FISCAL DECENTRALISATION AND ECONOMIC GROWTH IN SUB-SAHARAN AFRICA

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Abstract

Fiscal decentralisation is often considered a vital policy tool, but its applicability and effectiveness across different economic frameworks remain an open question. Yet, empirical findings have failed to provide a consistent guide due to a lack of consensus. Hence, the study examined the effects of fiscal decentralisation on economic growth in sub-Saharan countries for the period 2000-2023. In this context, 45 sub-Saharan African countries were analysed, employing the panel OLS estimation method on data from the IMF, CBN, World Bank, ILO and UNI-WIDER data sources. The study found that sub-national expenditure and revenue have positive economic growth effects while the federal government components have nil economic growth effects. The fiscal deficits have no economic growth effects. This implies that sub-national government expenditure and revenue are more pro-growth than the federal government counterpart. In this context, the study concludes that fiscal decentralisation on income and expenditure could be one of the key policy choice for sub-Saharan economies that are considering experimenting with or deepening their decentralisation processes for economic growth. Accordingly, this study recommends that policymakers encourage increased fiscal autonomy for the sub-national government to exercise their responsibilities to promote economic growth.

Keywords: Fiscal decentralisation, Economic Growth, Fiscal deficits

Jel Classification Code: F040, E6, E62, H6

1. Introduction

There are many determinants of economic growth identified in the literature both theoretically and empirically, among these is the issue of the structures of polity, particularly the extent to which powers and responsibilities are devolved to the lower tiers of government. The relationship between fiscal decentralisation and economic growth is a relatively new line of investigation. The traditional vision of the theory of fiscal federalism only emphasises the largest gains of efficiency that derive from the processes of decentralisation of the public sector. Nevertheless, in the last decades, a new line of investigation has arisen that tries to discover whether or not the processes of fiscal decentralisation can equally promote the economic growth of a country. More concretely,

this new field of analysis is inspired by the reflections made by (Oates, 1993). Oates (1993) argues that if from a static perspective, the main benefits that derive from the installation of multilevel government systems are expressed in terms of economic efficiency; then from a dynamic perspective, the potentialities of fiscal decentralisation can be translated in terms of economic growth. The decentralisation of public services and their financing is high on the economic agenda and has triggered a growing interest in measurement issues. Fiscal decentralisation has become an interesting topic today because researches about fiscal decentralisation are not only discussed from the economic perspective but also from other perspectives such as political and geographical, among others. Appropriate indicators can help governments compare, diagnose and reform intergovernmental fiscal frameworks as well as assess the outcome of past reforms. They can help assess whether and to what extent decentralisation fosters economic growth, raises the efficiency of the public sector or contributes to macroeconomic stability. In the scientific world, the question of how fiscal decentralisation affects the economic growth of the country has been analysed by many scientists (Oates 1999; Akai and Sakata 2002; Thiessen 2003; Iimi 2005; Buser 2011 & Szarowska 2014). The arguments for the positive influence of fiscal decentralisation consist of 3 different hypotheses: 1) the diversification hypothesis (also known as the decentralisation theorem); 2) the Leviathan hypothesis; and 3) the productivity enhancement hypothesis.

The results of numerous researchers on the relationship between fiscal decentralisation and economic growth, both from a cross-country and regional perspective, are very contradictory. Some researchers found a positive relationship (Szarowska, 2014; Ganaie et al. 2018), whereas others found a negative relationship (Davoodi and Zou, 1998; Baskaran and Feld 2013), while some found a nil effect (Thornton, 2007; Asatryan and Feld, 2015). The conflicting results can be attributed to differences in methodological approach, scope, or dataset. Irrespective of which of the arguments may be more convincing, what remains obvious is that there is a need for further studies to go beyond their specifications and methodologies. Thus, the focus of this study is to empirically investigate the effect of fiscal decentralisation on economic growth in 45 Sub-Saharan African countries using the latest data and the Panel Ordinary least squares (OLS) method on a cross-country panel data set collected from 45 countries from 2000 to 2023.

2.0 Literature Review

Economic growth is affected by a wide arrow of factors, among which fiscal decentralisation plays a certain role (Musgrave, 1959 and Oates, 1972). According to Kuznets (1973), a country's economic growth is a long-term rise in capacity to supply increasingly diverse economic goods to its population, with this growing capacity based on advancing technology and the institutional and ideological adjustments that it demands. It is conventionally measured as the percent rate of increase in real GDP (Merriam-Webster, 2020). According to the fiscal federalism theory (Tiebout, 1956 and Oates, 1972), local government fiscal autonomy ensures efficient allocative outcomes, which may eventually lead to higher rates of growth. The first theoretical discussion of fiscal decentralisation from an economic point of view dates back to the middle of the twentieth century. Musgrave (1959) and Tiebout (1956) formulated the theoretical foundations of fiscal federalism. These ideas were further developed by Oates (1999) and

Buchanan (1980). Traditionally, the economic aspect of decentralisation was analysed through the framework of fiscal federalism. While fiscal federalism is a framework for analysis of a nation's public sector, decentralisation is a process of public sector activities assigned to the government at different levels. Thus, fiscal federalism is the system of reference within which the process of decentralisation or centralisation occurs (Slavinskaite and Ginevičius, 2016).

2.1 Theoretical literature

This study is based on some theories. First is the theory on the role of fiscal decentralisation while the second, is the theory of Economic growth which is based on the neoclassical growth model which is chronologically reviewed below. The first theory is the studies conducted by Bardhan and Mookherjee (2003), the Traditional theory first developed by Oates (1972), and the public choice theory on the role of fiscal decentralisation.

Bardhan and Mookherjee (2003), argued that expenditure decentralisation not accompanied by revenue decentralisation limits the expansionary effect of decentralisation on service levels. Thus, fiscal decentralisation is expected to contribute to overall economic growth. The rationale behind this is that decentralising fiscal authorities create a competitive environment among sub-national entities, leading to efficiency and overall economic growth. Public Choice, on the other hand, emphasises the role of decentralisation as a mechanism to control an intrusive, expansive public sector and to support effective private markets (Weingast, 1995 and McKinnon, 1997). The second theory is the neoclassical growth model which is described below;

The neoclassical growth model was first introduced by Solow (1956) and Swan (1958). The theory posits growth in output to be a function of growth in inputs: capital, labour, and technological progress. Any increase in savings rate leads to only an increase in both the steady-state level of output per capita and capital per capita over time without affecting the growth rate of output. The growth rate of output remains unchanged due to the law of diminishing marginal product of capital because any further capital increase will lead to a fall in output back to the steady state. Also, population growth reduces the steady-state level of capital per head and output per head as it increases over time and it increases the steady-state growth rate of output. Long-run growth of output also depends on improvement in technology and an absence of this will allow output per person to converge to a steady state value, which depends positively on the savings rate and negatively on the population growth rate (Dornbusch et al., 2011).

2.2 Empirical Review

There have been flurries of empirical studies on fiscal decentralisation and economic growth globally, although there are few studies on Sub-Saharan African countries. Starting with studies outside Sub-Saharan Africa (SSA) that are very recent (being post-2000 ones), among such studies are Jin and Rider (2019) and Setiawan & Aritenang (2019), Huynh and NamTran (2020), Alves et al. (2023) & Mishra et al. (2023).

Jin and Rider (2019) investigated the relationship between fiscal decentralisation and economic growth in China and India using GMM, the study found that expenditure decentralisation has a negative effect on economic growth. Setiawan and Aritenang (2019) examined the effect of fiscal decentralisation on economic growth by using lag value, the study found that fiscal decentralisation has a positive effect on economic growth. Huynh and NamTran (2020) investigated expenditure decentralisation and tax revenue decentralisation on economic growth in 23 OECD countries over the period 2002 to 2016 and found that both expenditure decentralisation and tax revenue decentralisation have positive effects on economic growth. Alves, Araujo, Melo, and Mashoski (2023) investigated the effect of fiscal decentralisation on economic growth in Brazilian states from 1996 to 2015 and found positive effects of fiscal decentralisation on economic growth. Mishra, Arjun, and Tiwari (2023) examined the effect of fiscal decentralisation on economic growth in India from 1996 to 2021 and found that expenditure decentralisation has positive effects on economic growth.

Studies that have examined the relationship between fiscal decentralisation and economic growth in Sub-Saharan Africa include Udoh et al. (2015), Canavire-Bacarreza et al. (2019), Hanif et al. (2020), Hung and Thanh (2022), Stungwa and Mosikari (2023).

Udoh et al. (2015) investigated the effect of fiscal decentralisation on economic growth in Nigeria and found that expenditure decentralisation has a negative effect on economic growth. Canavire-Bacarreza et al. (2019) investigated the relationship between fiscal decentralisation and economic growth by using Geographic Fragmentation Index (GFI) and country size as instrumental variables. The study found that both instruments are strong and valid in the first stage of estimation and that, on average, a 10 per cent increase in sub-national expenditure or revenue share increases GDP per capita growth. Hanif et al. (2020) examined the relationship between fiscal decentralisation and economic growth, the results found that both tax revenue and expenditure decentralisation have positive effects on economic growth. Ewetan et al. (2020) examined the impact of fiscal federalism on economic growth using the ARDL approach and found that revenue decentralisation affects economic growth, while expenditure decentralisation affects it positively.

Hung and Thanh (2022) examined the effects of fiscal decentralisation on economic growth, the study found nil effects between fiscal decentralisation and economic growth. Stungwa and Mosikari (2023) investigated the relationship between fiscal decentralisation and economic growth in South Africa. The study used the annual panel fixed effects model from 2010 to 2019 across nine provinces. The study found a positive relationship between fiscal decentralisation and economic growth.

Virtually, previous studies examined the effects of fiscal decentralisation and economic growth using only GMM for specific countries or selected countries (See Hanif et al., 2020). This study adds to the existing by covering 45 countries in Sub-Saharan Africa using fixed effect. Furthermore, to the best of the researcher's knowledge, most empirical studies in Sub-Saharan Africa limit the variable used to revenue and expenditure, thereby failing to acknowledge the relevance of other important fiscal decentralisation-related variables, particularly the fiscal deficit. Thus, this study seeks to address this gap by

adding fiscal deficit as one of the variables of primary interest to determine which of the federal and sub-national components of fiscal deficit, if any, is more pro-growth.

3.0 Methodology

3.1 Theoretical Framework

There are two measures of the theory underlying this study: one is on the role of fiscal decentralisation on economic growth and the other is on the generalised growth theory.

This is premised on the proposition put forward by Bardhan and Mookherjee (2003) who, in their theoretical model, compared the delivery of public goods under decentralised and centralised systems. According to this theory, fiscal decentralisation influences economic growth by enhancing efficiency, responsiveness, competition, resource mobilisation and institutional development at the sub-national unit. The framework suggests that a well-designed and effectively implemented fiscal decentralisation policy can contribute significantly to overall economic growth.

Regarding the second part of the theory, which is on economic growth, the theoretical foundation of the growth of GDP (or economic growth) equation can be found in the neoclassical growth theory-based growth accounting framework, which is widely used in most empirical studies.

3.2 Model Specification

To determine the effects of fiscal decentralisation on economic growth, the neo-classical growth equation adopted in this study is extended through the level of technology (A), which can be construed broadly as embodying productivity and efficiency in all ramifications. This extension is through the identification of possible determinants of productivity growth $\left(\frac{\Delta A}{A}\right)$ and specification of the total factor productivity growth $\left(\frac{\Delta A}{A}\right)$ function.

The determinants of factor productivity growth $\left(\frac{\Delta A}{A}\right)$ include the totality of factors or things, except growth in the explicitly identified factors of production (which are only quantities of labour and capital that influence economic growth. In the discussion here, such identified or recognised factors are limited to only the size of budgetary variables (viz: government expenditure and its sources of financing) of the government and how they are distributed between the central and sub-national governments as well as five control variables in form of literacy rate, financial development, and net foreign direct investment, growth of capital stock and labour force growth.

Size of budgetary variables (government expenditure, GEXPF, SUBEXPD, revenue, REVF, SUBREV and deficits, DEFF, SUBDEF): The size of budgetary variables comprises revenue, expenditure and fiscal deficit. Federal and sub-national expenditures, particularly on infrastructure like power, roads, communication, etc should reduce the costs of production, and facilitate the development of the private sector and industrial profitability, thereby, fostering the growth of the economy. On the other hand, government expenditure, irrespective of whether federal or sub-national, that is tailored

towards unproductive economic services could retard economic growth. At the empirical level, some studies like Moche et al. (2014) and Sasana (2019) have reported a positive effect of expenditure on economic growth. But, despite this empirical evidence and given the above-stated inconclusive economic logic, on the whole, the actual effects of the federal and sub-national expenditure on economic growth are left open, to be empirically determined. Regarding government revenue, whether federal or sub-national government type, it is an important source of financing expenditure and, as such, if properly harnessed and utilised, could promote economic activities. However, if it is not efficiently collected and judiciously administered, it could retard economic growth. At the empirical level, several studies, like Hung and Thanh (2022) and Stungwa and Mosikari (2023) have reported a positive effect of revenue on economic growth. Again, notwithstanding these findings of the positive economic growth effect of government revenue and given the above-adduced economic logic that suggests an inconclusiveness of the direction of the effect of government revenue on productivity growth and, hence, on economic growth, on the whole, the net effect of federal and sub-national government revenues on productivity growth is left open, to be empirically determined. Regarding fiscal deficit, an increase in aggregate demand as a result of fiscal deficit should lead to increased economic activities which, in turn, should bring about economic growth. It also allows a government to allocate tax obligations across generations of citizens who all benefit from some form of government spending. However, the ease with which fiscal deficits can be incurred, with essentially nil resistance by the population because it seemingly costs them nothing explicitly (unlike taxes) makes fiscal deficit prone to create a temptation to over-borrow without a clear repayment plan and this may lead to inefficient and injudicious utilisation of the proceeds as well as an unsustainable debt level. Thus, on the whole, the net effect of federal and sub-national fiscal deficit on productivity growth is left open, to be empirically determined. The overall conclusion is therefore that the net effect of the size of each of the three categories of budgetary variables on productivity growth is left open, to be empirically determined. In addition, the 5 control variables considered in the study are Net foreign direct investment (FDI), Financial Development (FINDEV), inflation (INF), growth of capital stock ($\frac{\Delta K}{K}$) and labour force growth ($\frac{\Delta N}{N}$).

Following the above discussion, the productivity growth model, in its very simple form and based only on expenditure decentralisation, can be mathematically specified as:

$$\frac{\Delta A}{A} = \beta 3GEXPFit + \beta 4SUBEXPDit + \beta 5FDIit + \beta 6FINDEVit + \beta 7INFLit + eit \quad \ldots\ldots\ldots\ldots (1)$$

Where $\frac{\Delta A}{A}$ represent the Productivity growth of ith country during period t.

$GEXPFit$ represents Federal Government Expenditure of ith country during the period t;

$SUBEXPDit$ represents the Sub-National Government Expenditure of ith country during period t;

$FDIit$ represents the Net Foreign Direct Investment flow of a country during a period t;

$FINDEVit$ represents the Financial Development of the ith country during period t.

$INFLit$ represents the Inflation rate of the ith country during the period t;

μ_{it} = country effect; e_{it} = error term, β_3, β_4, β_5, β_6, β_7 and β_8 are parameters estimates.

The a priori expectations concerning the signs of these slope parameters are as stated mathematically thus: β_5, β_6, > 0, $\beta_7 < 0$, while β_3 and β_4, are left open for empirical determination.

Based on the above Equation (1), whether or not government expenditure decentralisation promotes productivity growth and, by extension, economic growth is to be determined by comparing the estimates of the coefficients of GEXPF (i.e. β_3) with that of SUBEXPD (i.e. β_4). If the estimate of β_3 is positive and statistically significant and is greater than the estimate of β_4, the conclusion would be that fiscal centralisation promotes productivity growth (and, with it, economic growth). This is because a given amount spent by the government would have a more positive productivity growth effect and, hence, economic growth effect if spent by the federal government than if spent by the sub-national government, so that, by centralising more of a given size of government expenditure, productivity growth and economic growth would increase. The converse would be the case if the estimate of β_4 is positive and statistically significant and is greater than the estimate of β_3 so that increased decentralisation can be said to promote economic growth. This same converse conclusion would apply when the estimate of β_4 is not statistically significant or it is negative and statistically significant but its absolute size is less than that of the negative and statistically significant estimate of β_3, which would then imply that the increased decentralisation reduces productivity growth and economic growth less than otherwise. If the estimate of β3 is not statistically significant or is negative and statistically significant, but its absolute size is less than the absolute size of the negative and statistically significant estimate of β4, it would imply that a given amount spent by the government would have either a nil productivity growth effect or a smaller negative productivity growth (and economic growth). This, in turn, means that increased centralisation can be said to reduce productivity growth and economic growth less than otherwise.

Equivalently, essentially the same conclusion would be reached by replacing GEXPF and SUBEXPD in Equation (1) with TGEXPD and FGTEXP respectively to arrive at the productivity growth in Equation (1a), thus:

$$\frac{\Delta A}{A} = \theta 3TGEXPDit + \theta 4FGTEXPrit + \beta 5FDIit + \beta 6FINDEVit + \beta 7INFLit \quad (1a)$$

where TGEXPD = total government expenditure about GDP, FGTEXPr = federal government expenditure about total expenditure, and θ_3 and θ_4 are their respective parameters and other notations and acronyms are as previously defined in connection with Equation (1).

In the context of this alternative Equation (1a) specification, the effect of fiscal decentralisation is based on the sign and statistical significance of θ_4, the coefficient of FGTEXP. If the estimate of θ_4 is positive and statistically significant when that of θ_3 is insignificant, this would mean that the government expenditure has no productivity growth effect and, hence, it is only the federal (but, not the sub-national) component of

the combined expenditure that has a positive productivity growth effect. The same conclusion of the positive productivity growth effect of only the federal (to the exclusion of the sub-national) component applies if the estimate of θ_4 is positive and statistically significant while the estimate of θ_3 is negative and statistically significant. If θ3 is negative and statistically significant while θ4 is positive and statistically significant, it may indicate that the federal component may have a milder or smaller negative impact on productivity growth. All of the preceding scenarios support the rationale for increased centralisation based on productivity and economic growth criteria. The converse would be the case if the above scenarios are reversed and the case for increased decentralisation would now be supported. Specifically, this would be so if the estimate of θ_4 is negative and statistically significant in a situation when the estimate of θ_3 is either insignificant or negative (but has a smaller absolute value than that of θ_4) and also statistically significant. In the former case, it implies that the observed nil productivity growth effect of the government expenditure must have been due to the negative effect being exerted by only the federal component while the sub-national component must have had a positive component. In the latter case, the negative productivity growth effect could be because both components individually have negative productivity growth effects but that of the federal component is greater in an absolute sense or that it is only the federal component that has the negative effect while that of the sub-national government is either nil or positive. Also, if the estimate of θ_3 is positive and statistically significant and that of θ_4 is negative and statistically significant, it can mean that, although both components (and, hence, their combination) have a positive productivity growth effect, that of the sub-national government is greater. Thus, in all cases, the case for increased centralisation would be supported if the estimate of θ_4 is positive and statistically significant; the case for increased decentralisation is supported if the estimate of it is negative and statistically significant; while a statistically insignificant estimate of it would mean that there is no difference on productivity growth and economic growth arising from a change in the degree of centralisation. Accordingly, the modifications will form the basis of economic growth equations to be specified for estimation in the paper.

Economic Growth Equations

There are four models to be estimated. The first is on expenditure decentralisation (or, rather, centralisation) while the second is another variant of expenditure decentralisation (or, rather, centralisation) and it entails the determination of the economic growth effect of the fraction of total expenditure that is taken by the federal government. The third model is on financing decentralisation (or, rather, centralisation) by examining the separate economic growth effects of each of the federal and sub-national government revenues and deficits while the fourth one is a variant of this government financing decentralisation (or, rather, centralisation) that entails testing for the economic growth effects of the share of each of the combined government revenue and combined fiscal deficits that is accounted for by the federal government.

The first variant of the economic growth model for determining the effect of government expenditure centralisation is specified by substituting the productivity growth Equation (1) into the growth accounting Equation and by inserting the error term (u), intercept term

(β_0) as well as time subscript (t). Doing this produces the economic growth equation specified for estimation in the study, thus:

$$\left(\frac{\Delta Y}{Y}\right)_{it} = \beta_0 + \beta_1\left(\frac{\Delta N}{N}\right)_{it} + \beta_2\left(\frac{\Delta K}{K}\right)_{it} + \beta 3GEXPFit + \beta 4SUBEXPDit + \beta 5FDIit + \beta 6\,FINDEV\,it + \beta 7\,INFL\,it + eit \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

where the acronyms and the a priori expectation of the signs of the coefficients are also as mathematically stated in connection with the productivity growth Equation (1), except the expected positive sign of each of β_1 and β_2 that is implied in the context of the growth accounting Equation.

The second variant of the economic growth model for determining the effect of government expenditure centralisation is specified by substituting the productivity growth Equation (1a) into the growth accounting and by inserting the error term (e_{it}), intercept term (β_0) as well as country and time subscript (it). Doing this yields the economic growth equation specified for estimation in the study, thus:

$$\left(\frac{\Delta Y}{Y}\right)_{it} = \beta_0 + \beta_1\left(\frac{\Delta N}{N}\right)_{it} + \beta_2\left(\frac{\Delta K}{K}\right)_{it} + \theta 3TGEXPDit + \theta 4FGTEXPr\,it + \beta 5FDIit + \beta 6FINDEVit + \beta 8INFL\,it + eit \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

where the acronyms and other notations are as previously defined in connection with the productivity growth Equation and the a priori expectation of the signs of the coefficients are also as previously indicated in the context of these same previous equations.

In economic growth models used to determine the consequences of funding decentralisation, two types of financial decentralisation (or, rather, centralisation) are recognized. The first is government revenue centralisation or decentralisation while the second is fiscal deficit centralisation or decentralisation. It is pertinent to state here that this study is a pioneer in considering fiscal deficit decentralisation or centralization in Sub-Saharan Africa as all previous studies that the present writer is aware of had always been limiting their consideration to either only government revenue decentralisation or centralisation.

Essentially, given these two components of financing centralisation, the economic growth equation to specify for estimation is obtained by replacing GEXPF and SUBEXPD in the productivity growth Equation (1) with REVF and SUBREV respectively, and also by introducing DEFF and SUBDEF as two additional explanatory variables to take care of the federal and sub-national fiscal deficit components respectively. Doing this gives rise to an expanded productivity growth equation (which is not shown for brevity).

Substituting the resulting productivity growth equation into the growth accounting Equation by inserting the error term (e), intercept term (β_0) a, as well as country and time subscript (*it*), could yield an economic growth equation, thus:

$$\left(\frac{\Delta Y}{Y}\right)_{it} = \beta_0 + \beta_1\left(\frac{\Delta N}{N}\right)_{it} + \beta_2\left(\frac{\Delta K}{K}\right)_{it} + \delta 3REVFit + \delta 4SUBREVit + \delta 5DEFFit + \delta 6SUBDEFit + \beta 5FDIit + \beta 6FINDEVit + \beta 7INFL\,it + et \ldots\ldots\ldots\ldots\ldots \quad (4)$$

where REVF, SUBREV, DEFF and SUBDEF are federal government revenue, sub-national government revenue, federal government deficit and sub-national deficit respectively, all about GDP, and δ_3, δ_4, δ_5 and δ_6 are their coefficients while other acronyms and notations are as previously defined in connection with the productivity growth Equation and the a priori expectation of the signs of the coefficients, except δ_3 to δ_6, are also as previously indicated in the context of these same previous equations. Regarding the new coefficients, δ_3 to δ_6, their signs are not to be determined on an a priori basis given the explanations adduced in Paragraph (a) which imply that they can be positive or negative so that only empirical evidence can indicate and confirm their signs.

The second variant of this economic growth model for examining both the revenue and fiscal deficit decentralisation or centralisation can be specified by replacing the federal government revenue to GDP (REVF) and sub-national government revenue to GDP (SUBREV) with the combined (i.e., federal and sub-national) to GDP (or TGREV) and the share of the federal government in this revenue (FGREVr) respectively. Similarly, the federal government fiscal deficit to GDP (DEFF) and sub-national fiscal deficit to GDP (SUBDEF) are to be replaced by the combined (federal and sub-national) deficits to GDP (or TGDEF) and the share of the federal government in this deficit (FGDEFr) respectively. Doing this yields the economic growth Equation (5), thus:

$$\left(\frac{\Delta Y}{Y}\right)_{it} = \beta_0 + \beta_1\left(\frac{\Delta N}{N}\right)_{it} + \beta_2\left(\frac{\Delta K}{K}\right)_{it} + \phi 3TGREVit + \phi 4FGREVrit + \phi 5TGDEFit + \phi 6FGDEFrit + \beta 5FDIit + \beta 6FINDEVit + \beta 7INFL\,it + eit \ldots\ldots\ldots\ldots\ldots \quad (5)$$

where: TGREV, FGREVr, TGDEF and FGDEFr are total government revenue about GDP, federal government revenue about combined government revenue, total government fiscal deficit about GDP and federal government fiscal deficit about combined fiscal deficit respectively and ϕ_3, ϕ_4, ϕ_5 and ϕ_6 are their coefficients while other acronyms and notations are as previously defined in the context of the growth accounting and productivity growth Equation and the a priori expectation of the signs of the coefficients, except ϕ_3 to ϕ_6, are also as previously indicated in the context of these same previous equations. Concerning the new coefficients, ϕ_3 to ϕ_6, their signs are not to be stated on an a priori basis but to be left open for empirical determination given the explanations adduced earlier, which imply that they can be positive or negative.

3.3 Estimation Techniques

To determine the effect of fiscal decentralisation on economic growth, both descriptive and inferential analyses were carried out. The descriptive analysis involves the use of summary statistics to describe each variable. After the general diagnostic tests and taking of appropriate remedial measures where the outcomes of the tests are not satisfactory, the study proceeds to present the estimates of the model, using the panel fixed effect

regression estimation method, and then evaluate the performance of each explanatory variable to conclude the study.

3.4 Sources of Data and Measurement of Variables

The data used for this study are panel ones spanning 2000 to 2023 for 45 Sub-Saharan African countries. The definitions of the variables employed, their sources, and how they were measured are described below.

Government expenditure, revenue, and fiscal deficit are measured as percentages of GDP. The data for the variables are obtained from the Central Bank of Nigeria, CBN Statistical Bulletin (2022), IMF (2022) and UNI-WIDER (2023). Economic growth, GDP growth, which is the major dependent variable, is expressed as the percentage annual rate of change of the real GDP. The data for the variable are obtained from the World Bank's World Development Indicators, WDI, database (2023). The five control variables are net foreign direct investment that is expressed as a percentage of GDP), Financial Development, proxied by the percentage of domestic credits from the banking sector about GDP, and inflation rate (INFL), which is the annual percentage change in the GDP implicit deflator and are obtained from International Monetary Fund (IMF), World Bank Indicator (2022). Finally, the growth of private capital stock $\frac{\Delta K}{K}$ is the annual percentage change of capital stock in real term and labour force growth $\frac{\Delta N}{N}$ is measured as labour force annual percentage change, obtained from ILO and IMF Investment and Capital Stock Dataset (2022).

4.0 Research Findings /Results

4.1 Descriptive Analysis

This section presents and evaluates the descriptive statistics for each of the variables employed in the study. The descriptive statistic is summarised in Table 1, which shows the number of observations, mean, minimum value, and maximum value.

Table 1: Summary Statistics Table

Variables Acronym	Variable Description	Obs	Mean	Min	Max
$\frac{\Delta Y}{Y}$	Economic Growth - Annual GDP growth, %	1085	1.784	-47.591	18.066
GEXPF	Federal Government Expenditure – % of GDP	1080	12.635	1.253	53.249
SUBEXPD	Sub-national Expenditure – % of GDP	1025	11.034	.227	43.032
TGEXPD	Total Government Expenditure – % of GDP	1025	23.669	2.489	84.749
FGTEXPr	Federal Government Total Expenditure – ratio of total expenditure – in %	1025	.54	.099	1.591
REVF	Federal Government Revenue – % of GDP	550	11.319	.479	26.041
SUBREV	Sub-national Revenue – % of GDP	550	10.057	.616	23.994
TGREV	Total Government Revenue – % of GDP	644	21.375	.637	48.403
FGREVr	Federal Government Revenue – the ratio of total revenue – in %	550	.53	.224	794
DEFF	Federal Government Deficits – % of GDP	475	1.316	-18.531	12.332
SUBDEF	Sub-national deficits – % of GDP	475	.978	-19.445	6.608
TGDEF	Total Government Deficits – % of GDP	475	2.294	-37.976	13.535
FGDEFr	Federal Government Deficits – ratio of total deficit – in %	475	.57	-.741	9.253
$\frac{\Delta K}{K}$	Growth of Private Capital Stock – Annual % growth	709	5.69	-4.512	39.587
$\frac{\Delta L}{L}$	Labour force Growth - Annual % growth	838	2.737	-8.491	15.958
FDI	Net Foreign Direct Investment Inflows - % of GDP	1048	21.827	.184	150.974
FINDEV	Level of Financial Development - % of GDP	788	18.95	.002	142.422
INFL	Inflation rate – Percentage change in GDP deflator	1006	9.447	-4.295	379.848

Author's Computation 2024

Explanatory Notes: Min = Minimum, Max = Maximum, Obs = Observation, Std.Dev. = Standard Deviation, Coef. Of Var. = Coefficient of Variation

The results from Table 1 summarised the descriptive statistics for all variables in the study. The table provides information on the mean, minimum, and maximum values of each variable, allowing for a comprehensive understanding of the data. For brevity, the self-explanatory nature of the statistics requires no further elaboration.

4.2 Correlation Analysis

The result of the correlation analysis is presented in Table 2. A correlation between a pair of variables is interpreted to exist if the p-value of the correlation coefficient does not exceed 5%, which is the cut-off significance level adopted in the paper, while no correlation is adjudged to exist if the p-value exceeds this chosen 5% critical significance level.

Table 2: The Correlation Matrix for the Variables

	(1) Y_{it}	(2) GEXPF	(3) SUBEXPD	(4) TGEXPD	(5) FGTEXPr	(6) REVF	(7) SUBREV	(8) TGREV	(9) FGREVr	(10) DEFF	(11) SUBDEF	(12) TGDEF	(13) FGDEFr	(14) Y_{it}	(15) Y_{it}	(16) ECI
1. Y_{it}	1															
2. GEXPF	-0.059 (0.053)	1														
3. SUBEXPD	-0.042 (0.179)	0.645 (0.000)	1													
4. TGEXPD	-0.040 (0.200)	0.641 (0.000)	0.647 (0.000)	1												
5. FGTEXPr	0.016 (0.600)	0.065 (0.033)	-0.469 (0.000)	-0.231 (0.000)	1											
6. REVF	0.004 (0.724)	0.165 (0.000)	0.125 (0.003)	0.154 (0.000)	-0.010 (0.420)	1										
7. SUBREV	-0.004 (0.652)	0.165 (0.000)	-0.125 (0.003)	-0.154 (0.000)	0.010 (0.620)	-1.000 (0.000)	1									
8. TGREV	-0.058 (0.139)	0.615 (0.000)	0.304 (0.000)	0.625 (0.000)	-0.138 (0.001)	0.225 (0.000)	-0.225 (0.000)	1								
9. FGREVr	0.000 (0.991)	0.165 (0.000)	0.125 (0.003)	0.154 (0.000)	-0.009 (0.629)	0.496 (0.000)	-0.296 (0.000)	0.223 (0.000)	1							
10. DEFF	0.052 (0.262)	-0.278 (0.000)	-0.431 (0.000)	-0.384 (0.000)	0.193 (0.000)	0.067 (0.053)	-0.097 (0.053)	0.128 (0.005)	0.067 (0.053)	1						
11. SUBDEF	0.049 (0.290)	-0.347 (0.000)	-0.446 (0.000)	-0.429 (0.000)	0.146 (0.001)	0.012 (0.512)	-0.012 (0.512)	0.059 (0.200)	0.005 (0.715)	0.634 (0.000)	1					
12. TGDEF	0.055 (0.232)	-0.335 (0.000)	-0.477 (0.000)	-0.440 (0.000)	0.179 (0.000)	0.066 (0.187)	-0.066 (0.187)	0.108 (0.019)	0.063 (0.209)	0.639 (0.000)	0.647 (0.000)	1				
13. FGDEFr	0.051 (0.263)	-0.036 (0.487)	0.018 (0.701)	-0.009 (0.547)	-0.061 (0.185)	-0.028 (0.576)	0.028 (0.576)	0.049 (0.291)	-0.030 (0.543)	-0.019 (0.677)	0.206 (0.000)	0.054 (0.068)	1			
14. Y_{it}	0.149 (0.00	-0.077	-0.069 (0.064)	-0.068 (0.020)	-0.024 (0.527	-0.031 (0.536)	0.031 (0.536)	-0.028 (0.558)	-0.031 (0.544)	-0.00	0.029 (0.573)	0.010 (0.734)	-0.037 (0.491)	1		

Author's computation, 2024. *GEXPF= federal government expenditure to GDP, SUBEXPD =sub-national government expenditure, TGEXPD*^{2}*= total general government expenditure,* FGTEXPr = ratio of *federal government expenditure,* REVF = *federal government revenue, SUBREV = sub-national government revenue, TGREV = total government revenue expenditure FGREVr= ratio of government revenue, DEFF = fiscal deficit, SUBDEF = sub-national deficit, FGDEFr = ratio of government deficit.*

On the whole, the correlation coefficients among the independent variables are generally low, with the highest correlation on coefficients being 0.647 Specifically, within the explanatory variables group, no correlation coefficient is up or even close to 0.8, which is the rule-of-thumb-based cut-off, above which a serious concern regarding the existence of multicollinearity problem can be raised (Asteriou & Hall, 2007). This implies that there should be no fear regarding the existence of a serious multicollinearity among the explanatory variables in the models. Meanwhile, it is to be pointed out here that, as a confirmatory and final test, this study also conducts the Variance Inflation Factor (VIF) test to double-check for the presence and severity of multicollinearity in the models specified.

Table 3: Presentation of Hausman Test

Model	FE & RE			Pooled OLS & FE			Pooled OLS & RE			Conclusion
	test-stat.	p-value	Decision	test-stat.	p-value	Decision	test-stat.	p-value	Decision	
Model 1	21.64	0.003	FE	3.54	0.0001	FE	-	-	-	FE
Model 2	21.16	0.004	FE	4.08	0.0000	FE	-	-	-	FE
Model 3	8.91	0.446	RE	-	-	-	68.01	0.0000	RE	RE
Model 4	12.38	0.192	RE	-	-	-	61.23	0.0000	RE	RE

Source: Author's computation, 2024.

In Table 3, based on the p-value of the computed Hausman test statistic and the adoption of a 0.05 significance level, FE is seen to be the best for estimating both models (viz: Model 1, 2, 3 and 4).

Presentation of Regression Results

Following the above procedure and the models that are specified in Section 3, the results of the estimates are presented in Table 4, which contains regression results for the four models. Each model estimation result is divided into 3 columns. Column 1 is for the coefficient. Column 2 is for the t-statistic and Column 3 contains the p-values. A coefficient is considered to be statistically significant only if the p-value of its t-statistic is less than or equal to 0.05 critical significance level.

Table 4: Estimates of the Regression Equations

	Model I			Model II			Model III			Model IV		
VARIABLES	Coef	Tstat	pval	Coef	Tstat	pval	Coef	Tstat	pval	coef	Tstat	Pval
GLAB	0.061	5.642	0.001	0.113	6.655	0.000	0.061	5.811	0.000	0.057	4.75	0.007
GCAP	0.006	5.811	0.000	0.006	5.889	0.000	0.001	3.023	0.011	0.004	4.11	0.009
GEXPF	0.045	0.985	0.32	-	-	-	-	-	-	-	-	-
SUBEXPD	0.101	2.118	0.035	-	-	-	-	-	-	-	-	-
TGEXPD	-	-	-	0.073	2.682	0.008	-	-	-	-	-	-
RGTEXPr	-	-	-	0.531	0.36	0.719	-	-	-	-	-	-
FDIDEV	-	-	-	-	-	-	5.146	1.534	0.167	-	-	-
SUBDEV	-	-	-	-	-	-	0.36	3.548	0.001	-	-	-
FDIDEF	-	-	-	-	-	-	-0.275	-2.66	0.026	-	-	-
SUBDEF	-	-	-	-	-	-	0.274	1.521	0.166	-	-	-
TDIDEV	-	-	-	-	-	-	-	-	-	0.167	5.112	0.002
FDIDEVr	-	-	-	-	-	-	-	-	-	0.759	0.204	0.859
TDIDEF	-	-	-	-	-	-	-	-	-	-0.109	-2.525	0.031
FDIDEFr	-	-	-	-	-	-	-	-	-	0.174	0.64	0.402
FDI	-0.028	-1.016	0.31	-0.025	-0.905	0.366	0.297	1.438	0.15	-0.091	-1.979	0.048
INF	0.028	2.696	0.007	0.029	2.705	0.007	-0.252	-2.495	0.013	0.212	1.029	0.304
RIN DEV	-0.027	-1.201	0.23	-0.028	-1.264	0.207	-0.057	-0.794	0.427	-0.069	-0.965	0.334
Constant	0.813	0.896	0.371	0.509	0.423	0.672	-0.058	-1.262	0.207	-0.059	-1.281	0.2
Observations	576			576			223			223		
R-squared	0.634			0.734			0.644			0.745		
F statistic/Wald chi-square for R^2 and its p-value	6.96	-	0.004	7.52	-	0.001	49.14	-	0.005	50.24	-	0.002
VIF statistic for multicollinearity test	1.64			1.68			1.65			1.67		
Wooldridge F statistic for autocorrelation test and its p-value	1.97	-	0.688	1.434	-	0.771	1.454	-	0.951	1.954	-	0.871
Modified Wald χ^2 statistic for heteroscedasticity test and its p-value	1.34	-	0.543	3.57	-	0.135	-	-	-	-	-	-
Galvao et al. (2013) χ^2 statistic for normality test and its p-value	1.32	-	0.583	1.5	-	0.201	0.76		0.843	1.37		0.360

Source: Author's computation, 2024.

`Evaluation of Diagnostic Test Results for the Estimates

As can be seen in Table 3, the overall R^2 is up to 50 per cent in each Model and the p-values of the associated F-test statistic in Models I, II, III and IV are, 0.004, 0.001, 0.005 and 0.002 respectively, indicating the overall statistical significance for all the equations. This means that all four Equations have high goodness of fit or explanatory power.

Concerning the presence or absence of autocorrelation of the residuals, the study carried out the Wooldridge test for Equations 1-IV. Given the decision rule that we reject the null hypothesis when the p-value is less than the significant level (which is taken to be 5% in this study) and vice versa, we conclude that autocorrelation is present in all the equations. Therefore, the study estimates a robust version of Fixed Effect (FE) regression to correct for the autocorrelation out of the alternative solutions. Furthermore, concerning the

presence or absence of heteroscedasticity of the residuals, the study carried out panel panel-modified Wald heteroscedasticity test for FE regression, we reject the null hypothesis of homoscedasticity and conclude that heteroscedasticity exists in these equations. Thus, the study estimates robust FE regression to correct for the heteroscedasticity. Since Equation IV was estimated with the RE estimator, and there is no specific heteroscedasticity test for the RE estimator, robust RE regression was also estimated for Equation IV to correct for the heteroscedasticity. Likewise, the normality test was carried out using Galvao et al. (2013) test. It shows that the error terms are normally distributed as the probability value of chi-square in all the equations is greater than 0.05 significance. Given the decision rule that we reject the null hypothesis when the probability value of chi-square is less than the significant level (which is taken to be 5% in this study) and vice versa, the study therefore, does not reject the null hypothesis of normality of the residuals in all the Equations and conclude that the residuals in all the Equations are normally distributed. Thus, the situation was corrected by running a robust version of Fixed Effect (FE) regression to correct for the non-normality of residual which, is the preferred one out of the alternative solutions. Finally, concerning the presence or absence of multicollinearity of the explanatory variables, the study carried out the Tolerance test. Given the decision rule that a Tolerance of less than 0.1 indicates the presence of severe multicollinearity and vice versa, we do not reject the hypothesis of no multicollinearity in the equations because the Tolerance is more than 0.1 in all circumstances. By implication, all equations are devoid of severe multicollinearity.

4.4. Discussion of Results/Implication of Findings

Having evaluated the result of the diagnostic tests in the manner discussed above, the study now proceeds to evaluate the performances of the specific explanatory variables as reported in Table 4.

Federal Government Expenditure and Sub-National Expenditure (GEXPF & SUBEXPD)

As shown in estimates reported in Table 4, given a 0.05 level of significance, the coefficients of fixed effects of GEXPF and SUBEXPD are 0.045 and 0.101 in Model 1, with respective p-values of, 0.32 and 0.035. This indicates that the coefficients of GEXPF and SUBEXPD are positive, with SUBEXPD being statistically significant. Going by this evidence of the coefficient, the conclusion is that sub-national government expenditure promotes economic growth because a given amount spent by the sub-national would have a more positive economic growth effect than if spent by the federal government. This implies that decentralising government expenditure would increase economic growth.

Total Government Expenditure and Federal Government Expenditure Share (TGEXPD & FGTEXPr)

Concerning Model 2, reported in Table 4, the estimates show that the coefficients of TGEXPD and FGTEXPr are 0.073 and 0.531, with p-values of 0.008 and 0.719. This indicates that the coefficients of TGEXPD and FGTEXPr are positive, with TGEXPD being statistically significant. This evidence means that the coefficient of TGEXPD is positive and statistically significant while that of FGTEXPr is insignificant, so the

conclusion is that, while the share of the federal government in the total government expenditure does not affect economic growth, an increase in the total government expenditure has a positive effect on economic growth. The conclusion is that, while total or government expenditure to GDP has an increased economic growth effect, an increase in the share of the federal government in the total government expenditure has nil effect on economic growth. In other words, a given amount spent by the government will have no economic growth effect if it is the federal government that spends it vis-à-vis if it is the sub-national government that undertakes the spending. This finding is in line with what several previous studies like Alves et al. (2023), amongst others have reported.

Federal Government Revenue versus Sub-National Revenue (REVF&SUBREV) and Federal Government Deficit versus Sub-National Deficit (DEFF&SUBDEF)

Regarding REVF and SUBREV in Model 3, the coefficients are 5.146 and 0.38 with p-values of 0.187 and 0.001 respectively. This implies that sub-national revenue has positive and significant effects on economic growth. Coming to DEFF and SUBDEF, the coefficients are -0.275 and 0.274 with p-values of 0.008 and 0.188. This implies that both federal and sub-national deficits have no economic growth effects. Going by this evidence, the conclusion is that government revenue decentralisation promotes economic growth because a given revenue collected by the government would have a more positive economic growth effect if collected by the sub-national government than if collected by the federal government, so, by decentralising more of a given amount of government revenue, economic growth would increase while fiscal deficit would retard growth if it is incurred by either federal government or sub-national government.

Total Government Revenue versus Federal Government Revenue Share (TGREV & FGREVr) and Total Government Deficit versus Federal Government Deficit Share (TGDEF & FGDEFr)

Coming to Model 4 as reported in Table 4, the coefficients of TGREV, FGREVr, TGDEF, and FGDEFr are 0.187, 0.739, -0.109, and 0.174 respectively, with p-values of 0.002, 0.839, 0.021, and 0.402. This implies that total government revenue, the ratio of federal government revenue, and the ratio of federal government deficit are positive, with total government revenue having a significant effect on economic growth while total government deficit has negative effects on economic growth. Going by this evidence, the conclusion is that government revenue promotes economic growth because a given amount of revenue collected by the government would have a more positive economic growth effect while a given deficit incurred by the government would retard economic growth. In the case of the share of government revenue and share of fiscal deficit, both have nil economic growth effects. This implies that the share of revenue collected by the federal government will have no effect vis-à-vis if is collected by the sub-national government. This is in line with previous studies like Melat et al. (2023), Alves et al. (2023), and Stungwa and Mosikari (2023), amongst others and opposed to Odigwe and Aibieyi (2015), and Ewetan et al. (2020).

5. Conclusion, and Recommendations

This study examined the effect of fiscal decentralisation on economic growth in sub-Saharan throughout 2000 to 2023. The study employed a fixed effect regression method in deriving the regression estimates, using the annual data sourced from the CBN database, International Monetary Fund (IMF) and World Bank World Development Indicators, UNI-WIDER, ILO, and Capital Stock Dataset. The study estimated four models. The first focuses on expenditure decentralisation by examining and comparing the separate effects of federal and sub-national government expenditure on economic growth, whereas the second is another form of expenditure decentralisation that involves determining the economic growth effect of the fraction of expenditure undertaken by the federal government. The third model is on revenue and deficits decentralisation by examining the separate economic growth effects of each of the federal and sub-national government revenues and deficits while the fourth one is an alternative of this government revenues and deficits decentralisation that involves evaluating the economic growth effects of the share of each of the government revenue and fiscal deficits that is accounted for by the federal government. In addition to the control variables, the explanatory variables of primary interest are the budgetary variables viz-a-vis, GEXPF, SUBEXPD, TGEXPD, FGTEXPr, REVF, SUBREV, DEFF, SUBDEF, TGREV, FGREVr, TGDEF, and FGDEFr. In addition, each of these four models has five control variables which are net foreign direct investment inflow, inflation, financial development, growth rate of capital stock, and growth rate of labour.

Following the methodology above, the study found that sub-national expenditure has positive economic growth effect while the federal government component has nil economic growth effect. Also, it is found that sub-national revenue has a positive economic growth effect while federal government revenue has a nil economic growth effect. Regarding, total government expenditure, TGEXPD, is found to have an economic growth effect while expenditure that is undertaken by only the federal government to the total government expenditure, FGTEXPr has a nil economic growth effect. Also, it is discovered that none of the federal government deficit (DEFF, SUBDEF) has an economic growth effect, just as it shares in total deficits. Also, out of the five control variables, only the growth rate of capital stock, and the growth rate of labour have an economic growth effect. Therefore, it can be concluded that sub-national government expenditure and revenue are more pro-growth than the federal government expenditure and income and, hence, the case for increased fiscal decentralisation is supported.

The study thus recommends, based on the findings and conclusions that, given the evidence that the sub-national revenue (SUBREV) has a positive economic growth effect whereas the federal government revenue has nil economic growth effect, it is recommended that policymakers should promote government revenue decentralisation to enhance economic growth. Also, given the evidence that sub-national government expenditure (SUBEXPD) has a positive economic growth effect while the federal government expenditure has nil economic growth effect, it is recommended that government expenditure decentralisation should be promoted. Most of these findings are for the relevant authorities in sub-Saharan countries to take cognisance of them and brace up for their implications to take appropriate corrective actions.

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