

Human Capital, Capabilities and Poverty in Rural Nigeria*

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Earlier studies investigating the determinants of poverty in Nigeria have not explicitly considered the importance of capabilities as determinants of poverty despite the fact that capabilities dictate the state of deprivation and poverty among households. This paper examines the link between human capital, capabilities, and poverty in the rural sector of the Nigerian economy. The study uses data from the 1996 General Household Survey (GHS) conducted by the Federal Office of Statistics. The analysis indicates that poverty is widespread in rural Nigeria and probit regression estimates emphasize the significant effects of human capital and capabilities in determining poverty status of rural households in Nigeria. These findings, therefore, suggest the need for a conscious effort at the policy level to redress poverty by increasing the human capital of individuals through provision of adequate education and other social sector services to individuals especially in rural areas.

The Problem

Poverty is a multifaceted problem, which manifests itself in different forms depending on the nature and extent of human deprivation. In absolute terms, poverty suggests insufficient or the total lack of basic necessities like food, housing, and medical care. It embraces the inadequacy of education and environmental services, consumer goods, recreational opportunities, neighbourhood amenities, and transport facilities. In relative terms, people are poverty-stricken when their incomes fall radically below the community average (World Bank, 2000). This implies that such people cannot have what the larger society regard as the minimum necessity for a decent living. One definition of the poor runs as follows: the poor are individuals and households lacking access to basic services, political contacts and other forms of support; whose nutritional needs are not adequately met, and who are marginalized, deprived and persecuted economically, socially, morally, and politically.

An important consensus in the literature on poverty is that poverty is a rural phenomenon (World Bank, 1990; Fields, 2000; World Bank, 2001). By this, it is acknowledged that rural communities are the worst hit by poverty. Unfortunately, the dimension of rural poverty is not always understood in Nigeria, partly because the urban poor are more visible and more vocal than their rural counterparts, despite the predominance of the rural sector in the country. Nonetheless, the rural sector plays a fundamental role in job creation at relatively low unit costs. The African Economic Research Consortium (AERC) Collaborative Poverty Phase I research found that poverty is concentrated among the rural population in Nigeria and it is everywhere higher than urban poverty for the period 1980–1996 (Okojie et al., 2001). This specifically makes it necessary to investigate rural poverty further.

The poverty situation in Nigeria is quite disturbing. Both the quantitative and qualitative measures attest to the growing incidence and depth of poverty in the country. This situation, however,

*The authors are grateful to the African Economic Research Consortium (AERC), Nairobi for the funding of the project from which this paper is extracted.

presents a paradox considering the vast human and physical resources with which the country is endowed. It is even more disturbing that, despite the large amount of human and material resources that have been devoted to poverty reduction by successive governments, no noticeable success has been achieved in this direction. The Human Development Report (HDR, 1999) ranked Nigeria as one of the poorest among the poor countries of the world. Nigeria ranks 54th with respect to the human poverty index (HPI) making it the 20th poorest country in the world. It is also ranked 30th in the gender-related development index (GDI) while occupying 40th position from the bottom in its human development index (HDI).

In line with the above, the quantitative poverty assessment by the Federal Office of Statistics (FOS, 1999), based on the analysis of a series of national consumer surveys over a 16-year period (1980–1996), shows that the incidence of poverty rose drastically between 1980 and 1985 on one hand and between 1992 and 1996 on the other, but decreased between 1985 and 1992. The 28.1% poverty incidence of 1980 translated to 17.7 million poor people in the country, whereas there were 34.7 million poor people in 1985 with an incidence of poverty of 46.3%. Despite the drop in the poverty incidence in 1992 to 42.7%, the population of the poor was 39.2 million, about 5 million more than 1985 figures. By 1996, 67.1 million people were in poverty with an incidence of poverty of 65.5%. The situation of poverty in 2001 would have worsened, as there has not been any significant improvement in the quality of life (welfare) of the majority of the people. What is more, the lack of capabilities such as education, health, and nutrition threatens to make poverty dynastic with descendants also becoming poor (World Bank, 2000)

The main asset of individuals and households in the rural sector of an economy is their bodies, and literature approximates these through such concepts as labor power, labor availability, and dependency. The capacity to do work has even been captured through anthropometric measures such as body mass index (BMI). Evans (1989) noted that poorer people depend on physical work and are the personal cost of physical disability. As a result, bodies (main asset) of the poor are more vulnerable than those of the less poor because they are more exposed to sickness from unsanitary, polluted, and

disease-ridden environments both at home and at work. This affects their productivity and since they are the majority in the rural sector, it also deters rural development.

This paper examines the link between human capital, capabilities, and poverty in the rural sector of the Nigerian economy. There have been a few studies investigating the determinants of poverty in Nigeria (see Omonona, 2000 and Olaniyan, 2003) but they were not explicit in the consideration of capabilities as important determinants of poverty despite the fact that capabilities dictate the state of deprivation and poverty among households. Data from the 1996 General Household Survey (GHS) conducted by the Federal Office of Statistics (FOS) are used. The GHS covers nationally representative households and the sample selection uses a two-stage cluster design. The GHS covers about 32,000 households and contains information on household characteristics including household amenities such as access to water, good sanitation, shelter, education level as well as income, expenditure, and consumption of household members.

Profile of Poverty, Human Capital, and Capabilities in Nigeria

Rural Poverty Profile

We utilize the Foster-Greer-Thorbecke (FGT) on the 1998 GHS of the FOS to analyse poverty profile in rural Nigeria. These are presented on Table 1 according to the characteristics of the households taking specifically into consideration the issues of human capital and capabilities. Distinguishing poverty by gender, it is found that poverty incidence is higher for male-headed households at 55.1% than female-headed households whose incidence is 52.2%. However, poverty is more severe among female-headed households. The table further reveals that households whose head falls between the age-range of 35 to 44 years form the highest proportion for the different age groups at more than 55.8% of total households. However, the poverty gap and severity is higher for household whose head falls into the age range of below 25 years. This might be due to the fact that these are households that developed after the economic crisis of the eighties with the attendant socioeconomic problems. Furthermore, household sizes are

Table 1. Poverty Profile in Rural Nigeria.

	P ₀ Headcount	P ₁ Poverty Gap	P ₂ Severity	Proportion of population
All rural	0.547	0.247	0.143	100.00
Human capital				
Male	0.551	0.247	0.142	87.40
Female	0.522	0.251	0.152	12.60
Age of household head				
Below 25	0.557	0.278	0.171	2.51
25–34	0.545	0.25	0.146	19.80
35–44	0.558	0.252	0.147	28.30
45–54	0.533	0.234	0.133	26.20
55–64	0.549	0.25	0.146	14.40
65 and above	0.555	0.25	0.143	8.80
Household size				
Small household	0.524	0.244	0.144	38.90
Medium household	0.560	0.246	0.140	41.90
Large household	0.568	0.257	0.149	19.20
Education of household head				
No education	0.594	0.274	0.160	67.20
Primary	0.452	0.190	0.106	20.80
Secondary	0.440	0.197	0.112	9.20
Beyond secondary	0.483	0.203	0.108	2.80
Occupation				
Agricultural	0.567	0.256	0.148	80.90
Nonagricultural	0.464	0.212	0.124	19.10

classified into three categories, namely small, medium and large households, which revealed that the larger the household size the higher the poverty headcount ratio. For example, large households in rural Nigeria have a headcount ratio of 56.8% and the poverty gap and severity index are also highest for this household size category.

The poverty profile by education level of the household head presents some interesting results. Contrary to expectations that the higher the education level, the lower the poverty status, Table 1 reveals that it is household heads who have up to primary education and those who have up to secondary education that have a lower poverty headcount ratio than households whose heads are educated beyond secondary school. An explanation for this might be the high incidence of unemployment that is prevalent in the country. However, poverty severity is highest among those with secondary education.

The poverty profile by the activity of the household head is also investigated by classifying the rural sector into two broad activity levels;

households that are engaged in agricultural activities and those that are engaged in non-agricultural activities. The non-agricultural sector is defined as non-agric rural activities such as manufacturing, craft, industry, transport, trade, and services. Our findings reveal that 19.1% of rural dwellers engage in non-agricultural activities while 80.9% engage in agricultural activities. The table further shows that poverty is everywhere higher for those engaged in agricultural activities than for those engaged in non-agricultural activities, while the poverty incidence is 56.7% for agric workers and 46.4% for non-agric workers.

Profile of Human Capital and Capabilities

Nigeria has the largest population in sub-Saharan Africa. By 2002, the population of the country was more than 120 million people and one out of every five African is a Nigerian. It has been argued that these human resources are not adequately combined with the enormous natural resources resulting in stunted growth of the economy. The low level status

of human capital is one important cause of the slow growth in the country. The quality of human capital is dictated by the quality and quantity of education, health, and nutrition available to the citizens. This section focuses on the profiles of rural education, health, and nutrition availability in Nigeria.

The enrolment pattern of children in Nigeria by age of the child is one way of building human capacity. Table 2 shows that for primary and secondary school age children, 56.6% and 51.1% of male and female children, respectively, are enrolled in formal schools. For the age cohort in secondary

school, the enrolment rate is higher at 59.7% than the cohort for primary school, which is 56.2% for male children as against 53.6% for the secondary school age cohort and 51.3% for the primary school age cohort for female children. The implication of this is that the younger generation are having lower enrolment rates and this calls for more policy insights

Nigeria experienced declining health status indices in the last decade and more so in the last five years. Life expectancy, for example, declined from a value of 54 years in the early 1980s to 52 years by

Table 2. Enrolment rates in rural Nigeria by age and gender of the child.

Age in years	Male	Enrolment rate	Withdrawal rate	Female	Enrolment rate	Withdrawal rate
	Illiteracy rate			Illiteracy rate		
6	54.63	41.61	3.76	56.3	39.19	4.51
7	48.14	48.05	3.81	50.1	46.49	51
8	38.48	57.28	4.24	46.57	48.63	4.8
9	34.17	62.2	3.63	39.48	55.79	4.73
10	35.9	58.87	5.23	45.34	50.29	4.37
11	24.81	69.19	6.01	27.01	67.41	5.58
Average (primary school age)	39.36	56.20	4.45	44.13	51.30	4.57
12	28.42	64.7	6.89	323	60.17	6.7
13	26.28	61.65	12.07	31.78	57.38	10.84
14	24.04	65.44	10.53	29.24	59.86	10.9
15	31.53	555	15.03	38.13	48.81	13.06
16	24.1	64.27	11.63	25.5	55.26	19.24
17	27.53	48.76	23.71	337	39.96	26.77
Average (secondary school age)	26.98	59.71	141	31.84	53.57	14.59
Total	35.56	56.59	7.85	40.69	51.09	8.22

Source: Computed from the 1999 MICS data.

Table 3. Number of health institutions and health personnel ratio in Nigeria.

Year	Population per physician (no.)	Population per nursing staff (no.)	Population per hospital bed (no.)	Number of health institutions			
				Primary	Secondary	Tertiary	Total
1995	3707	605	1477	6205	790	47	7042
1996	4706	1023	1555	6224	793	48	7065
1997	4839	1014	1632	6242	795	48	7085
1998	4977	1044	1738	8958	882	51	9899
1999	4479	906	1564	8970	892	51	9913
2000	4529	920	1611	10149	936	51	11136
2001	4675	1082	2124	10393	982	51	11426

Source: CBN annual report (various issues).

Table 4. Reported cases from notifiable diseases.

Year	Cases				Deaths			
	Malaria	Typhoid	Cholera	AIDS	Malaria	Typhoid	Cholera	AIDS
1970	628 534	2054	—	—	1109	195	—	—
1975	1 083 263	511	38	—	309	28	1	—
1980	1 171 071	288	139	—	865	8	23	—
1985	1 284 403	673	734	—	1400	17	18	—
1990	1 116 922	4772	4101	2	2284	92	61	—
1995	1 133 926	26 729	3364	117	3268	707	140	11
1998	1 975 380	32 231	13 405	5058	3189	191	468	19

Source: Annual Abstract of Statistics (various years).

1994 and increased marginally to 53 years in 1996. A picture of the health indicators of Nigeria shown in Table 3 reveals that there are inadequate health personnel in the country. The average population per physician rose from 3707 in 1995 to 4605 in 2001. Likewise, the number of nursing staff to population increased from 605 in 1995 to 920 in 2001. These indicators are well below the norm for adequacy of health personnel. It should also be noted that the number of tertiary health institutions has stagnated since 1998, while there is inadequate funding of the existing ones which impairs their effective provision of adequate health care.

Despite these inadequacies in both health personnel and institutional requirements, the reported cases of notifiable diseases have increased over the years (Table 4). Malaria still maintains its position as the most prevalent in the country killing the highest number of people. This is followed by typhoid and cholera.

The incidence and burden of HIV/AIDS is also on the increase in the country such that its doubt or denial is no longer possible. The prevalence rate estimated to be 1.8% in 1993, increased by more than 100% within a year to 3.8% in 1994,

then to 4.5% in 1996 and 5.4% in 1999 (African Development Indicators, 2002). Indeed, more than 2 million of the total population are infected by HIV/ADS in Nigeria, with women representing a higher percentage of those infected by the disease at an estimated population of 1,400,000 in 1999. The estimated death as a result of HV/AIDS was also 250,000 in 1999, which is almost a quarter of the number of HIV/AIDS deaths recorded in Africa in the same year.

Available indicators of child well-being show that Nigeria has made little progress in improving the well-being of its children. One of the cases in point is under-nutrition. Table 5 shows the level of under-nutrition for some nutrition indicators for sectors (rural and urban) and gender in Nigeria. The rural areas are worst hit by under-nutrition than the urban centers as indicated by the three anthropometric measures of nutrition, just as they are worse hit by levels of poverty. These measures are wasting, stunting, and underweight. Stunting or low height-for-age refers to shortness that is a deficit of linear growth that has failed to reach genetic potential as a result of poor diet and diseases. About 37% of rural children suffered stunting in 1999, while 33% of

Table 5. Percentage of Undernourished under-5 children.

	Stunting	Wasting	Underweight
National	33.5	15.6	30.7
Urban	32.6	14.1	21.7
Rural	37.3	16.2	34.1
Male	35.2	15.8	31.8
Female	31.6	15.4	29.3

Source: Computed from the 1999 MICS data.

urban children suffered from this problem. Wasting, which describes a recent and severe process that has produced a substantial weight loss, is usually as a consequence of acute and recent shortage of food and/or severe disease within a short time span. Again, the rural children suffered from wasting more than their urban counterparts.

The underweight measure represents a shortfall in weight-for-age, which is the anthropometric index of body mass relative to age. Weight-for-age is influenced by the height and weight of a child and is thus a composite of stunting and wasting. In the absence of wasting, both weight-for-age and height-for-age reflect the long-term nutrition and health experience of the individual or population (Thomas et al., 1990). From Table 5, there is a disparity between the underweight measure for rural and urban children with the former exhibited as more underweight than the latter.

Review of Literature

Human Capital, Capability, and Poverty

Poverty

There is no concise way of defining the concept of poverty, as it is a multidimensional issue that affects many aspects of the human condition ranging from physical to moral and psychological (Ogwumike, 2002). In effect, poverty has been viewed either as the inability of individuals to subsist and to produce for themselves as well as the inability to command resources to achieve these (Sen, 1985; Amis and Rakodi, 1994); the inability to meet basic nutritional needs (for example Sen, 1985); or as being unable to meet "basic needs"—physical (food, health care, education, shelter, etc.) and non-physical (participation, identity, etc.) which are the requirement for a "meaningful life" (Streeten, 1979; Blackwood and Lynch, 1994). These definitions are not exhaustive.

The common practice has been to conceptualize poverty in absolute or relative terms (Fields, 2000). Absolute poverty is the lack of adequate resources to obtain and consume a certain bundle of goods and services deemed basic such as food, shelter, and clothing (see Ogwumike, 1987, Odusola, 1997). Using consumption as the base line, any household that spends more than a specified

maximum of its income on basic needs such as food, housing, and health care, among others, is considered poor (see FOS, 1999; Obadan, 1997; Odusola, 1997; Afonja and Ogwumike, 1995). Poverty, which depends on income and access to social services, is not only regarded as a condition characterized by severe deprivation of basic human needs, but also includes deprivation of safe water, sanitation facilities, and information (Gordon et al., (2003). Relative poverty is conceptualized in terms of the standard of living that prevails in a given society. It exists where households within a given country have a per capita income of less than one-third of the average per capita of such a country (World Bank, 1997). Other forms beside these two are subjective poverty (Ogwumike, 2002), material poverty (UNDP, 1997) and transitory and chronic poverty (Ogwumike, 2002).

Human Capital and Poverty

Human capital refers to the abilities and skills of human resources of a country (Adamu, 2002). This suggests that human capital is a form of resources that can be acquired, built up, and developed. In essence, the development of human capital is to ensure that they acquire meaningful and productive skills that enhance their capabilities to engage in productive activities that lead to earning of livelihood (Meir, 1995; Awopegba, 2002). Therefore, human capital impacts on productivity, employment, income generation, and standard of living. By implication human capital development leads to improved capability and ultimately reduction in poverty.

Two major indices of human capital can be identified—education/training and health. First, education is said to be the most crucial means of improving skills and capabilities and eradicating poverty, in terms of quality and market relevance (Umo, 1997). Education and training are generally indicated as the most important direct means of upgrading the human intellect and skills for productive employment (see Söderbom and Teal, 2001; Yesufu, 2000), though not all forms of education can have a meaningful effect on human capital except when it leads to skill improvement (Okojie, 1995). It has been severally documented (e.g., World Bank, 2000) that labor is the main asset of the poor. One of the important ways of enhancing and preserving this asset is through education.

Olaniyan (2003) found that the most important

determinant of household poverty in Nigeria is the educational attainment of the household head. Sen (1999) argues that education helps provide human capabilities, which is “the essential and individual power to reflect, make choices, seek a voice in society and enjoy a better life”. Maternal education, in addition, can help to reduce life cycle poverty through better processing of health information and better use of health facilities (Glewwe, 1999). Education can also have an impact on a mother’s behavior in terms of greater value attached to child schooling and exposure to modern ideas especially in the case of girls’ schooling.

The foregoing suggests that education not only promotes growth and efficiency, but they can reduce inequality and the impacts of disadvantaged backgrounds. In fact, Gordon et al., (2003) argued that education remains the most effective way by which young people of poor backgrounds can rise in the economic hierarchy because human capital remains the main asset of 90% of the population. This also accounts for why income inequality is greater in countries where inequality in education is also high.

Health is a major form of human capital and there exists substantial agreement in the literature on the relationship between health and economic development through its relationship between capability and poverty (Strauss and Thomas, 1998). It is assumed that improvement in health leads to improvement in life expectancy, which is a robust indicator of human development. Health affects human development by improving living conditions, which in turn, improve human longevity. Empirically, increase in life expectancy is strongly correlated with increase in productivity and income among poor countries (Deaton, 2003).

Another major form of human capital is the individual nutritional status, which is often based on three anthropometric measures namely, height for age, which measures “stunting”, or chronic malnutrition; weight for age, a measure of underweight, and, weight for height, a measure of wasting or acute malnutrition. Martorell (1982) demonstrated that height and weight are indeed measures of growth attainment rather than nutritional status per se. Nutritional status has long-term consequences. Apart from convincing evidence which suggests that nutritional inadequacy increases the risks of death and impairs cognitive

development, it has also been found that inadequate nutrition can affect future productivity and earnings and hence poverty. Indeed, Deaton (2003) argued that investment in better nutrition has a considerable positive effect in terms of economic growth and equity.

Individual human capital and capabilities can also be enhanced through migration process. The issue of poverty and migration involves an understanding of the prevalence of poverty in rural and urban centers and the interactions of the various dimensions of deprivation (World Bank, 2002). Migration especially from rural to urban centers is one of the consequences of the dearth of skill acquisition, which is one of the characteristics of rural areas of developing countries. Thus, in practice, obtaining an education and learning the techniques that are useful for employment in the modern sector of the economy would often require moving away from the rural areas. This is usually due to policy bias against the rural poor in which case the urban centers tend to be disproportionately favored in terms of infrastructural facilities. Therefore, rural poverty tends to persist due to the absence of human capital that would facilitate obtaining high paying jobs.

Capabilities and Poverty

Sen (1993) defines capability as the freedom to achieve valuable beings and doings. Akire (2002) identifies that this definition contains two main ideas, which are freedom and valuable beings and doings (which is also referred to as functioning). These are all the “means” and “ends” of human life. Capabilities can be elementary (e.g., escaping morbidity and mortality; nourishment; mobility) or complex (e.g., self-respect, participation in community life, ability to appear in public without shame). Capabilities can also be general such as the capability to be nourished or specific such as the capability to drink a bottle of soda. In addition, functioning on its own refers to the various things a person may value doing or being. Capability is, thus, a set of vectors of functioning, reflecting the person’s freedom to decide what kind of life to lead (Dreze and Sen, 1990)

All these translate to development. In fact, Sen (1999) argues that the goal of development is the “promotion and expansion of valuable capabilities.” It is in this wise that he further

submits that "Human development is about people, about expanding their choices to lead lives they value... fundamental to enlarging human choices is building human capabilities: the range of things that people can do or be." This means that capabilities comprise ability to be well nourished, to avoid/escape morbidity, to read, write and communicate, to take part in the life of the community, to appear in public without shame. It has further been argued in the literature that absolute deprivation in terms of a person's capabilities can imply relative deprivation in terms of income, resources, or commodities, e.g., for taking part in the life of the community, for the avoidance of shame, or for the maintenance of self-respect (Gordon et al., 2003).

Atkinson and Bourguignon (1999) use the same framework but from a welfarist perspective. They regard poverty as inadequate command over economic resources but view this as an intermediate concern, the ultimate concern being in terms of capabilities. The absolute set of capabilities translates into a set of goods requirements, which is relative to a particular society and its standard of living. This leads them to formulate a concept in line with the World Bank's *World Development Report* (1990:26), that a poverty line can be thought of as comprising two elements: the expenditure necessary to buy a minimum level of nutrition and other basic necessities and a further amount that varies from country to country, reflecting the cost of participating in the everyday life of the society. There is a hierarchy of capabilities. The first concerns physical functioning and requires a

set of goods fixed in absolute terms; this capability has priority. The second capability concerns social functioning and requires a set of goods that depends on the mean level of income.

Poverty status is therefore dependent on the (in)adequate physical functioning such as hunger, lack of shelter, and lack of warmth and (in)adequate social functioning such as alienation, shame, and lack of self-respect. Capabilities are therefore associated with such elements as the standard of living and the broader aspects of the ability to be socially and economically useful.

The capability approach to poverty was intended to replace welfarism as a theory of well-being (see Sen, 1985 etc.). The idea of capability and functioning centers on "individual claims are to be assessed not by the resources or the primary goods". Hence capability means absence of deprivation in any form. Deprivation according to Townsend (1987) is the state of observable and demonstrable disadvantage relative to the local community or the wider society or nation to which an individual, family or group belong. Gordon et al., (2003) reveal that deprivation can be conceptualized as a continuum that ranges from no deprivation to extreme deprivation. For the purpose of this paper, capability is defined as the opposite of deprivation. Table 6 presents the operationalized determinants of deprivation which, according to Gordon et al., (2003), when households suffer from these deprivations they lack functioning capabilities to move out of poverty.

Table 6. Measurement of Deprivation.

Deprivation	Mild deprivation	Moderate deprivation	Severe deprivation	Extreme deprivation
Food	Bland diet of poor nutritional value	Going hungry occasionally	Malnutrition	Starvation
Safe Drinking Water	Not having enough water occasionally due to lack of money	No access to water in dwelling but communal piped water available within 200 m of dwelling or less than 15 minutes walk away	Long walk to water source which is more than 200 m away or longer than 1 minute walk. Unsafe drinking water	No access to water
Sanitation facilities	Having to share facility with other households	Sanitation facilities outside dwelling	No sanitation facilities in or near dwelling	No access to sanitation facilities
Health	Occasional lack of access to medical care due to insufficient money	Inadequate medical care	No immunization against disease. Only limited non-professional medical care available when sick	No medical care
Shelter	Dwelling in poor repair. More than 1 person per room	Few facilities in dwelling. Structural problems. More than 3 people per room	No facilities in house. Non-permanent structure, no privacy, no flooring, more than 5 people per room	Roofless—no shelter
Education	Inadequate teaching due to lack of resources	Unable to attend secondary but can attend primary education	Child is 7 or older and has received no primary or secondary education	Prevented from learning due to persecution and prejudice
Information	Cannot afford newspaper or books	No television but can afford radio	No access to radio, television or books or newspaper	Prevented from gaining access to information due by government
Basic social services	Health and education facilities available but occasionally of low standard	Inadequate health and education facilities, e.g., less than 1 hour travel	Limited health and education facilities, e.g., a day's travel away	No access to health or education services

Source: Gordon et al., 2003

The Model

Most studies on poverty analysis proceed in three stages. First is the definition of welfare, second is the determinant of poverty line, and third is the poverty measure. There are two broad definition of welfare in the literature. These are the money metric measures and the non-money metric measures of poverty. The money metric measures define the poor in terms of inadequate income or expenditure to provide for the minimum standard of living (Fields, 2000). The non-money metric measures assume that poverty goes beyond the issue of income as it also includes the capability of turning income into welfare enhancing activities. This paper uses per capita expenditure as a measure of household economic welfare. The approach of using per capita expenditure has been used in many studies on poverty in Nigeria (see Canagarajah and Thomas, 2001). A poverty line is a predetermined standard of income or consumption deemed to represent the minimum required for a productive and active life (Okunmadewa, 1999).

The paper uses proportions of the average per capital expenditure as the poverty line also in accordance with practice when there is no official poverty line (see FOS 1999). The poverty line is the two-thirds mean value of per capita consumption in the rural areas, classifying the poor and non-poor according to the poverty indices derived from poverty line. The Forster-Greer-Thorbecke (FGT) indices are deployed to measure the magnitude, depth, and severity of rural poverty.

The general class of the FGT (Pa) class of poverty measures is given by

$$Pa = \int \{(z-y)/z\}^a f(y) dy \quad (1)$$

Where z is the poverty line, $f(y)$ is the population density function of income. The three indices that we intend to use are the P0, which is the headcount ratio, P1, which is the poverty gap index, and the poverty severity index, P2. These indices shall thereafter be decomposed according to the characteristics of the household including human capital and capabilities variables.

This paper uses the probit model with binary response in analyzing the determinants of the probability of households being poor. The probit specification is designed to analyze qualitative data reflecting a choice between two alternatives, which in this case are the poor, and the non-poor. The probit model thus represents a convenient

way of quantifying the relationship between the characteristics of the households/individuals and their poverty status. The dependent variable takes the value of 0 or 1 where 1 represents being poor and 0 otherwise. The choice of the probit model is premised on the fact that ordinary least squares assume a continuous dependent variable while in the case of poverty, the response is a binomial process taking the values of 1 for poor and 0 for non-poor. In addition, level regression imposes constant parameters over the entire distribution. This assumes that the poor are not fundamentally different from the rich which is not a plausible assumption (see Grootaert, 1997 and Bekouin, 2002).

The dependent variable, household per capita expenditure, is transformed into a dichotomous response variable y_h with binary outcomes taking two values ($y_h \in \{0,1\}$), with $y_h = 1$ if per capita expenditure is greater than the poverty line, and 0 otherwise. Based on the above, the probability of poor which corresponds to $y_h = 1$, is derived using the following probit equation

$$Pr(y_h = 1) = \Phi[\sum \beta_k x_k] \quad (2)$$

In the same vein, since the response is a binary outcome, the probability associated with the alternative event of being non-poor is represented by $Pr(y_h = 0) = 1 - \Phi[\sum \beta_k x_k]$ (3)

Where Pr is the likelihood of being poor and where y_h = poverty status of household i ($Y_i = 1$ if the household is poor, and 0 if the household is non-poor x_k = k -th explanatory variable of the likelihood of poverty of household i

β_k = parameter associated with x_k

The estimation of equations 2 and 3 yields predicted probabilities given the set of values taken by the explanatory variables. However, the analysis will be based on the marginal effect of each variable on the probability of the effect. This is because probit coefficients do not represent the standard marginal effects represented by linear regression coefficients. However, the marginal effects combine the predicted probability of being poor with the estimated probit coefficients.

The marginal effect is derived by taking the partial derivative of equation 2 with respect to an independent variable. This is given as

$$\frac{\partial \text{Prob}(Y=1)}{\partial x_k} = \Phi[\sum \beta_k x_k] * \beta_k \quad (4)$$

Equation 4 represents the marginal changes in the probability that a household is poor due to changes in the underlying regressors. It should be noted that the changes are evaluated at the mean values of the data.

The parameters of the probit model are then estimated using the maximum likelihood estimation method. The assumption is that the response variable has a sample of N observations, which are independent. The choice of explanatory variables is guided by the objectives of this study. Hence the main explanatory variables are those representing human capital and capabilities. Human capital is embodied in the members of the household (Grootaert, 1997). The main human capital variable in our model is the education of the household head¹. We define education as categorical variable for those without formal schooling, those with primary schooling, those with secondary schooling, and those with post-secondary schooling. Different variables are used to represent capabilities. As reviewed in the literature, capabilities involve the ability to use human capital effectively and such capabilities would include access to safe water, good health and nutrition, good sanitation, and good shelter, among others. A full description of the variables used in our analysis is presented in the appendix.

Empirical Analysis

The key socioeconomic determinants of rural poverty in Nigeria include human capital variables, capabilities variables, household characteristics, economic activity of the household head, and the spatial locations of the households. Table 7 presents the results of probit regressions for rural households. The likelihood ratio statistics show that the model is significantly different from the null or intercept only model. We examine the marginal impact of each variable on the likelihood that the household falls into poverty.

The results reveal that there is a life cycle effect of age to rural poverty, as the predictors are significantly different from 0. The absolute value of the female dummy reveals that there is a high probability that individuals from these female-headed households are likely to be poor. It is, however, surprising that the coefficient is

not statistically significant different from zero which indicates that coming from a female-headed household does not increase the probability of being poor. All the predictors of human capital variables represented by the educational level of the household head have estimates that are significantly different from 0 as judged by the size of the coefficient relative to the asymptotic standard error, and further by the size of P-values. The results show that education reduces the probability of being poor in a household and judging from the marginal effects. In fact the higher the education attainment of the household head, the higher the probability of the individual not being poor. It is interesting, however, that the largest impact of education on poverty is for those whose household head has secondary education followed by those whose household heads who have post-secondary education. This might not be unconnected with the rising incidence of unemployment among graduates and the refusal of many of them to engage in blue-collar jobs.

In terms of the household structure, we investigate the effects of number of children under the age of sixteen and adults above 60 years of age. The age ranges are chosen so as to investigate the effects of non-working members of the households on the poverty status of the household as these two groups are assumed not to be currently working. The results indicate that the higher the number of children below sixteen years of age, the higher the probability of the household being poor. In fact the results reveal that an increase of one child in the household, increases the probability of poverty in the household by 2%. It is interesting that the presence of adults is even more worrisome. This is because an increase of a non-working adult increases the probability of the household being poor by as much as 8%. The implication of this is that large family size and unemployment among adults can have a significant effect on poverty. Furthermore, we found that household size is a major significant correlate of the probability of being poor. Only members of small household size have less probability of being poor and the higher the household size, the higher the probability of the household being poor, although our estimates suggests that they are not statistically significant.

¹It would have been better to get the educational level of all members of the household, but the information is not available in the data set that is available to us.

Table 7. Determinants of poverty among rural households in Nigeria: probit estimation.

Poor1	Estimate	Marginal effects	Standard error	z	P-Value
Age	0.0328	0.0128	0.0068	4.8200	0.0000
Age2	-0.0003	-0.0001	0.0001	-3.8400	0.0000
Gender	0.0528	0.0205	0.0507	1.0400	0.2980
Household structure					
Child	0.0156	0.0061	0.0062	2.5000	0.0130
Adult	0.0746	0.0291	0.0158	4.7100	0.0000
house1	-0.1081	-0.0419	0.0421	-2.5700	0.0100
house2	0.1019	0.0392	0.1173	0.8700	0.3850
house3	0.2086	0.0789	0.2002	1.0400	0.2980
Human capital					
Edu1	-0.1081	-0.0077	0.0019	-3.9700	0.0000
Edu2	-0.4990	-0.1919	0.0214	9.0745	0.0000
Edu3	-0.4691	-0.1830	0.0304	-6.1181	0.0000
Capabilities					
Safewater	-0.0154	-0.0060	0.0344	-0.4500	0.6540
Gdtoilet	0.1473	0.0575	0.0330	4.4600	0.0000
Gdrefuse	-0.1959	-0.0774	0.0633	-3.0900	0.0020
Pproom1	-1.2401	-0.4638	0.1226	-10.1100	0.0000
Pproom2	-0.4557	-0.1774	0.1217	-3.7500	0.0000
Pproom3	-0.2164	-0.0852	0.1250	-1.7300	0.0840
Agriculture	0.1291	0.0498	0.0744	1.7400	0.0830
Geopolitical zones					
Southwest	-0.3217	-0.1271	0.0741	-4.3400	0.0000
South-south	0.3130	0.1236	0.0724	4.3200	0.0000
Northeast	0.0662	0.0259	0.0455	1.4500	0.1460
Northwest	0.1473	0.0568	0.0769	1.9200	0.0550
North Central	-0.0991	-0.0388	0.0699	-1.4200	0.1560
_cons	-0.1388		0.2379	-0.5800	0.5600
		obs. P	0.5773		
		Pred. P	0.5858		
		Number of obs	7374		
		LR chi2(23)	12437		
		Prob > chi2	0.0000		
		Pseudo R2	0.1238		
		Log likelihood =	-4401.16		

The results further reveal that capability variables have poverty reducing effects. Households that have access to good toilets, good refuse disposal, good housing structure, and adequate persons per room have less probability of falling into poverty. If we take into consideration the proportion of households that have access to these facilities, then it reveals that inadequacy of these facilities can explain why a large proportion of rural households are poor. For

example, while 43% of households have access to a pit latrine and water closet system, 57% of rural households do not have access to good sanitation at all. This means that 57% of households would have a higher probability of being poor on the account of sanitation and toilet services they have.

In the same vein, 41% of the rural households have access to safe water. This is high because, we have classified a covered well as safe water. The

composition of safe water is tap water 12% and a covered well 29%. We however found that access to safe water is not a good predictor of the probability of being poor. Furthermore, only 23% of rural households have access to good refuse disposal. Our results reveal that households with good refuse disposal have 20% less probability of being poor. The implication is that about 77% of the households who do not have this access definitely have a higher probability of being poor. All these variables taken together reflect the impact of capabilities on the poverty status and the implication is that if these facilities are made available to rural dwellers, their poverty status can be significantly improved.

In addition, households whose head are engaged in agricultural activity have a higher probability of being poor and the marginal effect shows that this is as high as 5%. This is in line with the literature on rural poverty which suggests that as a result of the seasonality of the production, harvests, and income earning process among the households, they become more vulnerable than those that are engaged in non-farming activities, which is why poverty can be more pronounced among farmers than other category of worker in the rural sector (Blackwood and Lynch, 1994).

Our results also found that that relative to the other geopolitical zones of the country, rural households in the southwest and North-central have less probability of being poor while those in the South-south, Northwest, and Northeast have a higher probability of being poor.

Concluding Remarks

This paper presented an analysis of poverty in rural Nigeria with specific emphasis on the roles of human capital and capabilities. The analysis indicates that poverty is widespread in rural Nigeria. Probit regression estimates emphasize the significant effects of human capital and capabilities in determining poverty status of rural households in Nigeria. These findings, therefore, suggest the need for a conscious effort at the policy level to redress poverty by increasing the human capital of individuals through provision of adequate education to individuals especially in rural areas. Since capabilities also explain a substantial part of poverty in Nigeria, there is need for better provision of social services, infrastructure, and public goods. It should be noted that any increase in public

incomes in the rural area would inevitably lead to a significant decrease in rural poverty.

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Appendix Table: Description of the Variables

Variable	Description
poor1	Poor household = 1
Age	Age in years
Age2	Age in years squared
Gender	Gender of the household head (female =1)
Household Structure	
Child	Number of children below the age 16
Adult	Number of adults above the age 60
Human Capital	
Edu1	Household head have primary education
Edu2	Household head has secondary education
Edu3	Household head has post secondary education
Capabilities	
safewater	Access to safewater =1
Gdtoilet	Access to good toilet =1
Gdrefuse	Access to good refuse disposal =1
pproom1	1.1 - 3
Pproom2	3.1 – 6
Pproom3	Above 6 persons
House0	Micro houseold (1-2 persons)
house1	Small Household (3-4 persons)
house2	Medium Household (5- 6 persons)
house3	Large Household (more than 6 persons)
Agriculture	Household head engage in farming activities = 1
Geopolitical Zones	
South West	South West
South South	South South
North east	North east
North West	North West
North Central	North Central