MODERN AGRICULTURE AND EMPLOYMENT GROWTH IN NIGERIA

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Abstract

Nigeria is blessed with abundant land resources, its agricultural land, has been increasing which means it has a higher advantage in boosting agricultural productivity and employment growth in the economy, but this potential is not being realized. This study is aimed at examining the impact modern agriculture on employment growth in Nigeria. The methodology adopted for the study is the Recursive Ordinary Least Square estimation method. The variables used in the model are: Foreign Direct Investment, Export, Export Price Index, Agricultural Value Added per Worker, Agricultural Output, Agricultural Machineries & Tractor, Agricultural Credit, Inflation Rate, Exchange Rate, Government Expenditure on Education and Employment Rate. Using time series data spanning from 1980 to 2014, the result shows; a significant and positive relationship between agricultural productivity growth and modern agriculture, a significant and negative relationship between export price index and agricultural productivity growth, a significant and positive relationship between export and investment, a significant and positive relationship between investment and employment growth. Based on the findings, the author suggests that government should pursue a balanced growth of both agricultural sector and industrial sector in order to ensure both forward and backward linkages between the two sectors for the overall development of Nigerian economy.

Keywords: OLS Recursive Model, Dependent variable, Explanatory variable, Time series, Modern Agriculture, Productivity Growth, Employment Rate.

INTRODUCTION

Prior to the political crises of 1967-1970, agriculture was the backbone of the Nigerian economy providing employment and source of livelihood for the rising population, it accounts for over half of the GDP, (Amaza, 2000). And also the main stay of the majority of households in Nigeria (Udoh, 2000). Subsistence agriculture is the most adopted means of agriculture in Nigeria and this has not kept up with the rapidly growing population. One major cause of decline in Nigeria agricultural sector is the widening technology gap in agriculture itself which brings about a

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drastic fall in labor productivity and posses challenges on employment growth. Terzo (2010). Agriculture contributed 75 percent to GDP in the mid 1960s, dropping to less than 50 percent in mid 1990's. Nigeria agricultural exports are very minimal, about 0.2 % of exports and main exports were cocoa and rubber and spend close to $10 billion on food importation yearly which has brought about foreign goods substituting the domestic goods WDI, 2016. However, this has turned the trend against agriculture and its downstream industries leading to massive decline in agricultural output and employment growth. According to Krugman (1990) the three most significant elements for the economy are productivity, income distribution and employment. "If these things are satisfactory, not much else can go wrong; if they are not, nothing can go right"**.** Unemployment rate in Nigeria has been very high since this century began. In 2013, the number of unemployed labour force was 24.7%, it increased to 25.1% in 2014. Since 2014 it has been increasing and also fluctuating. According to NBS (2015), the labour force population in Nigeria grew by 5.5 percent from 71.1 million to 72.9 million, between 2014 and 2013 respectively. Within the same period, the total number of fully employed individuals decreased from 75.3% to 74.9%, while the number of the underemployed increased by 10.4 percent from 13.1 million people in 2014 to 14.4 million people. In Nigeria, Youth unemployment is also increasing. In 2014, youth unemployment was said to be 45.8% (NBS, 2015). Rural unemployment rates are higher than urban unemployment rates – 33.5 percent in urban areas, as compared to 38.2 percent in rural areas. (NBS, 2015). On the whole, unemployment continues to increase with a higher proportion of the youth entering the labour force yearly.

The agricultural sector has the potential to enhance both the industrial and economic sectors from which a country's development can take off. The root of these crises in the Nigerian economy lies in the refusal to invest largely in agricultural development and failure to understand that this investment can trickle down lots of benefits to other sectors thereby improving employment opportunities. It is therefore, essential in this study to show how modern agriculture can enhance productivity growth and employment growth for the growing population in the economy. Most researchers on agriculture has focused on achieving economic growth through agricultural development (Yao, 2000; Irz 2001; Suleiman and Aminu, 2010; Umaru and Zubairu 2012; without much emphasis on modern agriculture and employment growth. Some researchers investigated modern agriculture and its impacts on rural welfare (Ehui and Tsigas, 2009; Oyakhilomen and Zibah, 2014), agricultural sector and industrial development in Nigeria (Eze Chinweuba, 2016). The novelty of this research is in the use of advance methodology to adequately evaluate the impact of modern agriculture on employment growth. This study adds to literature the recursive effect of modern agriculture on employment growth. The purpose of this paper therefore is to examine the impact of modern agriculture and employment growth in Nigeria.

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AGRICULTURAL PRODUCTIVITY GROWTH AND EMPLOYMENT STRUCTURE: AN INTERNATIONAL PERSPECTIVE

To compare productivity level of different countries, it is essential to start with the comparison of land, labour and capital (machineries) productivity, Hayami and Ruttan (1985). Over five decades, the industrialized nations have consistently achieved highest agricultural outputs per labor and per acre of agricultural land. Currently, developing countries are the level which industrialized countries were in the 60's, this means there is a very wide productivity gap between these countries. Nigeria is an immensely endowed country and one of the countries with very high agricultural and arable land with virtually all mineral resources. From 1983 down to 2012 its agricultural land has been increasing, which means it has a higher advantage in boosting agricultural productivity WDI, 2016.

Table 1:

EMPLOYMENT IN AGRIC	1983	1986	2004	2007
Nigeria	33.6	46.9	44.6	48.6
Bulgaria	22.1	25.9	21	18.3
Korea	29.7	23.6	8.1	7.6
Malaysia	30.6	30.6	14.6	14.8
Brazil	27.1	25.9	21	18.3
China			3.7	3.5
MACHINARIES/TRACTORS (per 100 Sq KM)				
Nigeria	3.7	4.2	6.6	6.6
Bulgaria	148.9	140.2	114.3	172.3
Korea	77	73.3	81.8	81.8
Malaysia	85.1	119.7	-	-
Brazil	136.1	139.7	116.1	139.7
China	77	73.28	-	85.9
FETILIZER USED(kilograms per hectare of arable land)				
Nigeria			7.19	5.87
Bulgaria			74.23	111.24
Korea			643.4	441.05
Malaysia			1457.4	2026.9
Brazil			120.1	141.8
China			119	121.2
AGRICULTURAL PRODUCTIVITY				

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Nigeria	685.41	861.41	2952.54	3626.3
Bulgaria	4811.39	4710.43	12485.87	14577.83
Korea	4299.554	4937.167	15014.65	19924.59
Malaysia	3907.02	4513.17	6792.25	7925.79
Brazil	1298.57	1581.01	3338.01	4077.63
China	290.2	297.03	526.23	602.12

Source: WDI, 2016

From table 1 above, Nigeria agricultural sector has been employing a very large number of labour forces in the economy. Between 1983 and 2007, there have been different increases in agricultural labour employment. In 2004, 44.6 percent of the total labour force was employed into agriculture, it increased to 48.6 percent in 2007, comparing this to countries like Bulgaria and Brazil whose agricultural employment in 2007 were just 18.3 percent respectively (WDI, 2016). Despite a small workforce, Brazil produced 95% of its own food requirements; much of this is due to the use of advanced agricultural technology. Between 1983 and 2012, there was a drastic fall in Bulgaria, China, Korea, Malaysia and Brazil agricultural employment, for instance, Korea agricultural employment moved from 29.7 percent to 7.6, while that of Nigeria has been increasing, yet the agricultural productivity in these five countries are greater better than that of Nigeria. Much of this is due to their advanced agricultural technology. According to Osabuohien, 2010, the low level of technological innovations in Africa is one of the major reasons why the continent remains in the low developmental echelon compared to other regions of the world. From the same table 3 below, in 1983, Bulgaria had the highest use of tractor (148.9) per 100 square meter and in that same year, agricultural labour productivity was 4811.39 (US$) (WDI, 2016). Followed by Brazil, Malaysia Korea and China, Nigeria had the lowest which is 3.7 tractors per 100 square kilo meters with 685.41labour productivity. In year 2012, Bulgaria increased the use of tractors to 172.3, that same year it agricultural labour productivity was increased to 14577.83 (US$). There have not been any significant increases in Nigeria use of tractors for decades, this influences the agricultural output and the productivity level in the economy. Fertilizer is a very core agricultural input, which has brought about high yields for most farmers. Fertilizer consumption per hectare of arable land has really been fluctuating. About 10 kilograms fertilizer was consume (per hectare) on the average. Nigeria is not doing so good compared to countries like Korea and Malaysia who moved from using 643.4 and 1457.4 in 2004 to 441.05 and 2026.9 (per hectare of arable land) respectively in 2007 (WDI, 2016). According to Odum, 2015, the truth still remain that there is a correlation between fertilizer usage and yields; this means that the higher the fertilizer used, the higher the yield, ceteris paribus. Therefore, since Nigeria is not doing well in fertilizer consumption, the opportunities for applying more fertilizer is very high, which means the opportunity for productivity is also very high. Nigeria has over 50% of its labour in agricultural sector and his productivity cannot meet up with his booming population. It has been discovered that the more developed and technologically advanced a country is the lesser the labour needed in Agricultural sector. In

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Nigeria, agricultural holdings are small and scattered, and agriculture is carried out with simple tool, the average Nigerian farmer's remain poor, and survive on subsistence feeding. To change this ugly image of Nigerian agriculture, it has now become imperative to adopt an appropriate level of engine-power agricultural mechanization technology (EPAMT), to modernize and revitalize the industry. Over the years, agricultural development and economic growth has been extensively debated in mainstream economics. Chebbi (2010) studied the link between agricultural growth and other sectors in Tunisian economy, using the Johansen co integrations and Granger causality tests. The author confirms the existence of a long run positive relationship between agriculture growth and other sectors of the economy.

Collin *et al.* (2002) showed the importance of agriculture in the early stages of development. Analyzing data for 62 countries between 1960 and 1990, the authors found that growth in agricultural productivity was quantitatively important in understanding growth in GDP per worker. Both the Cross- section and panel data analysis showed that countries experiencing increase in agricultural productivity were able to release labor from agriculture into other sectors of the economy.

THEORETICAL FRAMEWORK AND METHODOLOGY
The theories that guide the design of this study are presented in this chapter. Gyimah-Brempong (2014) presents a theoretical framework to analyze how agricultural revolution can be used to create employment through agricultural sector expansion. The sector expansion creates job opportunities through increases in agricultural output and a re-organization of the agricultural sector to include agricultural value chain development. Drawing from these theory and empirical findings on the relationship between modern agriculture and employment generation which is a component of economic development, this study provides a schematic and analytical framework. The study adopted the structural change theory as framework developed by Lewis Arthur in the year 1954 and he called it "development with unlimited supply of labour. According to him an economy is made up of two sectors. One is the traditional (agricultural) sector and the other is the modern (industrial) sector. This gave rise to the two sector model. The theory posits that the development of an economy is dependent on the growth of the two sectors.
Y = f(AGRIC, IND)
Where; Y = Economic development, AGRIC = Agricultural sector and IND = Industrial sector.
The agricultural sector and the industrial sector are interrelated. The agricultural sector employs capital inputs, labour expertise and is also a final consumer of the output of the industrial sector while the industrial sector employs labour and output of the agricultural sector. This theory focuses on the mechanism by which underdeveloped economies can transform their domestic economic structures from a heavy emphasis on traditional subsistence agriculture to a more modern and more advanced agricultural practice through heavy financial support in order to attain industrial breakthrough. The extended version of the theory added that the full benefits of agricultural development cannot be realized unless government support systems are created that

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provide the necessary incentives, economic opportunities and most importantly access to needed inputs to enable small farmers to expand their output and raise their productivity.
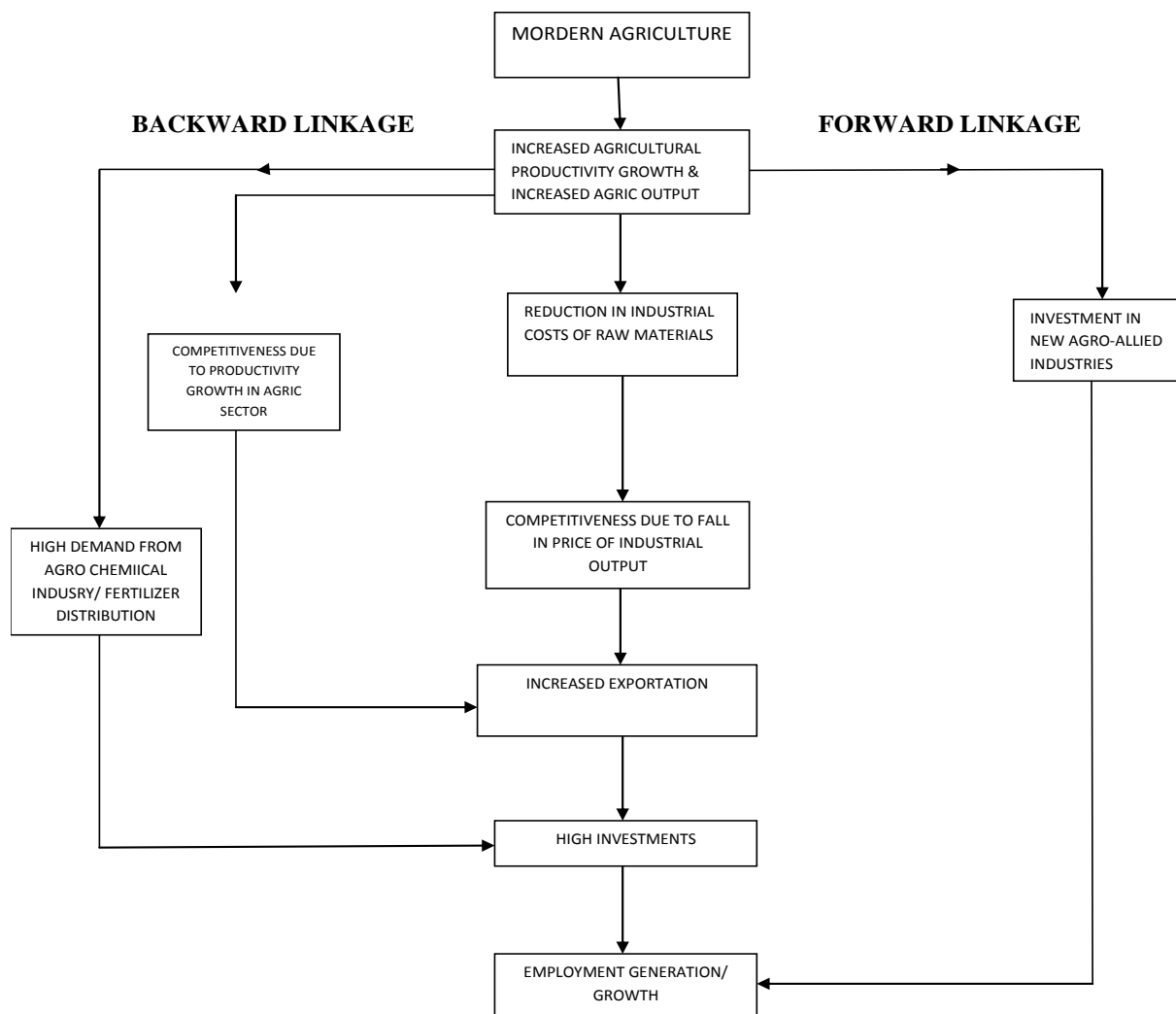
Analytical Techniques
Following Lewis theory of development, the schema below captures the linkages between modern agriculture and employment generation.

Backward and Forward Linkages
Agriculture's contribution to growth can also be viewed from the perspective of its links to other sectors that either supply the farming industry with inputs (backward linkages) and are supplied by the farming industry (forward linkages). Hayami and Ruthan (1985) revealed that agricultural productivity growth requires fostering the linkages between the agricultural and non- agricultural sectors. Backward production linkages refer to linkages from the farm to the part of the non-farm sector that provides inputs for agricultural production, for example agrochemicals, which is an important agricultural support industry that boosts agriculture, while preventing, reducing and eliminating the impact of disasters to increase food output and safety. Therefore, growth of the agricultural sector increase demand for goods and services from other sectors (e.g. transport and fuel) and thus stimulate growth in these sectors. While, Forward production linkages refer to the part of the non-farm sector that uses agricultural output as an input. The distribution and processing of agricultural outputs are fundamental components of forward production linkages. This will generate investment in the agro allied industry, e g. converting agric raw materials to semi finished goods; mostly these are embarked on by private investors which will therefore generate employment in the economy, thereby reducing the extent of poverty and enhancing the development of the economy as a whole. According to Adelman (1984), because of the strong growth linkage effects, agricultural development can lead to a wider economic growth in many countries during the early stages of industrialization.

Modern Agriculture and Employment Generation: A Framework

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                        ┌─────────────────────┐
                        │ MORDERN AGRICULTURE │
                        └──────────┬──────────┘
                                   │
BACKWARD LINKAGE                   ▼                    FORWARD LINKAGE
                        ┌─────────────────────┐
                        │ INCREASED AGRICULTURAL
                        │ PRODUCTIVITY GROWTH &
                        │ INCREASED AGRIC OUTPUT
                        └─────────────────────┘
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Diagram:

- MORDERN AGRICULTURE
- INCREASED AGRICULTURAL PRODUCTIVITY GROWTH & INCREASED AGRIC OUTPUT
- **BACKWARD LINKAGE**
- **FORWARD LINKAGE**
- COMPETITIVENESS DUE TO PRODUCTIVITY GROWTH IN AGRIC SECTOR
- REDUCTION IN INDUSTRIAL COSTS OF RAW MATERIALS
- INVESTMENT IN NEW AGRO-ALLIED INDUSTRIES
- HIGH DEMAND FROM AGRO CHEMIICAL INDUSRY/ FERTILIZER DISTRIBUTION
- COMPETITIVENESS DUE TO FALL IN PRICE OF INDUSTRIAL OUTPUT
- INCREASED EXPORTATION
- HIGH INVESTMENTS
- EMPLOYMENT GENERATION/ GROWTH

Source: Author's design

Note: Equipment includes laboratories, teaching aids and library services.

Agricultural Productivity Growth and Price Competitiveness

The enhanced productivity of a region's agriculture is critical for some reasons. Besides giving more sustenance, expanding the efficiency of farms influences the area's prospects for development and competitiveness in the worldwide farming business sector, pay dispersion and reserve funds, and work relocation. An expansion in a locale's farming profitability infers a more productive distribution of scarce resources. As farmers embrace new strategies and techniques,

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the more productive farmers are at advantage from an expansion in their welfare while agriculturists who are not sufficiently profitable will leave the market to look for achievement somewhere else. As a district's farms turned out to be more gainful, its comparative advantage in agricultural products increases, which implies that these items can be deliver at a lower opportunity cost than other different areas.

Productivity Growth and Cost Reduction
Increments in agricultural productivity will lead to farming development and can lighten poverty in poor and developing nations, where agribusiness regularly utilizes the best part of the populace. As farms turn out to be more productive, the wages earned by the individuals who work in agrarian area will increase. At the same time the cost of industrial inputs will diminish, food price decline and food supplies turn out to be steadier, and when prices fall competitiveness in industrial sector is enhanced. Additionally, workers have more cash to spend on food and different items. Productivity growth raises expectations for everyday comforts since all the more genuine salary enhances individuals' capacity to buy other goods and services, appreciate leisure, enhanced housing and education and add to social and environmental programs. Productivity improvements especially in developing nations have been observed to be a capable force for poverty reduction (Datt and Ravallion, 1998; de Janvry and Sadoulet, 2002).

Price Competitiveness and Increased Exportation
Being competitive in the domestic market helps organizations to secure a few strategies that can help them in the universal field. Export is a component of international trade whereby goods created in one nation are dispatched to another nation for future deal or exchange. The offer of such products adds to the producing country's gross yield. If used for trade, exports are exchanged for other products or services in other countries. Productivity growth will lead to price competitiveness, and this will give the economy a more prominent opportunity to contend in the international market. This will additionally lessen a country's level of importation and enhance their capacity to export both raw materials goods thereby producing more earnings.

Exportation and Investment
By advancing trade and investment we are advancing prosperity in the world. Exporting is one method for expanding your business potential; it extends the "pie" that you acquire cash from, else you are stuck attempting to make profit just out of the local market. Selling to different markets permits organizations to expand their business and spread their risk. Organizations that venture into the exporting business usually need to have a nearness or representation in the foreign market. This may require extra work force and in this way prompt to development and more investment. This will help support improvement and decrease poverty by creating development through expanded business openings and investment, and additionally widening the productive base through private sector development. Exportation energizes innovations by

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facilitating exchange of know-how, innovation and investment in research and development, including foreign direct investment.

Investment and Employment Generation
In macroeconomic structure, it is investment that creates employment. As appeared in the framework above, modern agriculture promotes investment in four distinctive ways; the introduction of new firms and the development of existing firms are requirements for employment growth. The significance of new firm creation as a wellspring of new jobs is especially expansive in a circumstance of massive reallocation of laborers and employments across sectors of the economy. Investment creates more employment by boosting economic sectors that make room for stable occupations and generally higher earnings, thus enhancing livelihoods. However, the relationship between the agriculture sector and other sectors should not be a competition but rather be viewed as interdependent where supply and demand in sectors can be accommodated through strengthened linkages (Adelman, 1984; Sabry, 2009). In any case, the position of agriculture in striving for industrialization should not be disregarded as the case has been in Nigeria. Neglect of the agricultural sector in favor of industrial sector will only lead to slow economic growth and inequality in income distribution. Therefore, in spite of the way that agriculture might be unable to single-handedly change an economy, it is an important and adequate condition in kick-starting industrialization in the early phases of development (Byerlee, Diao, and Jackson, 2005).

This work therefore recognizes the interrelationship between agricultural sector, industrial sector and employment generation in a structural equation model. The specifications allows for the identification of medium through which modern agriculture and other intervention affect employment growth.

The 5 system of equations is thus specified as;

$$AVAW = f(AMT, AGRC) \tag{5}$$
$$EPI = f(AVAW, INFR) \tag{6}$$
$$EXP = f(EPI, EXR) \tag{7}$$
$$FDI = f(EXP, AO) \tag{8}$$
$$EMPR = f(FDI, GEE) \tag{9}$$

The above equations can be re-specified explicitly as follows:

$$AVAW_{1t} = \beta_0 + \beta_{11}AMT_{1t} + \beta_{12}AGRC_{2t} + \varepsilon_{1t} \tag{10}$$

$$EPI_{2t} = \beta_1 + \beta_{21}AVAW_{1t} + \beta_{22}INFR_{3t} + \varepsilon_{2t} \tag{11}$$

$$EXP_{3t} = \beta_2 + \beta_{31}EPI_{2t} + \beta_{32}EXR_{4t} + \varepsilon_{3t} \tag{12}$$

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$$FDI_{4t} = \beta_3 + \beta_{41}EXP_{3t} + \beta_{42}A_{O5t} + \varepsilon_{4t} \tag{13}$$

$$EMPR_{5t} = \beta_4 + \beta_{51}FDI_{4t} + \beta_{52}GEE_{6t} + \varepsilon_{5t} \tag{14}$$

Where;
EMPR = employment rate
FDI = foreign direct investment
EXP = export
EPI = Export price Index
AVAW = agricultural value added per worker
AO = agricultural output
AMT= agricultural machineries & tractor
AGRC= agricultural credit
INFR= inflation rate
EXR= exchange rate
GEE= government expenditure on education
$\beta_0 - \beta_5$ Represent the intercepts
$\beta_{11} - \beta_{53}$ Represent the slope coefficients
$\varepsilon_{1t} - \varepsilon_{5t}$ Represent the error terms
The following relationships are expected between the endogenous variables and their repressors; $\frac{dAVAW}{dAMT} > 0,\ \frac{dAVAW}{dAGRC} > 0, \frac{dEPI}{dAVAW} < 0,\ \frac{dEPI}{dINFR} > 0,\ \frac{dEXP}{dEPI} < 0, \frac{dEXP}{dEXR} > 0$

$$\frac{dFDI}{dEXP} > 0,\ \frac{dEMP}{dFDI} > 0, \frac{dEMP}{dGEE} > 0 \qquad\qquad .$$

DATA ANALYSIS AND DISCUSSION
This paper employs the Unit root test to check for stationarity of the variables and Recursive ordinary least square (ROLS) to estimate the relationship between the dependent variables and the independent variables in justification of the objectives of the research.

Table 4.1 Unit Root Test

Variables	ADF Test		Critical Value		Interpretation
	Level	**1st Diff**	**1%**	**5%**	
EMPR	0.536715	-4.318200	-3.689194	-2.971853	I(1)
FDI	-1.194444	-6.410516	-3.689194	-2.971853	I(1)
GEE	5.927979	_	-3.689194	-2.971853	I(0)
EXP	-0.242976	-6.321628	-3.689194	-2.971853	I(1)

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EXR	-1.775310	-3.965186	-3.689194	-2.971853	I(1)
INF	-2.802411	-5.776266	-3.689194	-2.971853	I(1)
EPI	0.820857	-4.266987	-3.689194	-2.971853	I(1)
AVAW	2.362842	-4.452551	-3.689194	-2.971853	I(1)
AMT	1.723523	3.833693	-3.689194	-2.971853	I(1)
AGRC	2.788576	4.788999	-3.689194	-2.971853	I(1)
AO	1.135416	3.155506	-3.689194	-2.971853	I(1)

Source: (author's computation, 2017)

From the result above, only GEE was stationary at level. Since other variables ADF t-statistics is less than the critical value (1% and 5%) at levels, the unit root test was further tested at first difference. (AVAW, AMT, EPI, INF, FDI, AGRC, AO, EXP, EXR, FDI and EMPR) were however stationary at first difference. According to Engle & Granger (1987), any variable that is stationary has no unit root, this therefore means that any non-stationary variable will give a spurious data that may be very bad for forecast; this test is very relevant to the reliability of the result obtained from this research work. Since stationarity is attained for all the variables, we can now proceed to further testing.

Regression Result to Analyze The Effect Of Modern Agriculture on Productivity Growth

AVAW	Coefficient	Standard Error	t-statistics	t-probability	Observation
AMT	0.146400	0.016828	8.699982	0.0000	Significant
AGRC	1.6590	9.64000	1.707138	0.0978	Not significant

$R^2 = 0.923818$, F (2, 31) = 187.96 (0.0000)

(Agricultural Machineries & Tractors) AMT: The result shows a positive relationship between Agricultural Machineries & Tractors (proxy for modern agriculture) and agricultural value added per worker (AVAW), which is a proxy for productivity growth, a unit increase in agricultural machineries and tractors will increase agricultural productivity growth by 0.146400. This simply means that the use of technologies in agriculture will enhance and improve the quantity and quality of production.

Agricultural Credit (AGRC): There is a positive relationship between agricultural credit and agricultural value added per worker (AVAW). A unit increase in agricultural credit will bring about 1.6590 increases in productivity growth. This implies that access to credit will have a direct impact on productivity.

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Analysis Based on Statistical Criteria (1st Order Test)

Coefficient of Determination (R^2): From the result, R^2 is 0.923818, which implies that the explanatory variables (AMT & agricultural credit) adequately explained the behavior of the dependent variable (AVAW). This result also implies that 92% of the variation in the dependent variable is explained by the explanatory variables.

T-Test Statistics: At 5% level of significance, agricultural machinery and tractors which is the major explanatory variable for productivity growth is statistically significant while agricultural credit is not. This finding implies that modern agriculture has a significant impact on productivity growth in Nigeria within the period under study.

F-Test: To find out if a model is adequate and well specified or not, we use the F-test. F (2, 31) = 187.96, F-Probability = 0.0000. The result shows that at 5% level of significance the overall regression is statistically significant, this mean that the model is well specified and adequate for forecasting and policy analysis

Regression Result To Analyze The Effect of Productivity Growth on Price Competitiveness

EPI	Coefficient	Standard Error	t-statistics	t-probability	Observation
AVAW[*]	-0.038406	0.003157	-12.16469	0.0000	Significant
INF	0.108469	0.226317	0.479281	0.6351	Insignificant

R^2 =0.844096, F (2, 31) = 83.92 (0.00000)

Agricultural Value added per Worker (AVAW): The result shows a negative relationship between AVAW and EPI (export price index). AVAW has a coefficient of -0.038406, implying that a unit increase in value added per worker will reduce EPI by 0.038406. As EPI (export price index) falls, price competitiveness increases and AVAW (proxy for productivity growth) will increase. We can therefore say there is a positive relationship between price competitiveness and productivity growth.

Inflation Rate (INF): Inflation displays a positive coefficient of 0.108469. This implies that a unit increase in inflation rate will increase export prices by 0.108469. This is attributable to the fact that higher inflation rate discourages competitiveness.

Analysis Based on Statistical Criteria (1st Order Test)

Coefficient of Determination (R^2): From the result, R^2 is 0.844096, what this implies is that the explanatory variables (value added per worker and inflation rate) satisfactorily explained the behavior of the dependent variable (export price index). 84% of the variation in the dependent variable is explained by the explanatory variables.

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T-Test Statistics: At 5% level of significance the above table shows that agricultural value added per worker (AVAW) which is the major explanatory variable for EPI is statistically significant. Inflation rate is statistically insignificant at 5% level of significance. This shows that productivity growth has significant impact on price competitiveness in Nigeria within the period under study.

F-Test: F (2, 34) = 83.92**.** F-Probability = 0.000000. The result shows that at 5% level of significance the overall regression is statistically significant.

Regression Result to Analyze The Effect   of Price Competitiveness on Export

EXP	Coefficient	Standard Error	t-statistics	t-probability	Observation
EPI[*]	-7.6023	8.5347197	10.99882	0.0000	Significant
EXR	3.4537	2.101153	1.487095	0.1471	Insignificant

$R^2 = 0.811216$, F (2, 31) = 66.60429 (0.0000)

Export Price Index (PI): Export Price index is a proxy for Price Competitiveness, and the result shows a negative relationship between EPI and export. It is important to state clearly that when export price index falls, it gives more room for competitiveness. Following the apriori expectation; EPI has a coefficient of -7.6023, implying that a unit fall in export price index will increase exportation by-7.6023, thus increasing competitiveness. Therefore, there is a positive relationship between price competitiveness and export.

Exchange Rate (ER): Exchange rate has a coefficient of 3.4537; this implies a positive relationship between exchange rate and export. A unit increase in exchange rate will increase exportation by 3.4537. A weaker domestic currency stimulates exports and makes imports more expensive.

Analysis Based on Statistical Criteria (1st Order Test)

Coefficient of Determination (R^2): From the result, R^2 is 0.811216, what this implies is that the explanatory variables (export price index and exchange rate) explained the behavior of the dependent variable (export) adequately. 81% of the variation in the dependent variable is explained by the explanatory variables.

T-Test Statistics: Export Price Index (EPI) which is the major explanatory variable for export is statistically significant at 5%., while exchange rate is not. This finding implies that price competitiveness has a significant impact on exportation in Nigeria within the studied period.

F-Test: F (2, 31) = 66.60429, F-Probability = 0.000000. The result shows the overall regression is statistically significant at 5% level of significance.

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Regression Result to Analyze the Effect of Export on Investment

FDI	Coefficient	Standard Error	t-statistics	t-probability	Observation
EXP*	0.010296	0.003667	2.807420	0.0086	Significant
AO	0.000424	0.000415	1.021533	0.3149	Insignificant

$R^2 = 0.623404$, F (2, 31) =25.65821 (0.000000)

Export (EXP): The result shows a positive relationship between export (EXP) and foreign direct investment (FDI). EXP has a coefficient of 0.010296; which implies that a unit increase in export will increase investment by 0.010296.

Agricultural Output (AO): Agricultural output has a coefficient of 0.000424; this implies a positive relationship between agricultural output and investment. A unit increase in agricultural output will increase investment by 0.000424.

Analysis Based on Statistical Criteria (1st Order Test)

Coefficient of Determination (R^2): From the result, R^2 is 0.623404; the result shows that the explanatory variables (export and agricultural output) explained the behavior of the dependent variable (foreign direct investment) adequately. 62% of the variation in the dependent variable is explained by the explanatory variables.

T-Test Statistics: Export which is the major explanatory variable is statistically significant at 5%, while agricultural output is insignificant. It is obvious from the result that export and agricultural output has a very significant impact on investment within the period under study..

F-Test: F (2, 31) = 25.65821, F-Probability = 0.000000. The result shows the overall regression is statistically significant at 5% level of significance.

Regression Result to Analyze the Effect of Investment on Employment Growth

EMPG	Coefficient	Standard Error	t-statistics	t-probability	Observation
FDI*	0.00056	0.000218	1.122098	0.0270	Significant
GEE	0.00078	0.00037	2.462088	0.0196	Significant

$R^2 = 0.858868$, F (2, 30) = 94.32656 (0.000000)

Investment (INV): that a unit increase in investment will increase employment growth by 0.00056. The result shows a positive relationship between foreign direct investments (FDI) and employment growth (EMPG).

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Government Expenditure on Education (GEE): A unit increase in GEE will increase employment growth by 0.00078, this implies a positive relationship between government expenditure on education and employment growth.

Analysis Based on Statistical Criteria (1st Order Test)

Coefficient of Determination (R^2): From the result, R^2 is 0.858868, which shows that the explanatory variables (foreign direct investment and government expenditure on education) explained the behavior of the dependent variable (employment growth) adequately. 85% of the variation in the dependent variable is explained by the explanatory variables.

T-Test Statistics: Investment which is the major explanatory variable is statistically significant at 5% and GEE is also significant at 5%. It is obvious from the result that investment and government expenditure have significant impact on employment growth.

F-Test: F (2, 30) = 94.32656, F-Probability = 0.000000. The result shows the overall regression is statistically significant at 5% level of significance; this model is therefore good for forecasting.

SUMMARY AND FINDINGS

The reason for this study is to empirically examine the impact of modern agriculture on employment growth in Nigeria. In order to attain the objective of our study, we used the structural change theory (two sector theory) of Arthur Lewis. The work employed OLS recursive regression model, with different dependent and independent variables in the equations.

In line with the apriori expectation, the result from findings shows a significant and positive relationship between agricultural productivity growth and modern agriculture, this is in line with Terzo, 2010 that the use of improved tools and equipments like tractors, hand operated planters, hand operated fertilizer drills and combined harvesters will help increase agricultural productivity, it also make harvests more efficient and help to move produce to market more quickly and in better condition.

There is negative relationship between export price index and agricultural productivity growth; lower export price improves competitiveness. It can therefore be said that price competitiveness and productivity growth are positively related. As a region's farms become more productive if its comparative advantage in agricultural products increases, which means that its can produce these products at a lower cost than other regions. Therefore, the region becomes more competitive on the global market, which means that it can attract more customers since they are able to buy more of the products offered for the same amount of money. There is a significant and negative relationship between export and export price index, the lower the export prices the better the level of competitiveness attained. Price competitiveness will give the economy a greater chance to compete in the international market. This will further reduce a nation's level of importation and help improve their ability to export both raw materials and goods thereby generating more incomes.

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Also, a significant positive relationship exists between export and investment. Countries who venture into the exporting goods usually need a representation in the foreign market; this might require additional personnel and thus lead to expansion and more investments. Investment and employment growth also have a significant positive relationship. The birth of new firms and the expansion of existing firms (investment) are prerequisites for employment growth.

R^2 shows high goodness of fit implying that the explanatory variables adequately explained the behavior of the dependent variables. The findings show that modern agriculture in Nigeria has positive impact on the employment generation in Nigeria. This finding corroborates the submissions of Oyahkilome, (2012).

CONCLUSIONS

An understanding of the nexus of modern agriculture and employment generation in Nigeria was the kernel of this research. From the findings of this study, it can be ascertained that modern agriculture is beneficial and plays a significant role on employment generation process of Nigerian economy. Mechanization is recognized as the necessary major means needed to accelerate agricultural production and create a period of surplus in Nigeria. Indeed employment generation in the economy as a whole can be attained through manufacture of implements and equipment at low cost, the provision of credit and infrastructural facilities to farmers, and the building and development of expertise for maintaining of tractor powered equipment and mechanical means for an agricultural operation should be encouraged so as to strengthens the capacity of farmer to efficiently and effectively engage in agricultural production to meet the industrial inputs need at low cost and also boost food for the populace. Private sector involvement in agri-business should be encouraged to improve productivity, thereby promoting forward and backward linkages between the sectors. Finally, our local produce should be improved on so as to enhance productivity, exportation, competitiveness, investment and employment generation for the overall development of Nigerian economy.

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