REGIONAL DISPARITIES AND THE ROLE OF EDUCATION IN INCOME DETERMINATION AND DISTRIBUTION: THE EMPIRICAL EVIDENCE FROM NIGERIA

HABIBU MOHAMMED UMAR

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ABSTRACT

This study examined the sources of regional income determination and inequality in Nigeria with particular attention given to the role of educational distribution (inequality). The motivation of the study was twofold. First, there is a growing concern about the country's economic growth not being evenly distributed. Differences exist in the economic indicators between the Southern (coastal) and Northern (inland) regions, and such a disparity could be a hindrance to national development. Second, a review of previous studies in the regional economic literature suggests that the sources of regional disparity within the country have not been comprehensively investigated. Realizing that the development of human capital through education is critical to income determination and perhaps in reducing economic disparities across the regions, this study analysed, using the spatial econometric method, whether the regional variation in educational distribution is one of the main factors for this disparity to prevail. Data from the World Bank 'Living Standards Measurement Survey' (LSMS, 2013) on Nigeria were used. The study concludes that the leading determinants of regional income level and disparity in Nigeria include not only different levels of educational attainment but also different levels of regional educational inequality. In the Nigerian labour markets, as it is in other developing countries, education premium increases with the level of education. There is a significant variation across regions in the private returns to education in Nigeria, and social returns to education are the highest on secondary education in Nigeria. The findings of this research underscore the point that balanced regional development efforts in a heterogeneous country cannot effectively and efficiently yield the desired result with a 'one size fits all' strategy. The policies should, therefore, take into account regional peculiarities and be directed towards reducing educational inequality both within and between regions in the country.

Keywords: regional disparity, educational attainment, educational distribution, regional income, spatial analysis

ABSTRAK

Kajian ini bertujuan mengenalpasti faktor penentu pendapatan dan sumber yang menyumbang kepada ketaksamaan antara wilayah di Nigeria menerusi penekanan kepada peranan agihan dalam pendidikan (ketaksamaan). Terdapat dua perkara yang memotivasikan kajian ini. Pertama, wujudnya kebimbangan bahawa pertumbuhan ekonomi sedia ada masih tidak diagihkan secara saksama seperti ditunjukkan oleh perbezaan indikator ekonomi antara Wilayah Selatan (pesisiran pantai) dan Wilayah Utara (pedalaman) yang mampu menjadi penghalang kepada pembangunan negara. Kedua, kajian lepas menunjukkan faktor penentu jurang perbezaan antara wilayah di Nigeria tidak dikaji secara menyeluruh. Menyedari pembangunan modal insan melalui pendidikan penting bagi menentukan tingkat pendapatan dan mampu mengurangkan jurang ekonomi antara wilayah, justeru kajian ini menggunakan kaedah ekonometrik spatial bagi mengenalpasti sama ada jurang perbezaan antara wilayah dalam agihan pendidikan merupakan antara faktor utama yang menyebabkan perbezaan tersebut. Data World Bank Living Standards Measurement Survey (LSMS, 2013) bagi Nigeria telah digunakan. Data ini merupakan hasil survei National Bureau Statistics (NBS) dengan kerjasama Bank Dunia. Survei ini melibatkan 5,000 isi rumah merangkumi 36 buah negeri dan ibu negara (Abuja). Kajian ini menyimpulkan bahawa faktor penentu tingkat pendapatan dan jurang di Nigeria bukan hanya disebabkan perbezaan pencapaian pendidikan tetapi juga tahap ketaksamaan agihan pendidikan. Seperti negara membangun yang lain, pasaran buruh di Nigeria menunjukkan pendidikan premium meningkat selaras dengan tahap pendidikan. Dapatan menunjukkan perbezaan signifikan antara wilayah mengenai pulangan pihak swasta kepada pendidikan di Nigeria, dan pulangan sosial kepada pendidikan tertinggi adalah melalui pendidikan menengah. Kajian ini juga mendapati usaha untuk membangunkan wilayah secara seimbang di negara heterogen seperti Nigeria tidak akan berkesan dan efisien dengan hanya menerapkan strategi '*one size fits all*' dalam semua aspek. Oleh itu, polisi yang dijalankan perlu mengambilkira ciri khusus atau keunikan sesebuah wilayah dan menekankan pengurangan jurang ketaksamaan dalam agihan pendidikan sama ada dalam atau antara wilayah.

Kata kunci: jurang antara wilayah, pencapaian pendidikan, pengagihan pendidikan, pendapatan wilayah, analisis spatial

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The critical role of education in income determination and national development cannot be underestimated. It is the leading components of human capital, and it plays a critical role, not only in the advancement of knowledge and incubation of new ideas and strategies, but also in creating conducive social and political landscape that is favourable for sustainable economic growth. Additionally, education takes a leading role, among other factors in elevating people from one socioeconomic class to another by increasing their chances of securing a superior employment and procuring a higher pay. Accordingly, Barr (2003) observed that higher educational attainment is not just an objective that governments should pursue, but a powerful tool for achieving other government's objectives such as income distribution and poverty reduction.

Education makes a significant contribution in a number of ways towards the economic growth and development of the country. It boosts individuals' productivity by providing them with knowledge and skills that are essential in the production process. This channel has been investigated and confirmed by researchers within the framework of human capital theory. In these respects, education is associated with high rates of return, both private and social. At the micro level, education attracts higher earnings of the individual; with more educated people earning more than the less educated ones (Boarini & Strauss, 2010; Ciccone, Cingano, & Cipollone, 2006). Education also enhances labour utilization; the more the education level, the higher the labour market participation rate. It implies that, the more educated people are, the

more the likely they are to be hired and retained in their workplace (Asafu-Adjaye, 2012).

At the macro level, theories of growth, both the extended neoclassical model and the new growth theories, have recognized the importance of education in the growth process of the economy. The economy's aggregate output was specified as a function of human capital, among other factors (Barro, Sala-i-Martin, Blanchard, & Hall, 1991; Lucas Jr, 1988; Romer, 1989). Thereon, several empirical studies have shown that more affluent countries and regions are those with higher educational attainment (Di Liberto, 2008; Gennaioli, La Porta, Lopez-de-Silanes, & Shleifer, 2013; Ping, 2005; Ramos, Surinach, & Artis, 2010).

In the economic literature, educational attainment has been given considerable attention as a determinant of income and differences in economic performance across regions and countries. The existing literature emphasized that the education is one of the leading factors in the determination of income distribution. Countries with higher average educational attainment are expected to have an equal income distribution. In such literatures, Gregorio & Lee (2003) present empirical support on how educational attainment affects the level of income inequality in a panel of countries. They conclude that higher educational attainment plays a critical role in making income distribution more equal across countries. Similarly, Chintrakarn (2011) presents empirical evidence on the importance of education in reducing income inequality based on a panel dataset of US states. His findings show that an increase in average educational attainment has an equalizing effect on income distribution. Furthermore, some researchers picked more interest from the

disillusionment of empirical studies to support the speculative repercussions of a robust causal association from educational attainment to economic growth. Thus, the incorporation of the measure of educational distribution in the analysis of economic performance should deliver more reliable and significant estimates of the impact of education (e.g. Lopez, Thomas & Wang, 1998; Thomas, Wang & Fan, 2002; Yang and Li, 2007; Thomas and Wang, 2009). On this background, some researchers have empirically analysed the relationship between human capital inequality and economic growth (e.g. Bowman, 2007; Changzheng and Jin, 2010; Rodríguez-Pose and Tselios 2010; Ilon, 2011)

Economic growth differs from development but the two are inextricably linked to each other. The former can take place without the later but not the other way round. Economic growth refers to the quantitative increase in the level of GDP of a country or region. Economic development, on the other hand, implies qualitative improvements in the peoples' living standard and economic cohesion in a country. Thus, economic growth is a necessary (not sufficient) condition for any meaningful development. Initially, economic growth has been the target of every government worldwide. Policy makers are more concerned about the level at which their economies progress. Energy and resources have channelled to see that economies grow quantitatively. However, the effort and concerns are now shifted towards inclusive growth- a concept that emphasizes even distribution of the growth benefits (World Bank Staff, 2008). A growing concern that the benefits of the increasing economic growth have not been dispersed or shared evenly across the various segments of the society prompted the need for the inclusive economic growth. Economists argued that, while it is possible for an economy to grow economically, it

is not all that is required to guarantee a national economic cohesion and reasonable improvement in the quality of life of the majority of people in that country. Thus, for an increased economic growth to beget development, it has to be inclusive so as to minimize the problem of poverty in the entire country and also reducing economic disparities among the member regions in the country. Inclusive growth, embedded in it, includes equity, equality of opportunities, and protection from the inefficiencies of the market and employment processes. It is crucial and integral part of any successful growth strategy (Kakwani & Pernia, 2000; Ali, 2007).

Economic growth, especially in developing countries, is necessary and desirable, but it is the distribution of that growth (inclusive) that matters most, instead of the pursuit of the growth for its sake. Non-inclusive growth leads to heterogeneous society in terms of economic outcomes (i.e. income). Thus, inclusive growth is fundamentally good for sustainable economic development and prosperity in the country. Achieving inclusive growth will help to reduce the level of economic disparities among regions within a country. The challenge facing the governments is to make sure that every segment of the society is benefitting accordingly from the growing economy. One of the effective ways of achieving inclusive growth as argued by Lin (2004) among others is through pragmatic approach towards education and skills development. Therefore, developing people's skills is essential to minimizing regional disparities in the country.

Governments everywhere in the world are becoming more and more concern about regional economic disparities. Recently, regional income disparities become the dominant issues of regional development policies, as researchers and policy makers

noticed the relative poverty from the drastic national economic growth with an enormous income gap between social classes, regions and sectors in the economy (Lloyd & Hewett, 2009). Poverty in Nigeria, as highlighted by the United Nations Development Program (UNDP) in its report of 2009 on Nigeria, is an indication of persistent economic inequality which shows itself in a high level of income inequality, limited access to basic infrastructure such as education and health, and job opportunities. The reports concluded by reiterating that, high inequality if not checked, could negate the country's prospects of meeting the targeted millennium development goals (MDGs). Similarly, Wilkinson and Pickett (2011) emphasized on the very positive relationship between income differences and social issues in 29 OECD nations and clarified the extended income disparity could result in social conflicts.

Equitable distribution of opportunities such as education is a sign, not only of a well-functioning economy, but also a prerequisite for sustainable economic development. Moreover, inequality in educational opportunities can lead to other forms of inequality, especially that of income among individuals in society (see, for example, Crespo-Cuaresma, Samir & Sauer, 2012; Lorel, 2008). Rising inequality has been a central concern for policy makers all over the world. Persistence of inequality among individuals, groups or regions within a country has a far-reaching implication not only on the development agenda of the country, but on its entire future survival as a nation. The development and stability of the nation's economy depend partly on its socio-political stability, which in turn depends on the level of equity attained by that society. Policymakers have recognized the importance of equity in income for achieving social and political stability in the country. Nilsson (2004) views lower

income inequality as intrinsically desirable because the existing socio-political unrest in most parts of the world is perceived to be the result of unequal access to opportunities and resources which are detrimental to the peaceful coexistence of a country. Galor and Moav, (2004) demonstrate that higher levels of distribution stimulate regional economic performance as well as offer a number of economic opportunities especially for the disadvantaged groups and later minimize the regional gap within the country. This phenomenon is of particular importance in Nigeria due to its pluralistic nature of its regional divisions along tribal and religious lines. These concerns have recently been heightened by various complaints from different quotas of the economy on marginalisation and the subsequent call for a new look at the way resources should be shared in the country.

Inequality within a country has been found to create social and political instability most especially in less developed countries. In an unequal society, the gap between the average pay earned by low-skilled labourers and their potential income is tremendous. Thus, this is a likely push factor for the destitute to partake in disruptive activities and other forms of violence that may halt the progress of the nation (Nilsson 2004, in RodrÃ-guez-Pose & Tselios, 2010). The current scenarios of income inequality across regions in Nigeria support the above proposition. The region with the highest level of inequality and poverty incidence in the country (i.e. North-eastern region) is the most unsecured place to live in the country today due mainly to the insurgency operations by some aggrieved groups and the high-crime rate in the area. The Northern region also happens to be the most backward in terms of educational attainment and other human development indices (UNDP, 2010).

There are several factors that can improve income distribution and reduce the poverty level in the society. These include, among others, a well-structured occupational and wage policy that accommodates and induces rising average incomes in the economy; efficient capital market; a progressive tax system with well-targeted subsidies; and more importantly accessible opportunities to education of all eligible and willing people (Gregorio & Lee, 2003). The importance of education in addressing the problem of inequality has been reported in both theoretical and empirical literature. For example, Dhamani, (2008) illustrates that increase in educational attainment (stock) in the economy would have a negative effect on income inequality. Moreover, high level of inequality in educational attainment would lead to a higher level of income inequality.

Education is an important determinant of economic development of the country or region, and found to be effective towards equalizing opportunities among individuals and regions (Lucas, 1998). In this vein, Chintrakarn, (2011) found that increased educational attainment is critical in redistributing income to regions in the United States. Education influences economic growth both directly and indirectly; directly by rising productivity as it is the major component of human capital and essential process towards the accumulation of human capital thereby making the labour force more productive, thus leading to higher income growth (Galor and Moav, 2004). Indirectly, some variables channel their impact on the development through human capital. The effectiveness of factors such as foreign direct investment (FDI) and economic infrastructures is reinforced partly by the level of educational attainment in the economy (Shatz, 2003). However, education is also known to be crucial in the determination of an individual's earning in the modern economic environment. The

higher the level of educational attainment for an individual, the higher will be his or her income and the faster will be an increase in his earning capacity over time (Gregorio & Lee, 2003).

Since the return of Nigeria to civil rule in 1999, the Nigerian government has been implementing economic reforms that shifted the economy towards market-based. A number of liberal economic policies have been introduced; which includes the privatization of public owned enterprises; deregulation and public-private partnership scheme (PPP). With this new development, extensive dimensions of economic activities were liberalized, leading to a significant higher economic growth. Over this period, the growth rate of the economy averaged about seven percent (7%) annually placing the economy among the tops growing economies on the African continent. However, despite such outstanding macroeconomic performance, the level of poverty has been increasing in the country, and wealth has been distributed unequally both among individuals and regions in the country. Thus, the country remains a heterogeneous economy with outstanding economic and social differences between its regions and unbalanced territorial allocation of economic activities.

There is a disparity in economic performance among regions in Nigeria, especially in respect of GDP per capita, the employment rate; income inequality, to mention a few (see, for example, UNDP report of 2009 on Nigeria). Despite the enormous resources in the country, Nigeria is one of the countries ranked with a wide gap between the poorest and richest of its citizens. As of 2009, only 20% of the population owned 65% of the total assets of the country. However, about 70% of the

population in the country are rural dwellers, working as peasant farmers and artisans. Inequality (measured by Gini coefficient) worsened from 0.43 to 0.49 in the last decade, reaching the highest level ever in history. Despite the economy has been growing at the rate of 7% on average, the number of Nigerians living in poverty has increased over years. In any case, the proportion of Nigerians living in wretched neediness (poverty) has expanded from 54 % in 2004 to 61 % in 2010 (NBS, 2010).

Poverty and inequality in Nigeria have a high regional concentration, leading to significant levels of regional disparity. It may not be unconnected with the differing historical experiences from the two regions in the country (i.e. Northern region and Southern region) especially on education. Mustapha, (2005) opined that the Northern region's negative receptivity to western education coupled with the fallacious education policy in Northern Nigeria produced an enormous regional development gap between the South and Northern regions of Nigeria. Notwithstanding, the interplay of environmental factors peculiar to the regions and other historical factors, the persistence and widening regional development gap in Nigeria also raises grave concern about the effectiveness of post-independence national policies in producing an inclusive society.

The recent Nigeria survey on households' standards of living by the country's Bureau of Statistics (NBS, 2013), shows a variation in average income levels of the households as well as GDP per capita level across regions in the country as shown in Figure 1.1 and Figure 1.2 respectively. The northern region is having the lowest average household income and the per capita GDP level. It also shows that relative poverty is most apparent in the Northern region of the country. The North-west and

North-eastern regions of the country are having poverty rates as high as 77.7% and 76.3% respectively. The South-west has only 59.1% poverty rate and the trend continuous with almost all socio-economic indicators. This scenario, if not checked can cause distrust between the regions and plant a state of hopelessness in the minds of people in the lagging regions of the country which could be counterproductive to the nation's economy.

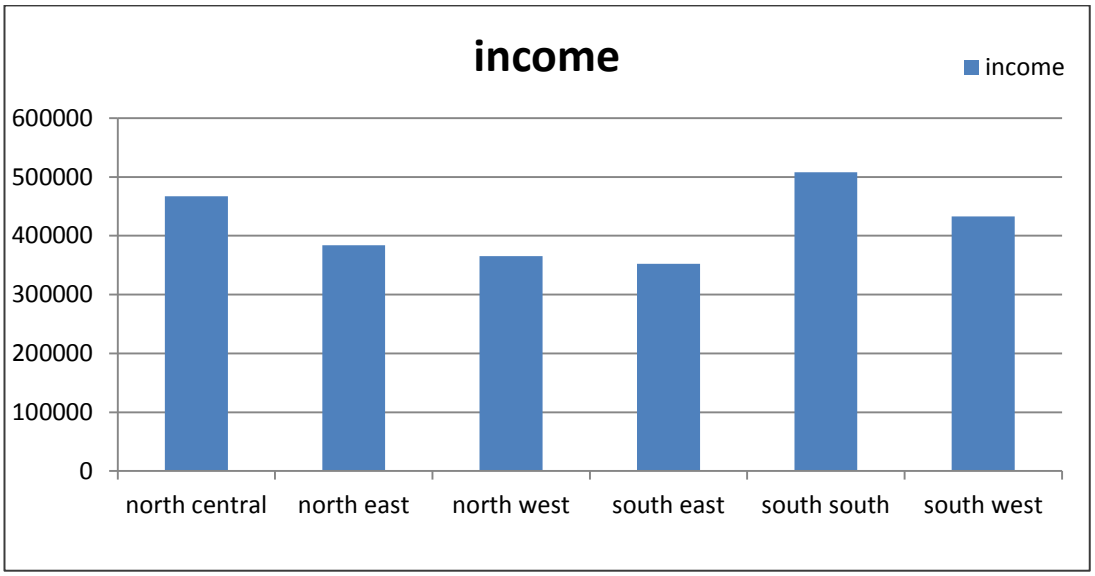

Figure 1.1
Average Household Income across Regions in Nigeria (2013)
Note: Income is per annum and measured in thousands of local currency (Naira).
Source: Author's calculations from the living standards measurement survey of Nigeria (2013)

However rating the regions by the level of their Gross Domestic Products (GDP), the disparity appears glaringly apparent. It can be seen that some regions are lagging far behind others despite the fact that all are under one central government. For instance, while the south-western region contributes about 27.56% to the national GDP, North-eastern region contributes only 7.83% as shown in Figure 1.2.

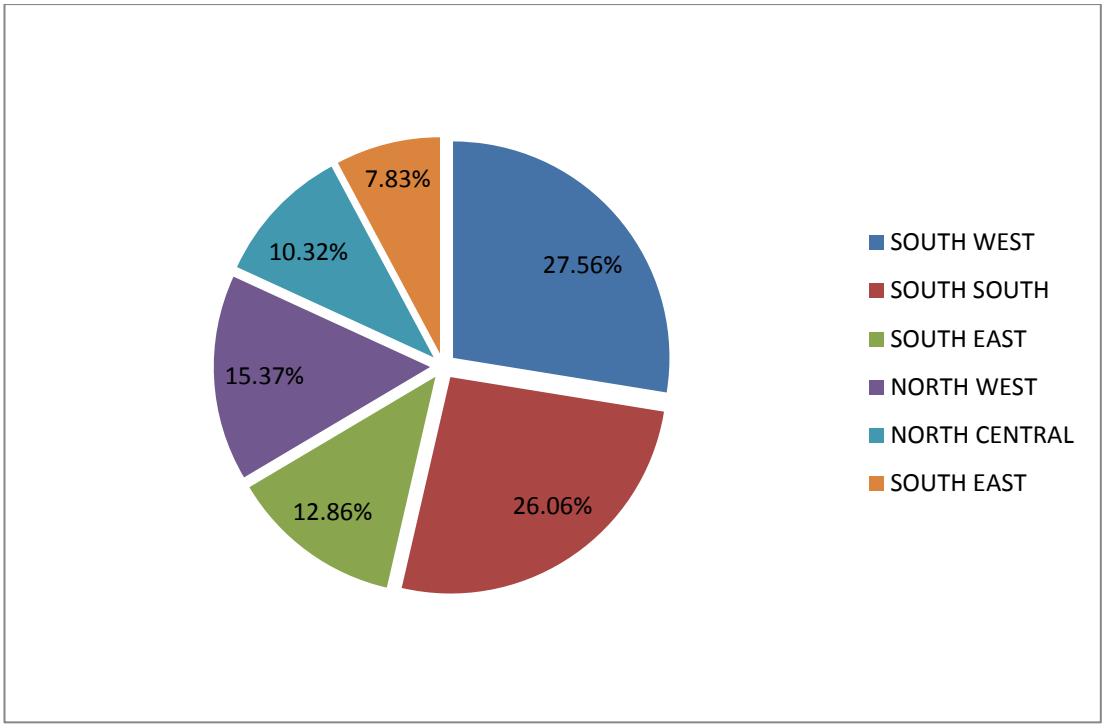

Figure 1.2
GDP Contribution by Regions in Nigeria (2012)
Source: Author's calculations using data from www.ZAWYA.com

The disparity in the regional contribution to the country's GDP between the Northern and Southern regions is further illustrated in Figure 1.3. The Southern region's contribution to GDP is as twice as that of the Northern region. While the North contributes only 34% to the total GDP of the country, the South contributes as large as 66%.

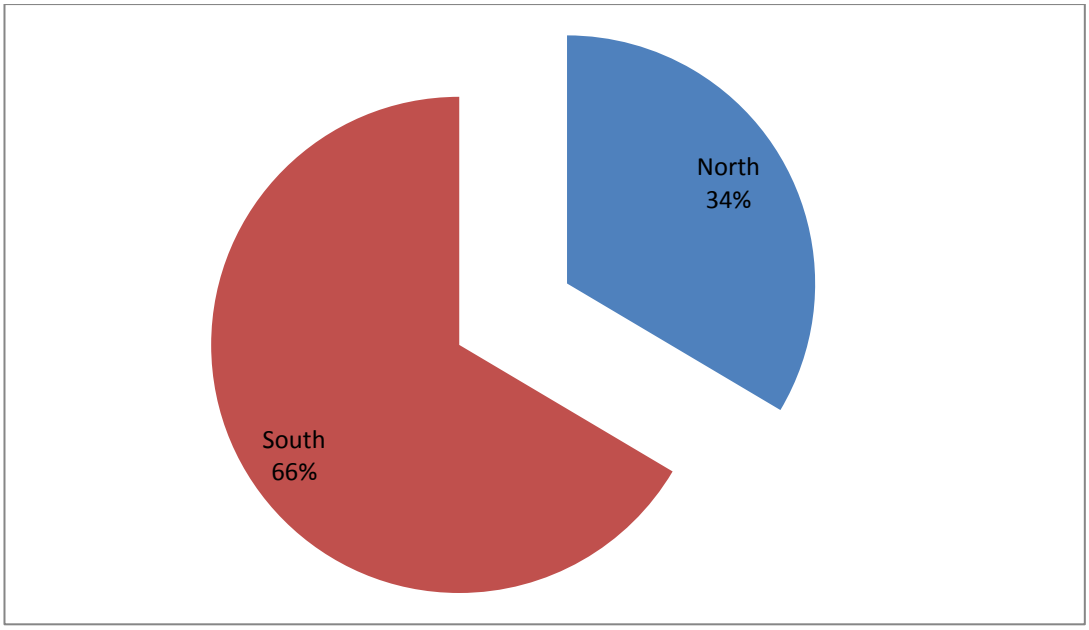

Figure 1.3
GDP Contribution by Regions in Nigeria (2012)
Source: Author's calculations using data from ZAWYA.com

The rising regional economic disparities could cause political upheaval, leading to a circumstance in which the backward regions could obstruct the country's general economic activities. In the quest for practical solution, empirical analysis is required to highlight the magnitude and mechanisms through which economic and policy variables affect regional economic performance and inequality so as to guide policy plans and actions. However, it is also evident that high-income disparities between regions in the country can increase the fiscal burden on government's revenue and subsequently negate the overall economic performance of the country (Bastagli, Coady & Gupta, 2012).

1.2 Administrative Structure and Regional Division in Nigeria

Like many other African states, Nigeria is the creation of European imperialism. Historically, the territorial boundary called Nigeria today came into being when the colonial master (Britain) amalgamated the Northern and Southern territories into a Colony and Protectorate of Nigeria in 1914. The country got its very name after its

great river known as ‘River Niger.' The vegetation in the South is predominantly rainforest, and moving northwards one discovers a stash of savannah and scrubland which offers a route to the Sahara Desert.

Constitutionally, the country operates a federal system that consists of states and local governments as federating units. At the state level, the administrative map of Nigeria consists of 36 states and the federal capital territory. There are also 774 local government councils across the country. The states and local governments are each under the administrative control of the governor and local government chairman respectively. Politically, the 36 states are classified into six (6) geopolitical zones: namely North Central, North East, North West, South East, South-South and South West. Although the six (6) geopolitical zones are not recognized as federating units in the constitution, but still form part of the administrative structure of the country on which political appointments, the federal government projects and public offices are shared.

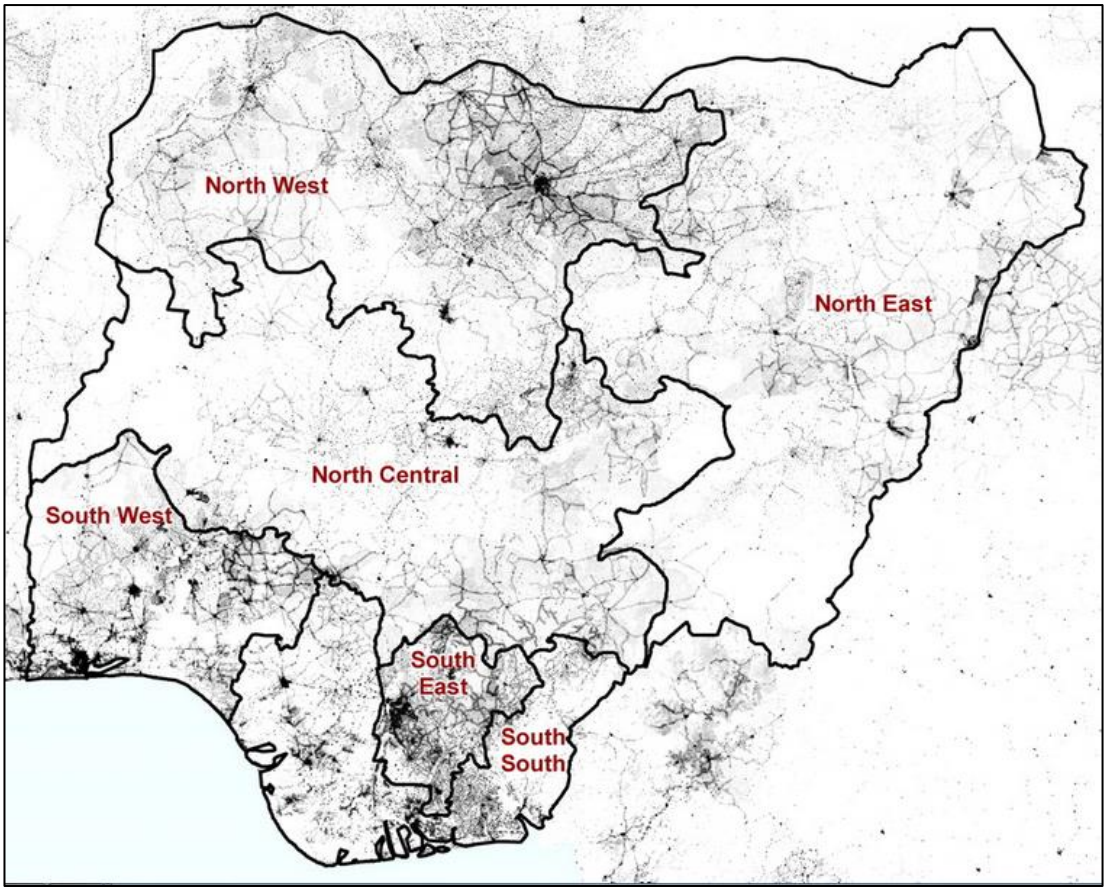

Figure 1.4
Map of Nigeria Showing the Six Geopolitical Zones
Source: Nigeria Education Fact Sheet (2012)

Each geopolitical region is identified with one dominant ethnic group that constituted the majority of the population residing in that geopolitical zone. In this regard, the Hausa-Fulani is the majority in the Northwest geopolitical region. The Fulani tribe is the majority in the North-eastern geopolitical zone, and there is a substantial number of Hausa, Kanuri and some Northern minority ethnic group. Both zones are regarded as the 'core north,' with varying cultures and Islamic attributes. The North-central geopolitical zone is also a place that house many ethnic groups. Most notable among them are the Nupe, Tiv, Jukun, Igala and Ibra, with substantial populations of both Muslims and Christians. The South-west zone is made up of the old Western Region, the heartland of the Yoruba while the Southeast is made up of the Igbo heartlands of the old Eastern Region. The South-South is the zone of

southern ethnic minorities, from the peripheries of the Igbo centre of the previous Eastern Region and the entire of the old Mid-West Region. Among the country's two regions (i.e. North and South), there are significant differences in the terrain and vegetation of the environment, population, social structure, education, and economic development as documented by the African Development Bank Group report on Nigeria in January 2013. After a century of the amalgamation of the two regions in to a country, Nigeria remains essentially two separate societies economically (i.e. The North and the South). The disparity between the Northern region and Southern region is apparent in terms of socioeconomic conditions. Moreover, the Northern region remains a vulnerable ground to socio-political upheavals in the country.

1.3 Nigerian System of Education: An Overview

The Federal Republic of Nigeria is on the West Coast of Africa. It is a federation of thirty-six states with the Federal Capital Territory in Abuja. There are 774 local governments that serve as federating units of the federation. The largest proportion of the government revenue comes from the oil sector. It accounts for about 72% of the government revenues. Despite oil's dominance, agriculture plays a significant role in the country's economic life, accounting for 35.2% of GDP (African Economic Outlook, 2012). The Nigerian government considers education as a vehicle towards prosperity. The country's philosophy of education is based on the development of the citizens of sound and productive minds and the provision of equal educational opportunities for all and at all levels of schooling both within and without a formal education system.

Primary education begins at the age of six to seven years after the two years pre-primary education. The pupils would be issued a 'leaving-school' primary certificate after spending six years in primary school,. Completing the primary school paves the way for the entrance into the upper basic education (junior secondary school). Subjects taught at the primary level include mathematics, English language, Religion, science and language from any of the three major languages in the country (i.e. Hausa, Yoruba and Ibo). Primary school pupils are required to sit and pass a Common Entrance Examination to qualify them for admission into the upper basic and secondary schools. Secondary School education usually last for six years; first three years for junior level and the subsequent three years for senior level. At the end of the first three years, they take the Junior Secondary School Exam (JSCE Exam). This is a qualifying exam for joining the Senior Secondary School level. By the end of Senior Secondary School (SS3), students are to take the senior secondary school certificate exam (SSCE), and most pass with at least five credits including English and Mathematics papers before obtaining a place in the university.

In Nigeria, the financial burden of primary education is a shared between the government at the Centre (federal) and the state governments. However, the management rests mainly with the state governments. The federal government owned and controlled Federal government colleges which are distributed across the states in the country- with at least two federal colleges in every state. Although, secondary education is mainly the responsibility of the state governments, the federal government colleges are meant to complement the efforts of the state governments in the provision of secondary education in the country. Similarly, private schools and

community schools also operate side by side with the public schools to ensure wider access to education in the country.

After secondary education, then comes tertiary education which of varying forms and specialization. There are conventional and specialized universities that offer a bachelor degree and other higher degrees. The polytechnics and Monotechnics that provide advanced vocational and professional training. There are also colleges of education for the training of professional teachers. The maximum period of tertiary education is six years, and the minimum is two years, depending on the type of certificate one is pursuing. Degree (bachelor) takes longer time while diploma has the shortest period of study. Figure 1.5 illustrates the structure of the education system in Nigeria.

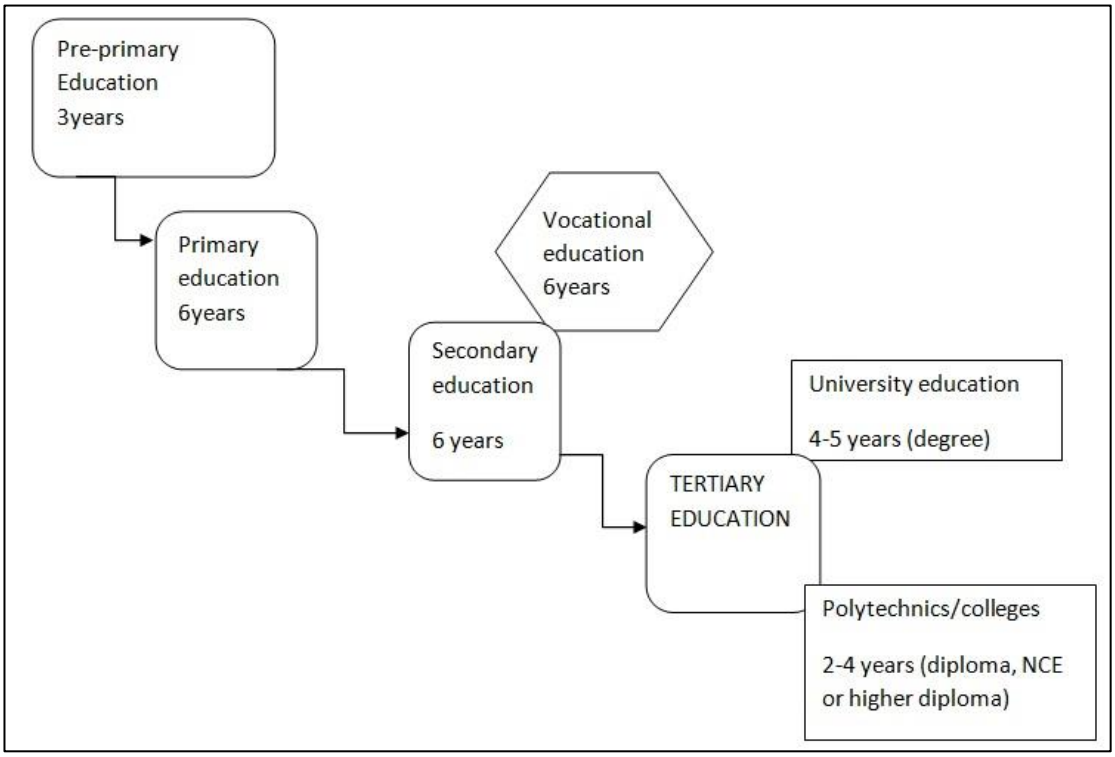

Figure 1.5
Years of Schooling by Level of Education in Nigeria
Source: Drawn by Author

In Nigeria, financing primary education is a shared responsibility of the three levels of governments: namely; Federal, State and Local Governments. The responsibility is more to the local authorities (local governments), but, in order to ensure the attainment of Universal Basic Education (UBE) objectives, both federal and state governments play a significant role in terms of funding. Under the provisions of UBE Act of 2004, the State Universal Basic Education Boards (SUBEB) in each state has been given the responsibility of manning all the aspects of basic education. However, the bulk of the responsibility for secondary education remains mainly with the state ministry of education (SMOEs) through the Teaching Service Boards or teachers service commission as are called in some states, have been given the overall control of essential human management functions which predominantly include the selection, recruitment, promotion, and discipline of staff. There is a statutory transfer from the federation account to the universal basic education commission (UBEC) that serves as intervention Fund for the primary education. This is another avenue for the state governments to access additional resources from the Centre for more investment in the primary education sector. However, with this new mechanism, the federal government retains a greater influence and control over the resources for the development of education in the country. There are some community efforts as well as non-governmental organizations (NGOs) especially on primary education through the establishment of community schools and orphanage centres.

There are 128 accredited universities in Nigeria: these include 40 federal universities, 38-state universities, and 51 private universities. There are also Polytechnics; Monotechnics and Colleges of Education, which were established to train technical and mid-level manpower, and award sub-degree qualifications, such

as certificates, diploma and higher national diploma (HND). There are currently 78 polytechnics, 27 Monotechnics, and 281 colleges in various specific disciplines. The tertiary sector of education in Nigeria comprises of both federal and state universities, polytechnics and colleges of education. The Federal Ministry of Education plays a leading role in the regulation and supervision of the higher education sector, formulating policies and ensuring quality control through its education regulatory agencies. Regardless of ownership and control, the regulatory bodies are the same. Universities are regulated and supervised by the University Service Commission (NUC); the polytechnics are under the supervision of the Nigeria Vocational and Technical Education Board (NAVTEB), and the National Commission for Colleges of Education (NCCE) oversees the activities of the colleges of education. Every state in Nigeria has its university, polytechnic and college of education. Therefore, Funding higher education in Nigeria is an obligation shared by both the federal and state governments. In any case, the central government is more directly involved with finances and policies of tertiary education than it is for primary and secondary education, which is generally the obligation of the states and local governments. However, private institutions owned by businesses or individuals also complement the process of providing higher education in Nigeria.

In the last five years, the budget share of education from the federal budget averaged about 10%. In 2012, about 10.5% of the national budget was allocated to the education sector; placing the sector as the second most-prioritized sector of the budget list of that year. For education, Nigeria has been spending below the average obtainable in the sub-Saharan region. On average, Nigeria spends only 2.4% of its Gross National Income (GNP) in comparison to the 5.1% of the Sub-Saharan

African countries (Central Bank of Nigeria, 2012). Figure 1.6 shows the trend of education expenditure from 2006 down to 2010 in Nigeria.

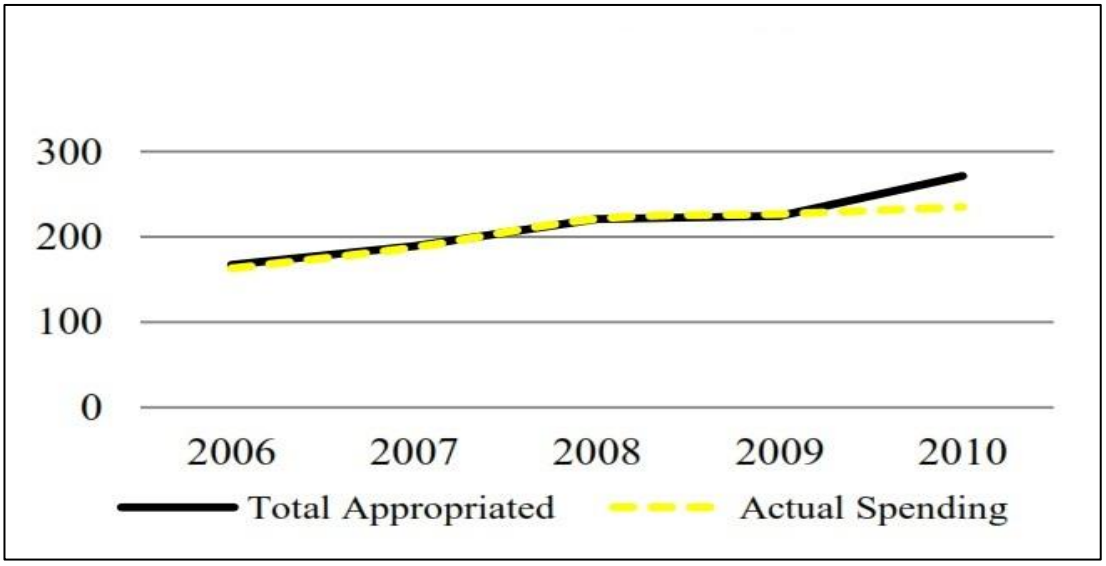

Figure 1.6
Federal Government Expenditure on Education (in billions of Naira)
Source: Nigeria Education Fact Sheet (2012)

In Nigeria, primary education gross enrolment rate of the relevant age group averaged 85%, and almost one-third of them drop along the way (World Development Indicators, 2012). Some reports by the International organizations are not showing significant progress. Near a half portion of the offspring of school going age is not enlisted in the school. Secondary school drop-out rates have been climbing, and educational quality measures have apparently declined. Gross Secondary education enrolment rate arrived at the midpoint of around 35% every year, and access to education stays compelled; less than 50% of secondary school age group goes to the classrooms (UNESCO, 2012). In Nigeria, there are significant regional disparities in school enrolment rates. The three Northern states of Borno, Jigawa, and Kano have very small primary and secondary school enrolment rates. Borno and Jigawa states have less than 50 percent primary enrolment rates, and

enrolment rates for secondary school are less than 30 percent. Figure 1.7 shows the gross enrolment rate for primary and secondary schools from 2004 and 2010 in Nigeria.

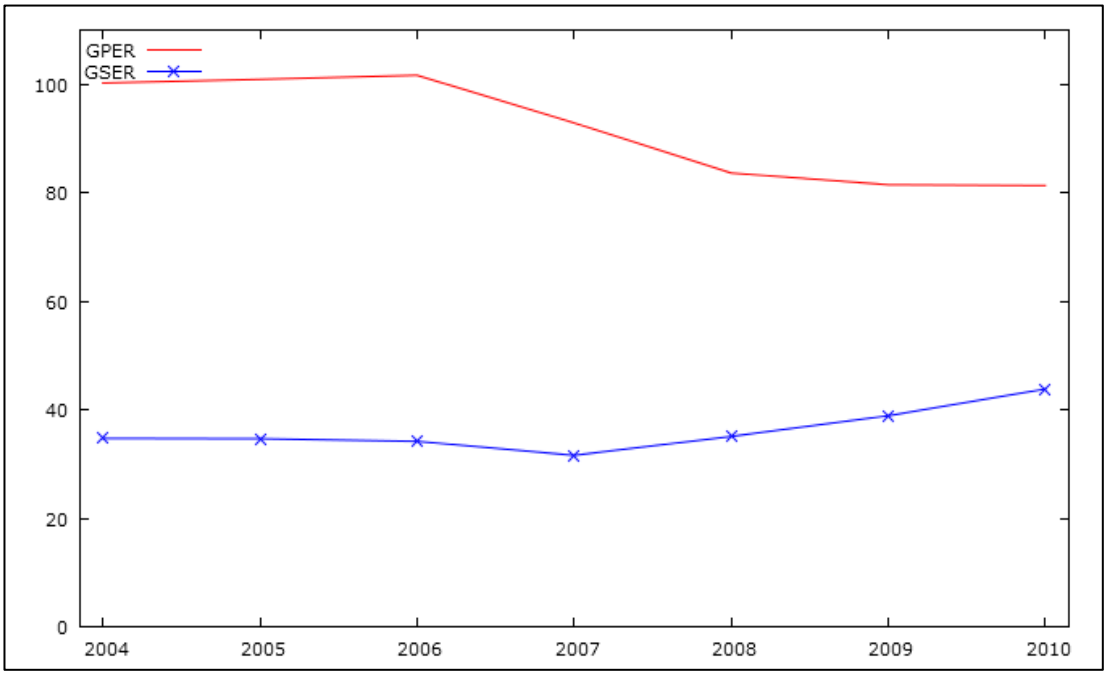

Figure 1.7
Primary (GPER) and Secondary (GSER) Gross Enrolment Rates in Nigeria
Data Source: (World Bank, 2013)

A higher education enrolment of the relevant age cohort is low compared to primary and secondary enrolments in Nigeria. Universities in Nigeria admit less than 20% of their applicants on average as illustrated in Figure 1.8. The gross enrolment rates for higher education in Nigeria (based on the household survey data) vary enormously across the regions. The participation rates for Southern states on average shows that more than one-fourth (1/4) of the young adults who are in the school going age are enrolled in education and training courses, either on a full-time or part-time basis. It is entirely a different story in the northern states, the percentage of the corresponding age cohorts that are enrolled is less than five percent.

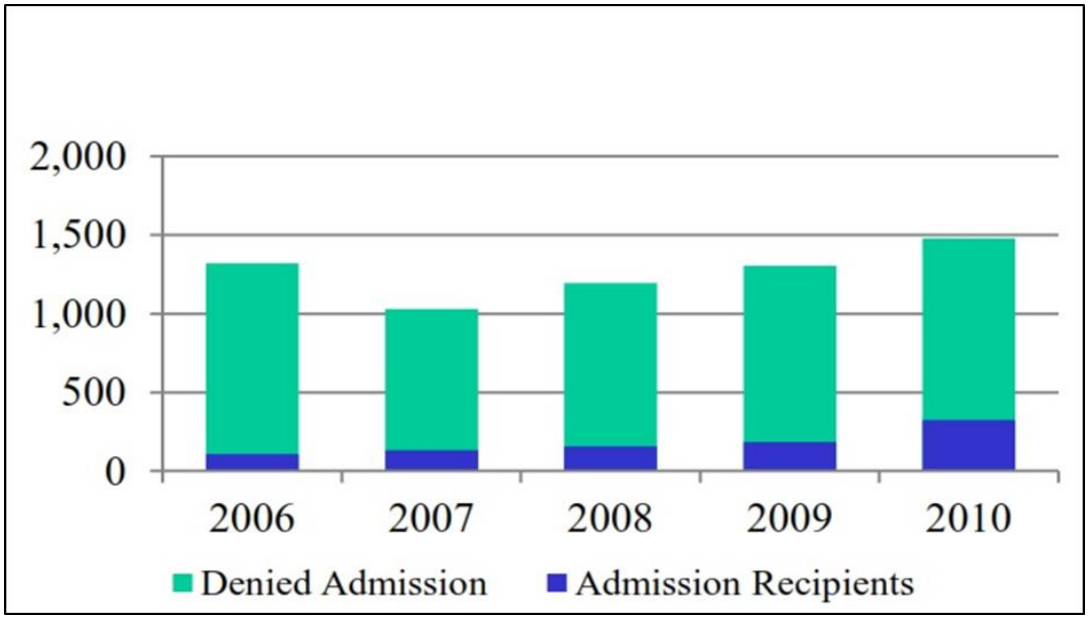

Figure 1.8
Application and Admission into Nigerian Universities (in Thousands)
Source: Nigeria Education Fact Sheet (2012)

1.4 Problem Statement

Nigeria's long haul objective is to wind up among the leading 20 economies on the planet by the year 2020 (Vision 20:2020). In line of this objective, the accompanying specific objectives are recognized: initially, to make an enabling environment for green and inclusive economic development; second, to diversify the Nigerian economy beyond reliance on oil sector alone; third, and to make job opportunities available to all citizens that are ready to work, and fourth, to lessen the level of poverty and destitution. While Nigeria has both qualities and chances to achieve its desires, including bounteous resource gifts, it is likewise confronted with numerous shortcomings and difficulties that are obstructing its development. One of these challenges is ‘non-inclusive growth: growth that does not lead to a reduction in inequality and poverty in the growing economy. Despite the growing oil revenues accrued to the government and increase in the performance of the national economy in terms of GDP growth, the level of poverty and inequality are on the increase so

also regional income disparities. The disparity between states in terms of wellbeing indicators (economic performance) increases despite the fact that all the states in the country constituted one political entity -the Federal Republic of Nigeria. The gap in GDP per capita between the northern and southern parts of the country has widened, with a recent report showing that the GDP per capita in the southern states is twice that of the northern states (Akanbi, 2011). So also rising poverty and unemployment rates have taken a regional dimension with Northern states lagging behind the Southern states.

The recent poverty statistics by the National Bureau of Statistic (2013) indicate that the poverty level of states in the North has worsened, reaching over 80 percent in some areas. Evidence from economic research indicates that the regional inequality can have profound adverse effects, especially in a multi ethnic and multi religious country like Nigeria. A study by Ortiz & Cummins (2011) affirms that unequal societies, in general, are much more prone to political instability and more vulnerable to social chaos and anarchy that may take the form of politically-motivated violence or terrorism.

However, the problem of regional imbalances in a country that is so regionally divided along ethnicity lines such as Nigeria, if not addressed, could increase distrust among the people and trigger social unrest, increased sense of vulnerability and can also drive up mortality rates and crime in the lagging regions. Mustapha, (2006) emphasized that the enduring pattern of inequalities among the regions in Nigeria is the most dangerous fault line in the country's national life. Thus, regional inequality if not addressed, can rob Nigeria, the very factors — law and order- that are

necessary for the attainment of national economic objectives. Hence, the existence of Nigeria as one nation cannot be guaranteed. This underscores the need for empirical investigation into the nature and causes of regional economic disparity in Nigeria so as to provide a well-informed guideline for policy action. However, the above-mentioned problems must not be unconnected with the low-education level as education has, for instance, been found to be associated with better public health, better parenting, lower crime rate, higher economic well-being, political stability and social order (Sianesi, 2003). Therefore, education has a role to play in addressing such problems, both through its direct effect on individuals and indirect effects via externalities. One of the ways through which education stimulates productivity is through education externality- skills transfer from highly educated workers to the co-workers who are less educated. An economic environment with highly educated workers may entail a higher incidence of education externalities.

It has been a global slogan and also prescriptive to the less developed countries that cost of education funding should be shared between the government and the beneficiaries. The Nigerian government corroborated this view by introducing Public Private Partnership (PPP) in the country's education reform policies; a policy that advocates sharing of the education funding between the government and the people. Since then, the government schools, especially the tertiary institutions have increased fees charges. However, this may become a disincentive to a decision to enrol in school, especially at higher levels of education, therefore, worsening the existing inequality in the country. This may be highly consequential in a country like Nigeria where the majority are poor and are deprived of good living conditions. This is because schooling creates an opportunity cost of foregone income that poorer

households might need. Thus, higher school fees will make the poor children, unlike the rich, to allocate less time to schooling therefore they become less able to increase their human capital.

The idea of recovering some costs of tertiary education from the students emanates from the belief that the benefits of receiving an education (return) are more to the individual than to the larger public and the returns increase with the level of educational attainment (Boarini & Strauss, 2010). This idea is supported by micro studies that measure individual private returns to education using the wage regression specification as in (Aromolaran, 2004; Asafu-Adjaye, 2012; Boarini & Strauss, 2010). However, these individual-level analyses could at most capture only the private return of the education, which may not capture the full returns of education to the society. The benefit of schooling may not be limited to the individual alone, however may 'spill- over' to other members of the society in the form of externalities (social profits). Supposedly, it is the social returns to education at the macro level that should provide the relevant economic justification for the government spending in education. To have a sound policy guide to government support for education, a simultaneous analysis of private and the social returns becomes crucial. The empirical literature that modelled both private and social returns to schooling at once is limited and none from Nigeria. This study helps to fill this vacuum.

Though, the literature on growth theories (both the neoclassical and endogenous growth model) that incorporated human capital (education) in their model specifications is more than limited, but the empirical evidences presented have not

been unanimous and conclusive. Some studies found education as a significant accounting factor for the differences in economic performance across countries and regions, as well as for the growth performance of different sectors of the economy. For example, (MartÃ-n & Herranz, 2004) using the econometric technique of panel data and using data from private and public investments, they concluded that human capital is an important factor that improves the economic growth in Spanish regions. Similarly, Fleisher et al., (2010) found that human capital positively affects output per worker and productivity growth across regions in China. Their findings further suggest that differences in educational levels among the regions contribute significantly to the regional income variation in the respective countries. LA Pez-Bazo & Motell An, (2011) found that increasing the educational attainment in Spain would have the effect of increasing the average income per capita of the less favoured regions and a reduction in regional disparities.

Contrastively, some empirical investigations found a weak correlation between education variables and economic growth at regional levels. Badinger and Tondl (2005) have investigated the influence of education on the value added growth in a Lucas-type specification, and they found low elasticity for education on output. Similarly, Diliberto (2007) analysed the impacts of human capital on Italian regions and reported a weak effect of human capital on regional output growth. He only found primary education- among the three levels of education- to be associated with output growth. Other influential contributions such as Fischer et al. (2009) and Bronzini & piselli (2009) have also raised concern about the weak performance of the education variables in their regional output equations. There may be an omission in the specifications that results of conflicting findings. The use of appropriate

functional form specifications that include more variables may lead to more significant results on the role of education in the regional growth models.

However, few studies had explored the cross-regional variation in income in Nigeria. For example, Oyekale, Adeoti, & Ogunnupe, (2005) explore the sources of income inequality and poverty in rural and urban Nigeria. Another attempt was by Oyelere, (2007), who investigated disparities in labour market outcomes among some regions in Nigeria. While income inequality has received considerable attention in the literature, similar attention has not been given to educational inequality and its role on cross-regional disparity in economic performance, especially in developing countries, and none from Nigeria, so far. However, the effects of the distribution of educational attainment on regional economic performance did not receive enough consideration in the regional economic literature. Nevertheless, the way human capital is distributed across the population may also have significant economic consequences, affecting, for example, income distribution (see Checchi, 2004; Duman, 2008; De Gregorio and Lee, 2002), and economic growth (see Lopez, Thomas, & Wang, 1998; RodrÃ-guez-Pose & Tselios, 2010). However, research on this topic is still very scanty. The main problem is that most of the researches done in the area rely on input measures of human capital, usually proxied by the average years of schooling or government education expenditures which do not represent actual stock of education in the country. Some studies used output measures proxied by the proportion of the labour force who has received a certain level of education but the sample size cuts across national boundaries. This aggregation also does not help much because it ignores the distribution aspect of human capital on economic performance. This thesis attempts to improve on the aforementioned drawbacks by

taking advantage of the new available database from the World Bank on household surveys that provide abundant information on household consumption and demographic information.

1.5 Research Questions

The study raises and addresses five fundamental questions:

i) What is the extent of educational inequality between and within regions in Nigeria?

ii) Does educational attainment matter for the determination of income at regional level?

iii) Does the distribution of educational attainment matter for regional economic performance across regions in Nigeria?

iv) What are the rates of return to the different levels of education, i.e. primary, secondary and tertiary, across regions in Nigeria?

v) What are the best educational policies to reduce the disparity in economic performance between regions in Nigeria?

1.6 Research Objectives

The aim of this study is to explore the role of education and its distribution on regional economic performance in Nigeria. Moreover, the study will also determine the extent to which these factors explain the regional economic disparities in the country. In line with the research objectives, the study will focus mainly on education inequality as a source of regional economic disparities in Nigeria. Both the level of educational attainment and its distribution are paramount to the national economic life of every nation both because of its position as a leading component of

human capital and also because of both private and social returns associated with it (education). In line of this, the study has the following specific objectives to achieve:

i) To measure the extent of educational inequality within and across regions in Nigeria.
ii) To measure the impact of educational attainment on regional income level across the regions in Nigeria.
iii) To measure the impact of the educational distribution on regional income level in Nigeria?
iv) To estimate the interactive effect of educational attainment and its distribution on the regional income level in Nigeria.
v) To test whether differences in regional educational attainment level and its distribution explain the regional income disparities in Nigeria.
vi) To estimate the private and social returns to different levels of education (i.e. primary, secondary and tertiary) in Nigeria.

1.7 Scope of the Research

The study will cover all the six geopolitical zones that constituted the two major regions (i.e. North & South) of Nigeria. The focal point of the research is to examine how education stock, its distribution and some demographic variables in a sample of 23,323 individuals from regions in the country shape the regional economic performance and well-being (i.e. Income) of the populace. The most recent 'micro data' on living standard household survey obtained from World Bank database will be used for the analysis.

1.8 Significance and Justification of the Research

This study investigates the role of education in regional income determination and inequality in Nigeria. It is believed that rising regional disparity may cause social and economic discontent that can lead to instability in the country. Moreover, this could obstruct the nation's overall economic progress. In the search for redress, reliable empirical analysis is needed so as to guide policies and actions appropriately. The research is important because any policy action that is not well grounded on empirical findings may not necessarily yield the desired results. Accordingly, the study will also help in designing appropriate regional economic and educational policies measures that will make economic growth more inclusive in the country. Along this line, the study bridges the research gaps identified and make some significant contributions both theoretically and practically as highlighted below:

Over the past few decades, the problem of regional economic disparity has attracted greater attention worldwide especially in the developing countries, and this has generated a number of empirical studies on the issue. Consequently, theories and econometric analysis of regional inequality and convergence also have been developed such as Quah (1992), Martin and Sunley (1998), and Barro and Sala-I-Martin (2004). Most of the early research studies on the phenomenon viewed the problem from the perspective of regional economic growth models. Within the regional economic literature, education has received considerable attention as a determinant of cross-regional variation in income. However, some researchers such as Fischer et al. (2009) and Bronzini & Piselli (2009) have also raised concern about the weak performance of the education variables in their regional output equations.

The findings have provided evidence to prove that educational attainment may not entirely be depended upon to understand the phenomenon of regional disparity. Consideration the foregoing weaknesses noted in the previous studies and the new development in the regional economic literature (Anselin, 2003, Anselin, Syabri & Kho, 2006). This study contributes to the field of regional economics literature by incorporating the role of the educational distribution in explaining regional income level and inequality. The educational distribution variable is incorporated into the model based on the suggestions from the literature (Lopez, Thomas & Wang, 1998; Rodriguez-Pose & Tselios, 2010). Furthermore, unlike previous studies, the use of spatial econometrics to take care of spatial dependence is another novel feature of this study.

Inter-regional income inequality and its related regional policy are particularly crucial in Nigeria because they also bear directly on the sustainability of economic reform and openness policy. The widening income inequality across regions tends to bring suspicion of economic reform and open-up policy and hence hamper further implementation of reform measures. In this context, an analysis of the regional variation in economic development is of high practical importance for the country. The study may make a significant contribution to governments in developing countries such as Nigeria, by shedding more light on the regional economic disparity within the country. The study provides policy guide on how to address the regional imbalances in the country. The study provides information that may enhance the understanding of the challenges posed by educational inequality and help in awakening the authorities to embark on programmes and projects that will improve wider distribution of education among the populace.

1.9 Organisation of the Thesis

This thesis entails five chapters. The first chapter is the introductory chapter which provides the background of the research. The remaining part of the thesis is organized as follows: Chapter 2 provides the review of the existing theoretical and empirical literature on income determination, regional income disparity and role of education. Chapter 3 provides a detailed methodology employed in this study. The findings of the study are presented and discussed in chapter 4. Chapter 5 is the concluding chapter of the thesis. It provides the summary of the thesis, the main conclusion of the study and some policy implications and recommendations based on the empirical findings to address the problem of regional economic disparities in Nigeria.

CHAPTER TWO

REVIEW OF THE LITERATURE

2.1 Introduction

It is argued that income and wealth inequalities among individuals or regions could have their origins in the inequality of educational attainment among the individuals or regions. Dhamani (2008) and Ostby, Nordas, & Rod (2009) have found that differences in the level of education attainment as among the main causes of income inequality among individuals and regions respectively. A persistent disparity in income among individuals or regions of the economy reveals the weaknesses of the economic policies of the national government, and it can be detrimental to the long-run economic progress of the country. The extent and pattern of regional economic disparity may vary from one society to another. This is because each country's scenario can be different, and always goes with the local circumstances as well as other institutional and economic factors in the country. It could be pertinent therefore to examine and compare the documented experiences of different countries. As with any other researchable issues, studies on the determinants of regional income level and inequality are of two strands; the first strand consists of theoretical analysis, and the second strand belongs to empirical studies. Although, the theoretical and empirical literature on income and education is more than limited, it is not the same when it comes to educational inequality and regional economic performance (income). This chapter provides an insightful review of the theoretical and empirical studies on education, its distribution and regional income.

2.2 Literature on Regional Income

2.2.1 Regional Income: Theoretical Considerations

Geographical areas that display a spatial division in the country are often referred to as regions. Hence, regions are characterized by a distinctive level of spatial, cultural and socioeconomic diversities (Nijkamp & Abreu, 2009). These are constituents that made up the country, most especially in countries with large territorial boundary such as China, India, Russia and Nigeria for example. However, regions tend to exhibit differences in economic performance; some regions outperform others in terms of output, income, its growth rate, and general wellbeing of the populace. According to Nijkamp & Abreu, (2009), several factors can account for regional economic inequality in the country. Differences in factors such as natural resource endowments, the quantity and quality of labour force, access to capital, flow of investments, entrepreneurial culture, physical infrastructures, and efficient public support systems, can lead to economic disparities within a country or across different countries. In line of this, a number of studies have considered some of these variables for the evaluation of regional economic performance.

In an economic sense, the concept of growth implies a positive change in the level of output or income in the economy over a specified period. It is often measured as positive changes in the level of Gross Domestic Product (GDP). Economic development often comes from the changes in the quantity and quality of the productive forces such as land, labour, capital and entrepreneurship. On the other hand, inadequate productive resources, inform of the factors mentioned above, tends to lower economic performance of a region or country. There are numerous growth theories in the literature of economics. Here, attention is given to only three which

include; 1) the Keynesian Economic Theory 2) The Neoclassical Theory and 3) the New growth theory- Endogenous Growth Theory. This is because the above-mentioned theories, more than any other economic theories, bring to the fore the importance of human capital accumulation in the determination of economic performance of a country.

Each of the aforementioned theories of economic growth conveys implications- implicit or explicit in it- on the determination of income level for the nation, region or firm, and which in this way are of pertinence to any policy discussion of economic performance of a region or country. The Keynesian hypothesis is a hypothesis of the short-run dynamics of total demand and employment in the economy, in light of desires, as they have significant impact through investment and consumption of goods and services in an economy.. The second school has its origin from the classical philosophy which sees the growth as an exogenous phenomenon that is mainly determined from outside the economic system. The third is known as the new growth theory (endogenous growth theory) that views growth as an endogenous phenomenon. The determination of long-run economic development inside the model, as opposed to by a few exogenous changing variables like unexplained innovative advancement, is the purpose behind the name endogenous growth theory.

2.2.2 The Keynesian Economic Theory

The adherents of Keynesian hypothesis do not subscribe to the idea of the 'market magic' that, market prices clear the market for equilibrium to surpass. They argue that price stickiness can prompt alterations in the quantity produced, and the market will only go one direction probably far away from equilibrium. An alternate critical

uniqueness is in the perspective of capital and labour. Where classical economists treated capital and labour as two autonomous creation components, Keynesian hypothesis presumes capital and labour to be integral. Here, the total output of the economy is taken as an aggregate of investment, private consumption, government spending, in addition to exports short imports. The drivers of the framework are the utilization capacity (consumption), the investment accelerator and export demand.

While Keynesian theory and methodology are principally Macro-economic in their nature of approach, they, however, have basic repercussions for Micro-economic dissection as well; interventionist system served as a reason for a traditional regional policy that began in the 1950s and 1960s. It attempted to accomplish equity among economic entities either through public investment by subsidizing firms to operate in the lagging regions. Thus, regional convergence might be accomplished through economic and financial policy.

2.2.3 The Neoclassical Theory

The growth and development hypothesis of Solow and Swan (1956) was the beginning stage of the neoclassical economic analysis on growth and development. Their models expect the rate of mechanical advancement to be controlled by a scientific process that is separable from and autonomous of the economic factors. The primary conclusion of the model is that the aggregation of physical capital alone can't explain either the entire growth process of the economy or the productivity growth of labour. The model treats other potential determinants of income inequality among economic entities as both exogenous and in this manner not clarified by the model or rendered irrelevant in the system. The model expects consistent and constant returns to scale, which is taking each economy as large enough that any

additions from specialization have been depleted. Thus, the model additionally accepts that the inputs other than capital, labour and entrepreneurial skills are moderately insignificant in the growth analysis. In this way the model suggests that, regardless of its beginning stage, the economy joins to an adjusted development process (convergence); a circumstance where every variable of the model is developing at a steady rate. Also, if investment converges to breakeven levels, then on these equalizations of growth paths, the development rate of yield for every laborer is determined exclusively by the rate of innovative advancement (Dowrick & Rogers, 2002).

However, the Solow model identified two main sources of growth variation across countries. These are differences in capital per worker (K/L) and differences in the effectiveness of labour (A). The second source found more support in the empirical literature of human capital than the former (Wilson & Briscoe, 2004). Going by the fact that countries such as Japan, South Korea and Taiwan have not been resource-rich countries, but recorded higher levels of growth than many resource-rich countries is a testimony to the role of the effective labour force in growth accounting. Specifically, the central conclusion of the Solow model is that, if the returns that capital commands in the business sector do not reflect its contributions to the total yields of output, then variations in the accumulation of physical capital wouldn't have explained either the economic growth process of a country or cross country economic growth divergence (i.e. income disparities).

On the other hand, the Solow model's treatment of the adequacy and effectiveness of labour is not very precise. The model takes the behaviour of the variable (adequacy

of labour) that is recognized in the model as the main thrust of economic growth and development as given. All the more in a general sense, the model does not recognize what the 'viability of labour' is; it is simply a catchall for components other than labour and capital that influence the level output. There ought to be an obvious, meaning of the viability of labour and what makes it fluctuate. One important plausible characteristic in the hypothesis is that the viability of labour relates to abstract knowledge and information. In order to comprehend the overall growth process, it would then be vital to study the determinants of the supply of labour and technical know-how over time. One would need to know why firms in some countries have more access to learning than firms in other countries, and why that more relevant technical information is not quickly transferred to poor nations. This will help explain why countries differ in their economic fortunes and development.

The Solow -swan neoclassical growth model has unquestionably clarified the elements of the growth and development processes, yet it wound up letting to know that the long-run equilibrium of growth rate relies upon two exogenous variables: the rate of population growth and the rate of technological change. Since these were exogenous, the hypothesis did not so much disconnect the central wellsprings of the long-run economic growth. As needs be, the neoclassical model is in fact, not a model of on-going development, since it suggests that for every level of output per head, yield rates will approach constant values in the absence of exogenous mechanical advancement. Thus, the model neglects to clarify the everlasting steady-state growth and real cross country observed growth differences.

2.2.4 The Endogenous Growth Theory

In this way, some development scholars, such as Paul Romer were progressively disappointed with the exogenously driven explanations of the long-run economic growth and developed a model in which the key determinants of economic growth and development are endogenous. The Endogenous growth is a long-run economic growth at a rate dictated by drives that are inner to the economic system, especially those factors affecting the incentives for creating technological knowledge and innovative learning. The fundamental property of endogenous-development models, as differentiated from the neoclassical models is the nonappearance of unavoidable losses to capital. Despite the fact that the idea of worldwide nonattendance of consistent losses may appear implausible, yet the thought gets to be more possible in the event that we consider "capital" in a more extensive sense to incorporate human capital. Therefore, endogenous models display an increasing return to scale when the impacts of expanded capital and work on innovation are taking into consideration. This has important policy suggestions as with increasing returns; changes in saving rates and rate of capital development can have enduring consequences for the long-run equilibrium growth rate. This diverges from the neoclassical development hypothesis in which the impact of progressions in the saving rate on the growth rate is brief or temporary (R. Barro & Martin, 1995).

An alternate significant thought in the endogenous-development writing is that the level of the innovation might be progressed by intentional movement, for example, research and development (RD) expenditures. It begins from the perception that the innovative advancement happens through developments, as new items, techniques and markets, a significant number of which are the consequence of economic

activities. Case in point is the fact that organizations gain from the experience on how to improve their productive efficiencies, a higher pace of financial action can raise the pace of the development process by giving firms more experience in the production management. Likewise, because numerous developments result from R&D financed by the operating firms, economic policies for trade, competition, education and training, taxes and protected innovation can impact on the rate of technological advancement by influencing the private firms to invest part of their profit for doing R&D. This potential for endogenous innovative advancement may permit a getaway from consistent losses at the total production level, particularly if the enhancements in the system might be imparted in a non-equal way by all makers.

Another remarkable contribution of the endogenous growth hypothesis is the formalization of the essentialness of human capital. The theory emphasized on the importance of human capital development as well as research and development. Profoundly talented workers have a tendency to be more productive and creative and are therefore very essential to both organizations and economies. Regional differences in productivity, profit and development could be explained by differences in innovation and human capital. It therefore follows that organizations and governments have an impetus to put resources into the preparation of workers' training and education for the whole populace. It takes after that with endogenous innovative change and increasing returns to scale those government policies that influence the saving rates, the rate of physical and human capital formation will also influence the long-run equilibrium growth rate in the economy. Since numerous government approaches have potential consequences for these variables, what the administration does now matters for future development (Barro, 1990).

Endogenous growth hypothesis has taken a central position in the on-going growth discourse since the 1990's. The principle thought of its new commitments is that the technological advancement is not exogenously given, but is an endogenous reaction from the economic performing actors in a stiff competitive economic environment. Thus, as opposed to prior macro-economic logical schema (frame work), the attention is considerably all the more on individual business conduct of firms (Nijkamp & Abreu, 2009). In this way, it could be exhibited that regional growth is not the aftereffect of exogenous productivity-enhancing factors, but instead the result of planned decisions of individual performing economic actors (firms, family units and policy makers).

Despite the fact that the above hypotheses have importance to the understanding of economic competitiveness, they frequently fail to offer a regional measurement that is so essential for understanding regional economic disparities. There are theories that incorporate regional measurement in their approach to income analysis, and the evident illustration of this model is a new economic geography. Much of the economic geography was concerned with the flow of industries in to the area, with the factors that focus on the land area of economic activities (Martin, 2003). The neoclassical economic hypothesis underpinned the main part of that work. In this manner, in the same way that neoclassical economists' essential expository idea is the 'creation capacity'; associating regional level of output to the endowments of key economic factors such as labour, capital, and innovation. Economic geographers saw production as a function of the ‘area capacity' and resource endowments. In which the area of economic movement was to be clarified as far as the land dissemination of key 'locational gifts' (accessibility of characteristic assets, work

supplies, access to business sectors, to mention afew). The areas "contend" with each other to draw in economic movement on the premise of their relative enrichments of these 'locational components' (Berger, 2008).

One of the implications of the regional theoretic perspective of the economic environment is that different regions will have a tendency to specialize in economic activities that give a relative advantage. The pattern of individuals and economic business in the world today has demonstrated clearly that some locations are economically advantageous over others. Likewise, new economic geography has assumed a focal position in clarifying the distribution of economic resources and opportunities, as well as the distribution of welfare among areas. The New economic geography theory takes a methodology of formal scientific evaluation of economic behaviour of families and firms crosswise over space, taking into account imperfect competition and assets needed for spatial interrelationships (Davis & Weinstein, 1999; Amin & Thrift, 2000; Ottaviano & Thisse, 2001; Fujita & Krugman, 2004; Combes, Mayer & Thisse, 2008).

2.2.5 Regional Income Determination: Empirical Literature

A voluminous literature exists as to effect of education on the economies of many regions around the world. Shockingly, studies on African countries and sub-Saharan countries in particular are lacking, probably due to limited information or poor data recording. However, studies on other parts of the world could serve as a useful reference in an attempt to study regional income disparities in sub-Saharan African country such as Nigeria. This subsection highlights some of the empirical work that has been done in the assessment of the impact of education in different economies.

This is relevant to Nigeria in view of its policies for poverty reduction, 'inclusive growth' and 'sustainable growth'. In particular the section analyses the empirical work regarding the impact of education on regional income levels.

Many researchers extended their interest beyond studying the dynamics of cross country income disparities to the analysis of regional income dynamics within a country (Checchi & Peragine, 2005; Fleisher et al., 2010; Takahashi, 2007). That is, That is, whether earnings between regions inside a given country become more or less the same over time. For example, Barro, Sala-i-Martin, Blanchard, & Hall, (1991) examined the growth and dispersion of personal income since 1880 and related the patterns for individual states to the behaviour of regions. Moreover, their findings support the convergence hypothesis for both the sectors and for state aggregates. The per capita income and product in poor states tend to grow faster than in rich states. They concluded that, the rate of convergence across states was slow: the gap between the typical poor and rich state diminishes at roughly 2 percent annually.

The documented information on economic performance emphasized the critical of human capital as an essential source of growth (see, for example, Lucas, 1988 and Barro, 1991). It is contended that the level of education drives economic development because it builds the capability to adjust to and actualize existing technology or make new advances. Cheshire & Magrini, (2000) analysed development in 122 regions of Europe and find that measures of human capital and economic potential have the strongest effect on development. So additionally Badinger & Tondl, (2003) consider information from 128 European Union regions

and find that capital accumulation and educational attainment are strong determinants of regional development. In this line, Crespo-Cuaresma, Foster, & Stehrer, (2011) investigated the determinants of provincial economic development by quantile of regions in the European Union. They joined together quantile regression (QR) analysis that allows regional growth at different points on the conditional growth, distribution to be modelled, and Bayesian model averaging (BMA) to choose a little number of powerful variables from a more extended arrangement of potential logical variables. Their results demonstrate that measures of skills (or human capital) are powerful determinants of provincial development, with an expanded level of high-talented work been connected with higher development. At the point when country effects are accounted for, investment in physical capital is also found to be a stronger determinant of growth. In terms of the quantile results, they found that physical capital has a stronger association in developed regions, with the results in human capital depending on whether or not country effects are included.

Some studies specifically targeted factors that account not only for income growth but variation of income among regions. In this vein, Takahashi, (2007) investigated the sources of regional income disparity in Vietnam, focusing mainly on the role of human capital and land endowments. The author classified the country into two regions; namely, Red River Delta located in the north (the RRD), and Mekong Delta located in the south (the MKD). The findings suggest that difference in returns to education and assets (land) rather than the difference in asset holding or stock of human capital (educational attainment) are the leading factors to account for economic disparity across the regions. Similarly, Ledyaeva & Linden, (2008)

applied the modified Barro and Sala-i-Martin framework to the question of unequal regional development. Their focus is on the determinants of regional per capita income growth in Russia for a period of ten years (1996-2005). They used both panel and crossed sectional information. The results recommended that the initial level of regional economic development; flow of investment and exports are the most essential stimulants of economic development in Russia. Of the other control variables used in the specification, shockingly the availability of natural resources does not help altogether to the short-run economic growth in the Russian regions. The same result was discovered when they supplanted the natural resource variable with the oil variable. A conceivable explanation is that natural resources (particularly oil resources) could have effects on the short-run economic development, not straightforwardly, but through the variables of domestic investment and exports. They inferred that lower initial Growth Regional Product (GRP) income per capita and quicker merging pace helps emphatically to the increased differences of GRP per capita economic growth between the rich and poor regions while more modest household speculation in poor areas helps adversely to this crevice.

Different levels of education can exert varying impacts on growth depending on the location and level of the economy. Ramos, Surinach, & Artis, (2010) modelled different levels of education on total productivity and growth of Spanish regions for a period of twenty five years. They employed panel data approach with different specifications. Their findings avow that the accumulation of physical capital has a positive impact on economic growth and development not only for the considered regions, but as well as for the neighbouring ones. Concerning the impact of education, the results depend upon the considered level: secondary and tertiary levels

of education have a significant and positive impact on productivity and growth regardless of the selected specification. In similar works, Di Liberto (2008) Focusing on Italian districts, finds that primary level of education gives an impression of being more important in the South while a negative impact of tertiary level of education is found for Northern areas. These results prescribe that Italy has not had the ability to get the positive returns from tertiary education since economic growth has been related more with low-tech activities where a highly skilled manpower did not assume a critical role. This runs in line with the discoveries of Fleisher, Li, & Zhao, (2010) telecommunication infrastructure as measured by telephone intensity has had a positive and huge impact on Total Factor Productivity (TFP) development. They, however, discovered that tertiary education variable, characterized as some college training or above, to be immaterial in all their specifications.

Higher initial level of income in some regions was credited to unequal endowment of natural resources. It is contended that these skewed concentration of the natural resources pulled in skilled manpower migration from the regions with lower returns on factors to regions of higher returns to factors and consequently generated rapid income growth in the host regions. This led to widening differentials in per-capita incomes between the core and peripheral regions. On the other hand, some studies found that when education variables are included in the equation the role of natural resource decreases. In line of this, Papyrakis & Gerlagh, (2007) analyse the determinants of economic growth in the United States using cross-sectional data on 49 states. They use growth rate of Gross State Product (GSP) as dependent variable. The regressors are initial income, natural resources, investment, schooling, openness

and corruption. Their results support the absolute convergence hypothesis for US states, but the data also show that natural resource abundance is a significant negative determinant of growth. They conclude that the abundance of natural resource reduces long term investment, school participation, openness, and R&D expenditure and increases corruption. these effects can completely clarify the negative impact of natural resource abundance on development as is commonly seen in the countries that are resource endowed and the countries are still underdeveloped (e.g. oil rich countries such as Nigeria, Libya and Sudan)

Most of the studies reviewed in this work have employed macro-econometric techniques that used aggregate data at macro level (cross national boundaries) and have just considered the likelihood that regional economic disparities are due mainly to the differences in educational attainment across the countries or the regions (Checchi & Peragine, 2005; Di Liberto, 2008; Fleisher et al., 2010; Gennaioli, La Porta, Lopez-de-Silanes, & Shleifer, 2013). The forces behind observed patterns of regional disparity may vary from one country to another. As documented by OECD's special focus on 'Inequality in Emerging Economies'(2011), the factors behind growing regional disparity in the emerging economies tend to differ from those at work in most OECD countries. It was also observed that spatial inequality in some countries has to do more with differences within region rather than a divide between the regions. This suggests the need to look beyond the average level of educational attainment of an area and consider the impact of both the absolute and relative distribution of education in the determination of regional income.

2.3 Education

Education is recognized by economists as a crucial factor that boosts an individual competitiveness as well as a country's competitive advantage. This is because education exerts a significant impact on both individual's personal income and national income of a country (Lucas, 1988; Barro et al., 1991; Kuo & Yang, 2008). The impact may be straightforward or through its indirect effects on other factors that are connected with income such as labour force participation, overall labour utilization, total factor productivity, the innovative advancement and the complementarity or substitutability of physical capital and workers' abilities. Education improves the level of income by enhancing labour force participation and utilization. The higher the education level, the higher the labour force participation rate by the people. A study in Ghana by Asafu-Adjaye, (2012) reported that more educated people are more likely to seek and find a job than the less educated ones. Other findings related to this correlation are demonstrated by studies on the private return to education (Alderman, Behrman, Ross, & Sabot, 2009; Aromolaran, 2004; Boarini & Strauss, 2010). The findings of these studies suggested that, people with a higher level of education made more money than those with less education.

A couple of studies have endeavoured to clarify the developing cross-territorial variation in income and, generally, welfare, in terms of differences in the contribution of factors of production and their general proficiency. Both the augmented neoclassical models and the new endogenous development theories have itemized the economy's aggregate yield as a limit of capital, utilized labour services which are the hours worked by the dynamic labour force, and a measure of technical progress. Capital is broadly characterized to consolidate both physical and human

capital. Innovative advancement is normally depicted as the process that decides how productive all the factors of production utilized are, that is, it measures aggregate variable benefit. This general speculative point of interest construes that the per capita aggregate yield or salary could be expressed as the total of, in addition to different components; human capital stock, the rate of change of labour utilization and total-factor-productivity (TFP) growth and all these are largely determined by level of education (Lucas, 1988; (Barro et al., 1991; Cuaresma, Doppelhofer, & Feldkircher, 2012; Fleisher, Li, & Zhao, 2010; Roberts & Setterfield, 2010; Romer, 1989; Sala-i-Martin & Barro, 1991).

Level of educational attainment can influence level of income both directly and indirectly. The direct effect is through human capital accumulation because it is a key determinant or segment of human capital and indirectly, by impacting on the level of total output. Trendle & Pears, (2004) studied the determinants of regional disparity in income across small areas of Queensland in Australia. They considered various explanatory variables, including demographic and education. They found a positive and significant impact of the education variables on the regional income. This suggests that higher educational attainment is associated with higher regional incomes. Similarly, LA Pez-Bazo & Motell An, (2011) found that increasing the educational attainment in Spain would have the effect of increasing the per capita income of the disadvantaged regions and a decrease in regional incongruities.

2.4 Returns to Education

2.4.1 Private Rate of Return to Education (Micro)

The positive effects of education on the individual's socioeconomic development in particular and societal development in general have been widely recognized in the

economic literature. Generally, education is considered essential in poverty alleviation as it improves the productivity and earning capacities of individuals (Schultz, 2003; Oreopoulos, 2007; Fasih, 2008; Harmon, 2011) as well as societal development (Barro, 1990; Romer, 1994; Psacharopoulos & Patrinos, 2002; Barro & Sala-i-Martins, 2004; Castello-Climent, 2011). However, evidence around the world shows that although the effects of education on an individual's earnings and economic growth are generally acknowledged, such effects vary with countries. Schultz (2004) argued that although the assumption that returns on the schooling fall as a student extends his or her education into more advanced levels of schooling is common, it appears not to be the case in countries such as Nigeria, Ghana and many low-income countries. In line with the Schultz analysis, Patrinos, Ridao-Cano and Sakellariou, (2006) posits that education premiums are higher in developing countries than in the developed countries. In most cases, developing countries exhibit higher social returns to primary and secondary education while returns on tertiary education are higher in developed countries. Universally, the average return to schooling is about 10 percent, but there are considerable differences between developed and developing countries with the latter showing about 11 per cent compared to about 7.5 percent for OECD countries. Their findings additionally demonstrate that, in Cote D'ivoire, Kenya, South Africa and Burkina Faso, financial returns associated with every year of higher education are in the range of 10 to 15 percent.

Similarly, the trend seems to be the same if one takes a look at other African countries. In the West African region, for example, the literature suggests that earning premium associated with education increases with levels of education.

Siphambe, (2008) found that Rates of return are lower for secondary and for primary education in Botswana than for tertiary education. The rates of return to tertiary education, be that as it may, climbed by more than 50 Percentage points (more than twice to that of secondary education). The result implies that return increases with the level of education in Botswana. Similarly, Kuepie et al. (2006) found that in Ouagadougou, Abidjan, Dakar, Bamako, Lomé, Niamey, and Cotonou income range from 39,000 CFA francs for people with no formal education training to 122,000 CFA francs for the individuals who have finished secondary education. Also, entrance into tertiary education brings about an enormous quantitative jump with income basically multiplying from 122,000 to 228,000 CFA francs. However, the returns vary from country to country; as the literature reports relatively lower returns in some countries. Compared to some West African countries, the wage return to education in Nigeria is relatively low. The return on education in Nigeria is within the range of 2-5 per cent in contrast with what earlier studies have estimated for returns on education, in the range of 5-15 percent, for other African countries. The estimated returns on primary and secondary education in Nigeria for an extra year of primary and secondary education were 1.9 per cent and 1.7 per cent respectively, while the returns to tertiary education was 9.8 per cent (Oyelere, 2008). In Namibia, Castel's study (as cited in Asafu-Adjaye, 2012) shows that in relation to no education, primary education increases wages by 4.9 per cent, secondary education by 14.9 per cent and technical education by 29.1 per cent, and higher education by 67.2 per cent.

In Ghana, it has been found that the wage premium of education increases with the level of education. According to Fasih (2008) higher wage returns on education are

apparent higher at the highest level of education. Hence, the biggest returner of wage employment in Ghana is tertiary education. Similarly, Schultz, (2004) observed that Primary to middle school education in Ghana yields wage returns averaging about 4 per cent per year, whereas between middle secondary school yields an average return of about 10 per cent. In Ghana's public sector, higher qualification is identified with higher wage premium. Baah (2006) shows that public sector workers in Ghana with basic education earn 72 percent higher wages relative to those with no formal education all other things being equal. The estimated wage premium associated with medium and higher levels of education in Ghana's public sector are 146 and 332 per cent respectively. Corroborating the education effect on wages in Ghana, a study by Aromolaran, (2006) on the wage return to education in Nigeria found a close link between educational attainment and wages. His estimates of private wage returns to schooling at different levels of schooling shows that the return at the primary level ranges between 2 to 3%; secondary level 4%; and post-secondary level 10 to 15%. Accordingly, Okuwa, (2004) estimated an earning function for the graduates of various levels of education in Nigeria with the aim of accounting for the variations in the rates of return to different levels of education. His findings suggest that the earnings of workers increase with more years of schooling. This was true for all categories of workers, whether male, female, public or private workers.

Moreover, the positive correlation between level of education and return is expected to be higher in developing economies (knowledge economies) as the technological environment requires the services of people with higher educational attainment. This goes in line with the synthesis of human capital theory: more education brings higher return. An empirical investigation of Greek information by Prodromidis and

Prodromidis (2008) utilizing three Greek surveys on households (1988, 1994, and 1999) analysed the pattern of returns to education over the period. They discover substantial return rates to higher education, which are however increasing with time. This is consistent with the findings of Petrakis, (2008), that rates of returns to the different levels of education depict a U-shaped curve with the educational level in Greece. Primary and tertiary education levels yield the most significant returns, while secondary level graduates delight in lower return rates. In Europe Psacharopoulos (2007) asserts that people with tertiary education earn nearly twice as much as those with lower secondary education. Similarly, in Turkey as reported by Tansel and Bircan (2010), the return on education increases with the levels of education so that highest returns are achieved at the university level.

In the developing world, there is some evidence which suggests some variation in wage returns on education for different groups and sectors. The literature shows that in some cases, there are differences in the wage returns on education between female and male workers. These differences are context specific as the wage premium on education may be higher for males or females depending on the context. Kuepie, Nordman and Roubaud, (2006) observed in a survey in Abidjan, Bamako, Cotonou, Dakar, Lomé**,** Niamey and Ouagadougou that with the exception of Abidjan (in Abidjan, return to schooling is equal for both males and females), returns on schooling are higher for males than females. Similarly, Fasih (2008) observed that in Ghana, earnings premium is not as high for women compared with men. Contrastively, in Pakistan, Fasih (2008) posits that the marginal returns on education are generally much lower for men than women. Like in Pakistan, in the Nigerian labour market, Schultz (2003) observed that among wage earners, hourly wage rates

increase by 10 per cent and 12 per cent per year of post-secondary schooling, for men and women respectively.

However, Context-specific and unobserved factors may contribute to the variation in the wage returns on education. The impact of different levels of education may vary with environment and level of development attained. Many studies reported that basic education attracts higher private return in developing countries than in developed economies and higher education is more important in terms of private return in middle income countries than it is in the higher income countries (Psacharopoulos & Patrinos, 2004). This implies that return to education is not always linear throughout. In this vein, Kuepie, Nordman and Roubaud, (2009) using a series of comparable labour force surveys in urban West Africa, estimated the private returns to education among representative samples of workers in seven economic capitals of the region. Their results show strong evidence that earnings are non-linear in education; the marginal rate of returns is higher in the upper levels of education. This contradicts the traditional human capital theories (e.g. Psacharopolous, 1994) that assume constant or concave marginal returns to education. With this, the conventional use of average years of schooling in wage return regressions becomes questionable if not unsatisfactory.

In addition to the private returns to education, there are other benefits which are not captured by wages or other individual private earning. These are externalities or social benefits that accrue to the entire society which are manifested through improved general economic performance.

2.4.2 Public Rate of Return to Education (Macro)

The existence of high rates of private returns to education gives an impetus to people to put resources into human capital. However, the profits of education and training may not be limited to the individual, however could overflow to others too, so the increased gains in the economy as a whole (the social return) could surpass the returns that go to an individual. This provides justification for public support for education. The returns to education are not limited to the individual's earning of money. Education often affects the quality of life in ways rarely captured by monetary earnings that go to individuals. Public or social returns on education, unlike the private returns, are the benefits of education which accrue to the society at large. An increase in educational attainment provides both economic and non-economic public (social) returns which are crucial for collective progress.

In economic literature, improvement in education is identified with rising aggregate labour productivity, competitiveness and consequently real output growth and development (Mankiw, Romer and Weil, 1992). Fliesher, Li and Zhao (2010) find that education positively affects output and productivity growth in the Chinese economy. They also find that workers with a secondary education or higher education have a much higher marginal product than labour with less than a secondary education. Accordingly, low level of education has been identified with underdevelopment. Fasih (2008) has argued that countries with low levels of education run the risk of being trapped in technological stagnation and lower productivity growth. Petrakis (2008) estimated the social return of different levels of education in Greece within the framework of cost-benefit analysis and found tertiary education commanding higher rates of return. Overall, the social rates of return are

lower when compared to the estimations of the private returns reported in previous studies in the country. He attributed the findings to the state subsidization of higher education.

Another strand of economic growth literature suggested that the investment in human capital is essential for faster economic growth (Jajri, 2007). In this line, Annabi, Harvey and Lan (2011) used a computable overlapping-generations model to assess the dynamic effects of increasing government investment on education in the Canada. Their Simulation results indicate that higher education incentives increase the rate of human capital accumulation and productivity growth. According to Psacharopoulos (2007) in OECD countries, each year of schooling is associated with a 0.3 higher rate of economic growth. Shindo, (2010) found that the interaction of FDI with education in China is more consequential on growth than taking the role of FDI alone. This implies that education not only affects economic performance directly, but serves as a tunnel through which other factors channel their influence on income growth.

In addition to the direct effect of higher education on total productivity of a country's labour force, increase in human capital (education) has an indirect effect via fiscal returns, particularly through improvements in personal income tax. However, improvement in the education of the populace may also have redistribution effects. Harmon, Oosterbeek and Walker, (2000) argued that the proportion of private gross returns on education goes to the government through taxation and also through reduced welfare entitlements. This was corroborated by Psacharopoulos (2007) who indicated that public expenditure on education generates fiscal returns as part of this

expenditure is later recouped by the state through higher taxation of the more educated individuals in the society.

Apart from the direct economic returns of education to societies, education also produces externalities that are essential in creating a conducive atmosphere for economic growth and development. These unintended consequences include the inculcation of behavioural and attitudinal changes, political awareness and participation, discipline and social cohesion which are all ingredients necessary for economic growth and development (Agüero, 2009; Fasih, 2008). Another social externality of education is improving in health. Education influences the lifestyle and health-seeking behaviour of individuals. According to Riddell and Song (2011) education improves non-market outcomes such as individual civic participation, health-seeking behaviours and reduces criminal tendencies. These non-market outcomes are important for economic growth and development. Similarly, Harmon et al. (2000) asserted that increased education is positively and strongly correlated with improved health, family stability and environmental benefits.

Given the foregoing private and social returns on education, social scientists have theorized about education. One of such theories is the human capital theory. This theory asserts that human capital (i.e. Education) accounts for much of the observed variation in labour market outcomes of individuals provide perspectives in estimating the effects of education on income in Nigeria.

2.5 The Educational Distribution (Inequality)

Balance of educational opportunities among individuals is one of the fundamental rights which everybody is entitled to enjoy. The educational gaps between different groups in many countries are amazing, as documented in numerous studies (e.g. Castello, 2002; Qian, 2008). This has serious implications because if ability across societies is normally distributed, then a skewed distribution of education in a particular society can lead to a substantial economic loss as many talented people may be left out in the skill and knowledge acquisition processes. Thus, more than land and machineries, an equitable distribution of education constitutes a precondition for individual productivity and ability to rise to the challenges of life and subsequently escape poverty (Lopez, 1998). Furthermore, equitable distribution of educational opportunities is desirable over a redistribution of existing assets or incomes. This is because education builds new assets and enhances social welfare by its overflow impact, without making anybody in the society worse off (Lloyd, 2009). Guaranteeing access to educational opportunity to all citizens by attending to both the supply and demand sides is a policy that supposed to be embraced by every country that wants to overcome the challenges of modern time. To support such an effort, an indicator of the educational distribution is required to bring out the picture of the distribution of opportunities in every society.

Lopez, Thomas and Wang (1999) contended that the distributional measure of human capital (education) is amazingly imperative for both the welfare of the general public and for the making of products and services In the event that an asset, say physical capital, is uninhibitedly exchanged crosswise over firms or people in a free environment, its marginal return will be adjusted through free-market system

and aggregation is conceivable. Therefore, its additive power to output level shouldn’t be influenced by its dispersion crosswise over firms or people. On the other hand, if a factor or asset is not totally tradable, then the marginal return to the asset across individuals or firms won’t be balanced, and there is an accumulation issue. For this circumstance, total creation capacity will depend not just on the average level of an asset or factor but additionally on its level of distribution. Since education (abilities and/or learning) is just partially tradable, the average level of educational accomplishment alone is not sufficient to reflect the qualities of the region's or nations human capital. Consequently, to dissect the real part of education in the development process of an economy adequately, we have to look past midpoints and explore both unquestionably the distribution and the relative distribution of human capital. Hence, the wider the spread of education among people in an environment, the more the education elasticity of growth in the economy.

2.6 Empirical Studies on the Measurement of Educational Distribution

Different indicators are no doubt used in the literature to measure the level of educational attainment of an economy. For example measures such as school enrolment rates, cohort survival rates, and cognitive test scores are used to represent the state of the nation's educational attainment. Operationalizing some of these measures has proved difficult if not impossible due to data problems. Where attempts have been made, arbitrary proxies were used which do not capture much of what is required. For example, average years of schooling are used to proxy educational attainment. Inherently, years of schooling may not correctly reflect attainment (educational stock).

Disparity regarding the land ownership, household income, wealth and or consumptions constitutes the heft of the writings on inequality. An estimation of the level of inequality in respect of the aforementioned factors has been accomplished using, for example, the standard deviation (a standardized measure of the variance of a variable); the Generalized Entropy family; and Gini index. The last one was the most widely used in the inequality literature. While, such indices have been generated and made accessible for the insightful exploration, the literature on educational inequality is limited, and one could count on the number of studies that consider educational distribution as a variable in economic modelling. Below are some of the few studies that analysed educational inequalities.

Birdsall and Londono (1997) analysed a sample of 43 countries and use the standard deviation of years of education as a measure of human capital inequality. Another study that used the standard deviation approach was that by the Inter-American Development Bank (1999). Utilizing regression analysis, their research findings on Latin American countries suggest that the standard deviation of education is strongly associated with income Gini—the more the inequality in educational attainment, the higher the level of inequality on income. Similarly, standard deviations have been applied for testing the existence of an Education Kuznets Curve, i.e. an inverted U-shaped relationship between the distribution and the average levels of schooling. Thomas, Wang, & Fan (2002) compared the standard deviation with average years of schooling of 140 countries in 2000 and confirmed that, educational inequality first increases as the average level of schooling rises, and, starts to decline after it has reached a peak. The problem with the standard deviation, however, is that it is an absolute measure of dispersion. Therefore it does not control for differences in the

mean of the distribution. Henceforth, it cannot give a reliable picture of the level of educational inequality, especially for countries with very low or high levels of average schooling (Crespo-Cuaresma, Samir & Sauer, 2012).

Sahn and Younger (2005) employed Generalized Entropy Index (Theil index) to evaluate the extent of the educational distribution among countries in science and numerical skills. They were able to decompose the observed inequality into within and between countries. They used scores on math and science achievement tests of school children (13-14 years old) gathered by the 1999 round of Trends in International Mathematics and Science Study (TIMSS) to create the GE indices. They found that within the country inequalities contributed more than 50% of the worldwide inequality for math and science. In the same vein, Rodríguez-Pose and Tselios, (2009) employed the generalised entropy index in the regions of the European Union and explored both the distributions of income and education within and between regions. Their results recommend that while income inequality is mainly between-regions, educational inequality is mostly within regions.

According to Crespo-Cuaresma, Samir and Sauer, (2012), Lopez, Vinod, and Yan, (1998) were the first to derive education Gini coefficients for 12 countries from attainment data. Subsequently, as a measure of relative inequality, the Education Gini Coefficient is seen as a more consistent and robust measure of the distribution of education. Thereafter, using attainment level from Barro and Lee of 2001, Castello & Domenech, (2002) computed Gini coefficients for education of about 108 countries over five-year intervals from 1960 to 2000. In constructing the indicators of education inequality, they have distributed school attainment levels by quintiles

and calculated the education Gini coefficient. Their findings reveal that, the variability of human capital inequality indicators is greater across countries than within each country. Similarly, Qian and Smyth (2008) estimated the China's level of education inequality using Gini coefficient. To distinguish the source of the overall country's inequality, they decomposed the inequality sources in to coastal and inland regions, as well as rural and urban areas. Average years of educating and rate of graduates of junior secondary schools entering senior secondary schools were utilized to represent educational attainment. Based on findings of the decomposition analysis, it is found that rural-urban inequality is the main source of inequality in educational attainment in china. The problem with their second proxy is that like the enrolment ratios, is not a reliable measure of a country's level of human capital stock. However, Brendler, (2008) using a sample of five countries, provided a detailed description of the underlying methodology that involves deriving cumulative distribution functions for the degree of educational attainment in the population, and then calculating the Gini ratios based on those distributions.

However, the majority of the studies that employed either the Generalized Entropy Index or Gini coefficient in measuring human capital (education) inequality were based on enrolment or education financing data but not real education stock available on the ground. Enrolment and finances represent only the inputs, but not output, which supposed to be the basis of the measurement. Measuring the distribution of education based on Micro data that provides education attainment for individuals in the country or region will be more promising and feasible than relying on enrolment rate or education finances as did by most previous studies.

2.7 Distribution of Education: Theoretical Considerations

Economic theories and arguments have been put forward to explain the link between educational inequality and income. The theories are mainly concerned on the channels through which distribution can influence total output and income in the economy. The theoretical literature reorganizes factors such as motivations, investments in physical and human capital, and habits through which educational inequality can influence economic growth (Castelló & Doménech, 2002; Castelló-Climent & Doménech, 2008). It is believed that equality of opportunities may invigorate the investment in human capital (education), which can accelerate the rate at which the economy grows; this is on the account that the impact of human capital accumulation is greater if it is shared by a larger segment of the society (De-Janvry & Kanbur, 2006; Crespo & Ferreira, 2009; Galor & Moav, 2004). In this vein, Lopez et al., (1998) contended that the extension (more extensive access) of educational opportunities is identified with technological advancement and industrialization which are useful for economic growth process. As such, equity enhances economic growth by means of investment in human capital, because more people can gain information and uncover their abilities that are useful for the economic development of a region or country.

There are arguments rooted from political economy, which postulate the negative role of inequality in the growth process. The main contention for the negative impact of inequality on growth is based on the premise that high level of inequality in the economy could lead to more requirements from the public, for redistributive arrangements, such as higher levy rate through taxation. This may have a trickledown effect on investment that would halt down the growth rate of the

economy. (Bertola 1993; Persson and Tabellini 1994). Inequality has long been associated with a tendency for conflict and other socio-political discontents. Educational inequality and other kinds of polarization are theorized as important determinants of internal conflicts and civil unrest in the economic literature. According to Esteban and Ray (2011) distributional measures such as educational inequality, can play a central role in describing conflict incidence in the country. Unequal societies are more likely to engage in violent conflict than more equal societies, and this could hamper economic development as shown by recent economic models of conflicts (Murshed & Tadjoeddin, 2009; Esteban, Mayoral & Ray, 2012).

However, most of the studies of inequality and conflict are based somehow on the theory of relative deprivation (Gurr, 1970).). This theory argues that the conflict depends not only on the absolute level of poverty or lack of economic wealth, but also on the level of inequality. The proponents of this theory believed that while absolute level of poverty may lead to apathy and inactivity, inequality may inspire people towards radical action and even violence (Langer, Mustapha, & Stewart, 2007; Østby, 2008; McCauley, 2013). Regional disparity and constrained economic inclusion can worsen provincial contention for the bounties of the state and may considerably cultivate conflict. A few African cases demonstrate that regional disparities are as the result of state procedures of appropriation and distribution, which create a feeling of distrust and goad hostility (Langer, Mustapha & Stewart, 2007; Mancini, 2009; McCauley, 2013; Lessmann, 2013; Østby, Nordås & Rød, 2009). Additionally, Gennaioli, Porta, Silanes, & Shleifer, (2012) argued that spatial

inequality in education is an overriding source of conflict in poor countries, particularly in Africa.

Contrastively, a number of arguments have been made as to why inequality might be an incentive for income growth and why government intervention and redistributive policies from rich to poor and may deter income determination and growth at the regional level (Galor, 2011). The proponents of such arguments opine that inequality could be growth enhancing and aid the generation of higher income levels in the economy. In a free market, economic incentives determined the relationship between inequality and growth. Free markets provide incentives to work through profits or returns. This in turn can create competition and increase wealth accumulation. Similarly, there are models that postulate the adverse effects of inequality through fertility decisions (De La Croix & Doepke, 2003; Lam, 1986). In these and other related models the aggregate behaviour of the economy depends on the initial distribution of income which can have its root of the initial distribution of human capital. All things being the same, economies with higher inequality in the distribution of education will have higher fertility rates and higher differential fertility between the educated and less educated households; this will accumulate less human capital and will lead to a lower rate of income and economic growth.

Along this line, Voitchovsky (2005) argues that in an economic environment where ability is compensated, productivity, human effort, and risk-taking are all encouraged, producing higher growth rates and income inequality accordingly. In this manner the more prominent the income inequality, the higher will be the incentives to invest either in physical or human capital, and accordingly the higher

the income growth rate. Income inequalities, as well as educational inequality are increasingly seen as positive determinants of growth. High proportion of less talented and educated individuals in society will serve as a motivation to seize the higher returns for one's skills and educational attainment (Voitchovsky 2005). Higher educational inequality is accompanied by wider gaps in returns that induce the educated to invest more in education. RodrÃ-guez-Pose & Tselios, (2010) argued that the more the level of educational inequality, the higher the motivation for an individual to accomplish a higher educational level and more skills relevant for market outcomes that bring more income.

So also, inequality can influence economic performance through physical and human capital investment. The school of classical economic thought is on the view that high-income inequality favours physical capital accumulation, because the marginal propensity to save is higher for the rich individuals than the poor people. This builds up total savings and makes funds available for more investments which, consequently leads to higher rate of economic grow inequality enhances economic advancement by regulating holdings towards individuals with a higher affinity to save. Inequality among the general public empowers the world class segment of society to build their venture in human capital, while equity traps the whole economy at a low level of investment in human capital (Galor and Tsiddon 1997). Accordingly, inequality is important for the economy to extend the total level of human capital and economic development.

2.8 Empirical Literature on the Role of Educational Distribution

There are limited empirical studies on the impact of educational inequality on economic performance and this must not be unconnected with the data constraints,

especially in developing countries. The few available empirical studies have presented mix findings (see, for example, Castello & Domenech, 2002; Lopez, Thomas & Wang, 1998; Rodriguez-Pose & Tselios, 2010). In López, Thomas & Wang, (1998) it has been shown that the unequal distribution of education tends to have a negative effect on per capita income in most countries, while an increase in the average level of educational attainment has a positive effect. They further demonstrated that the effect of education on growth is also influenced by the macroeconomic policies environment of the nation. They contended that macroeconomic arrangements in a country figure out what individuals can do with their skills and experiences. For instance, policy changes can expand the benefits of education and improve the effect of additional education and training on growth through labour market participation and trade. They, in a like manner, stress on the association of level of innovation, policy success and educational distribution on economic development. Correspondingly, Castelló and Doménech (2002) find a negative relationship between human capital disparity and development for a broad panel of countries. This negative relationship exists through the allocation efficiency of resources, and also through a fall in the investment financing for economic growth and development. They demonstrate that countries that have abnormal state of educational distributional distribution had experienced a declining rate of venture capital for investment and lower proficiency in asset distribution than nations with lower levels of human capital divergence. The less the financing rates of investment, the less the productivity of the allocated resources. Hence, the lower will be the rate at which the economy develops. The studies above used the global information on educational accomplishment of Barro and Lee, which is a conglomeration of various national data sets.

Contrastively, Rodriguez-Pose and Tselios, (2010) using static regression models examined how microeconomics changes in income and educational inequality for more than 100,000 sample size cutting across different locations in Europe influence the development of regional economic performance. They discovered a positive relationship between educational inequality and income. They presume that, the current levels of income and educational inequality appear to be in a far-reaching way useful for economic forces and in this way ought to be considered as income improving. Their findings corroborate the Classical hypothesis that the inequality is beneficial for economic development. It suggests that, inequality channels resources towards individuals whose marginal propensity to save is higher, thereby increasing the aggregate savings, capital accumulation, and economic growth (Galor, 2011). Equally, educational inequality could be good for incentives on individuals to accumulate more education in order to seize the opportunity of higher returns. It shows that, the more the inequality in the distribution of educational opportunities, the more the incentives for the few privileged to attain a higher educational level.

2.9 Conclusions

A survey of the past studies suggests that some vital factors underlying the variations in income levels across regions, especially within the context of sub-Saharan African countries, have not been adequately addressed. Keeping in mind the end goal to discover the sources of regional economic disparities in Nigeria and to be able to identify relevant policy implications and recommendations for addressing the regional economic divergence and inequality, there is a need to recognize the underlying factors for variation in economic performance, i.e. demographic factors, human capital stock and its distribution. Furthermore, hypotheses regarding the role

of these factors would be formulated in the next chapter, so as to allow the examination of the interactive relationships between the factors and economic performance (income). It is likewise important to provide for each of these variables quantitative measures of its capacity to influence the regional economic performance.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter entails the details of the methodology employed in this study for realising the stated objectives. The chapter starts with a reflection on the underpinning theories and followed by the statement of hypotheses about the role of educational attainment and its distribution on regional income determination and inequality (regional disparity) in Nigeria. The chapter also presents full description of the statistical and econometric techniques employed to empirically analyse the framework. And finally, the identification and description of the main variables are carried out together with data description and its sources.

3.2 The Underpinning Theories

A survey of past studies suggests that important factors underlying the variations in regional income level have not been well addressed. In order to find the sources of regional income disparity in Nigeria and to give sound policy recommendations for addressing the problem to the possible, bearable minimum level, we will focus mainly on education attainment and its distribution as our key driving forces of economic performance (income).

The task will be accomplished within a testable analytical framework based mainly on new growth theories (endogenous growth). However, some elements of economic geography theory that takes into consideration the spatial effects (spill over effects) would be incorporated. The endogenous approach to regional development insists on the exploitation of own economic, social and natural sources of the region. An

endogenous type of regional development primarily relies on inner development potentials of a region and pursues fully the use and productivity of those intraregional resources for boosting the economic performance of the region. These theories have explicitly brought the role of human capital (education) to the fore in the determination of regional economic performance. Human capital encompasses intangible skills, abilities and attributes which are imbedded in the individual and are developed through schooling, training courses, expenditures on medical care and other forms of social learning. The demand for and supply of labour in a given labour market are among other factors affected by human capital of the labour force (Fleisher et al., 2010).

The new growth theory's potential role in explaining economic performance and income disparities rests on the assumption that education increases the productive capacity and efficiency of workers by increasing the level of cognitive stock of economically active population. Thus, regions with higher economic performance (income) are predicted to be those in which the conditions for education, its accumulation and transmission are ripe. It follows that expanding educational opportunities and access will lead to better outcomes for both individuals and societies. Likewise, variations in the local supply of inputs into knowledge production —such as the facilities, activities and institutions (universities and colleges, for example) which promote its acquisition- will also be important in explaining interregional income differences. As observed by Florida, Mellander, & Stolarick, (2008) that presence of educational institutions such as universities and research centres favours economic performance in the host area. Additionally, the internal spatial structure of the region can also influence regional economic

performance. Thus, the extent that the spatial configuration of a region favours human interactions that facilitate the spread of education externalities (i.e. good-quality talk), the more income could be generated. So also the degree of segregation between groups characterised by high and low levels of education; because the higher degree of segregation lowers externality effects of education (Roberts & Setterfield, 2010).

The insightful ideas concerning the role of education as a source of productivity and income contended by the human capital theory will also be incorporated into this framework. Human capital theorists see education as an essential investment in the development of human capital. Education, training and health are critical investments in human capital development. These investments are believed to increase productivity and earnings of individuals, firms and/or the larger economy (Becker, 2009). It will be drawn from these theories various conceptualized variables and structural connections, so as to enable testing the formulated hypotheses more rigorously.

3.3 The Main Hypotheses

The stylised facts described in Chapter one have shown that, states in the southern part of the country have exhibited higher economic performance in terms of better socioeconomic indicators such as GDP per capita, mortality rate, employment opportunities and poverty level. However, there are some states that have higher human capital stocks but lagging behind in terms of the above mentioned indicators of economic performance. This made us to think that educational attainment alone could not have captured well and explain extensively the expected impact of education on regional economic performance (income level). In other words,

association of educational attainment and its wide spread distribution in an economy might have produce better result regarding the role of human capital on regional economic performance. If the mechanisms of 'distribution effect' of factor input on productivity as advanced by Topez, Thomas and Wang (1999) holds, then the unbalanced economic performance across regions in Nigeria should be attributed not only to differences in the accumulation of human capital stock, but also to the variation in the distribution of the education.

Many economists argue that societies with wider access to educational opportunities fair well economically than those with limited access (Lopez, Thomas & Wang, 1998; Castello & Domenech, 2002). Hence, we hypothesise that the contribution of educational attainment to regional economic performance (income) is improved by its interaction with the level of its distribution among the different socio-economic groups in the country.

However, different levels of education may have different impacts on economic performance in an economy. In this vein, Psacharopoulos & Patrinos, (2004) posit that basic education impacts more on the economy and also attracts higher return in developing countries, while in advanced economies tertiary education attracts higher return. On the contrary, if higher levels of productivity reflect higher levels of human capital, which are in turn primarily a result of increased education, therefore it could be expected that tertiary education will have higher social return due to its complementary role on technology production. Thus, a society with more tertiary education will have higher productivity. This is based on the expectation that higher education increases the region's ability of adopting leading edge technologies which

is crucial for regional economic performance in terms of productivity. For this, it will be tested if different levels of education produce different impacts on income across the regions.

3.4 Methods of Analysis

To test the hypotheses sketched out above and to evaluate the extent to which the analytical framework can explain the regional income determination and inequality in Nigeria, we employ the following statistical and econometric techniques for the analyses. These include: the use of Theil index to measure the extent educational inequality within and between regions in Nigeria; Spatial econometric models; and Blinder-Oaxaca decomposition techniques.

The Average Years of Schooling (AYS) are used to obtain the educational attainment variable (AYS) from the data set. This involves assigning some values to reflect years of schooling (YS) of each and every level of education attained by an individual, with each value somewhat reflecting the level of formal schooling involved and its contribution to the total educational stock. This is somewhat similar to the International Standard Classification of Education (ISCED) developed by UNESCO but, in this study, with some modifications to capture partial completion of a particular level of education (for example a person having primary 4 only, or JSS 3). In this case, no schooling could have a value of zero. In Nigeria, the duration of primary education is six years so also secondary education, therefore complete primary could have a value of six and lower if otherwise and the value, in such a case, will depend on the level one stops (e.g. primary 2 will have the value of 2; primary 3 will have the value of 3 and so on), complete lower secondary such as JSS 3 could have a value of nine, upper secondary could have a value of twelve, and

post-secondary (i.e. sub degree qualifications such as diploma) could have a value of 14. Degree certificates and equivalents have the value of 16; Masters and PhD could take the value of 18 and 21 respectively.

Table 3.1
Official ISCED Classification and the Author's Simplified Version

ISCED CLASSIFICATIONS		NIGERIAN CLASSIFICATIONS		
Level	Stage of education	Level	Stage of education	Weight
1	Primary	1	Primary (P1-P6)	6
2	Lower secondary or second stage of basic education	2	Lower secondary (JS1-JS3)	9
3	Upper secondary	3	Upper Secondary (SS1-SS3)	12
4	Sub-Degree (e.g. Diploma)	4	Sub-degree	14
5	Degree	5	First degree	16
		6	masters	18
		7	PhD	21

Source: Author Generated

To minimize the level of measurement error while determining our indicators, some effort is put in selecting the most suitable and reliable observations, by trimming down the sample size to only include the relevant age cohorts in the data set. Here, all individuals with less than 18 years of age as at the survey period were excluded. The rationale behind this decision is to exclude people who did not finish their study at the time of the survey. Doing this would help to minimize the measurement errors while measuring the education variable, since demographic patterns could vigorously influence the results. In such a case, if the proportion of school going age individuals

is high in the sample, the calculated educational attainment will be lower and its dispersion will be overestimated. The threshold of 18 years is chosen because it is the standard definition of the starting point of the adulthood age as per the law in Nigeria.

3.4.1 Measuring Educational Distribution

To measure the extent of educational inequalities in Nigeria, the Theil measure of inequality known as Theil Index is used. The index was introduced by Theil, (1967) and extensively discussed by, among others, Conceicao & Ferreira, (2000) and Akita, (2003). The 'Theil index' is a one of the Generalized Entropy (GE) family of inequality measures; it has the advantage of being additively decomposable (Meschi & Scervini, 2010). This is a desirable quality for both analytical and arithmetic reasons. Substantively, the ability to measure the contribution to a country's inequality that is attributable to inequality between and within different partitions of the observational units is the main advantage associated with this measure; therefore, it can provide a deeper understanding of a country's level and sources of inequality.

Equation 3.1 will be used to measure the extent of educational inequalities within the regions, while equation 2 will give the opportunity to decompose the overall educational inequalities into within and between regions. The formula is given as in equation (1) below;

$$T = \sum_{i=1}^{n} y_i \, log\left(\frac{y_i}{x_i}\right) \qquad (3.1)$$

In the above equation, the T stands for Theil index, while the subscripts *i* and *n* represent individual and country's population respectively. The y represents the

relative share of education indicator in the considered area (e.g. region or country), while *x* represents the relative share of the population. The "education share" of each is the individual's educational attainment divided by the country's total educational attainment. The "population share" is now just one (a single individual) divided by the country's population.

The equation 3.2 below will allow for the decomposition as mentioned earlier on.

$$T_D = \sum_{i=1}^{n} y_i \, log\left(\frac{y_i}{x_i}\right) + \sum_{k=1}^{m} Y_k T_k \qquad (3.2)$$

Here, the subscript *D* implies decomposition, the subscript *i* stand for a region (or state) and *n* represents total number of the regions in the country. The y and *x* are as defined before. The Y_k is the population share of region *k* in the country's whole population, while T_k represents Theil index accounting for the inequality within region *k*. The two equations (1&2) are adapted from (Karahasan & Uyar, 2009). In studies of regional inequality, the decomposition property has been exploited to investigate the extent to which a country's inequality can be attributed to inequality between or within regional groupings (Rey, 2004). Following this, we will explore the variability of human capital inequality measures across and within regions in Nigeria. However, in order to check the consistency and increase the robustness of our results, we will complement our measure of inequality with Gini index-the most used inequality measure in the literature.

3.4.2 Correlation Tests

On the off chance that theories are fit for exact checks, one would want to discover some indication of them in the data set that contains the real information.

Particularly, in the Nigerian economic environment where the states in the southern region have been experiencing higher economic performance than the northern states, in this manner it is logical to expect that, compared with the northern region the southern region has had a higher level of human capital accumulation, more equal distribution of education and consequently, greater labour productivity and income. Therefore, prior to the econometric analysis, the statistical correlation of the key variables will be examined, with a view to see the extend to which the identified variables are correlated with the regional economic performance (income). Thus, the correlation coefficient is expressed as:

$$\rho = \frac{cov(X,Y)}{\sigma_x \sigma_y} \qquad (3.3)$$

Correlations between an output indicator (i.e. dependent variable) and key input indicators (i.e. independent variables) are useful pre estimation guides on the potential relationships suggested by theory(s). However, correlation test among the input indicators (independent variables) gives us a preliminary understanding of the potential problem of the data; such as 'Multi-collinearity'. A 'Multi-collinearity' problem is said to exist among the independent variables in a regression if the independent variables are highly correlated to or over dependent upon each other. This problem can hinder the effectiveness of the hypothesis testing by denouncing the power of *t* statistic and the related *p*-value to assess the importance of the independent variables (Bowerman, O'Connell, Orris & Porter, 2008). Moreover, correlation does not necessarily imply causality, but only association or relationship between a variable and another (Gujarati & Porter, 2010). A cross-sectional correlation yields useful information on regional variation, but a stronger picture can be established by examining the relationship of the factors using advance econometric techniques.

3.5 Econometric Approach

3.5.1 Multiple Regression Models

This study adopted the log-lin specification of an income model that uses natural log values of the dependent variable and keeps the independent variables in their original scale. In this model the slope coefficient measures the constant relative or proportional change in the dependent variable for a given absolute change in the value of the independent variable(s) (Gujarati, 2012). A key point of interest in log-lin models is their flexibility, as we will see, in accommodating different types (measurement) of the independent variables, such as categorical, continuous, binary etc. They also permit the use of varying measures or scale for the independent variables in a model. For example, when the independent variables take a limited range, the dependent variable takes unlimited range. That is the nature of the data used in this study. The income variable which is the dependent variable used in the study has a very wide range of observations and carries large values in thousands and hundreds of thousands. However, some of the independent variables are of limited range and some are measured in binary form. There is evidence in the literature that similar specifications were used in some previous studies that used income or other variables with wide range of observations as dependent variable (Jolliffe, 2002; Perugini & Martino, 2008; Ning, 2010; Van Long & Yabe, 2011).

To measure the impact of education on regional income in Nigeria, the following model is specified:

$$lnY_{ij} = \beta_0 + \beta_1 Eduatt_{ij} + X'_{ij}\beta_2 + \beta_3 RDS + e_{ij} \qquad (3.4)$$

Here, lnY_{ij} denote the log of income of the *i-th* household in the *j-th* region, $Eduatt_{ij}$ is educational attainment of an *i-th* household in a particular *j-th* region, X

is a vector of a set of household characteristics and other relevant variables such as age of the household head, gender, household size, industry (categorized as Agriculture and non-Agriculture) and sector (i.e. rural or urban). RDS stands for regional dummy; *βs* are coefficients to be estimated and e is the random error term.

Moreover, the impact of educational distribution on income can be estimated by the following econometric specification:

$$lnY_{ij} = \alpha_1 + \alpha_2 EduIneq_{ij} + X'_{ij}\alpha_3 + \alpha_4 RDS + e_{ij} \qquad (3.5)$$

Where *i* denoting individual household ($i = 1,..., N$) and *j* denoting region. *lnY* is the natural log of economic indicator (income); $EducIneq_{ij}$ is the indicator of education distribution; X_{ij} is a vector of control variables; RDS represent regional dummy; alphas (α) are coefficients; and e_{ij} is the composite error.

However, as stated earlier on, we expect that the interaction of the variables of educational attainment and educational inequality to matter more for the variation in income than when the variables are considered independently. Equation 3.6 is used to test this hypothesis:

$$\boldsymbol{ln}Y_{ij} = \beta_0 + \beta_1 Eduatt_{ij} + \beta_2 EduIneq_{ij} + \beta'_3 X_{ij} + \beta_4\left(Eduatt_{ij} * EduIneq_{ij}\right) + Rds\beta_5 + u_{ij} \qquad (3.6)$$

In the equation (3.6) above an interactive term is introduced ($Eduatt_{ij} * EduIneq_{ij}$) and all other symbols are defined as before. *Rds* is a regional dummy.

3.5.2 Oaxaca-Blinder Decomposition

To examine explicitly, how educational attainment and inequality explain the regional disparity in Nigeria, a decomposition method suggested by Oaxaca and Blinder, (1973) is used. This method can be used to analyse mean differences across groups in any continuous and unbounded outcome variable as demonstrated in Jann, (2008). Similarly, the method was used empirically by O'Donnell, van Doorslaer, Wagstaff and Lindelow (2008) in their work on regional health inequalities.

Given the two regions (i.e. South and North) with an outcome variable Y (income) and a set of predictors comprising educational attainment and inequality, the disparity between the two regions with the respect to the outcome variable is set to be accounted for by regional differences in the predictors. This can be expressed as:

$$R = E(Y_S) - E(Y_N) \qquad (3.7)$$

where R is the mean difference in the outcome variable between the regions, and E(Y) denotes the expected value of the outcome variable based on the following model:

$$Y_e = X'_e\beta_e + \varepsilon_e, \qquad E(\varepsilon_e) = 0, \qquad \varepsilon\{S, N\} \qquad (3.8)$$

where X is a vector containing the independent variables, β contains the slope parameters and the intercept, and ε is the error term. Following Jann, (2008) the mean outcome difference can be expressed as the difference in the linear prediction at the regions -specific means of the predictors. Hence;

$$R = [E(Y_S) - E(X_N)]'\,\beta_N + E(X_N)'\,(\beta_S - \beta_N) + [E(Y_S) - E(X_N)]'(\beta_S - \beta_N) \qquad (3.9)$$

This is a 'three-fold' decomposition in which the outcome difference is decomposed into three parts: compactly expressed as: $R = E + C + I$

The first summand in the right hand side of equation X, $E = [E(Y_S) - E(X_N)]' \beta_N$ is the 'endowment effects' i.e. the part of the differential due to regional differences in the predictors. The second summand which is $C = E(X_N)' (\beta_S - \beta_N)$ measures the contribution of the differences in the coefficients including intercept. The third summand; $I = [E(Y_S) - E(X_N)]'(\beta_S - \beta_N)$ is the interaction term accounting for the simultaneous existence of the differences in endowments and coefficients (returns) between the two regions.

The above decomposition (eq. 3. 9) is formulated from the view point of the North. Implying that, the regional disparities in the indicators are weighted by the coefficients of the Northern region to determine the endowment effect (E). As it were, the E part measures the normal change in one region's mean outcome (say Northern region), if the region had the other region's (i.e. the Southern region) levels of the predictors. Likewise, for the second part (C), the differences in coefficients are weighted by the Northern region's indicator levels. That is, the second segment measures the expected change in Northern region's mean outcome, if the region had the Southern region's coefficients.

To distinguish between explained and unexplained components of the decomposition, the following alternative procedure is used. Based on this procedure, there is some non-discriminatory coefficients vector that ought to be utilized to evaluate the contribution of the predictors' differences. Let β^* be such a non-discriminatory coefficients vector. The disparity with the respect to the outcome variable will be expressed as:

$$R = [E(Y_S) - E(X_N)]' \beta^* + [E(X_S)' (\beta_S - \beta^*) + E(X_N)' (\beta^* - \beta_N)] \qquad (3.10)$$

This is a 'two-fold' decomposition shortly expressed as: $R = Q + U$

where the first summand ($Q = [E(Y_S) - E(X_N)]' \beta^*$) is the part of the differential in the outcome variable that is 'explained' by the regional differences in the predictors, while the second summand $\{U = E(X_S)' (\beta_S - \beta^*) + E(X_N)'(\beta^* - \beta_N)\}$ is the 'unexplained' part of the regional gap in the outcome variable. According to Jann, (2008) this portion is usually attributed to the potential effects of the differences in unobservable factors.

3.5.3 Human Capital Earning Model

To estimate the private and social returns of different levels of education (i.e. Primary, secondary and tertiary education) in Nigeria, the standard Mincerian human capital earnings function will be used. For the private return we used the following specification;

$$lnY_{ir} = X'_{ir}\beta_1 + \beta_2 (Dummy\ for\ edu) + £_{ir} \qquad (3.11)$$

Where lnY_{ir} is the log income of individual i in region r, X_{ir} denotes the set of characteristics that affect the income of an individual in a direct way (such as education, experience, gender, industry and location), and β_1 and β_2 are the vectors of returns associated with the characteristics and education levels respectively. Here, a dummy for each level of education is included to capture the private return associated with each educational level (i.e. Primary, Secondary and Tertiary levels).

However, to determine the social rate of return to education, the following equation is estimated:

$$lnY_{ir} = X_{ir}\beta_1 + \beta_2\,(Dummy\ for\ edu) + £_{ir} \qquad (3.12)$$

On the equation (3.12), the dependent variable is GDP per capita while X_{ir} denotes the set of individual household characteristics that affect the GDP per capita. Other symbols are as defined before. In all the equations above, some regional dummies are included to control for specific characteristics of the regions that are unobservable.

3.5.4 Spatial Regression Models

Space has dynamically been co-picked into econometric modelling through the usage of theories and estimation procedures that formally recognize the role of geography in understanding economic phenomena (Anselin, Bera, Florax and Yoon, 1996). These procedures allow for the testing of models that incorporate the effects of geography, or specify the impact of inter-dependence between observations at different points across geographical locations. Altogether, these methods constitute the field of spatial econometrics and it ranges from basic descriptive statistics that may be utilized to assess whether relative estimations of a variable are grouped together in geographic space, and estimation schedules that naturally perceive the part of geographic reach. The role of space in determining territorial economic performance has been recognised and being used in regional economic studies by many researchers (as in Trendle & Pears, 2004; Rey, 2004 etc.).

One of the potential problems associated with the usage of data collected across locations (space) is the presence of spatial dependence that translates to spatial autocorrelation: the relationship between the values of some variables at one location in space and nearby values of the same variables (Anselin, Bera, Florax & Yoon, 1996). The existence of spatial autocorrelation in a data implies that geographically close-by values of a variable have a tendency to be similar on a map: high values tend to be spotted close high values; medium values close medium values, and low close low values. Most social science variables tend to be spatially auto correlated as a result of the way phenomena are topographically sorted out. Also demographic and socioeconomic characteristics are good illustrations of variables that can exhibit a positive spatial autocorrelation. Neighbourhoods have a tendency to be bunches of families with comparable inclinations or preferences. Families have a tendency to arrange themselves in a manner that makes comparative family features more concentrated in a particular area, making positive spatial autocorrelation amongst numerous variables possible. Additionally, government environmental and ecological strategies and exercises further reinforce such patterns (Griffith, 2000).

Spatial analysis always employs statistical inference-based models to analyse economic phenomena (Anselin, 1988; LeSage & Fischer, 2008). And the validity of the models depends upon the rightness of the set of suppositions about the models' error term. One main supposition states that individual error terms come from a population whose observations are thoroughly mixed through randomness (Anselin, 1988). Besides, the likelihood of a value taken on by one of a model’s error term entries does not influence the likelihood of a value undertaken by any of the remaining error term entries (i.e., the assumption of independent observations in

classical statistics). The presence of spatial autocorrelation in Geo-referenced data disregards this assumption.

To overcome the problem highlighted above (if found to exist), a spatial regression analysis is used. This involves a range of operations to construct spatial weights, using either boundary files (contiguity based) or point locations (distance based), and then testing for spatial autocorrelation and the identification of the model that best describes the data set in use. Following the spatial econometric literature, the analysis begins with a non-spatial linear regression model utilizing the OLS procedures that have been utilized in many cases within the scope of the empirical examination of regional economics with cross sectional data, and afterward to test whether the models need to be stretched out to incorporate a spatial interactive effect. The examination involves evaluating if spatial dependence (autocorrelation) is available in the residuals of the specification that will be estimated using OLS, and assuming this is the case, whether it is best represented by a spatial lag or spatial error model. As pointed out earlier on, if spatial dependence is present, OLS estimation is no longer valid because it will yield biased and inefficient coefficients of the estimators, this holds whether the spatial dependence operates in the dependent variable (spatial lag) or in the disturbances (spatial error). In such a case, Anselin, (2002) notes that spatial autoregressive models (i.e. models with spatial effects) require a specific estimation strategy, such as maximum likelihood or instrumental variables.

Following Elhorst, (2010) we will consider both the spatial lag and spatial error models. Thus, a general form illustrating the consideration of both the cases of spatial dependence could be illustrated by a spatial autoregressive model given as:

$$y = \rho Wy + X\beta + \varepsilon \quad (3.13)$$

$$\varepsilon = \lambda W\varepsilon + \mu, \quad (3.14)$$

where ρ and λ are spatial autoregressive coefficient and spatial autocorrelation coefficient respectively. '*W*' is an exogenously determined weight matrix that illustrate the spatial structure of units, 'ε' is a vector of independently and identically distributed disturbances. *X* denotes an N * K matrix of exogenous explanatory variables, with the associated parameters β contained in a K × 1 vector. And *y* is the dependent variable.

The weighting matrix W demonstrates the interconnectedness of the spatial units in the sample; each element W_{ij} in W tells the strength of interaction between the pair of regions i and j. For the most part, it is normal that neighbouring regions would have a stronger connection (i.e. larger W_{ij}) as compared to geographically distant areas. Elhorst, (2010) has shown that the fundamental explanation behind the utilization of the spatial weight matrix is to associate a variable, at one point in geographic space, to the observations of the same variable in other spatial areas. In contrast to time series, where the relation in time can be expressed by the simple notion of a lag operator *L*, where $L^s y_t = y_{ts}$ shifts y_{ts} periods back in time, in space the issue gets to be more muddled. The extra difficulty originates from the way that there are numerous conceivable bearings over which the spatial movement operator could be connected. One result that has been offered to this issue is the utilization of

the idea of a spatial lag operator Ls, with the idea being to use a weighted sum of the values of neighbouring units (Trendle & pears, 2004).

In this study a first order spatial weight matrix has been used. This is because it is commonly used (see for example Trendle & pears, 2004) In this case, a symmetric matrix is defined by having the element (*i, j*) set equal to 1 if *I* and *j* are neighbours and *0* otherwise. By convention, the diagonal elements are set to zero, i.e. $w_i = 0$. Before being used in estimation, the weight matrix is standardized, denoted by the superscripts, with each of the non-zero elements being defined as $W_{ij}^{s} = w_{ij}/\sum_{j} w_{ij}$. In this matrix, the elements of the rows sum across to one. This manipulation encourages the understanding and facilitates the interpretation of the weights as an averaging of neighbouring values and also ensures the comparability between models of the spatial parameters in many spatial stochastic processes (Anselin and Bera, 1998).

Depending on the values taken by the spatial parameter ρ and λ, two nested models could be obtained. A spatial lag model is obtained when the parameter λ is equal to zero, and when the parameter ρ is equal to zero, then a spatial error model is obtained. However, if both the parameters (ρ and λ) are not equal to zero means that both the spatial lag and spatial error models suffice, then in such a case the spatial Durbin model should be estimated. This is because the spatial Durbin model generalizes both the spatial lag and the spatial error model as noted by Elhorst, (2010). By contrast, if the OLS model is estimated and not rejected in favour of both the spatial lag and the spatial error models, then it may be concluded that the OLS

model best describes the data. In that case there is no empirical evidence in favour of any type of spatial interaction effect.

For this purpose, we employ the classic Lagrange Multiplier (LM) spatial dependence tests proposed by Anselin (1988), and the robust LM tests proposed by Anselin, Bera, Florax & Yoon, (1996). Both the classic and the robust tests are based on the residuals of the OLS model and follow a chi-squared distribution with one degree of freedom. Regarding the estimation procedure, we will apply Generalized Method of Moments (GMM). One advantage of the GMM estimator is that it does not rely on the assumption of normality of the disturbances (Elhorst, 2010).

From the above discussion, it could be seen that the inclusion of spatial effects in to econometric modelling is generally impelled either on hypothetical grounds, following the formal specification of spatial dependence in an economic model, or on reasonable grounds, due to the characteristics exhibited by the data. In this vein, Trendle & Spears (2004) argued that spatial effects may be more fundamental in than on hypothetical ground, because of the effect that their omission may have on the error term of the estimated equation and its effect on the predisposition or the exactness of the coefficient estimates.

3.6 Description of the Key Variables

In this section, the key variables used in this study are described, and the data sources are identified.

3.6.1 Household Income (Per Capita Consumption)

In this study the household per capita expenditure is chosen as proxy for household income because expenditure is a good proxy for permanent income (Heltberg, 2003; Takahashi, 2007). The log of household per capita expenditure is used as dependent variable as it was used in other previous studies (Van Long & Yabe, 2011; Van de Walle & Gunewardena, 2001). This measure consists of all household monthly expenses on durable and nondurable goods, all services (such as health, education, transportation etc.). As a measure of living standard, household consumption expenditure is chosen rather than income. This is because, as observed by Takahashi, (2007), income data tend to be underreported as people are less willing to declare their exact earnings. Most people find it easier to reveal their expenses to others rather than their income. Another reason is that, unlike developed countries where most workers are engaged in regular employment and obtain a salary or wage, the majority of the working population in developing countries work in the informal sector or are engaged in self-employment activities, including farming. So also income data tend to fluctuate over time due to unexpected shocks.

In any case, unlike GDP per capita, the household per capita consumption can better reflect family living conditions. The measure of GDP is composed of capital formation, consumption, and net export; meanwhile the consumption can be further decomposed into government and household consumptions. The shares of capital formation, consumption, and net export may vary with regions, and so are proportions of government and household consumptions. Consequently, household per capita consumption level is the most accurate measure of family living conditions and wellbeing (Li & Xu, 2008).

3.6.2 Educational Attainment

Education has been reorganized as a catalyst for income and productivity growth (Lucas, 1988). The positive role of education for the welfare of people and the performance of their economies are widely recognized in the economic literature. Hence, it has become a well-established factor in explaining income and productivity both at micro and macro levels. Here, our measure of education is based on attainment levels of individuals that capture the highest qualification achieved. One of the advantages of this variable when compared with average years of education that does not adjust for partial completion, or the school enrolment rates is that it accounts for different duration of analogous school cycles. Moreover the use of a categorical indicator also allows for specifying the type of education completed (i.e. Academic vs. vocational tracks) or the level at which one stops (i.e. before completing primary or completing junior secondary only, etc.). We do this by employing a common internationally harmonized measure of educational attainment known as the 'International Standard Classification of Education' (ISCED) which was developed by UNESCO. It aims at ranking and classifying individuals according to the maximum level of education attained. We modify this measure by considering intermediate cases, such as dropouts or partial attendance that leave the system before completing a particular level of education. The classification distinguishes several levels of education ranging from primary education to the second stage of tertiary education.

3.6.3 Educational Distribution

This is measured by Theil Index measure of inequality using educational attainment level of individuals in the data set. It is a measure of educational inequality - the

concentration of education attainment on the small portion of the population in a given geographical area. It is believed that the distribution of abilities (intelligence) could be the same across societies, but it is not the same across individuals (Lopez, Thomas, & Wang, 1998). Education helps in extracting and translating that 'gift' (intelligence) into knowledge, skills, experience and creativity that determine largely the wellbeing of the society. Therefore, a skewed distribution of education opportunities can represent large welfare losses in an economy.

However, the distribution aspect of education is very important for both welfare consideration and for production (Thomas, Wang & Fan, 2001). On the off chance that an asset, say physical capital, is uninhibitedly exchanged across firms or people in a competitive environment, then, the operation of a free-market mechanism can minimize the variation in the asset's marginal productivity. Subsequently, the asset's contribution to the aggregate output shouldn't be influenced by its level of distribution over firms or people. At the same time, if an asset is not totally tradable, then there will be significant variation in the asset's marginal productivity, and there arises aggregation issue. For this situation, the total production function of an industry or an economy depends not just on the average level of the factor in question, but, on its relative distribution. The same applies to education on the grounds that education or expertise is only partially tradable, the average level of educational fulfilment alone is not sufficient enough to reflect all the qualities of a nation's human capital. The wider distribution of education across all groups constitutes a precondition for a productive society. Thus, while expecting positive signs of education attainment variable in our estimation, contrastively we expect the negative sign of education inequality variable in the estimated models.

3.6.4 Population

Regions with larger population sizes and labour forces can attract a large market and other economic activities that generate more employment opportunities for the people and more viable markets for both goods and services (Trendle & Pears, 2004). Notwithstanding more noteworthy differing qualities of commercial enterprises, such regions may have moderately larger number of experts and technocrats holding key positions and controlling collaborate economic institutions than would be normal in little territorial economies. For example, residential communities may have their bank administrators however regional centres will have regional managers, and so forth therefore, the relative territorial population size may be a crucial wellspring of regional income differences. Consequently, the local population is incorporated in the analysis. The total population of each geographical area will be used.

3.6.5 Industrial Composition

The industrial composition of employment across the region is also expected to affect the extent of regional income disparity. The proportion of the labour force in the sample that is employed in the agricultural sector is included. This is proxied by dummy variable (Dummy Agriculture); one for a household working in Agricultural sector, zero otherwise. It follows that agricultural sector, especially in developing countries like Nigeria, is associated with lower income level than other sectors such as service sector or manufacturing. Additionally, there is a tendency to have a high dispersion of output among farmers due to regional differences in the weather condition, farm types, farm size or regional access to modern inputs and methods (see, for example Trendle & pears, 2004).

Other control variables that are used in this study to capture the territorial demographic profile include the family Structure and Fertility of a region proxied by the average household size of a region. Another demographic variable considered in this research is age. Productivity is said to be associated with population aging. Rodriguez-pose and Tselios (2011) found that aged people that are still working are, on average, not as productive as the younger working people in Western Europe. Finally, GDP per capita is also incorporated to control for the regional initial economic condition.

3.7 Data Sources

This study uses household data from the Living Standards Measurement Study (LSMS) of the World Bank on Nigeria available on line, and also from 'http: //www.zawya.com/.' The Living Standards Measurement Study (LSMS) was founded by the World Bank in 1980 to investigate methods for enhancing the coverage and quality of household economic data gathered by statistical offices of the developing nations. Its main objective is to encourage expanded utilization of family information as a premise for strategic policy decisions. Particularly, the LSMS is attempting to help nations get rich information and create new routines so as to monitor progress in household living standards, and to enhance communications between researchers and policy makers.

This survey sample was drawn randomly from all parts of the country. The LSMS' sampling design is a two-stage replicate sample method, which is a common random sampling procedure. The sample frame includes all thirty-six (36) states of the federation and Federal Capital Territory (FCT), Abuja. Both urban and rural areas were covered and in all, 500 clusters/Enumeration areas (EAs) were canvassed and

5,000 households were interviewed. These samples were proportionally selected in the states such that different states have different samples.

The survey was conducted by the Nigeria Bureau of Statistics (NBS) with technical support from the World Bank and published by the latter on its official website. It is a national survey that covered all the 36 states and the Federal Capital Territory (FCT), Abuja. In the survey, 500 enumeration areas (EAs) that cut across urban and rural areas were canvassed. The survey covered a wide range of socioeconomic topics, which were collected via questionnaires administered to the household and the community. The content of the survey covers, among others, areas such as Households demographic features, income, expenditures, educational attainment and other related measures of wellbeing.

3.8 Summary

This chapter presented the various techniques and procedures applied towards meeting the identified objectives of the study. The conceptual model of the study, which is the extension of the regional income model of Trendle & Pears, (2004), contained economic and demographic autonomous variables. On the basis of the conceptual model, the role of educational distribution has been hypothesized to explain the regional income level and disparity in Nigeria. A recent national household survey was obtained from the World Bank Living Standard Measurement Study (LSMS, 2013). The data collected were analysed statistically using descriptive statistics, cross tabulation analysis, correlation analysis, spatial regression analysis and Blinder-Oaxaca decomposition analysis. The results of the various statistical analyses carried out on the data are provided in the next chapter.

It is, therefore, a reasonable conclusion to draw from this section that the variables (suggested by the theory) required to understand the sources of regional income disparity are numerous beyond the coverage of this study. Thus, the study is limited only to the variables that have been reported in the data sources used.

CHAPTER FOUR

RESEARCH FINDINGS

4.1 Introduction:

In this chapter, the statistical procedures and techniques discussed in chapter three were utilized in analysing the data and testing the hypotheses developed in this study to examine the relationship between the dependent variables and the independent variables, as depicted by the conceptual framework and in accordance with the research objectives. The results of the analyses provide answers to the research questions raised in chapter one. The results are, however, based on the output of the estimation procedures carried out using the LSMS data in a step by step process, as recommended by Anselin, (1988) and as was equally carried out in similar works by Perugini and Mertino, (2008).

This study applies spatial regression technique in an attempt to understand and provide an explanation of the role of education in regional income determination and inequality in Nigeria. A regional income model is expanded to incorporate the measure of educational inequality (Theil Index) and its interaction with educational attainment level in order to ascertain whether the regional distribution of education can affect the relationship between educational attainment and economic performance (income) at the regional level. In order to bring to light the issue of regional income disparity in Nigeria, the analyses focus to evaluate whether; (i) there is a strong positive relationship between the level of educational attainment and regional income level; (ii) there are differences in terms of education distribution (inequalities) within and between regions; (iii) that the variation in the regional distribution of education would explain proportionally the differences in economic

performance among regions and (iv) to determine the rate of return of various level of education so as to provide appropriate policy recommendations with respect to public expenditure for education.

The chapter is organized as follows: Section two presents the descriptive statistics of the variables, the derivation of the key variables and some stylized facts on the regional statistics, in respect of the key variables, in Nigeria. This will lay the foundation for the subsequent analyses that will follow. Section three carries out the correlation test between the dependent and the independent variables. Then, the regression analyses examining the links between the outcome variable (dependent variable) of regional economic performance, and the explanatory variables are carried out and presented in section four. Section five presents and compares the results of the spatial regression analyses with OLS. The chapter concludes with a summary of the main findings.

4.2 Descriptions of the Dataset

This section dissects and regionalizes the data sets to describe the typology of regional characteristics in Nigeria. However, the sample was selected in proportion to the states size (population), such that different states could have different sample sizes. The distributions of the samples are shown in (Appendix 1). It shows the size of the sample in each state, each geopolitical zone as well as in urban and rural areas.

The number of households with the required data sets was slightly less than the 5,000 sampled out in the survey. Thus, only 4,979 households were found to be suitable for this study and the descriptions of the data are given in Table 1. It can be

seen that the data set is proportionally and evenly distributed between the two regions considered in this study. This indicates a balance in terms of regional representation.

Table 4.1
Description of Dataset by Regions

Regions	Total Observations	Percentage %
Northern Region (N)	2487	49.9
Southern Region (S)	2492	50.1
Total	4979	100

Source: Authors' calculations using World Bank LSMS Data (2013)

Further decomposition of the distribution of the observations with respect to geopolitical zones that constituted the two main regions of the country was carried out. The statistics also exhibit a similar pattern with the regional values as shown in Table 4.2.

Table 4.2
Description of Dataset by Geopolitical Zones

Geopolitical Zones	Total Observations	Percentage %
North-Central (NC)	801	16.1
North-East (NE)	788	15.8
North-West (NW)	898	18.0
South-East (SE)	797	16.0
South-South (SS)	800	16.1
South-West (SW)	895	18.0
Total	4979	100

Source: Authors' calculations using World Bank LSMS Data (2013)

4.3 Educational Attainment and Distribution (Inequality)

The average years of schooling attained by the population in a state is used to measure educational attainment at the state level as detailed in the methodology section of chapter three. The educational attainment and its distribution (inequality) for all the 36 states, including the federal capital, and then that of the six (6) geopolitical zones were calculated. The same procedure was followed to determine the regional attainment and national attainment levels. In this study, two measures of inequality have been used in order to investigate the distributional dimension of education in Nigeria. The measures are Theil index and Gini index, which have been popular in the literature as measures of the distribution of education and income. For similar ends, the measures were used by Perugini & Martino, (2008) and Crespo-Cuaresma, Samir & Sauer, (2012). Though, only the measure of Theil index was used for the econometric analyses because it has the advantage of being additive across different regions in the country. The two measures are calculated in this study for robustness check in order to see the trend of the inequality whether it is sensitive to a method of measurement used or not. Figure 4.1 shows the trend exhibited by the two measures.

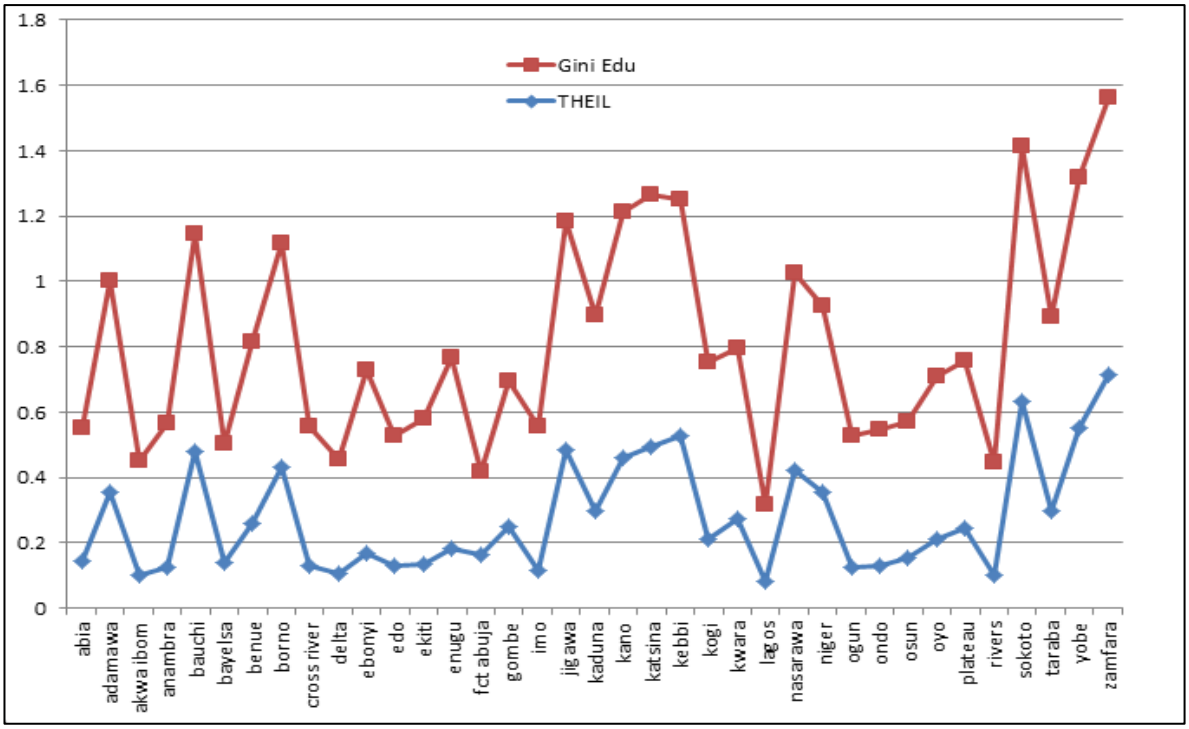

Figure 4.1
Education Gini coefficient and Theil index for Nigeria
Source: Authors' calculations using World Bank LSMS Data (2013)

Table 4.3 presents some basic descriptive statistics of the two inequality measures considered in this study. The Gini coefficient has 0.53 as its mean value, whereas the corresponding figures for Theil index are 0.28. The Gini coefficient ranges between 0.235 and 0.847 with a median value below the mean. As shown by the coefficient of variations and standard deviations of the two measures, Theil index has greater variability than the Gini index. However, it is interesting to note that the two measures are highly correlated, with a correlation coefficient of 0.92.

Table 4.3
Descriptive Statistics of Inequality Measures

Statistics	Gini coefficient	Theil index
Mean	0.530	0.280
Median	0.521	0.211
Standard deviation	0.156	0.172
Minimum	0.235	0.081
Maximum	0.847	0.717
Coefficient of variation	0.294	0.614

Source: Authors' calculations using World Bank LSMS Data (2013)

In order to depict the vast information contained in our education dataset, the results for the two main regions, that is Northern region and Southern region - which are of primary interest to this study, are tabulated and presented. Table 4.4 shows the average educational attainments and education inequality, measured by Theil index coefficients, for the regions and the whole country. It can be seen that, average educational attainment in the northern region is 3.5, which is low compared to the 7.0 and 5.0 averages for the Southern region and the country respectively. It follows that, the southern region has an average educational attainment above the country's average. Similarly, the distribution of education follows the same pattern as the regional educational attainment. Distribution of educational attainment is more equal in the southern region than it is in the north. As shown in Table 4.4, educational inequality is lower in the southern region with an inequality index of 0.169 against the 0.404 and 0.280 indices of the Northern region and for the whole country respectively. Meaning that, the level of educational inequality in the Southern region is below the national level of inequality. This is, of course, not a surprise since it is

the a region having higher average educational attainment. What is surprising is the magnitude of the gap in terms of distribution compared to the gap in educational attainment (AYS) among the two regions. In other words, regional disparity is higher in terms of distribution than attainment. Southern region is 103% and 139% higher in terms of educational attainment and distribution respectively.

Table 4.4
Average Educational Attainment and Inequality at Regional Level

Region	AYS	Education inequality
North	5.0	0.404
South	7.0	0.169
Percentage difference	103%	139%
Country	5.00	0.280

Source: Authors' calculations using World Bank LSMS Data (2013)

At the levels of states and geopolitical zones, the data exhibit the same pattern of behaviour. Among the states, Lagos state of the southern region has the highest level of average educational attainment level in the country with an AYS value of 9.14. This is about twice the national average attainment of 5.00. The state with lowest educational attainment is Zamfara, from the northern region, with an AYS of only 1.30. It shows that, out of the 19 northern states only two states (i.e. Kwara state and Kogi state) have average attainment above the national average against the southern states that are above the national average attainment. On education distribution, Lagos state has the highest level of educational distribution, with a Theil index of 0.08 and Zamfara state has the highest Theil index of 0.72 showing the lowest level of educational distribution (for the details of states statistics on educational attainment and distribution, see Appendices 2a, 2b & 2c).

At the geopolitical zone level, as shown in Figure 4.2, South-south and South-west zones have performed better both in terms of educational attainment and distribution.

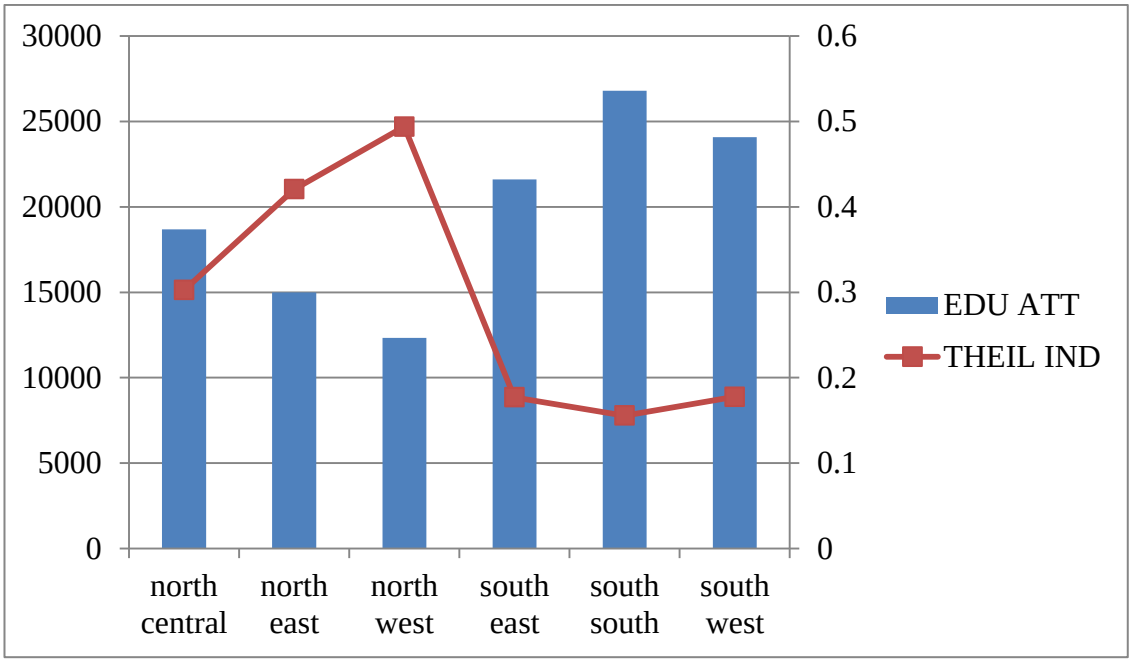

Figure 4.2
Educational Attainment and Inequality by Zones in Nigeria
Source: Authors' calculations using World Bank LSMS Data (2013)

Furthermore, the analysis was extended to capture rural-urban distribution of education and attainment levels. The data show higher unequal distribution of education in the rural area both at regional and country levels when compared to the urban areas. This higher level of educational inequality in the rural areas is associated with lower attainment level as clearly shown in Table 4.5.

Table 4.5
Educational inequality by Sector and Across Regions in Nigeria

SECTOR	Rural	Urban	ALL
NORTH	0.445(4.0)*	0.266(7.0)*	0.405 (5.0)*
SOUTH	0.184(6.0)*	0.144(9.0)*	0.170 (7.0)*
COUNTRY	0.327 (5.0)*	0.185(8.0)*	0.280 (6.0)*

Note: Average Educational Attainment by sectors & Regions in parentheses
Source: Authors' calculations using World Bank LSMS Data (2011)

Using the Theil index formula, we decomposed the educational inequality into within and between regions as well as between and within the urban and rural sectors of the economy. This is to show the extent at which the regional gap contributed to overall inequality in the country. Table 4.6 shows that the share contribution of inequality with respect to education from within regions to total inequality is higher than between regions. This suggests that the within-region inequality is the primary source of regional inequality in terms of education attainment. Similarly, the contribution of educational inequality from within the sectors to overall inequality is higher than between the sectors.

Table 4.6
Decomposition of the Theil index by Regions and Sectors in Nigeria

	Theil Index	% Between	%Within
Regions: (North & South)	0.350	25.5	74.5
Sectors: (Rural & Urban)	0.330	18.7	81.3

Source: Authors' calculations using World Bank LSMS Data (2013)

4.4 Regional Description of the Covariates

Descriptive statistics was used in this section to describe distributions of the control variables used in this study with respect to the regions so as to provide insights into the pattern of behaviour of the variables. The descriptive statistics used are mean, standard deviations and proportions. As shown in Table 4.7, the average household size in the Southern region is lower than in the Northern region, and it is below the national average household size. The average household sizes are 5, 7 and 6 for Southern region, Northern region and the country respectively. By implication, this household size difference between the northern and southern regions in Nigeria indicates variation in the dependency ratio between the two parts of the country.

In respect of the level of income, the average household income per capita in the country is about 89,522 in local currency that is equivalent to ($560). The northern region's average per capita income is lower than the national average of about 14%, whereas the southern region has 9% higher than the national average income as shown in Table 4.7. This regional per capita income disparity reflects the varying economic conditions of living in the two regions. Similarly, average annual household income is higher in the southern region, the northern region and southern region are having average annual household incomes of $2,526 and $2,696 respectively as shown in Table 4.7. For GDP per capita, the table reveals the same trend of results as in the case of income. The GDP per capita is 15% lower in the northern region when compared with the country's GDP per capita. In contrast, the southern region has higher GDP per capita than the country with about 13%.

Table 4.7
Regional Characteristics with Respect to Some Variables

Variables	Northern *Mean*	Southern *Mean*	Country *Mean*
Household size (hhsize)	7.0 (3.30)	5.0 (2.61)	6.00 (3.00)
Per capita income (percap)	71708.13 (68695.25)	107285.3 (112222.4)	89521.71 (94745.69)
Total Household Income (totexp)	404114.5 (372438.7)	431399.5 (441108.8)	417782 (408469)
GDPP	2047.33 (3274.81)	2717.34 (3331.74)	2382.807 (3320.054)

Source: Authors' calculations using World Bank LSMS Data (2013)

Table 4.8 shows information about the level of education of the working population as obtained from the sample data. To show the level and structure of human capital stock for each region in the country, the number of working population and its proportion of four human capital (education) categories were calculated. The categories are; no education, primary education, secondary education and post-secondary education. Overall, educational attainments in the south are better than in the north, with lower and higher ratios of no education and higher education respectively. In the Northern region, about 55% of the working members of the sample had no education, whereas the comparable figures for the Southern region and the country are 23% and 39% respectively. As for working members with primary and secondary education, the Northern region has lowest proportions. This indicates a problem of access to basic education in the Northern region, despite the long stand of universal basic education policy in the country. This may not be unconnected with the peoples' attitudes in the region (North) towards western

education and their misconception of it as a missionary education of the Christian West (Langer, Mustapha & Stewart, (2007).

The proportion of working people with higher education is also higher in the southern region than in the northern region as shown in Table 4.8. This shows higher composition of skilled manpower in the southern region than in the north. A considerable difference was also observed in the regional industrial composition. More working people from the sample are in agriculture in the Northern region than in the southern region. As shown in Table 4.8, 84%, 71% and 78% of the working people are in agriculture in the Northern region, Southern region and the country respectively. This reflects the fact that, in Nigeria, Agriculture is the main sector that provides jobs to the teeming population and also the highest contributor to the GDP of the country (NBS, 2013).

Table 4.8
Education and Employment Characteristics of Regions in Nigeria

Proportion of working population with:	Northern region	Southern region	Country
No education	0.55	0.23	0.39
Primary education	0.18	0.35	0.26
Secondary education	0.17	0.29	0.23
Tertiary education	0.10	0.13	0.12
In Agriculture	0. 84	0.71	0.78
Total Observations	2,485	2,493	4,979

Source: Authors' calculations using World Bank LSMS Data (2013)

Table 4.9 presents the levels of average educational attainment and household size by income quintiles. It can be seen that average educational attainment in the top quintile is twice higher than the bottom quintile. This shows higher access and affordability of education by the high-income group in the country. It is also shown that, average household size is lower in the upper income quintile (with an average of 4.0) whereas the lower income quintile group has an average household size of 7.0. Similarly, higher average educational attainment is associated with lower household size.

Table 4.9
Cross Tabulation: Education, Household Size and Income Quintile

Income quintile	Education (AYS)		Household size		N
	mean	sd	mean	sd	
1	3.0	4.42	7.0	3.14	811
2	4.0	4.83	6.0	3.01	857
3	5.0	5.21	6.0	3.07	922
4	6.0	5.53	5.0	2.93	1,040
5	9.0	5.82	4.0	2.59	1,349
Total					4,979

Source: Authors' calculations using World Bank LSMS Data (2013)

4.5 Correlation between Income and the Explanatory Variables

If the mechanisms of the economic process of the distributional dimension of education proposed by Thomas, Wang and Fan (2001) hold in the Nigerian context, then, the total regional production capacity will depend not just on the level of its educational stock but also on its level of dispersion across the populace. Since the

states in the southern area have encountered ceaselessly higher territorial economic performance as far GDP and GDP per capita growth rates than those in the northern region, it is sensible to expect that, compared to Northern states, the Southern states have had larger amount of educational attainment, as well as lower educational inequality. It is expected that regional income level will have a stable association with the educational attainment and educational inequality (distribution)

The correlation coefficients among the variables of this study, as shown in Table 4.10, indicate that the strength of the correlation between a dependent variable and most of the independent variables is moderate. Specifically, the dependent variable (income per capita) is significantly correlated with average educational attainment (0.402), educational distribution (-0.30), average household size (-0.314), industry (-0.252) and sector (0.313). This association is considered moderate because, the correlation of (*r=0.1)* is a weak relationship, whereas r=*0.5* and above is seen as a strong relationship (Acock, 2008).

Table 4.10
Correlation Matrix

	ln_pcy	Ageing	totexp	Hsize	Edu	Theil	GDPpcp
ln_pcy	1.00						
Ageing	-0.08	1.00					
Totexp	0.59	-0.04	1.00				
HSize	-0.31	-0.01	0.30	1.00			
Edu	0.40	-0.30	0.35	-0.04	1.00		
Theil	-0.28	-0.14	-0.09	0.27	-0.30	1.00	
GDPpcp	0.23	0.07	-0.17	-0.49	0.02	-0.17	1.00

Source: Author generated

4.6 Econometric Analyses

This section reports the estimation results and the model evaluation. The initial phase of the exercise involves the estimation of the models utilizing the conventional OLS method that has been habitually utilized in the empirical economic analyses involving a cross-sectional data set. As said in the prior parts, regional income level is hypothesized to be a function of the following factors; the regional population profile, the regional educational stock, the regional industry structure and the distribution of education among the regional population. The econometric analysis was carried out stepwise following the identified objectives of the study. A similar step process was used by Rodríguez-Pose & Tselios, (2010).

The first step involved the regression of the based model of regional income as specified in equations 4 and 5 of chapter three. The regression in this step was done to estimate the explanatory power of the regional educational attainment, educational distribution and other control variables on regional income level. However, the step was necessary as it will ascertain the effect of the aforementioned variables and also help to meet the second and third objectives of the study. This served as a baseline analysis on which the subsequent regression models are estimated and compared with the baseline models. However, an alternative estimation method has been used to assess the robustness of the empirical results. A General Method of Moments (GMM) estimation method is used. This method (GMM) takes into account the possibility that the residual distribution departs from normality. Additionally, Kelejian and Prucha's recent techniques that deal with both spatial autocorrelation and heteroskedasticity are incorporated. These techniques produce a heteroskedastic autocorrelation consistent (HAC) estimator (Kelejian and Prucha, 2010).

4.6.1 Regression Results (OLS)

The OLS regression results of the specification of equations *(4), (5)* and *(6)* are reported in Table 4.11. The table contains the statistics of the econometric estimation of the first three models; such as parameter estimates, standard errors, probability values, R-squared, etc. The joint roles of the variables identified in both specifications were statistically significant as indicated by the F statistics of 292.0 *(P=.000*), 258.2 (*p=.000)* and 231.5 (*P=.000*), respectively. The explanatory variables (*i.e. Equation 4*) explain approximately 29% of the variation in regional income level in Nigeria. If one were to assume unbiased standard errors- no spatial dependence (autocorrelation) and non-spherical error (Heteroskedesticity) problems, then, the results of the OLS estimation reveal the following. Six (6) variables, out of the seven independent variables used in the baseline model have yielded the expected signs at the 1 % level of significance. The results have confirmed the conclusions of our analytical framework that economic and demographic factors, such as, education level, GDP per capita, household size, urbanization and industrial composition of a region are very important for regional economic performance and income determination. Regression 1 (*R1*) in Table 4.11 illustrates the impact of regional human capital stock on regional income level. The elasticity coefficient on educational attainment (schooling) is positive and significant, as expected, this highlights the importance of education in regional economic performance.

Regression 2 (*R2*) addresses the combined impact of regional educational attainment and its distribution (educational inequality) on regional income level. As shown in Table 4.11, the coefficient of educational attainment remains positive and significant, but educational inequality entered the model with a significant negative

coefficient. This indicates that the existing levels of inequality are detrimental to the regional income determination. Moreover, the results also suggest that, not only educational attainment, but its distribution could be more important in the regional economic performance modelling as the model's R-square shows a considerable improvement. Additionally, interesting information comes from regression 3 (R3) with the inclusion of the interaction term between the educational distribution and educational attainment as can be seen in Table 4.11. The inclusion of the interaction term improves the model's R-squared significantly and renders the coefficient of educational distribution insignificant. This highlights the moderating effect of the distribution of education in the education-income relationship at the regional level.

In order to extend the model's capability in explaining the regional income level determination in Nigeria, the possibility of a quadratic relationship is considered. In this case, some of the explanatory variables are squared and inserted in the model. The model's R-square has improved, relative to the baseline model's R-square, to 32%, and the F statistic is significant at 1%. Overall, the entire model's relevant statistics such as Log-likelihood, Akaike criterion, Hannan-Quinn and Schwarz criterion have shown improvement from the previous specifications. The results of all the specifications are contained in Table 4.11 identified as regression 4 (R4).

Table 4.11
Regression Results with Log per Capita Income as Dependent Variable

Variable	R1	R2	R3	R4
gender	-0.018	-0.0042	-0.0125	0.0295**
	(0.014)	(0.0143)	(0.0145)	(0.0144)
Ageing	0.0007**	0.0004	0.0005	0.0029*
	(0.0003)	(0.0003)	(0.0003)	(0.00157)
inddmy	-0.0738***	-0.0717***	-0.0682***	-0.0611***
	(0.0113)	(0.0112)	(0.0113)	(0.0110)
Urbanization	0.123***	0.118***	0.117***	0.107***
	(0.0099)	(0.010)	(0.0099)	(0.00980)
HHsize	-0.0320***	-0.0306***	-0.0302***	-0.0711***
	(0.0017)	(0.0018)	(0.0018)	(0.00508)
Edu	0.0214***	0.0199***	0.0255***	0.00455*
	(0.0009)	(0.0009)	(0.0017)	(0.00273)
gdpp	3.11e-06***	2.83e-06***	2.98e-06***	3.80e-06***
	(6.10e-07)	(6.04e-07)	(6.04e-07)	(6.12e-07)
theil		-0.148***	-0.0486	-1.204***
		(0.0329)	(0.0430)	(0.117)
Ageing_sq				-2.97e-05**
				(1.44e-05)
sqtheil				1.491***
				(0.156)
sqsch				0.00102***
				(0.000169)
sqhhsize				0.00289***
				(0.000350)
edu_inq			0.0206***	
			(0.00531)	--
Constant	4.820***	4.867***	4.833***	5.049***
	(0.0250)	(0.0272)	(0.0286)	(0.0471)
Observations	4,979	4,979	4,979	4,979
Adjusted R-squared	0.290	0.292	0.294	0.320

NOTE: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

4.6.2 Specification Diagnosis of the OLS Estimation of the Basic Model

However, to ascertain the validity of the estimated OLS results, some post estimation statistics are used to test for the existence of potential misspecification problems in the OLS estimation. These include; Multicollinearity, non-normality and Heteroskedasticity.

To start with, Multicollinearity exists because of the existence of a strong linear correlation among the independent variables included in the regression specification, which in principle should not be so correlated (Anselin, 2008). Consequently, the OLS estimates will have colossal standard errors (or estimated variances) and, therefore, lower t statistics. As a result, very few coefficients will be found to be significant. Thus, the affected variables will not be able to provide sufficient separate information as could be expected. Moreover, the problem of Multicollinearity can be detected either by a correlation test or the Variance Inflation Factor (VIF) test (Acock, 2008). GeoDaSpace software computes Multicollinearity test of multiple variables and reports a condition number that, as a rule of thumb, should take values lower than 30. A value that is greater or equal to 30 suggests a problem (Anselin, 2008). Similarly, Multicollinearrity assessed using VIF test should not exceed the value of 10, which corresponds to a tolerance value of 0.1 (Acock, 2008).

The next diagnostic test considered is about normality. The condition of normality in the error terms is crucial in regression analysis and constituted the basis for most hypothesis tests (Anselin, 2008). The OLS technique assumes a normal distribution of the residuals. If this assumption is violated, then, the results arrived at, using the OLS technique, is no more valid. Statistical methods can assess normality. Under the

statistical method, one of the ways of checking normality is by Measures of Skewness and Kurtosis and Acock (2008) recommended that the value of kurtosis should not exceed 10 for a standard distribution. The *GeoDaSpace* regression output reports the results of the Jarque and Bera test with its statistic and associated probability value. The test is a test of the combined effects of both *skewness* and *Kurtosis*. The low probability value of the test score indicates a rejection of the null hypothesis of a normal error.

Another significant assumption of the OLS is that of Homokedasticity. This assumption implies constant variance of the error term. A violation of this assumption is a typical encounter, especially in a cross-section regression models that involve the use of data collected from different geographical areas. In such a case, the variance of the random regression errors increases with the observations. As a result, the OLS estimates can no longer be the most efficient. *GeoDaSpace* (the statistical software used for this study) reports some tests for Homoscedasticity, in which the null hypotheses are always being against the presence of Heteroskedasticity. The tests include: the Breusch-Pagan Lagrange Multiplier (LM) test, which is not powerful for non-normal errors in small samples; the Koenker-Basset test which is the Best alternative when dealing with errors that are not normal; and finally the White test, which is robust for any unspecified form of Heteroskedasticity (Anselin, 2008). The results of the OLS diagnostic tests with respect to the baseline model (R2) are presented in Table 4.12.

Table 4.12
OLS Regression Diagnostics

Tests	Df	Value	Prob.
Multicollinearity Condition Number:	a	17.862	na
Test on Normality 0f Errors:			
Jarque-Bera	2	3372.25	0.00
Test for Heteroskedasticity:			
Breusch-Pagan test	7	44.269	0.00
Koenker-Bassett test	7	15.464	0.03

Source: Author Generated

From Table 4.12, it could be seen that the residuals of the baseline regression model are clearly non-normal as shown by the lower probability value of the Jarque-Bera test statistics. This could put the OLS estimates under suspect, especially when one is dealing with a small sample size. This may not be too serious a problem here, since many properties in regression analysis hold asymptotically with large sample size (Bowerman, O'Connell, Orris and Porter, 2008; Gujarati, 2012). In and of itself, the sample size used in this study is large enough to overcome this limitation. The Multicollinearity Condition Number (MCN) shows no problem of Multiculinearity as the number is found to fall below the alarming threshold level (i.e. 30) recommended by Anselin, (2008). Similarly, the values of tolerance and VIF for each independent variable were all within the threshold of 0.10 and 10 respectively (see Appendix 10b). Going by the suggestion of Acock (2008), Multicollinearity does not pose any problems among the regressors in the baseline equations of this study. However, on the problem of Heteroskedasticity, both the Breusch-Pagan and Koenker-Bassett tests point to the existence of Heteroskedasticity in the data set.

This is indicated by the lower probability values of the tests as shown in Table 4.12. This does not come as a surprise because it usually occurs in a cross-section data set where the error variance could well be affected by the spatial dependence of the observational units in the data. As asserted by Anselin, (2008), the presence of Heteroskedasticity in a dataset may point to the need for a more explicit incorporation of spatial effects, in the form, for instance, of spatial regimes. As such, there is a high motivation, in this study, to further consider the investigation of spatial dependence and model it if it is found in the data set.

4.6.3 Diagnosis for Spatial Autocorrelation

Spatial autocorrelation, or all the more for the most part, spatial interconnectedness, happens when the observation of an outcome variable or the error term in every area is associated with observation on an outcome variable or the error term at neighbouring or different areas. Therefore, overlooking the spatial autocorrelation in the data set, when it is indeed present, is consequential and posed a serious threat to the validity of the results to be obtained from the analysis. In fact, if the spatial dependence is in the dependent variable (i.e. spatial lag) then it will make the OLS estimates to be biased and the inference from the results will be incorrect. This is akin to the omitted variables problem in the classic non-spatial models. Similarly, when the dependence happens to be in the error term (i.e. Spatial error) then OLS estimates are unbiased but, no longer efficient, as in the case of Heteroskedasticity (Anselin, 2005).

In the spatial econometric literature, there are mainly two statistics (tests) that are commonly used to test for the presence of spatial dependence. These include; the

Moran I statistic and the family of Lagrange Multiplier (*LM*) test (Anselin, Bera, Florax & Yoon, 1996). Under the *LM* test family there are simpler versions of the test that include *LM error tests* for detecting model misspecification due to the presence of spatial dependence in the error term and *LM* lag test for whether there is an omitted spatially lagged dependent variable. There are also the robust versions of the simple LM tests that include the robust LM lag- a test for an omitted spatially lagged dependent variable in the possible presence of spatial error dependence, and the robust LM error- a test for spatial error dependence on the potential existence of a spatially lagged dependent variable. Moreover, lastly, the general LM test for the joint presence of both a spatial lag and a spatial error model (SARMA test). All the LM tests are based on the results of the ordinary least-squares (OLS) estimation and follow a chi-squared distribution with the degrees of freedom being the number of the respective parameter being tested. Hence, the test statistics of the LM lag, the LM error, as well as their robust versions are all asymptotically chi-squared distributed with one degree of freedom. The general LM test (SARMA) is asymptotically chi-squared distributed with 2 degrees of freedom, therefore, having more than one parameter to estimate since it is testing for the joint presence of both spatial lag and spatial error dependence (Anselin, Florax & Rey, 2004).

The test for spatial dependence requires a specified spatial weight matrix *W*. This is a $N \times N$ matrix describing the spatial arrangement or the underlying relationship of the spatial units in the sample. Following the suggestions of Bell and Bocksteal, (2000) and that of Elhorst, (2010), a distance-decay weight matrix is considered and used for the diagnostic tests and also for analysing the spatial models. The elements of the weight (W) for the distance decay matrix are defined as $w_{ij} = \frac{1}{d_{ij}}$ if $d_{ij} < c$

and $w_{ij} = 0$ if $i = j$ or if $d_{ij} > c$, where d_{ij} is the distance between one spatial unit (observation) and another, and c is the distance beyond which no dependence is assumed and is taken to be 150 km from this study. The assume dependence or influence of one or more observations on the other can logically be expected to disappear with distance and become insignificant outside a reasonable distance. The row standardized version of this weight matrix is used and it is labelled '*weights.gwt'.* The results of the spatial autocorrelation diagnosis are presented in table 4.13.

Table 4.13
Diagnostics for Spatial Dependence

TEST	MI/DF	VALUE	PROB
Moran's I (error)	0.003	12.686	0.000
Lagrange Multiplier (lag)	1	44.793	0.000
Robust LM (lag)	1	.452	0.000
Lagrange Multiplier (error)	1	45.044	0.000
Robust LM (error)	1	32.703	0.000
Lagrange Multiplier (SARMA)	2	77.496	0.000

Source: Author Generated

The second row of Table 4.13 reports the result of the 'Moran *I'* test with a *t- value* of 12.686 and a probability value lower than one percent (p<0.001) which supports the hypothesis of spatial dependence as indicated by its lower probability value. This suggests that the residuals from the OLS estimation are spatially auto-correlated, and OLS is no longer helpful. While the test has a high predictive power and perhaps it is the most commonly used specification tests for spatial dependence, it provides no

information on whether the spatial dependence is from the dependent variable that will best be handled by spatial lag model, or it is an error process that will be best represented by a spatial error model. To this end, the LM tests are used- the tests that help to distinguish the real spatial process and point the alternative specification to be used (Anselin, 2008). In this case, as shown in Table 4.13, both the LM lag and the LM error are all significant, having probability values less than one percent, therefore confirming the presence of spatial autocorrelation but, still with no further suggestion on which spatial model specification will best suit the data. To understand which type of spatial dependence may be at work in the data, the robust LM tests should be considered. The robust measures for both the RLM error (32.70; $p<0.001$) and the RLM lag (32.45; $p<0.001$) are all significant, meaning that, even when a lagged dependent variable is present, the error dependence still persists (Anselin, Syabri & Kho, 2006). In the instance that both the robust LM tests are significant Anselin (2008) suggests that, the model with the largest value of the test statistic should be estimated. Thus, from Table 4.13, the slightly higher value of the robust LM error test seems to suggest for the use of a spatial error model as the most appropriate specification.

4.6.4 Models Estimation: Spatial Regression

Following the outcome of the diagnostic tests presented in Table 4.13, the spatial error model is the most appropriate specification to be estimated. This is carried out using GMM estimation technique as recommended by Anselin, Amaral and Arribas-Bel, (2012). The model is the standard regression specification with a spatial autoregressive error term and the model is represented as: $y = X\beta + e$, with $e = \lambda We + u$, where y is a vector of observations on the dependent variable, W is the spatial

weights matrix, X is a matrix of observations on the explanatory variables, e is a vector of spatially autocorrelated error terms, u a vector of *iid errors* and λ and ß are parameters. Additionally, we have included in the estimation a robust estimator, proposed by Kelejian and Prucha (2010), of the covariance matrix (using a command available in GeoDaSpace software) that takes care of the persistent presence of both spatial Heteroskedasticity and autocorrelation (KP-HET). As done for the diagnostic spatial autocorrelation tests, the Distance-decay weight matrix (row standardized) is used for the models' estimation, and the results are presented in Table 4.14

Table 4.14

Spatial Error Models with Log Per-Capita Income as Dependent Variable

Variables	SReg1	Sreg2	Sreg3	Sreg4
Lambda	0.099**	-0.204***	-0.084	-0.542***
	(0.048)	(0.059)	(0.053)	(0.067)
Constant	4.738***	4.780***	4.801***	4.964***
	(0.028)	(0.032)	(0.029)	(0.056)
GDPP	0.0001***	0.0001***	0.0001***	0.0001***
	(0.0000)	(0.000)	(0.000)	(0.0000)
Ageing	0.0006*	0.0004	0.0003	0.003*
	(0.0003)	(0.0003)	(0.0003)	(0.002)
Gender	-0.016	-0.007	-0.004	0.025*
	(0.014)	(0.0142)	(0.015)	(0.015)
Hhsize	-0.031***	-0.031***	-0.025***	-0.071***
	(0.002)	(0.0017)	(0.0019)	(0.0049)
Industry_Dummy	-0.071***	-0.069***	-0.067***	-0.058***
	(0.0112)	(0.011)	(0.011)	(0.0110)
Edu	0.021***	0.019***	0.025***	0.006***
	(0.0009)	(0.0009)	(0.002)	(0.003)
Sector	0.116***	0.115***	0.115***	0.105***
	(0.010)	(0.0099)	(0.0099)	(0.0097)
Theil	-----	-0.129***	-0.036	-1.116***
		(0.032)	(0.042)	(0.135)
*Edu*Ineq*	-----	-----	-0.021***	-0.002
			(0.005)	(0.0054)
Ageing_sq				-0.00003*
				(0.000014)
Hhsize_sq				0.003***
				(0.0003)
Edu_sq				0.00098***
				(0.00017)
Theil_sq				1.411***
				(0.165)

NOTE: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Author generated

The spatial error coefficient (Lambda 'λ') appeared as an additional indicator in the model. The coefficient parameter (λ) reflects the spatial dependence inherent in the sample data, measuring the average level of dependence among observations. In other words, the parameter captures the average influence on observations by their neighbouring observations. As shown in Table 4.14, its estimated coefficient has a positive effect (0.099) and is significant at 5% (p=0.03) indicating the leftover spatial dependence, but that has been taken care of by the Kelejian and Prucha (2010) Heteroskedasticity and spatial autocorrelation robust standard errors (KP-HET) in the estimation.

4.6.5 The Baseline Specification: Regional Income and Educational Attainment

The spatial error model specification of equation 4 (SReg 1 on Table 4.14) has not been much different from its OLS variant (Reg 1 on table 4.11). Here, five variables (as against the six variables in the OLS model) remain significant at the 5 % level of significance, so also the signs of the coefficients are not different from what was obtained under the OLS model. The first two control variables are; the Proportion of women in the workforce and the population ageing. The former is found to be insignificant in both the OLS model and its spatial error version- meaning that the relationship between gender proportion in the workforce and regional economic performance is not that clear. The latter shows an ambiguous impact, while it has its coefficient statistically significant in the non-spatial model; it is now found to be insignificant at the usual 5% under the spatial error model. This seems to go in line with the findings and conclusions of Disney, (1996) and Rodriguez-Pose and Tselios, (2011) that both found insignificant coefficients and concluded that the relationship between population ageing and economic performance is unclear.

Another control variable considered in the baseline model is the regional industry-composition- the relative size of the regional labour force employed in the agricultural sector. Trendle, (2004b) has suggested that regional income level could be influenced by the industry composition of the regional economy. In a setting like that of Nigeria, people from the less developed areas are more engaged in agriculture due to the less presence of industrial activities such as manufacturing and construction. Moreover, due to lower commodity prices as compared to prices of capital goods and services, commodity production activities (such as agriculture) are associated with lower income level as against the more advanced industrial production of capital goods (Tamura, 2002). The findings of this study support this hypothesis in the case of Nigeria. Thus, the significant and negative coefficient on the industry composition (*Inddmy: ß=-0.070; P<0.01)* suggests that higher shares of employment in the agricultural industry are associated with lower regional income levels in Nigeria.

In order to control for regional cultural variation in the model, a variable capturing family structure (in this case, proxied by the average household size) was also incorporated. This variable is important for understanding regional income determination because family structures may affect peoples' behaviour in the labour market; their incomes; as well as their general living standard (Berthoud & Iakōvou, 2004). This factor has been considered in the previous studies (e.g. Rodriguez-Pose and Tselios, 2011). As revealed in the previous section by the descriptive statistics, Household size varies significantly between regions in Nigeria. In both the OLS and spatial error models, the coefficient of the variable is negative and highly significant as shown in Table 4.14, suggesting that a large household size is associated with

lower regional income level. This could not be surprising because it is most likely that a large household size with more children than adults in it, could reduce work participation and wage income of the mothers. Thus, large households, comprising especially, of more children and aged persons, on average, could negate the level of private savings due to higher financial costs of bearing and raising children, and this could also reduce the proportion of school-age children attending schools which will consequently affect the rate of regional human capital accumulation (Anyanwu, 2013). This result is consistent with the findings of some previous studies that found a negative relationship between household size and economic condition (e.g. Poverty level and incomes) such as; Meenakshi & Ray (2002) for India, Kates and Dasgupta (2007) for Africa, and Rhoe, Babu, & Reidhead, (2008) for Kazakhstan in Central Asia.

Another variable considered in this study is Urbanization, which is measured by dummy for urban (i.e. 1 for a household living in the urban area and 0 otherwise. Some of the basic tenets associated with urbanization include: a distinctive division of labour, technology-based production of goods and services, commercialization, high level of spatial and economic interaction, and relatively high density and diversity of population (Rogers, 1982; Sharma, 2003). Similarly, Njoh, (2003) reported that urbanization leads to a high degree of specialization and industrialization which are associated with subsequent economic development of the area. The findings for urbanization in this study support the above assertions. The coefficient of urbanization is positive and statistically significant in both specifications. This suggests that, in Nigeria, productivity as well as income generating activities is more of urban centres than of rural areas. Thus, it should be

expected that higher level of urbanization in the region could lead to a higher regional income level. This supports the findings of Rodriguez-Pose and Tselios (2011). Also, significant is the coefficient of the real regional GDP per-capita incorporated to capture the differences in the regional economic condition in the country. Its coefficient is found to be positive and significant. The result supports the popularly held view that the initial level of development is critical for subsequent regional income determination.

However, of higher interest in this specification (i.e. SReg 1 in Table 4.14) is the coefficient of educational attainment (AYS). As expected, the coefficient on educational attainment is positive and highly significant in both specifications, indicating that higher educational attainment is associated with higher regional incomes. This highlights the important role of education not only in the regional income determination, but also in sustaining the regional economic performance through adaptation and diffusion of new technologies (Kumar, 2003). This finding is consistent with the prediction of the endogenous growth theory concerning the importance of human capital in economic performance (Wei, Song & Romilly, 2001). This evidence also corroborates with the findings in the literature that the level of educational attainment determines the income level, both at micro and macro levels (Trendle, 2004; Rodriguez-Pose & Tselios, 2011; Boarini & Strauss, 2010; Blundell, Dearden, Meghir & Sianesi, 1999).

4.6.6 Regional Income and Educational Distribution

The spatial error version of equation five (i.e. SReg 2 in Table 4.15) illustrates the combined impact of educational attainment and educational inequality on regional

income level in Nigeria. The coefficient on the measure of educational attainment stays positive, significant and robust to the incorporation of the measure of educational distribution (0.020 & p<1%). This result highlights, as expected, the importance of education in income determination. This further supports the predictions of endogenous growth theory as well as human capital theory on the general role of education on individual productivity and general economic performance. The coefficient on educational distribution (inequality), in contrast, is found to be negative and significant (0.124 & p<1%). This shows that the higher the educational inequality the lower the regional income level. In quantitative terms, a one point increase in the measure of inequality reduces the income level by about 12 percentage points on average.

The finding goes in line with the theoretical predictions and the hypothesis of this study that state a negative effect from education inequality on economic performance (Lopez, Thomas, & Wang, 1998; Castelló-Climent, 2010). This also implies that the existing level of inequality is fundamentally not favourable for regional economic performance in general and, in particular income determination, as the measure is associated with higher fertility rates, lower productivity and lower life expectancy which are all not going well with economic living standards (Galor & Tsiddon, 1997; Castelló & Doménech, 2002; Gungor, 2010). Again the findings reveal the very great similarity of outcomes obtained by the OLS approach.

However, interesting information comes from the comparison of specifications 2 and 3 (i.e. Sreg. 2 & 3 in table 4.14), which differ in the inclusion of the interaction term between educational attainment and educational distribution. The results are very

similar to those of the OLS model in terms of sign and significance but differ slightly in terms of coefficient magnitude. The coefficient of educational attainment remains positively significant with the inclusion of the interactive term, but renders the coefficient of the educational inequality insignificant. In this case, the individual effect of educational attainment is positive, the sign on the coefficient of educational inequality is negative but turned insignificant, and the interaction effect is negative and significant (β-value=0.021 with p<1%). In line with the conditions specified in the literature as suggested in Hayes (2013), the result of the interactive term support our hypothesis of the moderating role of educational distribution on the role of educational attainment in the determination of regional income level and inequality. This implies that the total effect of educational attainment on regional income level shrinks as the level of inequality increases. In other words, the total effect of educational attainment on regional income level increases as educational distribution improves.

In the subsequent regression (i.e. Sreg. 4 in table 4.14) the possibility of a nonlinear relationship between regional income and educational distribution (educational inequality) is explored by including quadratic terms of the variables that are found significant in the baseline specification including the measure of educational inequality. The coefficients of the quadratic terms of Educational Attainment, Household size and Educational distribution are all positive and significant. This shows that there exist a non-linear relationship between these variables and the regional income level. Both the coefficients of educational attainment and its quadratic term are positive and significant at 1% level, showing that the association between educational attainment and regional income is stronger at relatively high

level of educational attainment than at lower levels. In other words, the effect size of educational attainment on regional income level increases with the level of educational attainment.

The coefficient of squared educational inequality enters the model with a positive and significant sign. This outcome, together with the steadily significant and negative coefficient of educational inequality, supports the existence of a U-shaped quadratic relationship. This shows that increase in the level of educational inequality is associated with a decline in regional income level when education inequality levels are relatively small. At relatively high levels of inequality, however, regional income level is positively associated with educational inequality. On one hand, this U-shaped relationship between income level and educational inequality partly supports the predictions of the theoretical literature on inequality that theorizes negative consequences of educational inequality in economic performance (Lopez, Thomas, & Wang, 1998; Castelló & Doménech, 2002; Castelló-Climent, 2010). On the other hand, the prevailing positive and significant quadratic term of educational inequality corroborates the theoretical prediction that suggests a positive role of inequality (e.g. Heyns, 2005; Voistchovsky, 2005). Ultimately, when educational inequality is large enough, it will begin to lead to increases in income. The threshold can be seen by taking the first derivative of the regression function with respect to education inequality, setting it equal to 0, and solving to find the inequality threshold at which educational inequality begins to raise income. This is found to be at 0.40 level of inequality. This finding suggests that the role of educational inequality changes with the level of development of the society.

Similarly, the coefficient of Household is negative and significant while its quadratic term enters with a positive and significant sign implying a U-shape effect on the regional income level. However, the household size threshold number at which the relationship becomes positive is high relative to the averages obtained in both regions; in short it is even above the national average. Moreover, the observations that exceeded this threshold are very few in the data set.

4.6.7 Decomposition Analyses

To address the question of how much the differential income is, in aggregate, due to differences in the regional observable characteristics as expressed in equation 7 in chapter three, this sub-section analyses a simple model of regional income disparity in order to measure the extent to which the differences in regional economic performance (i.e. Income) between the regions in Nigeria can be explained by differences in their average observable characteristics such as regional human capital stock and educational distribution. This task is carried out using a decomposition technique developed by Blinder and Oaxaca (1973) which has been popular in the literature of economic discrimination and inequality (Jann, 2008). First, Chow test of structural difference with respect to the regions was carried out in order to ascertain the extent to which the two regions differ structurally in terms of income level. The test will show whether one sub-sample (in this case, a region) has different intercept and slopes than another. The null hypothesis is that the coefficients of the two subsets (i.e. the regions) are equal and the alternative is that they are not. In this case, the p-value associated with the test is less than 1% level of significance (p-value = 0.000), thus providing sufficient evidence to believe that the income levels are different with the respect to regions in Nigeria. However, as shown in (Appendix

3), the output of the Chow test contains the coefficient of a regional dummy (Region); which is coded '1' for Northern region and '0' for the Southern region. The coefficient of the regional indicator is significant with a negative sign (β= -0.175). This implies that the Northern region is differently lower than the southern region in terms of income level with about 17%. This result paves the way for the decomposition analysis in an effort to analyse the role of the educational attainment level and its distribution in explaining the regional income disparity in Nigeria.

The detailed decomposition results (output) are presented in Appendix 4 and 5 while Table 4.15 shows the summarized results of the decomposition. In the first panel of the decomposition output (shown in Appendix 4) is the mean predictions for Regions and their difference. In the sample, the mean of the log income is 4.883 for the Southern region and 4.712 in the Northern region, yielding a regional income difference of about 17 percentage points (0.17). It shows that, almost all of the regional difference is explained by the differences in the distribution of the observed characteristics (i.e. educational attainment and its distribution) and their associated returns. This implies that, adjusting the Northern educational attainment level and its distribution to the levels of the Southern region would clear off the regional income gap.

Table 4.15
Aggregate Effect of Endowments and Returns on Regional Disparity

Decomposition	*Coefficients/(standard error)*
Total difference between the Regions:	0.170***
	(0.010)
1 Endowments (Characteristics) Diff.	0.142***
	(0.014)
2 Coefficients (Returns) Diff.	-.285***
	(0.052)
3 Interaction Diff.	0.313***
	(0.052)

NOTE: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The total regional income difference is decomposed into three parts as depicted in the last three rows of Table 4.15; the first part reflects the mean increase in Northern region's income level if it had the same characteristics endowments level as the Southern region. An increase of 0.142 in that case indicates that differences in educational endowments and it distribution account for about 83% of the observed regional income disparity in Nigeria. The second part quantifies the change in the differences attributed to the returns on endowment characteristics between the North and Southern regions. The negative sign on the value of the return difference implies that the dominant predictor variable (in this case; Educational inequality) in the system has a negative effect. Finally, the third part is the interaction term that measures the simultaneous effect of differences in endowments and their returns. The results of the three components are shown in Table 4.16, and the details of the analyses are contained in Appendix five.

Table 4.16
The Disaggregated Effects of Educational Attainment and Its Distribution on Regional Disparity

Predictors	*Endowments*	*Coefficient*	*Interaction*
Educational Attainment	*0.056***	*0.020***	*0.012***
	(0.005)	*(0.008)*	*(0.005)*
Educational Distribution	*0.086***	*-0.453***	*0.301***
	(0.014)	*(0.079)*	*(0.053)*
Constant Term	---	*0.148***	---
		(0.037)	
Total	*0.142*	*-0.285*	*0.313*

NOTE: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The first column of Table 4.16 shows the regional observed characteristics that are used for the decomposition analysis. The second column contains the part of the differential (i.e. Regional disparity) that is due to regional differences in the educational attainment level and its distribution (i.e. 'Endowment effect'). However, the regional disparity accounted for by the 'Endowment effect' (0.142) is mostly captured by differences in the regional distribution of education than attainment level (0.086>0.056). That is to say, about 61% of the observed regional income disparity that is associated with endowments is explained by the differences in the distribution of the observable characteristics. However, the third column of the table shows the differential that is due to differences in the returns associated with the observed regional characteristics. The decomposition results suggest that returns associated with distribution of education dominates with a high coefficient, in absolute term, (*0.453 against 0.020).* Thus, almost the entire gap of the regional income associated with the returns to characteristics is mostly captured by the measure of the educational distribution. The last column is the interaction term that measures the

simultaneous effect of differences in the observed characteristics (i.e. Educational attainment and its distribution) and their associated returns (coefficients).

4.7 Private and Social Returns to Education in Nigeria

This sub-section is aimed at estimating the private and social returns to different levels of education (i.e. primary, secondary and tertiary) in Nigeria. The private and social rates of return to the different levels of education in terms of income are estimated using the Mincerian wage equation and macro growth regressions respectively. These methods have been commonly used in the literature to evaluate the returns to education (see Heckman, Lochner and Todd, 2003; Berry & Glaeser, 2005; Combes, Duranton & Gobillon, 2008; López-Bazo & Motellón, 2012 among others). The first estimate (private return) evaluates empirically an earning function in which individual income mainly depends on his level of educational attainment (years of schooling) and other individual characteristics of age, gender, industry and location, while the second estimate (social return), assesses the social return associated with each level of education (i.e. Primary, Secondary and Tertiary) at the level of output per capita, in this case, measured by state level GDP per capita which is assumed to capture the society's net benefits of educating its citizens. In the private return equation, the log of household head income is used as the outcome variable, whereas, in the social return equation, the log of GDP per capita is used as the dependent variable.

As already mentioned in chapter three, there is no information on gross earnings of the households in the LSMS data set. As a result, the total household expenditure is used as a proxy for income. Moreover, level of educational attainment is measured by the amount of years of formal education (Edu.) while experience is captured by

potential experience (exp.) which is computed as the age of the person minus six years minus years of formal schooling, where the six years represents the period from birth to the starting age of formal schooling. This approach has been used in other studies using a similar survey data (e.g. Ciccone, Cingano, Cipollone & Faini, 2004). The regression also includes dummies for gender (Male) to control for different wage levels between men and women; for industry to control for sector in the labour market; for urbanization (urban) to control for earning differentials between people in the urban and rural areas; and for location (region) as control variables. In order to capture the return to different levels of education in Nigeria, a specification that decomposes years of schooling into variables for primary, secondary and tertiary attainments is estimated.

As acknowledged in the literature a problem of 'Endogeneity' might arise; the education variable could be endogenous mostly due to unobserved variation in ability (ability bias). For example if those who extended education beyond compulsory schooling have greater ability than those who didn't, then the estimated return to education could be biased upwards since part of the income differential is due to ability or skills acquired outside the school. However, this theoretical expectation has not been consistent with the empirical literature measuring returns on education. Empirical evidences have shown that regressions that have taken care of endogeneity, such as Instrumental Variable (IV) estimates, report higher coefficient for education than the least square (OLS) estimates (see for example, Uwaifo-Oyelere, 2008). Similarly, Aromolaran, (2006) argued that the size of the OLS bias is often slight because the upward bias caused by an omitted variable is usually offset by the downward attenuation bias due to measurement errors in the

schooling variable. Because of data limitation (i.e. the LSMS data set does not capture any explicit measures of individual ability) finding a robust instrument would be impossible. Thus, this study could not deal with the problem. However, studies using data from the sub-Saharan African countries have reported OLS estimates of returns to schooling that are not substantially different, even after correcting the ability bias (e.g., Mwabu & Schultz, 2000; Kazianga, 2004; Aromolaran, 2006).

The Mincerian earning function described in chapter three (Equation 8) is estimated with robust standard errors in order to control for the presence of Heteroskedasticity and influential observations. The first empirical specification assumes that the financial returns to education are constant across the different levels of Education-primary, secondary and tertiary. This restriction is a common practice in the literature and has been tested statistically. Table 4.17 provides the summarized results of the estimated extended Mincer models using least squares. The results show a very significant relationship between each explanatory variable and the log of income as pointed out by their corresponding low p-values. The variables also have entered with the expected signs. However, regarding the measures of fit, the R-squared indicates that these regressors capture only a 20% of the dependent variable variance.

As shown in Table 4.17, the level of experience is positive and significant at 1% (β=0 .037; p-value=0.000) and its quadratic form is significant but with a negative sign (β= -0.00042; p-value=0.000). It affirms that the income of an individual is not a linear function of his experience profile. The turning point at which experience

ceases to impact positively on income is 44 years, meaning that the effect of experience on income reaches maximum at that point and then becomes negative afterward. Considering the Gender variable (*Dummy_Male*), it shows a positive and significant coefficient (β= 0.363; p-value=0. 000). This implies that, there exists a strong evidence of a gender pay gap in favour of men in Nigeria. On average, men earn more than women in Nigeria. Looking at the location variable with respect to urban centres (*Dummy_sector*), it can be observed that the estimate is positively significant at 1% (β= 0.199), meaning that those working in the urban centres, earn more income than workers in the rural areas by about 20%. Finally, considering different sectors of employment in the economy and its associated returns, a dummy variable is used for agricultural industry (*DummyIndustry)* in order to compare the returns of industries. This is prompted by the fact that the sector has been the primary employer of labour in the country and also the highest contributor to the country's Growth Domestic Product (NBS, 2013*).* The results show that working in the agricultural Sector is less convenient than working in other sectors of the economy in terms of income. The coefficient of the industry dummy is negative and highly significant (β= -0.159; p-value=0. 000), meaning that the return to labour in the Agricultural sector is lower by about 16% than in other sectors.

As shown in Table 4.17, the estimated elasticity of income with respect to average educational attainment is statistically significant (β=0.055; p-value=0.000). The private return to one additional year of schooling for Nigeria as a whole is 5.5% on average. This estimate is similar to the findings of previous studies on Nigeria (see, for example, Uwaifo- Oyelere, 2008; Aromolaran, 2006, among others).

4.7.1 Private Returns by Education Level and Regions in Nigeria

In order to estimate the returns to the different levels of education in Nigeria, the restriction that assumes constant returns to levels of education is relaxed. This specification replaces the aggregate or total years of schooling variable in the first Mincerian equation with three different dummy variables for the different levels of education- that is primary, secondary and tertiary levels. This is to allow the marginal return to schooling to vary with the levels of completed education, where different educational levels would have separate effects on income (earnings).

As shown in column two of Table 4.17, the parameter estimates for the relative returns to the different educational attainment levels are statistically significant at the one percent level of significance and come out with the expected signs. The relative returns are highest for tertiary education at about (0.95), followed by secondary education level with 50%. Primary education has the lowest rates of 30%. This shows that the return to workers with tertiary level of education is 95% higher than workers with no education. Similarly, the workers with secondary education earn a higher income than those without education by about 50%, while the difference between those with primary education and those without education is only about 30%. The general pattern of the results is also very similar to those obtained and reported by previous researches conducted on the African continent (e.g. Keswell and Poswell, 2004; Siphambe, 2008; Uwaifo- Oyelere, 2008; Aromolaran, 2006). They all found the marginal rate of return to be very high for tertiary levels compared to the secondary and primary levels of education. Finally, considering the experience variable and the other control variables that are included in the estimation, no significant changes are observed from the baseline estimates.

To determine whether or not returns to the different levels of education vary across the regions in Nigeria, a Chow test of structural difference is used. The test can be used to detect whether the returns to education in one region are different from another region (Adkins, 2013). Now, if, for example, returns (wages) are determined differently in the south, then the slopes and intercept for southerners will be different from those of northerners. Hence, the null hypothesis of the test is that the coefficients of the two subsets (regions) are equal and the alternative is that they are not. The results of the test reveal a significant difference in the returns to education between the two regions. Both the p-values of the Chi-square and F-form associated with the test are very low (p-values=0.000), thus providing sufficient evidence that returns to different levels of education are not equal in the two regions. The details of the test are provided in (Appendix 7)

Table 4.17
Private Earning Functions

	(1)	(2)	(3)
VARIABLES	model1	model2	model3
Edu	0.0551***	-----	-----
	(0.00253)		
Exp_sq	-0.000415***	-0.000414***	-----
	(3.73e-05)	(3.93e-05)	
gender	0.363***	0.370***	0.284***
	(0.0349)	(0.0351)	(0.0415)
Exp.	0.0370***	0.0360***	0.00186**
	(0.00305)	(0.00320)	(0.000910)
inddmy	-0.160***	-0.158***	-0.117***
	(0.0284)	(0.0283)	(0.0385)
sector	0.200***	0.216***	0.149***
	(0.0258)	(0.0256)	(0.0336)
primary		0.257***	0.418***
		(0.0304)	(0.0477)
second		0.487***	0.639***
		(0.0360)	(0.0522)
tertiary		0.952***	1.051***
		(0.0419)	(0.0629)
rgd1			0.0303
			(0.107)
r_pri			-0.108*
			(0.0644)
r_sec			-0.337***
			(0.0686)
r_tertiary			-0.236***
			(0.0821)
r_gender			0.188*
			(0.0975)
r_indtry_dumy			-0.0192
			(0.0572)
r_sector			0.185***
			(0.0540)
Constant	11.34***	11.39***	11.85***
	(0.0705)	(0.0726)	(0.0771)
Observations	4,979	4,979	4,979
R-squared	0.204	0.204	0.181

Note: Robust standard errors in parentheses;*** p<0.01, ** p<0.05, * p<0.1

Column three of table 4.17 shows the results for the differences in private returns to the different levels of education for the two regions. It can be seen that both the return to tertiary education and the return to secondary education are statistically lower in the northern region than in the southern region as shown by the negative coefficients associated with the interactive effects of the two levels of education and regional dummy for the northern region. The coefficients are statistically significant at 1% with β-values of -0.218 for tertiary education and -0.312 for secondary education. This means that, for people with the same level of education, it is more rewarding to work in the southern region than in the northern regions. The results show no significant difference in returns to primary education across the regions, as indicated by the high probability value of the coefficient of the variable on primary education (β= -0.094; p-value=0.152). However, the regional gap in returns to education in Nigeria is higher with respect to secondary education than tertiary education. This may be connected with the fact that, compared to people with only secondary education, most of the people with higher educational attainment (Tertiary) in both regions are employed in the formal sector (i.e. Public sector), which by law, there is little or no discrepancy in their earnings.

This finding contradicts the conclusion which differences in regional returns to education do not exist in Nigeria as reported in Uwaifo-Oyelere, (2008). His findings are based on a simple t-test using aggregate years of schooling as education variable. This study has gone further to use more robust techniques (i.e. Chow test), and also decomposed the education variable into different levels: namely; Primary, Secondary and Tertiary. This result is robust to the influence of Heteroskedesticity and influential observations as the conclusion is based on robust standard errors. The

result is also robust to a specification test as the null hypothesis in the '*RESET'* specification test could not be rejected. The detailed result of the test is shown in Appendix 8.

4.7.2 The Social Rate of Return to Educational Attainment in Nigeria

This section provides estimates on the social return to the different levels of education in Nigeria. Social returns on education are the benefits of education which accrue to the society at large. Educational attainment is expected to generate both economic and non-economic social returns which are very important for collective progress. In the economic literature, it is well documented that, improvement in education is identified by an increase in aggregate labour productivity and consequently real output growth (López-Bazo & Motellón, 2012; Combes, Duranton & Gobillon, 2008; Berry & Glaeser, 2005; Psacharopoulos & Patrinos, 2004). The major difference with the estimation of the private return to education when compared with the social rate of return is the coverage. The social return considers the impact of educating on the general economic condition of the society as measured by any economic indicator such as GDP per capita, not on individual as a person (salary or wages) and overlooks taxes and social transfers, as these are resource flow between the public (government) and private segments in the society. As effectively specified, the social rate of return estimations would represent the aggregate impact of the distinctive levels of education on GDP per capita.

In this specification (Equation 9), the GDP per capita of the 36 states in Nigeria are regressed on the three different levels of education. The diagnostic test of spatial autocorrelation indicates no presence of spatial dependence in the data set (see

Appendix 9). The regression results show that only secondary education is found to have a significant effect on the log of GDP per area as pointed out by the high values of its corresponding t-statistic results and low p-values (p-value= 0.04). The variables of Primary and Tertiary education are not significant. This implies that the social premium of educational attainment is higher for secondary education than for tertiary and primary education in Nigeria. This finding complements the conclusion of Psacharopoulos & Patrinos, (2004) that investment in basic and intermediate human capital yields the highest social returns in lower and middle-income countries. Thus, suggesting that investing in this level of education (secondary) would offer the most appropriate support for boosting economic productivity across the states in the country at the current stage of development.

Regarding the measures of fit, the Adjusted R-squared indicates that the regressors capture only a variance of 26% of the dependent variable. The F-test of the overall significance is also significant as shown by its corresponding p-values (F=4.400; P-value (F) =0.004). To further confirm the significance of the secondary education variable in the specification, a bootstrap estimate on the variable coefficient (point estimate 0.569) is carried out. Based on 1000 replications, with simulated normal errors, the coefficient remains significant at 5% (p-value= 0.042). However, bearing in mind the small sample size and the number of variables used to estimate the social return, some caution is called for in the interpretation of the results especially with the respect to variables of primary and tertiary education. Despite the constraints on the data and analysis in this section, the conclusions are at best consistent with the findings of other researchers using rather different models or different data sets.

4.8 Summary

The detailed results of the various analyses conducted in the course of this study are presented and discussed in this chapter. The exercise started with a descriptive statistics and derivation of the key variables- educational attainment and educational inequality. The results revealed the extent of the regional disparities between the regions in the country. The Northern region is significantly lagging behind in terms of Income level, Educational Attainment and Distribution. Then followed by a series of regression analyses, for which six econometric models were specified. The first and second models (Eq. 4 & 5) measured the impact of educational attainment and educational inequality on the regional income, as suggested in the statistical literature and with these models the second and third objectives of the study were achieved. The third regression model (Eq. 6) was designed to assess the interactive (moderating) effects of regional educational attainment and its distribution on the regional income level while the fourth specification (Eq. 7) was meant to quantify the role of the differences in the regional educational attainment and its distribution on the regional income gap (Objectives 4 & 5 respectively). Finally, the last two models (Eq. 8 & 9) measured the regional variations in the private and social returns to the different levels of education in Nigeria. These were designed for the purpose of the fifth and sixth objectives of the study.

Utilising the spatial econometric techniques that take care of the spatial dependence identified in the data set, the evidence from the econometric analyses revealed the following: there is a significant variation across regions in the private returns to education in Nigeria, and social returns to education are highest on secondary education in Nigeria. The results also suggested that educational distributions matter

more for regional economic performance than average educational attainment level. However, the findings further revealed that, more than average attainment level, educational inequality explains the largest variation in the regional economic performance in Nigeria. The results on the interaction effects provide evidence that educational inequality cancels out the role of educational attainment in posturing regional economic performance.

Lastly, none of the control variables presented in the models changed the level of significance or the sign of the coefficients for the variables delineating the level of educational attainment and its distribution, making the positive relationship between educational achievement and regional income level, and the negative association between education inequalities and regional income robust to changes in the models' specification.

CHAPTER FIVE

SUMMARY AND CONCLUSION

5.1 Summary of the Study

Since the return of the country to 'democracy' in 1999; the Nigerian economy has recorded a remarkably high level of economic growth, averaging about 7.2% of real GDP (Gross Domestic Product) growth rate (NBS, 2014). Despite this development, the country is gulped with unequal regional development that stands on the way of progress of such a prosperous nation. The question of the sustainability of the economic growth in Nigeria has been a recurring one, as the economic disparity between the Southern (coastal) and Northern (inland) regions have a tendency to make political and social pressures that may keep down the development of the economy in the long run. Roused by this intense circumstance of regional economic disparity, this study attempted to uncover the sources of the persistent regional economic (income) disparity in the Nigerian economic context. Thus, in an effort to find ways of reducing the regional economic disparity in Nigeria, the role of households' education level and educational distribution, among others, in explaining the differential income level across the regions were explored. Specifically, the research involves the examination of how educational attainment and its distribution affect the determination of income level across the regions, and how the factors account for regional income disparities in the country.

The stylized facts presented in Chapter 1 show clearly that there has been a regional economic disparity among the regions of Nigeria. Specifically, the Southern region has enjoyed a higher level of per capita income and consumption expenditure, as well as the labour productivity than the Northern region. That goes the same way

with other indicators such as the unemployment rate, income inequality and infant mortality rates, which have enlarged economic disparity between the two regions. However, despite the central government's efforts in distributing projects across regions in the country, differences in standards of living among the regions remain profound. From the stylized facts arise two crucial questions on the regional disparity in Nigeria. The first question relates to the sources of the regional disparity; first, what explains the difference in income level across regions? Second, what is the leading factor(s) in the determination of regional income level and regional disparity in Nigeria that causes the Northern region to lag behind? The study focused primarily on the role of educational attainment and its distribution guided mainly by the fundamental assumptions of endogenous growth and human capital theories. Both the theories recognise that the accumulation of education generates increasing returns because highly skilled workers tend to have a high capacity for productivity and innovation, and are, therefore, crucial to both companies and the regional economies.

The review of previous empirical literature in Chapter 2 suggests that these two questions have not been correctly addressed in the regional economic literature. However, the existing literature on regional disparity did not consider the role of the distribution of education in explaining the regional income disparity in the country. So also the potential interdependence among regions through the concept of spill-over effects has been ignored. Therefore, in Chapter 3 a new analytical framework has been conceptualized based on the new growth theory to investigate the determinants of regional income and sources of regional income disparity in Nigeria. The study developed a more comprehensive analytical framework that gives a better

understanding of the role of education in regional economic performance and inequality. Economic and demographic factors that are consistent with the recurring arguments in the literature are incorporated. The framework incorporates not only educational attainment level, but its distribution that could be imperative for evaluating the levels of, and differences in regional income among regions (see, for example, Thomas, Wang & fan, 2001; and Lopez, Thomas & Wang, 1998).

In Chapter 4, with the assistance of econometric procedures involving the spatial regression analysis, the degree to which such a framework can explain the sources and pattern of regional economic inequality in Nigeria has been checked empirically utilizing the recent Nigeria survey data obtained from the Living Standard Measurement Studies (LSMS) of the World Bank database (LSMS).

5.2 Conclusion and Policy Implications

This study investigated the factors that determine the level of regional income and sources of income disparity across regions in Nigeria, with emphasis on the effect of educational attainment and its distribution as well as their associated returns. Additionally, various factors were also considered pertaining to the demographic profile, industry and level of economic conditions proxied by GDP per capita. Relying on household data and by calculating the average years of schooling (AYS) and the Education Theil Index for the whole country and regions (Southern and Northern Regions), this study shows the extent of educational inequality in the country. Average educational attainment is higher in the Southern region than in the North as the results show. Not only that the northern region is lagging behind in terms of educational attainment level, the region also has higher levels of educational

inequality of the Theil index. The study affirmed the presence of wide differences among regions and across states in both the level of educational attainment and its distribution in Nigeria.

Although there are differences with respect to education inequality among states and between the regions, this study finds that there is within regions disparity on the level of educational distribution, and the same goes between and within states in the same region. A few states are improving and have higher attainments and distribution than other states in the country. As contained in Appendix 2a, the distinction in both educational accomplishment and imbalance gets to be more noticeable at the state levels than at regional levels. For instance, between regions in Nigeria, the gap in the level of educational attainment measured by years of schooling goes as high as 100% difference. The highest average attainment level is 7.0 years, and the lowest is 3.5 years. Similarly, as for the educational Theil Index, it goes as high as 0.405 to as low as 0.170 for the Northern region and Southern region respectively. Then again, the average years of education across states go as high as 9.14 years and as low as barely a year and the educational inequality range between 0.081 and 0.717 across the states. The finding calls for urgent improvement in the states governments' efforts towards education especially from the disadvantaged states.

For a preliminary analysis, in order to understand the regional variations in Nigeria, a twofold observation was carried out. Both between and also within inequalities are evaluated with respect to regions and sectors. The study found that within regions and sectors' educational inequality rather than between, contributes more to the

country's level of educational inequality. The results underscored the problem of access to education, especially in the rural areas. Increasing equal access to education in rural areas will help in no small measure towards improving educational equality in the country. However, this study finds that at state and regional levels, the average years of education of the economically-active population is inversely related with inequality of educational attainment as measured by the education Theil Index. In this manner, enhancing the enrolment rate of education at all levels would have positive impacts on the level of educational attainment, as well as on the change in the nation's education distribution.

There is strong evidence for spatial clustering of income and educational attainment in the data set. The spatial autocorrelation tests confirmed the presence of spatial dependence among the regions in Nigeria: meaning that, the income in one area is influenced by the income of the neighbouring areas. It points to strong econometric evidence that the spill-over effects is important in the modelling of regional income determination and inequality and, therefore, shouldn't be ignored in the analysis. The tests recommended that the spatial error version of the spatial model is the most proper specification for the data set, and the model fits did not vary remarkably from the OLS models. It indicates that OLS estimates are not severely biased when spatial effects are taken into account.

However, statistical associations of a number of socio-economic indicators with regional income level are tested to give a clarification of territorial economic performance. Among those most inversely related were family size, spill-over effects, and the specialization in Agriculture. Ageing and gender indicated almost no

critical association with regional levels, recommending that they may not be an essential condition for regional development. Through spatial examination, it was apparent that rural areas and specialization in agriculture tend to be those associated with lower income levels. The result suggests that regional industrial policy which includes promoting the return to agricultural activities and establishment of companies in rural areas that require agricultural produce as inputs will bring down regional income disparities.

As a whole, the results show that both educational attainment and educational distribution matter for regional income determination. However, the evidence displayed in this study shows that a more educational inequality not only hinders regional economic performance, but also negates the potential impact of educational attainment on regional income determination. It follows that the interactive effect of educational attainment and its distribution is paramount for regional income determination. These results are shown not to be affected by the omission of relevant variables as confirmed by the GMM estimation of the spatial regression model that takes care of unobservable heterogeneity and endogeneity of the regressors.

Based on the empirical analyses, the main factors accounting for the regional income difference in Nigeria include both the differences in the level of regional educational attainment as shown by the existing literature, and also differences in the level of its distribution. The high level of income in the southern region should be ascribed partly to the cumulative relationships between the level of regional stock of education (educational attainment) and its widespread distribution and partly to the region's preferential policies favouring the education sector. The finding shows the

suitability and effectiveness of these factors to serve as instruments in designing a regional policy that will help in narrowing the regional gaps.

The private returns to the different levels of education have been obtained by cross-sectional regressions based on individual data that allow controlling for a number of unique characteristics. The empirical results demonstrate, in line with the theoretical literature that the education confers significant private benefits to individuals. In the Nigerian labour markets, as it is in other developing countries, education premium increases with the level of education. This study confirmed that, tertiary education gives the highest private returns to education in Nigeria when compared to the secondary and primary education levels. The findings show that the tertiary education has higher returns for the individual by about 95%, is followed by secondary education by 49%, then primary education with 26%. The results corroborate the findings of empirical studies conducted in some African countries as in Siphambe, (2008) and Schultz, (2004), where substantially higher private returns to tertiary education than those of the secondary and primary levels were also documented. Additionally, the findings of high returns to higher education in this study comply with the results of Asafu-Adjaye, (2013) and Aromolaran, (2006), indicating a significant demand for skilled manpower in the modern Nigerian economy.

This study finds significant regional differences in the private returns to education in Nigeria. The findings show the existence of a high variation in the returns to the different levels of education across the regions. Returns to all levels of schooling are lower in the north than in the south. The result corroborates the earlier results of the decomposition analysis of the regional income disparity that found heterogeneity in

the returns to factor endowments as one of the main factors explaining income disparities across regions in Nigeria. The high rate of return for higher level of education demonstrates that the income gap between the most astounding and least educated labourers is noteworthy, and may be one of the reasons why Nigeria is having such a high and expanding income disparity both between and within regions. The crevice might additionally work to keep the recorded economic growth from being pro-poor or being capable of decreasing poverty. From policy standpoint, however, the rising pattern of private rates of return to education by level of education proposes that there exists some space for private financing at a college level or university levels. A shift of some part of the cost burden from the government to the direct beneficiaries and their families is not likely to create a disincentive of investing in higher education given the high private rates of return at that level of education.

For the social rate of return to the different levels of education in Nigeria, this study finds an association between education and a measure of social benefit used in this study (GDP per capita) to be greater at lower levels of education than at higher levels. Only secondary level of education appears to be significantly associated with the GDP per capita. It is found that, the social returns on investment in secondary education in Nigeria are higher than the returns on investment in higher education. The estimated social rates of return in this study highlight two significant policy implications: First, the utmost importance of investment in secondary education for economic development; second, the social rates of return to the different levels of education are well below the corresponding privates return rates. It could be because many social benefits that are accruing to education, such as social cohesion, lower

crime rate, personal health, fertility and political participation, are not captured in the analysis. Moreover, since these benefits are equally important in the development process, therefore, the comparison between social and private estimates in this study is somewhat difficult if not meaningless. Similar observations are well documented in the related literature (see for example Blundell, Dearden, Meghir, & Sianesi, 1999; Voon, 2001; Vedder, 2004; Oreopoulos & Salvanes, 2011; Dickson & Harmon, 2011; Oreopoulos & Petronijevic, 2013; Cygan-Rehm & Maeder, 2013).

Overall, after controlling for spatial effects, the evidence points to the paramount importance of the educational distribution in accounting for regional disparities in economic performance in Nigeria, also suggests from model estimation is the importance of spatial spillover effects and human capital externalities in understanding the data.

5.3 Policy Recommendations

In 2004, the National Policy on Education was again amended. This is the most recent change in the education policy in the country and the fourth of its kind. For the most part, the National Policy of Education in Nigeria is versatile to changes and also appropriate for a developing nation and multi-ethnic country like Nigeria. The revised policy has led to the establishment of more schools for all levels of education in the country. In Nigeria today, every state has at least two universities (i.e. federal and state universities). The policy also provides an avenue for more participation from the private sector that led to the establishment of more private schools and universities. Consequently, there is a substantial improvement, in absolute terms, in the school enrolment at all levels of education, particularly at the primary level due

to the reintroduction of the universal basic education program. However, there is no improvement in relative terms in the school enrolment in the country (UNESCO Actions Plan, 2012).

The establishment of federal colleges and universities across the states in Nigeria may not be enough to produce or enhance the desired distribution of education and the even development of all regions, zones and states of the country (Arubayi & Ikoya, 2009). The current policy for admissions into federal colleges and universities in Nigeria are mainly based on test scores archived by a candidate in a national common entrance examination and Tertiary Matriculation Examination respectively. This is unfavourable to the candidates from the rural areas and those from the low socioeconomic background as they have poor educational background, and thus, making it very difficult for them to compete with the children of the elites who are well thought and trained in the private schools and colleges.

In an effort to improve the education funding and also to reduce the burden of financing education for the government in Nigeria, the tuition fees and user charges paid by students have been increased particularly at the tertiary level of education. This strategy allows the institutions to recoup some part of the management costs for the students and make more funds available for the institutions. By implication, this development makes it more difficult for the offspring of the poor and those from the rural areas to have access to education. However, this strategy is more consequential in the northern region where cultural and economic factors are working against the peoples' participation in education.

In line with the findings of the study and the current educational policies in Nigeria, the following policy recommendations are made towards reducing the economic disparities between the North and the Southern regions of the country. It is pertinent to stress here that, the state governments have various fundamental and non-replicable roles in the process of reducing regional disparities through the supply of necessary economic and social infrastructures, especially education and training, so as to allow individuals and firms to be able to catch up with modern technological progress. However, it is even more imperative on the part of the federal government to implement Sector and region-biased policies, especially by introducing preferential measures to attract FDI and promote international trade in commodities to the inland region (North). Moreover, this could have an equalizing effect on spatial income distribution.

From a policy standpoint, the findings of the study also suggest that reducing the rural–urban as well as regional disparity in educational attainment should be the prime objective of Nigerian government. For the rural-urban gap, more educational infrastructure should be established in the rural areas with additional incentives for reducing the opportunity cost faced by rural households in sending their children to school. Rural households typically need their children to work to supplement household income through assisting in agriculture or the related industries or trade. With the regards to admission into schools at all levels of education, the rural populace and unfortunate offspring should be given a special consideration. A ‘one cap fit all’ policy will not help. The cut off points for students from rural areas, and poor background should be lower than those from urban areas and rich background.

Additionally, governments should strategize means to support poor households with textbooks, school uniforms, school fees and other school materials for their children. This will help towards increasing the school enrolments in the rural areas. Going from the low-income level associated with Agricultural sector in Nigeria and the economic problems created by the sluggish growth in the sector, there is a need to improve the economic efficiency of the agricultural sector. This could be through investment and policies that will mechanise the process and make it more commercial than subsistence. This will quickly raise farmers' earnings, and consequently, increase the investment and productive abilities of these economic agents (households) and improve the economic performance of the northern region, which is dominated by this inefficient sector.

In terms of reducing the regional disparities in Nigeria, it seems that policies aiming at promoting educational attainment and quality of education are a useful tool towards improving peoples' productivity, employability and participation in the market for labour. The effect of these strategies is likewise prone to be stronger in locations with lower levels of development. Accordingly, increasing the level of education in these regions would help in closing the gap in the regional labour productivity, employment and investment rates. The general impact would, therefore, be an increase in the average income level of the lagging regions and a reduction in regional disparities. Equally important, is the suggestion that the promotion of education in less developed regions simultaneously meets the goals of equity and efficiency, given that the reappearance of such a strategy is higher in poor and less developed areas than in the prosperous and more advanced areas. Nonetheless, strategic move to the regional equalization of educational attainment

and returns to education will be useful in enhancing the regional income convergence in Nigeria.

Finally, for the government to address regional income disparity in Nigeria and avoid its possible adverse effects, policies with a dual goal of increasing educational attainment and reducing educational inequality would be a very helpful strategy. The current educational policy in the country does not take into consideration the regional peculiarities of the country. Education policy for a heterogeneous country like Nigeria should not be a blanket for all. For effectiveness, a policy should be tailor made so as to accommodate the peculiarities of the receiving targeted environment.

Going by the above findings, the policy implication of the role of educational attainment through its distribution is quite different from the postulations in some theories of a trade-off between equity and development. Those theories emphasize that educational inequality is essentially an impetus for people to investment more in education, and, therefore, should be viewed as income-enhancing (Rebelo, 1991; Voitchovsky, 2005; Rodríguez-Pose & Tselios, 2010). Quite the opposite, the findings of this study suggest equalizing the distribution of educational opportunities across the regions can lead to regional income convergence. Moreover, through increasing access to education especially for the rural populace may not only improve the living standard of individuals and regional income level, but will also reduce the regional economic disparities that have the potential of distracting the country's peace and progress.

5.4 Limitations and Directions for Further Research

Like any other research studies, this study is not without some limitations. The main constraint of this study is the unavailability of data for some variables that are necessary for regional income modelling, and these have created a major obstacle to the evaluation process. Many variables that theories suggest having influence on regional income level could not be included in the analysis due to the limited number of variables available on the data set. There is, however, a need for upgrading the database to include more economic variables. Another drawback faced by the study is the short span of data. Consequently, the study only used one-period data as it is the only available data at the time of the study, because the survey (LSMS) is not carried out annually. Therefore, when more data sets are available, it is imperative to investigate further in future researches some of the specifications adopted in this study using long span data that will allow for the use of panel data techniques.

It cannot easily be said that regionally economic disparities in Nigeria are determined only by differences in educational distribution. Other factors such as regional resource endowments, institutional quality, educational quality, and market and work access may also exert their influence in accounting for the regional disparity. Therefore, future studies could focus on these factors by using the application of different methods and techniques. The stylised facts presented in chapter one and the preliminary observation of the data in chapter four suggest, with respect to economic indicators, the presence of two settled disparities in Nigeria. One is the North-South imbalance, while the other is the rural-urban disparity. To thoroughly understand the nature and pattern of regional income disparity in Nigeria,

the sources of income inequality between the rural and urban areas can additionally be considered in future researches.

Finally, it is also recommended that future study may consider investigating the determinants of educational inequality in Nigeria.

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