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Public Debt-Investment Nexus: The Significance of Investment-Generation Policy in West Africa

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Abstract

The study examines the long run relationship and interconnections between public debt and domestic investment in 13 West African countries from 1986-2018. Using Panel Dynamic Least Squares (DOLS) and Panel Fully Modified Least Squares (FMOLS), debt (% of GDP) and external debt have an insignificant effect on investment in the long run, suggesting the negligible effect of public debt on the level of investments. But domestic investment Granger causes public debt indicators, implying that there is unidirectional causality. This suggests that any investment-generation policy could engender a rise in public borrowing, although such public loans might not be effective when there is pervasive mismanagement of public funds, as public debts need to be well managed for ensuring improved investment. Thus, the study suggests that maintaining a strong and effective debt-investment nexus requires fiscal consolidation efforts across countries, as such could lead to enhanced institutional capacity and sustainable investment-generation policy.

Keywords: Public debt, investment, fiscal policy, cointegration analysis, West Africa

JEL Classification: H63, E22, H30

Introduction

Expositions on the nexus between public debt and investment have been linked to the classical postulations. Following the dominant view, public debt is considered as capital injections meant for productive investment. The use of borrowed funds for private consumption negates the basic principle of the classical school (Say, 1880). This implies that, irrespective of the prevailing condition, public expenditure, other than infrastructure spending on physical capital, ought not to be funded by means of borrowing. The possibility of constraints that fiscal actors may experience due to the size and structure of public debt necessitates the consideration for investment-inducing loans (Pascal, 2012). Since governments view borrowing as an augmenting tool (an alternative for taxes), expenditures often increase without corresponding increase in tax rates. In the context of developing countries, given the inherent procyclical behavior, and in recognition of the danger posed by debt used for unproductive activities, Churchman (2001) asserts that existing public debt not directed towards enhancing public investment should not be allowed to escalate any longer in these economies.

Given the pervasive efficiency constraints that hamper the effectiveness of investment-generating policies across African countries (Devarajan et al., 2003), pragmatic steps are required to fast track the emergence of conducive business climate for building their capacity in advancing investment. In recent years, efforts have been made to better integrate Africa within the global investment systems. While exploring Africa's enormous investment potential is essential, non-transparent procedures and weak institutional measures have undermined investment policy initiation. Hence, surging public debt levels, with no corresponding increase in investment levels, could be caused by fiscal policy that is not sound (Agim, 2014). Dysfunctional public institutions account for the probable consequences of debt distress in developing countries, particularly West Africa. It is challenging to turn West African countries into more competitive and resilient investment project destinations. Despite spiraling public debt often caused by increased fiscal deficits, and the establishment of seemingly robust public–private dialogue mechanism at the regional level, investment policy issues remain unresolved. In view of this, in order to spur trade and investment in the West African region, the World Bank Group and USAID have come together to implement "Invest West Africa" — a five-year, $15 million program (World Bank, 2018). However, owing to prevailing regulatory constraints, providing tailored support for this program

(Invest West Africa Initiative) has been largely difficult across countries. This has necessitated increasing concerns among policymakers and economists on the effectiveness of fiscal and institutional policies in boosting investment and economic development in the region.

Over the years, public debt-investment debate has been paramount. As many West African countries are developing into hubs of productivity, they can boost their investments through effective fiscal policies. Thus, using both domestic and external loans judiciously is desirable for ensuring broad-based development. Statistical evidence bears out the growing public debt (which specifically began in 2012) in West Africa without commensurate improvements in the investment indicator (gross capital formation) (see Figure 1). The absence of sufficient elucidations on the low investment state in most developing countries gives rise to a pressing need for offering cogent explanations on how they can leverage huge borrowed funds for domestic investment transformation. In recognition of this, although not on West Africa, Alesina et al. (2002); Arin (2004); Balls (2005); Marratin and Salotti (2010) conducted studies that affirmed the role of public expenditures (fiscal policy) in investment process, while Soli et al. (2008) focused on the role of tax structures. On the other hand, Faini and Demelo (1990); Savvides (1992); Traum and Yang, (2010) (for sub-Saharan Africa) emphasized on the adverse impact of public debt on domestic savings and investment. In spite of the significance of this topical issue, Omojolaibi et al. (2016) seems to be the only study that centered on West Africa. The major focus of the study was on the link between recurrent expenditure, external debt and private investment (1993-2014).With the use of Fixed Effects technique, the authors confirm an insignificant effect of these fiscal indicators on private investment. Since panel regression techniques (Fixed and Random effects) could be susceptible to possible statistical errors due to endogeneity issue and might not be well suited for explaining long-run effect or capturing the part of investment sustainability, their conclusions could be misleading and remain untenable in West Africa's context. As a consequence, apart from the difference in scope (1986 -2018), this study sets to make use of cointegration techniques (Panel Dynamic Least Squares [DOLS] and Fully Modified OLS [FMOLS]) which accounts for endogeneity issue and provide better elucidations for long-run association (Kao & Chiang, 2000).

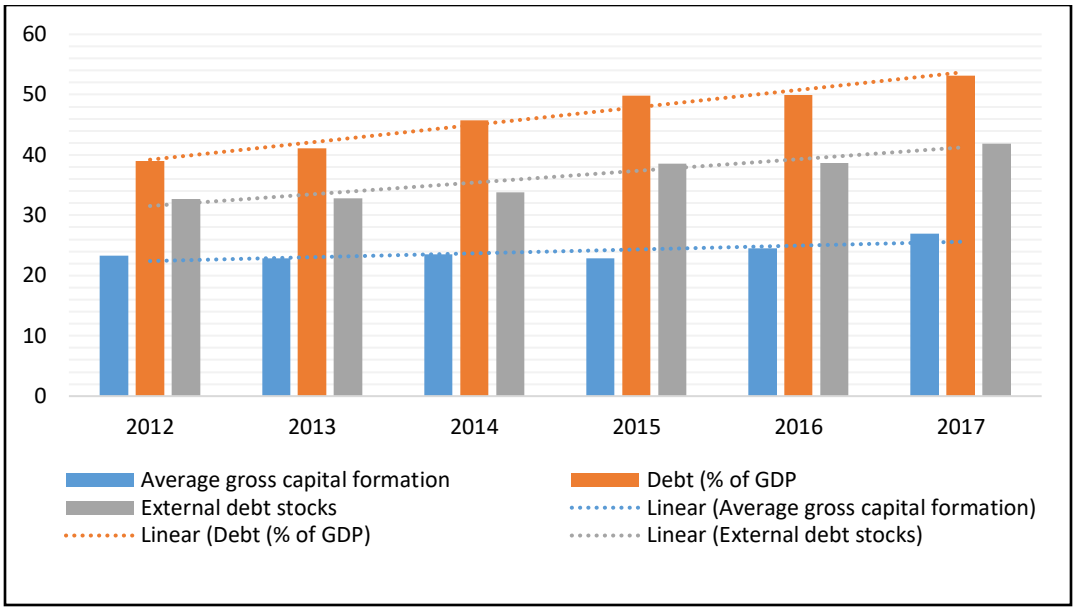

Fig. 1. West African gross capital formation, external debt stocks and debt (% of GDP) average growth rate between 2012 and 2017

Source. Authors' estimates based on data from World Development Indicator (WDI), 2018.

Following the preceding background, the main goal of the study is to explore the long run relationship and interconnections between public debt and domestic investment in West Africa. Essentially, a study of this nature is to proffer major inroads into addressing low investment levels plaguing the region and securing critical fiscal policy measures. The rest of the paper is structured as follows: The immediate section offers the discussion on emerging debt risk and the reevaluation of domestic investment in West Africa. Next section centers on theoretical and empirical review and is followed by the data description and methodological techniques. The empirical results and discussion are presented and finally the concluding remarks are given.

Emerging debt risk and the reevaluation of investment in West Africa

The growing public debt in most African countries, in particular West Africa, has given rise to concerns about an imminent debt crisis in the region. The widening fiscal deficits in Africa due to overreliance on deficit financing could create perverse dynamics of public debt accumulation that might put at risk debt sustainability. For instance, according to IMF (2018) report on "Regional Economic Outlook", as of 2017, nineteen (19) African countries have surpassed the 60% debt-to-

GDP threshold set by the African Monetary Co-operation Program (AMCP), while five (5) countries in West Africa have exceeded this threshold (see Figure 2) with two countries in the sub-region have the highest level of public debt (Cape Verde [127.8%] and Gambia [116.1%]) in the continent. Following IMF suggested standard, twenty-four (24) countries have exceeded the 55% debt-to-GDP ratio, whereas eight (8) countries fall into this category in West Africa. In addition, gross government debt which is the most relevant data for the discussion of government default and debt ceilings has been on the rise in nine (9)out of fifteen (15) countries in West Africa (see Table 1). By and large, the debt service ratio (% of export revenue used for external debt repayment), based on estimated statistics, had grown in 2015–2017, mainly owing to larger debt. The growth is reported to have restricted the sub-region's fiscal space (Africa Development Bank [AFDB], West Africa Economic Outlook, 2018). Over the years, the argument has been that the adoption of expansionary fiscal policy is to stimulate the region's economic performance through accelerating investment in productive industry and infrastructure projects. However, Africa's devastating experience regarding past debt crises necessitates the need to critically monitor and assess this recent debt spiral (Onyekwena & Ekeruche, 2019).

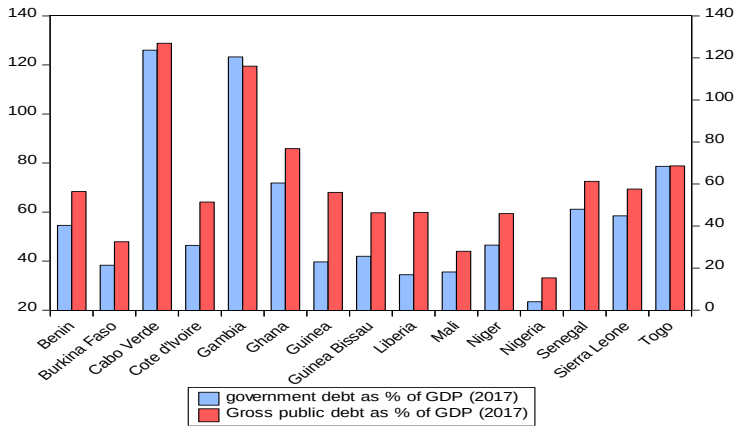

Fig 2: Government debt as % of GDP and gross public debt as % of GDP in African countries, 2017
Source. Authors' estimates based on IMF (2018) report on Regional Economic Outlook.

Table 1: The ratio of government debt to GDP

Country	Last/Year	Previous
Benin	22.1/Dec-17	22.4
Burkina Faso	24.4/Dec-17	26.1
Cape Verde	123.4/Dec-18	127
Ivory Coast	24.5/Dec-17	23.1
Gambia	65.6/Dec-17	60.3
Ghana	70.5/Dec-17	73.4
Guinea	18.66/Dec-17	26.5
Guinea Bissau	28.1/Dec-17	26.9
Liberia	28.8/Dec-17	23.6
Mali	35.56/Dec-17	29.87
Niger	29.7/Dec-17	28.7
Nigeria	21.3/Dec-17	17.6
Senegal	37.1/Dec-17	33
Sierra Leone	60.3/Dec-17	55.9
Togo	19.6/Dec-17	19.8

Source. Trading Economics, 2019

In light of the present fiscal state in West Africa, reevaluating the level of investment is critical for enhancing economic development as many countries in the sub-region are at the crucial stage of financing infrastructure projects. When debt is incurred to finance growth-stimulating investments, it can engender a virtuous circle in which improved growth not only reduces the debt burden but strengthens the fiscal and current account balances (Africa Development Bank [AFDB], West Africa Economic Outlook, 2018). Hence, the potential for public debt to open up long-term growth is mainly determined by countries' ability to stimulate debt–public investment nexus. However, the level of investment-generation activities and the realization of investment projects have persistently remained poor in most countries (World Bank, 2018). These trends raise concerns around the precarious investment state given the possible higher refinancing risks. The levels of gross capital information (a key investment indicator) are unsteady following the up and down movements in countries (see Figure 3).

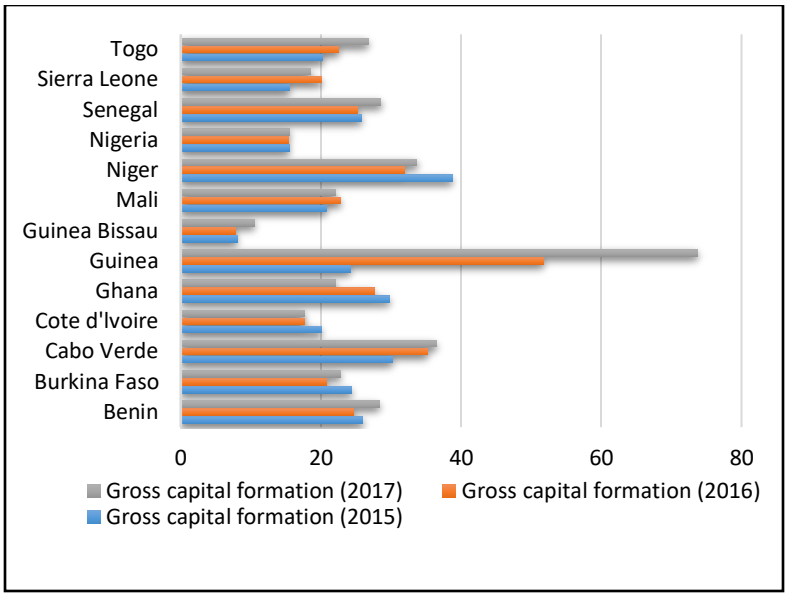

Fig 3. Gross capital formation (% of GDP) in West African countries between 2015 and 2016

Source. Authors' estimates based on data from World Development Indicator (WDI), 2018.

Literature review

Theoretical review

The effect public debt has on any economy is initiated by the following channels: private savings → investment in public projects → total factor productivity → and real interest rates. This theoretical linkage can be traced to the work of Baaziz (2015). The author postulates that public debt could shape the growth trajectory through domestic savings and public investment. It is also emphasized that, via crowding out effect, huge public debt is harmful to domestic savings and investment. However, there are controversies on these theoretical expositions which emanated from Ricardian equivalence theory. In the theory, it is argued that public debt does not have influence on the performance of economy. According to this view, private savings increase as a result of more tax cut that is financed by borrowed funds which would invariably offset the drop in public savings, thereby inducing investment levels. On the other hand, regarding the assumption of constant rate of taxes and interest rate, the endogenous growth model establishes that rising public debt impedes economic progress, and thus inhibits sustainable development across levels. Nonetheless, a reduction in debt could have a positive impact when there is an investment subsidy. The model stresses that in such a case government pays a particular part in the interest cost of capital. Hence, as the private return on capital would now be higher, people tend to consume less and save more, which in turn affects the level of public investment (Saint-Paul, 1992).

Furthermore, theories that specifically link public debt to investment in the literature include; debt hypothesis, the dual-gap, debt overhang and liquidity constraint hypotheses. Based on the debt hypothesis, no matter how negligible the role of external debt is in the saving-investment is ratio but given its impact on productive factors and investment mix, productivity could still be affected (Fosu, 1996). In a subsequent study (Fosu, 1999), the author further posits that the rate of output and economic sustainability may be hampered by external debt levels. Similarly, Pattillo et al. (2004) asserts that, although at a moderate level, public debt may not have an adverse influence on the economy, the accumulation of debt above a normal level would be unfavorable, as it (high debt burden) could give rise to uncertainty. This implies that long-term investments will no longer be considered tenable owing to higher uncertainty and risks that are embedded in these categories of investment. In a nutshell, short-term-investment would be most preferred. In relation to the dual-gap theory, investment is viewed as a function of savings ($I = f\ [S]$). This theoretical assertion is

supported by Presbitero and Panizza (2012). In order to complement the insufficient state of local savings, external sources of capital are required to finance the needed investment for stimulating development. Regarding traditional hypotheses (debt overhang and liquidity constraint hypotheses), Krugman (1988); Sachs (1989) espouse to the proposition that rising debt burdens, a replica of unsustainable debt accumulation, would be a dire impediment to investment and presumably to the total output. This argument is anchored on debt overhang hypothesis. In another way, the proponents of liquidity constraint hypothesis (LCH) opine that the requirement for debt servicing may contract the availability of financial resources meant for investment projects in the economy (Hoffman & Reisen, 1991; Serieux & Yiagadeseen, 2001). More importantly, in most African countries, the main challenge is to ascertain the level of effectiveness of the public debt (especially external debt), since the larger part of loans is often obtained from the foreign governments. While the gestation period of public loans is usually long and mostly offered with concessional package, pervasive efficiency constraints can hinder the operational rate of such borrowed funds in Africa, particularly West Africa (Devarajan et al., 2003).

Empirical review

Recognizing the importance of public sector performance in any economy, many scholars indicate that it is pertinent to ascertain the extent to which government debt affects domestic investment and economic development. In view of this, Sichula (2012); Kasidiand Said (2013); Herndon et al. (2014); Al-zeaud (2014); Kumar and Woo (2015),in respective analyses, emphasize that public debt is key to macroeconomic conditions. While these studies majorly focus on the relationship between debt and economic growth, few authors that investigate the relationship between public debt and investment provide an established basis for further empirical assessment of debt-domestic investment nexus (Vergara, 2004; Alesina et al, 2002; Forni et al, 2009). In their studies, the dominant view is that public policy could have a significant influence on the level of investment in countries, and that unsustainable debt service levels may engender substitution away from productive investment activities. However, this assertion is mostly country-specific or on developing countries as a whole. The significance of previous findings has necessitated the increased relevance of a study on public sector-investment linkage.

Starting with country-specific studies, focusing on Mexico over the period of 1993-2012, Sanchez-Juarez and Garcia-Almada (2016) explore the relationship between state governments' public debt, public investment and growth with the use of dynamic models of panel data and generalized method of moments (GMM). The authors find a positive correlation between public debt and investment, which in turn could stimulate economic growth. In contrast, regarding Nigeria, Adepoju, Salau and Obayelu, (2007); Oke and Suleiman (2012) argue that high level of debt service in the country has hindered the government to embrace policy that would enhance greater volume of domestic investment. Similarly, Isah (2012); Asogwa and Chetachukwu (2013) assert that deficit financing has a crowding-out effect on private investment in Nigeria. Atoyebi et al (2012); Kibet (2013) also argue in line with other authors' postulations. On the other hand, a study on Ghana conducted by Naa-Idar et al. (2012), shows that there exists an adverse relationship between fiscal policy and private investment. In addition, studies that examine the implication of fiscal deficits on private investment include; Paiko, (2012); Akomolafe, (2015). While these studies commonly confirm the harmful impact of public debt on investment levels, they are generally country-specific.

Based on panel studies, Alesina et al (2002) explore the role of fiscal policy in investment process of OECD countries. The authors posit that public spending has a significant negative effect on business investment. Also, Arin (2004); Balls (2005) affirm that public expenditures substantially affect private investment. They further stress that changes in public expenditures would have a greater influence compared to changes in taxes. On the contrary, Soli et al. (2008) maintain that for private capital investment, changes in taxes are crucial. In relation to another view, Marratin and Salotti (2010) indicate that expenditure shocks positively affect private investment in 14 EU countries examined. Following a seemingly contradicting exposition, a limited association is found to exist between public debt and private investment, while in the short run, the magnitude of the effect of public debt on private investment depends on its cause (Traum & Yang, 2010). With respect to sub-Saharan Africa (SSA), Faini and Demelo (1990); Savvides (1992) find that public debt adversely affects domestic savings and investment.

In a more recent study on West Africa, Omojolaibi et al. (2016), using Fixed Effect model, stress that recurrent expenditure and external debt have an insignificant crowding-out effect on private investment between 1993 and 2014. In general, many cross country-studies on Africa

mainly center on the link between public debt and economic growth. For instance, Fosu (1999) and Iyoha (1999) for sub-Saharan African countries; Christensen (2004) for 40 Sub-Saharan African countries; Musebu (2012) for Southern Africa Development Community (SADC),these authors conclusively postulate that rising public debt could have deleterious influence on economic performance and development in the region. Aside the work of Fagbemi and Olatunde (2019) that specifically explores the effect of public debt on domestic investment in 33 SSA countries using Panel - Corrected Standard Error Estimation (PCSE) and one - step System GMM dynamic panel estimations over the period 2000-2017, there seems to be no recent study. In their findings, debt (% of GDP) and external debt stocks (% of GNI) have a negative effect on domestic investment, suggesting that rising public debt tends to have an adverse influence on investment levels across countries in SSA. Hence, this accounts for the little attention researchers accorded to the relationship between public debt and domestic investment levels across regions in Africa.

The aforementioned scenarios uncover the critical requirement for vast empirical evidence that would show the extent to which investment could be influenced by fiscal position. There are two key issues noticed in the literature; first, no known study seems to have examined the causal relationship or interconnection between public debt and investment in a context of Africa, especially West African sub-region; and second, the bulk of studies mostly concentrated on the association between public debt and economic performance as regards African region. Thus, the current work amplifies the extant literature on public debt-domestic investment nexus by giving exclusive concentration to West African sub-region.This will be approached through the investigation of causal relationship between debt and investment, and long-run impact of public debt on domestic investment.

Methodology

In order to describe the dynamics inherent in investment of developing economies, this study based its model derivations on the theoretical assertions of the flexible accelerator and neoclassical schools. Specifically, an essential fiscal indicator (public debt) is incorporated to make explicit the crowding out and crowding in effects of investments in tandem with the classicalist propositions. The study draws insights from the works of Agidew (2014), Mabula and Mutasa (2019) to derive an investment function of the form;

$$I = \lambda(\bar{\kappa} - \kappa_{t-1}) \quad (1)$$

Here, I is firms' investment and λ is the weight assigned to the gap between the optimal capital stock ($\bar{\kappa}$) and past stock of capital (κ_{t-1}). Thus, equation (1) depicts the positive nexus between firms' rate of investment and the optimal previous capital stock gap. Furthermore, following flexible accelerator model, the determinants of $\bar{\kappa}$ could be public debt (internal and external financing) and other macroeconomic variables (such as domestic credit to private sector, gross domestic product [GDP] per capita and trade openness). These macroeconomic variables have been widely used in the literature as determinants of capital stock (Laopodis, 2001; Mbanga, 2002). Theoretically, they are expected to have a direct impact on the level of investment.Therefore, a panel functional relationship is described as follows;

$$I_{it} = \lambda(\kappa_{it}^{**} - \kappa_{it-1}) \quad ` \quad (2)$$

κ_{it}^{**} , which represents $(D_{it}, CP_{it}, GDP_{it}, TRADE_{it})$, denotes the various determinants of $\bar{\kappa}$; thus equation (2) can be expressed in a more explicit econometric form;

$$InGCF_{it} = \alpha_i + \beta_1 InD_{it} + \beta_2 InCP_{it} + \beta_3 InGDP_{it} + \beta_4 TRADE_{it} + \varepsilon_{it} \quad (3)$$

The study used gross capital formation (*GCF)* as a proxy for investment (I) because it incorporates both public and private capital formations; thus, it is a wide and broad measure compared with gross fixed capital formation (GFCF). Also, debt (% of GDP) *(DEBT)*and external debt stocks *(EXTDEBT)* are employed as proxies for fiscal policy; while domestic credit to private

sector (*CP*), gross domestic product (*GDP*) and trade openness (*TRADE*) represent other macroeconomic indicators. Following Lin and Nelson (2018), equation (3) is estimated using a panel dynamic ordinary least square (DOLS) cointegration approach of stock and Watson (1993). This is expressed as follows; let $y_{it} = (InGCF_{it})$ denotes a scalar and $x_{it} = (InD_{it}, InCP_{it}, InGDP_{it}, TRADE_{it})$ a k dimensional vector, therefore $(y_{it}, x'_{it})'$ represents a $(k+1)$ dimensional vector of observations which is captured in equation (4)

$$y_{it} = \alpha_i + \vartheta_i t + \eta_t + \varphi' x_{it} + \varepsilon *_{it} \qquad (4)$$

If $\vartheta_i = 0$ and $\eta_t = 0$, therefore (4) leads to

$$y_{it} = \alpha_i + \varphi' x_{it} + \varepsilon *_{it} \qquad (5)$$

To avoid the problem of endogeneity that may arise when the error term and the model explanatory variables are correlated, ε_{it} is projected on leads and lags to obtain

$$\varepsilon *_{it} = \sum_{p=-n_i}^{n_i} \varsigma'_{i,p} w_{it-p} + \varepsilon_{it} = \sum_{p=-n_i}^{n_i} \varsigma'_{i,p} \Delta x_{it-p} + \varepsilon_{it} = \varsigma_i' z_{it} + \varepsilon_{it} \qquad (6)$$

Where ς_i, p is a k×1 vector which represent the projection coefficients, $\varsigma_i = (\varsigma'_{i,-n_i}, ...\varsigma'_{ni})'$ is a vector of dimensions $(2n_i + 1)k$, and the leads and lags of $zit = (\Delta x'_{it} - n_i, ..., \Delta x'_{it} + n_i)'$ vector is of same dimension as ς_i. By substituting the orthogonal projection of the error term in (5) and (6) gives

$$y_{it} = \alpha_i + \varphi' x_{it} + \varsigma'_i z_{it} + \varepsilon_{it} \qquad (7)$$

Given the assumption of cross-sectional independence and a system of cointegrated regressions in equation (7), where y_{it} is cointegrated with x_{it}, panel dynamic OLS estimator for β is depicted as follows;

$$\overset{\Lambda}{\beta}_{DOLS} = \left[\sum_{i=1}^{N} \sum_{i=1}^{T} x_{it} \, x'_{it} \right]^{-1} \left[\sum_{i=1}^{N} \sum_{i=1}^{T} x_{it} \, y_{it} \right] \qquad (8)$$

The choice of the panel dynamic ordinary least square approach (DOLS), for this study, was predicated on the work of Kao and Chiang (2000) that argued the potency and supremacy of the DOLS over the OLS and fully modified (FM) OLS, specifically, in estimating cointegrated panel regressions. While DOLS will determine the basis of the analysis as it is mostly appropriate in offering better explanation for the aspect of investment and fiscal sustainability, ensuring the robustness of the estimates, FMOLS estimation technique is also employed in the study..

It is noteworthy that data used in the study are gross capital formation (*GCF)* a proxy for investment, public debt (debt (% of GDP) *(DEBT)* and external debt stocks *(EXTDEBT)*) denotes the fiscal indicator; domestic credit to private sector, gross domestic product (GDP) and trade openness represent other macroeconomic indicators. The debt component of fiscal policy was incorporated, following empirical studies of Barro (1979); Omojolaibi et al. (2016); Mabula and Matasa (2019), to explain the transmission from public debt to investment. Government debt, as an outcome of fiscal operation, could be channeled to spur public investment, and thus engenders private investment Barro (1979). Trade openness is included in the model to account for the role of external sector in the process of capital formation. Furthermore, the study covers the period 1986-2018. The study considers the thirty-one (31) year period as sufficient to reflect fluctuations accompanied by macroeconomic changes experienced in the region. Essentially, the choice of the base year is predicated on the fact that most West African economies started the implementation of the IMFstructural adjustment program (SAP) in 1986, while limiting the scope to 2017 is based on the availability of data. Furthermore, thirteen (13) West African countries comprising Benin, Burkina Faso, The Gambia, Ghana, Guinea, Guinea-Bissau, Ivory-coast, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo are considered in the panel study. Detailed data description and sources are presented in Table 2.

Table 2: Data description and sources

Data	Description	Source
Gross capital formation (GCF)	Expressed as percentage of GDP. It encompasses both fixed and working capital formation. It proxies both private and public domestic investments.	WDI, 2019
Debt	Total debt stock scaled as percentage of GDP. It denotes both the domestic and external components scaled by GDP.	WDI, 2019
External Debt stock	Total external debt stocks (expressed as percentage) ratio of gross national income.	WDI, 2019
Domestic credit to private sector	Financial resources from financial corporations receivable by the private sector; expressed as percentage ratio of GDP	WDI, 2019

Gross domestic product (GDP) per capita	GDP divided by midyear population. It is rebased using constant 2010 prices denominated in US dollars.	WDI, 2019
Trade Openness	It captures the role of external sector in the process of capital formation	WDI, 2019

Source: World Development Indicators (World Bank, 2019) database

Empirical results and discussion

The summary statistics presented in Table 3 reveal the key attributes of the variables employed in the studies. There is evidence of wide disparities between the mean values and standard deviation across categories, indicating a high variation in the investment pattern and persistent fluctuations in the level of public debt in West African countries. In addition, deviations of GDP, domestic credit to private sector and trade openness from their mean values depict a growing incidence of continued changes in these macroeconomic indicators. The descriptive statistics underscore the unstable and fluctuating rates of performance measures in West African economies. Based on Table 4 (Pairwise correlation coefficient), it could be further observed that an insignificant inverse correlation exists between investment indicator (gross capital formation) and the two fiscal measures (debt [% of GDP] and external debt stocks), suggesting that public debt spiral may not lead to increased investment. However, GDP, domestic credit to private sector and trade openness are directly correlated with gross capital formation, but a negative relationship with both debt (% of GDP) and external debt stocks.

Table 3: Summary statistics

	Dependent Variable	**Explanatory Variable**				
	Gross capital formation (GCF)	**Debt (% of GDP)**	**External debt stocks**	**GDP**	**Private credit**	**Trade openness**
Mean						
Overall	19.63	87.90	84.55	782.07	13.19	58.56
Standard deviation						
Overall	9.32	67.21	71.71	448.63	7.97	19.47
Between	5.15	50.76	48.35	432.99	5.95	14.09
Within	7.89	45.70	54.58	166.71	5.56	13.99
Minimum						
Overall	-2.42	1.57	4.13	273.85	0.40	9.13
Between	11.91	38.56	36.01	356.10	4.08	35.34
Within	2.76	-97.08	-119.26	333.32	1.54	23.88
Maximum						
Overall	73.78	434.91	504.48	2563	41.40	146.77
Between	31.76	234.45	228.14	1781.74	23.13	83.91
Within	69.85	288.36	360.88	1563.42	31.47	139.88
Observation						
N(large)	411	379	416	416	407	416
N(small)	13	13	13	13	13	13
T	31.61	29.15	32	32	31.31	32

Table 4. Pairwise correlation coefficient

Variable	Gross capital formation	Debt (% of GDP)	External debt stocks	GDP	Private credit	Trade openness
Gross capital formation	1.00					
Debt (% of GDP)	-0.09	1.00				
External debt Stock	-0.06	0.92*	1.00			
GDP	0.19*	-2.23*	-0.14*	1.00		
Private credit	0.06	-0.31	-0.19*	0.27*	1.00	
Trade openness	0.05	-0.06	-0.06	0.01	0.31*	1.00

*represents correlation coefficients significant at the 5% level or better.

Given the unbalanced nature of the data, Im, Pesaran and Shin (IPS), ADF Fisher and Phillips – Perron Fisher unit root tests were performed. However, Levin and Lin (LL) were excluded, since itis most appropriate for balanced panel. Results of the test shown in Table 5confirm the absence of I (0) variables in the model, which is line with the theoretical underpinning of the cointegration techniques employed in the study — Panel Dynamic Least Squares (DOLS) and Panel Fully Modified Least Squares (FMOLS). These techniques require that all variables should be I (1) for robust estimates (Stock &Watson,1993). Hence, the use of DOLS and FMOLS offers a sufficient ground for the analysis. The diagnostic tests conducted (Wald chi2 and Pesaran CD) also underscore the adequacies and robustness of the model. These tests are presented in Table 6. Furthermore, different panel cointegration tests conducted show that there is existence of cointegration relationship among variables employed. The cointegration test is presented in Table7. In the study, two different models are used. Model 1 represents the incorporation of total public debt (% of GDP) as the independent variable, while model 2 is for external debt stocks as the explanatory variable. External debt is included as second model because most of the large part of these countries' debts is incurred through external sources. Hence, examining the effect of external debt as a separate model is crucial to ensuring a better understanding. There is limited data on domestic debt across countries which necessitate its exclusion in the study.

Table 5

Panel unit root test

Variable	Im, Pesaran and Shin (W-stat)	ADF Fisher (Choi Z-stat)	Phillips – Perron Fisher (Choi Z-stat)	Status
Gross Capital Formation(GCF)				(1)
Level	-0.02	-0.04	-0.86	
First difference	-13.86***	-11.26***	-16.03***	
Debt (% of GDP)				(1)
Level	0.86	1.10	1.57	
First difference	-11.08***	-9.58***	-12.33***	
External Debt Stock				(1)
Level	0.46	0.89	1.91	
First difference	-14.60***	-12.34***	-13.92***	

GDP				(1)
Level	6.08	5.73	5.34	
First difference	-9.36***	-7.79***	-11.27***	
Private Credit				(1)
Level	1.32	1.48	2.16	
First difference	-11.96***	-10.38***	-12.05***	
Trade openness				(1)
Level	1.37	1.85	1.37	
First difference	-18.14**	-13.98***	-14.59***	

** & *** indicate the level of significance at 5% and 1 % respectively.

Table 6.
Diagnostic test

Test	Chi-sq	Prob.
Heteroscedasticity	320.93	0.23
Pesaran CD	51.18	0.13

Source: Authors' computation

Table 7.
Cointegration Test

Statistic	Coefficients and Probability
Panel v-Statistic	-182.9305**
Panel rho-Statistic	-0.063380**
Panel PP-Statistic	-2.892361***
Panel ADF-Statistic	-2.893687***
Group rho-Statistic	1.213152*
Group PP-Statistic	-1.959964**
Group ADF-Statistic	-1.895658**

***, ** and * indicate 1% 5% and 10% level of significance.

In table 8, for models (1 &2), total public debt (% of GDP) and external debt stocks are found to have an insignificant effect on gross capital formation (investment). This implies that the inflated levels of these fiscal indicators have negligible effect on gross capital formation across countries. In the sub-region, a rise in government debt yields no meaningful investment level, thereby amplifying the slow pace of productivity-enhancing investment in the long run. DOLS estimates buttress the growing view that emphasizes on the negligibility and ineffectiveness of

public debt in explaining and influencing investment levels in developing countries. For FMOLS, this assertion also holds. The bias towards domestic and external debt in West Africa could be a part of injudicious fiscal choices in stimulating investment-generation measures in the region, as findings indicate that the huge indebtedness might largely undermine the growth rate of investment across countries. This empirical postulation corroborates the argument of some authors (Bonga et al., 2015; Omojolaibi et al., 2016; Mustapha & Prizzon, 2018). These authors commonly stress that spiraling public debt could not significantly influence investment-generation capacity of an economy that does not accord high priority to investment.

More specifically, the insignificance of the coefficients of debt indicators across models could be attributed to the high level of governance and policy deficits which hinder effective channeling of borrowed funds in most countries in the region. Due to the ubiquitous institutional gaps, public debt is not an essential part of investment trajectory in these economies. The plausible explanation for this is that public resources (both earned and borrowed ones) meant for investment purpose are often being siphoned off by corrupt officials. This lends credence to the assertion of Anayiotos & Toroyan (2009); Fagbemi (2020) that in a weak institutional environment, public sector, in terms of utilization of resources for infrastructure development or investment, seems to be ineffective and inefficient. In fact, Nigeria is a critical case, considering the role of the country in West African economies. For instance, Nigeria accounts for over 70% of regional GDP, and if Ghana, Côte d'Ivoire, and Senegal get included, in total, it will amount to 90% (African Development Bank [AFDB], West African Economic Outlook, 2018). Since Nigeria is one of the highly corrupt countries (Anayiotos & Toroyan, 2009), Nigeria's factor might largely be responsible for the outcome of the estimates.

Regarding the control variables, results indicate that GDP and trade openness have a positive and significant influence on domestic investment, underlining the direct relationship between these macroeconomic indicators and gross capital formation. Improved economic performance and robust trade activities (external trade) could play a substantial role in building investment capacity across West African countries, and thus leading to accelerated development. These findings are in line with the work of Jacobs, Schoeman, and Van Heerden (2002). On the other hand, domestic credit to private sector has an insignificant effect on the investment indicator. This suggests that due to the low level of financial sector development in the region, domestic

credit to private sector as the crucial indicator of financial deepening may not contribute substantially to investment-generation capacity in West Africa. This supports the expositions of previous work on the state of financial sector in West African countries (Fagbemi, Ajibike & Ige, 2018). In their study, the authors strongly confirm the low level of financial sector development in the region. Also, trade openness estimates are insignificant in both models. This can be attributed to the high dependence of most developing countries (particularly Africa) on imported products with less export (UNCTAD commodities and development report, 2017).

Table 8.
Cointegration regression

Variable	Panel Dynamic Least Squares (DOLS)		Panel Fully Modified Least Squares (FMOLS)	
	Gross capital formation (GCF)			
	Model 1	Model 2	Model 1	Model 2
GDP	2.26***	0.82**	1.35***	1.34***
	[4.08]	[2.02]	[5.38]	[5.44]
Private credit (PC)	-0.03	0.09	0.01	0.02
	[-0.19]	[1.06]	[0.20]	[0.40]
Trade openness (TRADE)	0.28	0.05	0.58***	0.57***
	[1.04]	[0.28]	[6.66]	[6.48]
Debt (% of GDP)	-0.16		-0.05	
	[-1.40]		[-1.10]	
External debt stocks		-0.03		-0.05
		[-0.67]		[-1.57]

Note. *, ** & *** indicate statistical significance at 10%, 5% and 1% respectively, whilstfigures in [-] are t-values. All variables are in logarithmic form.

Causal relationship between investment and public debt

In light of the study's objective, this section shows the interrelationship between public debt and investment based on the causality test proposed by Toda and Yamamoto (1995); and Dolado and Lütkepohl (1996). The basis for this approach is to investigate whether a persistent increase in debt levels among these countries ensures bi-directional relationship as postulated by theories since a steady rise in public debt should facilitate continuous and sustained increase in investment levels across countries. However, as reported in Table 9, both total public debt and external debt do not Granger cause investment in the model. This shows that debt accumulation by ECOWAS countries does not stimulate or account for the investment levels in the sub-region, thereby invalidating the position of the theory that hypothesized debt is a key determinant of investment (Presbitero and Panizza (2012). On the other hand, these results espouse to the proposition that rising debt burdens, a replica of unsustainable debt accumulation, would be a dire impediment to investment and presumably to the total output (Krugman, 1988; Sachs, 1989). Furthermore, in the table, evidence

indicates that gross capital formation (investment indicator) Granger causes both total public debt and external debt. This suggests that any investment-generation policy could engender a rise in public borrowing, although such public loans might not be effective when there is pervasive mismanagement of public funds.

Table 9.

Summary of results from panel causality test

Causality	Wald Test	Inference of Causality
Gross capital formation(GCF) → total public debt	4.21**	Yes
	(0.03)	
Gross capital formation(GCF) → external debt	3.41**	Yes
	(0.04)	
Total public debt → Gross capital formation(GCF)	1.20	No
	(0.32)	
External debt → Gross capital formation(GCF)	1.03	No
	(0.52)	
Gross capital formation(GCF) ↔total public debt	1.48	No
	(0.43)	
Gross capital formation(GCF) ↔External debt	2.41	No
	(0.12)	

Notes: Where → indicates one-way causality ↔ indicates bi-directional causality
** indicates 5% significance level.

In sum, findings robustly buttress the view that public debt has an insignificant influence on domestic investment in West Africa, underscoring that policies and institutional system that lead to public debt spiral could not provide tailoring support for enhanced investment levels through borrowed funds in the long run. Compared to the quality of public debt management institutions in other African countries, on the basis of inefficient allocation and the risk of debt distress, estimated results find some similar strengths and weaknesses (Mustapha & Prizzon, 2018). The pervasive deficiencies in public sector could be ascribed to ineffective channeling of both internal and external debt to productive uses in the long run. Considering the long-term effect, continued debt accumulation may be irrelevant in the drive towards investments, thereby undermining development process. In these economies, evidence indicates that fiscal policy has no strong effect on investment-generation activities. For instance, Omitogun & Ayinla (2007) assert that the ineffectiveness of fiscal policy has been ostensibly associated with policy inconsistencies, wasteful spending and weak policy implementation mechanism in most countries. Thus, the quality of fiscal measures could be responsible for the state of investment in West African region.

Concluding remarks

In many West African countries, public debt is on the rise with no commensurate increase in the level of investment. The unsustainable debt state and huge development gaps in West Africa have been a major concern. In most countries, pervasive debt management challenges have necessitated the drive towards better fiscal (policy) arrangements in the region. Hence, the study examines the long run relationship between public debt and domestic investment in West Africa between 1986 and 2018. Specifically, 13 countries in the region are studied based on data availability. These countries include; Benin, Burkina Faso, The Gambia, Ghana, Guinea, Guinea-Bissau, Ivory-coast, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. In the study, variables are found to be integrated in the first difference. This informed the use of cointegration techniques in the study (Panel Dynamic Least Squares (DOLS) and Panel Fully Modified Least Squares (FMOLS)).

Following the main focus of discussion, rising public debt has no substantial impact on the level of investments. As findings revealed, debt (% of GDP) and external debt stocks insignificantly affect gross capital formation (investment indicator) in West Africa, suggesting the negligible effect of high indebtedness on investments across countries. The study posits that an increase in government debt might not result to any significant change in investment levels, thereby spurring the slow pace of productivity-enhancing investment in the long run. In addition, both total public debt and external debt do not Granger cause investment in the model, whereas gross capital formation (investment indicator) Granger causes both total public debt and external debt, suggesting a unidirectional relationship. The prevailing deficiencies in public sector might be attributed to the poor channeling and mismanagement of both internal and external debt in economic development process. This implies that long-term investment measures cannot be substantially influenced by spiraling public debt in the region. Thus, compared to growth rates of investment levels, higher growth rates of debt need to be well managed for ensuring improved investment levels.

Furthermore, it has become apparent that while borrowed funds channeled to investments in the face of widening fiscal deficits could be a right policy order in building resilience, absence of sound fiscal settings needed for improving the efficiency of public debt might undermine investment-generation capacity in West Africa. In view of the insignificant contribution, the current size and structure of public debt portfolios in the region seem to have no meaningful role in lifting key productive capacity constraints. Hence, maintaining a strong and effective debt-

investment nexus requires fiscal consolidation efforts across countries, as such could lead to enhanced institutional capacity and sustainable investment-generation policy.

The current study has revealed how effective management of public debt could enhance investment levels across West African countries. Future research in this line can replicate this research focus on other sub-Saharan African (SSA) sub-regions such as East Africa; Central Africa; and South Africa, since no study of this kind seems to have covered extensively respective sub-regions in the literature. This could also come in form of studies on a larger scale comparative panel analysis among sub-regions in SSA, so as to ascertain the common features prevalent in African countries, and economic peculiarities that determine each sub-region investment-generation path.

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