Benefit Incidence Analysis of Government Spending on Education in Anambra State, Nigeria.

Malachy I. Okafor,[1*]   Hyacinth Eme. Ichoku [1,2]
1. Department of Economics, University of Nigeria Nsukka, Nigeria
2. Health Economics Unit, University of Cape Town, Cape-Town, South Africa

Abstract
Education services have been identified as one of the most important services the poor need to escape from poverty. Governments generally devote significant portion of her budget to provision of education services in developing countries. This study employed the non-behavioural method of benefit incidence analysis to assess how equitably government expenditure in education has been well targeted across households and gender in Anambra state, Nigeria. The study found that primary and secondary education were absolutely progressive across households, absolute progressive for female and just progressive for male primary education spending, while secondary education spending is just progressive across both sexes. Among other policies, strict implementation of the compulsory free basic education as stated in the National Policy on Education was recommended.
Keywords: Benefit incidence analysis, progressivity, concentration curve, public expenditure, education.

1. Introduction

One of the major objectives of the public sector is the adjustment of the distribution of income and wealth to ensure conformance with what society considers a "fair" or "just" state of distribution (Musgrave & Musgrave, 2004). This distribution function can be achieved using fiscal policy of government expenditure, through provision of social services such as education and health. Public expenditure affects the population in a number of ways, among them is that public expenditure generates 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 potentials. They therefore involve current and capital transfers to the recipients and can be called the transfer effects (or the 'benefit incidence') of spending (Demery, 2000)

According to Sen (1999), education has both intrinsic and instrumental value. It is desirable not only for the individual but also for the society as a whole. Education as a private good benefits directly those who receive it, which in turn affects the individual's future income stream. At the aggregate level, a better educated workforce is thought to increase the stock of human capital in the economy and increase its productivity. Considering the externalities prevalent in education, it is widely accepted that the state has a key role to play in ensuring equitable distribution of educational opportunities to the entire population (Mukherjee, 2007). This is particularly crucial in developing country like Nigeria that suffers from high levels of poverty, inequality and market imperfections. Public intervention in education can lead to improvement in the future stream of individuals' income, enabling equitable distribution of wealth and help reduce poverty. Public expenditure on social services like education has been generally considered as the main redistributive or anti poverty policy instrument especially for the developing countries (Bourguignon & Luiz, 2003). When subsidy is provided for a particular social service, there is every tendency that the income set aside for that expenditure will be used for other expenditures or better still be saved (Amakom & Ogujiuba, 2010).

The development literature has highlighted the role of education in reducing inequalities and poverty that prevail in developing economies. According to Mukherjee (2007), inequalities across generations can persist if the level of education is correlated with parental income and wealth, and these characteristics has been used to justify public intervention in the provision and financing of education from equity perspective. Education has been identified as one of the most important services the poor need to escape from poverty (Demery, 2000).

There have been an increased investment in education in Anambra state as a result of the establishment of social investment funds such as Anambra state Universal Basic Education Board (ASUBEB) and Post Primary School Services Commission (PPSSC), therefore it is pertinent to know how well the provision of the education services have been targeted to the poor. Commonly government provision of certain services varies significantly across households, gender and locations. Services typically attract higher subsidies in urban than in rural areas and services especially education are better financed in the capital city than in other urban areas.

Gender inequalities in the distribution of benefits from public spending arise because of bias within households that limit females' (males') access to publicly provided services such as education. The gender issue in Anambra state is a special case because access to education is not in favour of male as the case may be in other countries or states. The 2009/2010 enrolment figure published by the Anambra state Post Primary School

Services Commission (PPSSC) shows that out of 131,580 students, 59,467 are male while 72,113 are females. Because of this perceived variations in access to education which will lead to inequalities in the distribution of benefits across households and gender, benefit incidence will be a useful tool to analyse who benefits from government spending and by how much, across households and gender.

This study therefore employed the 2009/2010 Harmonized Nigeria Living Standard Survey (HNLSS) to estimate the benefit incidence of education (Primary and Secondary) spending in Anambra State, Nigeria across households and gender. Though there are other comparable measures of expenditure impact, Benefit incidence analysis even with some of its limitations and flaws is preferred because it is easier to calculate and current benefits is measured as opposed to benefits over the recipients' lifetime. This method combines the cost of providing public services with information on their use in order to generate distributions of the benefit of public spending. This approach values the benefit of the services at the average unit cost of providing them and does not incorporate the behaviour of the users such as opportunity cost or willingness to pay.

2. Benefit Incidence Analysis: Brief Theory and Empirical

Benefit Incidence Analysis is a tool used to assess how tax policy or government subsidy affects the distribution of welfare in the population. In other words, Benefit Incidence Analysis (BIA) evaluates the distribution of government subsidies among different groups in the population, in particular, among different income groups (Cuenca, 2008). Benefit Incidence Analysis (BIA) is always defined in terms of financial subsidy received from public resources, as distinct from volume of services delivered (education, health and other social services) 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.

Benefit incidence analysis came to the limelight through the works of Meerman (1979) on Malaysia and Selowsky (1979) on Colombia which stems from the work of Aaron and McGuire (1970) who set out the basic principles to be followed in assessing how public expenditures benefit households (Demery, 2003). BIA combines the cost of providing public services with information on their use in order to generate distributions of the benefit of government spending.

Because the analysis calls for the use of subsidized public services (or the receipt of public transfers), it can only be applied to 'assignable' public expenditures – subsidies on private goods and services. The fact that most government spending cannot be readily assigned to individuals (being non-rival in nature) means that incidence analysis can only cover a small proportion of the public budget typically around one third of the budget (Demery, 2003). Secondly, not all government spending is relevant to the present concern of equity and poverty reduction. Many items of government spending, though significance for the poor, are pure public goods, for example spending on law and order, which are non-rival in nature. It is impossible to assign consumption levels of such services to sub-groups of the population (Demery, 2000). These factors including the availability of data combine to restrict the number of sectors that can be covered by a benefit incidence study.

Heltberg, Simler, and Tarp (2003) adopted the non behavioural benefit incidence approach to estimate which income groups benefit the most from education services in Mozambique. Lower primary education was found to be distributed almost equally across the population, with the concentration curve closely tracking the 45-degree line. As one moves to a higher level of education the distribution of benefits becomes increasingly unequal. The education data were examined further to understand the reasons behind the increasing inequality of benefits received, revealing that inequality increases at each rung in the educational ladder. 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. Castro-Leal, Dayton, Demery and Mehra (1999), examined the effectiveness of public social spending on education and health in seven African countries (Ghana, Cote d'Ivoire, Guinea, Madagascar, South Africa, Tanzania and Kenya) and found that these programs favour not the poor, but those who are better off. They used comparative benefit incidence examination of government health and education spending. The richest 20% of the population received more financial benefits than the poorest 20% in five of the seven countries; spending was found to be regressive in all the seven countries studied. They concluded that this targeting problem cannot be solved simply by adjusting the subsidy allocations. The constraints that prevent the poor from taking advantage of these services must also be addressed if the public subsidies are to be effective in reaching the poor.

Evidence from Nigeria was pioneered by Amakom and Ogujiuba (2010) who employed the welfare dominance tests to determine the incidence of expenditure and how subsidy has been beneficial to both men and women alike. Their study was based on how equitably public expenditure in education and healthcare has been targeted based on gender. The study utilized the Nigerian Living Standard Survey (NLSS) 2003/2004 data. They discovered that primary education was absolutely progressive for both sexes while primary healthcare subsidies were just progressive. Interestingly, secondary education was only progressive for female while tertiary education and healthcare for both male and female were regressive and not pro poor. In an extended study, using non-behavioural method, Amakom (2013) evaluated public spending efforts in reducing inequality and poverty

at all levels of health and education using Benefit Incidence Analysis (BIA) in Nigeria. Findings from the study suggest that primary education and healthcare were more pro-poor in absolute terms than the tertiary education and healthcare. Secondary education and healthcare reveal mixed results, while the findings suggest state, regional (geopolitical zones), location and gender biases in benefits from public spending for both education and healthcare. He recommended that income redistribution may be effected through subsidized government services rather than through direct income or consumption transfers.

But since Nigeria practices a federal system of government and education is in the concurrent legislative list, and therefore can be provided (legislated upon) by both the federal and state governments, we therefore employed the 2009/2010 Harmonized Nigeria Living Standard Survey (HNLSS) data as the primary source of data to estimate the progressivity of government spending on education in Anambra state across households and gender.

3.1 Analytical Framework
The study was analysed based on the measure of inequality known as concentration coefficient. Concentration coefficient is defined analogous to Gini coefficient except that instead of being bounded between 0 (perfect equality) and +1 (perfect inequality), it ranges from -1 (the poorest recipient receives all the benefits) through 0 (perfect equality – each recipient receives the same level of benefit) to +1 (the richest recipient receives all the benefits) (Davoodi, Tiongson, & Asawanuchit, 2010). If we denote y as the mean income in the population and $F(y)$ the normalized rank of a household in the distribution of income, the Gini coefficient of inequality denoted by G_y is defined as:

$$G_y = \frac{2\,\mathrm{cov}\big[y, F(y)\big]}{\overline{y}} \quad\text{..(1)}$$

$\mathrm{cov}\big[y, F(y)\big]$ is the covariance between y and the normalized rank of the recipients in the distribution of income.

When combined with mean income, the Gini coefficient can be used to derive the following social welfare function.

$$W = \overline{y}(1 - G_y) \quad\text{...(2)}$$

In this function, a higher mean income leads to a higher level of social welfare (W). Higher inequality lowers social welfare (Ajwad & Wodon, 2002). Public sector expenditure impact on welfare is apparent since it affects both variables, Yitzhaki (1982) provides the rationale for using this welfare function relying on relative deprivation theory. He empirically established an inverse relationship between inequality and social welfare.

Graphical presentation of benefit incidence results can be helpful in showing how targeted and progressive subsidies are; this is done using concentration curves, this study was also analysed based on this. Concentration curve for benefit from government service plots the cumulative proportions of households, ranked from the poorest to the richest on the horizontal axis, against the cumulative proportions of benefits received by households on the vertical axis (Davoodi, Tiongson, & Asawanuchit, 2010). The concept of concentration curves, besides being more precise; provide some justification for the use of quintiles or deciles as the case may be. According to Sahn and Younger (2000), concentration curve is similar to a Lorenz curve in that it graphs the cumulative share of the sample, from poorest to richest, on horizontal axis, against the cumulative share of benefits from a given service or subsidy on the vertical axis. Concentration curve for benefits from government subsidies is usually compared with two benchmarks, the Lorenz curve for per capita expenditure (income) and the 45-degree line.

Social sector expenditure is progressive if it benefits poorer households more than wealthy ones relative to their expenditure per capita, and regressive if otherwise. Public expenditure spending is considered well targeted to the poor only if its benefits go disproportionately to the poor in absolute terms, not relative to income. Such transfers are regarded as 'absolute progressive' and they have a concentration curve that is above the 45-degree line. Another name for this 'absolute progressivity' is pro-poor government expenditure.

Such type of concentration curve result in a negative concentration coefficient and is concave rather than convex. This concavity implies that bq1>bq2>bq3>bq4>bq5 and is larger than 20%, that is, benefits from government spending disproportionately goes to the bottom quintile in absolute terms and in relative to their share in the population. Analogously, benefits are said to be pro-rich if bq1<bq2<bq3<bq4<bq5 (where bq1 is the benefit to first quintile, bq2 is the benefit to second quintile, bq3 is the benefit to third quintile, bq4 is the benefit to fourth quintile and bq5 is the benefit to the fifth quintile). Social service whose concentration curve is above the Lorenz curve but below the 45-degree line is simply 'progressive' and those below the Lorenz curve is 'regressive'.

3.2 Estimation Procedure

1. Average unit cost of providing education is obtained by dividing total government spending on education by the total number of enrolments.
2. Average benefit from government spending on education is simply equated with the unit cost of providing the service as derived from step 1.
3. Ranking households by level of welfare. The welfare indicator used is the total household per capita expenditure. Using the HNLSS data, the study ranked individuals by this benefit and it was important since it is the distribution of welfare indicators that applied in the absence of the in kind transfer embodied in the government subsidy.
4. The population of users is ranked from poorest to richest using the welfare measure stated above and is aggregated into groups of equal size (the population will be divided into five quintiles). Further disaggregation into gender and locations will also be carried out.
5. The distribution of benefits across group is obtained by multiplying the average benefit derived from step 2 by the number of users of the service in each consumption group. Quintile share of benefits accrued to each consumption group from education is simply total benefits thus derived from each group divided by the total spending on the service across all groups.
6. Finally the concentration curve will be plotted and compared with a number of benchmark distributions: the 45-degree line and the Lorenz curve of consumption.

3.3 Methodology

Analyzing benefit incidence of public sector expenditure 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 in general and Anambra state in particular. Some of the reasons are the increase, in nominal terms, the amount of public resources the government is channeling towards social and community services and the establishment of social investment funds such as the Universal Basic Education (UBE), Tertiary Education Trust (TET) fund, the adoption of Anambra State Integrated Development Strategy (ANIDS) with its 'all-point' agenda for the development of all sectors simultaneously and the adoption of Vision 20:2020 which involves more outlay from government. The diverse nature of Nigerian households in terms of the ability to access and utilize social services, most times, it is the households in the upper income echelons which may reap larger benefits from public spending programs. Such variations can be because of factors such as derivation formula, urban bias in concentration of public services and opportunity cost incurred by poor households, in sending a child to school for example.

This method as specified by Demery (2003) combines the information about the unit costs of providing education with the information on the use of education. In effect, the analysis 'pays' to those households using education services the cost of providing education. This payment is the amount by which household income would have to increase if it had to pay for the services used. This can be formally written as:

$$X_1 = E_{1p}\left[\frac{S_p}{E_p}\right] + E_{1s}\left[\frac{S_s}{E_s}\right] ....(3)$$

Where X_1 is the amount of education subsidy that benefits group 1, S is the government subsidy; E is the number of school enrolments. The subscript p and s denote the levels of education – primary and secondary education respectively.

The benefit incidence of total government spending on education accruing to say group 1 or quintile 1 for households is given by the number of primary enrolments from the group (E_{1p}) times the unit cost of primary school place $\left[\frac{S_p}{E_p}\right]$, plus the number of secondary enrolments (E_{1s}) times the secondary unit cost $\left[\frac{S_s}{E_s}\right]$. This can be written as:

$$X_j \equiv \sum_{i=1}^{2} E_{ij}\frac{S_i}{E_i} \equiv \sum_{i=1}^{2}\frac{E_{ij}}{E_j}S_i ....(4)$$

Where,
- X_j is the benefit incidence of spending on education to group j
- E_{ij} is the number of enrolments for group j at education level i.
- E_i is the total number of enrolment at education level i
- S_i is the net government education subsidy on education level i.

$\dfrac{S_i}{E_i}$

➢ is the mean unit subsidy of an enrolment at education level i.

The share of total education spending imputed to group j (X_j) is:

$$x_j \equiv \sum_{i=1}^{2} \frac{E_{ij}}{E_i}\left[\frac{S_i}{S}\right] \equiv \sum_{i=1}^{2} e_{ij}s_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(5)$$

Equation (5) assumes that this subsidy only varies by level of schooling and not across groups.

Typically government subsidies for services vary significantly by location and gender. Because of these variations in unit subsidies which lead to inequalities in the distribution of benefits which should be captured in the analysis, equation (5) becomes:

$$x_j \equiv \sum_{k=1}^{2}\sum_{i=1}^{2} \frac{E_{ijk}}{E_i}\left[\frac{S_{ik}}{S}\right] \equiv \sum_{k=1}^{2}\sum_{i=1}^{2} e_{ijk}s_{ik} \dots\dots\dots\dots\dots\dots\dots\dots(6)$$

Where i's stands for levels of education (primary and secondary),

j's stands for quintiles

k's stands for gender (male and female) specified in the unit cost estimates.

It can be seen from equation (6) that the overall inequality in benefit incidence is determined by two factors, the share of the group in total enrolments at each level of education and in each location (gender) (*eijk*), and the share of each level of education and location (gender) in total education spending (*sik*). The *e*'s reflect household enrolment decisions, whereas the *s*'s reflect government spending allocations across regions (gender) and levels of schooling.

Understanding how the benefits of public spending are distributed, and doing something about it requires therefore, an understanding of how both government and household behave –including how they are constrained in making choices.

3.4 Data and Sources

The data for the study was drawn from Harmonized Nigeria Living Standard Survey (HNLSS) 2009/2010 which is a follow up of the Nigeria Living Standard Survey (NLSS) 2003/2004. The NLSS was combined with the Core Welfare Indicators Questionnaire to form what is now HNLSS. The HNLSS provides information on the average Nigerian household's livelihoods for the period. The data was collected by National Bureau of Statistics (NBS) and was funded by the World Bank and the UK Department for International Development (DFID). The survey covered all the 36 states of the federation and the federal Capital Territory (FCT). The welfare approach was conducted in 77,400 households which is an average of one hundred households per local government. This implies that about 2,100 households were sampled from Anambra state but only 1,713 households have complete information. The data contained information on households' total expenditure and households' expenditure on education. Data from the survey was disaggregated into gender (male and female). Actual expenditure on education in Anambra state was sourced from the Anambra state ministry of education Awka, while male and female enrolment data, for 2009/2010 academic session, was sourced from Anambra State Universal Basic Education Board (ASUBEB) Awka, for primary school and Post Primary School Services Commission (PPSSC) Awka, for secondary school.

4. Results and Discussion

The result of the BIA across household is presented in table 1 below. The results suggest that benefit incidence was absolutely progressive for primary and secondary education across households. This implies that the poorer households benefited more from government spending in both primary and secondary education in the state. This also implies that government spending on primary and secondary education in the state is well targeted to the poor. The decision above is informed because, the poorest 20% of the population (quintile 1) benefitted 31.4% of the total government spending on primary education and 27.3% of secondary education, while the richest 20% (quintile 5) benefitted 10.9% and 13.7% of primary and secondary education in the state respectively. The absolute progressivity of primary education according to (Demery, 1996) can be attributed to the fact that greater proportion of children of primary school age come from poor households.

Table 1: Benefit Incidence Analysis Results for Primary & Secondary Education in Anambra State by Quintile in 2010 (₦)

| Quintiles	1	2	3	4	5	Sample Size (No of Households)
Primary Education	9,176 (31.4)	9,102 (22.0)	9,104 (19.9)	7,136 (15.7)	6,440 (10.9)	1,713
Secondary Education	8,026 (27.3)	8,202 (22.9)	8,014 (18.8)	8,006 (17.4)	6,090 (13.7)	1,713

Source: Author's computation

Note: Numbers in parenthesis stand for percentage share of the quintile from total benefits accruing to all quintiles.

It is also worth noting that the absolute progressivity of primary and secondary education spending as indicated by the result says nothing about the quality or standard of education provided, just as it fails to capture the behaviour of households (household choices) in sending their wards to school. It is possible that richer households may not have benefitted much from public primary and secondary education spending because they consider the quality/standard of service very low, hence resorting to private schools. Apart from quality issues, private primary and secondary schools in the state are scanty in the rural areas as against the urban areas, they also pay high tuition fees and other hidden charges, such situations are expected to limit the choices of rural and poor households from sending their wards to private schools.

Unlike most gender based analysis, the gender dimension used in this study was based on male and female enrolments in primary and secondary education in Anambra state; as against the use of household heads. This was due to the fact that the only available household data disaggregated into gender is household head. Using household head to represent gender has been criticised by Muthwa (1994) who argued that within the households, 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 aspect of exploitation. This is true for Anambra state where no matter what happened in the family, the male is always seen as the household head and making use of the household head as the unit of this analysis will be bias. Based on the above argument, this study made use of individuals as unit of analysis instead of the head of the households to represent the gender dimension.

A visual inspection of figures 1 (for primary education) and 2 (for secondary education) reveals absolute progressivity for female and progressivity for male primary education spending. For secondary education, both male and female education spending are just progressive.
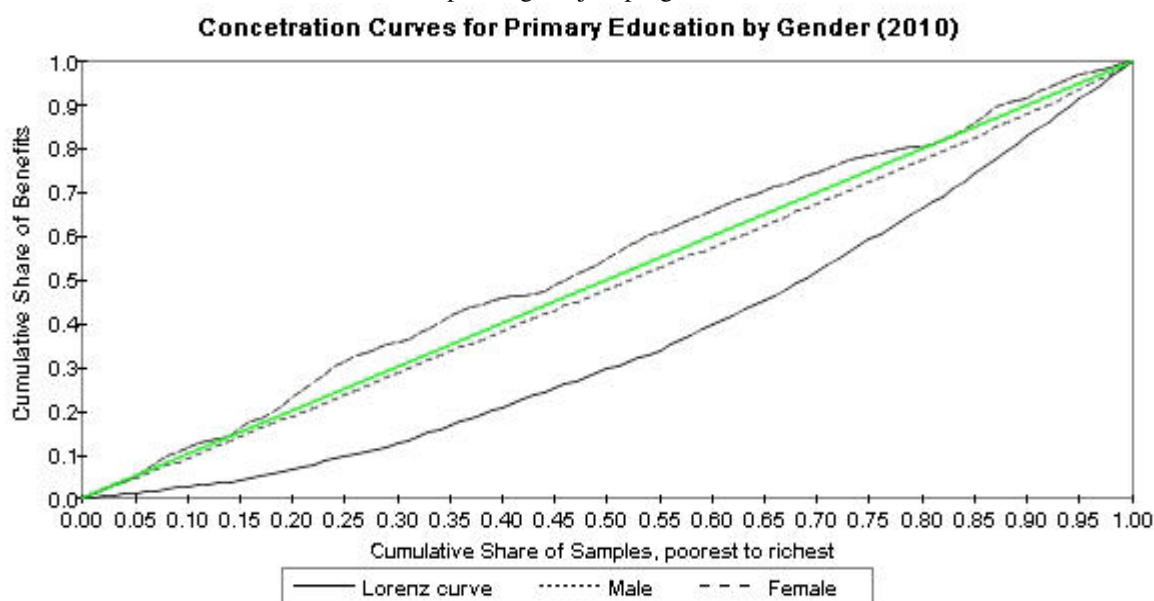
Source: Author's computations

Figure 1: Concentration Curves for Primary Education by Gender
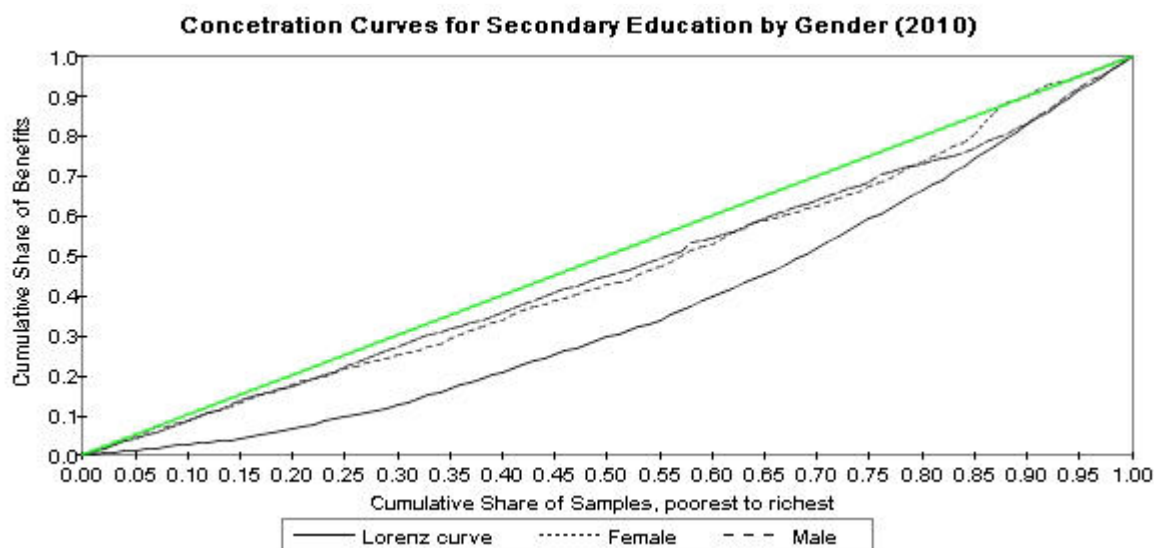
Source: Author's computation

Figure 2: Concentration Curves for Secondary Education by Gender

The finding that female benefits more than the male in secondary education in Anambra state can be attributed to the fact that secondary schools in the state is in three forms; boys, girls and mixed secondary schools. It is observed that girls' secondary schools are more in number (43) than their boys' counterparts (24), while mixed schools are 187 out of 254 public secondary schools in the state. Besides the per capita spending for public girls' secondary schools in Nigeria are by far higher than public boys' secondary schools in order to encourage girl's education (Amakom, 2013). Such arrangement of providing separete schools for males and separete schools for females may have given the female folk an edge in secondary education in the state. The average benefit by gender shows that male benefits more than female in primary education spending, while the opposite is the case for secondary education, this change in benefit across gender as one moves to a higher level of education can be attributed to what Nwagbara and Nwammuo (2013) tagged male apathy towards education in the state. This is because the drop out rate of young males from secondary school in Anambra state is becoming a growing concern. Many young males do not enroll in schools while others drop out of schools, especially secondary level, to pursue a lucrative career in petty trading and general merchandising business which is popular in the state because of the proximity of major markets such as Onitsha and Nnewi Markets among others.

5. Conclusion

We have estimated the benefit incidence of government spending on education in Anambra state using the non behavioural method. We presented our results using the quintile table and the concentration curves. BIA has its obvious advantages, it is easy to apply and its data requirement is moderate. Though widely used to access the distributional impact of government expenditure, it suffers from a number of limitations. It uses cost of providing public service as a measure of the value attributed to such service; it therefore assumes that cost of provision is a good approximate of benefits the users attach to government services. It also captures at best benefit incidence of government spending at a point in time, this makes it a static analysis, and to get a dynamic picture of incidence over time BIA have to be conducted for different years (Davoodi, Tiongson, & Asawanuchit, 2010). Finally the analysis only provides information on who benefits from public provision of services, it does not say anything about the quality of services provided.

The study findings have an implication that income redistribution can be affected through subsidized government services, rather than through direct income or consumption transfers. There are reasons why household income will be affected by government spending. According to van de Walle (1995), the provision of services by the state can influence household spending decisions, in some cases displacing private spending and in others augmenting it. For example, government spending on primary education will have the effect of reducing private spending on such education, and government subsidies on secondary education may induce households to spend on other services. We suggest that government should device a policy to encourage male enrolment in school and discourage school drop-out especially in secondary schools. The government is advised to strictly enforce the compulsory free basic education as recommended in the National Policy on Education (NPE). Creation of more boys' secondary school to discourage the males from dropping out of school, this should also be followed with enacting and enforcing laws that will stop a school aged child from going into business. We also suggest that BIA should be carried out as often as possible so as to capture the dynamic picture

of incidence over time and to ensure that government spending on an important service like education or health remains pro-poor.

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