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The Effects of Public Debt Financing: A Multi-State Perspective

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ABSTRACT

This paper investigates the relation between public debt financing and government expenditure. Using year and states fixed effect estimation, we find that the amount owed by federating states propels government spending. While external debts have a significant and positive association with public expenditure, domestic debts have positive effect, though not significantly different from zero, on government expenditure. The study recommends that policymakers in the public sector should widen external debts than domestic debts because its influence governments' recurrent and capital expenditure.

Keywords: developing economies, domestic debts, external debts, government expenditure, public debts.

INTRODUCTION

A fundamental question in public sector accounting literature is: Does public debt financing influence public spending? Indeed, this question has been a subject of extensive discussion in the scientific community. Efforts to answer this question have generated a great deal of debate in the academic literature. Public spending, also known as government expenditure, is the form of publicly supplied goods and services (Ukwueze, 2015). To finance these expenditures, governments use diverse sources, one of which is public debts. Public debt(s), external and domestic, which is synonymous to government debt(s) is an amount owed by government or governmental units (Idenyi et al., 2016). Domestic debts, unlike external debts, are intra-country debts such as treasury bills, bonds, notes, and government stocks (Ajibola et al., 2015). Scholars have studied the effect of public debts on public expenditure; however, outcomes of these studies are heterogenous. For instance, one strand of literature indicates that government debts propel public spending (Iiyambo & Kaulihowa, 2020; Uguru, 2016; Ukwueze, 2015). Whist another group of studies (Lora & Olivera, 2006; Shabbir & Yasin, 2015) notes that the amount owed by the government adversely affect government spending. Given the puzzle in the academic literature on the association between public debts and public expenditure, this study examines the effects of public debt financing, external and domestic, on government expenditure of federating states.

Using two-way fixed effects (year- and state/region- fixed effects), this study reveals that the amount owed by federating states has positive and significant association with government spending, implying that, state governments take more debts to finance their recurrent and capital expenditure. It also connotes that public is a determining factor of public spending. This

study contributes to the academic literature by being the first, based on our knowledge, to investigate the impact of public debt financing on federating states' government expenditure in a developing economy.

The rest of the paper is organized as follows: This paper reviews the literature in Section 2. In the third section, we present data, sample, and variables. In Section 4, the paper presents empirical results. Section 5 concludes.

LITERATURE REVIEW

Studies on the association between public debt financing and government expenditure have been inconclusive. A recent study (Iiyambo & Kaulihowa, 2020) with focus on Namibia reveals that an increase in public debt stimulates public expenditure. Examining government expenditure, external and domestic debts, and economic growth, le Van et al. (2019) disclose that there is a bell shape association between public expenditure and the tax rate. It is also shown that positive relationship between domestic debt and tax. Alawneh (2017), focusing on Jordanian data, finds positive and significant relationship between public debts, external and domestic, on taxes.

Using a time series data from 1980 to 2013, Uguru (2016) shows that positive association exists between public debt and government expenditure in Nigeria. Also, in Nigeria, another study (Idenyi et al., 2016), reveals that government expenditure, capital and recurrent, has a significant positive relationship with public borrowing. Ukwueze (2015) discloses that in the short run, external and domestic debts significantly influence the size government expenditure. Oladokun (2015)find that public debts granger cause government spending. In Greece, Mah et al., (2013), studying government expenditure and government debt between 1976 and 2011, show that positive and significant relationship exists between government spending and public debt. Okafor & Eiya (2011) in their study, reveal that public debt is one of the determining factors of government expenditure.

Aside from the above findings, another strand of literature reveals that public debts and public expenditure are negatively associated. For instance, in a cross-country study, Lora & Olivera (2006) study total public debt and social expenditure. They find an inverse relationship between higher public debt ratios and social expenditures. In another study, Shabbir & Yasin (2015) reveal that external debt has adverse impact of public expenditure.

Based on the above, this hypothesis of this that there is a positive and significant relationship public debts, external and domestic, and government expenditure.

DATA, SAMPLE AND VARIABLES

The sample of this paper are the States in the six geo-political zones in Nigeria, namely North-central, North-east, North-west, South-east, South-west, and South-south from 2007 to 2020. Data are obtained from the following sources: published annual budgets of states, the database of Debt Management Office of Nigeria, the National Bureau of Statistics (NBS), and publications from the country's Office of the Accountant General of the Federation.

The baseline regression model for this study is presented below:

$$GEXP_{i,t} = a_0 + \beta_1 \mathrm{EXTD}_{i,t} + \beta_2 DOMD_{c,t} + \beta_3 \mathrm{STA}_{i,t} + \beta_4 IGR_{i,c,t} + \delta_Z + \psi_i + \omega_t + \varepsilon_{i,z,t} \quad (1)$$

Where GEXP is the government expenditure which is measured as the total expenditure incurred by each state government. EXTD, external debt, represents the amount owed by the state government to non-resident individuals, foreign governments, or financial institutions. Domestic debt (DOMD) is measured as the debt of state government to creditors within the country. This debt includes commercial bank loans, lease finance, Central Bank of Nigeria (CBN) stocks, treasury bills, and shares issued to individuals; for instance, in 2006, the Ekiti state Executive governor forced all employees to buy Wema Bank shares. This paper controls for other sources of funds to the States which are statutory allocations (STA), the monthly allocation to the States from the federation accounts; and internally generated revenue (IGR) which are the revenue generated by the States which includes levies, fines, licenses, tenement rates, tollgate fares, registration of vehicles, billboard rates, sales of employment forms, payment of fees by academic institutions, rents received from usage of government properties like buildings and vehicles, personal income tax, amongst others. This paper includes year fixed effects (ω_t), States fixed effects (ψ_i), and geo-graphical zone fixed effects (δ_z). These fixed effects are used to control for time-invariant States and geo-graphical zones characteristics which allow the paper to separate effects that the research attributes to the debt financing from the time-invariant States and geo-political effects. Subscripts *i*, *z,* and *t* represent States, geo-political zones, and year, respectively. a_o is the intercept, β_1- β_4 are the shift parameters. ε represents the error term.

RESULTS

Tables 1, 2, and 3 shows the summary statistics, correlation, and collinearity test of the variables in this paper. In Table 1, the mean government expenditure (GEXP) is 103 billion Naira, suggesting that, on the average the States incurred above 100 billion on both capital and recurrent expenditures between 2007 and 2020. The standard variation of GEXP is 92.432, connoting that, GEXP of each States is different from the overall mean. The external debts (EXTD) and domestic debts (DOMD) have mean of 83 and 72 billion Naira, respectively, implying that, on the average, State governments finance their expenditure more through external debts than domestic debts. The Statutory allocation (STA), a monthly allocation to the States from the federation accounts, has an average of 49 billion Naira while the average internally generated revenue (IGR)-the revenue generated by the States like levies, fines, personal income tax, amongst others- is 20 billion. This implies that, on the average, the states generate more revenue from STA than IGR. Table 2 shows the pairwise correlation matrix of the variables.

As can be seen from the correlation results, all the variables, government expenditure, external debts, domestic debts, statutory allocation, and internally generated revenue, have a positive correlation. This connotes that GEXP, EXTD, DOMD, STA, and IGR are all significant and critical factors which are related to each other. Table 3 presents the collinearity diagnostics for the independent variables. As it is shown, all the VIFs are lesser than 10, connoting that multicollinearity is not an issue in this paper.

To understand the variation in the key variables of interest, government expenditure, external debts, and domestic debts, across the six geo-political zones of the country, North-Central, North-East, North-West, South-East, South-South, and South, for the period between 2007 to 2020. As can be seen in Figure 1, a bar chart showing the mean of GEXP, EXTD, and DOMD, the South-South geo-political region has the highest government expenditure while the North-Central, North-East, and South-East have the lowest government expenditure. Compared with other geo-political zones, South-West owes the highest external debts while the South-South region has the highest domestic debts.

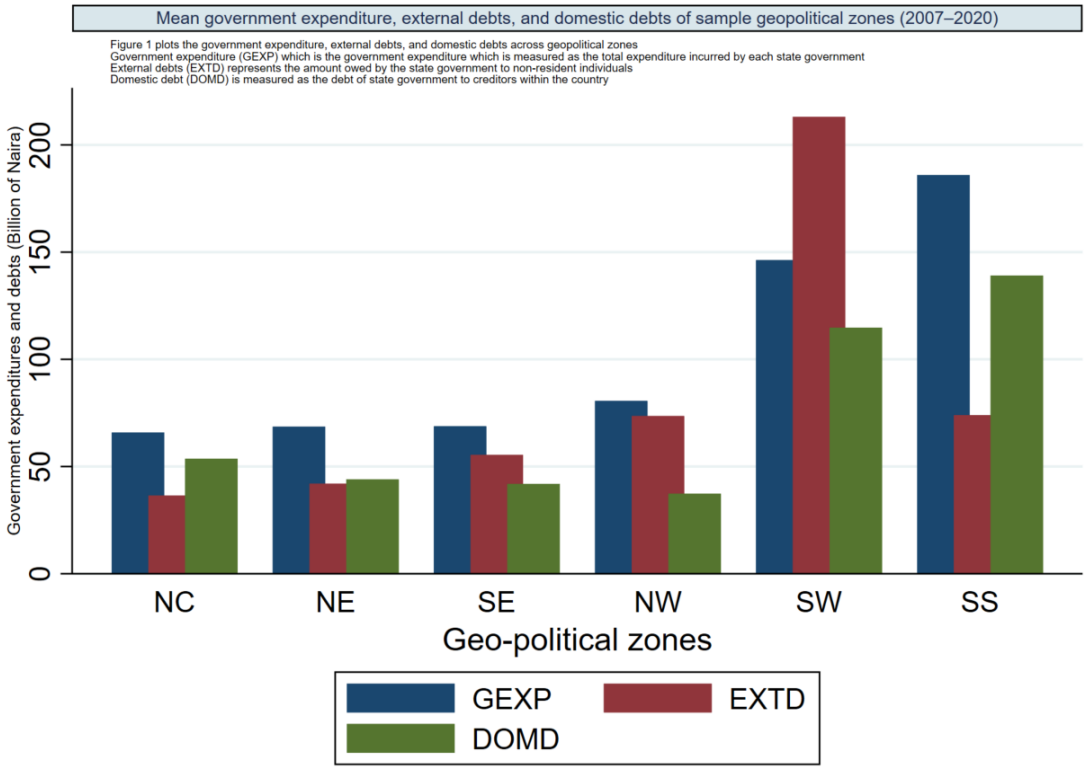
Table 4 presents the baseline regression results for equation (1) which investigates the effect of public debts, external and domestic debts, on government expenditures. The paper performs homoskedasticity test using Breusch-Pagan /Cook–Weisberg test. As can be seen in Table 4, the result, 283.18 at 1 percent level of significance, reveals the presence of heteroskedasticity. To mitigate the effect of heteroskedasticity, this paper clusters standard errors at the State level.

Using Hausman test on the three-panel data estimation shown in Table 4, the result of the fixed effects is identified as the suitable panel data estimation in this study, therefore, the interpretation of results in this paper is based on fixed effect estimation. The empirical results in Columns 4 and 5 in Table 4 reveal that external debt (EXTD) has a significant and positive effect on government expenditure, implying that, a Naira increase in the external debts of the States has a significant increase in the public expenditure. This result is in tandem with the literature(see for example, Iiyambo & Kaulihowa, 2020; Okafor & Eiya, 2011; Ukwueze, 2015) that public debt financing propels government expenditure. A possible reason for this is because external debts are tied to specific government expenditure. In terms of economic significance of the result in Column 4, a standard deviation (169.39, see Table 1) increase in EXTD increases government expenditure, GEXP, by 4556percent (0.269×169.39). Domestic debt (DOMD) has a positive relationship with government expenditure; however, the effect is insignificantly different from zero.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GEXP	432	103.001	92.432	0	796.72
EXTD	504	82.915	169.39	4.75	1466.16
DOMD	360	71.661	73.077	0.27	530.244
STA	504	48.626	38.364	0	254.215
IGR	504	19.687	46.227	0	418.99

Note: Table 1 presents the descriptive statistics of the variables in this study. Government expenditure (GEXP) which is total expenditure incurred by each state government. External debt (EXTD) represents the amount owed by the state government to non-resident individuals, foreign governments, or financial institutions. Domestic debt (DOMD) is measured as the debt of state government to creditors within the country. Statutory allocation (STA) is the monthly allocation to the States from the federation accounts. Internally generated revenue (IGR) is the revenue generated by the States which includes levies, fines, licenses, tenement rates, tollgate fares, personal income tax, amongst others.



Note: Figure 1 presents the mean distribution by geo-political zones of the mean variables in this study. Government expenditure (GEXP) is total expenditure incurred by each state government. External debt (EXTD) represents the amount owed by the state government to non-resident individuals, foreign governments, or financial institutions. Domestic debt (DOMD) is measured as the debt of state government to creditors within the country.

Table 2. Pairwise correlations between the government expenditure, public debts, and control variables

Variables	GEXP	EXTD	DOMD	STA	IGR
GEXP	1.000				
EXTD	0.699*	1.000			
	(0.000)				
DOMD	0.817*	0.641*	1.000		
	(0.000)	(0.000)			
STA	0.689*	0.106*	0.475*	1.000	
	(0.000)	(0.018)	(0.000)		
IGR	0.790*	0.867*	0.707*	0.261*	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	

***** p<0.01, ** p<0.05, * p<0.1**

Note: Table 2 presents the correlation of the variables. Government expenditure (GEXP) which is total expenditure incurred by each state government. External debt (EXTD) represents the amount owed by the state government to non-resident individuals, foreign governments, or financial institutions. Domestic debt (DOMD) is measured as the debt of state government to creditors within the country. Statutory allocation (STA) is the monthly allocation to the States from the federation accounts. Internally generated revenue (IGR) is the revenue generated by the States which includes levies, fines, licenses, tenement rates, tollgate fares, personal income tax, amongst others.

Table 3. Collinearity diagnostics

Variables	VIF	SQRT VIF	Tolerance	R-Squared
EXTD	4.91	2.22	0.2036	0.7964
DOMD	2.60	1.61	0.3846	0.6154
STA	1.50	1.23	0.6653	0.3347
IGR	5.27	2.30	0.1897	0.8103
Mean VIF	3.57			

Note: Table 3 presents the collinearity diagnostics of explanatory variables in this study. External debt (EXTD) represents the amount owed by the state government to non-resident individuals, foreign governments, or financial institutions. Domestic debt (DOMD) is measured as the debt of state government to creditors within the country. Statutory allocation (STA) is the monthly allocation to the States from the federation accounts. Internally generated revenue (IGR) is the revenue generated by the States which includes levies, fines, licenses, tenement rates, tollgate fares, personal income tax, amongst others.

Table 4. Public debts and public expenditure with the OLS Approach Dependent variable: Government expenditure

	(1) Pooled OLS	(2) Fixed Effect	(3) Random Effect	(4) Full models	(5)
	GEXP	GEXP	GEXP	GEXP	GEXP
EXTD	0.183***	0.276***	0.197***	0.269***	0.187**
	(9.18)	(9.38)	(9.63)	(7.64)	(2.47)
DOMD	0.169***	0.173***	0.171***	0.202	0.175
	(4.11)	(3.88)	(4.12)	(1.36)	(1.58)
STA	1.245***	1.122***	1.253***	1.409***	1.428***
	(21.21)	(10.18)	(20.44)	(4.70)	(10.25)
IGR	0.531***	-0.179*	0.468***	-0.170	0.465
	(6.87)	(-1.68)	(5.94)	(-0.60)	(1.19)
Constant	5.801*	19.57***	5.254	12.72	5.203
	(1.75)	(3.16)	(1.49)	(1.12)	(0.76)
State-Year Observations	288	288	288	288	288
States	36	36	36	36	36
adj. R^2	0.910	0.544		0.939	0.919
Breusch-Pagan /Cook–Weisberg test	283.18***				
Hausman		67.16***			
State fixed effect	No	Yes	No	Yes	Yes
Year fixed effect	No	No	No	Yes	No
Geo-political zone fixed effect	No	No	No	No	Yes
Standard error clustered at State level	No	No	No	Yes	Yes

Note: Table 4 presents the results of Eq. (1) using the OLS approach. The dependent variable is government expenditure (GEXP) which is measured as the total expenditure incurred by each state government. The main variables of interest are (i) external debt (EXTD) which represents the amount owed by the state government to non-resident individuals, foreign governments, or financial institutions, and (ii) domestic debt (DOMD) which is the debt of state government to creditors within the country. The control variables include statutory allocation (STA) which is the monthly allocation to the States from the federation accounts, and internally generated revenue (IGR) is the revenue generated by the States which includes levies, fines, licenses, tenement rates, tollgate fares, personal income tax, amongst others. T-statistics are in parentheses. *, **, and * represent significance at 0.10, 0.05, and 0.01, respectively.**

CONCLUSION

Due to the level of corrupt practices among political class, the effects of public indebtedness on government expenditure have been a topic of discuss among the public. Evidence in the literature has also been a puzzle. This paper explores the effect of public debt financing-external debts and domestic debts-on government expenditure of federating states. Using fixed effect estimation, this study documents a positive association between public debts and government expenditure. This finding suggests that government expenditure is propelled by external and domestic debts. This paper makes significant contribution to not only the extant public finance literature but also towards public sector policy making and financing.

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