EDUCATION, LABOUR PRODUCTIVITY AND INCOME INEQUALITY IN NIGERIA

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ABSTRACT: *This study examines the role of education and labour productivity on income inequality in Nigeria by considering both educational attainment and productivity growth over a period of time. A dynamic structure is devised for the analysis using data for the period 1981 to 2013. The cointegration and error correction methodology is adopted in the empirical analysis. It is shown that productivity has a stronger impact on inequality reduction than education. This implies that any policy that promotes education without the productive capacity of labour would not lead to reduction in inequality. It also suggests that policies of reducing income inequality in Nigeria should invariably incorporate productivity growth measures for such policies to be sustainable.*

1. INTRODUCTION

Rising income inequality is a growing concern for policymakers in many economies. These concerns have recently been heightened by high unemployment in many advanced economies in the aftermath of the financial crisis. Many policymakers view a more equal income distribution as a desirable goal, although the underlying motivations may differ. Lower income inequality is often viewed as important for achieving greater equality of opportunities to access economic, social, and political resources. Others view it as intrinsically desirable because the existing income inequality is perceived to be the outcome of unfair access to resources and thus

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detrimental to social cohesion. Generally known high levels of income inequality have historically persisted in Sub-Saharan Africa, and this unfortunate situation has changed very little over the past decades. There is no doubt that income inequality is a deeply rooted and multifaceted problem, with both moral and economic aspects, which is why the topic spurs a continuous heated debate.

In Nigeria, households suffer from vast inequality of incomes, assets and control over public resources and essential services as well as insecurity (World Bank, 2000). The distributional consequences of economic growth are one of the main policy issues begging for attention from the government. Inequality in income distribution has been a subject of controversy in the literature over the years. Policies seeking steady economic growth may not be enough without giving attention to means of generating such growth processes and the factors easing income inequality and eliminating barriers (Iwayemi, Afeikhena, & Adeboyejo, 2000).

One of such policies may be the improvement in the education system. Educational attainment was one of the strongest factors that led to rapid growth among the Asian tigers in the 1970s (Krugman, 1994) and if this is looked into for the Nigerian case, the issue of income inequality may be addressed. Moreover, productivity is viewed as the instrument for continuous progress, and of constant improvement of activities. It is often seen as output per unit of input. Hence, higher productivity connotes achieving the same volume of output with less factor inputs or more volume of output with the same amount of factor inputs. Thus, increased productivity could result from the reduction in the use of resources, reduction in cost, use of better methods or improvement in factor capabilities, particularly labour (Obadan & Odusola, 2000).

Investigating the sub-growth factors that exacerbate and tend to ensure persistence of income inequality is germane since it is important for policymakers to understand the forces behind distribution of income in order to tackle the problem in the most efficient way. Moreover, the initial response of the economy to income inequality is also a veritable aspect for empirical analysis. Efforts at understanding the causal pathways and transmission mechanisms through which various factors impact inequality over the short and long run are ongoing. In this study, we address this issue by considering the role of education and income redistribution in income inequality reduction in Nigeria.

2. THE LITERATURE

Inequality seems to be a straightforward concept which, as Cowell (1995) states, "obviously" suggests a departure from the simple idea of equality, this is, the fact that two or more quantities are the same size. The concept is generally related to differences in income, consumption or wealth and associated with social welfare. Globalization, free international trade, technology change, transition from communism to capitalism, the erosion of minimum wage are some reasons that have been suggested to explain rising inequality (Steward, 2004). Inequality compares the living standard of each individual in a specific society. Unfortunately, no agreement has been achieved among social scientists about what exactly the standard of living of an individual

means and how to measure it. The controversies arise not only from the different ethical points of view of those who want to measure the extent of inequality, but also from the difficulties in capturing accurately the person's wellbeing. It seems quite improbable to find out a single index able to provide a full description of living standard.

The literature on inequality and poverty has often used income, consumption, and wealth as proxies for living standards, but none of these three concepts takes into account health, freedom or achievement. They do not measure happiness unless we assume that happiness is directly equivalent to level of income or consumption. Furthermore, what people regard as happiness is influenced by culture and personal preferences, and this varies from individual to individual. These proxies do not measure the 'worth" of an individual. Income, consumption and wealth tell us about the command over resources potential in the case of income and wealth, and actual in the case of consumption, but not about welfare, (Goodman, Johnson & Webb, 1997). Furthermore, Cowell (1995) discuss that none of these concept cover completely the command over resources for all goods and services in society. They exclude "social wage" elements such as the benefits received from enjoying items such as public parks, public libraries, and the police force, whose distribution may only be conjectured.

According to Lipton and Ravallion (1995), measures based on person's consumption of goods and services are intrinsically limited. They may reveal nothing about the disutility of work, the length or health of the life over which consumption is expected, risk and variability, etc. "Income is a useful indicator if we want to identify which people are likely to lack the resources to achieve a social acceptable standard of living". However, it does not measure accurately their capacity to achieve access (which may be influenced by other factors such as education, information, legal rights, illness, threatened domestic violence or insecurity) (Wratten, 1995). Supplementary social indicators are sometimes used to compensate the weakness of income or consumption based measures in capturing adequately many aspects of wellbeing. Examples of these indicators are life expectancy, infant mortality, nutrition, the proportion of household budget spent on food, literacy, school enrolment rates, access to health clinics or drinking water. Again, the idea is to have a standard scale so that different population groups may be compared (Wratten, 1995). In practice for policy purposes, income, consumption and wealth remain the key measures of inequality (Cesar, 2002).

Until recently, the most widely accepted method of assessing the contribution of policies, programmes and projects to the benefit of the public relied on the calculation of the added-value (i.e. quantification of the change in social utility created by initiatives) obtained from these interventions. Added - value is an important concept in social cost benefit analysis. It stems directly from the work undertaken in the 1950s and 1960s by Simon Kuznets and Paul Samuelson to provide an analytical framework which allowed microeconomic measurements of welfare changes created by individual initiatives to be directly related to macroeconomic measurements of national or regional output. Kuznet and Samuelson's research provided a sound methodological basis for asserting that a social cost-benefit assessment which could demonstrate a 'Potential Pareto Improvement' (i.e. that the present value of aggregate benefits

exceeded the present value of aggregate costs) could be translated into a general improvement in the benefit of the public (Gowdy, 2005).

2.2 Education, Income Inequality, and Productivity in Nigeria

Education in Nigeria has experienced several dynamic shifts and changes over time in Nigeria (Akinsokeji & Adegboye, 2015). In Figure 1 below, the population of enrolments at the primary and secondary school levels of education in Nigeria is reported. Primary school enrolment rate has remained quite high over the period although it has stealthily declined since 2006. Enrolment to junior and senior secondary school has remained at relatively steady levels since 2006 with slight rise since 2009. Apparently, entrance into junior secondary schools invariable suggests that pupils will continue into the senior level. Challenges still abound, especially at the primary level which is expected to be mandatory; the UBE in 2010 reported that there is still a short fall of over 5 million children of the 30 million that are expected to be enrolled in the primary school level. There is also the issue of quality in the educational system.
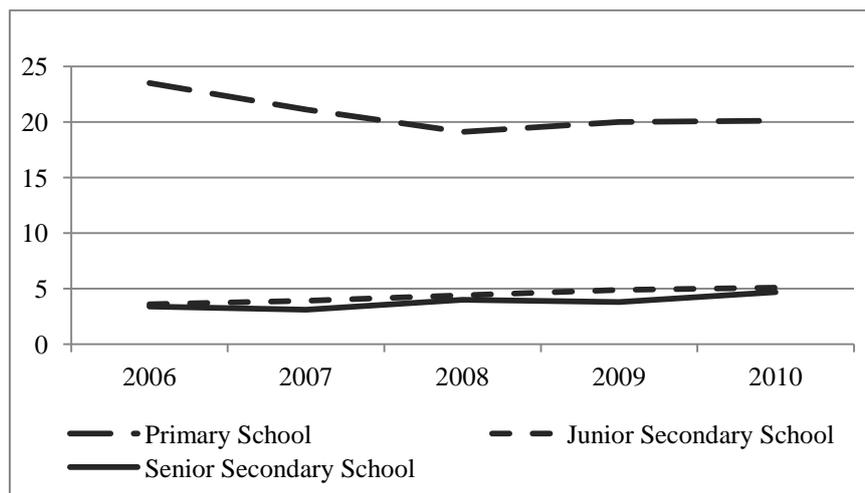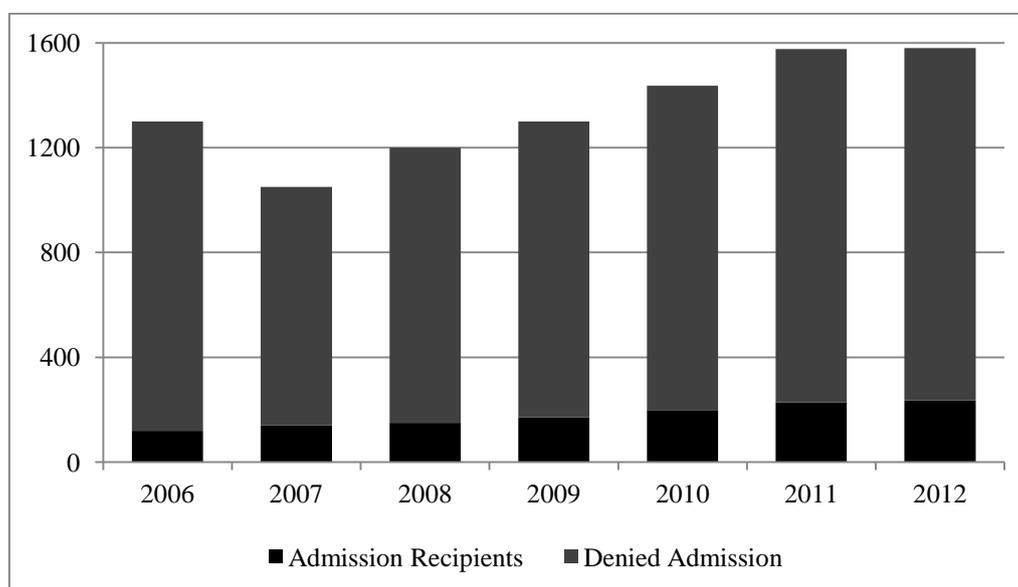

Source: Underlying data from Universal Basic Education (2011)

Figure 1. School Enrollment (in millions)

The situation in tertiary enrolment is reported in Figure 2 below. There is a very high turnover rate in acceptance into tertiary institutions in the country. As at 2012, there were 36 federal universities, 37 state universities, and 45 private universities accredited by the National Universities Commission (NUC) in Nigeria. But consistently less than 80 percent of the applications to Nigerian universities were denied between 2006 and 2012. Polytechnic and colleges of education were established to train technical, mid-level manpower, but manpower and other infrastructural deficiencies have plagued the system. For instance, Shu'ara (2010) indicated that there are academic staff shortages in all areas, particularly in the critical areas of science and

technology. Over 60% of academic staff in the Nigerian university system is in the category of lecturer 1 and below; due to inter and intra-sector brain drain.

Source: Underlying data from Joint Admissions and Matriculation Board (2014), Underlying data from Federal Ministry of Education (2011)

Figure 2. Application and Admission into Nigerian Universities (in thousands)

Average productivity growth for 1990 to 2013, shown in Table 1, is 2.15 percent which is relatively low considering the fact that this is an essential factor for sustainable long run growth in an economy (Harris, 1999; Solow, 1956). Indeed, Obadan & Odusola (2000) found that the long-term productivity growth rate for Nigeria for the period 1974 to 1996 was actually negative at -0.17.

Table 1. Income Inequality and Productivity Growth in Nigeria, 1990-2013

	Mean	*Median*	*Max.*	*Min.*	*Std. Dev.*	*J-B*	*Prob.*
productivity	2.15	1.87	12	-8.69	4.47	18.72	0.00
inequality	44.7	45.38	53.66	35.2	4.69	0.94	0.62

The situation has obviously improved in the last decades. The average income inequality value for the same period was 44.7 for the period. This value indicates that inequality has been quite perverse in the system since it is close to 50 percent. The standard deviation is low for this variable, suggesting that its movement has been steady and the values may be quite similar for the years in the study. This similarity is

not just over periods of time but also across spatial distributions in the country, even though there are suggestions that some regions (North-East and North-West) have had higher incidences of income inequality (NBS, 2012).

The relationship between income inequality and productivity, which evolves over economic transition (Kuznets, 1955) can also be presented in Figure 3 within a scatter plot. The chart indicates that the relationship is better proxied by a parabola function which shows that the relationship may change from positive at lower values to negative at higher values of either of the variables. Thus, it is shown that perhaps, less inequality may tend to boost productivity growth but when the inequality widens, productivity growth begins to fall.
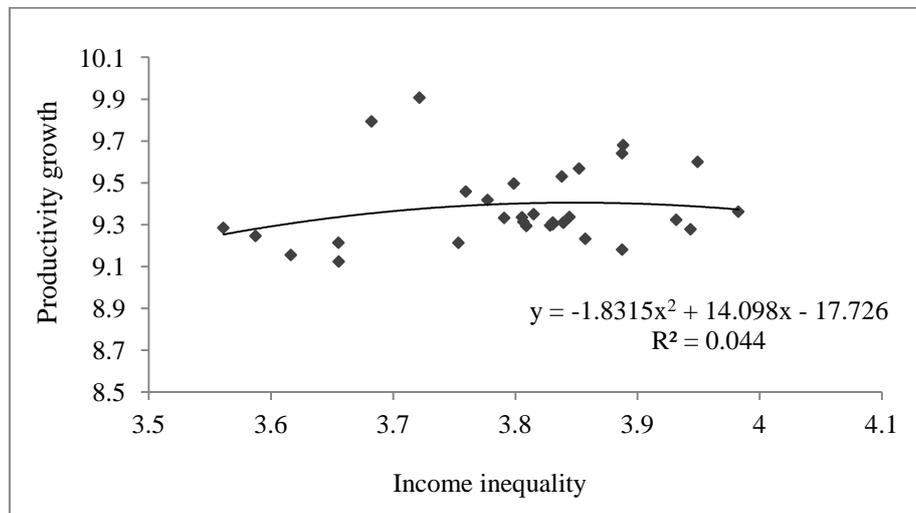

Figure 3. Application and Admission into Nigerian Universities (in thousands)

3.1 METHODOLOGY

3.1 Model Specification

The model specified in this study follows the theoretical framework laid down in the previous section. It also follows the income distribution models developed in several papers on human capital-inequality nexus (Forbes, 2000; Gallo, 2002; Ostry *et al*, 2014). Specifically, the model hypothesizes that income inequality is generally explained by education and the rate of productivity of the economy as well as other private and public sector variables. The model is does specified as:

I = f(edu, prod, sav, rd, rgdp, ges)

The expanded form of the model is written as:

$$I_t = \lambda_0 + \lambda_1 edu_t + \lambda_2 logprod_t + \lambda_3 sav_t + \lambda_4 rd_t + \lambda_5 ges_t + \lambda_6 rgdp_t + \delta ECM_{t-1} + u_t$$

Where

I = income inequality (measured using the Gini coefficient);
edu = level of education in the country, measured as the secondary school enrolment
prod = productivity growth (this is measured as the ratio of total output - real GDP and cost of labour input);
rgdp = real gross domestic product (derived from the CBN statistical);
rd = income redistribution (measured as share of private consumption expenditure in total expenditure);
sav = gross private sector savings;
ges = government expenditure on social services
ECM = the error correction mechanism
u = the stochastic error term and t represents time.

Apriori expectation $\lambda_1, \lambda_2 \lambda_3 \lambda_4 \lambda_5 > 0$. This implies that each of the factors in the model are hypothesized to be capable of reducing income inequality in the country. Note that in the income inequality equation, government expenditure on social services (*ges* - a proxy for government transfer) is included in order to capture the effect of government insurance on inequality. Apparently, the higher the role of government in transfer of resources, the higher will be the distribution of income which is expected to reduce income inequality. Thus, a negative relationship is expected to exist between the variable and income inequality. Moreover, a lagged productivity growth variable is used in the model since it has been shown that income inequality responds to productivity growth with a lag.

3.2 Data and Method of Analysis

The nature of this study necessitated the use of secondary time series data. The data are be sourced from both International and Nigerian Data Agencies such as the Central Bank of Nigeria (*Statistical Bulletin*), the National Bureau of Statistics (NBS), and World Bank (*World Economic Indicators*). In this study, a dynamic framework is devised for the analysis in order to examine the interactive patterns of the relationship among the variables. Hence, the cointegration and error correction mechanism (ECM) is adopted for the empirical analysis of the study. This method would also involve the test of the time series properties of the data using the unit root tests.

4. EMPIRICAL ANALYSIS

4.1 Unit Root and Cointegration Tests

In the study, the ADF test statistic is used for the unit root test. The results (shown in Table 2) indicate that each of the variables possesses ADF values that are less than the 95 percent critical values for the levels series and greater than the critical value for the differenced series. The implication of this is that the time series are non stationary in their levels but stationary after first differencing. In order words, the variables are time-dependent and word not guarantee a long run relationship unless

tested. Thus, we would accept the hypothesis that the variables possess unit roots. Indeed, the variables are integrated of order one (i.e. I[1]).

Table 2. Unit Root Test for Variables

Variable	ADF Test	
	Levels	*First Difference*
Li	-2.329	-6.155
Lprod	-1.803	-5.344
Lrd	-2.612	-4.119
Lrgdp	1.487	-53.83
Lsav	0.388	-3.948
Ledu	-0.808	-3.165
Lges	-0.691	-6.735

*Note: * significant at 5 percent*

Having established that the series in the analysis are not stationary in their levels, we move on to determine if they are cointegrated. The Engle and Granger two stage method is employed for the test of cointegration and the result of the cointegration tests are summarized in Table 3. From Table 3 using the Engle and Granger cointegration procedure, the ADF value of the ECM in levels is significant at the 5 percent level. This shows that the residuals are stationary in levels. Based on this result, we cannot accept the null hypothesis of no cointegration among the variables. Therefore, long run relationships exist between the particular dependent variable and the selected independent variables. An inter-temporal model can therefore be estimated for the relationships.

Table 3. Results of Engle-Granger Two-Stage Cointegration Test

ADF Test Statistic	95% Critical ADF Value	Remark
-4.055	-2.964	Stationary

4.2 The Dynamic Analysis

The dynamics of the relationship between education and economic income inequality in Nigeria is analysed within a dynamic error correction framework, using the specified model in chapter three. Moreover, we estimate the relationship within the error correction framework which brings out the pattern of short term changes in the inequality measure arising from movements in the explanatory variables. In this study, the autoregressive distributed lags (ARDL) approach was used in the ECM estimation while the R squared was employed in the lag selection for the parsimonious model. As mentioned in the previous section, the model was estimated for the period 1981 to 2013.

The diagnostic results of the ECM estimates are generally impressive. The R squared indicates that about 78 percent of the short term variations in income inequality was captured in the model. The F-value passes the significance test at the 1 percent level. This indicates that the hypothesis of a significant relationship between income inequality and all the independent variables combined cannot be rejected.

The contribution of the individual predetermined variable to the behavior of the endogenous variables is determined by observing the coefficients of the variables in the model in terms of signs, size and significance. In the inequality result, the coefficients of education, income redistribution, productivity growth and savings each has a negative coefficient, suggesting that these variables have negative impacts on income inequality in Nigeria. The other coefficients in the equation are positive. These results indicate that the coefficients of economic growth and government expenditure do not possess the signs in line with a priori expectations. In terms of significance, only the coefficients of education and government social expenditure fail the significance test at the 5 percent level.

Table 4. ECM Estimates

Variable	Coef.	T-ratio	Prob.
Constant	17.313	2.238	0.03
Ledu	-0.193	-1.27	0.21
Lrd	-0.619	-2.749	0.01
Lprod	-0.859	-2.586	0.02
Lsav	-0.125	-3.654	0.00
Lrgdp	0.273	2.671	0.01
Lges	0.078	0.803	0.43
ECM_{t-1}	-0.114	-3.942	0.00
R squared = 0.782	F = 16.1		D.W. = 1.74

Specifically, the results from the empirical estimation shows that
- Education level in the country has a negative bu weak impact on income inequality. This implies that with more education, income inequality does not seem to reduce significantly in Nigeria.
- Productivity growth has a negative significant impact on income inequality in Nigeria. The implication of this is that as productivity of the labour force increases, income inequality reduces. Thus, it is not the level of education in itself that matters for income levels to change, rather it is how productive the individual is.
- Savings has a strong impact on income inequality in Nigeria. Apparently, as private sector savings increase, ability to invest also rise giving rise to increases in jobs and wages which would tend to reduce inequality in Nigeria.
- Income redistribution as expected has a negative impact on income inequality. When more resources are moved into the private sector, this study shows that the ability to reduce inequality rises.

- Government social spending does not have strong impact on income inequality. That implies that government social welfare programs actually do not have strong effect in reducing income inequality.

We had noted earlier that focusing more resources in the hands of the private sector may act to widen inequality the inequality gap in the country since the private sector does not seem to be efficient in the equitable allocation of resources. However, the results from the estimation demonstrate the reverse conditions that private sector concentration of resources may actually provide leverage for income inequality reduction in Nigeria. The savings coefficient also passes the significance test, thus showing that as savings increases inequality is likely to reduce in the country. When it is considered that savings provides the needed background for investment, the relevance of this factor for inequality reduction can be better appreciated.

The coefficient of the error correction term has the expected negative sign and it also passes the 1 percent significance test. This goes to show that any short-term deviation of income inequality from equilibrium in the short-run can be restored in the long run. The low value of the error correction term means that adjustment to equilibrium in the long run is rather slow. Just about 11 percent of long run adjustment to equilibrium is completed during the first year. The DW statistic value of 1.74 shows absence of autocorrelation in the model. The implication of this is that the short-run estimates in the model above are reliable for structural analysis and policy directions.

Overall, the study demonstrates the capacity of productivity growth to promote income equalization in the Nigerian economy. However, educational attainment was shown not to be the actual factor that drives inequality. The main linkage in this analysis is that since education is a very strong way of improving productivity, education has a rather indirect impact on income inequality in Nigeria.

5. CONCLUSION

This study has examined the role of education on income inequality in Nigeria by considering both educational attainment and productivity growth. It is shown that productivity has a stronger impact on inequality reduction than education. Any policy that promotes education without the productive capacity of labour would not lead to reduction in inequality. It also suggests that policies of reducing income inequality in Nigeria should invariably incorporate productivity growth measures for such policies to be sustainable. For policy directions, tools available in the hands of policy makers to promote productivity can also be used to reduce inequality in income. For instance, increasing savings rate the economy will stimulate productivity growth and also reduce income inequality in Nigeria.

A major recommendation from the study is that government should invest in the people since high economic performance is a function of the people working in the country. Schooling policies and curricula must focus on enhancing individual abilities to develop potential capabilities to contribute to productivity levels. Entrepreneurship education helps to develop skills that will promote income levels and domestic productivity.

Finally, although this study has provided extensive analysis of the relationship between education and income inequality in Nigeria, the results may not be generalized for more particular instances of sectoral components in the economy. There is wide heterogeneity in sectoral characteristics in Nigeria ranging from size, labour specialization and technology. Therefore, further studies on this relationship patterns are required for individual sectors in Nigeria in order to specify the individual sectoral behaviours in Nigeria.

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