

Review paper

The Impact of Domestic Debt on Agricultural Output in Nigeria (1990-2014)

ABSTRACT

This paper investigates the impact of domestic debt on agricultural output in Nigeria using annual time series data spanning 1990-2014. The study employs the OLS test, Augmented Dickey-Fuller test, Johansen co-integration test, Granger causality test, and Vector Error Correction Method (VECM). Findings of the OLS test reveals that domestic debt stock and Interest rate have positive relationships with agricultural output growth, while domestic debt service payment has a negative relationship with agricultural output growth in Nigeria in the short-run. The high R^2 value (0.915513) and the f-statistical value (75.85314) indicate that domestic debt is a major and significant determinant of agricultural output growth in Nigeria. However, finding of the co-integration test reveals that domestic debt stock and Interest rate have negative relationship with agricultural output, while domestic debt service payment has a positive relationship with agricultural output in Nigeria in the long-run. The Vector Error Coefficient shows that about 87.8404% of the errors will be corrected in the long-run. Also the Granger Causality test revealed the existence of a bidirectional relationship between agricultural output and domestic debt, and a bidirectional relationship between domestic debt servicing and agricultural output, while it was discovered that interest rate have no causal relationship with agricultural output in Nigeria. It is therefore concluded that domestic debt, domestic debt servicing and interest rate affects agricultural output in Nigeria both in the short-run and long-run. Domestic debt stock and interest rate stimulates agricultural output in the short-run, but depresses agricultural output in the long-run, while domestic debt servicing reduces agricultural output in the short-run, but stimulates agricultural output in the long-run. Hence, long-term macroeconomic policies should be targeted toward increasing the level of domestic debt servicing, and reducing the level of domestic debt with a low rate of interest in the economy, as it crowds out private investment in agriculture in the long-run. This would contribute to agricultural growth in the long-run

Key words: Economic Growth, Agriculture, Domestic Debt, Domestic Debt Servicing, Interest Rates.

1. INTRODUCTION

1.1. Background to the Study

Over the years, several studies have focused on understanding the association between agriculture and economic growth, yet there is some disagreement. While some researchers have argued that agriculture should be the foundation of economic growth (Gollin, Parente & Rogerson, 2002; Thirtle, Lin & Piesse, 2003), others claim that the linkages agriculture has with other sectors are too weak and its innovative structures are inadequate for promoting economic growth (Ranis and Fei, 1961; Jorgenson, 1961). The relationship between agriculture and development, especially in sub-Saharan Africa, cannot be overemphasized. Reducing poverty, improving nutrition and general well-being of the population hinges critically on the performance of the agricultural sector as this would imply improving the standard of living of citizens of the country. Agriculture plays an important role in the overall economic development of a country, to the extent that a country that is able to achieve a 4% annual growth rate in agriculture would record an improvement in technology, and an increase in

40 agricultural production is capable of reducing food import bills which in the long-run can translate to a
41 favourable terms of trade (World Bank, 2006).

42 In Nigeria, 70% of the population is employed in the agricultural sector and economic growth will be
43 almost impossible to achieve without developing the sector. Furthermore, the importance of
44 agriculture to the Nigerian economy is evident in the nation's natural endowments in production
45 factors such as: extensive arable land, water, human resources, and capital. Exploring the nation's
46 productive advantage in this sector is the fastest way to stimulate growth in the economy (FMARD,
47 2012).

48 For the sector to be developed, the government of Nigeria depends on borrowing (externally or
49 internally) for actualizing its agricultural and river basin development projects. Domestic debt is one
50 method through which the government of Nigeria finances deficits and carry out Agricultural
51 development projects. Developing countries are faced with increasing difficulty in obtaining external
52 finance to drive the nation's development efforts, the nation rely solely on domestic debt (Ola &
53 Adeyemo, 1998). Domestic debts are debt instruments issued by the federal government and
54 denominated in local currency.

55 Over the years, the government has put in place certain policy measures and programmes with a
56 view of increasing the contribution of agriculture to economic development, even as far as
57 accumulating enormous domestic debt. However, the federal government expenditure on agriculture
58 as a ratio of total federal government expenditure portrait a gloomy future for the sector's
59 development in the country. Available statistics from the CBN shows that the federal government
60 expenditure on agriculture were low except for the following years; 1999, 2008, 2011 and 2013
61 (Muftau and Gafar, 2003; CBN, 2014). Despite these huge sums of money allocated to the sector
62 during these years, there was little or no improvement in agricultural production. For instance,
63 agricultural real growth rate was 7% in 1999, 18% in 2008, 7% in 2011 and 6% in 2013 as compared
64 with the growth rate of 14%, 14%, 42% and 12% in 1998, 2007, 2010 and 2012 respectively (CBN,
65 2014). The reason may be that successive governments only used the policies/programmes to
66 mismanage or embezzle public funds to the total neglect of food production.

67 The outstanding level of government domestic debt has grown tremendously from N0.023 billion at
68 inception in 1960 to N1.111 billion in 1970. In 1980 it stood at N8.23 billion when compared to the

level of external debt which moved from N0.094 billion 1960 to N0.175 billion in 1970 and further to N1.86 billion in 1980 (Asogwa & Ezema, 2005). Asogwa et al. (2005) further observed that it was in 1986 at the inception of the structural adjustment programme that the level of external debt for the first time became larger than the level of domestic debt. Ever since then, the stock of external debt has consistently been larger than domestic debt. In 1986, the total government outstanding domestic debt which was N28.4 billion increased progressively to N477.7 billion in 1995, reduced in 1996 and started rising again in 1997. Domestic debt stock fell significantly from N4.13 trillion in 2007 to N2.32 trillion in 2008, and thereafter, has been on the increasing rate (CBN, 2014).

The federal government reliance in borrowing from the banking system to finance its large and unsustainable fiscal deficits has hindered the attainment of macroeconomic stability and sustainable economic growth in Nigeria. In addition, this has crowded out the private sector from the credit market, thereby stalling investment and total output growth. It is against this background that this study will seek to assess the impact of domestic debt on agricultural output in Nigeria. This study therefore set out to analyze the extent to which government domestic borrowing have helped in increasing agricultural output in Nigeria and will be significant as its findings will provide a basis which will aid policy makers in proffering policies aimed at managing the problems that may arise from the accumulation of domestic debt in Nigeria.

This paper is organized into five sections: section one comprises the introductory background of the study. Section two covers the literature review and theoretical framework. Section three gives information about the research methodology while section four deals with presentation, interpretation and discussion of results. Section five covers the summary of findings, policy recommendations and conclusion.

2. LITERATURE REVIEW

2.1 Definition of Concepts

Domestic Debt: According to Ozurumba and Kanu (2014), domestic debts refer to the portion of a country's debt borrowed from within the confines of the country. These loans are usually obtained from the central bank of Nigeria, deposit money banks, discount houses and other non bank financial houses.

97 Domestic Debts are debts that originate from within the geographical region of a country, which are
 98 contracted through debt instruments such as treasury bills, treasury certificates and treasury bonds.
 99 Others are development stocks, FGN bonds and Promissory notes.

100 **Agriculture:** According to Anyawu, Oyefusi and Dimowo (1997) agriculture involves the cultivation of
 101 land, raising and rearing of animals for the purpose of production of food for man, feed for animals
 102 and raw materials for industries. It involves cropping, livestock and forestry, fishing, processing and
 103 marketing of these agricultural products. Essentially it is composed of crop production, livestock,
 104 forestry and fishing. Agricultural Output is the final produce of agriculture. For example, crop yields,
 105 food for man, animal, dairy, raw materials for industries and all the final goods that are marketable in
 106 the local and international markets and also the portion that counts in the nation's Gross Domestic
 107 Product (GDP). The most direct contribution of agriculture to economic growth, according to Irz, Lin,
 108 Thirtle and Wiggins (2001) is increase in incomes of farmers and therefore their purchasing power.
 109 Results of several studies, including Irz et al. (2001) and Thirtle et al. (2003), show that an increase in
 110 agriculture growth results in an increase in the income level of the poorest of the population. Also
 111 results from cross-country regressions among developing countries show that \$1 increase in GDP
 112 results in significantly more poverty reduction when the growth is in agriculture rather than other
 113 sectors (Lipton, 2012). This sectoral growth increases the incomes and therefore purchasing power of
 114 farmers resulting in a vibrant domestic market for other sectors, hence growth in the economy.

115 **2.2. Empirical Literature Review**

116 There are scanty literatures on the impact of domestic debt on agricultural output, though several
 117 studies abound in literature on domestic debt but have focused more on its effect on economic growth
 118 and development.

119 Ogunbiyi and Okunlola (2015) investigate whether domestic debt impact on real sector growth in
 120 Nigeria with particular emphasis on the agricultural and industrial sector growth using time series data
 121 covering a period of 34 years (1980–2013). Agricultural growth was proxied by Agriculture GDP while
 122 industry growth was proxied by industry GDP. The ADF unit root, and Vector Auto Regression (VAR)
 123 analysis technique were employed in their estimation. The study concludes based on the findings that
 124 in an advent of consistency and project tied borrowing, real sector will experience growth and
 125 development.

Ozurumba et al. (2014) examine the impact of the different components of domestic debt on economic growth of Nigeria using multiple regression technique, and discovered that in the short-run, FGN Bond proved to have a positive significant relationship with economic growth, while development stock maintained a significant negative relationship. In the long-run, Treasury Bills and the lagged value of GDP variables were positively significant.

Adofu and Abula (2010) investigate the empirical relationship between domestic debt and economic growth in Nigeria. Using OLS regression technique with time series data spanning 1986–2005, the study explored the relationship between domestic debt and economic growth in Nigeria. The findings of the study reveal that several factors responsible for rising domestic debt in Nigeria are high budget deficit, low output level, increased government expenditures, high inflation rate and narrow revenue base. The analysis shows that domestic debt has affected the growth of the economy negatively and recommends that government domestic borrowing should be discouraged and that increasing the revenue base through its tax reform programmes should be encouraged.

Peter, Denis and Chukwuedo (2013) examine the relationship between government domestic debt and economic growth of Nigeria using unit root and co-integration test. Findings of the study show that domestic debt and credit have a significant and direct relationship with GDP and that debt servicing has inverse relationship with GDP and also government expenditure has a direct but insignificant relationship with GDP. The implication of the findings concludes that domestic debt should be invested in productive sector of the economy and more specifically in the real sector and further productivity gain will be achieved in the improvement on capital project expenditure.

Onyeiwu (2012) examines the relationship between domestic debt and economic growth in Nigeria using Ordinary Least Squares Method (OLS), Error Correction and parsimonious models to analyze quarterly data between 1994 and 2008. Result of this study found that domestic debt holding of government is far above a healthy threshold of 35 per cent of bank deposit. This portends a crowding out effect on private investments. The study affirmed that the level of debt has negative effect on economic growth in Nigeria. The study recommended that government should maintain a debt-bank deposit ratio below 35 per cent, increase its usage of tax revenue to finance developmental projects and to divest itself of all projects the private sector can handle, while providing enabling environment for private sector investors and most importantly improved infrastructural facilities.

Anyawu and Erhijakpor (2004) analyze the growth effects of the current domestic debt outstanding as a ratio of GDP and the growth effects of the past domestic debt accumulation, using Nigerian time series data for the period, 1970-2003. The results show that current domestic debt outstanding as a ratio of GDP has a significant negative effect on economic growth, due largely to high implicit domestic interest rates. On the other hand, past domestic debt accumulated positively and significantly affects economic growth, thus rejecting the domestic debt overhang hypothesis. The study recommends the need for Nigeria to open and improve foreign access to holdings of domestic debts so as to strengthen competition and hence reduce financial costs with the accompanying introduction of financial technology and innovation that will in turn result in higher market efficiency.

Obi and Nurudeen (2009) investigate the effects of fiscal deficits and government domestic debt on interest rates in Nigeria by applying a Vector Auto-regression approach for the period of 1981 to 2006. The interest rate in the model is a function of the fiscal deficit and government domestic debt. The findings of the study show that fiscal deficits and government domestic debt have positive impact on interest rates. The authors suggest that the government should decrease its unnecessary spending and should increase the revenues.

Damian and Chukwunonso (2014) investigate the empirical issues pertaining to the structure and composition of domestic debt and its impact on private investment in Nigeria. The study employed multiple regression models using secondary data from 1970 to 2012. The study found that domestic debt has a significant negative impact on domestic private investment in Nigeria. Results also show that domestic debt has a significant negative impact on foreign private investment in Nigeria with exchange rate and debt servicing having positive effect on foreign private investment in Nigeria. The study concludes that domestic debt if unchecked crowds-out private investment in Nigeria.

2.2. Theoretical Framework

It has been recognized that agriculture plays a vital role in the nation's economic growth. Sustainable agricultural growth requires a given level of capital and investment, and in a case where it is not sufficient, government resorts to the issuance of domestic debt instruments to raise capital for agricultural investment purposes and thereby, enhance the output level of the sector. This scenario lays the basis for Cobb–Douglas production function.

183 According to the Cobb–Douglas production function, total output is a function of labour and capital, a
 184 change in one of these inputs will bring about a proportionate change in output. This may imply that
 185 the need for domestic borrowing is determined by the amount of capital required for agricultural
 186 investments to enhance the total output of agriculture.

187 The Cobb–Douglas production function is a particular functional form of the production function,
 188 widely used to represent the technological relationship between the amounts of two or more inputs,
 189 particularly physical capital and labor, and the amount of output that can be produced by those inputs.
 190 Sometimes the term has a more restricted meaning, requiring that the function display constant
 191 returns to scale.

192 In its most standard form for production of a single good with two factors, the function is:

$$193 \quad Y = AL^{\alpha}K^{\beta} \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad 2.1$$

194 where:

195 Y = total production (the real value of all goods produced in a year)

196 L = labour input

197 K = capital input

198 A = total factor productivity

199 α and β are the output elasticities of capital and labour, respectively. These values are
 200 constants determined by available technology.

201 Output elasticity measures the responsiveness of output to a change in levels of either labour or
 202 capital used in production, ceteris paribus. For example, if $\alpha = 0.45$, a 1% increase in capital usage
 203 would lead to approximately a 0.45% increase in output.

204 **3. RESEARCH METHODOLOGY**

205 **3.1. Data Types and Sources**

To examine the impact of domestic debt on agricultural output between the period of 1990-2014, this work solely relied on secondary type of data collection, which was gotten from Debt Management Office (DMO, 2014) and the Central Bank of Nigeria (CBN, 2014) statistical bulletin annual report, 2014.

3.2. Data Estimation Technique

The Ordinary Least Square (OLS) technique was adopted for obtaining the numerical estimates of the coefficients of the equation and involves decision on whether the parameters are statistically significant and theoretically meaningful. The OLS result is short-run oriented in nature and because of the problem of non-stationarity of data, spurious regression is likely to occur. Hence, the Augmented Dickey Fuller test was used to check for the presence of a unit root in the variables i.e whether the variables are stationary or not. After testing for the stationarity of the variables, the next step was to test for co-integration. This test was used to check if long-run relationship exists among the variables in the model and was carried out using the Johansen technique. The Vector Error Correction Model (VECM) was used to test the speed of adjustment from short-run to long-run equilibrium. The apriori expectation is that the VECM coefficient must be negative and significant for errors to be corrected in the long-run. The higher the VECM, the more the speed of adjustment. Finally, the granger causality was used to check for causality between the variables.

3.3. Model Specification

This study modifies the empirical work of Ogunbiyi et al. (2015) in order to capture the extent to which domestic debt significantly influence agricultural output in Nigeria. A multiple regression model is used with agricultural output growth proxied by AGDP, as dependent variable, while domestic debt and interest rate are treated as independent variables. The model is therefore given below:

The functional form of the model is as follows:

$$AGDP = f(DDST, DDSP, INR) \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad 3.1$$

The stochastic form of the model is:

$$AGDP = \beta_0 + \beta_1 DDST + \beta_2 DDSP + \beta_3 INR + \mu \quad - \quad - \quad - \quad - \quad - \quad 3.2$$

Where: AGDP = Agricultural Gross Domestic Product

233 DDST = domestic debt stock

234 DDSP = domestic debt servicing

235 INR= Interest Rate

236 β_1 = Constant term

237 β_1 , β_2 and β_3 are the coefficients of the parameter estimates

238 μ = Error term/stochastic variable

239 Our apriori expectations are:

240 $\beta_1 > 0$, and β_2 and $\beta_3 < 0$.

241 4. RESULT PRESENTATION AND ANALYSIS

242 4.1. Ordinary Least Square Test

243 **Table 4.1: Regression Results**

Dependent Variable: AGDP			
Variable	Coefficient	t-Statistic	Prob.
C	-4441.738	-2.663649	0.0145
DDS	4.132442	6.383826	0.0000
DDSP	-15.93729	-2.795356	0.0108
INR	169.7153	1.656854	0.1124
R-squared	0.915513		
Adjusted R-squared	0.903444		
F-statistic	75.85314		
Prob(F-statistic)	0.000000		
Durbin-Watson stat	2.136686		

244 **Source: Author's Computation from E-views 4.1.**

245 These results indicate that domestic debt was positively related to the dependent variable, AGDP,

246 conforming to our apriori expectation and was statistically significant at the 5% level going by the

probability value of 0.0145. Also, domestic debt service (DDSP) has a negative relationship with the dependent variable, AGDP and conforms to our apriori expectation. It was also statistically significant with AGDP at the 5% level going by its probability value of 0.0108. Interest rate (INR) showed a positive relationship with AGDP and does not conform to our apriori expectation though statistically insignificant at the 5% level, going by its probability value of 0.1124. A possible interpretation of this contradiction is that interest rate did not determine agricultural investment in Nigeria during the period of study but profits from investment in agriculture.

The value of the coefficient of determination (R^2) of 0.915513 shows that the model has a good fit, implying that DDS, DDSP and INR accounts for about 92% of the systematic variation in AGDP while the remaining 8% variation in AGDP is caused by factors which affects agricultural output but were not captured in the model. The adjusted R^2 value of 0.903444 confirmed the goodness of fit of the model.

Furthermore, the statistically significant f-value (75.85314) with the probability value of 0.000000 at the 5% level implies that DDS, DDSP and INR taken together, have significant linear relationship with the dependent variable, AGDP. The Durbin-Watson statistic of 2.136686 was indicative of the absence of autocorrelation in the model since it approximates 2.

The OLS result is short-run oriented in nature and because of the problem of non-stationarity of data, spurious regression is likely to occur. Hence, the stationarity of data is established using the Augmented Dickey-Fuller (ADF) Unit Root Test.

4.2. The Unit Root Test Results

The test result of the Augmented Dickey-Fuller statistic for all the time series variables used in the estimation are presented in table 4.1 below.

Table 4.2: Test for Stationarity

Variable	Augmented Dickey Fuller statistic	Critical Value	Order of integration	Level of significance %	Probability
AGDP	-4.698462	-2.998064	1 (1)	5	0.0012
DDS	-4.691772	-3.004861	1 (2)	5	0.0013
DDSP	-4.318254	-2.998064	1 (1)	5	0.0028
INR	-6.445452	-2.998064	1 (1)	5	0.0000

Source: Author's Computation from Unit Root Test (ADF)

The result of the ADF test statistics show that three of the variables viz; AGDP, DDSP and INR were not stationary in their level form but were stationary after the first difference, while DDS became stationary after the second difference. The null hypothesis of the presence of unit root in the series was rejected as indicated by their probability values which were less than 0.05 and the values of their calculated ADF (in absolute terms) statistics which were higher than their critical values at the 5% level.

4.3. Johansen Co-integration Test:

Having confirmed the stationarity of the variables, we proceeded to examine the presence or non presence of co-integration among the variables i.e. long-run relationship among the variables. The co-integration test was carried out using the Johansen technique and it produced the following results:

295 **Table 4.3.1: Test for Johansen Co-integration Using Trace Statistic**

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	5 Per cent Critical Value
None **	0.853273	83.01284	47.21
At most 1 **	0.520715	38.87160	29.68
At most 2 **	0.445043	21.95604	15.41
At most 3 **	0.306321	8.412141	3.76
(**) denotes rejection of the hypothesis at the 5% level Trace test indicates 4 cointegrating equation(s) at the 5% level			

296 **Source: Author's Computation from E-views 4.1.**

297 **Table 4.3.2: Test for Johansen Co-integration Using Max-Eigen Value**

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	5 Per cent Critical Value
None **	0.853273	44.14123	27.07
At most 1	0.520715	16.91557	20.97
At most 2	0.445043	13.54390	14.07
At most 3 **	0.306321	8.412141	3.76
(**) denotes rejection of the hypothesis at the 5% level Max-eigenvalue test indicates 1 cointegrating equation(s) at 5% level			

298 **Source: Author's Computation from E-views 4.1.**

299 The Trace Test indicated four co-integrating equations while the Max-Eigen statistics indicated one
 300 co-integrating equation at the 0.05 level. The results of the Johansen Co-integration tests above
 301 strongly rejects the null hypothesis of no co-integration, i.e. no long-run relationship between the
 302 dependent and the explanatory variables in favour of at least one co-integrating vector. This implies
 303 that there is long-run relationship between the dependent variable and the explanatory variables. The
 304 co-integrating equation chosen from the Normalized co-integrating coefficients is;

305 $AGDP = -7.257453DDS + 40.97062DDSP - 383.1567INR$

306 (0.35978) (2.76253) (50.3250)

307 *Note: Standard Error statistics are stated in parenthesis*

308 From the co-integrating equation, DDS and INR have negative relationship with AGDP, while DDSP
 309 has a positive relationship with AGDP in the long-run. In the long-run, a unit increase in DDS and INR
 310 leads to a fall in AGDP by 7.257453 and 383.1567 units respectively, while an increase (decrease) in
 311 DDSP will cause AGDP to increase (decrease) by 40.97062 units.

312 4.4. Vector Error Correction Model

313 **Table 4.4: Table Showing Vector Error Correction Estimates**

Error Correction:	D(AGDP)	D(DDS)	D(DDSP)	D(INR)
CointEq1	-0.878404	-0.248856	-0.004674	0.005307
	(0.36127)	(0.08637)	(0.02646)	(0.00149)
	[-2.43140]	[-2.88137]	[-0.17661]	[3.55759]

314 **Source: Author's Computation from E-views 4.1.**

315 The apriori for the vector error correction coefficient (alpha) is that it must be negative. The alpha
 316 meets this expectation and this implies that 87.8404 per cent of the errors are corrected in the long-
 317 run and as such there is a convergence. This indicates a very high speed of adjustment, i.e. the
 318 speed at which the deviation from long-run equilibrium is adjusted slowly in which 87.8404% of the
 319 disequilibrium is removed each period.

320 4.5. Granger Causality Test

321 The result of Pairwise Granger's causality between the variables under study is provided below.

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329 **Table 4.5: Result of the Granger Causality Test**

Null Hypothesis:	Obs	F-Statistic	Probability
DDS does not Granger Cause AGDP	23	17.9472	0.00051
AGDP does not Granger Cause DDS		4.58411	0.02460
DDSP does not Granger Cause AGDP	23	14.4184	0.00018
AGDP does not Granger Cause DDSP		3.85808	0.04033
INR does not Granger Cause AGDP	23	2.27742	0.13131
AGDP does not Granger Cause INR		0.04530	0.95582

330 **Source: Author's Computation from E-views 4.1.**

331 For the period under review (1990- 2014), result of the Granger causality test indicated that, there
 332 exists a bidirectional relationship between agricultural output and domestic debt, and a bidirectional
 333 relationship between domestic debt servicing and agricultural output. However, interest rate did not
 334 have any causal relationship with agricultural output in Nigeria.

335 **4.6. Policy Implication of Findings**

336 Findings of the study revealed that domestic debt stock and Interest rate were positively related to
 337 agricultural growth, while domestic debt service payment has a negative relationship with agricultural
 338 growth in Nigeria in the short-run. It implies that domestic debt accumulation and interest rates in the
 339 short-run contributes to agricultural output growth in Nigeria while domestic debt service payment
 340 reduces the money that could have been put into investment in agriculture and hence reduces the
 341 level of output of agriculture. The high R^2 value and the statistically significant f-value implied that
 342 domestic debt is a major and significant determinant of agricultural output growth in Nigeria.

343 However, domestic debt stock and Interest rate have negative relationship with agricultural output,
 344 while DDSP has a positive relationship with agricultural output in Nigeria in the long-run. The Vector
 345 Error Coefficient of concern showed that about 87.8404% of the errors will be corrected in the long-
 346 run. Also the Granger Causality test revealed that there exists a bidirectional relationship between
 347 agricultural output and domestic debt, and a bidirectional relationship between domestic debt
 348 servicing and agricultural output, while interest rate have no causal relationship with agricultural
 349 output in Nigeria.

5. SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1. SUMMARY

This study has empirically examined the impact of domestic debt on agricultural output in Nigeria using annual time series data spanning 1990-2014. Agricultural output (proxied by AGDP) was regressed on domestic debt stock (DDS), domestic debt service payment (DDSP) and interest rate (INR). The study employs the OLS test, Augmented Dickey-Fuller test, Johansen co-integration test, Granger causality test, and Vector Error Correction Method (VECM). Findings of the OLS test revealed that domestic debt stock and Interest rate were positively related to agricultural growth, while domestic debt service payment has a negative relationship with agricultural growth in Nigeria in the short-run. The high R^2 value (0.915513) and the f-statistical value (75.85314) is an indication that domestic debt is a major and significant determinant of agricultural output growth in Nigeria.

However, findings of the co-integration test revealed that domestic debt stock and Interest rate have negative relationship with agricultural output, while DDSP has a positive relationship with agricultural output in Nigeria in the long run.

The Vector Error Coefficient of concern showed that about 87.8404% of the errors will be corrected in the long-run. Also the Granger Causality test revealed the existence of a bidirectional relationship between agricultural output and domestic debt, and a bidirectional relationship between domestic debt servicing and agricultural output, while interest rate have no causal relationship with agricultural output in Nigeria.

5.2. Recommendations

The following recommendations were made based on the findings of the study:

- i. The government should increase the level of domestic debt accumulation and interest rate, and reduce the level of domestic debt servicing as it will contribute to agricultural output growth in Nigeria in the short-run
- ii. Long-term macroeconomic policies should be targeted toward reducing the level of domestic debt with a low rate of interest, and increasing the level of domestic debt servicing in the economy, as it would contribute to agricultural output growth in the long-run.

- 378 iii. The government should desist from borrowing short term loans to finance long term
379 projects.
- 380 iv. Government should reduce the level of domestic debt it accumulates in the long-run as it
381 crowds out private investment in agriculture in the long-run.
- 382 v. Public domestic borrowings should be channeled to the real sectors of the economy,
383 specifically the agricultural sector; this would help increase the productivity of the nation
384 in the short-run.

385 **5.3. Conclusion**

386 From the findings of this study, it can be ascertained that domestic debt, domestic debt servicing and
387 interest rate affects agricultural output in Nigeria both in the short-run and long-run. In the short-run,
388 domestic debt stock and interest rate stimulates agricultural output while domestic debt servicing
389 reduces agricultural output in Nigeria, but domestic debt stock and interest rate depresses agricultural
390 output while domestic debt servicing stimulates agricultural output in the long-run. Therefore, the
391 overall impact of domestic debt when considering the long-run period would be smaller total
392 agricultural output in Nigeria. This is also referred to as the burden of public domestic debt, as each
393 generation burdens the next, by leaving behind a smaller aggregate stock of capital for investment in
394 agriculture.

395 It is also concluded that a bidirectional relationship exists between agricultural output and domestic
396 debt, and a bidirectional relationship between domestic debt servicing and agricultural output, while
397 interest rate have no causal relationship with agricultural output in Nigeria.

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