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Crowding Effects of Government Borrowing on Activities in the Private Sector: Another Evidence from Nigeria

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Abstract

Motivated by the high and rising public debt profile in Nigeria, this study investigates public debt effects in relation to financial leverage and corporate investment in the private sector using the panel D-GMM framework. Three public debt ratios are considered: namely, external debt to GDP ratio, domestic debt to GDP ratio, debt service to GDP ratio. On the other hand, financial leverage is measured in terms of non-current liability to equity ratio, whereas corporate investment is measured in terms of total assets. The study is based on a panel sample comprising 156 firm-period observations from 2011 to 2022 in respect of thirteen (13) companies that are listed in the consumer goods sector of the Nigeria stock exchange. We find that both external debt and domestic debt exert a statistically significant effect on financial leverage, while none of the public debt ratios is significant in determining private sector investment. However, while increase in external debt is associated with increase in debt-equity ratio, increase in domestic debt reduces debt-equity ratio. Also, we find that debt service has a negative but with statistically insignificant effect on financial leverage. However, the effect of debt service on financial leverage appears to be significant in economic sense. These findings, which are largely robust, tend to validate the crowding-out effect, especially in the context of the relationship between domestic debt and corporate financing. Therefore, we recommend that Federal Government should borrow more from external sources than relying on domestic debt to finance the increasing fiscal deficit in order to protect the growth and performance of the private sector.

***Key words**: Public debt, financial leverage, corporate investment, crowding-out effect theory*

Introduction

With the rising public debt profile in Nigeria, it has become necessary to investigate government borrowing effects on private sector investment and financing. Theoretically, there is a negative correlation between debt-financed fiscal deficit and private sector investment and financial leverage. The crowding-out effect theory, which has received considerable attention in the

economic and finance literature, contends that rising public debt impedes private sector financing and investments. According to Friedman (1978), debt-financed fiscal deficits crowd out private debt financing. Vanlaer et al. (2021) contend that the crowding-out effect of public debt on private sector gross fixed capital formation works through the credit channel and is more pronounced when government borrowing increases the credit constraints for private firms resulting from financial frictions and credit rationing. Traum and Yang (2015) maintain that government debt expansion crowds in or crowds out private sector investment depending on whether the debt increase results from fiscal or monetary policy. According to Anyanwu et al. (2018), governments' resort to the banking sector to fund fiscal deficit explains the observed low credit to private sector relative to GDP in oil-dependent countries.

Several studies have attempted to empirically validate the crowding-out theory. However, much of the previous studies are focused on developed countries and emerging markets in Asia. This research gap has underscored the need to reconsider this important topic from the perspective of a developing African country such as Nigeria. This study contributes to the large but growing crowding-out effect literature by exploring the extent to which the observed increasingly high public debt ratios in Nigeria affect corporate investment and financing decisions using a dynamic panel regression framework. The study is focused on consumer goods firms that are listed on the Nigeria exchange over the period from 2011 to 2022. Compared to previous studies in Nigeria, the current study is the most recent empirical work on crowding-out effect theory with up-to-date firm-level and macroeconomic data.

Sections of the remainder of the study proceed as follows: The next section reviews some recent studies on capital structure determinants in Nigeria and globally. The methodology section discusses the sample, data, variables and the empirical framework. This is followed by the results and discussion section which contains the empirical analysis and discussion of findings. The last section is the concluding section which summarizes and concludes the study.

Literature Review

Theoretical Framework

Our theoretical framework allows both corporate investment and corporate financing to depend on public debt ratios. This framework is consistent with the crowding-out effect theory, which states that increasing government borrowing impedes or crowds-out financial leverage and investments in the private sector.

Review of Recent Empirical Studies

King'wara (2014) analyzes the significance of public domestic debt in driving private sector investment in Kenya focusing the period from 1967 to 2007. The study specifies and estimates a private sector investment function incorporating public domestic debt, interest rate, public investment, and GDP as explanatory variables. Using the Johansen cointegration method, he finds that public domestic debt has a negative and significant long-run effect on private sector investment, which is consistent with the crowding-out effect theory. He also finds that interest rate and GDP are significant determinants of private sector investment.

In Nigeria, Akomolafe et al. (2015) explore the effect of government deficit financing on private sector investment using the Johansen cointegration and vector error c orrelation frameworks. Private sector investment is measured in terms of gross capital formation, while both external debt and domestic are examined. Their empirical analysis is based on time series data covering from 1980 to 2010. They find that private sector investment responds negatively to both domestic debt and external debt shocks which indicate evidence of crowding effect in Nigeria.

Thilanka and Ranjith (2018) examine the extent to which public debt crowds out private sector investment in the Sri-Lankan context using the vector error correction model. Focusing on the period from 1978 to 2015, their finding, which provides evidence of cointegration between public debt and private sector investment, shows that while economic expansion is generally beneficial, public debt crowds out private sector investment in the long run.

In a cross-country study of oil dependent countries, Anyanwu et al. (2018) seeks to determine the extent of the crowding-out effect of government domestic debt. The study is based on panel data on 28 countries covering the period from 1990 to 2012. Using both fixed effects and GMM regression frameworks, they find that government borrowing significantly impedes private sector credit but has no significant effect on private sector cost of borrowing or interest rate. Hence, their empirical evidence suggests that the crowding out of government domestic borrowing does not work through the interest rate channel but works through the credit channel.

Demirci et al. (2019) investigate the extent of the dependence of corporate financing on government borrowing across the globe. Their sample includes 38,778 firms operating in 40 countries, with dataset consisting of 343,403 firm-panel year observations covering the period from 1990 to 2014. Consistent with the crowding-out theory, they find, using several panel regression frameworks, evidence that government domestic borrowing exerts a negative effect on corporate debt ratios. However, the negative effect of government domestic borrowing is more significant for larger and more profitable firms, especially those competing in countries with more developed stock markets.

Nilsson (2020) investigates the question of whether public debt crowds-out or crowds-in private investment for a panel sample of 26 European countries using the fixed effects method. Public debt is proxied by the ratio of gross government debt to GDP, while private investment is represented by gross fixed capital formation as a ratio of GDP. Consistent with the crowding-out effect theory, it is found that increase in public debt ratios impedes private investment.

In cross-country analysis, Kabir and Flath (2020) seek to obtain international evidence on the crowding-out effect of government deficit financing on private sector credit. Their analysis involves 73 countries and covers from 1995 to 2014. In agreement with the crowding-out effect theory, they find evidence that government borrowing from the domestic commercial banks exerts a negative effect private sector credit for both developing and high-income countries.

Using the instrumental variable GMM regression framework, Vanlaer et al. (2021) seek to provide international evidence on the overhang effect of government debt expansion private sector investment based on panel data obtained from 28 EU countries from 1995 to 2016. Consistent with

the debt overhang effect theory, they find that increase in public debt significantly reduces private sector investment.

Zhang et al. (2022) analyze the impact of both central government and local government debts on corporate financial leverage in China focusing on the period from 2008 to 2019. They find evidence supporting the crowding-out effect theory. More specifically, their empirical evidence indicates that Treasury and LGFV bonds issuance exerts a significant negative effect on corporate financial leverage. Also, while central government debt exerts a safety crowding-out effect by crowding out corporate bonds, local government debt crowds out corporate loans, which the authors refer to as financial crowding out effect.

In China, Bai et al (2022) analyze the effects of government borrowing on both the cost and scale of corporate financing in the context of commercial bank credit. Their analytical data are obtained from listed companies in the A-share market from 2006 to 2018. Using a panel regression model that controls for both individual and period fixed effects, they find evidence that supports the theoretical view that government debt crowds out private debt financing. More specifically, their empirical evidence shows that government borrowing significantly reduces corporate leverage and increases cost of capital.

In US, Akkoyun et al. (2023) re-examine the impact of public debt on corporate financing decision in the context of World War 1 period covering July 1916 and December 1919, they provide empirical evidence that government borrowing exerts a crowd-out effect on long-term corporate bond and preference stock. However, there is no evidence suggesting that short-term corporate debt is affected by government borrowing.

Liu et al. (2023) consider the extent of how government borrowing affects corporate financing decisions in China, focusing on A-share listed non-financial companies operating in prefecture-level cities from 2006 to 2018. Their empirical evidence indicates that government borrowing crowds out private sector debt financing as it increases the cost of private debt, ties up bank credit and reduces the total corporate debt stock.

Methodology

Sample, Data and Variables

Our sample encompasses 13 firms that are listed in the Nigeria stock exchange over the period from 2011 to 2022. These include Vita foam, Honeywell, NASCON, Cadbury, Flourmill, Nigerian Breweries, Guinness, Champion Breweries, Nestle, PZ, Dangote Sugar, Unilever and McNichols. The companies are selected purposively based on data availability and consistency. Our panel dataset comprises 156 firm-period yearly panel observations. Firm-level data are obtained from the annual reports and financial results of the individual companies assessed through their official websites, while data on public debt are sourced from the CBN database. EViews statistical software is used for data analysis.

Dependent Variables

Financial Leverage is measured by debt-equity ratio (DER) defined in this context as the ratio of non-current liabilities to total equity. Higher debt-equity ratio implies higher financial leverage.

Corporate Investment is measured in terms of total assets (TA). Increase in total assets indicates increase in corporate investment.

Explanatory Variables

Three measures of public debt are examined and they are total external debt ratio to GDP (TEXDY), total domestic debt ratio to GDP (TDDY) and total debt service ratio to GDP (DSERVY).

Control Variables

Corporate Profitability is measured in terms of return on assets (ROA), which is the ratio of profit after tax to total assets. Higher ROA implies higher corporate profitability.

Figures 1 and 2 display the time series plot of DER and TA for the individual firms while Figures 3 and 4 plot their means and standard deviations. Table 1 shows the pooled descriptive statistics for all variables under investigation.

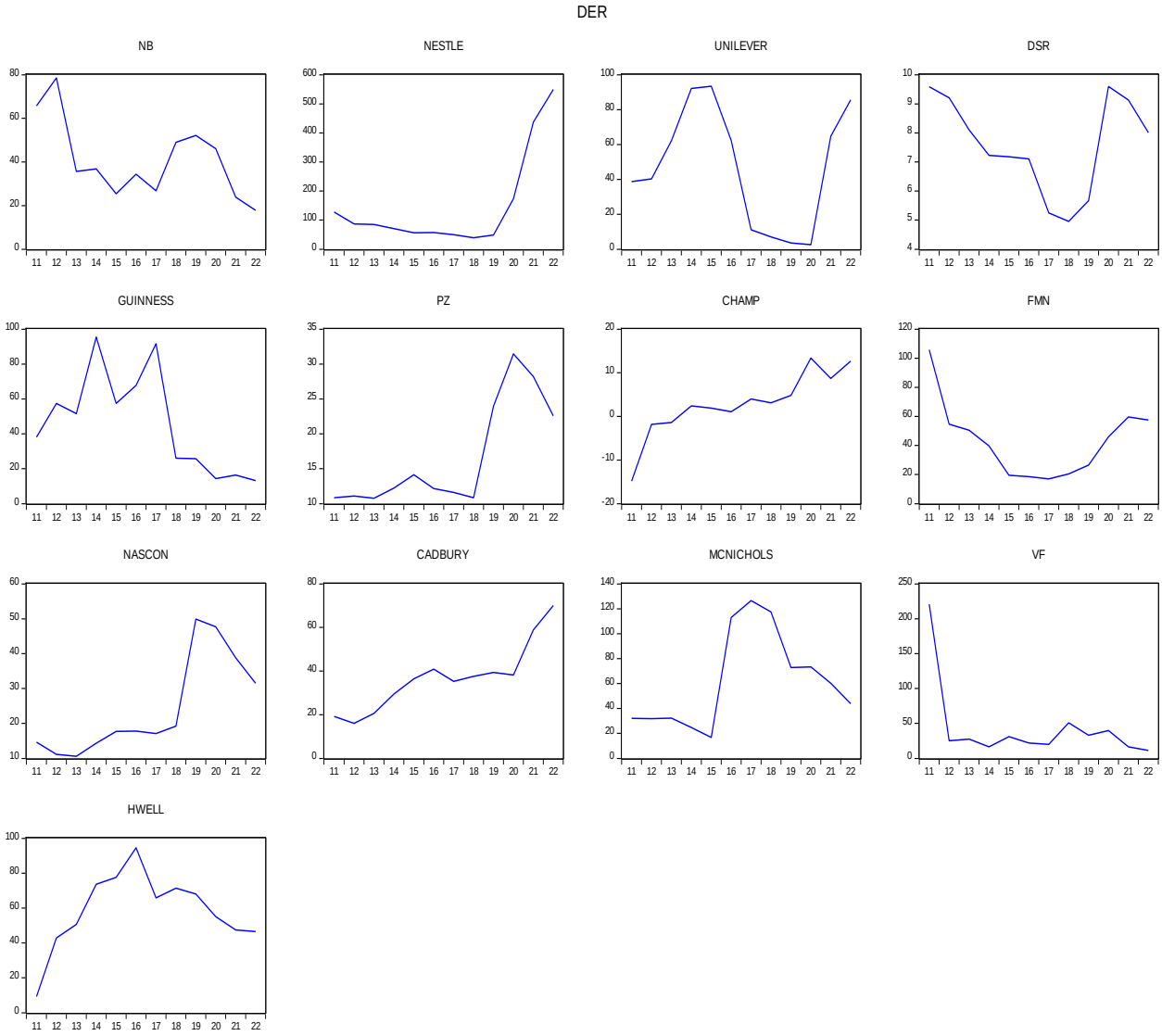
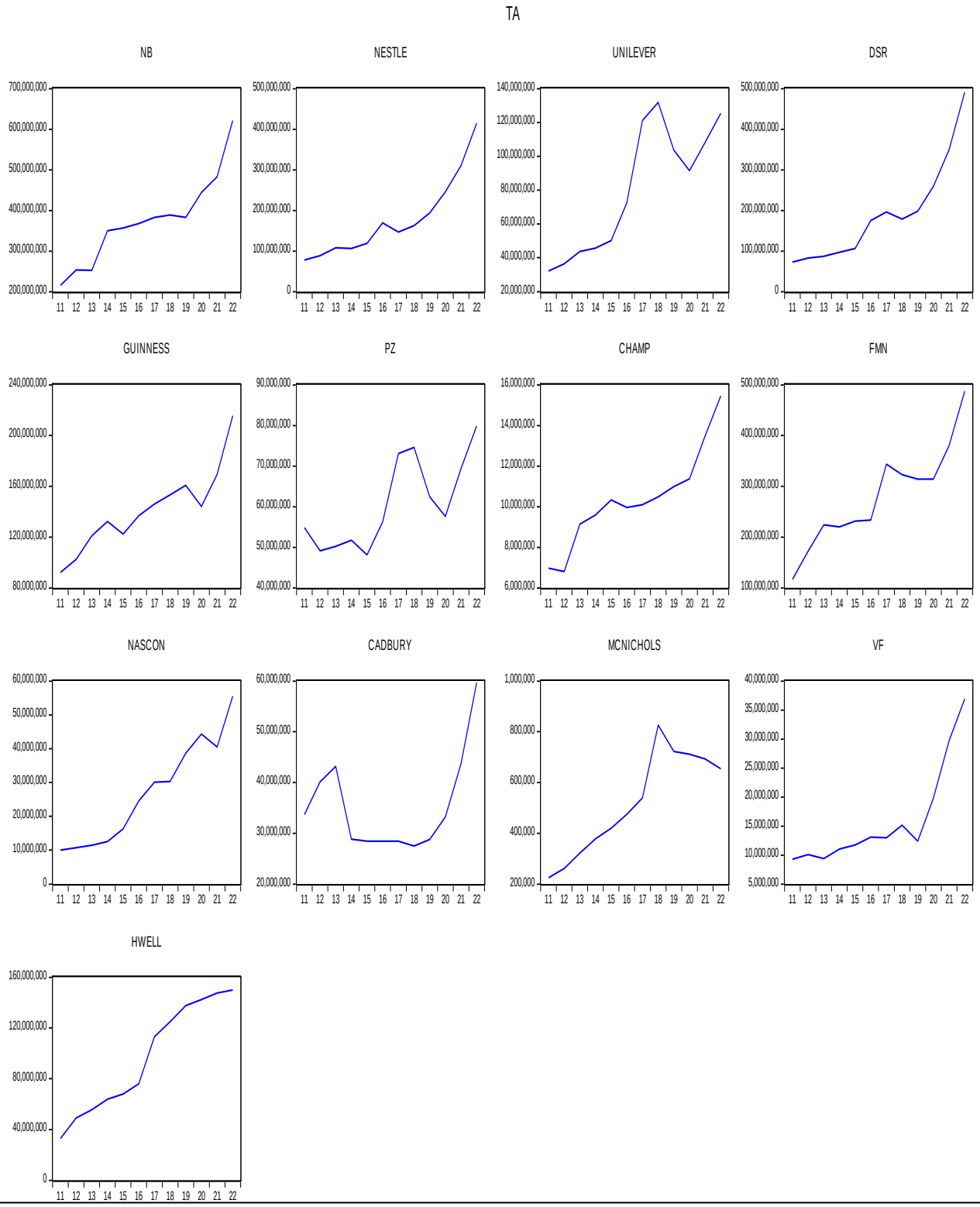


Figure 1: Time series of plot of Debt-Equity Ratio


TA
NB
NESTLE
UNILEVER
DSR
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PZ
CHAMP
FMN
NASCON
CADBURY
MCNICHOLS
VF
HWELL

Figure 2: Time series of plot of Total Assets

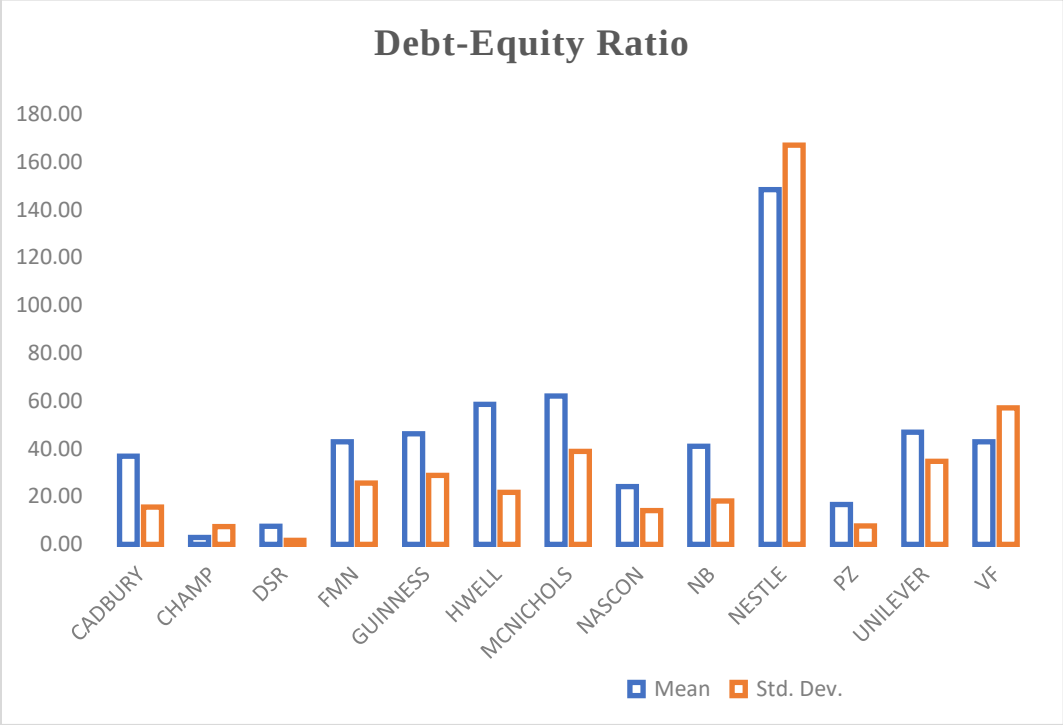

Figure 3: Means and Standard Deviations for DER

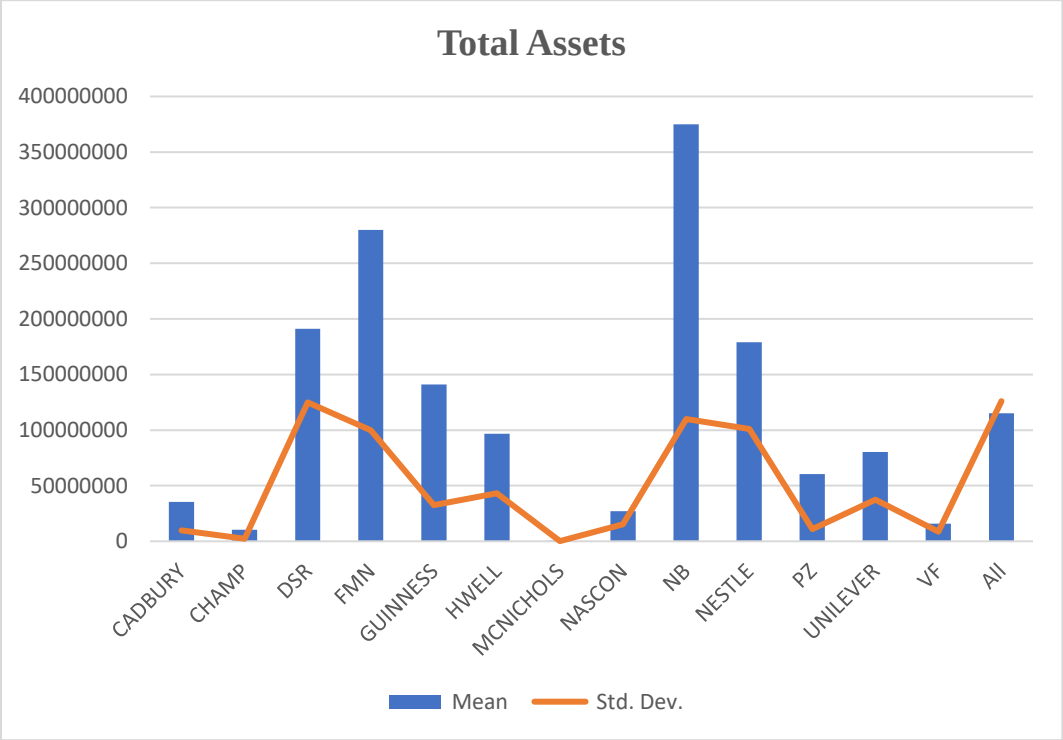

Figure 4: Means and Standard Deviations for DER

Table 1: Descriptive statistics

VARIABLES	Mean	Std. Dev.	CV	Skewness	Kurtosis	Jarque-Bera (P-value)
DER	44.41	61.81	5.40	40.09	9699.35	0.0000
TA	11500000	126000000	1.55	4.99	88.07	0.0000
ROA	6.65	7.72	0.06	4.10	7.95	0.0188
TEXDY	4.70	2.97	0.35	1.58	16.17	0.0003
TDDY	9.98	0.89	0.04	1.37	17.35	0.0002
DSERVY	1.57	0.61	0.70	2.40	15.21	0.0005

Empirical Framework

This study employs a dynamic panel regression framework to analyze the impact of public debt on corporate investment and financial leverage. More specifically, the D-GMM (Differenced

Generalized Method of Moment) framework suggested by Arellano and Bond (1991) is employed. This robust framework has the advantage of controlling both heterogeneity and endogeneity problems associated with panel data. While the heterogeneity is controlled through differencing, endogeneity is controlled through instrumental variables.

We specify two dynamic GMM models as follows:

$$\Delta DER_{it} = \beta_1 \Delta DER_{it-1} + \beta_2 \Delta TEXDY_t + \beta_3 \Delta TDDY_t + \beta_4 \Delta DSERVY_t + \beta_5 \Delta ROA_{it} + \beta_6 \Delta TA_{it} + \Delta \epsilon_{it} \quad (1)$$

$$\Delta TA_{it} = \phi_1 \Delta TA_{it-1} + \phi_2 \Delta TEXDY_t + \phi_3 \Delta TDDY_t + \phi_4 \Delta DSERVY_t + \phi_5 \Delta ROA_{it} + \phi_6 \Delta DER_{it} + \Delta \varepsilon_{it} \quad (2)$$

Where Δ is the first difference operator. Arellano and Bond (1991) argue that the lagged variables in level can serve as instruments for the lagged variables in first difference. Hence, we use the lagged value of DER s an instrument to control for the endogeneity problem associated with the correlation between ΔDER_{it-1} and $\Delta \epsilon_{it}$, while we use the lagged value of TA as an instrument to control for the endogeneity problem associated with the correlation between ΔTA_{it-1} and $\Delta \varepsilon_{it}$.

Empirical Results and Discussion

Model Estimation and Analysis

Table 2 displays the D-GMM results for the effect of public debt ratios on private investment and corporate financial leverage. To control for the endogeneity problem in the model, we include all valid lags from period -2 to -3 as instruments. Model estimates and diagnostic tests are reported in Panels A and B respectively.

As Table 2 clearly shows, both investment and financial leverage models are estimated with 13 instruments which are greater than the 7 estimated coefficients, indicating that both models are over-identified. However, for both models, the J-statistic is not statistically significant, and thereby validates all the 13 instruments as strictly exogenous in relation to the error term. Also, for both models, while the AR(1) coefficient has the expected negative sign, the AR(2) coefficient is not significant, implying evidence of zero second-order autocorrelation. Hence, our models are valid, while our model estimates are reliable and reflect the reality in the consumer goods industry.

Our results indicate that both investment and financial leverage are persistent and are determined by their previous performance. However, while the lagged dependent variable is positive and highly statistically significant for both models, it is much higher in size for investment suggesting that the persistence in investment is much higher than the persistence in financial leverage. For other firm-specific factors, we find that the effect of debt-equity ratio in the firm investment model is not statistically significant, whereas the effect of total assets on debt-to-equity ratio is highly significant. The estimated coefficient for LTA is -1.8504, which is negative, sizable, and shows that an increase in investment is associated with a decrease in debt relative to equity. More specifically, a 1% increase in total assets is associated with about 1.9% decrease in debt-equity

ratio. Hence, firms tend to reduce their debt-equity ratio following a positive change in their total assets, and vice versa. However, profitability has no significant relationship with both investment and financial leverage.

For the main relationship of interest, our results show that both investment and financial leverage are positively related to external debt, which implies the tendency for increase in public external debt to increase both corporate investment and corporate financial leverage. However, the effect of external debt is not significant for both financial leverage and firm investment. Further, our results indicate that domestic debt has a positive but not significant relationship with firm investment, whereas its effect on financial leverage is negative and significant at the 10% level. However, the negative effect of external debt on debt-equity ratio is sizable, hence, it is economically significant. The coefficient of -3.6420 shows that a 1% increase in domestic debt relative to GDP is followed by about 3.6% reduction in corporate debt-equity ratio. This finding is consistent with the crowding-out effect and suggests that public domestic debt precludes corporate debt. In other words, government's reliance on domestic debt affects the ability of corporate entities to assess investible funds from the debt market.

For debt service, there is no evidence of a statistically significant impact on both investment and financial leverage. However, while the coefficient on debt service is positive and marginal in the firm investment model, it is negative and substantial in the financial leverage model. This implies the tendency for corporate managers to reduce their financial leverage or debt-equity ratio in response to increasing debt service obligation of the government. This reaction may be linked to the fear that government may resort to more borrowing to meet its increasing debt service obligations, especially when faced with increasing financing gap. Hence, higher debt service ratio is associated with lower corporate debt-equity ratio.

Table 2: D-GMM Estimation Results; p-values are in parenthesis

Variable	TA	DER
Model Estimates		
y_{it-1}	0.6506 (0.0002)	0.3725 (0.0093)
LTA	–	-1.8504 (0.0010)
LDER	-0.0143 (0.6294)	–
LROA	-0.0194 (0.8134)	-0.1124 (0.4102)
LTEXDY	0.1136 (0.8149)	2.4220 (0.0746)

LTDDY	0.4372 (0.2651)	-3.6420 (0.0744)
LDSERVY	0.0868 (0.8699)	-0.8774 (0.4619)
Diagnostic Tests		
Instrument	13	13
J-statistic	7.9961 (0.3329)	7.9906 (0.3334)
AR(1)	-0.1134 (0.9097)	-0.1528 (0.9785)
AR(2)	-0.1104 (0.9120)	0.2120 (0.8321)

Table 3: D-GMM Results (for Robustness Check); p-values are in parenthesis

Variable	**TATE**	**NCLTA**
Model Estimates		
y_{it-1}	0.4255 (0.0000)	0.4973 (0.0461)
LTA	–	-1.0559 (0.3064)
LNCLTA	0.1106 (0.7347)	–
LROA	-0.0608 (0.1809)	-0.0530 (0.7912)
LTEXDY	-0.1428 (0.7103)	0.6827 (0.6260)
LTDDY	0.2880 (0.4299)	-1.6618 (0.4127)
LDSERVY	0.2433 (0.8134)	-0.0703 (0.9858)
Diagnostic Tests		
Instrument	13	13
J-statistic	8.9587 (0.2556)	7.5643 (0.3725)

AR(1)	-1.6659 (0.0957)	-0.5426 (0.5874)
AR(2)	0.6906 (0.4898)	0.0216 (0.9828)

Robustness Check

To ensure the robustness of our empirical results, we use different measures of corporate investment and financial leverage. We use non-current liability ratio to total assets to proxy financial leverage, and total assets ratio to total equity to proxy corporate investment. The results are presented in Table 3. The estimated D-GMM model is valid as shown by the J-statistic and the second order autocorrelation or AR(2) statistic. Both statistics are statistically insignificant as expected for a well-behaved model.

For corporate investment, we can see that the coefficients on LTDDY and LDSERVY both with positive signs shown earlier, the coefficient on LTEXDY does not. However, the three public debt measures all lack statistical significance which is consistent with the results presented in Table 2. Hence, the results for the relationship between public debt and corporate investment are largely robust to alternative measures of corporate investment.

For financial leverage, all the public debt measures maintain their earlier signs, although they lack significance in statistical sense. This shows that the results for the relationship between public debt and corporate leverage are robust in terms of the direction of the relationship.

Discussion and Conclusion

This study employs the D-GMM framework to estimate the extent of the impact of public debt ratios on both firm investment and financial leverage in the context of the crowding-out effect theory. Three public debt ratios are considered: namely, external debt to GDP ratio, domestic debt to GDP ratio, debt service to GDP ratio. On the other hand, financial leverage is measured in terms of non-current liability to equity ratio, while corporate investment is measured in terms of total assets. The study is based on a panel sample comprise 156 firm-period observations obtained from thirteen (13) companies that are listed in the consumer goods sector of the Nigeria stock exchange between 2011 and 2022.

There is evidence that debt service has a negative but statistically insignificant effect on financial leverage. However, the coefficient linking the two variables is sizable and may be significant in economic sense. Further, we find that both external debt and domestic debt exerts a statistically significant effect on financial leverage. However, increase in external debt is associated with increase in debt-equity ratio, while increase in domestic debt reduces debt-equity ratio. A plausible explanation is that increase in government borrowing from the domestic financial market increases market frictions and credit rationing leading to higher credit constraints for the private sector. This

evidence supports the earlier findings reported by several studies including Anyanwu et al. (2018), Demirci et al. (2019), and Kabir and Flath (2020).

We find no evidence that public debt ratios are significantly related to corporate investment. However, the positive coefficients associated with the three public debt measures are consistent with the view that government borrowing crowds in private sector investment. This finding tends to contradict Akomolafe et al. (2015), King'wara (2014), Nilsson (2020), Thilanka and Ranjith (2018). These studies find that private investment responds negatively to both domestic and external debt.

Overall, our findings suggest the existence of crowding-out effect in the relationship between public debt and corporate financing. However, this crowding-out effect occurs through domestic debt and debt service. Therefore, we recommend that government should rely more on external debt than domestic debt to finance the increasing fiscal deficit in order to protect the growth and performance of the private sector.

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