CHAPTER NINE

DOMESTIC DEBT, BANK CREDIT, AND THE LAZY BANKS HYPOTHESIS: EVIDENCE FROM NIGERIA

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Abstract

The rapid build-up of domestic debt in Nigeria is a major policy issue that has attracted the attention of researchers, policymakers, and the public in recent years. High and rising domestic debt could negatively affect access to bank credit, given the government's ability to borrow in large amounts. This policy can weaken the effectiveness of the private sector's role in economic growth. This study examines the effect of domestic public debt on bank credit in Nigeria. It also examines the lazy banks hypothesis in the context of Nigeria. Whereas evidence supports the presence of crowding out, we do not find evidence supporting the lazy-banks hypothesis in Nigeria. Given that private investment depends critically on the availability of credit, the study recommends that the government evaluate its borrowing needs vis-a-vis that of the private sector, given the limited loanable funds.

Kew words: Government domestic debt, bank credit, Nigeria, autoregressive distributed lag (ARDL), instrumental variables

Introduction

A large body of literature emphasizes the role of bank credit in the economic growth process. A well-functioning banking system plays the broad role of financial intermediation, which in contemporary banking theory can be sub-divided into four unique but interrelated functions: (i) provision of liquidity payment services, (ii) transformation of assets, (iii) management of risks, and (iv) processing of information and monitoring of borrowers (Freixas & Rochet, 2022). These functions enable banks to fulfill their unique task of mobilizing deposits from the public (savers) to different categories of borrowers in the form of loans. Thus, while subject

to regulation, banks can influence domestic investment and, by extension, affect employment and income distribution (Anyanwu, Gan, & Hu, 2017).

Even if only in theory, there is a close association between advanced financial and developed economic systems (King & Levine, 1993; Imran & Nishat, 2013). A well-developed economy will tend to place an increasing demand on bank credit to support the private sector's role in sustainable growth. In Nigeria, the banking system has evolved over the decades, having undergone various phases of reforms that have been aimed, inter alia, at making it an important player in a globalized economy. Supported by technological advancements, Nigeria's banking system has experienced substantial growth in liquidity, capitalization, and profitability over at least the last two decades. Sadly, however, bank credit to the private sector seems little affected by this growth. Nigeria's position as an oil-rich country makes this even more surprising. Whereas non-oil countries such as Bangladesh and Tunisia recorded a bank credit over gross domestic product (GDP) ratio of 35% and 55% from 2000-2017, respectively, Nigeria disbursed only about 11% during the same period, which gives much scope for growth in financial intermediation in Nigeria.

Access to credit in the private sector is a topic of policy deliberation in developing countries, given the central role of the private sector in economic development. Therefore, a widely researched strand of the literature assesses the underlying factors that may influence the amount of credit available to the private sector (for example, Hofmann, 2004; Imran and Nishat, 2013). This literature narrows down to the crowding out effect of government borrowing on private investment (for example, Vanlaer, Picarelli, and Marneffe, 2021). Crowding out can occur through two channels: the interest rate channel, or the credit channel, or both. Previous studies mainly focus on the interest rate channel (Bradley, 1986; Engen & Hubard, 2004; Aisen & Hauner, 2008). However, increased domestic public debt can potentially affect private capital by crowding out bank credit to the private sector, given the government's ability to borrow large amounts (Emran & Farazi, 2009).

Evidence suggests that the credit channel may be more important than the interest rate channel in developing countries (Emran & Farazi, 2009; Shetta & Kamaly, 2014; Anyanwu, Gan, & Hu, 2017). This is because, in

such countries, the banking and finance sector is imperfectly competitive, less developed, and influenced by the government (Fischer & Valenzuela, 2013; Hossain, Moudud-Ul-Huq & Kader, 2020). Credit rationing is, therefore, an important characteristic of the banking sector in such cases. This is indeed the case in Nigeria, where the government has increasingly borrowed from the domestic debt market over the past decades, and even more so in the aftermath of the 2005 debt relief offering of Paris Club. As of 31st December 2020, domestic debt had grown to about 39 billion dollars, from only about 3.72 billion dollars in 2005, representing an increase of 946%. This radical growth of domestic debt raises the question of how this might affect the availability of credit to the private sector by banks. Such a question is important in light of the private sector's crucial role in fostering economic growth and reducing the rate of unemployment. The importance of country-specific studies that re-examine the evidence of previous panel studies must be emphasized. Such localized studies provide the opportunity to account for unique country-specific nuances, which, in the case of Nigeria, include variables such as oil price, foreign aid, and trade openness.

To identify and estimate crowding out through the credit channel, we account for the possible simultaneity effect that may bias the estimates. The study employs time series data for Nigeria spanning 1970-2018. The dataset is analyzed using the auto-regressive distributed lag (ARDL) approach to cointegration and the alternative instrumental variables approach, which controls for simultaneity bias. The rest of the paper is as follows: Section 2 reviews the relevant literature. The empirical model and data are discussed in Section 3, while Section 4 presents and discusses the results. Section 5 concludes and provides policy implications.

Literature review Theoretical literature

The crowding out hypothesis has garnered several perspectives in the literature. From an early viewpoint, public spending directly crowds out private spending when the government gets involved in productive activities otherwise carried out by the private sector (Blinder & Solow, 1973). This is referred to as direct crowding out, and it emphasizes the substitutability between public and private spending. It is often criticized

that some public goods, such as the military and the courts, may not be sustainably provided by the private sector.

A more compelling argument is presented within the context of the impact of public deficits and debt on the economy. This approach to the analysis of crowding out employs the interest rate channel, which has extensively been researched, albeit with inconclusive evidence (for example, Engen & Hubard, 2004; Faini, Duranton, & Hau, 2006). This study, however, focuses on the credit quantity channel in the spirit of Emran & Farazi (2009). This channel is considered more important than the interest rate channel in financially repressed economies, typically found in developing countries (Reinhart & Sbrancia, 2015). This is because, in such economies, the government exercises some control over the interest rate. Government intervention can be done through various means, including moral suasion, direct intervention on credit allocation, high reserve ratio, ownership or control of financial institutions, and barriers to entry (Anyanwu et al., 2017). These constraints tend to weaken the effect of public debt on interest rates while substantially impacting the quantity of credit available to the private sector (Reinhart, Kirkegaard, & Belen Sbrancia, 2011). Credit rationing and inefficiencies result in credit being allocated not based on the expected returns on projects but on factors like political pressure, collateral quality, loan amount, and hidden incentives to loan officers.

The idea that government debt negatively impacts private credit comes from the popular view based on banks' balance sheets, where an additional one dollar of government debt issued to the banking sector reduces private credit by the same amount. However, banks may respond to increased government borrowing by optimizing their loan portfolios based on the risk-return characteristics of various assets and liabilities (Haikal *et al.*, 2023). Thus, there is the possibility that higher public debt may have no impact on private credit, even taking into cognizance that the Ricardian Equivalence hypothesis may not hold in developing countries (Fielding, 2008). It is essential to recognize that if banks have surplus funds, the increased lending to the government may not significantly reduce the amount of credit available to the private sector. The argument also supports a positive relationship, suggesting that higher government borrowing could crowd in private credit or mitigate the traditional crowding out effect. In this case, safe government assets in the bank's portfolio could induce them to take more risk by lending to the private sector (Kumhof & Tanner, 2005). The contrary argument where banks' access to safe government assets tends to discourage them from lending to the private sector is known as the "lazy banks" hypothesis (Emran & Farazi, 2009).

Empirical literature

Despite the theoretical ambiguity about the relationship between debt and private credit, the available evidence supports the crowding-out argument, particularly in developing countries. Evidence from Emran & Farazi (2009), who examine the credit channel using a panel of 60 developing countries, shows that an additional one dollar of government debt decreases private credit by more than one dollar. Anyanwu *et al.* (2017) explore the crowding out of the argument in the context of 28 oil-dependent countries using the pooled ordinary least squares (OLS), fixed effects, and generalized methods of moments (GMM) estimators. They also find evidence of crowding out where a one percent increase in government borrowing is associated with a 0.22 percent reduction in private credit. De Bonis & Stacchini (2009) focus on a panel of 18 OECD countries from 1981-1997 and examine the determinants of bank loans with a focus on government debt. Their results link low bank loans to higher government borrowing to support the crowding out hypothesis.

Several country-specific studies have also examined the crowding out hypothesis using the credit quantity channel in country-specific case studies. For example, Shetta & Kamaly (2014) focus on the case of Egypt and employ the vector autoregressive (VAR) framework. Their studies found that a rise in government debt by \$1 crowds out private credit by \$1.8. This study supports the lazy banks model. Evidence of crowding out is also presented in the case of Pakistan in Ahmed (2016) and Choudhary, Khan, Pasha, & Rehman (2016). Studies that explore this topic in the context of Nigeria are scarce. It is surprising given the rapidly growing levels of government debt and the low relative levels of bank credit to the private sector. Omodero (2019) employs the OLS method using data covering 1988-2018. The results surprisingly lend support to the alternative crowding in hypothesis. On the contrary, Akanbi (2020) employs the simple OLS approach and finds a statistically insignificant relationship between domestic debt and private credit, suggesting no relationship between the variables. However, a drawback of these studies is the need for more attempts to account for the possibly endogenous relationship between debt and private credit. This study aims to fill this gap in the literature.

Previous studies have carefully considered the endogeneity problem, its potential sources, and what it implies for identifying and estimating the crowding-out effect (see Emran & Farazi, 2009; Ahmed, 2016; Anyanwu et al., 2017). Unobserved heterogeneity is a source of endogeneity in panel studies. More generally, however, it is possible that the endogeneity issue could arise from banks' ability to diversify risks by optimizing their loan portfolios in response to higher government borrowing, which would create simultaneity bias. In the case of developing countries, such an argument may be weakened by the lack of independence of banks, which creates a situation where the government's demand for loanable funds is prioritized over that of the private sector. In this context, it would seem plausible that the simultaneity issue may not be much of a problem (Emran & Farazi, 2009). This leads us to consider a modeling and estimation approach that accounts for both sides of the coin, the case where simultaneity might matter to the nexus between government debt and bank credit and where it might not. We discuss this further in the section focusing on the data analysis methods.

Methodology

Model specification and data

This paper aims to examine the effect on bank credit of high and rising domestic borrowing in Nigeria. Empirical analyses are carried out using time series data that covers 49 years, spanning 1970-2018. The data are sourced from the Central Bank of Nigeria (CBN) statistical bulletins of various years, the World Development Indicators (WDI), and World Bank commodity price data. The two focus variables are bank credit and government domestic debt, calculated as a share of GDP. The study adapts Emran & Farazi's modeling approach (2009) to a country-specific context like Nigeria. In particular, it controls foreign aid, oil prices, and trade openness. The model is specified as follows:

$$bc_t = \beta_0 + \beta_1 D_t + \varphi' X_t + \varepsilon_t \tag{1}$$

Where the dependent variable (bc_t) is bank credit as a share of GDP. D_t denotes the independent variable of interest, domestic debt, as a share of GDP. X_t is a vector of control variables considered important in explaining bank credit in Nigeria. Included in X_t are the log of GDP, foreign aid as a share of GDP, inflation, trade openness, broad money-to-GDP ratio (m/gdp), as a proxy for financial depth, the log of oil price, lending interest rate, and institutional quality. The error term (ε_t) is assumed to be white-noise such that $\varepsilon_t \sim IID(0, \sigma_{\varepsilon}^2)$. The subscript t = 1, 2, 3, ..., T is an index of time variation that captures, in our case, the annual observations spanning 1970 to 2018. The variables are discussed in detail in what follows.

Bank credit as a share of GDP is the dependent variable. It represents one of the most notable measures of financial development. Its importance derives from its direct link with investment and economic growth (Calderón & Liu, 2003; FitzGerald, 2006). Bank credit is defined as the claims on the private sector by deposit money banks in the form of loans, non-equity securities, trade credit, and other accounts receivable. Data on domestic bank credit are obtained from the World Development Indicators.

Domestic public debt is the explanatory variable of interest. It refers to debt issued in local financial markets to domestic residents in domestic currency (Asogwa & Ezema, 2005). It measures the claims of commercial banks and other financial institutions on the Nigerian government. *A priori*, the expected sign on the coefficient of this variable (β_1) is ambiguous. In support of the crowding out effect, we would expect a negative sign on β_1 but its magnitude will depend on whether the risk diversification effect or the lazy banks effect is dominant. In the case of a dominant risk diversification effect, the absolute value of β_1 will be less than one, while a dominant lazy banks effect would yield an absolute value of β_1 that is greater than one. If, at the extreme, β_1 approximates -1, then that would imply that the risk diversification and lazy banks' effects cancel each other out. A positive value of β_1 would be supportive of the crowding in effect. Data on domestic debt are collected from the Central Bank of Nigeria Statistical Bulletins of various years.

The log of real GDP is the proxy for economic growth. Its inclusion is essential because of the assumption that the demand for and supply of credit is positively influenced by increases in economic growth. The lending interest rate captures the rate at which the private sector accesses loans to meet their financing needs. We expect a negative sign on the estimated coefficient because higher rates may indicate a low quantity of credit. As a proxy for inflation, the consumer price index captures the possible adverse effect of macroeconomic uncertainty on the demand and supply of loanable funds (Baum, Caglayan, & Ozkan, 2009). We obtain real GDP, lending interest rate, and inflation data from the World Development Indicators. The quality of institutions is also an important variable because it is associated with the extent of protection of property rights, transparency, and accountability. We, therefore, expect a positive sign on its coefficient. As a proxy for the quality of institutions, we employ the categorical variable "constraints on the executive" obtained from the Polity V database. It measures the "institutionalized constraints on the decision-making powers of the chief executives" (Marshall & Gurr, 2020) and employs a 7-category scale where 1 represents unlimited authority and 7 illustrates the highest institutionalized constraints. We expect higher levels of institutionalized constraints to be positively associated with bank credit. We include three additional variables that help us localize the model to the context of the Nigerian economy. These are foreign aid, trade openness, and log of oil prices, given their relevance in explaining bank credit in Nigeria (Uneze, 2010; Anyanwu et al., 2017).

Foreign aid refers to Official Development Assistance (ODA) which is defined by the OECD Development Assistance Committee (DAC) as government aid that promotes and specifically targets the economic development and welfare of developing countries (OECD, 2021). Its inclusion is based on the conjecture that multilateral aid is linked with private investment in West African countries (Uneze, 2010). One key channel through which foreign aid may impact private investment is if donor funds, channeled through domestic banks and other financial institutions, are used to raise the amount of available credit to the private sector (Mosley, Hudson, & Horrell, 1987). The variable is, therefore, expected to have a positive effect on bank credit. Despite the potential importance of this variable in determining bank credit in developing countries, previous studies have yet to consider it. Trade openness, measured as the sum of imports and exports as a share of GDP, is also an important variable. Theoretically, this variable is positively associated with bank credit (Balmaceda, Fischer, & Ramirez, 2014). However, empirical evidence suggests that this only applies to economies with a competitive banking sector (Fischer & Valenzuela, 2013). Hossain, Moudud-Ul-Huq, & Kader (2020) provide supportive evidence on developing countries, showing that trade openness negatively impacts bank credit in this category of countries. Money supply, measured as the ratio of liquid liabilities as a share of GDP, is the sum of currency outside banks, demand deposits other than those of the central government, time, savings, and foreign currency deposits of resident sectors other than the central government (WDI, 2020). We expect increases in money supply to lead to credit expansion by banks (Emran & Farazi, 2009).

We include oil prices in the model to account for the significant dependence of the Nigerian economy on oil revenues. We expect that an increase in oil prices will improve the country's fiscal position and liquidity, leading to an increase in available credit (Anyanwu *et al.*, 2017). We employ the average annual crude oil price in real 2010 US dollars as a measure of oil price. Additional information about the variables, including their sources, is provided in Table A1 of the Appendix.

Methods of Data Analysis

This study employs two separate empirical techniques to examine Nigeria's crowding-out hypothesis. The first approach ignores the potential simultaneity bias between domestic debt and bank credit. Earlier, we highlighted the tendency of banks in developing countries to prioritize the government's demand for loanable funds due to their lack of independence. We argued that simultaneity may not be a problem in this case. Therefore, our first approach to the analysis of crowding out does not account for this potential bias. In this case, empirical investigation is aided by the single equation framework of Pesaran & Shin (1999, 2001), commonly referred to as the autoregressive distributed lag (ARDL) approach to cointegration. The ARDL approach presents a unique advantage over other cointegration procedures like the two-step approach of Engle & Granger (1987) and the maximum likelihood approach of Johansen & Juselius (1990). These different approaches may be unsuitable when the variables are integrated in mixed order.

The ARDL Approach

To apply the ARDL approach, we can rewrite equation (1) as a conditional error correction process of order ARDL(p, q) as follows:

 $\Delta bc_{t} = c + \delta t + \theta bc_{t-1} + \varphi x_{t-1} + \sum_{i=1}^{p-1} \beta \Delta bc_{t-i} + \sum_{i=0}^{q-1} \gamma' \Delta x_{t-i} + v_{t}(2)$

Here, p and q are the lag lengths for the dependent and independent variables, respectively, both of which are determined by appropriate information criterion; Δ is the difference operator, used to capture the short-run dynamics of the model; c captures the fixed regressors including the intercept while t denotes the time trend. The dependent (bank credit) is denoted by bc_t while the regressors including the one of interest – domestic debt – are captured in x_t . Short-run parameters are represented by β and γ , and the long-run parameters by θ and φ . All the variables are as earlier defined in equation (1).

The ARDL method proceeds in two steps (Pesaran & Pesaran, 1997). The first step involves the test for the existence of a long-run relation between the variables in the model. The hypothesis of no long-run relationship is tested against the alternative using the calculated F–statistic. The critical values of the F-statistic provided by Pesaran *et al.* (2001) and Kripfganz & Schneider (2018) are employed. P-values accompany the critical values of Kripfganz & Schneider (2018). A calculated F-statistic below the lower critical bound supports the non-rejection of the null hypothesis.

On the other hand, the rejection of the null hypothesis is indicated by a calculated F-statistic that lies above the upper critical bound. In this case, the study will conclude that the variables are cointegrated. An inconclusive inference is associated with an F-statistic between the lower and upper critical bounds.

Following the convention, we present diagnostic tests for validity and reliability (Pesaran, Shin, & Smith, 1999). These include the Breusch-

Godfrey LM for autocorrelation, Engle's ARCH LM test for conditional heteroscedasticity, the Breusch-Pagan/Cook-Weisberg test for heteroscedasticity, the RESET test for the correct functional form, and the Jarque-Berra test for normality. In each case, a non-rejection of the null hypothesis supports the model. For model stability, we employ the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares (CUSUMSQ) plots. A conclusion favoring model stability is reached if the values of both tests lie within the 5% critical bounds.

The instrumental variables approach

The alternative approach is to try to account for the possible simultaneity bias, which could affect the reliability of the estimate. We rely on three alternative instrumental variables (IVs) methods, namely the traditional two-stage least squares (2SLS), the more efficient two-step GMM, and Hansen, Heaton & Yaron's (1996) continuously updated GMM estimator (CUE-GMM).

In addition to using the lagged dependent variable as one of the instruments, we also instrument domestic debt through the average external debt of all other Sub-Saharan African countries. We derive the idea of this instrument from Checherita-Westphal & Rother (2012), who examine the debt-growth nexus of 12-euro area countries. They instrument the debt variable for each of the 12 countries through the average debt levels of all other countries in their sample. It is relevant in our context mainly because of the fiscal similarities of the SSA countries. Further, it seems plausible that the external debt of other SSA countries is not directly associated with bank credit in Nigeria. Of course, this assumes that there are no real spillover effects or common shocks to which the bank credit of individual SSA countries respond (Panizza & Presbitero, 2014). We are relieved to find a strong partial correlation between the chosen IV and Nigeria's domestic debt and a lack of correlation between the IV and bank credit in Nigeria (see Table A4 of the Appendix).

Results

Empirical evidence from the ARDL cointegration approach

Although the ARDL cointegration test accommodates a mixed order of integration, it also assumes that variables are at most integrated of order one, i.e., I(1). The convention is, therefore, to test for stationarity of variables to ensure that this assumption is not violated. Accordingly, we employ the following unit root tests: The Augmented Dickey-Fuller (ADF) test by Dickey & Fuller (1979; 1981), the KPSS test by Kwiatkowski, Phillips, Schmidt, & Shin (1992), and the DF-GLS test by Elliott, Rothenberg, & Stock (1996) which is relatively more recent and powerful. The results (see Table A3 of the appendix) show that the variables are of a mixed order of integration but do not exceed the order of 1. Broadly, the results are the same across the testing methods with a minor variation regarding domestic debt, which is I(0) in the ADF and KPSS tests but I(1) in the DF-GLS test. Aside from this, all other variables are first difference stationary, except for trade openness, which presents uniform evidence of stationarity across the methods.

Having confirmed the stationarity properties of the variables, we can now proceed with the first step in the analysis of crowding out using the ARDL approach, which involves the cointegration test (see Table 1). The results show compelling evidence of a long-run relationship between bank credit and domestic debt, along with the other covariates. The F statistic is greater than the upper critical bounds of Pesaran, Shin, and Smith (2001) and Kripfganz and Schneider (2018). The evidence is well-supported by the postestimation diagnostic tests (see Panel C of Table 1). In particular, we find no evidence of autocorrelation and heteroscedasticity in the errors. Further, the CUSUM and CUSUM Squared plots (not presented for brevity) indicate that the model is stable.

The next step in the analysis employs the error correction framework to examine the crowding out hypothesis. Regression outputs for the long-run and short-run are presented in Tables 2 and 3, respectively. In the longrun (Table 2), we document a negative and significant relationship between domestic debt and bank credit, which indicates the presence of a crowding out effect. The result implies that a percentage point increase in the domestic debt-to-GDP ratio is associated with a decline in bank credit-to-GDP by 0.329 percentage points on average, with other factors held constant. This result supports risk-diversification effect of domestic government debt in Nigeria.

Panel A			Inference		
Model	K	F-stat	PSS (2001)	KS (2018)	
1 Panel B	8	8.596	cointegrated at 1% asymptotic o	cointegrated at 1% critical values	
	PSS (2001)		KS (2018)		
	LB, I(0)	UB, I(1)	LB, I(0)	UB, I(1)	
1%	3.15	4.43	3.917	5.745	
Panel C					
diagnostics	test stat (p-value)				
BG (χ^2)	1.10 (0.2	29)			
Het (χ^2)	0.52 (0.4	47)			
ARCH (1)	2.23 (0.1	14)			
JB (χ ²)	3.01 (0.2	22)			
RESET (χ^2)	0.94 (0.4	43)			
R-squared	0.75				
Stability	yes				

Table 1. ARDL bounds test

Remarks: BG is the Breusch-Godfrey LM test for serial correlation; HET is the Breusch-Pagan/Cook-Weisberg test for heteroscedasticity; JB is the Jarque-Bera test for normality; RESET is the Ramsey RESET test for correct functional form. PSS (2001) and KS (2018) denote the Pesaran, Shin and Smith (2001) and Kripfganz and Schneider (2018) critical values. LB and UB denote the lower and upper critical bounds at the 1% level of significance. In support of a long-run relationship between bank credit and domestic debt inter alia, the F-statistic is greater than the upper critical bounds in both the PSS and KSS tests.

Variables	Coefficient	std. error	p-value
domestic debt % of gdp	-0.329**	0.138	0.023
log gdp	0.282	3.785	0.943
foreign aid % of gdp	0.278	0.449	0.549
trade % of gdp	-0.098**	0.037	0.012
broad money % of gdp	0.797***	0.148	0.000
Inflation	-0.091***	0.021	0.000
log oil price	-2.277***	0.680	0.002
lending interest rate	-0.110	0.112	0.336

Table 2. Long-run estimates: 1970-2018

Remarks: *, **, *** denote statistical significance at 10%, 5% and 1% respectively; The selected model is an ARDL(1, 1, 0, 1, 1, 0, 0, 0, 0).

Several of the other covariates are significant and consistent with the theoretical expectation. Trade openness presents a negative effect, contradicting previous findings regarding developing countries with an imperfectly competitive banking sector (Fischer and Valenzuela, 2013; Hossain, Moudud-Ul-Huq and Kader, 2020). As expected, the broad money-to-GDP ratio, the proxy for financial depth, is positively associated with bank credit. Though positive, the estimate of this variable is insignificant in Anyanwu, Gan, and Hu (2017). Inflation presents a negative and significant effect which agrees with the expectation. Emran and Farazi (2009) show a similar finding, indicating the impact of macroeconomic uncertainty on bank credit.

Contrary to expectations, we find a negative relationship between oil prices and bank credit. This accords with Riahi's (2021) finding, however, and suggests that banks get rather shrewd in their lending behavior during times of excessive increases in oil prices. This could also reveal some deeper issues relating to the negative impact of oil booms on bank performance and solvency.

Short-run results are in Table 3. Unlike the long-run regression, there are no short-run effects of crowding out as domestic debt, though correctly signed, presents insignificant estimates. Our proxy for institutional quality (executive constraint) enters the ARDL model as a fixed regressor and thus reflects in the short-run model. Although it is positively and correctly signed, it does not have a statistically significant role in the model, similar to the evidence in Anyanwu, Gan, and Hu (2017). The error correction term, indicative of the adjustment speed, is significant and correctly signed. Its coefficient (-0.68) suggests that deviations from the equilibrium in the current year will tend to adjust by 68% in the next year. This implies that adjustments to the long-run equilibrium level will take more than one year.

Variables	Coefficient	std error	p-value
Δ domestic debt % of gdp	-0.089	0.081	0.275
Δ foreign aid % of gdp	-0.336	0.251	0.189
Δ trade % of gdp	0.037	0.025	0.137
ECT(t-1)	-0.654***	0.097	0.000
Deterministics			
executive constraint	0.063	0.107	0.556
Trend	0.322***	0.070	0.000
Intercept	-13.86***	1.299	0.000

Table 3. Error correction representation: 1970-2018

Remarks: *, **, *** denote statistical significance at 10%, 5% and 1% respectively. ECT represents the error correction term that captures the speed of adjustment. The selected model is an ARDL(1, 1, 0, 1, 1, 0, 0, 0, 0).

Empirical evidence – instrumental variables approach

This section reports the 2SLS, the efficient two-step GMM, and the CUE-GMM estimations. Although the model comprises variables with a mixed order of integration, mostly nonstationary in levels, they are cointegrated (compare Table 1 and Table A3 of the appendix). This allows us to include the variables in their level form (Hill, Griffiths, & Lim, 2018). The instrument set comprises one lag of domestic debt, the average external debt of all other SSA countries, and its one-year lag. The results (see Table 4) accord with those of the ARDL model in general. We find compelling evidence of crowding out in Nigeria. Similar to what we observe in the ARDL regression in Table 2, a percentage point increase in the debt-GDP ratio is associated with a 0.3 percentage point decline in bank credit-GDP ratio on average, ceteris paribus. Again, the evidence leans towards the risk diversification effect rather than the lazy banks effect. Besides, other explanatory variables present the expected sign with strong statistical

significance across all the alternative IV regressions. Financial depth gives a positive and significant estimate, while Inflation, oil price, and trade openness each present a negative and significant effect in the ARDL model. Institutional quality retains its positive but statistically insignificant relationship with bank credit even across the IV regressions. Overall, the results are robust to variation in the estimation approach.

variables	2SLS	2-step GMM	CUE-GMM
domestic debt % of gdp	-0.335**	-0.284*	-0.340**
	(0.139)	(0.155)	(0.133)
log of gdp	-1.441	-0.988	-1.500
	(2.386)	(2.407)	(2.786)
foreign aid % of gdp	0.066	0.064	0.067
	(0.124)	(0.112)	(0.254)
trade % of gdp	-0.072***	-0.059***	-0.073***
	(0.024)	(0.023)	(0.023)
broad money % of gdp	0.698***	0.654***	0.700***
	(0.124)	(0.137)	(0.105)
inflation	-0.061***	-0.057***	-0.061***
	(0.010)	(0.010)	(0.012)
log of oil price	-1.746***	-1.687***	-1.748***
	(0.368)	(0.392)	(0.475)
lending interest rate	-0.040	-0.059	-0.037
	(0.064)	(0.066)	(0.090)
executive constraints	0.117	0.137	0.116
	(0.093)	(0.086)	(0.108)
Trend	0.382***	0.352***	0.382***
	(0.057)	(0.057)	(0.072)
intercept	36.153	24.893	37.666
	(60.396)	(60.969)	(70.262)
R-squared	0.869	0.870	0.869
Kleibergen-Paap LM stat	13.222	9.011	19.99
(p-value)	0.004	0.029	0.000
Hansen/Sargan test	1.284	1.223	1.036
(p-value)	0.526	0.542	0.595
Observations	47	47	47

Table 4. Instrumental variables regression estimates: 1970-2018

Remarks: *, **, & *** denote significance at 10%, 5% and 1% respectively. K-P statistics is the Kleibergen-Paap test for under-identification test. The instrument set

include one-year lag of domestic debt, average external debt of SSA countries, and its one-year lag.

We employ a battery of diagnostic tests to assess the validity of the instrument set. The Kleibergen-Paap (K-P) LM test for underidentification and the Hansen test for overidentifying restrictions are in Table 5. The K-P LM test posits a null hypothesis that the model is identified. Rejecting this null hypothesis implies a conclusion that the excluded instruments are correlated with domestic debt. In all cases, the results support the non-rejection of the null hypothesis in support of the instrument set. In addition, the Hansen-Sargan test supports the non-rejection of the null hypothesis in all cases, suggesting that the instruments are valid. Even in the first-stage regression (see Table A5 of the appendix), each instrument is significantly associated with domestic debt. The Shea partial R-squared of 0.71, coupled with a significant F-statistic, further shows the explanatory power of the instrumental variables in the domestic debt regression.

Discussion of Findings

The predominant theme emerging from the results is decreased bank credit in response to increased government domestic debt. However, the reduction in bank credit is less than the increase in debt. This finding can be interpreted as implying that banks are responding to increased government borrowing by adjusting their loan portfolios to diversify their risks. This behavior of banks leads to some crowding-in, offsetting some of the crowding-out effect of government debt. Thus, the effect is no longer one-to-one as should have been expected in the traditional crowding-out view, which leads us to conclude against the presence of lazy banks for the specific case of Nigeria. Thus, whereas the finding is consistent with Anyanwu et al. (2017), who focused on oil-dependent countries, including Nigeria, it does not agree with Emran & Farazi's (2009) evidence of lazy bank behavior in developing countries. This mix of evidence is also obtainable in previous country-specific studies between risk diversification and lazy-banks behavior. For example, whereas evidence on the Pakistani economy by Ahmed (2016) supports the riskdiversification effect, that of Shetta & Kamaly (2014) on the Egyptian economy is in line with lazy banks behavior.

Conclusion and Recommendation

The persistent growth of domestic debt in SSA in general, and Nigeria in particular, has attracted the attention of researchers and policymakers in recent years. One of the main economic effects of high and rising domestic debt is its negative impact on private capital, which, by implication, weakens the effectiveness of the private sector's role in economic growth. This study examines the crowding out hypothesis from the viewpoint of Nigeria and evaluates its extent using the ARDL and IV estimation methods. The results affirm the presence of crowding out in Nigeria. The coefficient estimate on domestic debt is approximately 0.3 across the ARDL and IV regressions. This finding concludes that an increase in the domestic debt ratio by one percentage point reduces the bank credit ratio by approximately 0.3 percentage points on average, ceteris paribus. It turns out that the evidence does not support the hypothesis of lazy banks' behavior.

Nevertheless, the crowding-out effect is substantial and should be taken seriously, especially given the dwindling economic growth prospects and the rising levels of unemployment in Nigeria. The quantity of credit available to the private sector is crucial because it shows how much government borrowing may affect private investment. Although the Nigerian financial market has evolved, it still needs to be well-developed. Thus, private investment depends critically on the availability of credit. It is, therefore, important for the government to consider this by evaluating its borrowing needs vis-a-vis the private sector, given the constraints on available loanable funds.

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