

Public Spending and Poverty Reduction in Nigeria: A Benefit Incidence Analysis in Education and Health

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Abstract

One of the functions that people usually expect a government to perform is to reduce inequality and poverty, and public spending is one way a policy maker works towards achieving such important task. Education and healthcare provision have been suggested as key sectors that help every policy maker achieve the above objective. The study evaluated public spending efforts in reducing inequality and poverty at all levels of these two sectors using the Benefit Incidence Analysis (BIA) in Nigeria. Findings from the study suggest that primary education and healthcare were more pro-poor in absolute terms than tertiary education and healthcare. Secondary education and healthcare reveal mixed results, while the findings suggests state, regional (geopolitical), location and gender biases in benefits from public spending for both education and healthcare. The study findings have an implication that income redistribution may be effected through subsidized government services, rather than through direct income or consumption transfers.

List of abbreviations and acronyms

AIAE	African Institute for Applied Economics
AERC	African Economic Research Consortium
ANOVA	Analysis of Variance
ASUU	Academic Staff Union of Universities
BIA	Benefit Incidence Analysis
CBN	Central Bank of Nigeria
EFA	Education For All
FCT	Federal Capital Territory
FEAP	Family Economic Advancement Programme
FMH	Federal Ministry of Health
GDP	Gross Domestic Product
HDI	Human Development Index
HMB	Hospital Management Board
HND	Higher National Diploma
JAMB	Joint Admissions and Matriculation Board
JS	Junior Secondary
LGAs	Local Government Areas
MDGs	Millennium Development Goals
NBS	National Bureau of Statistics
NBTE	National Board for Technical Education
NCCoE	National Commission for Colleges of Education
NCE	Nigeria Certificate in Education
NCML	National Commission for Mass Literacy
ND	National Diploma
NEEDS	National Economic Empowerment and Development Strategy
NEMA	National Emergency Management Agency
NHIS	National Health Insurance Scheme
NISER	Nigerian Institute of Social and Economic Research
NLSS	Nigerian Living Standard Survey
NUC	Nigerian University Commission
PETS	Public Expenditure Tracking Survey
PHDA	Primary Healthcare Development Agency
PPSMB	Post-Primary School Management Board
PSM	Propensity Score Matching
RBM	Roll Back Malaria

SAP	Structural Adjustment Programme
SEEDS	State Economic Empowerment and Development Strategy
SS	Senior Secondary
SSA	Sub-Saharan Africa
SSCE	Senior Secondary Certificate Examination
SUBEB	States Universal Basic Education Board
UBE	Universal Basic Education
UBEC	Universal Basic Education Commission
UNDP	United Nations Development Programme
UPE	Universal Primary Education
USA	United States of America
VAT	Value Added Tax
WHO	World Health Organisation
WHR	World Health Report

1. Introduction

The state, in promoting development functions, acts as the provider of goods and services in some areas and plays the role of a facilitator towards private sector enhancement and development in other areas. By so doing, it undertakes expenditures to pursue a variety of economic, social and political goals which include poverty alleviation, reduction in inequality and creating an enabling environment for the private sector. In support of the above, Sahn and Younger (2000) opined that, two functions that people routinely expect a government to perform are to reduce both inequality and poverty. This implies that poverty reduction may not be enough unless there is a corresponding reduction in inequality. Besides the targeted programmes of food and housing subsidies, investment in the form of public expenditure that increases access to, and provision of, basic social services like education and healthcare is central to increasing the welfare of the poor.

According to Heltberg et al. (2003), reduction in poverty and inequality usually requires a combination of well distributed economic growth and increased investment in human capital, especially among the poor. Two key areas for such investment are education and health, both sectors in which the state is the major service provider. If it is believed that investment in education and healthcare helps to improve the welfare of the poor, then there is a need to look at who is benefiting from such spending for equity reasons. The incidence of public spending is crucial for efficient targeting which has become increasingly important in the current era of macroeconomic reforms as most governments are under pressure to reduce their total expenditure due to growing deficits. It is also equally important because if not well-targeted, such spending may not be able to achieve its goals; hence, for this challenge to be met, policy makers need information on the structure of the sector and its financing. Such information provides a basis for the understanding of the government's financial operations that will contribute to the goals of resource usage and fairly balance spread of budget allocation among sectors, locations, states, regions as wells as gender.

Shenggen et al. (1999) argued that government spending can have direct and indirect effects on people's welfare in three ways such as the macroeconomic effects (inflation and unemployment), the primary income effect (the expenditure incidence), and the transfer effect (the benefit incidence). It is also believed that public expenditure can have a direct impact on human development outcomes. According to Demery (2000), public spending is expected to create other incomes directly, some of which are expected to benefit poor households and these incomes in turn create other incomes through the income-expenditure multiplier process. Such spending generates transfers to the population either

in the form of cash or monetary transfers, social assistance¹ or social insurance payments or in kind payments if spending is progressive² and otherwise if regressive.

Progressive monetary or cash transfers, through public expenditure, can help reduce income inequality through its redistribution process. In support of this believe, Ajawd and Wodon (2001) maintained that if public spending gets to the richer households before reaching the poorer households, especially if there are some level saturation in the services that can be provided to the rich, then the poor may benefit more from an increase in spending than from the existing level of spending. Spending in social services like education and health care is generally considered as a redistributive or anti-poverty policy instrument in developing countries (Bourguignon et al., 2003; Luiz et al., 2002). This is so because when subsidy is provided for a particular expenditure which households would have made, there is every tendency that the income set aside for that particular expenditure will be used for other expenditures or rather saved.

Nigeria's public expenditure, as an aspect of fiscal policy for nearly four decades, has been based on two goals of helping spurring rapid economic growth, and ensuring that economic growth is distributed in a fair and equitable manner. This has been the target of all the policy regimes.³ These policy regimes have also recognized the importance and the need to invest in education and healthcare as one way of tackling sustainable reduction in poverty and inequality with the introduction of notable education and healthcare programmes like Universal Primary Education (UPE) in 1975, National Primary Healthcare in the 1990s, Family Economic Advancement Programme (FEAP) of 1992, National Commission for Mass Literacy (NCML) in 1997, Universal Basic Education (UBE) Programme in 2000, Immunization Programmes from 1970 to date, Roll Back Malaria (RBM) in 2001, amongst others. In summary, Nigeria's health targets for nearly four decades include: affordable and cost-effective basic health services for 90% of the population, and 100% routine and special immunization coverage while that of education target has been Education for All (EFA).

The current debate is no longer that of investment in education and healthcare but who has benefited from the investment so far. This is important, not only in achieving the Millennium Development Goals (MDGs), but also in fostering improved education and healthcare outcomes. Table 1.1 presents basic education and healthcare indicators in Nigeria across regions (geopolitical zones). Looking at Table 1.1, doubts emerge as to whether there have been improvements in education and healthcare given the investments in the two sectors over the years.

Table 1.1: Basic social and poverty indicators across region and location in Nigeria

Regions/ Indicators	North- East	North- West	North- Central	South- East	South- West	South- South
Literacy Rate	46.3	53.6	63.1	56.1	57.3	63.2
Poverty Incidence (%)	72.2	71.2	67.0	26.7	43.0	35.1
Public Medical Access (%)	48.4	55.3	61.1	37.1	73.1	45.9
<i>Primary Net Enrolment</i>						
Male	43.7	42.2	72.5	81.6	82.3	76.8
Female	41.5	38.6	72.1	80.0	81.2	76.1

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Table 1.1 continued

Regions/ Indicators	North- East	North- West	North- Central	South- East	South- West	South- South
<i>Secondary Net Enrolment</i>						
Male	26.7	27.5	47.9	58.0	65.4	56.8
Female	24.7	22.5	43.8	61.4	64.3	60.9
Infant Mortality rate	125	114	103	66	69	120
Under 5 Mortality rate	260	269	165	103	114	176
<i>Total Number of Public schools</i>						
Primary	8,796	16,298	11,755	5,327	9,120	7,308
Secondary	1,341	3,791	3,680	2,138	3,547	4,176
Tertiary	28	31	39	26	49	33
<i>Total Number of Public Health facilities</i>						
Primary	2,127	3,763	2,887	1,196	2,336	1,964
Secondary	91	100	207	88	193	166
Tertiary	7	11	9	10	12	10
Percentage of Population	13.6	25.6	14.5	11.7	19.7	15.0
Male headed households	95.6	97.5	88.3	76.2	80.0	76.6
Female headed households	4.4	2.5	11.7	23.8	20.0	23.4
Quintiles	1	2	3	4	5	
Infant Mortality rate	133	140	110	87	52	
Under 5 Mortality rates	257	293	215	179	79	

Source: NBS.2007. *Annual Abstract of Statistics*.

In this respect, empirical evidence on who benefited from spending on healthcare and education provides clear evidence that goes beyond answering the question of *level or amount spent but how well they have been targeted across households*.⁴ Amount spent is necessary for poverty reduction but better targeting is required for reducing inequality.

Statement of the problem

Poverty in Nigeria is multi-dimensional and has many faces as revealed by Nigerian indicators of human development such as education⁵ and health⁶ amidst spending relative to the Gross Domestic Product (GDP). Analysis of poverty in Nigeria shows inequalities in terms of educational and health indicators, and such indicators vary across regions (geopolitical zone), states, location (urban and rural), and gender (male and female). Table 1.1 reveals regional differences in national poverty. The North-East and North-West regions had the highest contribution to national poverty, while South-East had the least contribution to national poverty. Table 1.1 also discloses high inequality in health outcomes according to household quintile which improves as household moves from a poorer quintile to a richer one. The Nigerian case shows inequalities by location, with people in the rural areas contributing 65% to national poverty, while their urban counterparts contribute 35%. This reveals that poverty is more predominant in the rural sector.

Net enrolments for primary and secondary schools vary across regions and reveal gender disparity too. These two indicators favour male more than female across regions, except in the South-East where female secondary net enrolment is higher than male. South-East region has the lowest infant and under five mortality rates but has the highest number of female-headed households.

In terms of health outcomes, rural infant mortality rate in 2007 was 121 as against 81 per every 1000 live births for urban while under five mortality rate for rural was 243 as against 153 per every 1000 live births for the urban. A look at the situation tends to corroborate the fact that poverty in Nigeria is becoming *dynastic* with the children of the poor likely to become poor due to widening inequality in access to education and healthcare facilities.

The story is not different at the state level. Poverty incidence increased in nine states from the 1996 figures and the increase was more pronounced in Jigawa State, which increased from 71% in 1996 to 95% in 2004. In general, poverty increased more in the northern states than in the southern states.

With the scenario presented above, it is worrisome if public spending and subsidies in these two sectors have been progressive (concentrated among the poor). This is because public spending is known to have direct linkage to the poor through social transfers. This study, therefore, is aimed at measuring benefits accruing to households from public expenditure in education and healthcare and to find if they are progressive, regressive or neutral. Benefits from public spending and subsidies are progressive if they are more concentrated among the poorer households and regressive if otherwise. The study is an evaluation of public spending on poverty reduction and inequality using the Benefit Incidence Analysis⁷ (BIA). Though there are other comparable measures of expenditure impact, BIA even with some limitations and flaws is preferred because it is easier to calculate the current benefits as opposed to benefits over the recipients' lifetime. BIA also combines the cost of providing public spending with information on their use in order to generate distributions of the benefit of government spending.

The result of the study will be very useful as information on distributional impacts; particularly, the extent of benefit on the different quintiles can help policy makers in making public spending choices. According to Reinikka (2002), employing BIA is most appropriate because of evidence of limited impact of public spending on growth and human development outcomes across developing countries and there is a dearth of studies in Nigeria in that direction.

The goal and objectives of the study

The goal of the study is to determine how equitable the public expenditures are at every level of education and healthcare through the benefits that accrue to different households quintiles in Nigeria. In other words, the study's main goal is to determine what the distribution pattern of expenditure in education and health has been and ascertain if public expenditures in these sectors have been progressive, regressive or neutral when compared to the 450 lines and per capita consumption or expenditure known as the Lorenz curve.

Specifically, the study is to analyse benefits from public expenditure on education and healthcare at all levels in Nigeria to ascertain if they are:

- Progressive across different household groups (quintiles);
- Progressive across regions (geopolitical zones) and states of the federation; and
- Progressive by location and according to gender of recipients.

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The study will also assess the distribution of beneficiaries using tests for welfare dominance with simple binary indicator of whether or not one uses a service as well as test and compare the result from different methods (traditional BIA and assessment of distributions of beneficiaries using tests for welfare dominance with simple binary indicator).

2. Literature review

Benefit Incidence Analysis (BIA): Brief theoretical and empirical evidence

BIA is always defined in terms of the financial subsidy received from public resources, as distinct from volume of services delivered (education, health and other social sectors) or some other form of output measure. It is usually employed in public finance field, to determine the progressive or regressive nature of government expenditures. BIA offers an important perspective on budgets, and can illuminate the distributional impacts of proposed reallocations of government resources among projects.

According to Demery (2000: 1), public expenditures affect the population in a number of ways. First, fiscal policy influences the macroeconomic balances, particularly the fiscal and trade deficits and the rate of inflation. These changes, in turn, affect living standards — directly, through influencing real incomes, and indirectly, through changing the rate of economic growth. These are the macroeconomic effects of public spending. Second, public spending creates incomes directly, some of which might benefit poor households. These incomes in turn create other incomes through the income-expenditure multiplier process. These are the primary income effects (or the ‘expenditure incidence’) of public spending. Finally, public expenditures generate transfers to the population. These may be either in the form of cash or monetary transfers, such as social assistance or social insurance payments, or in kind. The latter includes subsidized government services such as health, education, and infrastructure services. These in kind transfers improve the current well-being of the beneficiaries, and also enhance their longer-run income-earning potential. They, therefore, involve current and capital transfers to the recipients, and can be called the transfer effects (or the ‘benefit incidence’) of spending.

If the above conditions hold, assessing the actual level and allocation of public expenditure is, therefore, the key to understanding any government’s true expenditure priorities and its coherence with the policy objectives. This has been a long-standing problem in the economics literature, i.e., the measurement of publicly provided goods to individuals and the society. The above task requires an analytical framework to organize data on the government’s financial operations which will give insight to how and who benefit from such spending.

Apart from poverty reduction, the case for public subsidy is also based on equity considerations and most economists think it is the responsibility of the State. It is becoming widely accepted that, provisions of social services for the poor is one of the

most effective instruments the state can employ to achieve this crucial objective. What follows, according to Demery (2001), is based on the following arguments:

- First, public expenditures can only be effective in reducing poverty when the policy setting is right. It is hardly worth increasing spending on primary education for girls if distortions in labour markets prevent female school graduates from securing employment. Similarly, it is futile to increase spending on agricultural extension or research if overvalued exchange rates make agricultural activity unprofitable. Pro-poor experiences must be accompanied by pro-poor policies.
- Second, it is assumed that open public expenditure process (including budget management, accountability, transparency and stakeholders' participation) is based on outcomes and impacts and not just line items and inputs. Simply spending money on the provision of a service, without attending to the efficiency with which that spending generates services and to the impact on the intended beneficiaries, is not what is recommended here (Filmer et al., 1998).
- Third, public policy in general and public expenditure decisions in particular, must be based on a sound understanding of the needs and preferences of the population at large. The provision of public services should be viewed as collaboration between governments, on the one hand, and the households on the other. To make this collaboration effective, there must be a two-way flow of information, with governments constantly 'listening' to households and households, in turn, being informed of government objectives and their rights under explicit contracts or covenants. The big concern here is with one dimension of the information flow: how can governments be informed about the needs of their clients, especially the poor? Who indeed benefits from public spending?

In an effort to provide answers to the above issues, especially when governments subsidize the provisions of goods and services or when they take the responsibility of providing them, gave birth to the Benefit Incidence Analysis (BIA). BIA came to the limelight through the works of Meerman (1979) on Malaysia and Selowsky (1979) on Columbia which stem from Aaron and McGuire (1970) who set out the basic principles to be followed in assessing how public expenditures benefit households. The need for principles and basic framework were borne on the fact that, when such goods and services are provided by the State (public goods and services), price(s) may not be the best guide. Based on the above works, BIA has been employed in several assessments towards finding who benefited from public spending. BIA is easier to calculate unlike the welfarist⁸ approach, which is more theoretical with simulation alternative outcomes that are based on the estimated demand functions. Several authors have used BIA to assess how progressive public spending has been. Some selected empirical studies are presented in the Table 2.1.

Table 2.1: Summary of selected empirical expenditure incidences across the globe

Author(s) and Year	Country(s)	Title	Methodology	Findings	Conclusion
Van de Walle and Nead (1995)	13 African countries	Public Spending and the Poor: Theory and Evidence.	Employed traditional BIA to assess which economic groups benefit most from the financial subsidies provided by their government in education expenditures.	On average, only 10% of the subsidies for higher education went to the poorest 40% of the population, while 43% of subsidies for "all education" accrued to same income group.	Education sector expenditures vary in their incidence according to the level of service. Primary and secondary education were more pro-poor than university/higher education.
Demery (1996) and The World Bank (1995b)	Ghana, Bulgaria and Vietnam	The Incidence of Social Spending in Ghana, Bulgaria and Vietnam.	Employed traditional BIA in public expenditure review.	Women gained an in kind transfer of Cedis 4,321 per capita compared with Cedis 3,576 for men in Ghana. On average, each Bulgarian Turk ^o gained just 1,101 leva from health subsidy and each Bulgarian Gypsy, 1,446 leva. Whereas Turks and Gypsies represent 13% of the population, they received only 6% of health subsidy with the Turks being the most disadvantaged.	A major source of inequality in the benefit incidence of health spending in Ghana was the gender dimension because females gained more health subsidy than males in Ghana. In Bulgaria, there is a wide disparity in racial access to health hence targeting health services to the poor is an ethnic issue.
				In Vietnam, the mean subsidy for hospital inpatient and outpatient care were used for the benefit incidence estimates which could not take into account an important source of variation in the s variable (differences across levels of hospital services).	No conclusion was reached for Vietnam.

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Table 2.1 continued

Author(s) and Year	Country(s)	Title	Methodology	Findings	Conclusion
Harding (1995)	Australia	The Impact of Health, Education and Housing Outlays on Income Distribution in Australia in the 1990S.	STINMOD/94B and NATSEM's static micro-simulation model. STINMOD is a publicly available computer model of major federal government revenue and expenditure programmes.	The pattern of receipt shows a strong life cycle effect, with the value of non-cash benefits peaking in the 30-40 years age group, rising again in retirement. Non-cash benefits were also shown to have an equalizing effect on income distribution.	Major beneficiaries of public outlays on social services were families with children and the aged.
Demery et al. (1996)	Ivory Coast	The Incidence of Social Spending in Ivory Coast.	Used traditional BIA in assessing who benefited from educational expenditures	There was a marked improvement in targeting of education spending in Ivory Coast (between 1986 and 1995), despite a reduction in overall real spending on education.	Changes in benefit incidence were not necessarily a result of changes in public spending.
Castro-Leal et al. (1999)[Seven sub-Saharan countries	Public Social Spending in Africa: Do the Poor Benefit?	Comparative benefit-incidence examination of government health and education spending.	On average, the amount of overall government health expenditure going to the top 20% of the population was about two and a half times the amount benefiting the bottom 20%. The record of expenditures on primary care was less regressive. The highest 20% of the population received more financial benefits than the lowest 20% in five of the seven countries; overall, the richest 20% gained about one and a half times from primary care spending as much as the poorest 20%.	Spending was found to be regressive in all the countries.

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Table 2.1 continued

Author(s) and Year	Country(s)	Title	Methodology	Findings	Conclusion
Sahn and Younger (1999)	Ghana, Ivory Coast, Guinea, Madagascar, South Africa, Uganda, Tanzania, and Mauritania	Dominance Testing of Social Sector Expenditure and Taxes in Africa.	Benefit incidence using dominance tests to determine whether health and education expenditures redistribute resources to the poor.	Primary education tended to be the most progressive as well as efficient, including some broad-based taxes such as the Value Added Tax (VAT) and wage taxation. Taxes on kerosene and exports appeared to be the only examples of regressive taxes.	Social services in these countries were poorly targeted.
Ajay et al. (2000)	India and its principal states	Who Benefits from Public Health Spending in India? Results of a Benefit-Incidence Analysis for India	Employing BIA in assessing the distributional impacts of health spending.	Government health expenditures benefited the better-off more than the poor. The financial benefits from primary and outpatient care were less unevenly distributed than those from hospital services.	The pro-rich bias was larger in rural than in urban areas; much greater in poor than in better-off states.
Sahn and Younger (2000)	Eight sub-Saharan African countries	Expenditure Incidence in Africa: Microeconomic Evidence.	Employing dominance tests, complemented by extended Gini/concentration coefficients, to determine whether health and education expenditures redistribute resources to the poor.	Primary education tends to be the most progressive while university education was the least progressive. The benefits associated with hospital care were less progressive than other health facilities.	Social services were poorly targeted. While concentration curves are a useful way to summarize information on the distributional benefits of government expenditures, statistical testing of differences in curves is very important.

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Table 2.1 continued

Author(s) and Year	Country(s)	Title	Methodology	Findings	Conclusion
Rannan-Eliya et al. (2001)	Nepal, Sri Lanka and Bangladesh	Equity in Financing and Delivery of Health Services in Bangladesh, Nepal and Sri Lanka.	Extending the boundaries of traditional benefit-incidence including the private as well as well as governmental health service expenditures in an effort to examine the equity of health financing as a whole, rather than only the portion of financing involving the government.	In Bangladesh, health-financing situation was found to be regressive while in Sri Lanka it was progressive. Data limitations posed a problem for Nepal.	Health financing was regressive in Bangladesh but progressive in Sri Lanka
Jalan and Ravallion (2001)	Argentina	Estimating the Benefit Incidence of an Anti-poverty Program by Propensity Score Matching.	The study applied the recent advances in propensity – score matching (PSM) to the problem of estimating the distribution of net income gains from an Argentinean welfare programme.	The average direct gain to the participant was found to be about half the gross wage with over half of the beneficiaries in the poorest decile nationally and 80% were in the poorest quintile.	Program participants were more likely to be non-participants by a variety of both objective and subjective indicators. The relatively low wage rate clearly makes the programmes unattractive to the non-poor.
Foster et al. (2002)	Ghana, Malawi, Mozambique, Tanzania and Uganda	How, When and Why Does Poverty Get Budget Priority: Poverty Reduction Strategy and	Summarizing and synthesizing the key findings from case studies in five sub-Saharan African countries – namely Ghana, Malawi, Mozambique, Tanzania and Uganda – each of which examined the linkages between poverty reduction	Public expenditure, in which efficiency and effectiveness of public spending was very low, had its benefit mainly to the non-poor.	The efficiency and effectiveness of public spending was very low and had its benefit mainly to the non-poor.

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Table 2.1 continued

Author(s) and Year	Country(s)	Title	Methodology	Findings	Conclusion
Younger (2002)	Peru	Public Expenditure in Five African Countries. Benefits on the Margin: Observations on Marginal Benefit Incidence.	strategy and public expenditure management. Considered a variety of options for analysing the marginal benefit incidence of policy change and argued that, despite the fact that each method measures marginal incidence, they neither in fact measure the same thing nor are intended to do so.	Empirically, the precision of the methods differs substantially with those relying on the differenced data or aggregations of household into groups yielding standard errors that are quite large relative to the estimated shares.	The study concluded that relying on individual or household level data yield smaller standard errors than those that use regional aggregations hence a straightforward modification of the Lanjouw-Ravallion method using individual-level is preferable where such data are available. Also the methods that rely on differencing across time have particularly large standard errors.
Ye and Canagarajah (2002)	Ghana	Efficiency of Public Expenditure Distribution and Beyond: A Report on Ghana's 2000 Public	The study analysed the public expenditure flows from line ministries to the basic service provision facilities, including primary and junior schools and health clinics using the general principles of	The results from the PETS data indicated that only about 20% of non-salary public health expenditure and 50% of non-salary public education expenditure reached the facilities. In health sector, evidence suggests that a large proportion of the leakage	The study concluded that a consistent and transparent recording system from the line ministries to the service provision facilities may significantly improve the efficiency of public resource distribution by providing easy

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Table 2.1 continued

Author(s) and Year	Country(s)	Title	Methodology	Findings	Conclusion
Helberg et al. (2001; 2003)	Mozambique	Expenditure Tracking Survey in the Sectors of Primary Health and Education. Public Spending and Poverty in Mozambique.	Public Expenditure and Tracking Survey (PETS). Estimated the distribution or incidence of public spending by socio-economic status of recipients using the non-behavioural social benefit incidence approach.	occurred between the line ministries and the district offices, where public expenditures are turned into materials from cash flows. Post-primary intermediate education crosses the Lorenz curve at 0.1 on the horizontal axis, and lies well below the Lorenz curve for the rest of the distribution, so it would be considered regressive by most other criteria. From the concentration curves, it might be observed that the poorest 50% of school-age children constitute 50% of all students enrolled in lower primary education and 32% of students in upper primary education. At higher levels, participation by the poor drops drastically with the poorest half accounting for only 19% of students in post-primary education and 11% of students in the intermediate post-primary category.	public access to the resource flow data. Public service provision in Mozambique was more equal than in many other African countries, with the major exceptions of upper secondary and university education. Health services and investments in public infrastructure also tend to be distributed progressively. Regional inequalities in access to public services were more pronounced than inequalities by income level.

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Table 2.1 continued

Author(s) and Year	Country(s)	Title	Methodology	Findings	Conclusion
Yuki (2003)	Yemen	Distribution of Public Education Spending for the Poor: The Case of Yemen	Employed standard benefit-incidence analysis to examine how public education spending is distributed in Yemen	The study found the distribution of total public education spending moderately favouring the poorest households in absolute terms. However, in higher education and vocational training, the distribution of public spending does not favour the poor, whereas it moderately favours the poor in basic education and is almost neutral in secondary education.	Yemen's public education spending is more equitably distributed than its household expenditures; but the distribution does not favour the poor in absolute terms or in proportion to the school-aged population, especially in higher education.
Liberati (2003)	Belarus	Poverty Reducing Reforms and Sub-group Consumption Dominance Curves.	Extension of consumption dominance curves to population sub-groups in Belarus looking at public subsidies on rents and utilities, healthcare and public transport in six groups of the population.	The highest decile consumes proportionally more of all the subsidized goods which means that efficiency score of the corresponding subsidies was quite low with a greater degree of leakage to richer households. The most disproportionate distribution is from public transport.	The study concluded that decomposition has useful informational advantages because it allows policy makers to get detailed information on poverty reduction strategies for population sub-groups without being constrained to a specific poverty line.
Soares et al. (2006)	Brazil	Cash Transfer Programmes in Brazil: Impacts on Inequality and Poverty.	Authors developed a methodology that separated the income of different cash transfers programmes, evaluating the incidence of the programmes using	The study found that both BPC – the means tested old age pension and disability grant programme - and <i>Bolsa Familia</i> were quite well targeted and both jointly contributed to the fall of 28% in the Gini inequality between 1995	The analysis of distributive effects of these programmes contributes to the correction of existing deficiencies and to the planning of future expansion because of the programmes importance in

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Table 2.1 continued

Author(s) and Year	Country(s)	Title	Methodology	Findings	Conclusion
Soares (2006)	Brazil	Health and the Evolution of Welfare across Brazilian Municipalities	concentration curves indexes and decomposing the Gini indexes into the contribution of each income source. Employed compensating differentials approach to estimate the value of the observed reductions in mortality and dynamic assessment of the potential determinants of these gains.	and 2004. The study also found pensions equal to the minimum wage whether contributory or not and this better performance was attributed to the fact that they make up 4.6% of the total family income. The results suggest that gains in life expectancy had a welfare value equivalent to 39% of the growth in income per capita, being therefore responsible for 28% of the overall improvement in welfare. Improvements in education, access to water, and sanitation seem to be important determinants of the dimension of changes in life expectancy not correlated with income.	eradicating poverty and inequality reduction to tolerable levels within a reasonable time frame. Given that initial income inequality across Brazilian municipalities was very high while life expectancy gains were more or less homogeneous, changes in mortality did not contribute to reduction in overall welfare inequality but life expectancy had a significant impact on the level of welfare though it did not play the same role in reducing welfare inequality as it did across countries.

The Nigerian education and health sectors: A brief inquiry on structures

Education and healthcare in Nigeria fall under the concurrent list of the 1999 Nigerian Constitution. This implies that provision of such service should be done by all the levels of government. The local government level has the basic responsibilities for primary education and healthcare with interventions from the state and federal levels. The states have the basic responsibilities for the provision of secondary education and healthcare as well as contribution to tertiary education and healthcare. The federal level does intervene in secondary education through the federal government colleges, federal technical centres and the unity schools, but the states provide for more than 90% of the secondary education nationwide.

Currently, the federal level of government provides for more than 60% of the public tertiary education and healthcare institutions while the states provides for the rest. The tertiary education being provided by the federal level includes the federal colleges of education, federal monotechnics and polytechnics, federal conventional universities, federal universities of technology and the federal universities of agriculture. Similarly, the federal level provides for most tertiary healthcare institutions including the federal medical centres, specialist hospitals, federal university teaching hospitals and colleges of medicines. Table 1.1 provides the detailed number of each of these publicly-owned institutions as of December 2006.

The education system in Nigeria is based on 6-3-3-4 system, that is, six years of primary school, three years of junior secondary school, three years of senior secondary school and four years of tertiary education leading to a degree. With the introduction of the Universal Basic Education (UBE) in 1999, the first nine years of education (primary and junior secondary levels) are tuition-free and a meal per day per pupil subsidy for all public schools. Primary schools throughout the country are administered by the Universal Basic Education Commission (UBEC) with offices in all the 36 states of the federation including the Federal Capital Territory (FCT) for easy and up-to-date administration. As at December 2006, a total of 58,604 public primary schools were operating in the country with Kano State having the highest number of 3,676 and Oyo State having the lowest number of 422.

Similarly, secondary schools are administered by the Post-Primary School Management Board (PPSMB) with offices in all the 36 states of the federation including the FCT. This system is a result of the reform in the sector, which objective is to make education functional and enable outputs employable and self-reliant. It is also to encourage vocational and technical education that would be of relevance to the needs of the society. The junior secondary school is both pre-vocational and academic. At the senior level, technical, commercial and other vocational courses are included to make senior secondary school leavers employable after the Senior Secondary Certificate Examination (SSCE). There were 18,673 public secondary schools in operation by December 2006, with the highest number of 1,143 operating in Plateau State. Apart from the FCT that had 85 public secondary schools, Taraba State had the lowest number of 91 public secondary schools.

The tertiary level of education includes colleges of education, monotronics, polytechnics, colleges of technology and the universities. Colleges of education are responsible for the training of middle-level manpower in teacher education. Successful candidates from senior secondary school that gain admission into the colleges are trained as teachers for three years; on completion, they are awarded the Nigeria Certificate in Education (NCE). As professional teachers, they can teach in primary, junior secondary (JS) or the senior secondary (SS) schools, depending on their areas of specialization. Colleges of education in the country are managed by the National Commission for Colleges of Education (NCCoE).

The monotronics, polytechnics and colleges of technology are mainly to produce middle-level technical manpower at the sub-professional level of two categories: National Diploma (ND) and Higher National Diploma (HND). These institutions are administered by the National Board for Technical Education (NBTE).

The third tier of higher education in Nigeria is the universities. Admissions into first degree courses are through tests conducted by the Joint Admissions and Matriculation Board (JAMB) or by direct entry with Higher School Certificate or its equivalent. The basic admission requirement is SSCE with a minimum of five credits in subjects relevant to the proposed course of study. These institutions are administered by the Nigerian University Commission (NUC). The country, as of December 2006, had a total of 206 tertiary educational institutions; 93 colleges of education; 56 monotronics, polytechnics and Colleges of Technology; and a total of 57 public universities, out of which 26 are federally controlled including one military university while 25 belong to the states. About 24 private universities were in operation in the country at the same period.

On the reflex, the healthcare sector in Nigeria comprises primary, secondary and tertiary levels. The primary healthcare is healthcare services provided by health centres, clinics, dispensaries and maternities. At this lower level, the states and Local Government Areas (LGAs) share responsibility for healthcare. States largely operate secondary health facilities (general hospitals and comprehensive health centres), providing mostly secondary care and serving as referral level for the LGAs which provide the essential elements of primary healthcare centres (PHC). Operationally, the decentralized health structures of the federal government are in the states, while those of the states are in the LGAs. Some states build and operate tertiary facilities or specialist hospitals. While the federal government is responsible for the management of teaching hospitals and medical schools for the training of doctors, the states are responsible for training nurses, midwives and community health extension workers (CHEWs). The LGAs provide basic health services and manage the primary healthcare facilities which are normally the first contact in the health system.

The primary healthcare level is administered by the Primary Healthcare Development Agency (PHDA) with offices in every state of the federation, including the FCT. In December 2006, the country had a total of 14,273 public primary healthcare centres. Kaduna State had about 813 and is the state with the highest number, while Ebonyi State has the lowest number with 30 only. There existed 6,575 private primary healthcare centres at the same period operating in the country.

Similarly, secondary healthcare facilities are administered by the respective states Hospital Management Boards (HMB) and by December 2006, Nigeria had a total of 845 public secondary healthcare centres with Kogi State having the highest number of 83,

while Taraba State had the lowest number of two public secondary healthcare centres. It is also interesting to note that private secondary healthcare centres in operation in the country as at December 2006 were 2,458 with 315 in Edo State alone and none in more than five states. Also, a total of 60 tertiary healthcare facilities were in operation as at December 2006 with only one being privately owned. Every State has at least one public tertiary healthcare centre with Lagos and Edo states having the highest number of four each.

Apart from public and private education and healthcare facilities, there also exist education and healthcare facilities established by religious and industrial organisations. According to the National Bureau of Statistics (NBS, 2007) about 2% of the population used these facilities for their education and healthcare needs in 2007.

According to the National Health Policy, the federal government is responsible for policy formulation, strategic guidance, coordination, supervision, monitoring and evaluation at all levels. It also has the operational responsibility for disease surveillance, essential drugs supply and vaccine management. In addition, it provides specialized healthcare services at tertiary health institutions (university teaching hospitals and federal medical centres). These facilities serve as referral institutions for the secondary health facilities.

3. Theoretical framework and methodology

Analysing benefit incidence of public sector expenditures is tantamount to testing fiscal policy performance with respect to reduction in poverty and inequality. A number of reasons can be cited as to why the distributional outcomes from public spending are important for Nigeria. Increasingly, the Nigerian Government is resorting to spending discretions to alleviate poverty and addressing equity objectives. In this respect, the government has increased, in nominal terms, the amounts of public resources channelled towards social and community services¹⁰ and established social investment funds such as the Universal Basic Education (UBE) fund and the National Health Insurance Scheme (NHIS).

Another factor that justifies incidence analysis in Nigeria is that households are diverse in terms of ability to access and utilize social services. Most times, it is households in the upper income echelons which may reap larger benefits from public spending programmes. Such variations could stem from wide ranging factors as derivation formula¹¹, urban bias in concentration of public services to possible tremendous opportunity costs incurred by poor households, e.g., in sending a child to a school.

Furthermore, the poor oftentimes are not sufficiently insulated from the adverse effects of expenditure cutbacks. When reductions in total public sector expenditure become a must due to situations like a drop in the price of oil in the international market¹², allocations to social sectors tend to shrink more. This point is stressed by Ravallion (2002) who pinpoints the need for safety net measures to alleviate the negative incidence impacts.

Hence, the social welfare functions for Nigeria could be conceptualized as developmental challenges that aim to maximize a composite good of poverty reduction and growth with fiscal policy entering as a right-hand side argument. A mathematical representation of such types of social welfare functions can be defined using the Gini coefficient of inequality (G_y):

$$G_y = \frac{2 \text{cov} [Y, F(y)]}{\bar{y}} \quad (1)$$

where cov = covariance
 Y = Income level
 $F(y)$ = normalized rank of a household in the distribution of income
 \bar{y} = mean income

Combining the Gini coefficient with mean income, the social welfare is then defined as:

$$W = \bar{Y} (1 - G_y) \quad (2)$$

As such, it can be readily shown that increases in average levels of income \bar{Y} and reductions in inequality G_y help improve social welfare W . Since it affects both of these variables, public sector expenditures impact on social welfare is apparent. The inverse relationships between inequality and social welfare have been empirically established by Sen (1976) and Yitzhaki (1982). The social welfare function identified in (2) does have contextual relevance to Nigeria, perhaps expressed more so in its poverty reduction strategy documents, the National Empowerment Development Strategy (NEEDS) and the Vision 2020. Its fiscal policy has been serving these objectives in a number of ways. First, the government worked hard to contain deficit at a lower rate to the GDP and by avoiding practice of deficit monetization to help create stable macroeconomic environment, needed for sustained growth, can boost average levels of income \bar{Y} . Secondly, functional expenditure has been rearranged¹³ improving the shares of spending going to social services (especially education and healthcare) and physical infrastructures. Third, decentralizing fiscal powers to state and local governments would improve public sector efficiency by enabling the economy to capitalize on local entities' informational edge.

Based on the above factors, this study estimated incidence of public spending by socioeconomic group¹⁴ (quintiles) of recipient households using the non-behavioural social benefit incidence approach as applied by Van de Walle and Nead (1995).

This was achieved by combining information about unit costs of providing those services (obtained from ministries of education and health as well as private service providers) with information on the use of these services (obtained from the households - the Nigerian Living Standard Survey [NLSS]). In effect, the analysis imputed to those households using a particular service and the cost of providing that service. This imputation is the amount by which household income would have to increase if it has to pay for the service used.

Taking the example of government spending on a social service (education or health), this was formally written as:

$$X_j \equiv \sum_{i=1}^3 E_{ij} \frac{S_i}{E_i} \equiv \sum_{i=1}^3 \frac{E_{ij}}{E_i} S_i \quad (3)$$

where X_j is the amount of the social service (education or health) subsidy that benefits group j' (j is the socioeconomic group).

S and E refer, respectively, to the government social sector (education or health) spending and the number that is expected to benefit from them (the number of public school enrolment for education and number of people that uses the health facility for the health sector), and the subscript i denotes the level of social service (primary, secondary and tertiary, hence $i = 1$ to 3).

The benefit incidence of total education imputed to group j , for example, is given by the number of primary enrolments from the group (E_{ij}) multiplied by the unit cost of a primary school added to the number of secondary enrolments multiplied by the secondary unit cost of secondary education, plus the number of tertiary enrolments multiplied by the unit cost of tertiary education. The benefit incidence of total health imputed to group j is given by the number of users of primary healthcare from the group (E_{ij}) multiply by the unit cost of providing primary healthcare added to the number of users of secondary healthcare multiplied by the unit cost of providing secondary healthcare, plus the number of users of tertiary healthcare multiplied by the unit cost of providing tertiary healthcare. It is noteworthy that S_i/E_i is the mean (average) unit spending of enrolment at education level i , or unit spending of usage of a health facility at a health level i .

The share of total education or health spending imputed to group (X_j) is then given by:

$$x_j \equiv \sum_{i=1}^3 \frac{E_{ij}}{E_i} \left[\frac{S_i}{S} \right] \equiv \sum_{i=1}^3 e_{ij} S_i \quad (4)$$

Equation 4 depends on two major determinants:

- The e_{ij} 's which represent the shares of the group in total service use (enrollments in education and number of users of health facilities). These reflect *household behaviour*.
- The s_i which is the shares of public spending across the different types of service, reflecting *government behaviour*.

Equation 4 defines only one unit spending for each level of service. Given variations in poverty and inequality across regions (geopolitical zones), locations (urban and rural), gender (male and female) and states, the study also analysed benefit incidences based on them. This was justified by the fact that Nigeria practices fiscal federalism¹⁵ and the issue of social spending differs across geopolitical zones/region, state and location as well as across gender. In order to achieve that, equation 4 became:

$$x_j \equiv \sum_{k=1}^n \sum_{i=1}^3 \frac{E_{ijk}}{E_i} \left[\frac{S_{ik}}{S} \right] \equiv \sum_{k=1}^n \sum_{i=1}^3 e_{ijk} S_{ik} \quad (5)$$

Where: i 's stand for levels of education or health

j 's stand for the quintiles

k 's stand for region, location, state and gender specified in the unit cost estimates.

In essence, this means that data on costs of service provision were combined with client information to assess how benefits are distributed among the various socioeconomic groups. Specifically, the study followed the steps thus:

1. Identifying the households that receive (benefited from) public services (education and healthcare). For the present study, this was done through a household survey and service-use data. The availability of the Nigerian Living Standard Survey (NLSS) served the purpose of the household data and some service-use data. Other service data used are enrolment data from schools for education and number of visits to hospitals. For primary schools, the respective States Universal Basic Education Board (SUBEB) provided the data; for secondary schools such information were provided by the PPSMB; tertiary data were provided by NCCoE, NBTE and NUC, while for primary healthcare, information were sourced through the various states PHDA; secondary healthcare data from HMB of respective states and the ministry of health for tertiary healthcare. These set of data were collated by the NBS. Potential biases in household data that occur due to survey design, questionnaire structure, the wording used and sample limit were taken cognizance of and the study matched the two data sets based on the knowledge of the institutions and situations.
2. Ranking all households (recipients and non-recipients alike) by level of welfare. The welfare indicator used here is total household consumption per capita.¹⁶ Using the NLSS household data, the study ranked individuals by this benefit and it was important since it is the distribution of welfare indicator that applied in the absence of the in kind transfer embodied in the government subsidy.
3. Aggregating individuals ranked according to welfare measures into group of equal size, it was easy to define the population into five quintiles. Further disaggregation into regional, states, location, and gender groupings were done along with consumption based groupings. These are relevant for poverty assessment since the weak targeting of government spending to the poor is closely related to regional, states, location, and gender biases in the use of government services as revealed by differences in the amount spent by states, regions and across location.
4. Placing a value on services received. This was taken to be the unit cost of service provision, disaggregated by types (education and healthcare) and levels of social service (primary, secondary and tertiary), geopolitical zones¹⁷ (regions), states and location (urban and rural).
5. Obtaining the average unit cost of providing a public service by dividing government spending on the service (net of any cost-recovery fees and out-of-pocket expenses by the users) by the total number of users of the service.
6. Defining the average benefit from government spending on a service as the average unit cost of providing the service, this is derived from the previous step.

7. Graphing concentration curves that show the cumulative distribution of total consumption plotted against cumulative participation in public education and healthcare services nationally across quintiles.
8. Plotting concentration curves that show the cumulative distribution of benefits across households and by gender. The concentration curves are compared to the cumulative distribution of total consumption (often referred to as the Lorenz curve).
9. Testing for statistically significant differences in the average (mean) benefits to households across quintiles, regions, states and locations using Two-Way Analysis of Variance (2-Way ANOVA). This test followed the study hypotheses but only focused on the mean differences in benefits and has nothing to say about the progressivity or regressivity of spending. Two-Way Analysis of Variance considers two factors (i.e., two independent variables) simultaneously. If a significant F-value is found for one independent variable, then this is referred to as a significant *main effect*. However, when two or more independent variables are considered simultaneously, there is also always an interaction between the independent variables - which may or may not be significant. There is an interaction between two factors if the effect of one factor depends on the levels of the second factor. Here the factors are primary, secondary and tertiary for both education and healthcare. Therefore, the interaction effect will show if benefit from primary education and healthcare depends on the levels of benefit from both secondary or tertiary education and healthcare. The decision rule is to reject the null hypothesis if the calculated F-statistic is greater than the critical value of F at 0.05 significance level.
10. Testing for statistically significant differences among the concentration curves, known as welfare dominance tests.¹⁸
11. Conducting supplementary descriptive data analysis, where necessary, to help identify the sources of inequality in education and healthcare services.

This study thus followed the standard procedure where the monetary valuation of the benefits an individual receives from using a certain public service is not based on any behavioural information, such as opportunity cost or willingness to pay; but instead, all those who used the service are assigned the same monetary value of benefits received. This value is the unit cost of providing the service. As such, the term benefit incidence is really a misnomer in the present context (Heltberg et al., 2003). Rather than measuring the exact value to recipients of government-sponsored services, the study is looking at the distribution of beneficiaries from those services. It follows that beneficiary incidence would be a more precise term for this kind of study (Heltberg et al., 2003).

In the analysis that follows, the study opines that the distribution of benefits is progressive¹⁹ (in absolute terms) if it is more equal than consumption, that is, if the concentration curve for benefits lies everywhere above the Lorenz curve for consumption. In this case, public benefits are helping to equalize the distribution of welfare. Furthermore,

if the distribution of spending is such that poorer individuals receive more per capita in absolute terms than richer individuals or if $bq_1 > bq_2 > bq_3 > bq_4 > bq_5$ (where bq_1 is the benefit to first quintile, bq_2 is the benefit to second quintile, bq_3 is the benefit to third quintile, bq_4 is the benefit to fourth quintile and bq_5 is the benefit to the fifth quintile) for the traditional benefit incidence results, the study will say that the distribution is per capita progressive (also referred to as absolute progressivity). Graphically, per capita progressivity appears as a concentration curve of benefits above the 45-degree line. Per capita progressivity indicates successful targeting of benefits towards lower income groups. If benefits are distributed more unequally than consumption (i.e., the concentration curve lies below the Lorenz curve), services are said to be regressive. When curves cross, no determination of progressivity or regressivity can be made using the Lorenz criterion.²⁰

The main advantage of the non-behavioural benefit incidence methodology is its simplicity and the relatively modest data requirements. A potential problem occurs when quality of the service varies systematically with the level of welfare. If poorer individuals receive lower quality services, the results will be biased in the direction of finding progressive results. It is most important to use data for the unit costs of service provision that are as disaggregated as possible. In this way, variation in the quality of service may be captured (to the extent quality variation shows up in the unit costs), and bias will be reduced.²¹ The study, therefore, obtained unit costs at levels that are disaggregated by region, state, location and kind of service provided.

This study estimated unit costs at all levels and for all social services based on actual public expenditure and not on budget allocations. This was done across states, regions and locations. Revenue from cost recovery was netted out for secondary education²² in some states that their tuition fees are paid directly into the state government coffers only. Revenue from cost recovery was not netted out for other states and other levels of education and healthcare because other levels of education and healthcare have their revenue remaining within the facilities providing the service hence this revenue adds to the value of the service that the household obtains, over and above the government subsidy. Therefore, it can be regarded as cost sharing rather than cost recovery.

Pearson (2002) has shown that BIA relates to public expenditure, and is concerned with the issue of how effectively governments are able to target their limited resources towards meeting the need of the poor. The study argument rests in employing the incidence analysis in the health system performance instead of the World Health Report (WHR) approach which was criticized mainly on the ground that WHR approach treats the health system as a “black box” attempting to measure the performance by investigating the link between health expenditure and five health sector goals (average health status, distribution of health status, average responsiveness and the fairness of financial contribution). The WHR approach made no attempt to look inside the black box and explain how the expenditure translates into these goals by looking at which health services are delivered and who receives them. On the other hand, using BIA was found to give better insight into these factors responsible for health sector performance hence the study findings contributed conveniently and reliably to the policy debate.

Further development, as shown by Demery (2000) BIA model focusing on average benefits from public spending, has been in use. The model, has its final result, discusses the issue of how effectively governments are able to target their limited resources

towards meeting the need of the poor. From the model, it is easy to identify users of basic spending or services which are based on information obtained through a household survey. The survey data, which is usually through a sample of some households, is used alongside service data (enrolment data from schools, or visits from hospital records). Hence, unit subsidy data that will be estimated from spending, which is derived from official sources is combined with service-use information from the selected household survey. The above methodology has been used for most developing countries like Ghana, Ivory Coast, Indonesia, among others.

BIA has been applied by some studies but it has its limitations. Some of the limitations include:

- its description of average participation rates is not necessarily useful in guiding marginal changes in public expenditure policy from the status quo, a point first made by Lipton and Ravallion (1995) and confirmed by Younger (2002);
- unit costs do not always reflect values. Unit costs also reflect inefficiency in public provision. For example, a tracking study in Uganda found that only 38% of non-wage recurrent primary education spending actually reached the schools. Quality variations in services are not always reflected in unit costs (Demery, 2001);
- BIA takes the pattern of service-use as given which tells nothing about what determines such behaviour and what constrains households;
- it is less theoretically robust, and does not permit counterfactual experiments, simulating alternative outcomes based on the estimated demand functions;
- incidence analysis does not deal very well with issues of service quality;
- BIA measures distributional impact and not impact itself; and
- interpreting the pattern of benefit incidence tells us very little about what would happen if governments increase spending on certain categories.

BIA is also based on the following assumptions and conditions:

- benefit incidence should be assigned to households based on household survey information on usage rather than on ad hoc assumptions that assign benefits based on income or the number of members in the household;
- improved annual cost measures for services need to be developed, particularly for capital inputs;
- careful attention to life cycle benefits, benefit shifting, rent-seeking, out-of-pocket costs, displacement of private sector efforts, average versus marginal incidence, and several other issues can significantly increase the value of benefit incidence analysis to policymakers;
- aggregate results based on the zero-government counterfactual rely on strong assumptions about fixed relative prices and incomes, government efficiency, and the relationship between marginal and total benefits; and
- it assumes that all relative prices and real incomes are fixed, and benefits are not shifted, marginal benefits are equal to average benefits, and average cost is a good proxy for marginal benefit.

Despite its limitations, it is generally believed that the expenditure-based incidence approach can provide a useful first look at the allocation of government expenditure among households.

Procedure of testing for differences in concentration curves (dominance tests)

Dominance test, in this study, was primarily based on ranking the progressivity of benefits of categories of social expenditure (education and healthcare) across all levels (primary, secondary and tertiary). The tests evaluated the distribution of expenditure against two benchmarks looking at whether they are absolutely progressive (i.e., inequality reducing relative to welfare benchmark which is the 45-degree line), and if they are per capita progressive meaning that households at the lower (upper) end of the income distribution receive at least an equal level of benefit as upper (lower) income households. These tests were necessary because concentration curves are estimated from survey data and are therefore subject to sampling variability hence the need for statistical comparisons. It is true that visual inspection of a concentration curve in comparison with the 45-degree line or another concentration curve like the Lorenz curve (per capita expenditure/consumption) may give an impression of whether there is dominance, but clearly this inspection may not be sufficient to conclude whether or not dominance is statistically significant. In order to make inferences about dominance, the standard errors of the concentration curve ordinates must be computed in addition to their point estimates.

Several approaches have been applied by various authors in testing for differences in concentration curves or dominance tests depending on the interest of analyst. If the interest is to test dominance of a concentration curve(s) against the Lorenz curve of expenditure/consumption or against another concentration curve estimated from the same sample, then the standard errors for the differences between curve ordinates must be computed though this is complicated by the fact that, in such cases, the curves are dependent. An appropriate variance-covariance matrix which allows for dependence between curves was derived by Bishop et al. (1994) and Davidson and Duclos (1997) to help overcome the problem. Davidson and Duclos (1997) thus derived an estimator which is a distribution-free standard error for the difference between two concentration curves that may be dependent. Such estimator was used to establish a confidence interval around the estimated concentration curves and then tested for significant differences between them with the null hypothesis that the ordinates of two concentration curves are equal at each of 19 evenly spaced abscissa. According to Howes (1996), the null hypothesis of equality will be rejected if all 19 ordinate pairs are significantly different.

Dominance tests in this study followed the above as applied by Sahn and Younger (1999; 2000) and O'Donnell et al. (2007), but in addition to accounting for the possible dependence between concentration curves, the current study used the covariance matrix for the ordinates estimates which was also used by Sahn and Younger (1999). This was to avoid the fact that, statistical tests using only t-tests for the difference between ordinates of two concentration curves at several abscissa (usually 0.1 to 0.9) leading to the rejection of the null hypothesis of non-dominance when one of the ordinates differs statistically in the direction of dominance as long as none of the other pairs indicates a statistically significant result in the opposite direction which has been widely used commonly leads to the acceptance of the null hypothesis quite often. This has resulted to very little in concluding about the progressivity of categories of, not only expenditures/consumption, but also taxes.

However, according to Sahn and Younger (1999), bounding the size of test at the risk of low power is consistent with standard econometric but failure to reject the null hypothesis leads to indeterminate result, unless there is an establishment that the two curves cross and can be revealed by two significant differences in ordinates of opposite signs.

Besides the decision rule, the study noted that, it is important to choose the number of quantile points at which ordinates are to be compared. If the number of comparison points is too restricted, then dominance across the full range of the distribution is not being tested. According to Howes (1996), it is difficult to find dominance at the extremes of distributions. With reasonably large samples, a popular choice has been to test for differences at 19 evenly spaced quantiles from 0.05 to 0.95²³ as applied by Sahn and Younger (2000), Sahn et al. (2000) and O'Donnell et al. (2007). Therefore, the decision rule will be thus: Using 19 equally spaced ordinates from 0.05 to 0.95, the null hypothesis (non-dominance) is rejected in favour of dominance if all t-statistics are greater than the critical value and of the same sign; or the null hypothesis is rejected in favour of crossing if there are at least two significant t-statistics with opposite signs. This means that rejecting the null on non-dominance using the above procedure implies that one distribution is preferred to the other under any social welfare function that favours progressivity.²⁴

Data and sources

The survey data for the study was primarily drawn from the NLSS 2003/2004, a welfare monitoring survey collected by the NBS in collaboration with the European Union and the World Bank. The data has 19,158 households with complete information out of the 22,000 households in the sample. These households comprised both rural and urban households. Broad issues included in the survey range from access to education, healthcare services, and housing status to possession of assets and other selected living standard indicators. Information were also collected on individual basis for education and healthcare issues and further disaggregated by gender with 40,967 responses from male and 39,725 responses from females for education issues as well as 47,208 from males and 45,308 from females for healthcare related issues.²⁵ Here, access to education and healthcare were chosen for analysis taking into account their close correlation with welfare status of households. The data contained information on households' total expenditure and households' expenditure on education and healthcare. Data from the survey was disaggregated into state levels, and gender (male and female) in both healthcare and education. The data was also disaggregated into location (rural and urban) and into geopolitical zones.²⁶ Though there were many inconsistencies in the data, to partially overcome this data problem, the study assumes that service-access rates for each household group (quintile) in a specific zone overlaps with corresponding rural or urban patterns. This was certain to compromise the degree of analytical insights and policy derivations, which otherwise would have been achieved, by masking existing access differences among local administrations.

The following data from secondary sources were helpful in this study:

- Actual revenue and expenditures on education and healthcare across local

governments, states and the federal level for the year 2004. These set of data were sourced from the Central Bank of Nigeria (CBN), respective states auditor generals reports for actual spending on education and healthcare in the 36 states, including the FCT. These reports were already submitted to the African Institute for Applied Economics (AIAE), Enugu, Nigeria. The institution coordinated the State Economic Empowerment and Development Strategy (SEEDS) benchmarking exercise for all states hence has access to all the state finances and expenditures except that of Ogun State in the south-west region which the author sourced directly. The federal component was sourced from the Federal Ministry of Finance, Abuja, Nigeria.

- Enrolment rates for every level of education was sourced from the NBS, Federal Ministry of Education as well as the respective states UBEC, PPSMB, NCCoE, NBTE, and NUC.

4. Results, findings and discussion

The study analysed benefits across household groups, regions, states and location using the traditional BIA technique as reflected in the study's methodology. The study also graphed concentration curves that show the cumulative distribution of total consumption, plotted against cumulative participation in public education and healthcare services. Concentration curves were applied to test the progressivity, regressivity or neutrality of public expenditure on education and healthcare across household groups by federal spending, states, regions, location and gender. The results of the traditional BIA are presented in tables 4.2, 4.3, A1, A2, and A3, while concentration curves across household groups and by gender are presented in figures 4.1–4.5. Concentration curves for states and regions were not presented because they lack visual comprehensiveness but their ordinates were used in the dominance tests.

Usage of public education and healthcare facilities across quintiles and location

Benefiting from a facility can only be possible when a household uses such facility: the study analysed the usage of all levels of public and private education and healthcare facilities by household groups (quintiles) and also across location to ascertain who uses and who does not use. Table 4.1 shows the result of the analysis.

The results in Table 4.1 show that more than 70% and 58% of households in the first quintile (the poorest households) make use of public primary education and healthcare facilities, respectively, while only 14% and 29% of household in the fifth quintile (the richest households) are using the same facilities. It also shows that over 80% and 70%, respectively, of household in the fifth quintile (the richest households) patronize private primary schools and healthcare centres as against 13% and 31%, respectively, from the first quintile (the poorest households). Apart from the public and private education and healthcare facilities, there also exist religious, industrial and other education and healthcare facilities. Such education and healthcare facilities make up for the shortfall from 100% in the addition of public and private facilities across quintiles.

Another striking evidence from Table 4.1 is that, usage of public education and healthcare facilities by poorer households (Quintiles 1-3) decreases as the level of education or healthcare increases while usage of public education and healthcare facilities by richer households (Quintiles 4-5) increases with increase in the level of education and healthcare. This, in effect, may imply that usage of higher levels of public education and healthcare facilities depends on how rich every household is.

Table 4.1: Usage of Education and Healthcare Facilities by Quintiles, type (public/private) & location

Quintiles	1		2		3		4		5		No of Households
Education	Pub	Priv	Pub	Priv.	Pub.	Priv.	Pub.	Priv	Pub	Priv.	
Primary	76.8	13.2	63.1	26.9	64.9	31.1	28.0	62.0	14.4	82.6	16,991
Secondary	55.0	15.0	53.8	38.2	40.0	50.0	36.4	60.6	30.5	67.5	17,018
Tertiary	5.6	0.4	7.0	1.4	30.5	8.5	69.3	10.7	78.0	12.0	17,030
Quintiles	1		2		3		4		5		No of Households
Healthcare	Pub	Priv	Pub	Priv.	Pub.	Priv.	Pub.	Priv	Pub	Priv.	
Primary	58.9	31.1	49.4	50.6	40.8	59.2	34.6	65.4	29.9	70.1	16,991
Secondary	39.7	30.3	38.8	33.2	52.4	41.6	53.4	42.6	54.8	43.2	17,018
Tertiary	8.3	---	12.8	---	19.8	---	24.3	---	34.8	---	17,030
Education	Urb.	Rur.	Total			Health	Urb.	Rur.	Total		
Primary	47.8	52.2	100			Primary	39.1	60.9	100		
Secondary	56.3	43.7	100			Secondary	47.3	52.7	100		
Tertiary	62.2	37.8	100			Tertiary	73.7	26.3	100		

Source: Author's Computation

Generally, the patronage of private tertiary education facilities was still low across household groups (quintiles) which can be explained by the fact that these facilities were, not only fewer in number, but also have very low capacity and limited number of departments and faculties in accepting students during the time of the survey (2005/2006).

Similarly, the lower part of the table presents usage of education and healthcare facilities by location which suggest that rural households use more of the primary education and healthcare facilities than their urban counterparts. The usage of public secondary and tertiary education facilities as well as tertiary healthcare facilities favour urban households more than rural households. Further enquiry (not reported) also revealed that over 83% of households visit professional healthcare providers (doctors, nurses, midwives, pharmacists and dentists) during illness as against 8.24% and 8.03%, respectively, that consult traditional healer and other sources including sorcerers.

Benefit incidence across household groups

The study used data on expenditure of education and healthcare from the three tiers (federal, state and local) of government in conjunction with the survey data in analysing the average benefit incidence from education and healthcare in Nigeria by levels across household groups (quintiles). The results are presented in Table 4.2.

The results in Table 4.2 suggest that benefit incidence was absolutely progressive for primary education and healthcare, progressive for secondary education and regressive for secondary healthcare as well as tertiary education and healthcare.²⁷ These results suggest

that poorer household benefited more from government spending in primary education and primary healthcare hence it may not be out of place from such findings to say that primary education and primary healthcare were well targeted. It is also noteworthy that the absolute progressivity of primary education and primary healthcare as portrayed by the result says nothing about quality or standard of services provided just as it fails to capture anything about households' choices. It is possible that richer households may not have benefited much from public primary education because they consider the quality/standard of services very low hence resorting to private schools and healthcare centres for a better background and attention to their wards rather than better targeting. A look at Table 4.1 shows that, respectively, only 6.9% and 10.9% of the richest quintiles make use of public primary schools and public primary healthcare centres. This may imply that over 85% of households in the richest quintile may have preferred private primary schools and healthcare centres.

Table 4.2: Average benefit incidence by quintile per social service (N)

Education Quintiles	1	2	3	4	5
Primary	3,707	3,465	2,925	2,413	2,095
Secondary	3,806	3,856	4,020	3,804	3,789
Tertiary	8,585	9,159	10,249	11,263	11,525
Health Quintiles	1	2	3	4	5
Primary	2,795	2,728	2,718	2,352	2,188
Secondary	2,291	2,541	3,137	3,240	3,672
Tertiary	3,133	3,512	4,071	4,361	5,055

Source: Author's Computation

Apart from the quality issue, evidence from the UBEC shows that private primary schools are scanty in the rural areas of the country with about 14% of the total as against 86% found in the urban areas. They also pay high tuition and other hidden fees. Such situations are expected to limit the choice of households in sending their children to private schools. This was corroborated by the location result in Table 4.1 which reveals that usage of public primary schools by rural households was higher than urban households. This may also be the case for primary healthcare because since 2004, most donor interventions ranging from immunization and preventive medicare are classified under the primary healthcare in Nigeria. These interventions and other healthcare programmes have been targeted to the rural area. Donor intervention programmes, though very small compared with total government spending, have also been channelled through the respective levels of government. Also, it is noteworthy that most primary healthcare centres (more than 60%) are located in the rural area and urban slums. On the other hand, the number of private primary healthcare facilities in most states with high literacy level and states with higher urban concentration are higher than the public primary healthcare outfits. They are more concentrated in the urban with better service quality hence may have lured the urban richer households towards the private healthcare facilities.

The findings that primary education and healthcare spending were progressive in Nigeria have been found by some other studies that dealt on developing countries such as

Van de Walle and Nead (1995) for thirteen developing countries, Demery (1996) and the World Bank (1995b) for Ghana and Bulgaria, Rannan-Eliya et al. (2001) for Sri Lanka, Yuki (2003) for Yemen, Heltberg et al. (2001; 2003) for Mozambique where public service provision were found to be more equal than in many other African countries with the exception of the upper secondary and university education, amongst others.

Conversely, the finding of regressivity of spending from Table 4.2 for secondary and tertiary education and healthcare have corroborated findings of other studies from developing countries such as Castro-Leal et al. (1999) for seven Sub-Saharan African countries, Ajay et al. (2000) for India and its principal states, Sahn and Younger (2000) for eight sub-Saharan African countries, Rannan-Eliya et al. (2001) for Bangladesh, Foster et al. (2002) for Ghana, Malawi, Mozambique, Tanzania and Uganda. Specifically, Sabir (2002) in a study on Pakistan, found that government subsidies directed towards higher education, either general education or professional education, were poorly targeted to low-income households and indeed favoured those who were better-off.

Benefit incidence by gender

The study analysed the benefit incidence for education and healthcare by gender (male and female). Unlike most other traditional BIA studies reviewed in this study, the gender dimension used individuals with responses from 27,845 males and 22,753 females as its unit of analysis instead of the households. This was due to the fact that the only available household data disaggregated into gender is the household head. Using household head to represent gender has been criticized by Muthwa (1993:8), who stated that “within the household, there is much exploitation of women by men which goes unnoticed when we use poverty measures which simply treat households as units and ignore intra-household aspects of exploitation.”

The use of individual, by the study, was based on the argument by Moser (1998) who argued that a focus on what the poor aspire to, what they have, and how they make use of it, allows for a much more holistic, person-oriented, appreciation of how survival is negotiated. Similarly, González de la Rocha and Grinspun (2001:59-60) observes that “analysing vulnerability requires opening up the household so as to assess how resources are generated and used, how they are converted into assets, and how the returns from these assets are distributed among household members.”

Based on the forgoing argument, the study used individual as a unit of analysis instead of the head of the household to represent the gender dimension. The results of gender disaggregated analysis for education and healthcare are presented in figures 4.1 and 4.2, respectively.

A visual inspection of figures 4.1 (for education) and 4.2 (for healthcare) reveals an absolute progressivity for primary education and healthcare spending for both males and females; absolute progressivity for female secondary education spending; progressivity for male secondary healthcare expenditure; and regressivity for both male and female tertiary education and healthcare spending. The progressivity or regressivity of male secondary education spending could not be ascertained by a visual look at the concentration curve.

The absolute progressivity for primary education and healthcare spending for both

sexes corroborated the general findings on incidence to national household groups, but progressivity for male secondary healthcare contradicted the general findings by national household groups for healthcare.

Figure 4.1: Concentration curves for education by gender in Nigeria

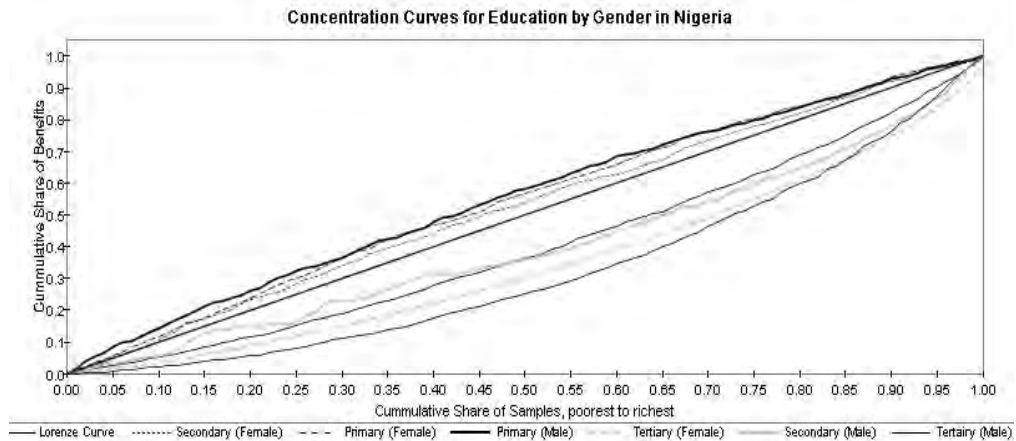
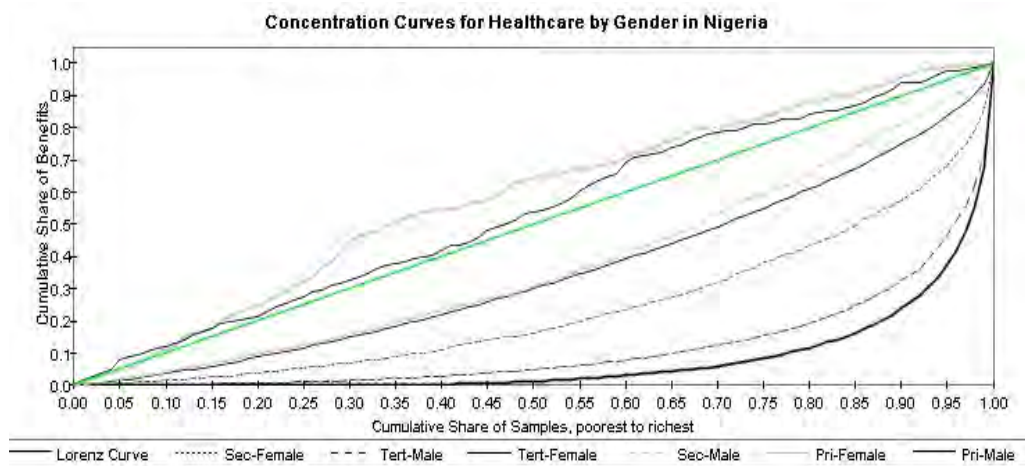


Figure 4.2: Concentration curves for healthcare by gender in Nigeria



The finding of female absolute progressivity in secondary education benefit in Nigeria can be attributed to the fact that, secondary education in Nigeria is normally in three forms viz: boys, girls and mixed and it has been observed, by most studies, that girls' secondary schools are more in number than their boys' counterparts and per capita spending for such public girls' secondary schools are by far higher than public boys' secondary schools in order to encourage girls education. Such arrangement of providing separate schools for males and females may have given the female folk an edge in secondary education benefits than secondary healthcare where both sexes are required to use the same facilities ignoring religious and cultural beliefs which may inhibit a particular sex from not using

these services the way they ought to. This finding was supported by Akanji et al. (2003) and Amakom and Obi (2007). Therefore, it may not be abnormal to find the spending incidence in favour of females as against males in public secondary schools.

Some studies like Akanji et al. (2003) have attributed the absolute progressivity in public secondary education for females to the education policy of most northern states, which make female education free irrespective of the background and social status of the parents. The only issue here is the quality of service which BIA cannot capture. Further analyses by Akanji et al. (2003) reveal that up to 40% of the capital expenditure across public girls' secondary schools goes into home economics while 50% of capital expenditure goes to science equipments in public secondary boys' schools with only about 5% going to science equipment and experimentation in public girls' secondary schools.

The visual progressivity of male secondary healthcare benefit, from the study, can be attributed to regional differences caused by cultural, ethnic and religious beliefs. The finding of male public secondary healthcare progressivity contradicts the findings of Demery et al. (1996) for Ivory Coast where females benefited more than the males.

Further analysis of the visits to healthcare facilities reveals that, male visits to public secondary healthcare centres in the North-East and North-West regions of Nigeria were about 75% of the total visit as against 25% for females. Religious and cultural beliefs, which restrict the movement of females in these two zones, have been blamed for this occurrence. It should also be noted that healthcare services interact with many factors such as better water, better education (especially of women), and better nutrition to generate improved health outcomes. These other factors are important complementary factors leading to better health and the impact of better health services, in part, depends on these other influences.

Benefit incidence by location

Table 4.3 presents the average incidence of benefit by location (urban and rural) for education and healthcare in Nigeria. The results reveal that, rural residents benefited more than the urban residents in both public primary education and healthcare, while the urban residents benefited more from secondary education as well as tertiary education and healthcare. The gap between incidences of benefit for location was felt more in tertiary education and healthcare.

Table 4.3: Average benefit by location per social service (N)

	Education		Health	
	Urban	Rural	Urban	Rural
Primary	4,053	4,079	3,806	3,862
Secondary	6,055	5,509	4,645	4,283
Tertiary	18,213	12,256	7,820	4,258

Source: Author's Computation

The higher benefit for tertiary education and healthcare by urban residents has been found in many studies; and according to Demery (2000), spending on tertiary health

facilities (teaching hospitals, for example) will not benefit the population at large, as such facilities are used mostly by better-off urban residents. This may be true in Nigeria where more than 60% of public secondary and tertiary education, as well as healthcare facilities, are sited in the urban areas. It should also be noted that, education and healthcare services typically attract higher subsidies in urban than in rural areas. It has also been observed that, in Nigeria, education and healthcare services, generally, are often better financed in capital cities than in other urban areas. These variations in unit subsidies may have led to inequalities in the distribution of benefits across location in Nigeria.

Benefit incidence across regions (geopolitical zones)

Nigeria is divided into six regions known as geopolitical zones, with three from the north and three from the south. Each region is made up of five to seven states. There are no legal regional governments with autonomous expenditure, though states in every region do come together to look at common problems and agree on strategies towards solving them. Regional spending, from the study's results, was generated through the aggregation of different states spending. Therefore, much discussion may not be necessary at this level but at the states level, where there exists a legal backing for all spending priorities. Incidence of benefits across region (geopolitical zones) in Nigeria is presented in Table A1 in Annex 1. A look at the traditional BIA results showed an absolute progressivity for primary education and healthcare for South-East and South-South regions and progressivity for other regions of the country. Secondary education and healthcare revealed a mixed trend, while tertiary education and healthcare services showed regressivity. It is also noteworthy that the South-East region, with the least average incidence of benefit for public primary education and next to South-South and North-Central in primary healthcare, comes up to be the region with lowest poverty incidence, lowest infant mortality rate, lowest public medical access, lowest under five mortality rates, lowest number of public primary schools but with the highest number of private primary education and healthcare facilities per capita, as shown in Table 1.1.

If the region has lowest average incidence of the basic public education, yet one of the best education and poverty outcomes, this may imply that the progress may not be entirely attributed to public or government spending. The high patronage of private education and healthcare providers in the region was corroborated by Ichoku (2008) who revealed that the region is incurring catastrophic expenditure because it spends 40% or more of its discretionary (non-food) or 10% or more of its total expenditure on healthcare. The study further revealed that, in 2004, 24% of South-East households incurred catastrophic health expenditure; about 37% of the households spent more than 25% of total annual expenditure on healthcare and this catastrophic expenditure is more prevalent among the richest income quintile. This may also be true for the entire country since a careful analysis of other regions, in comparison with the secondary statistics provided in Table 1.1, reveals no significant correlation between the education/healthcare benefit incidences and the general outcomes of education/healthcare. Therefore, it may not just be that there are regional differences in benefit incidence of public education and healthcare services in Nigeria but also different outcomes. The finding of differences in regional incidences corroborated Demery (1996) and The World Bank (1995b) for Ghana and

Bulgaria, in a study that showed a wide disparity in racial access to healthcare, thereby making healthcare targeting a regional or ethnic issue. The above analyses are based on the results of the traditional BIA. Further issues about the progressivity or regressivity of spending are dealt with under the section on dominance tests.

Benefit incidence across Nigeria states

Nigeria is a federal state with three tiers of government (one national or federal, 36 states including the Federal Capital Territory (FCT) and 774 local governments). The three levels are autonomous in decision making, especially on spending, though the last Supreme Court judgment recognized local government councils as appendages of the state level. All the states have every right under the 1999 Nigerian Constitution to do the following:

- identify its priority areas for development and sources of revenue;
- estimate how much to be generated and how much to be spent on the priority areas identified;
- get the approval of the lawmakers (state legislatures) to generate money from the sources identified and spend money as allocated to the priority areas for development;
- generate money from the approved sources and spend the money on the approved priority areas for development; and
- allow for monitoring and evaluation as to how well the money was generated and spent.

The above breakdown of state rights underscores an actual need for state benefit incidence analysis because if decisions on public spending at this level are well managed and targeted, it will complement the effort of the federal level in poverty and inequality reduction.

The results of incidence of benefits across Nigerian states for education and healthcare are presented in tables A2 and A3 in Annex 1. Evidences from the results reveal differences in average benefits across states for different social services at different levels across different quintiles. The BIA results show absolute progressive benefits for primary education in most states except for Abia, Adamawa, Akwa Ibom, Bauchi, Benue, Delta, Imo, Kano, Kwara and Niger states which were just progressive. Similar trend exists for primary healthcare benefits.

A further look at the results in terms of primary healthcare shows that, benefits from public healthcare services across the states showed high differences with four states (Benue, Jigawa, Katsina and Kogi) having the lowest public primary healthcare average benefit incidence. The four states, unfortunately, have the worst healthcare outcomes according to NBS (2007). It is also interesting to note that the five states with the highest benefit incidence in primary healthcare from the study results are also states with very high negative healthcare outcomes according to NBS (2007). The latter may be attributed to the fact that health services interact with many factors to generate improved health outcomes such as better drinking water, better education and better nutrition which are lacking in the former states and are important complementary factors leading to better health.

Public secondary healthcare revealed mixed results with some states showing just progressive benefits while others show regressive benefits. The result is such that states with high number of public secondary healthcare facilities have higher incidence of benefits with the exception of Kogi State. The tertiary result revealed regressive benefits for more than two third of the states.

On average, the FCT emerged as one of the top five high incidences of benefits for all levels of education and healthcare which further corroborate the notion that public education and healthcare services are often better financed in the capital cities than in other urban areas. Further discussion on the states results will be based on the dominance tests results since the aforementioned analyses have been based on visual analysis of the traditional BIA results which have not been tested statistically.

ANOVA tests for differences in average (mean) benefits from public expenditure

The study carried out a test to ascertain if there are differences in benefits by household groups (quintiles) across social services (education and healthcare). In other words, testing if there are differences across the means. Testing the first mean difference hypothesis (H01) of the study thus: Public expenditure on education and healthcare at all levels does not differ significantly, the study employed the 2-Way ANOVA as highlighted under the section on theoretical framework and methodology. Results (Annex 2: tables A4 and A5) from the tests suggested that the first hypothesis was not rejected because F calculated (0.00765, 0.4727) for education and healthcare, respectively, were less than the critical F (3.478) at 0.05 level of significance for household benefit effect for both social services (education and healthcare). Therefore, the study concluded that, benefits from national or federal public expenditure on education and healthcare, at all levels, do not differ significantly.

The second null hypothesis of mean difference was to find if public expenditure on education and healthcare at all levels across regions (geopolitical zones) and states of the federation do not differ significantly. The result (Annex 2: tables A7 – A10) shows an F calculated for education by states and region (geopolitical zones), respectively, were 57.6486 and 13.1243 as against the critical F (1.7101 and 1.8259) which implies that the calculated F were greater than the critical F for education across states and regions. Similarly, the healthcare calculated F was 10.20286 and 11.7732 for states and regions as against the critical F (1.7101 and 1.8259) which was also greater than the calculated F values for both states and region. The above finding led to the rejection of the second null hypothesis of mean difference; hence the study concluded that, benefits from public expenditure on education and healthcare, at all levels, across regions (geopolitical zones) and states of the federation differ significantly at 0.05 significance level.

The third hypothesis for mean difference was to find if benefits from public expenditure on education and healthcare, at all levels, do not differ significantly across location. The ANOVA result for location (Annex 2: Table A6) shows an F calculated value of 0.7769 as against a critical F value of 4.06618 hence the study could not reject the null hypothesis and concluded that benefits from public expenditure on education and healthcare, at all levels, do not differ significantly across location at 0.05 significance level.

It is also interesting to note that, the three ANOVA results for the three hypotheses

supported interaction effect at 0.05 significance level. The finding of interaction corroborated with the fact that spending in one level of education and healthcare do affect the amount of spending on the other levels. The ANOVA results were to test for differences in benefits and not for progressive or regressive spending. To test for progressive and regressive, the study employed the dominance tests.

Tests and discussions of differences in concentration curves (dominance tests)

Concentration curves used for dominance tests in this study are presented in Figures 4.1, 4.2, 4.3, 4.4 and 4.5. Figures 4.3, 4.4 and 4.5 are concentration curves for levels of education and healthcare by household groups in Nigeria; while figures 4.1 and 4.2, presented at the gender section, reveal concentration curves for education and healthcare by gender in Nigeria.

Figure 4.3: Concentration curves for primary education and healthcare in Nigeria

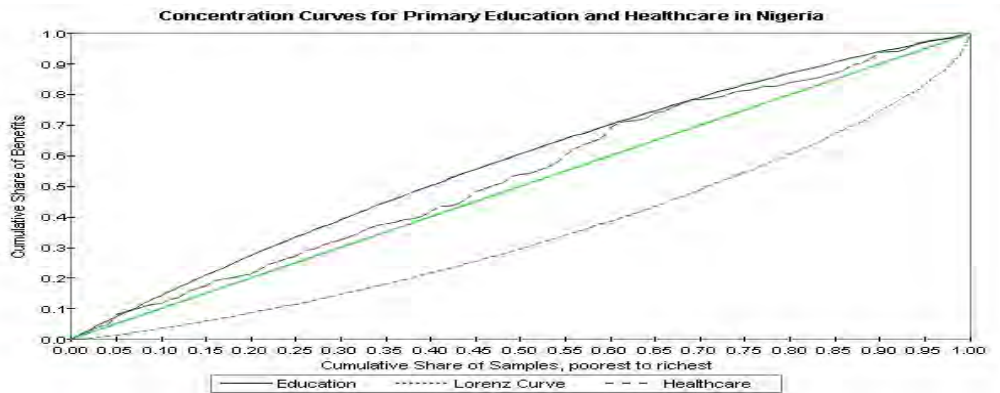


Figure 4.4: Concentration curves for secondary education and healthcare in Nigeria

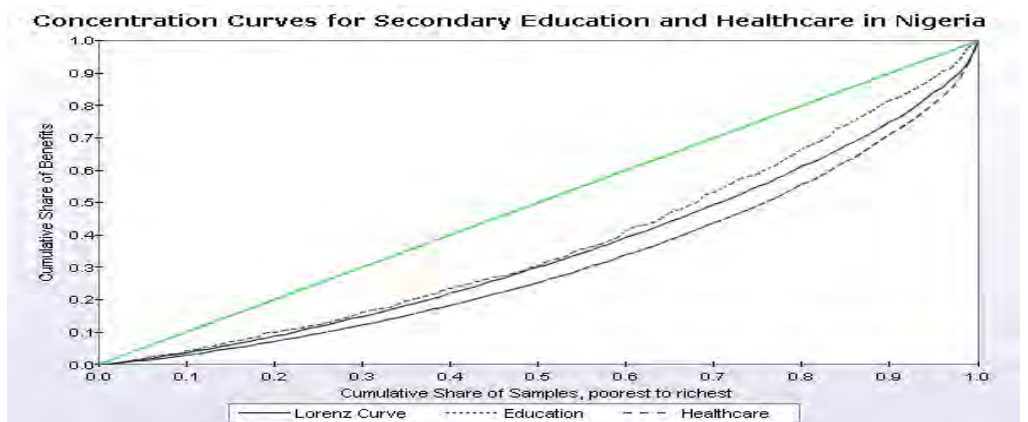
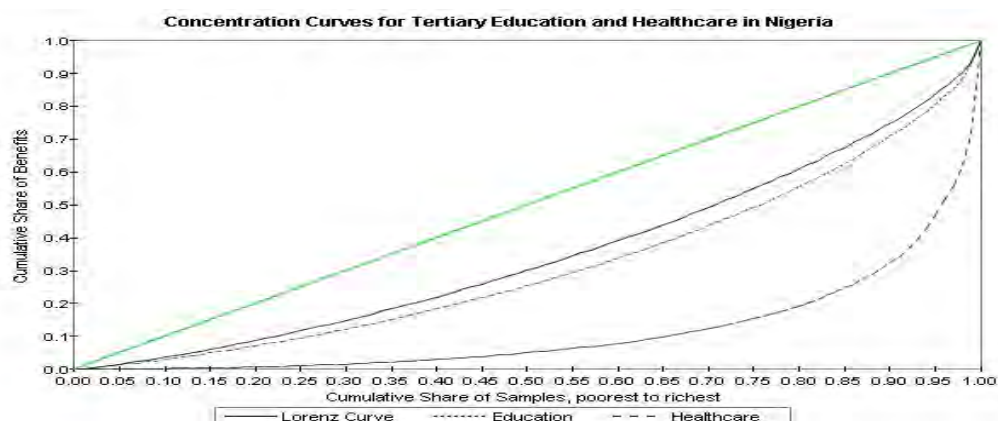


Figure 4.5: Concentration curves for tertiary education and healthcare in Nigeria

A visual inspection of the above tables corroborated with traditional BIA results. Other concentration curves (states and regions) were not presented in the study because there were too many conflicting curves hence lack of visual comprehensibility. Meanwhile, the different states and regions ordinates were used for the welfare dominance tests and results reported in Table 4.4 to ascertain statistical significance and reality. Table 4.4 shows the dominance tests results for social services (education and healthcare) relative to the Lorenz curve and the 45-degree line in Nigeria (nationally) and by gender (region and states).

Table 4.4: Dominance results for social services (education and healthcare) relative to the Lorenz curve and the 45-degrees line in Nigeria

	Primary Education		Primary Healthcare		Secondary Education		Secondary Healthcare		Tertiary Education		Tertiary Healthcare		
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
National	+	+	+	X	X	--	X	--	--	--	--	--	--
Male	+	+	+	X	X	--	X	--	--	--	--	--	--
Female	+	+	+	X	+	X	--	--	--	--	--	--	--
North-East	+	X	+	+	+	--	X	--	--	--	--	--	--
North-West	+	+	+	X	X	--	--	--	--	--	X	--	--
North-Central	+	X	+	X	--	--	--	--	--	--	--	--	--
South-East	+	+	+	X	+	X	X	--	--	--	--	--	--
South-West	+	X	+	X	X	--	X	--	--	--	--	--	--
South-South	+	+	+	+	--	--	--	--	--	--	--	--	--
ABIA	+	+	+	X	+	X	X	--	--	--	X	--	--
ADAMAWA	+	X	+	X	+	X	X	--	--	--	--	--	--
AKWA IBOM	+	X	+	X	--	--	X	--	--	--	X	--	--
ANAMBRA	+	+	+	X	+	X	X	--	--	--	--	--	--
BAUCHI	+	X	+	X	X	--	--	--	--	--	--	--	--
BAYELSA	+	X	+	X	X	--	--	--	--	--	X	--	--
BENUE	X	X	X	X	--	--	+	--	--	X	--	--	--
BORNO	+	+	+	X	--	--	X	--	--	--	--	--	--

continued next page

Table 4.4 continued

	Primary Education		Primary Healthcare		Secondary Education		Secondary Healthcare		Tertiary Education		Tertiary Healthcare	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
CROSS RIVER	+	+	+	+	X	--	--	--	--	--	--	--
DELTA	+	X	+	X	--	--	--	--	--	--	--	--
EBONYI	+	X	+	X	+	X	X	--	--	--	--	--
EDO	+	+	+	X	--	--	X	--	X	--	--	--
EKITI	+	+	+	X	--	--	--	--	--	--	--	--
ENUGU	+	+	+	X	+	X	X	--	--	--	--	--
FCT	+	X	+	X	--	X	--	--	--	X	--	--
GOMBE	+	X	+	+	X	--	X	--	--	--	--	--
IMO	+	X	+	X	X	--	X	--	--	--	--	--
JIGAWA	+	X	+	X	--	--	--	--	--	--	--	--
KADUNA	+	X	+	X	--	--	--	--	--	--	--	--
KANO	+	X	+	+	--	X	X	--	--	--	--	--
KATSINA	+	X	+	+	X	--	--	--	--	--	--	--
KEBBI	+	+	+	X	X	--	--	--	--	X	--	--
KOGI	+	X	+	X	--	--	--	--	--	--	--	--
KWARA	+	X	+	X	--	X	--	--	--	--	--	--
LAGOS	+	+	+	+	--	--	--	--	X	--	--	--
NASSARAWA	+	+	+	+	X	--	--	--	--	--	--	--
NIGER	+	X	+	+	X	--	--	--	--	--	--	--
OGUN	+	+	+	X	--	X	--	--	--	--	--	--
ONDO	+	+	+	X	X	--	+	--	--	--	--	--
OSUN	+	+	X	--	--	--	--	--	--	--	--	--
OYO	+	X	X	X	--	--	--	--	--	--	--	--
PLATEAU	+	+	+	+	--	--	--	--	--	--	--	--
RIVERS	+	+	+	+	--	--	--	--	--	X	--	--
SOKOTO	+	+	+	X	+	--	--	--	--	--	--	--
TARABA	+	X	+	X	+	X	--	--	X	--	--	--
YOBE	+	X	+	X	X	X	X	--	--	--	--	--
ZAMFARA	+	+	+	+	--	+	X	--	--	X	--	--

Notes:

(1) compares the column's concentration curve with the Lorenz curve for per capita household expenditure (progressive if + and regressive if x or --)

(2) compares the column's concentration curve with the 45-degree line (absolute progressive if +) and progressive if x)

'+' indicates that the benefits from the column's service are more concentrated among the poor than per capita expenditure (Lorenz curve) (for [1]) or an equal per capita distribution (for [2])

'--' indicates that the service is less concentrated among the poor

'x' indicates that the concentration curves cross

If the curves are statistically insignificant from one another, the corresponding cell is blank

Source: Author's Computation

This dominance tests results are country-specific (Nigeria) following the process and method explained under the section on procedure testing for differences in concentration curves to ascertain whether social services (education and healthcare): (a) were absolutely progressive (i.e., the concentration curve is above 45-degree line, implying that the poor receive more benefits than the rich in absolute terms), (b) were progressive (i.e., the concentration curve is above the expenditure distribution (Lorenz curve), implying that the poor benefit more in relative terms), and (c) can be ranked or ordered by their degree of progressivity.

Federal spending dominance tests

Based on the results in comparison to the 45-degree line, the t-tests for the differences between ordinates of two concentration curves at 19 abscissa, as interpreted and presented in Table 4.7, revealed that with the exception of primary education service, no service(s) level was absolutely progressive for federal level spending. This finding corroborates the finding by Sahn and Younger (2000) for seven African countries, namely, Ghana, South Africa, Guinea, Ivory Coast, Madagascar, Tanzania and Uganda. Based on the same results, the study found tertiary education and tertiary healthcare for national as statistically dominating services or services where the poorer households receive less benefit in per capita terms than households at the upper end of the expenditure distribution. Also, the study found statistically significant crossings for primary healthcare for federal concentration curves as well as secondary education and secondary healthcare concentration curves.

Comparison between the Lorenz curve for household expenditure and various categories of social services revealed dominance of social services such as primary healthcare for national concentration curves for primary healthcare. Such findings indicate that, such services were progressive hence the study can reject the null hypothesis of non-dominance between public primary healthcare and federal Lorenz curve. These findings show that, public primary healthcare was more progressive than the distribution of expenditure hence can be adjudged progressive.

Based on the foregoing statistically insignificant progressivity for all levels (except for primary education and healthcare) and across all quintiles, the study therefore accepted the first null hypothesis of the study and concluded that, public expenditure on education and healthcare in Nigeria, at all levels across households groups, were not progressive. The dominance test corroborated with results of the traditional BIA for public spending on education and healthcare at all levels across households groups.

Gender-based dominance tests

The gender disaggregated dominance tests results reveal that, only primary education service was absolutely progressive for both male and female, hence the study cannot reject the null hypothesis that their concentration curves are equal to or above the 45-degree line. Primary healthcare spending for both sexes were progressive, while secondary healthcare as well as tertiary education and healthcare, were regressive. The results show significant crossing for male secondary education and progressivity for female secondary education. The dominance tests and the traditional BIA results for the public spending on education and healthcare by gender were the same. Results for the gender dominance tests were based from the t-tests for the differences between ordinates of two concentration curves at 19 abscissa, as interpreted and presented in Table 4.7.

Regional or geopolitical zonal dominance tests

The study added up states in each of the six geopolitical zones to generate the regional spending that enabled carrying out the regional BIA because there are no legal regional

governments with autonomous expenditure. Regional concentration curves were also subjected to dominance tests and the results, as presented in Table 4.7, suggest an absolute progressive spending on primary education in three regions (North-East, North-West and South-East) and progressive spending in the other three regions (North-Central, South-West and South-South). The two regions with absolute progressive spending for primary healthcare were North-East and South-South while all the regions have regressive spending for both education and healthcare at tertiary level with the exception of North-West for tertiary healthcare spending only. Secondary education spending at the regions also reveals progressive for North-East and South-East while North-Central spending on same was regressive. Other regions at the secondary education and healthcare show some significant crossings. The dominance test and the traditional BIA results for the public spending on education and healthcare across regions exhibited almost the same results. Results for the regional dominance tests were based from the t-tests for the differences between ordinates of two concentration curves at 19 abscissa, as interpreted and presented in Table 4.7.

State-level dominance tests

Because the states in Nigeria have every right in the country's constitution to identify its priority areas for development and spend money on the approved identified priority areas for development, it is necessary to have a detailed look at the dominance tests results across the 36 states, including the FCT. This is important because the states in Nigeria are regarded as a tier of government closer to the people more than federal government and for the fact that even the local governments, which is the closest to the people, still need approval from the states before embarking on development projects; the states in Nigeria sit somewhat at a very strategic point towards every facet of development. Results for the states dominance tests were based from the t-tests for the differences between ordinates of two concentration curves at 19 abscissa, as interpreted and presented in Table 4.7. The dominance tests results reveal an absolute progressive spending for 17 states and progressive spending in the other states except Benue State for primary education and absolute progressive spending in primary healthcare spending for only ten states. None of the states, including the FCT, dominance tests results revealed an absolute progressive spending at the secondary education level but seven states showed progressive spending. Similarly, only three states dominance tests results revealed progressive spending on secondary healthcare. Tertiary education and healthcare spending across all states, including FCT, showed regressive spending.

The findings of differences in states benefit incidence have been supported by studies such as Ajay et al. (2000) for India and its principal states which further found that pro-rich bias was stronger in rural than in urban areas and much greater in poor than in better-off states. The Nigerian states differences in benefits by quintiles can be viewed from two contending issues: (a) policy setting/priority and (b) fiscal federalism in Nigeria.

On the policy setting and priority front, public spending can only be effective in reducing poverty when the policy setting is right. Eboh (2009) in a study found some conflicts in policy setting and priorities between the federal and states governments in Nigeria. This in effect implies that education and healthcare policies may have different

targets, strategies and outcomes at the two tiers of government. Such conflicts may have resulted to different targeting and outcomes between the federal and the states. Policy settings also affect efficiency and equity levels. The above conflicts may have ignored the principles of public policy information flow from the people to the government and vice versa. According to Demery (2001), public policy in general, and public expenditure decisions in particular, must be based on a sound understanding of the needs and preferences of the population at large. For policy to be complete and inclusive, the provision of public services should be viewed as collaboration between governments, on the one hand, and the households on the other. To make this collaboration effective, there must be a two-way flow of information, with governments constantly 'listening' to households and households, in turn, being informed of government's objectives and their rights under explicit contracts or covenants. The big concern here is with one dimension of the information flow: how can governments be informed about the needs and behaviour of their clients, especially the poor? Who indeed benefits from public spending?

The second issue from the states results have to do with the practice of fiscal federalism in Nigeria. First, state creation in Nigeria has been borne out of political benefits rather than true efficiency, equity and viability concerns. Study by Eboh et al. (2006) found that more than 70% of the Nigerian states cannot generate up to 20% of the yearly expenditure internally, which means they depend on the federal allocation for every of their expenditure, including recurrent expenditure. State allocation, on the other hand, is not the same across all states but depends on so many factors. Issues on financing of education and healthcare in Nigeria at the state level, therefore, are embedded in the virtually endemic problems of fiscal federalism – in particular, the so-called vertical and horizontal fiscal imbalances. In Nigeria, since independence, the search for appropriate instruments and formulas for minimizing each set of imbalances has been particularly problematic. According to Hinchliffe (2002:1-2), between 1960 and 1991, sixteen changes were made to the constitution in attempts to resolve these issues. Education figures centrally in these debates for several reasons. First, primary school enrolments are part of the allocation formula for distributing centrally collected revenue across states. Second, the education and healthcare sectors typically consume a significant share of states and local government resources. And third, the financial responsibility for primary education and healthcare across levels of government has never been fully reserved.

Summary and further discussion of findings

The major findings of the study revealed an absolute progressivity for primary education in Nigeria, progressivity for primary healthcare while tertiary education and healthcare were regressive from the federal, regional and state public spending. The finding of absolute progressivity for primary education should be taken with a pinch of salt because benefit incidence says nothing about the standard/quality of public primary education in Nigeria as well as coverage. Descriptive statistics presented in Table 4.1 show the spread of its usage, which suggested that the poor may have benefited more because they use the facilities more. For standard, the average teacher-pupil ratio in Nigeria public primary schools in 2007 was well above 1:40 as against 1:35 as stipulated in the county's educational policy. Available statistics from the National Bureau of

Statistics (NBS) showed that teacher-pupil ratio in basic education fell from 7.1% in 1993 to 5.9% in 2005.

In terms of access and coverage, available statistics in 2009 suggested that Nigeria is one of the 15 countries with the highest number of illiterates and one of the top five countries of the developing world that will not achieve any meaningful *Education For All (EFA)* goals in 2020, let alone 2015. This is because only 22.1 million out of 42.1 million Nigerian children are in primary schools; only 10.4 million out of 33.9 million of those eligible for secondary education are attending; only 25% of those who sat for Senior Secondary Certificate Examination (SSCE) from 2000 to 2006 passed with credits in mathematics and English language; while only 19.5% out of 1.5 million Nigerians seeking for admission to tertiary education, got admitted (Ikechukwu, 2006). It is expected that most of these children outside the educational system belong to the poorer households. These children are not captured in any statistics and are not known to be part of the nation's calculation when deliberating on investment in capacity issues. They are not in any vocational institutions, trade centres, or skills giving activities planned and delivered by the government as a deliberate policy. The implication, therefore, is that more than 30% of children who ought to be in primary, secondary or tertiary schools are nowhere nearer to the school environment.

For those who have the opportunity to be in schools at all levels, Soludo (2008) opined that the problems of the so called Nigerian graduates are not unemployment but unemployable. Such statements has further strengthened the fact that Nigeria's economic landscape, especially since the oil boom of mid 1970s, has become a textbook example of Africa's economic growth and development tragedy. Therefore, a careful analysis of the aforementioned facts reveals serious challenges facing policy makers, not only in terms of standard or quality of education, but also access at all levels hence the need for political will and transparent financial commitment towards solving the twin problems.

On the healthcare front, the finding that only primary healthcare shows dominance with the Lorenz curve does not mean that primary healthcare system is perfect. Healthcare outcomes in the country remain scary with maternal mortality rate in 2007 estimated at 800 per 100,000 live births (UNDP, 2007) and was rated one of the highest in the world. Infant and under-five mortality differ across location (81 for urban and 121 for rural) for every 1,000 live births while under-five mortality rate was 243 for rural and 153 for urban for every 10,000 with a life expectancy of 54 years in 2007 (NBS, 2008). In summary, health issue in Nigeria is one of the worst around the globe (UNDP, 2002).

Healthcare delivery service centres in rural Nigeria is found spasmodically, with more than half of the population not having access to basic health infrastructure. According to NISER (2006: 128) there is inadequate food supply and high morbidity, especially of malaria. In 2006, nurses per capita stood at 839, doctors per capita stood at 3,180 in absolute terms while per capita public spending on healthcare was less than US\$15 and as low as US\$3 in some parts of Nigeria which is far below the US\$34 recommended by WHO for low income countries. Although the federal government recurrent healthcare budgets have shown an upward trend from 1999 to 2006, available evidence indicates that the bulk of this expenditure goes to personnel costs.

The regressivity of tertiary education and healthcare spending in Nigeria need an urgent and comprehensive review for the two social service levels. Tertiary level of

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education and healthcare are known to be out of the reach of the poor in Nigeria and some other developing countries. In tertiary education, apart from the number of such facilities, they also have the problem of capacity in terms of numbers to admit, number of lecturers, standards of facilities and other indicators in education. Similarly, tertiary healthcare facilities suffer from number of beds, number of medical practitioners and equipment as well as underfunding. The two facilities have suffered from several and constant industrial actions due to underfunding-led agitations by workers which have very high cost to the economy. The NUC estimated the country's financial loss due to 2003 industrial action by the Academic Staff Union of Universities (ASUU) at N83.3 billion or US\$0.72 billion and US\$1.06 billion in 2009. For the five months in the two years when the university system was shut down, the nation lost the estimated amount.

5. Conclusions and policy implications

Accessing the actual level and allocation of public expenditure (subsidy) is the key to understanding any government's true expenditure priorities and its coherence with the government's policy objectives. In the light of this, the study attempted to determine what has been the distribution pattern of public expenditure in education and healthcare in Nigeria. Two important sectors (education and healthcare) which the state uses in undertaking expenditures to pursue a variety of economic, social and political goals, were chosen and the distributional pattern of government subsidies was analysed.

Findings from the study suggest there is a wide disparity in state access to education and healthcare, hence targeting education and healthcare services to the poor is a state issue. A major source of inequality, in the benefit incidence for secondary education and healthcare spending in Nigeria, was the gender dimension because females gained more from secondary education spending while males gained more from secondary healthcare spending. Education and healthcare sectors expenditures vary in their incidences according to the level of service. Primary education and healthcare were more pro-poor than tertiary education and healthcare. It is also noteworthy that changes in benefit incidence were not necessarily a result of changes in public spending hence the fact that most government spending is not imputable means that benefit incidence simply cannot be exhaustive. Analysts therefore, must be aware that benefit incidence cannot hope to be exhaustive in its coverage of public expenditure. At best, benefit incidence provides clues about which components of government spending have the greatest impact on the current income and consumption levels of households.

It is a general believe that public expenditure can help government achieve the goal of poverty reduction as well as reduction in inequality when the policy setting is right. The present situation in Nigeria may be at variance with right policy setting because it abhors open public expenditure process including budget management, accountability, transparency and stakeholders' participation that is based on outcomes and impacts and not just line items and inputs. According to Filmer et al. (1998), simply spending money on the provision of a service, without attending to the efficiency with which that spending generates services and to the impact on the intended beneficiaries, is not what is recommended. Nigeria's public spending process should be based on a sound understanding of the needs and preferences of the population at large. The provision of public services should be viewed as collaboration between governments, on the one hand, and the households on the other.

Results from the state analyses reveal differences in state public spending on education and healthcare at all levels as a result of cooperative federalism being practiced currently in Nigeria. Cooperative federalism, as practiced in Nigeria, gives larger share of the revenue to the federal government on account of larger responsibilities as defined in the

Executive List. The study results suggest that such practice may not have favoured the country as evidenced by all indicators of development when compared with the country's position in the 1960s when dual federalism was in place.

While much attention in the past four decades in Nigeria has been given to the issues of horizontal imbalances (particularly between states), less has focused on whether the revenue allocation arrangements are sufficient to minimize vertical imbalances and to allow each level of government to perform the responsibilities allocated to it. In the education and healthcare sectors where, in spite of some overlaps, the major financial responsibility for each separate level lies with a different tier of government, it is relevant to ask whether the vertical allocation criteria allow for the provision of 'appropriate' funding for the education and healthcare system as a whole and for each individual level of the system.

The study findings have an implication that income redistribution may be effected through subsidized government services, rather than through direct income or consumption transfers. Benefit incidence may give some measures of targeting efficiency, but the basis for such targeting does not go beyond the objectives of current income redistribution. There are many reasons why observed household income (or expenditures) will be affected by government spending. The provision of services by the state can influence household spending decisions in some cases displacing private spending and in others augmenting it (van de Walle, 1995). For example, government spending on secondary education will have the effect of reducing private spending on such schooling, and government's subsidies in health may induce households to spend on other services.

In conclusion, it should be noted that the analysis does not necessarily measure the actual benefits households and individuals receive. The reason why the approach is termed benefit incidence is to distinguish it from *expenditure* incidence. The benefit flows to *recipients* of government services are distinguished from the income flows government spending generates to the providers of those services. In line with Demery (2000) argument, this should not be taken, however, to imply that benefit incidence analysis is an accurate tool for measuring benefits to service recipients. Perhaps a better term to describe the technique is *beneficiary* incidence since this avoids the suggestion that true benefits are measured, but simply conveys the message that spending is imputed to the beneficiaries.

Notes

1. Social assistance here includes subsidized government services such as education, health and infrastructure services, which will in effect improve the well-being of the beneficiaries and enhance their longer-run income earning potentials.
2. Public expenditure is progressive if the poorer households benefits more than the richer households.
3. Notable policy regimes include the Rolling Plan (1974-1979), the Austerity Measures (1981-1984), the Structural Adjustment Programme (SAP) of 1985-1992, Vision 2010 (1992-1998), Obasanjo Economic Direction (1999-2003), the National Economic Empowerment and Development Strategy (NEEDS) of 2003-2007 and the current Yar'Adua Seven Point Agenda (2007-2011).
4. See literature review for details of such studies.
5. Adult literacy rate is still struggling to leave 57%, a position it has maintained for more than five years now.
6. Health poverty in Nigeria is at a different dimension when the percentage of people that has access to clean/safe water and essential drugs is compared to other sub-Saharan African (SSA) countries.
7. In assessing how public expenditure benefit households, hot argument has been in existence with two major approaches; the need to measure households preferences for the goods in question based on theory and the benefit incidence analysis that combines cost of providing public services with data on their use in order to generate distribution of the benefit of government spending.
8. The (welfarist) literature has been characterized by two broad approaches. The first emphasizes the need to measure *individual preferences* for the goods in question, based on refinements of the Aaron and McGuire (1970) methodology. The second approach is *benefit incidence* analysis, which combines the cost of providing public services with information on their use in order to generate distributions of the benefit of government spending.
9. The Turks and Gypsy are the two minority groups in Bulgaria comprising 13% of the total population, 25% of the poorest quintile and very few are found among the better-off (only about 3% in the richest quintile).

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10. The Federal Government of Nigeria made available about one billion dollar debt relief. This amount has been channelled to education, health and other MDG sectors annually starting from 2006 as part of the benefits of the debt relief granted Nigeria.
11. In Nigeria, different states get different allocation from the federation account. The allocation is distributed using a formula comprising of vertical (federal 52.7%, states 26.7% and local government 20.6%) and horizontal (equality 40%, population 30%, internally generated revenue 10%, land mass and terrain 10% and social development factors 10%). The social development factor is used to determine states that have better literacy levels, hospital facilities, and others factors and it includes: territorial spread 1.5%, rainfall 1.5%, primary/secondary enrolment 4%, and hospital beds 3%.
12. A notable shock in Nigeria comes from her overdependence in oil revenue.
13. A telling indicator is the annual channeling of over N100 billion (US\$1 billion) debt relief to key sectors known as MDG sectors since the debt relief of 2006.
14. Disaggregating the entire population into quintiles represents every household socioeconomic status.
15. There are three levels of funding, namely: federal, state and local government. Also both health and education fall under the concurrent list and hence is being taken care by the three arms independently.
16. Total consumption here is the sum of food and non-food consumption expenditures, using standard definitions (see, for example, The World Bank [2000]). Food consumption includes all items consumed by the household (from purchase, own production, wages in kind, or transfers). Non-food consumption includes all non-food items, such as clothing, house rents, cooking fuel, transport, education and others as well as imputed values for rents if the household lives in owner-occupied housing, and imputed use values of household durable goods.
17. Nigeria has six regions known as geopolitical zones and thirty-six (36) states.
18. See details in section 4.7.
19. Some authors refer progressive spending as pro-poor spending.
20. In such situations, one could resort to other criteria such as the Gini coefficient, Atkinson index, or generalized entropy measures for a complete ordering.
21. To the extent that quality variation is not captured in the cost data, e.g., because of systematic variation in teacher absenteeism between the schools attended by poorer and richer students (which is plausible), bias in the direction of finding progressivity still prevails. Similarly, the cost of providing services of identical quality may vary with the remoteness of an area or the size of the population served, with a higher proportion of fixed costs in more remote areas. If poorer households are disproportionately represented in areas where the unit cost of service delivery is high, our analysis would be biased toward findings of progressivity. Alternative methods for adjusting for differences in the quality of services delivered are necessary, but difficult to identify.

22. For secondary education in states that collect fees, tuition is paid directly into the government coffers.
23. See the cited papers for details.
24. This method used is a demanding criterion, especially in the light of low power of the test hence effort should be made to explore alternatives like the use of extended Gini coefficients as an alternative means for stochastic dominance as used by Sahn and Younger (2000).
25. This individual disaggregation enabled the study to draw concentration curves by gender.
26. Nigeria is divided into six geopolitical zones and each of these zones comprises of nothing less than five states.
27. The result was further subjected to dominance tests and only primary education passed the absolute progressive test.

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Annex 1 – Results of incidence of benefits across Nigerian States for education and healthcare

Table A1: Average education and healthcare benefit for regions by quintiles (N)

Education	Secondary															Tertiary																			
	Primary					Secondary					Tertiary					Primary					Secondary					Tertiary									
	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile
North-East	3,042	2,698	2,791	2,381	2,457	3,665	3,428	3,963	3,978	3,907	5,330	6,995	7,103	7,683	9,734	3,978	3,907	5,330	6,995	7,103	7,683	9,734	3,978	3,907	5,330	6,995	7,103	7,683	9,734	3,978	3,907	5,330	6,995	7,103	
North-West	3,946	3,255	2,671	2,873	2,465	4,030	4,131	4,862	4,648	4,483	5,935	7,471	8,212	9,053	10,989	4,648	4,483	5,935	7,471	8,212	9,053	10,989	4,648	4,483	5,935	7,471	8,212	9,053	10,989	4,648	4,483	5,935	7,471	8,212	
North-Central	2,995	2,581	3,044	2,079	1,748	3,532	3,698	4,802	4,690	4,976	4,771	6,063	7,157	8,253	9,217	4,690	4,976	4,771	6,063	7,157	8,253	9,217	4,690	4,976	4,771	6,063	7,157	8,253	9,217	4,690	4,976	4,771	6,063	7,157	
South-East	2,799	2,444	2,532	1,846	1,598	4,181	4,010	4,627	4,581	4,103	5,608	6,887	7,538	7,885	9,773	4,627	4,581	4,103	5,608	6,887	7,538	7,885	4,627	4,581	4,103	5,608	6,887	7,538	7,885	9,773	4,627	4,581	4,103	5,608	6,887
South-West	3,217	4,637	4,124	3,505	3,035	6,881	6,808	9,232	8,708	8,098	9,554	11,893	13,835	13,868	15,834	9,232	8,708	8,098	9,554	11,893	13,835	13,868	9,232	8,708	8,098	9,554	11,893	13,835	13,868	15,834	9,232	8,708	8,098	9,554	11,893
South-South	2,612	2,203	1,876	1,805	1,624	3,425	3,905	5,026	5,473	5,184	4,243	5,307	6,221	7,103	7,785	3,425	3,905	5,026	5,473	5,184	6,221	7,103	3,425	3,905	5,026	5,473	5,184	4,243	5,307	6,221	7,103	7,785	3,425	3,905	5,026
Average	3,102	2,970	2,972	2,415	2,155	4,286	4,330	5,419	5,346	5,125	5,907	7,436	8,344	8,974	10,555	5,419	5,346	5,125	5,907	7,436	8,344	8,974	5,419	5,346	5,125	5,907	7,436	8,344	8,974	10,555	5,419	5,346	5,125	5,907	7,436
Healthcare	Secondary															Tertiary																			
Zones	Primary					Secondary					Tertiary					Primary					Secondary					Tertiary									
	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile	Quintile
North-East	1,929	1,798	1,735	1,785	1,726	1,703	2,198	2,052	2,401	2,286	1,907	2,670	2,832	2,966	3,196	1,703	2,198	2,052	2,401	2,286	2,670	2,832	1,907	2,670	2,832	2,966	3,196	1,703	2,198	2,052	2,401	2,286			
North-West	2,230	2,146	2,266	2,012	2,140	1,658	2,145	2,044	2,234	3,334	2,491	2,880	2,880	3,199	3,518	1,658	2,145	2,044	2,234	3,334	2,880	2,880	2,491	2,880	2,880	3,199	3,518	1,658	2,145	2,044	2,234	3,334			
North-Central	1,485	1,549	1,546	1,504	1,557	2,657	2,818	2,777	3,179	3,341	2,728	3,141	3,409	3,699	3,980	2,657	2,818	2,777	3,179	3,341	3,141	3,409	2,728	3,141	3,409	3,699	3,980	2,657	2,818	2,777	3,179	3,341			
South-East	1,629	1,683	1,494	1,453	1,362	1,952	2,379	2,524	2,483	2,033	3,274	3,880	4,130	4,552	5,007	1,952	2,379	2,524	2,483	2,033	3,880	4,130	3,274	3,880	4,130	4,552	5,007	1,952	2,379	2,524	2,483	2,033			
South-West	1,363	1,517	1,310	1,346	1,310	1,613	2,064	2,147	2,223	2,170	2,501	2,573	2,886	3,429	3,637	1,613	2,064	2,147	2,223	2,170	2,573	2,886	2,501	2,573	2,886	3,429	3,637	1,613	2,064	2,147	2,223	2,170			
South-South	3,014	2,752	2,634	2,679	2,336	1,904	2,547	2,603	2,850	2,648	3,469	4,119	4,223	4,426	4,869	1,904	2,547	2,603	2,850	2,648	4,119	4,223	3,469	4,119	4,223	4,426	4,869	1,904	2,547	2,603	2,850	2,648			
Average	1,936	1,890	1,831	1,779	1,738	1,915	2,324	2,323	2,562	2,635	2,679	3,176	3,341	3,660	3,982	1,915	2,324	2,323	2,562	2,635	3,176	3,341	2,679	3,176	3,341	3,660	3,982	1,915	2,324	2,323	2,562	2,635			

Table A2: Average education benefit for states by quintiles (N)

States	Primary					Secondary					Tertiary				
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
ABIA	2,336	2,686	2,742	2,244	1,978	4,333	4,099	4,600	5,162	4,221	6,483	8,632	8,550	9,755	12,312
ADAMAWA	2,053	3,311	3,259	2,359	2,029	3,675	3,189	3,685	3,530	3,331	5,926	8,178	7,726	8,059	11,126
AKWA IBOM	1,368	1,151	698	1,048	609	2,895	3,060	4,421	4,874	5,118	3,529	4,164	5,347	7,198	7,700
ANAMBRA	3,236	2,409	2,147	2,081	1,702	5,886	5,490	5,978	5,957	5,942	4,906	5,408	6,459	6,776	6,857
BAUCHI	994	563	880	788	693	1,843	1,963	2,565	2,394	2,393	2,555	3,268	3,694	4,324	5,319
BAYELSA	1,919	2,012	1,729	2,124	1,950	3,947	3,919	5,208	4,797	4,789	5,408	6,869	7,664	8,857	11,036
BENUE	568	1,434	1,652	1,118	1,087	2,261	2,156	2,917	2,959	4,034	2,892	3,523	4,067	4,976	5,856
BORNO	3,181	2,742	1,708	1,178	987	2,106	2,116	2,706	3,603	3,642	3,183	4,261	4,462	5,697	6,426
CROSS															
RIVER	3,282	2,579	2,017	2,738	2,176	3,413	3,193	4,488	4,939	4,172	5,439	7,464	7,676	8,961	11,054
DELTA	3,451	2,379	3,006	1,328	1,926	3,977	6,796	6,096	7,989	7,269	3,830	4,424	5,945	5,442	4,486
EBONYI	1,684	1,189	1,337	1,191	1,110	3,557	3,408	3,731	3,721	3,221	4,827	3,875	6,307	5,428	6,118
EDO	1,507	1,273	847	831	813	2,898	3,009	4,148	4,270	3,899	3,682	4,096	5,406	5,129	5,562
EKITI	4,130	3,632	3,669	3,273	2,866	4,166	4,191	5,678	5,677	4,723	3,777	5,239	6,021	6,949	6,448
ENUGU	3,752	3,067	2,902	2,310	2,341	3,960	3,641	4,405	4,277	3,773	6,737	9,514	9,054	9,537	13,038
GOMBE	3,645	2,299	3,871	3,215	3,191	4,070	3,308	4,268	4,320	4,310	6,435	8,800	8,482	9,144	12,214
IMO	2,985	2,870	3,531	1,404	858	3,171	3,413	4,418	3,786	3,357	5,089	7,007	7,320	7,930	10,541
JIGAWA	5,103	1,131	1,417	1,266	1,425	3,721	3,827	5,203	4,827	4,673	3,785	4,219	6,695	6,709	7,271
KADUNA	2,127	2,762	1,718	2,682	1,488	2,745	2,371	2,870	2,878	3,117	4,073	5,402	5,346	5,866	7,698
KANO	3,809	3,147	1,929	3,173	3,046	3,697	3,346	4,815	4,407	4,640	6,129	8,560	8,619	9,303	12,412
KATSINA	3,345	3,698	3,241	3,570	2,986	4,138	5,068	5,039	5,143	4,920	6,441	8,744	8,872	9,980	12,775
KEBBI	4,696	3,982	2,557	2,386	2,414	4,908	4,473	6,068	5,736	4,396	7,902	10,897	10,939	11,902	15,752
KOGI	1,530	1,282	1,584	874	816	1,510	2,298	2,579	2,856	2,756	2,106	2,702	3,360	3,446	4,024
KWARA	2,807	2,382	4,058	2,391	882	2,658	2,975	4,597	4,124	3,492	5,138	7,618	7,844	8,541	11,295
LAGOS	3,477	3,439	2,255	1,834	1,536	3,524	4,065	5,766	6,013	6,794	6,505	5,783	9,791	6,966	8,914
NASSARAWA	3,237	2,524	1,904	1,701	1,368	3,161	3,031	3,874	2,963	3,335	5,316	7,470	7,340	7,396	10,570
NIGER	5,470	3,847	4,073	2,224	1,845	5,706	5,225	6,599	5,768	7,367	5,490	5,645	6,917	8,783	9,072
OGUN	2,111	1,627	1,572	1,313	1,228	2,465	2,493	3,960	3,537	3,249	3,650	4,836	5,559	6,462	8,004

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PUBLIC SPENDING AND POVERTY REDUCTION IN NIGERIA

Table A2 continued

States	Primary					Secondary					Tertiary				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ONDO	2,709	1,836	1,828	1,654	1,385	4,008	3,538	4,534	3,442	3,638	4,485	5,703	6,171	6,083	6,368
OSUN	3,973	3,214	2,776	2,113	1,520	4,802	4,500	6,469	5,942	4,647	7,855	10,908	11,169	11,354	12,380
OYO	2,901	1,708	1,647	1,496	1,580	3,970	3,904	4,364	4,415	3,943	5,573	7,175	7,407	8,413	10,666
PLATEAU	2,353	2,316	1,836	1,224	1,170	3,006	3,000	3,661	4,139	3,919	4,200	5,395	5,780	7,027	8,323
RIVERS	4,146	3,826	2,961	2,759	2,271	3,421	3,452	5,796	5,968	5,856	3,568	4,827	5,286	7,028	6,871
SOKOTO	4,233	4,036	3,579	3,463	3,365	3,353	3,561	3,519	3,457	3,370	5,773	5,230	5,895	7,000	8,045
TARABA	3,660	3,127	3,091	2,765	3,817	4,104	4,250	4,593	4,401	3,717	4,624	5,144	6,381	6,364	6,225
YOBE	4,722	4,143	3,937	3,979	4,028	6,191	5,740	5,964	5,621	6,050	9,257	12,322	11,871	12,513	17,094
ZAMFARA	4,311	4,031	4,259	3,569	2,534	5,644	6,268	6,517	6,089	6,266	7,443	9,242	11,119	12,612	12,974
FCT	5,001	4,282	6,198	5,021	5,067	6,424	7,203	9,392	10,017	9,926	8,255	10,086	14,794	17,603	15,377
AVERAGE	3,130	2,647	2,702	2,181	1,948	6,777	6,886	8,537	8,465	8,186	5,196	6,557	7,333	7,987	9,411

Source: Author's Computation

Table A3: Average healthcare benefit for states by quintiles (N)

States	Primary					Secondary					Tertiary				
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
ABIA	1,296	1,389	1,354	1,135	1,071	1,567	2,296	2,108	2,596	2,004	1,980	3,038	3,038	3,132	3,446
ADAMAWA	2,794	2,827	2,579	2,783	2,480	1,875	2,795	2,938	2,944	2,652	721	2,631	2,631	2,743	3,017
AKWA IBOM	1,432	1,567	1,460	1,514	1,711	1,916	1,794	1,634	1,992	1,993	1,489	2,355	2,355	2,449	2,694
ANAMBRA	1,774	1,701	1,378	1,544	1,523	3,579	3,951	4,158	4,112	3,489	2,775	3,918	3,918	3,924	4,317
BAUCHI	1,358	1,364	1,253	1,326	1,374	1,719	2,330	2,460	2,269	2,241	135	901	901	1,147	1,262
BAYELSA	4,363	3,229	2,854	3,265	3,168	2,441	2,871	2,902	2,919	2,846	3,817	4,520	4,520	2,841	3,125
BENUE	690	795	1,179	1,127	1,106	3,042	2,758	2,602	2,744	2,866	1,338	2,076	2,076	1,813	1,994
BORNO	1,841	1,850	1,787	1,820	1,685	1,926	2,235	2,313	2,405	2,209	1,262	2,450	2,450	2,634	2,898
CROSS RIVER	1,869	1,892	1,805	1,502	1,522	1,885	2,441	2,618	2,628	2,286	5,029	6,085	6,085	8,156	8,972
DELTA	2,595	2,749	2,496	2,789	326	2,192	2,673	3,254	3,349	3,198	586	1,449	1,449	1,699	1,869
EBONYI	1,915	1,882	2,013	1,865	1,838	1,099	1,513	1,742	1,879	1,265	5,039	5,155	6,405	7,808	8,588
EDO	3,667	2,997	3,129	2,963	3,319	2,404	3,084	2,789	3,328	2,980	3,717	4,405	4,405	4,591	5,050
EKITI	1,581	1,468	1,440	1,272	1,465	1,951	3,264	3,343	3,407	3,290	4,001	4,216	4,216	4,353	4,789
ENUGU	1,319	1,507	1,332	1,266	1,208	1,785	2,223	2,310	1,864	1,480	5,540	5,850	5,850	6,526	7,179
GOMBE	1,724	1,640	1,694	1,693	1,656	1,608	1,945	2,125	2,171	1,891	4,619	5,251	5,251	5,513	6,065
IMO	1,842	1,937	1,393	1,457	1,167	1,731	1,914	2,301	1,964	1,926	1,034	1,439	1,439	1,370	1,507
JIGAWA	2,848	2,710	2,933	1,723	2,973	1,120	1,840	896	1,924	10,726	943	1,969	1,969	1,973	2,171
KADUNA	1,047	759	1,497	1,367	1,383	1,020	2,056	2,100	2,153	2,076	472	1,029	1,029	1,133	1,247
KANO	2,263	2,231	2,231	2,105	2,110	1,583	1,926	1,915	1,958	1,686	5,321	5,783	5,783	7,176	7,893
KATSINA	2,102	2,041	2,004	1,889	1,686	1,156	1,872	2,013	2,023	1,799	685	822	822	1,025	1,128
KEBBI	2,439	2,314	2,314	2,275	2,314	1,726	2,026	2,049	2,078	2,017	2,003	2,215	2,215	2,372	2,610
KOGI	853	922	719	406	799	1,289	1,241	1,768	1,662	1,708	647	1,275	1,275	1,405	1,545
KWARA	1,648	1,398	1,385	1,603	1,549	1,716	2,419	2,381	2,216	2,307	1,357	1,884	1,884	2,169	2,386
LAGOS	1,168	1,122	846	735	841	1,253	1,552	1,867	1,708	2,382	1,719	1,333	1,958	2,455	2,513
NASSARAWA	2,256	2,123	2,112	2,025	2,070	2,429	2,819	3,090	3,076	3,429	3,992	4,356	4,356	4,578	5,036
NIGER	1,508	1,456	1,409	1,330	1,379	2,629	2,552	1,401	3,521	3,334	4,897	5,007	6,882	8,184	8,377
OGUN	1,238	1,111	948	759	1,089	829	1,184	1,156	1,279	982	237	685	685	1,112	1,223

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PUBLIC SPENDING AND POVERTY REDUCTION IN NIGERIA

Table A3 continued

States	Primary					Secondary					Tertiary				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ONDO	858	1,602	955	1,546	746	2,150	2,503	2,201	2,555	2,162	1,638	1,779	1,779	2,174	2,392
OSUN	1,354	1,560	1,604	1,575	1,619	1,583	1,502	2,000	2,219	1,898	5,486	5,210	6,460	7,891	8,055
OYO	1,976	2,239	2,067	2,188	2,099	1,912	2,377	2,319	2,171	2,308	1,921	2,215	2,215	2,590	2,848
PLATEAU	1,954	1,902	1,832	1,826	1,771	2,058	2,404	2,605	2,786	2,621	1,840	2,459	2,459	2,665	2,932
RIVERS	4,159	4,078	4,059	4,039	3,969	584	2,417	2,421	2,883	2,587	6,174	5,899	5,899	6,820	7,502
SOKOTO	2,156	2,192	2,224	2,224	2,053	1,987	2,186	2,196	2,337	2,065	4,665	5,133	5,133	5,159	5,675
TARABA	1,300	1,235	1,267	1,341	1,298	1,878	228	2,625	2,392	2,394	1,980	2,536	2,536	2,808	3,089
YOBE	1,808	1,863	1,821	1,820	1,793	2,002	2,247	1,994	2,331	2,313	2,810	3,223	3,223	3,129	3,442
ZAMFARA	2,757	2,773	2,663	2,500	2,461	3,017	3,108	3,138	3,163	2,967	3,347	3,207	3,207	3,551	3,906
FCT	1,488	2,249	2,185	2,211	2,226	5,439	5,536	5,596	6,246	7,123	5,025	4,933	4,933	5,082	5,590
AVERAGE	1,920	1,893	1,844	1,789	1,753	1,948	2,293	2,380	2,574	2,689	2,659	3,174	3,309	3,629	3,958

Source: Author's Computation

Annex 2 – ANOVA results

Table A4: Two-Way ANOVA – Education BIA (national)

Source of Variation	SS	df	MS	F	P-value	F crit
Sample	0	0	65535	65535		
Columns	498186.2	4	124546.5	0.007649	0.999862	3.47805
Interaction	0	0	65535	65535		
Within	1.63E+08	10	16283331			
Total	1.63E+08	14				

Table A5: Two-Way ANOVA – Healthcare BIA (national)

Source of Variation	SS	df	MS	F	P-value	F crit
Sample	0	0	65535	65535		
Columns	1510187	4	377546.8	0.472673	0.755155	3.47805
Interaction	0	0	65535	65535		
Within	7987482	10	798748.2			
Total	9497669	14				

Table A6: Two-Way ANOVA – Education and healthcare by location (Rural/Urban)

Source of Variation	SS	df	MS	F	P-value	F crit
Sample	0	0	65535	65535		
Columns	47974082	3	15991361	0.77692	0.539003	4.066181
Interaction	0	0	65535	65535		
Within	1.65E+08	8	20583010			
Total	2.13E+08	11				

PUBLIC SPENDING AND POVERTY REDUCTION IN NIGERIA

Table A7: Two-Way ANOVA – Education BIA by states

Source of Variation	SS	df	MS	F	P-value	F crit
Sample	0	0	65535	65535		
Columns	2.61E+09	14	1.86E+08	57.64861	1.76E-97	1.710117
Interaction	0	0	65535	65535		
Within	1.75E+09	540	3232239			
Total	4.35E+09	554				

Table A8: Two-Way ANOVA – Healthcare BIA by states

Source of Variation	SS	df	MS	F	P-value	F crit
Sample	0	0	65535	65535		
Columns	2.76E+08	14	19707533	10.20286	1.6E-20	1.710117
Interaction	0	0	65535	65535		
Within	1.04E+09	540	1931569			
Total	1.32E+09	554				

Table A9: Two-Way ANOVA – Education BIA by zones

Source of Variation	SS	df	MS	F	P-value	F crit
Sample	0	0	65535	65535		
Columns	5.51E+08	14	39370423	13.12431	6.11E-15	1.825908
Interaction	5.96E-08	0	65535	65535		
Within	2.25E+08	75	2999808			
Total	7.76E+08	89				

Table A10: Two-Way ANOVA – Healthcare BIA by zones

Source of Variation	SS	df	MS	F	P-value	F crit
Sample	0	0	65535	65535		
Columns	46456853	14	3318347	11.7732	8.71E-14	1.825908
Interaction	3.73E-09	0	65535	65535		
Within	21139199	75	281856			
Total	67596052	89				

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