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Public Debt and Foreign Direct Investment Inflow in Nigeria

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ABSTRACT

This study investigates the relative impacts of external and domestic public debt components on foreign direct investment (FDI) inflows in Nigeria. The focus is on establishing a nonlinear (inverted U-shaped) relationship between public debt accumulation and FDI in the country. Drawing on the debt overhang hypothesis, the paper posits that while moderate debt may stimulate investment by financing growth-enhancing activities, excessive debt can create fiscal and macroeconomic risks that deter foreign investors. Annual time-series data for the period of 1981 to 2023 is used for the empirical analysis while a dynamic econometric model was evaluated using the autoregressive distributed lags (ARDL) approach. The study finds that rising and unsustainable public debt in Nigeria signals economic risk with attendant capacity to reduce FDI inflows in the long run. This negative long run effect exists for both domestic and external debt. In particular, there is evidence that low levels of debt may improve FDI inflows. However, at very high levels, public debt generates disincentives for foreign investors in the long run. Thus, the study provides evidence that a threshold of debt accumulation exists beyond which debt becomes detrimental to attracting foreign investment. The results underscore the need for prudent debt management and policy frameworks that balance borrowing for development with maintaining an enabling environment for sustained FDI inflows.

1. INTRODUCTION

The relationship between public debt and economic outcomes continues to attract considerable interest from research and policy makers. The general position is that public debt accumulation can constitute a long-run burden on the economy, especially in developing countries. In particular, there is concern that large debt service payments made by indebted low-income countries retard their growth and fiscal adjustment efforts (Bi et al, 2014; Salmon & Rugy, 2020; Miningou, 2023). In the same vein, large external debt accumulation has resulted in "debt overhang" in these countries with negative implications for investment and domestic stability (Krugman, 1988; Borensztein, 1990; Otieno, 2024). In the same vein, the complex crowding-out effect that domestic debt could generate for investment also poses challenge in an economy. These issues have intensified the debate over the impact of a high debt burden on an economy and the channels through which these effects may occur.

In Nigeria, the public debt problems (particularly external debt) that started in the early 1980s emanated from deep-rooted macroeconomic difficulties related to worsening fiscal revenue. Although there was respite in external debt condition after the debt forgiveness in 2005, overall public debt challenge in Nigeria has remained severe, especially in recent years. For instance, while external debt to GDP ratio was 1.48 percent in 2006 (a year after the debt relief), the ratio had grown to 16.3 percent in 2023. Domestic debt to GDP ratio also rose from 8.21 percent in 2010 to 22.72 percent in 2023. These sharp increases in public borrowing are consistently pushing the economy into the pre-2005 era. Moreover, the share of external debt in total debt, which had fallen to 6.83 percent in 2006 has risen to 41.78 percent in 2023. This shifts in the public debt structure in Nigeria further complicates the possible effects of debt on the economy.

FDI flows in Nigeria have been marked by inconsistency. FDI to GD ratio which had reason to 2.9 percent in 2009 was only 0.85 percent in 2016 and 0.52 percent in 2023. These vagaries are not unrelated to the distorted market environment arising from high

levels of macroeconomic instability that has characterised Nigeria's economy in the last decade. An important challenge for Nigeria is therefore how to foster an enabling environment for ensuring consistent attraction of FDI. This significant involves maintaining standard macroeconomic stability that provides enabling framework for a non-beclouded investment environment.

Since both policy and research signal that the effect of debt accumulation in the economy could occur through all the main sources of growth, the impact of debt on FDI can easily be isolated and studied. With the debt burden acting as a drag on the Nigerian economy, it is expected that its effect on FDI flows will be deleterious. Moreover, although literature on the effect of debt on the economy is replete, research which narrows down this effect to zero in on FDI are scanty, especially for Nigeria. In this direction, this study seeks to evaluate the contribution of public debt in Nigeria (domestic and external) in influencing FDI inflows. We consider whether heavy debt burden in the country constitutes a binding constraint on the inflow of FDI into the country. The study also examines discretionary effects of debt on FDI inflows by considering whether a turning point exists in the relationship between public debt and FDI inflows in Nigeria.

2. BRIEF LITERATURE REVIEW

The positive role that FDI plays in economic progress, especially in developing countries, has received much evaluation over the years (Akinlo 2004; Pegkas 2015; Afonso 2022; Benetrix et al 2023). The main determinants of FDI inflows into a country like Nigeria has however been an issue for debate. Recent literature has highlighted a range of economic, institutional, social, and environmental determinants influencing FDI inflows with varying impacts depending on country-specific contexts. For instance, Asiedu (2002) and Morgan et al (2022) found that economic instability and trade issues influenced inflows of FDI in SSA countries. Similarly, Rodriguez-Pose and Cols (2017) and Islam and Beloucif (2023) emphisised the critical role of institutional quality in sustaining FDI inflows in the region, while Kubik and Husmann (2019) indicated that climate change issues have mitigated the pattern of FDI inflows in developing economies like Nigeria.

The focus on external debt in the discussion of the flow of FDI in Nigeria is misplaced, given the hydra-headed effect of external debt on the Nigerian economy (Osadume & Imide, 2022; Yusuf & Mohd, 2021; Ajayi, 2000). This outcome is also noticed for other developing economies. Otieno (2024) examined the effects of public debt in SSA economies and found that debt weakens growth irrespective of the source of debt. In particular, Azolibe (2022) examined the effects of external debt and FDI using data for 25 sub-Saharan Africa countries. After controlling for endogeneity, the study found that external debt accumulation reduced FDI inflows into the region. It was also shown that domestic infrastructural development and efficient tax administration significantly mitigated the negative effects of external debt on FDI for the SSA region. The results are similar to those of de Mendonca and Brito (2021). In the same vein, Belyacz and Kuti (2013) found that external debt reduces efficiency of capital investment, including that of foreign investment in develo0ing countries.

Similarly, Shiyalini and Suresh (2022) examined the effect debt accumulation at the sub-national level on both domestic and foreign direct investment in Sri Lanka using the ARDL methodology. They found that while the long run effect of internal debt was to crowd out FDI, foreign debt had no significant long run effect on FDI inflows to the country. Ogbebor and Aigheyisi (2019) also evaluated the dynamic effects of public debt and FDI on economic growth in Nigeria and found no significant causal relationships between debt and FDI inflows to the country. Using a panel of developing countries, Dao and Le (2024) examined the interactions among FDI, public debt and economic growth, while controlling for endogeneity. The study revealed that while FDI stimulates economic growth, public debt has a nonlinear impact on the economy. In particular, public debt was found to impede the positive effect of FDI on economic growth in developing countries. This negative effect of debt on the capacity of FDI was found to be more pronounced in African economies.

Furthermore, Prah and Ofori (2022) evaluated the impact of Ghana's heavy external debt on its ability to attract foreign investment using a dynamic framework. The study found that external debt had significant negative long-run impact on FDI inflows to Ghana. In a related study, Emmanuel and Ibebi (2023) examined the effects of public debt on foreign investment performance in Nigeria by focusing on debt accumulation and servicing. The study revealed that domestic debt led to lesser FDI inflows to the country in the long run while foreign public debt improved FDI inflows in Nigeria. The study by Triatmanto et al (2023) found similar results for a group of South East Asian economies.

Using two to three waves of panel firm-level data across developing economies, Islam and Nguyen (2024) found that higher public debt reduces investment by formal private sector firms by limiting accessibility of finance for private sector firms and imposing additional regulatory taxes on the firms. Thus, there is a direct channel of public debt effect in squeezing investment in an economy. Also, Abubakar and Mamman (2021) also found that external and domestic debt do not have similar effects on private investment in Nigeria. Using both linear and non-linear ARDL framework, the study showed that growth in external debt adversely affected private investment while positive shock in domestic debt led to decrease in private investment for the country.

From the empirical literature, there is evidence that country-level studies in developing countries appear to suggest that only domestic debt affects FDI inflows or that the effects of public debt on FDI can vary, depending on the type of debt being considered. A major consideration that the studies do not evaluate is the possible non-linear relationship that can exist between public debt and FDI inflows as highlighted by theoretical postulations. According to Obadan (2004), the need for foreign borrowing and the

subsequent debt accumulation is linked to desire to cover the gap in domestic savings and government revenue which are geared towards boosting domestic output, consumption and investment. Thus, there are grounds show that debt accumulation can expand investment in an economy where public borrowing has a positive impact on the investment up to a certain threshold. Beyond this threshold, however, its impact becomes adverse, giving rise to an inverted U type of relationship between debt and investment. Thus, at very high levels, debt may deliver indirect effects on economic investment. Although several studies have tested this condition for debt-growth relationship (Chudik et al, 2017; Adegboye & Arodoye, 2019), there is little evidence for the case of debt-FDI relationship, especially for Nigeria. This is an important area where this study contributes to literature.

3. METHODOLOGY

3.1 The Model

The model specified in this study follows theoretical and empirical formulations in Patillo et al (2004), Prah and Ofori (2022) and Azolibe (2022). In the model, the dependent variable is measured as FDI to GDP ratio to indicate the rate of FDI at any period (Afonso, 2022; Otieno, 2024). Both domestic and external public debt components are included in the debt impact analysis. Both variables are measured as ratios of GDP, with domestic debt DDYR and external debt as EDYR. In the model, we control for effective demand by including real GDP per capita (GDPPC) and the level of external interaction using trade openness (TOPEN). The macroeconomic and policy environment is proxied by inflation rate (INFL) and exchange rate (EXRT), while domestic institutional quality is also included as control variable. In this case, an index of political stability and absence of violence in the country (POLSTAB) is used. In its functional form, the baseline model is specified as:

$$FDI = f(EDYR, TOPEN, EXRT, RGDP, GFCF, INFL, POLSTAB) \quad (1)$$

Turning to the main debt variables, the main argument in this study is that a non-linear relationship exists between public debt and FDI inflows which generates an inverted U impact of debt on FDI. To capture this inverted U interaction, the non-linear relationship between debt and FDI flow is estimated with a quadratic function (a parabola) as follows:

$$FDI = f(EDYR, DDYR, EDYR\_SQ, DDYR\_SQ, X) \quad (2)$$

Where *EDYR_SQ* is the square of external debt and *DDYR_SQ* is the square of domestic debt. Also, *X* is a vector of the control variables indicated in Equation (1). Thus, the econometric form of the model is presented as

$$FDI_t = \alpha_0 + \alpha_1 EDYR_t + \alpha_2 DDYR_t + \alpha_3 EDYR\_SQ_t + \alpha_4 DDYR\_SQ_t + \alpha_4 EDYR_t + \alpha_5 X_t + U_t \quad (3)$$

Where u is stochastic disturbance term and t is the period (year) indicators.

The *EDYR* variable is expected to have a negative coefficient to show that higher external debt-to-income ratio tends to signal economic risk that deter *FDI* inflow into the country. *DDYR* is also expected to have a negative relationship with *FDI* inflow to indicate that domestic debt burden can also generate domestic macroeconomic instability that lowers FDI inflows. Among the control variables, *TOPEN, RGDP, GFCF and POLSTAB* are expected to have negative effects on *FDI* inflows since trade expansion, larger markets, domestic capital depth and institutional quality all support investor confidence in an economy. On the other hand, the coefficients of *EXRT* and *INFL* are expected to be negative to show that currency depreciation and inflationary pressure increase domestic volatility.

3.2 Method of Analysis

Debt accumulation tends to generate a dynamic relationship with macroeconomic variables since there are often more than one round of effect on each debt unit. In particular, the planning and gradual capital allocation involved with debt adjustment means that there are potential lagged effects of debt on investment. The Autoregressive Distributed Lag (ARDL) bounds testing approach, developed by Pesaran et al (2001) estimates this dynamic relationship by generating both short and long run effects. Moreover, the ARDL model mitigates the likelihood of endogeneity problem between debt and investment to a large extent by including lagged dependent variables, which account for the persistence in FDI flows (Murthy & Okunade, 2016). Similarly, the ARDL yields reliable estimates even in small or finite samples and is flexibility with underlying variable integration order. Based on this method, the model in the study is respecified in ARDL form as follows:

$$\Delta FDI_t = \alpha_0 + \sum_{i=1}^{p-1} \alpha_1^i \Delta FDI_{t-i} + \sum_{j=0}^{q1} \beta_1^j \Delta EDYR_{t-j} + \sum_{j=0}^{q2} \beta_2^j \Delta DDYR_{t-j} + \sum_{j=0}^{q3} \beta_3^j \Delta EDYR\_SQ_{t-j} + \sum_{j=0}^{q4} \beta_4^j \Delta DDYR\_SQ_{t-j} + \sum_{j=0}^{qn} \beta_n^j \Delta X_{t-j} + \lambda_1 FDI_{t-1} + \lambda_2 EDYR_{t-1} + \lambda_3 DDYR_{t-1} + \lambda_4 EDYR\_SQ_{t-1} + \lambda_1 DDYE\_SQ_{t-1} + \lambda_i X_t^i + \varepsilon_t \quad (4)$$

Where X represents the control variables in the model, Δ is the first-difference operator to determine short-run effects, λ_i's are the long-run coefficients, α, β are the short-run dynamic coefficients, and ε_t is the error term.

3.3 Data Sources

Annual time series data for the period of 1981 to 2023 was used for the empirical analysis in the study. Most of the data was sourced from the Central Bank of Nigeria Statistical Bulletin. Data on political stability was sourced from the International Country Risk Guide (ICRG) database.

4. EMPIRICAL ANALYSIS

4.1 Descriptive Statistics

The empirical analysis of the study is presented in this section. Table 1 presents the summary statistics of the variables used in the regression. FDI to GD ratio is 1.48 percent which shows that FDI has quite low penetration in the Nigerian economy. The maximum of 5.79 percent also indicates that there were periods of significantly large GDI inflows, although the low standard deviation suggests that the trend of low FDI penetration is relatively stable over the years. Average external debt ratio is larger than that of domestic debt, emphasising the focus of the government in terms of borrowing pattern. The standard deviation of domestic debt ratio is lower that for external debt ratio which suggests that domestic borrowing was more consistent than external borrowing over the period. Both inflation and exchange rate are relatively high on average, with large standard deviation scores that suggest significant volatility of these macroeconomic indicators. The standard deviation of real GDP er capita is also large in relation to the mean value, which suggests that economic performance was generally volatile of over the study period. The J-B statistics indicates normality of the variables.

Table 4.1 Summary Statistics

Variable	Mean	Max.	Min.	Std. Dev.	Skewness	Kurtosis	J-B
FDI	1.48	5.79	0.18	1.24	1.77	6.19	3.72
EDYR	19.46	60.36	1.24	19.51	0.87	1.66	2.90
DDYR	12.01	23.04	5.77	4.45	0.81	2.09	4.13
EXRT	96.72	306.92	0.67	92.81	0.78	2.82	3.88
GGDPPC	0.90	12.28	-13.13	4.67	-0.54	4.46	2.19
INFL	19.10	72.84	5.39	17.29	1.77	4.89	3.48
POLSTAB	0.66	7.00	-7.00	5.54	-0.38	1.40	4.99
TOPEN	29.85	55.02	7.52	11.59	-0.21	2.37	0.89
GFCF	9.02	9.46	8.64	0.19	0.14	2.56	0.44

In the correlation matrix shown in Table 2, external debt ratio (EDYR) and domestic debt ratio (DDYR) have significant negative correlations with FDI inflows. EDYR and DDYE exhibit a strong positive correlation which indicates that external and domestic debt levels in Nigeria tend to rise together. Both debt variables show strong negative correlations with GDPPC and political stability. This suggests that higher debt levels are more prevalent during periods of weak economic performance low political stability. In terms of the macroeconomic stability variables, EDYR and DDYR are positively correlated with inflation rate which implies that periods of higher debt coincide with rising domestic inflationary pressures. The debt ratios are also negatively correlated with exchange rate which shows that currency appreciation is associated with higher public debt. There is however no correlation between the public debt variables and trade openness.

Table 2: Correlation Matrix

Variable	FDI	EDYR	DDYR	GDPPC	TOPEN	INFL	EXRT	POLSTAB	GFCF
FDI	1								
EDYR	-0.32	1							
DDYR	-0.52	0.71	1						
GDPPC	0.66	-0.70	-0.60	1					
TOPEN	0.56	0.18	-0.18	0.02	1				
INFL	-0.14	0.67	0.54	-0.36	0.09	1			
EXRT	0.56	-0.57	-0.53	0.65	0.12	-0.35	1		
POLSTAB	0.42	-0.69	-0.70	0.68	0.03	-0.50	0.69	1	
GFCF	0.21	-0.55	-0.45	0.55	-0.09	-0.30	0.44	0.66	1

4.2 Tests of Unit Root and Cointegration

The test for stationarity of the data series is performed using the Augmented Dickey Fuller (ADF) and the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) procedures. It should be noted that while the ADF test is a direct process of testing for unit roots in which case the null hypothesis affirms the absence of a unit root, the KPSS is an indirect means of unit root test with the null hypothesis that the series in stationary. The results of the unit root tests are presented in Table 3. The ADF test statistics for each of the variables are not significant in levels except for DDYR and TOPEN. In first differences, the ADF statistics for all the variables are significant. This shows that all variables except DDYR and TOPEN are I(1), while the other two variables are I(0). This result is complemented by those of the KPSS test for each of the variables.

Table 3: Unit Root Test Result

Variable	*ADF*		*KPSS*	
	Level	**Difference**	**Level**	**Difference**
FDI	-1.896	-10.39**	0.551	0.124
EDYR	-1.343	-5.748**	0.542	0.260
DDYR	-3.035*	-4.912**	0.399	0.131
EXRT	1.394	-4.263**	0.727	0.416
RGDPPC	-0.918	-3.912**	0.605	0.342
GFCF	-2.134	-4.889**	0.532	0.286
TOPEN	-3.447**	-8.213**	0.267	0.347
POLSTAB	-1.692	-5.380**	0.641	0.199

The results Bounds test of cointegration in the models with external debt and domestic debt are reported in Table 4, while the result of the lag selection test is in Table 5. The computed F values for both equations are greater than both the lower and upper Bounds values at the 5 percent level. The null hypothesis of no long-run relationship between both FDI and the other variables in the study is therefore rejected at the 5 percent level. These results reveal presence of long run relationship among the variables.

Table 4: Results of Bounds Approach to Cointegration Test

Level of interaction	F-stat	I0 Bound (5%)	I1 Bound (5%)	Cointegration
Domestic debt	7.086	2.17	3.21	Yes
External debt	7.621	2.27	3.28	Yes

4.3 Regression Results

The results of the estimated ARDL model in the study are presented and analysed in this section. As indicated earlier, the ARDL procedure generates both the short run and the long run estimates of the relationship between public debt and FDI inflows in Nigeria. The short and long run impacts of the explanatory variables on FDI inflows are presented in Table 6. Note that estimates with external debt are separated from those with domestic debt. The adjusted R-squared values for both estimates are essentially high at 0.696 and 0.728. This shows that about 70 percent of the behaviour of FDI inflows to the economy is explained in the model.

Table 5: Linear ARDL Result

Variable	*External debt*			*Domestic debt*		
	Coeff.	**t-Stat.**	**Prob.**	**Coeff.**	**t-Stat.**	**Prob.**
Long run						
EDYR	-0.310	-2.115	0.046			
DDYR				-0.831	-2.726	0.013
TOPEN	0.052	7.986	0.000	0.054	9.554	0.000
EXRT	-0.003	-1.464	0.157	-0.002	-1.226	0.234
GDPPC	2.938	3.385	0.003	3.450	6.364	0.000
GFCF	2.609	3.063	0.006	2.350	3.118	0.005
INFL	0.018	3.715	0.001	0.021	4.451	0.000
POLSTAB	0.067	2.487	0.021	0.045	1.715	0.101
Constant	8.269	0.846	0.407	2.915	0.413	0.684
Short run						
ΔEDYR	-0.073	-1.282	0.216			

ΔDDYR				0.255	0.740	0.467
$\Delta DDYR_{t-1}$				1.139	2.889	0.009
ΔTOPEN	0.015	2.175	0.041	0.020	2.844	0.010
$\Delta TOPEN_{t-1}$	-0.030	-3.889	0.001	-0.032	-4.209	0.000
$\Delta LGDPPC_{t-1}$	0.879	0.694	0.495	1.956	1.568	0.132
ΔLGFCF	-1.724	-3.806	0.001	-1.694	-3.938	0.001
$\Delta LGFCF_{t-1}$	0.828	2.063	0.051			
ΔINFL	0.004	1.143	0.265	0.005	1.157	0.260
ECM_{t-1}	-0.724	-9.325	0.000	-0.811	-9.732	0.000
Adj. R-sq.	0.696			0.728		

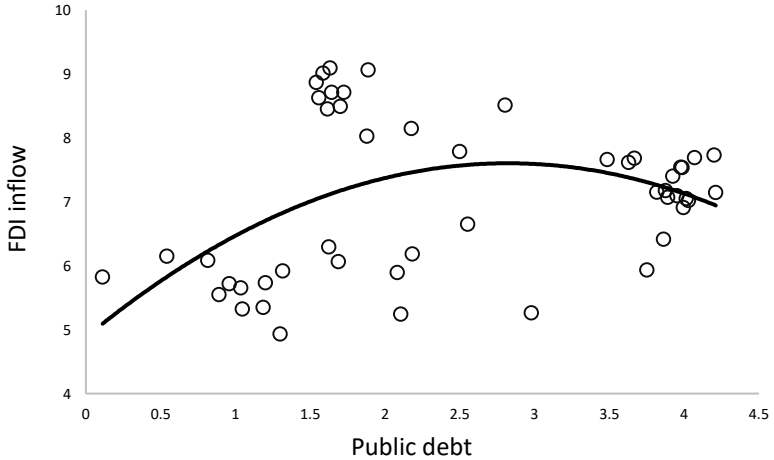
The results of the long run estimates are indicated in the upper panel of the Table. The coefficient of external dent is negative and significant at the 5 percent level. This shows that a 1 percent increase in external debt reduces long run FDI inflows by about 0.31 percentage points. This shows that external debt deters foreign investment in Nigeria. Essentially the debt overhang effect of external debt on FDI inflows, which emphasises the heightened macroeconomic risk in relation to external debt burden, holds for Nigeria as also shown in (Abubakar & Mamman, 2021; Emmanuel & Ibebi, 2023). The coefficient of domestic debt ratio is also negative and significant, also indicating that increases in domestic debt significantly decreases FDI inflows in Nigeria in the long run. This negative impact may be more related to the crowding out effect of government borrowing in the domestic market (Prah & Ofori, 2022). There is therefore evidence in this result that increased public debt weakens FDI inflows in Nigeria.

Among the control variables, all the coefficients are significant in the external debt model, while only the coefficient of political stability is insignificant in the domestic debt model. This shows that trade openness, effective market demand, capital development, and institutional quality all promote the inflow of FDI into Nigeria. On the other hand, exchange rate depreciation and rising prices tend to discourage FDI inflows. This result is in line with the macroeconomic instability argument in the study, where increased macroeconomic instability (demonstrated by currency depreciation and inflationary pressure) imposes additional tax on foreign investors. This instability is often traced to debt unsustainability, especially in developing countries (Montiel, 2005; Adegboye & Arodoye, 2019; Davoodi et al, 2021).

The error correction term in the ARDL result captures how quickly the system adjusts back to long-run equilibrium after a short-run shock. The coefficient in the EDYR model is -0.724 and -0.811 in the DDYR model. Both coefficients have the expected negative sign and are highly significant. This shows that the error correction process is statistically valid. The high coefficient in both results reveal that adjustment to long run equilibrium is relatively fast. In the short run results, the coefficient of lagged domestic debt variable shows that domestic debt has a significant and positive short run effect even though the long run effect is negative. It is also seen that external debt has no significant short run effect on FDI inflows. The control variables of trade openness and domestic capital have significant short run effects on FDI.

In this study, a quadratic model is also estimated to explain the effects of public debt on FDI inflows in Nigeria. The scatterplot in Figure 1 illustrates this non-linear relationship where the fitted curve suggests a parabola plot between public debt and FDI inflows. Specifically, an inverted U-shaped curve is shown. As debt increases initially, FDI inflows rise. Beyond a particular threshold, however, further increases in debt leads to a decline in FDI inflows. The non-linear effect of public debt on FDI shows that a squared debt term may yield a more robust estimate of the relationship between public debt and FDI inflows in Nigeria.

Fig. 1: Public debt and FDI



The result of the non-linear model is presented in Table 7. In the long run estimates, the coefficient of external debt in levels is positive and slightly significant. This indicates that initially, higher external debt tends to improve FDI inflows. The coefficient of the square of the external debt variable is however negative and significant at the percent level. This indicates that at very high levels of external debt, the effect on FDI inflows is inverse and deleterious. Thus, the negative coefficient obtained in the linear estimates above reflect the prominence of very large external debt ratios in the country. Similar coefficient estimates are reported for the domestic debt ratio. It shows that at lower or stable levels of domestic debt accumulation, it increases FDI inflows.

However, at large or unsustainable levels of domestic debt, the effect on FDI is negative. Notice that the coefficient of the square of external debt (in absolute value) is much larger than the coefficient of the variable in levels. This shows that the negative effect of unsustainable levels of external debt on FDI inflows is much larger than the positive effect of low-level (perhaps, manageable) external debt ratios. The positive effect of low-level domestic debt is however larger than the negative effect of excessive domestic debt. This shows that in terms of FDI inflows, high external debt generates more negative outcomes than high levels of domestic debt in Nigeria.

Thus, as Chudik et al (2017) and Adegboye and Arodoye (2019) also found for the entire economy, there is a nonlinear (inverted-U) relationship as well as an optimal government debt threshold for maximising FDI in Nigeria. This shows that excessive debt burdens, rather than all debt conditions, directly contribute decline in FDI inflows in Nigeria. Public borrowing is generally beneficial for expanding long run FDI access in Nigeria. However, excessive external debt burdens lead to investor uncertainty and FDI crowding out over time.

Table 4.7: Non-Linear Estimates of the ARDL Model

Variable	*External debt*			*Domestic debt*		
	Coeff.	**t-Stat.**	**Prob.**	**Coeff.**	**t-Stat.**	**Prob.**
Long run						
LDDYR				0.981	2.735	0.014
LDDYR_sq				-0.737	-2.968	0.008
LEDYR	0.246	1.994	0.059			
LEDYR_sq	-0.940	-2.271	0.034			
TOPEN	0.041	6.123	0.000	0.048	9.482	0.000
EXRT	-0.001	-0.551	0.588	-0.002	-1.803	0.088
LGDPPC	1.899	2.178	0.041	3.472	7.834	0.000
LGFCF	-1.021	-1.650	0.114	-2.416	-3.896	0.001
INFL	0.016	3.360	0.003	0.015	3.493	0.003
POLSTAB	0.044	1.846	0.079	0.067	2.958	0.008
Constant	9.588	1.052	0.305	27.170	2.669	0.016
Short run						
ΔEDYR	0.060	1.097	0.206			
ΔEDYR_sq	-0.382	-2.119	0.037			
ΔDDYR				0.871	0.221	0.828
ΔDDYR_sq				-1.871	-0.151	0.882
$\Delta DDYR\_sq_{t-1}$				2.888	2.836	0.011
ΔTOPEN)	0.017	2.678	0.014	0.015	2.667	0.016
$\Delta TOPEN_{t-1}$	-0.022	-3.182	0.005	-0.031	-4.948	0.000
ΔEXRT	0.004	1.658	0.112			
ΔGDPPC	2.752	1.997	0.059	2.141	2.037	0.057
ΔGFCF	3.276	2.697	0.014	-1.795	-4.942	0.000
$\Delta GFCF_{t-1}$				0.476	1.499	0.151
ΔINFL	0.003	0.920	0.368	-0.004	-1.261	0.223
ECM_{t-1}	-0.713	-10.24	0.000	-0.815	-12.09	0.000
Adj. R-sq.	0.745			0.808		

The short run estimates reveal that while the square of external debt significantly weakens FDI inflows, the square of domestic debt significantly improves FDI in Nigeria. Thus, excessive external debt accumulation is seen to have a dynamically stable negative effect on FDI inflows (both in the short and long run), while excessive domestic debt is shown to be beneficial to FDI inflows in the short run. It is the long run effect of high domestic debt that mar the possible short run benefits for FDI. The coefficients of the

error correction terms are also negative and significant in both estimates. This shows that any short-term deviation from equilibrium will be seedily adjusted in the long run.

4.4 Post-Estimation Tests

In order to determine the robustness and stability of the ARDL estimates, the test of CUSUM of Squares and normality of the residuals are conducted. Figure 2 shows that the CUSUM of squares line lies entirely within the 5% confidence bounds throughout the period. This shows that the models are stable over the sample period with no structural break in the regression coefficients. The parameter estimates are therefore consistent and reliable over time and can therefore be employed for forecasting and policy inference. The Histograms in Figure 3 also show the normality tests for the residuals of the two equations (with EDYR and DDYR). As the Jarque-Bera tests indicate, the residuals normally distributed. This further confirms the stability of the estimated results in the study.

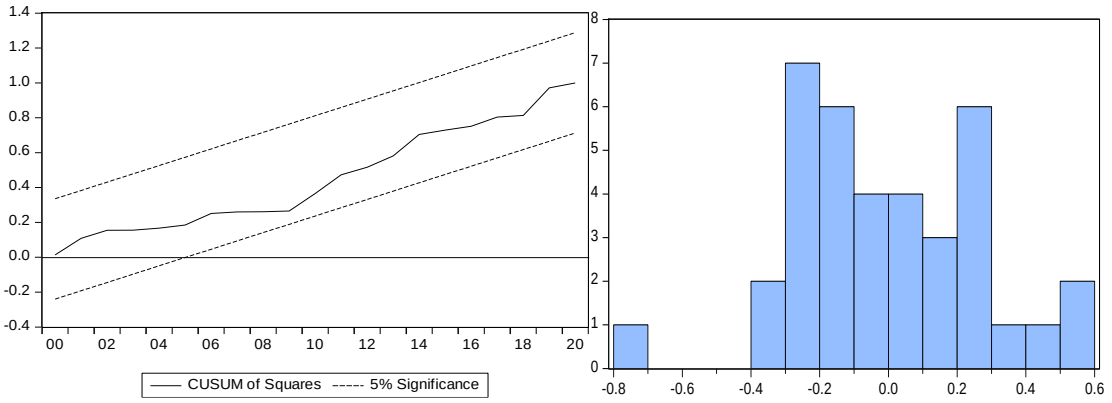


Fig. 2: CUSUM of Squares Tests for Estimates

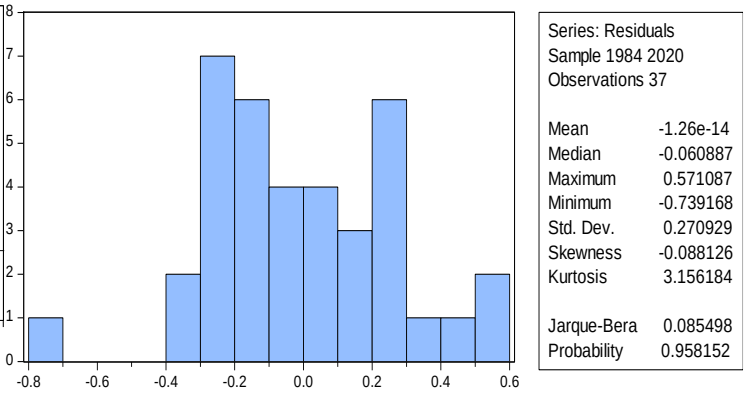


Fig. 3: Histograms and Tests for Normality

5. CONCLUSION

Nigeria has deep potentials to attract FDI, especially in relation to other SSA or developing countries. Yet the country's share of global FDI flows has not reflected this position over the years. In addressing this issue, this study examined the relative impacts of the external and domestic components of public debt on foreign direct investment (FDI) inflows in Nigeria. Given the nature of the relationship both a linear and non-linear relationship was tested using the autoregressive distributed lags ARDL framework in order to account for potential threshold effects. The data used covers the period of 1981 to 2023. The results from the study reveal a nonlinear (inverted U-shaped) relationship between public debt and FDI in Nigeria. This indicates that while debt accumulation can initially stimulate FDI, excessive levels eventually deter FDI inflows.

In the long-run estimates, both external debt-to-income ratio and domestic debt-to-income ratio showed positive linear effects in levels. The effects were however significant and negative in their squared terms. There was also evidence that excessive external debt portends more harmful long run outcomes for FDI inflows than domestic debt. The short run effects suggested that excessive domestic debt accumulation may actually be beneficial to FDI inflows in the short run. Overall, the results from the study confirms the debt overhang hypothesis in Nigeria whereby rising debt burdens raises significant concerns about fiscal sustainability and policy uncertainty by foreign investors. This eventually leads to potential crowding out of FDI in the country. Particularly, the study establishes that the marginal deterrent effect of public debt becomes stronger as the debt level increases. This suggests that a critical turning point exists where policymakers should avoid crossing in terms of debt accumulation. Between the two forms of debt, the external debt ratio appears to exert a more pronounced negative effect on FDI. This implies that external borrowing may pose a greater long-term risk to foreign investor sentiment as is also the case with debt-growth relationship.

The study has provided clear empirical evidence that public debt influences FDI inflows in Nigeria not only in scale but in structure. As such, maintaining moderate and sustainable levels of public debt is critical for ensuring consistent FDI inflows into Nigeria. Moreover, since low levels of debt are shown to improve FDI inflows to the country, there is need to ensure that borrowed funds are directed toward productive uses that are critical for preserving Nigeria's attractiveness to foreign investors. Indeed, the investment financed by public borrowing must have real economic rate of return that is at least equal to the rate of interest. Finally, given that FDI is irreversible and investors are cautious about potential future instability posed by large government debt, government-backed joint ventures with foreign investors in the country may help to improve foreign investors' confidence in the economy.

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