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# Do Location and Sectoral Composition of Economic Growth Matter for Poverty Reduction in Nigeria?

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## Abstract

This paper examines the effects of location and sectoral components of economic growth on poverty in Nigeria. The study provides an insight into growth-poverty discourse by explicitly recognizing the effects of location and composition of economic growth. The study used Pooled Ordinary Least Square(POLS) regression techniques using state level data. The results show that reducing poverty in rural areas requires substantial growth in the rural agricultural sector, as 10% growth in the sector is associated with a poverty reduction of 2 percent. While, reducing poverty in rural areas requires robust growth in the urban wholesale and retail trade sector, as a 10% growth in this sector is associated with poverty reduction of 1 percent. This suggests that urban services and rural agricultural growth exert significant impact on poverty reduction in both rural and urban locations, while urban agriculture and industry growth have been found to have positive impact on urban poverty. The study concludes that location and composition of economic growth matters for poverty reduction. Therefore, there is need to pay special attention to rural-urban dualism in eliminating poverty.

**Keywords:** economic growth, location, poverty, industry, agriculture, services

## 1 Introduction

Over the past decade, much has been written on economic growth and poverty in developing countriesand a large number of studies have inextricably linked the progress in poverty reduction to economic growth. Also, a quite number of literature have emerged on the composition of economic growth and poverty. For instance, a study carried out by Hasan and Quibria (2004) in East Asia, Latin America and the Caribbean, South Asia, and Sub-Saharan Africa (SSA) spanning the period from 1960 to 1998, suggests that the progress in poverty reduction in South Asia and SSA is attributed to growth in the agricultural sector, while the significant decline in poverty in East Asia is associated with manufacturing and export production activities. Further, it has been reported that SSA countries benefit more from agriculture growth than from industrial sector growth (Dorosh and Haggblade, 2003; Christiaensen and Demery, 2006; Thorbecke and Jung, 1996; Christiaensen *et al.*, 2011).

It has been argued that a more balance-investment in different sectors of the economy has a heterogeneous effect on growth and poverty (see Killick, 2004; Williamson and Canagarajah, 2003; Ravallion and Datt, 1996; Foster and Rosenzweig, 2005). However, these studies did not decompose the sector's output growth and poverty rates into its urban and rural locations. For instance, in the case of India, Ravallion and Datt (1996) use time series data from 1951 to 1991 and find that both agriculture and informal service growth have a significant reduction effect on poverty head count, but the effect of the informal service sector's growth is higher. A study on the effects of growth in four Southeast Asian countries indicates that agricultural and services sector growth contributes significantly to poverty reduction, but the effect of agriculture has been relatively higher.

Recently, Christiaensen and Todo (2014) examine the effects of structural change on poverty using cross-country panel data for

developing countries, which was motivated by the great diversity in the nature and speed of countries' sectoral and occupational diversification, with some countries fostering transfer from rural agriculture to non-agricultural activities, and secondary towns, and others undergoing rapid agglomeration in urban areas. The study finds that that the agriculture-industry transition yields more inclusive growth patterns and faster poverty reduction. Conversely, in a related study carried out by Berardi and Marzo (2015) find that composition of economic growth is important for poverty reduction, they argue that growth of agriculture is more pro-poor in the short term while in the medium term fostering industrial growth could contribute to economic diversification and sustainable structural change, and thus reduces poverty. Christiaensen and Wang (2013) find that agriculture growth plays a significant role in reducing poverty in rural lagging regions, also when non-agriculture drives national growth. Similarly, it has been argued that structural change generates positive as well as negative impacts on overall growth and poverty (Zulkhibri, Naiya and Ghazal, 2015).

However, little is known about the role of the different components of economic growth on poverty across rural and urban locations. While development experts, practitioners and policy makers have had stronginterest on how changes in the composition of the economic growth affect poverty in the rural and urban areas, information in Africa is generally limited. Although, the role of the agricultural sector on poverty have received considerable attention (Diao *et al.*, 2010;Christiaensen and Demery, 2006). Therefore, a detailed analysis of the relationship between sectoral components of economic growth and poverty across rural and urban locations are of paramount importance. As the knowledge of the sectoral economic growth on aggregate poverty might be insufficient for effective policy formulation. Therefore, this study investigates the effects of sectoral growth on rural-urban poverty. This study differs from existing studies; in this study the poverty rates and economic growth components are decomposed into rural and urban locations.

This paper is structured as follows: the following section reviews relevant theories and related empirical studies. Section 3 describes the sources of data, the methods of analysis and the empirical models. Section 4 discusses the results and in section 5 provides the conclusion of the study.

## 2 Literature Review

In analysing the economic growth-poverty relationship in the LDCs, development economists began to focus on the structure of the economy. The structure of the developing economy is typically characterized by its primary sector. The LDCs have historically been and mainly still are dependent on the primary sector while little resources are devoted to the secondary sectors that need to be developed for sustained growth and development. The role of structural change to economic growth and poverty reduction cannot be over emphasized, industrial development has had an important role in the economic growth of countries like China, Korea, Taiwan, Malaysia and Indonesia. The growth of the modern sectors are important for accelerating growth and thus creating job opportunities (Amrita, 2015). The marginal productivity of labour is extremely low in the traditional primary sector of the economy, and the transfer of surplus labour from the traditional agricultural sector would be utilized in more productive sectors and hence growth would continue until all the surplus labour in the rural agricultural is exhausted (Todaro, and Smith 2006).

Expansion of the urban industrial sector is important as large-scale migration workers could be hired at a wage rate above that of the rural area. The transfer of surplus labour would also lead to increase in real wages in the rural agricultural sector due to a decline in unemployment in the rural areas. This implies that the coexistence of the traditional primary sectors alongside the highly productive non-primary sectors is what makes development possible. However, these models could not explain the sectoral differences in some of the developing economies with low incomes, large primary sectors, and low levels of production, high population growth and low human capital development, which pose challenges to growth (Chatterjee 1995).

However, Todaro (1969) criticizes the dual-sector theory for its assumption that there would exist a fixed urban wage rates until the rural surplus labour exhausts. Todaro's model does not advocate simply the internal labour migration on the relative difference in rural-urban real income differentials and rates of unemployment as the basis of migration as is claimed in Lewis-Ranis-Fei migration theories. The rural-urban migration is decided on the basis of differences in expected rural-urban wage, rather than in actual earnings. The model assumes that rural-urban migration will continue as long as the expected urban real income surpasses rural real income because relocation to the cities is stimulated mostly by economic reasons. According to the Todaro model, the substantial migration in excess of available job opportunities is both a symptom of and a factor contributing to poverty.

The balanced growth and the structural change theory are the two opposing theories in the literature. The balance school position is that large scale investment ('big-push') across all sectors would open up economic opportunities, expand the size of the market, increase output and eventually create mutually supporting demand whereas the structural school stands for the structural change models where no balanced growth paths exist as long as structural change takes place (Laitner, 2000; Acemoglu and Guerrieri, 2008).That is, investment needs to be in strategic sectors of the economy as the LDCs lack the required resources to invest in large scale across all the productive sectors. Therefore, the best approach is to create an imbalance development in the economy, the other sectors would automatically develop through what is called the "linkages effect". That is, the developed sectors could stimulate the growth of the other sectors through backward and forward linkages. These intersectoral linkages are likely to result in higher output growth.

Similarly, a growing number of empirical studies have utilized individual sector level data to examine individual sector contribution to poverty reduction. For example, Diao et al. (2010) find evidence that industrial sector GDP growth is negatively related to poverty in countries like hina, Korea, Taiwan and

Indonesia. Zulkhibri et al. (2015) investigate the structural change and economic growth in Malaysia, Nigeria, Turkey and Indonesia), motivated by the substantial progress in economic growth. The findings reveal that structural change and economic growth has a positive and statistically significant but the impact of GDP on structural change is higher than the impact of structural change on GDP. This Hasan and Quibria (2004) investigates the relationship between sectoral growth and poverty in developing countries. The results suggest that the progress in poverty reduction in South Asia and Sub-Saharan African (SSA) is attributed to growth in the agricultural sector, while the significant decline in poverty in East Asia is associated with manufacturing and export production activities. However, the poverty reduction impact of the agricultural sector in Africa has been lower relative to other regions due to low factor productivity (Diao et al., 2010), in spite of the fact that the agricultural sector accounts for 30 to 40 percent of Africa's GDP and almost 60 percent of its total employment share (Fan et al., 2009). Similarly, Foster and Rosenzweig (2003) examine the role of agricultural growth and non-agricultural investments on poverty and find that growth in agricultural productivity and in rural factory employment accounts for the largest poverty reduction through increases in rural incomes and wages. Suryahadi et al. (2009), in Indonesia, find that rural agricultural growth is significant in reducing rural poverty, but that the impact of the urban services growth is larger, and conclude that for effective poverty reduction, investments in the agriculture and service sectors need to be expanded.

Laitner (2000) posits that as income per capita rises, the agricultural sector loses its importance, while the manufacturing sector at the initial stage gains momentum but is eventually surpassed by the continuously growing service sector. Findings of Suryahadi et al. (2009) and Loayza and Raddatz (2010) regarding the impact of the services sector on poverty are different. Suryahadi, (2009) find evidence of poverty reduction as a result of increase in services sector GDP growth. Whereas, Loayza and Raddatz (2010) find that services by themselves do not seem to

reduce poverty when growth in other sectors is controlled for.Warr and Wen-thuen (1999) investigate the effects of sectoral growth in Taiwan, find that industrial sector growth has largely contributed to poverty reduction. Further, Labour-intensive sectors such as agriculture play a crucial role in improving rural household income, but their indirect effects might be larger due to their linkages with other sectors of the economy (Ravallion and Datt, 1996; Sumarto and Suryahadi, 2007; Thorbecke and Jung, 1996). For instance, Loayza and Raddatz (2010) developed the sectoral growth model that exemplifies how the sectoral composition of growth and associated labour intensity can affect workers' wages and, thus, alleviate poverty which is a cornerstone in structural change theory. Loayza and Raddatz's model provides an essential contribution by explicitly accounting for productivity gains in labour-intensive sectors.

An analysis of the differences in poverty reduction rates in rural Indian states suggest that agricultural growth, agriculture infrastructure investments and initial levels of human resources account for the differences in poverty reduction across states (Datt and Ravallion, 1998). Another study by Ravallion and Datt (1996) determines the importance of urban and rural economic growth on rural, urban and national poverty reduction and concludes that the impact of urban growth on urban poverty reduction has been significant, while its effect on national poverty is insignificant. However, rural growth has been effective in reducing poverty in rural and urban areas. Similarly, Thorbecke and Jung (1996) examine the pathways through which a production sector's output reduces poverty using a Social Accounting Matrix for Indonesia. They find that the impact of the agricultural sector on overall poverty reduction has been larger, followed by the services sector and the informal sector's output growth.

Gollin et al. (2002) demonstrate that agriculture plays a pivotal role in the early stage of development. They use both cross-sectional and panel data from 62 developing countries for the period from 1960 to 1990, and find that agricultural productivity growth is statistically significant in explaining growth in GDP per

worker. The study observes that labour migration from agriculture to non-farm sectors in countries with higher agricultural productivity is higher. This labour transfer accounts for 29 percent of GDP growth, while non-agricultural growth accounts for the remaining 17 percent. This tends to suggest that growth in the agriculture sector facilitates movement of labour from rural agriculture to the urban industrial sector.

Suryahadi et al. (2009) examine the effects of different components of economic growth in rural and urban poor households in Indonesia. They find that the growth of the urban services sector has the largest impact on rural poverty reduction, followed by rural agricultural growth. They further suggest that more emphasis be placed on policies that support growth in both agriculture and service sectors for rapid poverty reduction. This is also consistent with a study conducted by Dorosh and Haggblade (2003) in four Sub-Saharan African countries, which found that the poor tend to benefit more from investments in agriculture than from similar investments in manufacturing. This is also supported by other theoretical studies (Loayza and Raddatz, 2010) as well as empirical findings, such as the works of Christiansen and Demery (2011), Sumarto and Suryahadi (2007), and Thorbecke and Jung (1996).

Recently, Christiaensen and Todo (2014) examine the effects of structural change on poverty using cross-country panel data for developing countries, which was motivated by the great diversity in the nature and speed of countries' sectoral and occupational diversification, with some countries fostering transfer from rural agriculture to non-agricultural activities, and secondary towns, and others undergoing rapid agglomeration in urban areas. The study finds that that the agriculture-industry transition yields more inclusive growth patterns and faster poverty reduction. Conversely, in a related study carried out by Berardi and Marzo (2015) find that composition of economic growth is important for poverty reduction, they argue that growth of agriculture is more pro-poor in the short term while in the medium term fostering industrial growth could contribute to economic diversification and sustainable structural change, and thus reduces poverty.

Christiaensen and Wang (2013) find that agriculture growth plays a significant role in reducing poverty in rural lagging regions, also when non-agriculture drives national growth. Similarly, it has been argued that structural change generates positive as well as negative impacts on overall growth and poverty (Zulkhibri et al., 2015).

## 3 Methodology

### 3.1 The Methods: Linear Panel Static Model

This study used static panel data analysis to estimate the growth-poverty model. The lack of long time series data on poverty in Nigeria necessitated the use of state-level panel data (N=36. T=6). The panel data is also called longitudinal data or cross-sectional time series data, which, as the name implies, is a dataset that involves time series and cross-sections. The longitudinal data are datasets in which multiple phenomena are observed at different points in time for the same individuals, households, companies, states or countries. There are several benefits of using panel data. According to Baltagi (2001), one of the benefits of using panel data is that it reduces aggregation bias, as it is usually collected on micro units. Therefore, estimation based on state-level data and decomposition reduces the risk of bias resulting from aggregate time series data, and also the implausibility of pooling data across countries.

A widely used panel data models are pooled (OLS), fixed effects model and random effects model. The Pooled (OLS) model ignore the panel nature of the data, and treat ? as identically and independently distributed (i.i.d) disturbances that are uncorrelated with x, or Cor $(\varepsilon_i, \chi_i) = 0$. That is, the effects of observed explanatory variables x, are identical across cross-sectional units, i, and over time, t, hence, it assumes that both intercept and the slope are the same across units and time. However, the fixed effect model and random effects model assume that each units (e.g. countries, states, households) have their own intercepts while restricting the slope to be homogenous. That is,

the units are all different from one another in fundamental unmeasured ways, and these vary across individual.

To accommodate such heterogeneity, the unobserved explanatory variable ($\varepsilon_{it}$)is decomposed into the individual-specific effect ($\lambda_i$ ) and the disturbance term ($\mu_{it}$)which is assumed to be identically and independently distributed (i.i.d) with zero mean and variance. However, the difference between the random effects and the fixed effects model is in the treatment of the individual effects, the random effects assumes that the individual specific effects are uncorrelated with the independent variables. The fixed effects model assumes that the individual specific effect is correlated with the independent variables. In other words, the random effects model treated the individual effects as if they arise from random causes while the fixed effects model treated the individual effects as constant for each individual.

There are two basic tests that can help in determining right methods to apply in the static panel data analysis. The first test is the Breuch-Pagan's Langrangian Multiplier (LM) test, and it is used to distinguish between the Pooled OLS model and the random effects model. As stated earlier, it is the presence of individual specific effects that distinguishes the random effects model from the pooled OLS. If the assumption of the pooled OLS holds, the data can be pooled and OLS can be used to estimate the model and no additional technique is required. The second test that is often used in panel data analysis to decide between the fixed and the random effects model is the Hausman test. If the assumption of the random effects model holds, the random model can be applied to estimate the model. Otherwise the fixed effects model is more efficient.

### 3.2 The model

The simple model to investigate economic growth impacts on poverty can be stated as: $\boldsymbol{dP = \alpha + \beta Y = \varepsilon}$ (1)

Where *dP* refer to the change in poverty rate, *Y* represents economic growth, ε is the error term, while α and β are the

parameters to be estimated. To estimate the model above we need to have time series data covering sufficiently long period. However, it is difficult to get a long time poverty data in developing country. To evade the problem of unavailability of sufficiently long term national poverty data and uncertainty of pooling data across countries, this study employs panel data with states as the unit of observations. Therefore, it is important to control for the potential effects of various initial conditions, such as initial inequality, income, poverty and population (Chatti and El Lahga 2008; Son and Kakwani 2004). Furthermore, it has been argued that the poverty reduction impact of economic growth is conditional on the level of income distribution, and also on the changes in both population growth and poverty rates.

To estimate Eq. (1) some adjustment need to be made to account for the inter-sectoral migration and the initial condition of each state, which may influence poverty to vary across states. For this adjustment, the Ravallion and Huppi (1991) decomposition principles are applied to compute the change in poverty. The most extensively applied decomposition approach that captures the effects of within and inter-sectoral population shift on the evolution of poverty.

The change in poverty can be decomposed into

$$dP = (S_1 dP_1 + P_1 dS_1) + (S_2 dP_2 + P_2 dS_2) + \cdots (S_n dP_n + P_n dS_n) \quad (2)$$

Where $s_1$ is the share of population in state 1 and $s_2$ the share of population in state 2 and $s_T$ is the share of population at state T and $ds_1$, $ds_2$ and $ds_T$ denote change in population at state 1, state 2 and state T respectively. Similarly $dp_1$, $dp_2$ and $dp_T$ represent changes in population in state 1 and state 2 and state T respectively.

Equation (2) implies that change in aggregate poverty, denoted by *dp,* corresponds to the sum of changes in states' poverty rates weighted by each state's population share and the changes in states' population share weighted by each state's initial poverty rate. The second term on the right-hand side captures the change

in national poverty arising from changes in population shift across states (perhaps due to disparity in natural population growth and inter-state migration). Therefore, it is important to control for the potential effects of various initial conditions, such as initial inequality, income, poverty and population (Chatti and El Lahga 2008; Son and Kakwani 2004; Datt and Ravallion 1998). Furthermore, it has been argued that the poverty reduction impact of economic growth is conditional on the level of income distribution, and also on the changes in both population growth and poverty rates (Ravallion and Huppi 1991). Therefore, it is also of interest to look at the indirect effects of the inequality and population shift on poverty.

Therefore, the sectoral growth-poverty model can be written as

$$dP_j = dP_{it} = \alpha + \beta dY_{it} + \emptyset dS_j + \gamma P_j + \Gamma_m X_m + \mu \quad (3)$$

where $dS_j$ refers to change in population share in state $j$, $P_J$ is the 1980 poverty rate in state $j$ and $X_{mj}$ denotes the vector of initial conditions in state $j$. Since we are interested in examining the relationship between rural-urban poverty and sectoral growth, we decomposed economic growth into urban and rural sectoral components and the model can be written as follows:

Rural Poverty model:

$$drp_{it} = \beta_0 + \beta_1(dy_u^A)_{it} + \beta_2(dy_u^I)_{it} + \beta_3(dy_u^S)_{it} + \beta_4(dy_r^A)_{it} + \beta_5(dy_r^I)_{it} + \beta_6(dy_r^S)_{it} + \beta_7(ds)_{it} + \beta_8(ip)_{it} + \beta_9(iy)_{it} + \varepsilon \quad (4)$$

Urban poverty model:

$$dup_{it} = \beta_0 + \beta_1(dy_u^A)_{it} + \beta_2(dy_u^I)_{it} + \beta_3(dy_u^S)_{it} + \beta_4(dy_r^A)_{it} + \beta_5(dy_r^I)_{it} + \beta_6(dy_r^S)_{it} + \beta_7(ds)_{it} + \beta_8(ip)_{it} + \beta_9(iy)_{it} + \varepsilon \quad (5)$$

| Variable | Measurement | Expected signs |
|---|---|---|
| $(drp)$ | = Change in rural poverty and $dup_{it}$ | |
| $(dup)$ | = change in urban p overty | |
| $(dy_u^A)$ | = urban agricultural growth (per capita, share weighted) | Negative |
| $(dy_u^I)$ | = urban industry growth (per capita, share weighted) | Negative |
| $(dy_u^S)$ | = urban services growth (per capita, share weighted) | Negative |
| $(dy_u^T)$ | = urban trade growth (per capita, share weighted) | Negative |

| | | |
|---|---|---|
| $(dy_r^A)$ | = rural agricultural growth (per capita, share weighted) | Negative |
| $(dy_r^I)$ | = rural industry growth (per capita, share weighted) | Negative |
| $(dy_r^S)$ | = rural services growth (per capita, share weighted) . | Negative |
| $(dy_r^T)$ | = rural trade growth (per capita, share weighted) | Negative |
| $ds$ | = change in population share | Positive |
| $iy$ | = initial income | Negative |
| $ip$ | = initial poverty | Positive |
| $\beta_0$ | = the intercept | |
| $\beta_{1-9}$ | = the slopes of the equation. | |
| $\varepsilon$ | = the error term | |

## 3.3 Sources of Data

The data were obtained from different sources. First, data on poverty rates were obtained from the National Bureau of Statistics (NBS). The NBS is an established institution that is responsible for developing and managing official statistics, including the provision and maintenance of a comprehensive data bank on households' demographic and socio-economic data, among others. In addition, this study utilizes the real GDP from 1981 to 2014.The population data were sourced from the National Population Commission of Nigeria (NPC).

## 4 Results and discussion

The Breusch and Pagan Lagrangian Multiplier test suggests that there is no state specific effect in the data. Hence, the Pooled OLS is more appropriate for the model estimation, where the standard errors are corrected for heteroskedasticity and serial correlation. However, in Table 1 we present the empirical results. The rural agricultural growth variable carries a negative and statistically significant coefficient, implying that rural agriculture growth exerts significant influence on rural poverty reduction.

| ***Right-hand side variables*** | *Rural poverty Coefficients* | *Urban poverty Coefficients* |
|---|---|---|
| Rural agriculture growth | -0.021*** | -.022*** |
| | (-4.18) | (-9.46) |
| Rural industrial growth | 0.015 | 0.025 |
| | (0.79) | (0.38) |
| Rural services growth | -0.064 | -0.02 |
| | (-0.41) | (-0.21) |
| Urbanagriculture growth | 0.013 | 0.012*** |

| | | |
|---|---|---|
| | (1.31) | (4.28) |
| Urban industrial growth | -0.052 | -0.01 *** |
| | (-1.48) | (-4.73) |
| Urban services | -0.011*** | -0.0081*** |
| | (-6.94) | (-8.69) |
| Change in population share | 13.446*** | 0.054*** |
| | (3.00) | (4.02) |
| Initial poverty head count | 0.265*** | 0.195*** |
| | (7.05) | (8.73) |
| Initial income Level | 0.023*** | -6.61e-06 |
| | (2.86) | (-0.25 ) |
| Constant | 45.449*** | 45.514*** |
| | (5.690) | (5.724) |
| R-square | 0.438 | 0.4391 |
| Breusch-Pagan LM | 0.00 | 0.00 |
| | (0.952) | (0.952) |
| Heteroskedasticity | 0.21 | 0.22 |
| | (0.647) | (0.653) |
| Observation | I80 | 180 |

1. *Note: the figures in the parenthesis are t-statistics; the symbols ** and*** indicate 5% and 1% significant levels respectively.*

This indicates that reducing poverty in rural areas requires substantial growth in the rural agricultural sector, as 10% growth in the sector is associated with a poverty reduction of 2 percent. The significance of rural agricultural growth is important, the sector being the largest employer of the rural population. This result corroborates the findings of Christiaensenet al. (2011) in low-income and resource-rich countries, Loayza and Raddatz (2010) in the case of developing countries, Suryahadi et al. (2009) in Indonesia and Ravallion and Datt (2007) in rural India. Therefore, any policy change that discourages agriculture production may not augur well for the economy.

The results show that the coefficient of urban wholesale/retail trade grow this negative and significant. This indicates that reducing poverty in rural areas requires robust growth in the urban wholesale and retail trade sector, as a 10% growth in this sector is associated with poverty reduction of 1 percent. Urban wholesale and retail trade is important for poverty reduction in Nigeria, as it provides a wide range of opportunities

for the poor in terms of jobs creation. The findings corroborate those of other studies in Indonesia, such as McCulloch, Timmer, and Weisbrod (2007), and Suryahadi et al. (2009), who admit that the share of petty trading activities in services growth has a positive impact on poverty reduction in Indonesia. Loayza and Raddatz (2010) and Azam and Gubert (2006) argue that petty trading activities in urban regions require relatively small capital compared to agriculture, and as result, many unskilled workers trade their labour in that sector. Therefore, the direct impact of this subsector on the rural poor is much higher than the modern financial sector, as the retail sector absorbs a larger percentage of labour from rural areas.

Comparatively, the magnitude of the coefficients of sectoral growth indicates that the effect of the urban wholesale/retail sector growth on rural poverty reduction is larger. The significant impact of urban wholesale and retail trade growth on rural poverty reduction makes sense because petty trading or being a domestic aid is one of the activities in the retail services subsector that absorbs a greater percentage of rural migrants. The results indicate that the coefficient of rural industry growth and urban industry growthis insignificant at all significance levels. Other studies have reported that the impact of industry growth on poverty reduction has not been impressive in the SSA (see Christiaensen and Todo, 2014). The low impact of industrial sector growth on poverty has been associated with resource curse because the greater percentage of industrial sector growth is from the oil and gas sector and as a result other sectors have been neglected (see Torvik, 2009).

However, the results show that neither rural services nor urban services sector growth is significantly related to rural poverty, although the coefficients indicate that both variables carry negative signs. This corroborates other empirical findings: Suryahadiet al. (2012) found that the growth of the rural and urban services sector contributed to reductions in poverty in Indonesia. Berardi and Marzo (2015) uncovered a similar phenomenon in Africa.

The rural poverty model can also be used to explain how the initial conditions affect rural poverty reduction. The results indicate that the Gini coefficient (g) carries a negative and significant coefficient, while initial population, initial income and initial poverty variables have positive coefficients. The coefficient of initial poverty is statistically significant. This indicates that the higher the population density at the poverty line, the lower the poverty reduction impact of high growth. As expected, with the exception of the Gini coefficient, other initial condition variables carry positive coefficients. This negative relationship between the Gini coefficient and poverty in the results might be absolutely contradictory because the theoretical view and the practical evidence suggest that high inequality drags down economic growth and thus increases poverty. This might not be unconnected with the measure of the inequality used, because the Gini index has been criticized for being more sensitive to the income of the middle classes than to that of the poor. Studies in Indonesia conducted by Suryahadiet al. (2009) and a cross-country study by Loayza and Raddatz (2010) show a negative relationship but it is non-significant in both cases.

This corroborates other findings: Kraayy (2006) shows that changes in poverty rates in respect to economic growth depend on the population density at the poverty line. Janvry and Sadoulet (2000) investigate the relationship between economic growth and poverty reduction using panel data from twelve countries from Latin America between 1970 and 1994, using an econometric approach. They find that growth has a reducing effect on both urban and rural poverty but the effects depend on the initial level of poverty. This implies that growth can only be relied on to reduce poverty if the initial poverty is not too high. Their findings reveal that in Latin American countries where the level of poverty is too high, growth is less effective in reducing poverty. Going by this study, growth is good for poverty/inequality reduction when the poverty (and inequality) is not severe.

Similarly, the results of the sectoral growth and urban poverty model appear to be somewhat similar to those obtained

for the rural poverty model. The results indicate that the effects of sectoral growth on urban poverty are far from uniform. The coefficients of rural-agricultural growth and urban wholesale and retail trade sector growth are negative and statistically significant. This implies that rural agriculture growth and urban wholesale/retail trade have positive impacts on poverty in Nigeria. The results show that 10 percent growth in the agricultural sector is only associated with a 0.02 percent reduction in urban poverty, while 10 percent growth in the urban wholesale/retail trade sector reduces urban poverty by 0.08 percent.

On the other hand, the results show that both rural and urban industry and ruraland urban services sector growth exert no significant influence in reducing urban poverty in Nigeria. This does not mean that they are irrelevant in reducing urban poverty. Rather, this may imply that their effects work indirectly via the size and composition mechanism. For instance, in the case of Nigeria, available evidence suggests that the percentage share of industry growth grew substantially over the years, but about 70 percent of the sector's contribution is from the oil and gas sector. The oil and gas sector is the least labour-intensive sector compared to the manufacturing sector. The manufacturing sub-sector contributes just 20 percent to the industry's GDP growth according to available statistics. According to Loayza and Raddatz (2010), the production and export of labour-intensive manufacturing impact on poverty reduction might be higher. Similarly, Hassan and Quibria (2004) contend that the poverty reduction success of the East Asian miracle economies was mainly propelled by the rapid development of the labour-intensive manufacturing sector.

The non-significance and negligible magnitude of the coefficient of industry growth is consistent with findings: Hasan and Quibria (2004), in analyzing the sectoral growth effects across regions, report that industrial sector growth and poverty are negatively related in South Asia and Sub-Saharan Africa but the magnitudes of the coefficients are negligible and statistically insignificant at all levels of significance. The results suggest that

the relationship between rural industrial growth and urban poverty is positive, implying that an increase in rural industry growth has an increasing effect on poverty, though this effect is statistically insignificant. This corroborates findings in Latin America and the Caribbean, as studies report that the relationship between industrial growth and poverty in both countries is positive but statistically insignificant (see Hasan and Quibria, 2004).

## 5 Conclusion

This study investigates the effects ofsectoral components of economic growth and poverty across rural and urban locations within the framework of static-panel data analysis. The findings of the sectoral-growth models suggest that rural agricultural sector growth and urban wholesale/retail trade have positive impacts on poverty in both rural and urban areas. However, the services sector and the industry growth exert less influence on poverty reduction. This indicates that sectors that are more labour and production intensive tend to have larger effects on poverty reduction. Thus, the urban wholesale/retail services sector is the most poverty-reducing, followed by the rural agricultural sector, while the services sector (including the financial sector and real estate) and industry do not seem to have benefitted the poor. The low impact of the industrial sector's growth can be linked to this sector's value-added growth rates or its composition. For instance, the fast growth in the industrial sector resulted from the oil and gas sector production.

Moreover, although the agricultural sector exerts significance influence on poverty reduction, its impact is considerably low, considering its percentage share of GDP and the level of poverty in both rural and urban areas. This might be due to the low output of the major agricultural value-added activities like cash crop production, livestock, and fishing. This has not only had an adverse effect on commercial agriculture production but also hampers economic opportunities in the sector. Furthermore, the overdependence on oil and gas has also truncated the

development of the agricultural sector, paving the way for increased agriculture imports. This has further exacerbated the low level of agricultural productivity in the country. The findings furthersuggest that the labour employment intensity of a sector matters for poverty reduction. Therefore, any policy alteration that discourages labour employment may impede the ability of economic growth to alleviate poverty. This should not be interpreted to mean that only the agricultural sector needs to be prioritized to reduce poverty: rather, the labour-intensive manufacturing and services sectors should be made more effective in creating employment for unskilled labour.

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