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IMPLICATION OF AGRICULTURAL AND INDUSTRIAL SECTOR LINKAGES ON SUSTAINABLE DEVELOPMENT IN NIGERIA

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ABSTRACT

The issue of backward and forward linkages among the sectors of an economy has always been at the center of determining the appropriate policy response to structural imbalance in Nigerian economy. The paper examined empirically the causal relationship between the components of agricultural sector and other sectors of the economy with the aim of investigating their linkage effects on development agenda in Nigeria. The study used Vector Error Correction Model method and data from 1981 to 2012 on Nigerian economy. Findings from the study showed that while there exist a causal relationship between the agricultural sector and industrial sector in Nigeria in the long run, however, it was noted that in the short run no such causal relationship exist. Hence, it was recommended for the government to increase the funds to these sectors in order to speed up their operations and productions.

Keywords: Agriculture Industrial, Causal linkages, Nigeria

INTRODUCTION

The role of agricultural sector in industrialization process of any nation has been well established in development economics literature (Okafor 2012). An agricultural sector contributes in four

ways to economic developments. It supplies the labour force, raw materials, savings and foods needed to establish and maintain industrial production. Similarly the industrial sector in return is expected to provide more efficient agricultural inputs and improved socioeconomic infrastructure that can boost agricultural productivity. Therefore the relationship between agricultural sector and industrial sector is perceived as mutually rein forcing (Todaro and Smith 2011)

In Nigeria, the seemingly theoretical plausible argument presented above seems lacking. From 1970 to 2000, the agricultural sector's productivity grew at 1.7 percent per annum, very low when compared with the country's population growth rate of about 2.7 percent per annum (CBN, 2010). Also manufacturing industries in Nigeria generally have been characterized by declining `productivity rate, the slow performance of manufacturing sector in Nigeria has been attributed to massive importation of finished goods, inadequate financial support (Adebiyi, 2011; Adebiyi and Babatope, 2004; Rasheed, 2010) and other exogenous variables which has resulted in the reduction in capacity utilization and output of the manufacturing sector of the economy (Tomola et al., 2012).

A careful note from the above observation is the direct link between performance of agricultural sector and industry. Therefore the relationship between agricultural and other sector should be symbiotic. This symbiotic relationship is what is called backward and forward linkages. While there are economic theories supporting such symbiotic relationship, empirical evidence in the literature are scarce and when available most are on developed countries like China and Cyprus and other Asian countries.

The aim of this paper is to examine the causal linkages between the key sectors of the economy and whether each of the agricultural components has similar or different patterns of relationship with the other sectors of the economy. This paper examine the causal relationship between the aggregate agricultural output and other sectors of the economy and also causal relationship between the agricultural components and other sectors of the economy with a view to determining the nature of roles of agricultural sectors and other sectors of the economy in the development process of Nigerian economy.

Several literatures have linked the industrial revolution in developed countries to increase in agricultural productivity (Nurkse, 1953; Rostow, 1960). Classical models of structural transformation had stressed that productivity growth in agriculture increases income per capita and generate demand for manufacturing goods (Murphy et al., 1989; Golin et al., 2002). Most recently, the Asian industrial revolution has been linked to vibrant and technology based agricultural sector (Koo & Lou, 1997). Johnston and Mellor (1961) observed that agriculture contributes to economic growth and development through five inter-sectoral linkages.

The sectors are linked via: (i) supply of surplus labour to firms in the industrial sector; (ii) supply of food for domestic consumption; (iii) provision of market for industrial output; (iv) supply of domestic savings for industrial investment; and (v) supply of foreign exchange from agricultural export earnings to finance import of intermediate and capital goods. In contrast to the arguments above, proponents of the opposite viewpoint contend that the agricultural sector does not have strong linkages to other sectors and lack adequate innovative structure necessary for fostering higher productivity and export growth

(Lewis, 1954, Hirschman, 1958; Fei and Ranis, 1961; Jorgenson, 1961, 1967) and Lewis (1954) are the first working economists in the theory on the multiplier effect of agricultural sector. They claimed that as a labour-intensive sector, agriculture provide labour employment and the supply of cheap food and raw materials in countries where capital accumulation is insufficient, and provide the demand for non-agricultural goods by the savings. Therefore, they depicted agricultural growth as the key of food security, poverty reduction political stability and economic progress (Bezemer and Headey, 2008). Some studies have attempted investigating this relationship, for instance, Shombe (2008) in Tanzania discovered a two-way causality relationship between agricultural GDP and total exports, but a one way causality relationship among manufacturing, export and agricultural GDP.

However, in Cote D'voire and Zimbabwe,(Bulanch and Verner, 2006), empirically supported the existence of the positive growth links between agriculture and industry. Similar result by (Chebbi 2010) point out that all sectors that is, agriculture, industrial and services sector, tend to move together in the long run. With respect to the relationship between agricultural and industrial sectors,(Hye 2009) finds that the agricultural sector plays a significant role in promoting modern sector to achieve economic development. These sectors have a bidirectional relationship both in the short and long run. While on the other hand, the industrial output only can influence the agricultural sector in the long run. Likewise,(Subramaniam and Reed 2009) study the inter-linkages among sectors by using Romania and Poland data. The study employs cointegration analysis and point out that non-agriculture sector has a positive impact to the agriculture sector in both countries particularly in the long run. Another study by Seka (2009) point out that appear unidirectional granger causality from agriculture to industrial growth in the West African States. In India perspective (Chaudhuri and Rao 2004) find bidirectional causality between these sectors.

Other study by (Paul 2010) estimate the causality among services, industrial and agriculture sector for Indian data and find the existence a unidirectional relationship from industrial or services sector to agriculture output. The result supported the previous study by (Koo and Lou 1997) which found that the Chinese agriculture growth output is depends on industrial sector.(Tang 2002) studies the cointegration relationship among manufacturing, services and agriculture sector in Malaysia from 1960 to 1998. Based on the result, the paper finds that the manufacturing sector has a little impact to the agriculture production in the short run.

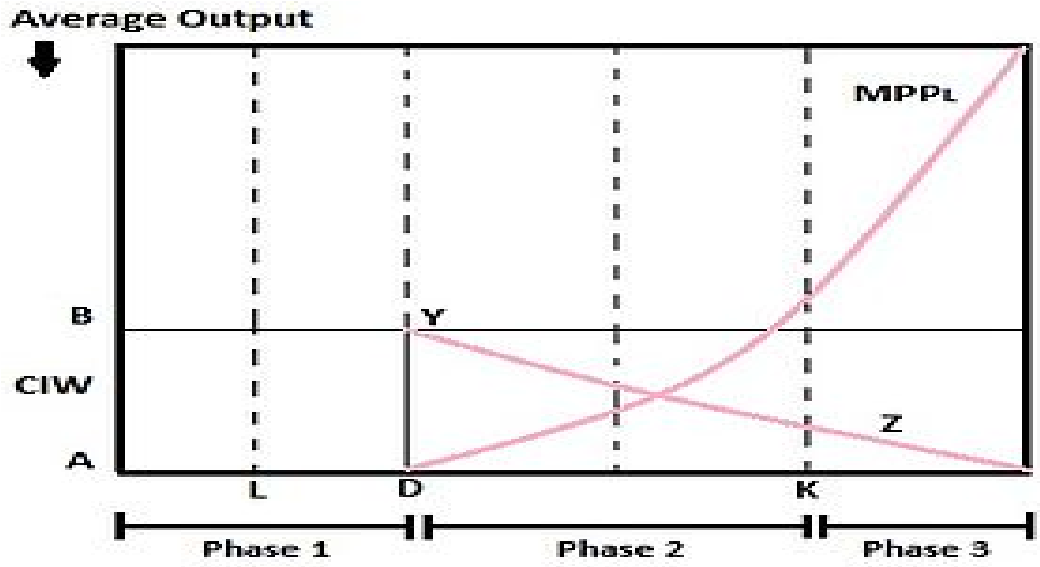
However in another study,(Tang 2003) examined the causality between agricultural output and its sources of growth. In sharp contrast, the (Tang 2003) could not establish any significant causality between agriculture and industrial sector production. As sum, there still remains an inconclusive role by these two sectors either whether agriculture drives industrial sector or vice versa. The inconclusiveness may be due to the different situations of a country. For example a country which focuses largely on industrial sector could give up their agriculture production and therefore cause a negative impact on its production. Similarly, a country which focuses on industrial sector may also have to sacrifice the agriculture production.

LINKAGES BETWEEN AGRICULTURAL SECTOR AND OTHER SECTORS OF ECONOMY

This is based on the fact that the model took into account the linkage between the developments of both sectors. The economy is assumed to be dual, that is agricultural sector and industrial sector, where the industrial sector captures

nonagricultural sectors hence the theoretical model is called Dual Economic Model. According to this theory, the primitive sector consists of the existing agricultural sector in the economy, and the modern sector is the rapidly emerging but small industrial sector (Thirlwall, 2006). Both the sectors co-exist in the economy, wherein lies the crux of the development problem. Development can be brought about only by a complete shift in the focal point of progress from the agricultural to the industrial economy, such that there is augmentation of industrial output. The Fei-Ranis model has three stages and recognizes the role of agriculture in promoting industrialization. It also captures the possibility that agricultural labour productivity must be higher before labour can move to industrial sector. These two key assumptions were neglected by the Lewis model, (Subrata 1995). The Fei-Ranis model is depicted graphically as in Figure1. In Phase 1 of the Fei–Ranis model, the elasticity of the agricultural labour work-force is infinite and as a result, suffers from disguised unemployment. Also, the marginal product of labour is zero. This phase is similar to the Lewis model. In Phase 2 of the model, the agricultural sector sees a rise in productivity and this leads to increased industrial growth such that a base for the next phase is prepared. In Phase 2, agricultural surplus may exist as the increasing average product (AP), higher than the marginal product (MP) and not equal to the subsistence level of wages (Bezemer and Headey, 2008).

Figure 1: Phases of Dual economy Model



Source: (Bezemer and Headey, 2008)

From the diagram in the Phase 1: AL (from figure) = MP = 0 and AB (from figure) = AP. According to Fei and Ranis (1961), AD amount of labour (see figure) can be shifted from the agricultural sector without any fall in output. Hence, it represents surplus labour. At the second phase AP > MP and after AD, MP begins to rise, and industrial labour rises from zero to a value equal to AD. AP of agricultural labour is shown by BYZ and falls downward after AD. This fall in AP can be attributed to the fact that as agricultural labourers shift to the industrial sector, the real wage of industrial labourers decreases due to shortage of food supply, since less labourers are now working in the food sector. The decrease in the real wage level decreases the level of profits, and the size of surplus that could have been re-invested for more industrialization. However, as

long as surplus exists, growth rate can still be increased without a fall in the rate of industrialization. This re-investment of surplus can be graphically visualized as the shifting of MP curve outwards. At this second phase the level of disguised unemployment is given by AK. This allows the agricultural sector to give up a part of its labour-force until MP = Real wages = AB = Constant institutional wages (CIW). The third phase begins from the point of commercialization which is at K in the Figure 1. This is the point where the economy becomes completely commercialized in the absence of disguised unemployment. The supply curve of labour in Phase 3 is steeper and both the sectors start bidding equally for labour. Phase 3: MP > CIW. The amount of labour that is shifted and the time that this shifting takes depends upon: (i) the growth of surplus generated within the agricultural sector, and the growth of industrial capital stock dependent on the growth of industrial profits; (ii) the nature of the industry's technical progress and its associated bias; (iii) growth rate of population (Subrata and Ghatak, 2003).

Therefore three inferences can be made from this model (i) growth in agricultural and industrial are both equally important; (ii) agricultural growth and industrial growth are balanced; (iii) only if the rate at which labour is shifted from the agricultural to the industrial sector is greater than the rate of growth of population will the economy be able to lift itself up from the Malthusian population trap (Subrata and Ghatak, 2003).

MODEL SPECIFICATION

On the basis of the model above, to establish the causal link between agricultural sector and industrial sector both agricultural output and industrial output will be used as dependent and independent variables. When agricultural sector variable is used as dependent variable that is forward linkage and when the industry is used as dependent that is backward linkage. If both link were found to be economically and statistically significant then there is forward and backward linkages but if it only agricultural growth that affect industry and not otherwise then there is only forward linkage. If it is industry that affects agricultural only that is backward linkage.

In this study both agricultural and industry is to be decomposed into its components. Agricultural sector according to CBN classification has four components namely (i) Forestry, (ii) Cash crops (iii) Fishery, (iv) Livestock. Also, according to CBN, the non-agricultural sector can be divided into four components namely (i) industry (ii) services (iii) building & Construction (iv) Wholesale & Retail. Each of these components will be taken one by one to establish the linkages between them. To show whether agricultural and industrial sectors complement each other in the growth process, agricultural and industrial output will be regress on gross domestic output and if the signs on them are the same then they complement but if the signs are different then they are non-complementary and the argument of (Todaro and Smith 2011) complimentary hypothesis between industry and agricultural sector in development process do not hold in Nigeria. For the causality test, the following model will be estimated:

AGRIC OUTPUT= f(IND OUTPUT)…….1

$IND\ OUTPUT_t = f(AGRCI\ OUTPUT_t)$…….2

ANALYTICAL TECHNIQUE

The empirical relation between agricultural output and industrial sectors is investigated through Vector Error Correction Mechanism following other studies that have examined similar issues in the past. A common feature of most macroeconomic variables is that they have unit roots. Despite that, most early studies did not pay sufficient attention to that. As a result, such works and their results may suffer from the problem of spurious regression. However, most of the studies in the 1990s and 2000s began correcting that by testing for unit root and co-integration. Since the main focus is to have a better understanding on the relationship among sectors of Nigerian economy the study employs the techniques of co-integration, granger causality, error correction model and unit root test to estimate the relationship

The unit root test equation is of the form

$$\Delta X_t = \alpha X_{t-1} + \sum_{i=1}^{n} \beta_i \Delta X_{t-1} + \mu_t \qquad 3$$

This test uses the t-statistic on the coefficient of the lagged level of X_{t-1} and the result obtained is compared with the critical t-values given in the Fuller (1976) distribution table. The critical value for the rejection (or acceptance) of the null hypothesis is a function of sample size and the functional form of the model used for the test. The Augmented Dickey Fuller (ADF) is the same as the DF test, except that the lag length has to be long enough to reflect the additional dynamics that may not have been captured by the DF test and also possibly to ensure that the error term is a white nose.

Having established the stationary properties of the variable to be integrated of order one, and then the next stage is to determine the cointegration properties of the time series. Economically speaking, two variables will be co-integrated if they have long run relationship between them. The technique of co-integration thus arises out of the need to integrate short run dynamics with long run equilibrium. Engel and Granger (1985) have all shown that the existence of co-integration is a sufficient condition for the formulation of a model that allows for the incorporation of an error correction model (ECM). The inclusion of ECM in a model ensures that the long run relationship is preserved.

The error correction term indicates the speed of the adjustment which restores equilibrium in the dynamic model. The ECM coefficient shows how quickly variables return to equilibrium and it should have a statistically significant coefficient with a negative sign. Error correction technique corrects for disequilibrium between short run and long run behaviour of the dependent variable. Since disequilibrium may exists in the short run, there is need to tie the value of the dependent variable to its long run value. The error term from the co-integrating initial regression is thus “equilibrium error”

The error correction model can be specified as:

$$\Delta Y_t = \beta_0 + \beta_1 \Delta X_t + \beta_2 \Delta Z_t + \beta_3 \Delta N_t \ldots\ldots\ldots\ldots + \beta_n \mu_{t-1} + \varepsilon_t \qquad 4$$

Where:

Δ = difference parameter

μ_{t-1} = one period lagged value of the error from the co-integrating regression

ε_t = random term

Granger causality test is used to examine causality between two variables. Causality means the impact of one variable on another. In other word, causality is when an independent variable causes changes in a dependent variable. The rationale for conducting this test is that it enables one to know whether independent variables can actually cause the variations in the dependent variable. Two variables may correlate without one causing changes in the other. Thus, Granger causality test helps in adequate specification of model. In Granger causality test, null hypothesis is that no causality between two variables. Null hypothesis is rejected if the probability of F-statistic given in Granger causality result is less than 0.05.

RESULTS

The first step in analysis macroeconomic data is the checking of properties of all the variables. Table 1 presents the unit root tests for each of the variables, the augmented Dickey Fuller approach was adopted and the results of the test as presented in table 2 shows that all the variables were not stationary at levels. The log differencing of the variables to derive the growth rates was carried out. The ADF tests were conducted on the growth rate and the results show that all the variables are not stationary. This implies the variables are integrated of order one I (I)

Table 1 : ADF Unit Root Test

Series	**ADF**	
	Level	First Difference
LAGRIC (LAGRIC))	-0.790	-6.886
CASH (LCASH)	-0.745	-6.905
LIVESTOCK (LLIVSTK)	-1.106	-6.136
FISHERY (LFSH)	-1.544	-7.333
FORESTRY (LFORST)	-0.962	-7.271
INDUSTRY (LIND)	-2.164	-6.879
BUILDING &CONSTRUCTION (LBC)	-1.256	-6.302
WHOLESALE & RETAIL (LWRT)	-1.019	-6.046
SERVICES (LSERVS)	-0.905	-6.732

In estimating a vector error correction model, the number of lags to be used must be determined. It has been argued in the literature that the way the variables enter the model determine the reliability of the estimated from the model. In this section the VAR lag selection approach was adopted to determine the optimal lag to be used in the subsequent analysis. Based on the lag selection criteria presented in Table 2, most of the lag selection recommended the lag 1 this means that optimum lag will be 1; hence we shall use this lag in the Johansen co-integration test and in the Vector Error Correction Model.

Table 2 Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-8.374311	NA	2.84e-05	0.883879	1.074194	0.942060
1	98.14254	24.16215	2.97e-06*	-2.153039*	1.082315	-1.163959*
2	35.08059	71.39020*	4.06e-06	-1.077185	-0.125610*	-0.786279
3	52.33145	23.41188	4.02e-06	-1.166532	0.546302	-0.642902
4	67.39072	16.13493	5.33e-06	-1.099337	1.374757	-0.342982

Note : LR: sequential modified LR test statistic (each test at 5% level)FPE: Final prediction error, AIC: Akaike information criterion , SC: Schwarz, HQ: Hannan-Quinn information criterion information criterion and * indicates lag order selected by the criterion

COINTEGRATION TEST

Table 3 presents the summary of the cointegration tests. The test summary results show that industrial output has two cointegration equations when the trace statistics is used and when the maximum eigenvalues statistic is also used. But the components of agricultural output have only two cointegrating equations only when the trace statistic is used. If the trace statistics is used as basis for establishing the long run relationship, then it can be concluded that there is a long run relationship between industrial output and agricultural output in Nigeria. No cointegrating equation is established between building and construction with aggregate agriculture but there is only one cointegrating equation between the components of agriculture and building and construction. The wholesale and retail components of GDP also have similar results with building and construction with only cointegration with the components of agriculture but not with aggregate agriculture. Services has three cointegrating equation with the components of agriculture but had none with aggregate agriculture. The results of the aggregate domestic output with agriculture also have similar patterns.

Table 3: Cointegration Test (Long run Causality Test)

		AGGREGATE		COMPONENTS.	
		TRACE	**MAX. ON EGE.VALUES**	**TRACE**	**MAX. ON EGE.VALUES**
IND	R=0	0.27(0.0005)	22.75(0.0002)	79.01(0.0076)	29.23(0.16)
	R=1	4.86(0.02)	4.86(0.03)	49.84(0.03)	22.23(0.2)
	R=2			27.60(0.08)	17.74(0.14)
BNC	R=0	9.57(0.3151)	6.61(0.56359)	78.20(0.0092)	32.69(0.0687)
	R=1	2.95(0.0854)	2.95(0.0854)	45.51(0.0817)	22.47(0.1970)
	R=3			23.03(0.2444)	13.56(0.4018)
GDP	R=0	14.39(0.0728)	8.15(0.3634)	82. 66(0.0034)	31.72(0.0884)
	R=1	6.23(0.0125)	6.23(0.0125)	50.93(0.0250)	23.43(0.1557)
	R=3			27.49(0.0900)	15.94(0.2284)
WRT	R=0	7. 66(0.5015)	5.89(0. 6262)	91. 60(0.0004)	49.01(0.0004)
	R=1	1.76(0.1834)	1.76(0.1834)	42.58(0.1429)	20.81(0.2875)
	R=3			21.77(0.3113)	12.23(0.5248)
SECRN	R=0	10.38(0.2570)	8.44(0.3349)	76.35(0.0137)	24.93(0.3892)
	R=1	1.86(0.1716)	1.86(0.1716)	51.42(0.0223)	20.23(0.3250)
	R=3			31.18(0.0344)	17.71(0.1410)

The main observation from this result is that though there is no cointegration between the aggregate agriculture and other sectors of the economy, there is evidence that there are cointegration between some sectors of agriculture and other sectors of the economy. All the sectors of the economy has at least one cointegrating relationship with the components of agricultural output but only and aggregate GDP has cointegration with the aggregate agricultural output. The results show that there are long run linkages between agricultural output components and industrial output. However, the cointegration though shows that that is long run linkages but the direction of linkages and which variable account for the linkages is not explicitly indicated. Therefore there is need to explore other methodology to detect the direction of causality as a way of detecting the direction of linkages and to identify which of all the components of agricultural output has direct linkages with industrial output. To achieve this task, the granger causality test was carried out.

The results of the causality test show that industrial sector has at least significant backward linkages with all the component of agricultural sector except the fishery. Both forestry and livestock have forward and backward linkages. This implies that agricultural output has little contribution to industrial development but there is a backward linkage from industrial sector to development of agricultural sector as a whole in Nigeria. For the service sector, there was both forward and backward linkage between aggregate agricultural output and service sector. This implies that service sector contribute to development of agricultural output and agricultural sector also contribute to the service output improvement. The cash crops and forestry also have similar forward and backward linkages with service sector. Therefore improvement in forestry and cash crop production lead to higher demand for support service like transportation, communication, banking, insurance and other service related productive activities. For the fishery there were only backward linkages from service output to fishery sector of agricultural fishery output. Livestock has no causal linkages and hence implies that there is significant relationship between livestock and service sector. Building and construction has backward and forward linkages with aggregate agricultural output and, forestry and livestock. But has only backward linkages with cash crops and fishery. Wholesale and Retail has only backward linkages with agricultural output and forestry output. It has forward linkages with cash crops and fishery.

Table 4: Summary of Granger Causal Linkages among the sectors of the Economy

Industrial Output Components		**Agricultural Output Components**				
		AGRIC	**CASH**	**FORST**	**FSH**	**LIVESTK**
IND	**Direction of causality**	Unidirectional (IND to AGRIC)	Unidirectional (CASH to IND)	Bidirectional	No causality	Bidirectional
	Nature of Linkages	Backward linkage	Forward linkage	Forward and backward Linkages	No Linkages	Forward and backward Linkages
SERVS	**Direction of causality**	**Bidirectional**	**Bidirectional**	**Bidirectional**	Unidirectional (SERVS to FISH)	No causality
	Nature of Linkages	**Forward and backward Linkages**	**Forward and backward Linkages**	**Forward and backward Linkages**	Backward linkage	No Linkages
BNC	**Direction of causality**	Unidirectional (BNC to AGRIC)	Unidirectional BNC to CASH)	**Bidirectional**	Unidirectional (BNC to FISH)	**Bidirectional**
	Nature of Linkages	Backward linkage	Backward linkage	**Forward and backward Linkages**	Backward linkage	**Forward and backward Linkages**
WRT	**Direction of causality**	Unidirectional (WRT to AGRIC)	Unidirectional (WRT to CASH)	Unidirectional (WRT to FORST)	Unidirectional (WRT to FSH)	No causality
	Nature of Linkages	Backward linkage	Forward linkage	backward Linkages	Forward linkage	No Linkages

MULTIVARIATE CAUSALITY TEST

The analysis of the causality and linkages between the agricultural sector and industry were also examined using the vector error correction mechanism. Since the objective of the study is to determine the causality in the long run and short run, we

did not report the full estimate of the short run regression from the Johansen multivariable causality. The Wald test was conducted to establish the casualty and linkages. The results of the estimates is presented in table 5,

Table 5: Short Run Causality Test Result (WALD TEST Statistics)

	IND	BNC	WRT	SER	GDP
AGRIC	5.94(0.051)*	4.39(0.111)	13.47(0.001)*	3.60(0.165)	6.63(0.036)*
CASH CROP	8.02(0.018)*	7.15(0.028)	14.25(0.000.)*	5.19(0.075)	9.45(0.009)*
FORSTRY	4.32(0.11)	1.31(0.519)	2.14(0.344)	3.64(0.162)	3.32(0.190)
FISHERIES	4.86(0.09)	3.34(0.188)	5.46(0.065)	2.50(0.287)	5.28(0.071)
LIVESTOCK	0.16(0.92)	0.16(0.922)	2.34(0.310)	0.25(0.88)	0.24(0.888)
ALL	27.02(0.04)	26.10(0.519)	32.25(0.009)	21.80(0.88)	28.22(0.030)

The result shows that there is significant relationship between Agriculture and industry in the short run reveals that there is a unidirectional causality flowing from agriculture to industry. The breakdown of causality between Industry and the components of Agriculture shows that there is bi-causality between industry and forestry and industry and livestock. However, there is uni-directional causality flowing from crop production to industry. More precisely, the forward linkage flows from forestry, livestock and crop production to industry. However, there is also some evidence of and backward linkage from industry to agriculture through forestry and livestock. In term of relationship between building and agriculture, there is strong evidence of backward linkage from Building and Construction to Agriculture. The backward linkage flows into all the sectors of Agriculture. Though, Agriculture has no causal effect on industry, there is some evidence of some level of forward linkage from Forestry and livestock to Building and Construction.

The causality between Wholesale and Retail Trade and Agriculture shows that there is strong evidence of backward linkage from Wholesale and Retail Trade to Agriculture. The backward linkage flows into three sectors of Agriculture namely: crop production, forestry and fisheries. Empirical evidence did not show any forward linkage from Agriculture to wholesale and retail Trade. Similarly there is empirical evidence of backward linkage from Services to Agriculture through the Sectors. The backward linkage flows into crop production, forestry and fisheries. The study also reveals that there is forward linkage from Agriculture to Services. The forward linkage mentioned flows through crop production and forestry.

The findings from the study is in line with the submissions of similar result obtained by(Subramaniam and Reed 2009) that studied the inter-linkages among sectors by using Romania and Poland data. The study employs co-integration analysis and point out that non-agriculture sector has a positive impact on the agriculture sector in both countries particularly in the long run. Conversely, short run relationship shows industrial sector causes negative effect to the output. They conclude that the Romanian and Polish industrial sectors can be a harmful to agriculture sector and this study suggests that agriculture sector, particularly in the Romanian economy, have contributed to the output of industrial sector.

CONCLUSION AND POLICY IMPLICATION

The paper empirically examines the causal relationship between the agricultural sector output and the industrial sector output both in the short run and the in the long run in Nigeria. Findings from the study show that there exist a long run causality relationship between the agricultural sector output and some of the industrial outputs but such relationship depends on how agricultural output and industrial output are measured. The study underscores the importance of the forward and backward linkages between the agricultural sector and the industrial sector. However, because of the inherent challenges that exist in both sectors in Nigeria it was found that a causal relationship only exists in the short run between both sectors.

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