author's computation using STATA

The correlation coefficients between the variables of interest are presented in Table 2. It can be seen that government expenditure is positively correlated with government revenue (97%) during the review period, suggesting that they move in a similar direction. Interestingly, only state GDP (61%) and state external debt (70%) seem to exert a relatively higher correlation with the state fiscal deficit while state CPI and state domestic debt stock recorded approximately 26% and 53% respectively suggesting that their impact may not be significant.

Table 2: Correlation Matrix

	lnsrev	lnsexp	Lnsgdp	lnscpi	lnsdef	lnsdomd	lnsextd
lnsrev	1						
lnsexp	0.9762	1					
lnsgdp	0.9523	0.9398	1				
lnscpi	0.5116	0.5415	0.7143	1			
lnsdef	0.6687	0.5485	0.6100	0.2631	1		
lnsdomd	0.8536	0.8713	0.9108	0.7997	0.5345	1	
lnsextd	0.9045	0.8469	0.9112	0.523	0.7024	0.7561	1

Source: Author's computation using STATA

5 DISCUSSION OF FINDINGS

The empirical analysis starts with stationarity tests because it is a condition for conducting a panel Granger non-causality test. Thus, we carry out the Harris and Tzavalis (1999) unit root test because it is suitable for datasets with large panels and relatively short time dimensions. In other words, it assumes that the number of panels is infinite while the time is fixed.[10] Furthermore, we subject the data to a panel unit root test that accounts for cross-sectional dependence. The test is a simple alternative where the standard augmented Dickey-Fuller (ADF) regressions are augmented with the cross-section averages of lagged levels and the first differences of the individual series (Pesaran, 2007). The results indicate that the data are stationary and therefore we proceed with the causality test.

Table 3: Panel Unit Root Test Results

variables	Harris-Tzavalis (1999)	Pesaran (2007)
	rho stat.	CIPS stat.
lnsrev	-0.034*	-3.430*
lnsexp	0.077*	-3.148*
lnsgdp	-0.081*	-2.368*
lnscpi	0.016*	-3.439*
lnsdomd	-0.185*	-3.193*
lnsextd	-0.026*	-2.751*
sdef	0.186*	-3.751*

Source: Author's computation using STATA

[10] https://www.stata.com/features/overview/panel-data-unit-root-tests/

Note: For the Harris-Tzavalis (1999) test, common AR parameters are used. The panel mean is taken into account while the time trend is not included. The Pesaran (2007) unit root test with cross-sectional dependence includes the first difference mean with a deterministic constant. (*) Indicates significance at the 5% level.

Table 4 presents the output of the Granger non-causality univariate test of the relationship between state government revenue and expenditure as well as the causal factors of the state fiscal deficit. The null hypothesis that government expenditure does not Granger-cause government revenue and vice versa are both rejected at the 5% level of significance. This implies that past values of government spending (government revenue) contain information that helps to predict government revenue (government expenditure). This implies that there is a bidirectional linkage between state government spending and revenue, thus validating the fiscal synchronization hypothesis. This conforms with Yien et al. (2019) who also found that the fiscal synchronisation hypothesis holds in Indonesia. However, Babarinde (2022) presented contrary results as the study showed that the fiscal neutrality hypothesis holds at the local government level in Nigeria. This could be explained by the state governors using their discretion in the allocation of funds to the local governments.

Our findings are however in line with Ibrahim (2018) who showed that the fiscal synchronization hypothesis holds in Nigeria especially when structural breaks are considered but fails to hold without structural breaks. This also conforms with Chang and Chiang (2009) for a panel of 15 OECD countries but deviates from the unidirectional linkage from government revenue to government spending found by Tashevska et al. (2020) for 6 Southeast European countries. On the other hand, one fails to reject the null hypothesis that domestic and external borrowing by state governments does not Granger-cause fiscal deficit.

Table 4: Dumitrescu & Hurlin (2012) Granger non-causality test results

Null Hypothesis:	W-Stat.	Zbar-Stat.	P-value	Remark
lnsexp does not Granger cause lnsrev	0.152	-1.9883	0.0468	reject null
lnsrev does not Granger cause lnsexp	0.103	-2.1026	0.0355	reject null
lnsgdp does not Granger-cause sdef	0.126	-2.0503	0.0403	reject null
lnscpi does not Granger-cause sdef	3.789	6.5416	0.000	reject null
lnsdomd does not Granger-cause sdef	1.124	0.2913	0.7708	do not reject null
lnsextd does not Granger-cause sdef	0.794	-0.4823	0.6296	do not reject null

Source: Author's computation using STATA

The result of the Granger non-causality test proposed by Juodis et al. (2021) is presented in Table 5. This result reflects the nature of the temporal relationship between state government revenue and expenditure as well as the causal factors of subnational fiscal deficits. As indicated in the Table, the null hypothesis that state government spending (lnsexp) does not granger cause state government revenue (lnsrev) is rejected, suggesting that expenditure drives revenue. This result is in line with the findings of Magazzino (2013) for Burkina Faso, Senegal, Togo, Cabo Verde and Guinea. Narayan and Narayan (2006) document similar evidence for Haiti but present evidence supporting the tax-spend hypothesis in Mauritius, El Salvador, Chile, and Venezuela. However, the results show that government revenue does not cause government spending at the state level. This may be explained by the fact that the states have limited space to generate revenue internally and are thus overly dependent on monthly statutory allocations from the Federal Government.

Based on this test, we conclude that there is a one-way causal relationship running from expenditure to revenue, thus validating the expenditure-tax hypothesis. This does not conform with the findings of Obioma and Ozughalu (2010) who find that revenue drives expenditure in Nigeria. This could be explained by the fact that they focused on aggregate federal-level data and not subnational governments. However, Ibrahim (2018) presents similar results that

validate the spend-tax hypothesis in Nigeria and Karlsson (2019) for China. In terms of fiscal deficit, the result in Table 5 also shows that state GDP (lnsgdp) and inflation (lnscpi) are the main causal factors of the deficit. This is quite surprising because we expected state debt to influence the deficit. This is because domestic and external borrowings are used by the state governments to finance the deficit.

Table 5: Juodis, Karavias & Sarafidis (2021) Granger non-causality test results

Null Hypothesis:	HPJ W-Stat.	P-value	Remark
lnsexp does not Granger cause lnsrev	16.047	0.0001	reject null
lnsrev does not Granger-cause lnsexp	0.389	0.5328	do not reject null
lnsgdp does not Granger-cause sdef	3.773	0.0521	reject null
lnscpi does not Granger-cause sdef	46.358	0.000	reject null
lnsdomd does not Granger-cause sdef	1.599	0.206	do not reject null
lnsextd does not Granger-cause sdef	0.021	0.8857	do not reject null

Source: Author's computation using STATA

Table 6 depicts the results of the cross-state regressions estimated using pooled OLS (POLS), fixed effect (FE) and random effect (RE) models. The objective is to understand the drivers of fiscal deficit at the subnational level and due to obvious data limitations, the model is formulated such that fiscal deficit is explained by state GDP (lnsgdp), state inflation (lnscpi), external borrowing (lnsextd) and domestic debt stock (lndomd). The result for the POLS shows that only external borrowing is a significant (at the 5% level) determinant of fiscal deficit in Nigerian states whereas the fixed effect model shows that the state level of economic activity exerts a positive and significant (at the 10% level) effect on the deficit. All other variables in the model do not have a statistically significant effect on the state fiscal balance.

These findings are in line with other studies such as Tujula and Wolswijk (2004) for a group of OECD countries and Okoye et al. (2019) who showed that external debt reduces the level of fiscal deficit in Nigeria. Ekeocha and Ikenna-Ononugbo (2017) note that most state governments run fiscal deficits to sustain recurrent spending at the expense of capital expenditure. Similar to our finding, the authors establish that economic growth had a significant positive impact on the fiscal deficit across Nigerian states. These findings have been validated in a relatively more recent study by Mawejje and Odhiambo (2020) who opine that in addition to other macroeconomic indicators, economic size and debt are important determinants of the budget deficit.

Table 6: Cross-State Regressions Results

	(1)	(2)	(3)
VARIABLES	POLS	FE	RE
lnsgdp	-1.198	10.745*	4.081
	(1.703)	(4.899)	(6.899)
lnscpi	-1.458	-24.165	-1.726
	(0.896)	(33.877)	(4.588)
lnsdomd	0.808	-2.843	0.034
	(0.712)	(1.775)	(0.412)
lnsextd	1.171**	-3.728	-2.095
	(0.471)	(5.020)	(3.096)
Constant	17.215	-3.500	-41.323
	(23.128)	(142.898)	(142.095)
Observations	27	27	27
R-squared	0.54	0.97	
Year POLS	Yes		

State POLS	Yes		
Adj. R-squared	27.00	27.00	27.00
Number of years		11	11
Year FE		Yes	
State FE		Yes	
Year RE			Yes
State RE			Yes

Source: Author's computation using STATA
Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

6 CONCLUSION AND POLICY RECOMMENDATIONS

Fiscal sustainability has remained an important concern for Nigerian governments at the federal and state level. This is due to obvious revenue shortfalls and budgetary constraints in the face of huge spending need especially at the subnational level. However, the focus of the literature on fiscal sustainability has largely been focused on the central government (federal) with limited attention to the other federating units (states). This is mainly due to data limitations at the subnational levels, especially in developing countries like Nigeria where public financial management remains weak and fiscal deficit persists across states. The recent improvement in public financial management at the state level which has culminated in the publishing of audited financial statements and budgets by the state government has made fiscal data more available and such analysis feasible.[11] Therefore, this paper investigated whether the fiscal synchronisation hypothesis holds in selected states in Nigeria. Furthermore, the drivers of subnational fiscal deficits were also analysed.

The trend analysis reinforced some salient facts. First, the fiscal profile of states is largely affected by the recessionary pressure observed in 2016 and the covid-19 pandemic in 2020. These periods coincided with lower deficit financing, more borrowing, and relatively higher spending outlays. The Dumitrescu and Hurlin (2012) panel causality analysis reveals that the fiscal synchronization hypothesis holds in Nigeria but the Juodis, Karavias and Sarafidis (2021) causality test only validated the spend-revenue hypothesis. While the causality test both showed that state-level inflation and economic activity are the main drivers of the deficit, the cross-state regression revealed that external borrowing and economic size exert a positive and significant impact on fiscal deficit in states.

Fiscal management in Nigeria is complicated by the fiscal federalism structure where state governments have autonomy over their spending and non-statutory revenue decisions. Limited fiscal discipline by state governments in form of low non-statutory revenue generation capacity combined with the significant deviation between budget and actual expenditure outlays magnify fiscal risks in the states with possible spillover effects on federal finances. The empirical analysis has some important policy implications and considerations for state governments. The results make a case for state governments to urgently diversify their revenue inflows by strengthening non-statutory revenue mobilization. Concomitantly, spending plans by subnational governments should carefully consider their projected revenue inflows by ensuring that revenue targets in the budgets are realistic and able to finance the planned expenditure outlay. Finally, reducing the deviation between the approved budget and actual spending would help improve the short- to medium-term public expenditure framework and minimize the deficit. Some limitations of this study serve as important areas for future studies. As data become more available, it would be useful to include more states as well as expand the

[11] It is important to note that this positive development is due to the World Bank's State Fiscal Transparency Accountability Sustainability (SFTAS) program which was largely predicated on the Federal Government's home-grown Fiscal Sustainability Plan (FSP).

timeframe of the analysis. Also, the analysis of fiscal deficit could be extended to account for more determinants as state-level data become more available. Finally, panel data techniques that capture short- and long-run dynamics could provide additional information on the nature of the relationship between revenue, expenditure and the driving factors of fiscal deficit.

REFERENCES

Adnan, Q.M. and Jalil, A. (2010). Revenue and expenditure nexus: A case study of Romania, *Romanian Journal of Fiscal Policy*. 1(1), 22-28.

Afonso, A., Jalles, J.T. and Venâncio, A. (2021) Structural Tax Reforms and Public Spending Efficiency. *Open Economies Review*. 32, 1017–1061. https://doi.org/10.1007/s11079-021-09644-4

Akinboyo, O. L. & Apinran, M. O. (2018). States' Fiscal Dependency and Implications on Monetary Management in Nigeria. Central Bank of Nigeria *Bullion*, 42(4), 12-27.

Akujuobi, L.E. and Akujuobi, A.B.C. (2003). Financing State Governments in Nigeria, 1980-2007, *African Research Review*, 3(3), 204-215.

Aregbeyen, O. and Ibrahim, T. M. (2012). The causal relationship between government spending and revenue in an oil-dependent economy: the case of Nigeria. *The IUP Journal of Public Finance*, 10(1), 6-21.

Babarinde, G.F. (2022) Fiscal Neutrality Hypothesis: An Analysis of the Nigerian Local Government Revenue and Expenditure. *Journal of Public Administration, Finance and Law*. 23(1), 119-130.

Baghestani, H., and McNown, R. (1994). Do Revenue or Expenditure Respond to Budgetary Disequilibria? *Southern Economic Journal*, 61(2), 311–322.

Chang, T. and Chiang, G. (2009). Revisiting the revenue-expenditure nexus: Evidence from 15 OECD countries based on the panel data approach. *Czech Journal of Economics and Finance*, 59(2), 165-172.

Dhaene, G. and Jochmans, K. (2015) Split-panel Jackknife Estimation of Fixed-effect Models, *The Review of Economic Studies*, 82(3) 991–1030.

Dumitrescu, E.-I., and C. Hurlin. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic Modelling.* 29(4), 1450–1460.

Ekeocha, P. and Ikenna-Ononugbo, A. (2017) Cost of Governance and Fiscal Deficit in Nigeria: Evidence from State Government Data. Central Bank of Nigeria *Economic and Financial Review*, 55(1), 111-136.

Fasano, U. and Wang, Q. (2002) Testing the Relationship Between Government Spending and Revenue: Evidence from GCC Countries. International Monetary Fund (IMF) Working Paper No. 201.

Friedman, M. (1978). The Limitations of Tax Limitations. *Quadrant*, 22(8), 22–24.

Gootjes, B. and de Haan, J. (2022) Procyclicality of fiscal policy in European Union countries. *Journal of International Money and Finance.* 120(1), 1-29.

Harris, R. D. F., and Tzavalis, E. (1999). Inference for unit roots in dynamic panels where the time dimension is fixed. *Journal of Econometrics.* 91(2), 201–226.

Ibrahim, T. (2018). Government expenditure-revenue nexus reconsidered for Nigeria: Does structural break matter? University Library of Munich, Germany, *MPRA Paper No*. 86220

Juodis, A., Y. Karavias, and V. Sarafidis. (2021). A homogeneous approach to testing for Granger non-causality in heterogeneous panels. *Empirical Economics*, 60(1/4), 93–112.

Kamo, K, Andohol, J. and Anjande, G. (2022). Investment-Savings Gap and Public Debt Sustainability in Nigeria. *Journal of Economics and Allied Research*. 7(3), 27-39.

Holtz-Eakin, D., Newey, W. and Rosen, H. (1989) The Revenue-Expenditures Nexus: Evidence from Local Government Data. *International Economic Review*, 30(2), 415-429.

Hyunjoo Kim Karlsson (2019) Investigation of the time-dependent dynamics between government revenue and expenditure in China: a wavelet approach, *Journal of the Asia Pacific Economy*. 25(2), 1-22.

Kaya, H.F. and Arslan, S.N. (2020) The government revenue–expenditure nexus: Asymmetric causality test. *Current Research Social Science*, 6(2), 170-178.

Kolawole, B.O. (2019). Foreign debt and economic growth dynamics: further evidence from Nigeria. *Journal of Economics and Allied Research*, 3(3), 1-12.

Magazzino, C. (2013). Revenue and expenditure nexus: A case study of ECOWAS. *Economics*. 7(1), 1-27.

Mawejje, J. and Odhiambo, N.M. (2020). The Determinants of Fiscal Deficit: A Survey of the Literature. *International Review of Economics*, 67(3), 403-417.

Meltzer, A. H. and Richard, S. F. (1981). A Rational Theory of the Size of the Government. *Journal of Political Economy*, 89(5), 914–927.

Narayan, P. K. and Narayan, S. (2006). Government Revenue and Government Expenditure Nexus: Evidence from Developing Countries. *Applied Economics*, 38(3), 285-291.

Narayan, P.K. (2005). The Government Revenue and Government Expenditure Nexus: Empirical Evidence from nine Asian Countries. *Journal of Asian Economics*, 15(6), 1203-1216.

Nggada, M.H. and Yushau, I. and Shehu, Y. (2021) Public Expenditure and Economic Growth in Nigeria: A Nonlinear Analysis. Journal of Economics and Allied Research, 6(2), 245-255.

Obioma, E.C. and Ozughalu, U.M. (2010). An Examination of the Relationship between Government Revenue and Government Expenditure in Nigeria: Cointegration and Causality Approach. *Central Bank of Nigeria Economic and Financial Review*, 48(2), 35-57.

Okoye, L.U., Omankhanlen, A.E., Okorie, U.O., Okoh, J.I, and Ahmed, A. (2019) Persistence of Fiscal Deficit in Nigeria: Examining the Issues. *Investment Management and Financial Innovations*. 16(4), 98-109.

Oligbi, B.O. (2020) Fiscal Decentralization and Macroeconomic Stability in Nigeria. Journal of Economics and Allied Research. 4(1), 95-106.

Omoshoro-Jones, O.S. (2020). Investigating the Government Revenue–Expenditure Nexus: Empirical Evidence for the Free State Province in a Multivariate Model. University Library of Munich, Germany, *MPRA Paper* No. 101349.

Peacock, A. T. and Wiseman, J. (1979). Approaches to the Analysis of Government. *Public Finance Review*, 7(1), 3-23.

Pesaran, M.H. (2007). A Simple Panel Unit Root Test in the Presence of Cross-Section Dependence. *Journal of Applied Econometrics*. 12(2), 265-312.

Ram, R. (1988) A Multicountry Perspective on Causality between Government Revenue and Government Expenditure, *Public Finance*, 43(2), 261-270.

Takumah, W. (2015). The dynamic causal relationship between government revenue and government expenditure nexus in Ghana. University Library of Munich, German. *MPRA Working Paper No*. 58579.

Tashevska, B., Trenovski, B. and Trpkova-Nestorovska, N. (2020). The Government Revenue–Expenditure Nexus in Southeast Europe: A Bootstrap Panel Granger-Causality Approach, *Eastern European Economics*, 58(4), 309-326.

Tujula, M. and Wolswijk, G. (2004). What Determines Fiscal Balances? An Empirical Investigation in Determinants of Changes in OECD Budget Balances. *European Central Bank Working Paper Series* No. 422, December.

Uche, E. and Ogbonna, B. (2018) Tax-and-Spend, Spend-and-Tax, Fiscal Synchronization, or Fiscal Separation: Emerging Evidence from Nigeria. *Journal of Economics and Sustainable Development*, 9(24), 68-77.

Westerlund, J., Saeid, M., and Fathali, F. (2011). The tax-spending nexus: Evidence from a panel of US state-local governments, *Economic Modelling*, 28(3), 885-890

World Bank (2003) Nigeria State Finances Study. Macroeconomics 3 Division Africa Region, Washington DC. https://openknowledge.worldbank.org/handle/10986/14671 (Accessed November 27, 2022)

World Bank (2011) Nigeria State Level Public Expenditure Management and Financial Accountability Review: A Synthesis Report – Anambra, Bayelsa, Ekiti, Kogi, Niger, Ondo, and Plateau. Poverty Reduction and Economic Management, Africa Region, Washington DC. https://openknowledge.worldbank.org/handle/10986/12351. (Accessed November 27, 2022)

Xiao, J., Juodis, A., Karavias, Y., and Sarafidis, V. (2021). Improved Tests for Granger Non-Causality in Panel Data, Discussion Papers 21-06, Department of Economics, University of Birmingham. https://repec.cal.bham.ac.uk/pdf/21-06.pdf (Accessed December 10, 2022).

Yien, L.C, Abdullah, H. and Azam, M. (2019) Monetarism or Keynesian Discourse in Indonesia, *Bulletin of Indonesian Economic Studies*, 55(3), 367-385.

Yinusa, D.O and Adedokun, A. (2017) Fiscal Synchronization or Institutional Separation: An Examination of Tax-Spend Hypothesis in Nigeria. *Journal of Finance and Accounting*, 5(3), 80-87.

Yinusa, O.G., Aworinde, O.B., and Oseni, I.O. (2017) The Revenue- Expenditure Nexus in Nigeria: Asymmetric Cointegration Approach. *South-Eastern Europe Journal of Economics* 16(1), 47-61