Analysis of the Missing Dimensions of Poverty Data in Developing Countries Based on Current Dataset: A case of Nigeria

A RESEARCH PROPOSAL
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Abstract

Traditionally, poverty is a measure linked to income or consumption. The design of any poverty alleviation policy requires a holistic understanding of the causes and magnitude of poverty. In developing countries, aside the paucity of available data, there are also issues of data insufficiency and inadequacy. Most commissioned welfare surveys obtain data on income, consumption and other money-metric measures. Even when they collect data on other non-money metric welfare measures, they are lacking in the area of some identified ‘missing dimensions of poverty data’. To monitor and evaluate the effect of poverty, which is at the heart of poverty reduction strategy papers, there is need for timely, adequate and reliable data on wellbeing over all its identifiable dimensions. There is also need to know how the poor in the society feel about their poverty conditions and the challenges they face. In this regard, the research seeks to use a modified questionnaire based on ‘the missing dimensions of poverty’ in Nigeria. It also proposes to analyse the data and provide an understanding of poverty along the ‘missing dimensions’. The study intends to shed more lights on the policy making debate for the poor in the light of the missing dimensions.

I Introduction

Traditionally, poverty measurement and analysis has been concentrated on single dimension measure often linked to income or consumption. It is argued that to design policies for poverty alleviation and reduction, the causes and magnitude of poverty must be fully understood (2003). There are basically two broad approaches to welfare and poverty that has been recognized in literature (i.e. the welfarist and the non-welfarist approach). While the welfarist approach draws from classical microeconomics, defining poverty as a lack of command over commodities, measured by low income or consumption levels; the non-welfarist approach draws from Sen’s capability approach and the basic needs approach (Duclos and Araar, 2006). The welfarist approach focuses on money-metric measure, but the non-welfarist approach considers poverty as a multidimensional phenomenon based on multidimensional outcomes. Within the multidimensional sphere, poverty is considered by looking at a whole range of ‘dimensions’ including among other things, health, education, environment and how they interrelate. Various approaches for measuring multidimensional poverty have used theory of fuzzy sets, information theory, efficiency analysis and axiomatic derivations of poverty indices (Bourguignon and Chakravarty, 2003; Duclos and Araar, 2006; Deutsch and Silber, 2005). As literature continue to build up even in this area, the lack of internationally comparable standard measure of multidimensional poverty still present a problem for researchers.

While these conceptual issues of poverty measurements exist, poverty reduction is still seen as the fundamental objective of development and also a metric for assessing the effectiveness of poverty reduction interventions with economic growth as an influential tool in combating income poverty (Essama-Nssah and Lambert, 2006). In this regard, countries of Africa and other developing world have sought for ways to combat the effects of poverty.
This motivates the need to adequately measure and monitor poverty to feed into the policy making debate.

In Nigeria, for example, poverty has been linked to various causes including inadequate growth, high and growing unemployment, problems in the productive sector of the economy, widening income inequality, weak governance, social conflicts, gender factors, environmental factors, and history (NPC, 2004). While the country battles with the effects of poverty, inequality is also a major worry. These problems are not only limited to the economic circle but also the social sphere. Considering poverty as an absolute measure of income, Figure 1 shows that poverty manifests differently in the various geo-political zones of Nigeria. While its incidence is highest in the North West, the South East has consistently had a lower incidence. On the average, the incidence is greater than 50% nationwide.

Social conflicts, for example, have been singled out and identified to be another cause of poverty in Nigeria (NPC, 2004). In some cases, this is heightened by inflows of internally displaced people. In this regard, Nigeria is described as one of the most deeply divided states in Africa (Osaghae and Suberu, 2005). In the recent past, some ‘primordial’ identities have become common where various categories of inhabitants have ethnic, communal, religious and regional origins. This entrenched a system of discriminatory practises among themselves. Indigenous settlers would not allow ‘migrants’ to have equal rights as they do. This system produced and sustains a hierarchical, unequal, and ranked system of citizenship that has provoked violent conflicts all over the country. Such deprivation arising from this is conceived as relative because an individual’s feeling of deprivation in a society is as a result of comparing his situation with those of better off persons (Mukherjee, 2001).

Figure 1: Poverty Incidence by Regions in Nigeria

With the high poverty statistics, many macroeconomic programmes have been advocated and initiated over the years. These are directed at poverty reduction by raising the standard of living of the poor. They include the establishment of the Peoples’ Bank; community banks (now microfinance banks); small scale credit schemes; National Directorate of Employment (NDE); the Family Support Programme (FSP); Directorate of Foods, Roads and Rural Infrastructure (DFRRI); Family Economic Advancement Programme (FEAP); National Poverty Eradication Programme (NAPEP); introduction of the Small and Medium scale Investment Equity Insurance Scheme (SMIEIS); and so on (Osinubi, 2003; FRN, 2005; NPC,
None of them have had a significant, lasting, or sustainable positive effect on overall poverty reduction in Nigeria (NPC, 2004).

II Problem Statement

Recently, there is a growing concern among countries of the Low and Middle Income Countries (LMICs) in Africa to meet the targets set in the Millennium Development Goals (MDGs) of halving poverty and freeing a large population of people from extreme and dehumanizing poverty, avoidable deaths and pains (ECA, 2005). Within this policy view, there is strong need for policies to be targeted at the poor and where possible, poverty should be adequately measured to encompass wider dimensions where the poor can be effectively identified.

In the case of Nigeria, pioneer effort to monitor and evaluate national poverty programmes and polices started with the analysis of a series of National Consumer Expenditure Surveys (NCES). These were institutionalized by Federal Office of Statistics (FOS), now the National Bureau of Statistics (NBS), through the use of National Integrated Survey of Households (NISH). This initially led to production of Poverty Profile Report in Nigeria (1980-1996) (FOS, 2004). This report has been invaluable in the monitoring and evaluation of poverty at all the level of governance and also in the design of poverty reduction and alleviation programmes and schemes.

As a follow-up to the NISH, the Nigeria Living Standard Survey (NLSS) 2003/2004 was conducted to build on the NISH and to address some of its limitations in terms of the scope of coverage to make it nationally representative of the living standard of the population at the national and sub-national levels. However, these surveys have been limited to cover monetary measures of welfare. In recent times, in 2006, the Core Welfare Indicator Questionnaire (CWIQ) survey was conducted. This looks more at the level of basic needs of households and individuals and not necessarily monetary measures. These surveys have largely ignored some basic factors and dimensions that impact on the living standards of households and often impoverish households and are obvious in a developing country context. These include those that have been identified as the ‘missing dimensions data’ of poverty data or human development (Samman, 2007a; Zavaleta, 2007; Diprose, 2007; OPHI, 2007; Lugo, 2007; Ibrahim and Alkire, 2007). Also, it is important to go beyond the figures of poverty to qualitatively examine perceptions of poverty which is rarely conducted in most developing countries national surveys. There is need to know how the poor in the society feel about their poverty conditions and the challenges they face. Therefore, the absence of poverty surveys that capture the crucial dimensions of employment, empowerment, physical safety, ability to move about without shame or stigma, and a measure of psychological and subjective wellbeing by households creates a big problem in the way poverty is measured and interpreted for policy purposes in Nigeria and other similar countries.

While some of these indicators mentioned have been collected in various countries separately, they are often not standardized for international comparison. In other instances especially the developing country context, these indicators are of poor quality or largely unavailable.
III  Core Research Questions

The research is being guided by the following research questions.

1. Are the proposed research instruments adaptable to a developing country context of Nigeria?
2. What modifications are necessary, if any, to make the instruments adaptable to the local situation of Nigeria?
3. Does the inclusion of the missing dimension add anything new to our understanding of poverty?
4. Are such new insights significant enough to change policy options in the light of current government reforms and the development agenda?
5. Are there possibilities that relationships will exist among the proposed missing dimensions of poverty? And where such relationships exist, are they significant?
6. Does the consideration of poverty using the missing dimension add value to our understanding of gender differences in poverty?
7. Can poverty be better understood or robustly understood by inclusion of the new dimensions? What new insights does this provide for policy makers around the world?

IV  Research Objectives

The aim of the research is to adapt and use the instrument designed by the Oxford Poverty and Human Development Initiative (OPHI) in Nigeria to obtain data on deprivation and poverty. The research will also include qualitative aspect that incorporates qualitative questions on perceptions and values. On the other hand, the research proposes to analyse data that will be available from the field based on the survey on the missing dimensions of poverty.

Specifically, the research aims at achieving the following objectives:

1. Use a modified questionnaire based on the missing poverty dimensions to obtain a small area data in Nigeria.
2. Validity testing of the data obtained in the Nigerian context of the missing poverty dimensions survey instrument.
3. Analyse the data obtained based on the five dimensions to identify vulnerable groups.
   I. Provide descriptive statistics of the data obtained
   II. Produce general poverty profile and also with unconditional relationships between identifiers such as gender, age, marital status, education, and so on.
   III. Analyse the relationship between the dimensions of poverty.
   IV. Analyse the sensitivity of ‘poverty’ in each dimension to addition of indicator(s)
   V. Explore the correlates of deprivation/poverty along the dimensions.
VI. Compare poverty/deprivation with and without the missing dimensions.
4. Obtain an understanding of the non-material values and perceptions as it relates to individuals’ assessment.
5. Shed more lights on the policy making debate for the poor in the light of new often neglected dimensions.

V How to Achieve the Objectives

Objective 1 is achieved by administering the questionnaire based on the OPHI missing poverty dimensions as well as other relevant questions to be included in the questionnaire. The sample size and population is contained under the methods section. Objective 2 involves validity testing. This will be conducted based on the methods for validity testing listed under the section on validity testing (see also Table 1). Objective 3 will involve the in-depth analysis of all the data based on the five missing dimensions. Such analysis will involve the use of simple proportions, testing for significance of the simple proportions, simple summary statistics, cross tabulations, poverty profile across gender, age and other relevant identifiers. The relationship between dimensions will also be analysed through the use of correlation analysis as well as confirmatory factor analysis. A Hausman-type\textsuperscript{1} test will be used to test the sensitivity of deprivation or poverty in each dimension to addition of indicators. Also decomposition analysis will be performed where deprivation will be compared with and without the missing dimensions. Objective 4 will be achieved by analysing perception and values based questions to be included in the questionnaire.

VI Scientific Contribution

The study is aiming at making the following scientific contributions:

1. Testing for the validity of the proposed survey instrument (Missing dimensions of poverty data) in Nigeria. The instrument has not been tested or administered in Nigeria before. This will be invaluable in modifying the proposed instrument for suitability in a developing country context of Nigeria.
2. Contributing to the modification of national surveys conducted in Nigeria to include the missing dimensions of poverty data.
3. The study also seeks to apply various methodologies to measuring poverty/deprivation based on a multidimensional concept and the missing dimensions of poverty data.
4. The study will also contribute to the debate on gender dimensions to poverty.
5. The study proposes to use the FGT indices on multidimensional datasets as well as the use of factor analysis to analyse poverty.
6. Robustness checks of the multidimensional poverty measures obtained will be performed.

VII Policy Relevance

\textsuperscript{1} This will involve ranking households based on exclusion of one or more indicators and comparing ranks with or without the indicator(s).
On the domestic front in Nigeria, the National Economic Empowerment and Development Strategy (NEEDS), the State Economic Empowerment and Development Strategy (SEEDS) and the Local Economic Empowerment and Development Strategy (LEEDS) were instituted which builds on the governments’ poverty reduction strategy paper and focuses on four key priority areas – value re-orientation, reducing poverty, creating wealth, and employment generation. In essence, the NEEDS, SEEDS and LEEDS centre on the Nigerian people. This includes their health, education, employment, happiness, sense of fulfilment and general well-being (FOS, 2004). It is no doubt the enormity of data requirement to monitor and evaluate the progress of these initiatives. In this regard, several surveys have been commissioned in the country to obtain requisite data. All the surveys seem to be inclined to other quantitative measures but exclude dimensions that measure things like sense of fulfilment, happiness, quality of employment, and empowerment. Obtaining these dimensions is very vital to comprehensively understand the complex notion of the causes of poverty and deprivation.

The phenomenon of poverty needs monitoring over and above quantitative data. This is because current public sector reforms advocate for community participation in governance. If there is need for community participation in the policy process, it is important to obtain data that will adequately reflect the communities’ perception about poverty and deprivation. This data will feed favourably into effective policy making process by enabling a more precise policy analysis and policy targeting. This is because it will enhance the appropriate identification of the poor and the problems they face. Also, government interventions will be based on accurate and more reliable data that can be monitored regularly and international comparisons can easily be made.

Specifically, the research aims to fit into policy making in the following ways:

1. Include in current data collection process, if possible, all the dimensions that have been identified as missing in poverty data. This is particularly important through interactions with key personnel at the apex statistical organisation in Nigeria – The National Bureau of Statistics. Where possible, national surveys conducted in Nigeria will include those variables that bear correlation to poverty or deprivation and can be effectively collected.
2. Poverty analysis in Nigeria will be based on evidences from not just the traditional measures of poverty and deprivation but will likely include those dimensions identified to influence poverty based on the result of the study.
3. As highlighted earlier, the objectives of NEEDS, SEEDS and LEEDS can be effectively achieved and monitored through the availability of timely and accurate data. While such data as they currently exist is not adequate, the addition of the missing dimension data is likely to improve the quality of monitoring and effective policy targeting.

VIII. Brief Justification for the research

Originally, individuals across countries are compared based on their level of consumption or income. The standard US$1/day (or currently, US$1.25/day) has been used as a threshold for categorizing individuals as poor or non-poor. This statistics makes it difficult for
comparisons because of cross country price differentials. It is difficult to say an individual in a relatively poor country living on less than US$1/day is poorer than an individual in a rich country living on about US$2/day. These measures are therefore difficult to make international comparisons hence the need for a more acceptable international means of comparison through the use of multidimensional measures of poverty which should also include the missing poverty dimensions.

Looking at poverty in terms of deprivation, the poor suffer deprivation along various lines that includes low levels of consumption; low literacy level; poor access to basic amenities and infrastructure such as water, electricity, good environment, quality health care, and so on; lack of participatory voice in governance; high levels of morbidity and mortality; low level of empowerment and physical security, and so on. This is a strong justification for moving from consideration of income or consumption levels alone to include also, these aspects of deprivation. For example, consider an individual who suddenly becomes insane. The fact that the individual owns a ‘fat bank account’ does not mean that the individual is rich. This is because the individual is greatly deficient in other major dimensions to poverty. On the international front, though initial attempts were made to construct the Human Development Index (HDI), this index has been seen as being too narrow to consider income, longevity and education. This consideration centred the new initiative of the ‘missing dimensions to poverty’ championed by the OPHI. This is important to develop internationally comparable indicators of wellbeing across households.

IX. The missing dimensions of human development

For human development and deprivation, utilitarianism considers individuals in terms of the total amount of happiness or desired fulfilment and not necessarily how the happiness is attained, what causes it, what goes with it, or whether it is shared by many or a few (Sen, 1984). This utilitarian view however dominated much of earlier thoughts on deprivation. Resignation to fate as well as quiet acceptance of deprivation has great impact on the measure of satisfaction and dissatisfaction as entrenched under the utilitarian view (Sen, 1984). Sen therefore argues for the need to go beyond the solely mental-view to understanding deprivation to consider other metric, which is the metric of capabilities to function. This answers the question of who can in fact do what, and not just the way people desire or react to their ability or disability to do these things (Sen, 1984). As a follow-up on the capability to function approach, the OPHI proposed the inclusion of other missing dimensions of human development that are perception based.

Such perception-based indicators are less frequently reported in national surveys such as the Core Welfare Indicator Questionnaire (CWIQ) in Nigeria and in other developing countries of the world. In developed countries, these indicators have been subjected to rigorous psychometric, reliability and validity tests (OPHI, 2007). Current efforts being proposed is to subject these indicators of welfare to developing countries and see whether
Dimensions that have been identified so far include Employment, Empowerment, Physical safety, Ability to go about without shame, and Psychological and subjective wellbeing.

(1) **Employment** (Lugo, 2007): Access to employment opportunities is a great determinant of wellbeing. Individuals that are gainfully employed are more likely to escape the crunching effects of poverty than those who are either unemployed or discouraged. This dimension is not necessarily new. The question here is knowing how to define and measure a ‘good’ employment. That is what type of employment are people engaged in? Do they find satisfaction from their employment? What is the type of employment that such individuals should and want to engage in? And so on.

(2) **Empowerment or Agency** (Ibrahim and Alkire, 2007): This has been defined by Sen as ‘what a person is free to do and achieve in pursuit of whatever goals or values he or she regards as important’ (Sen, 1985: p. 206). This requires that the individual enjoys freedom to perform what brings satisfaction that can produce positive change. The absence of this freedom makes this dimension vague. In Nigeria, agency of people have been overridden often by lots of constraints which are often linked to their mores and culture. Traditionally for example, females lack the freedom to choose who to marry, what nature of education to pursue or even participate in family deliberations to bring about change. This eventually impoverishes households because of capacity underestimation and submerging.

(3) **Physical Safety** (Diprose, 2007): This dimension seeks to address the question of ‘how safe and secured individuals are in the communities and where they live to carry on their normal activities of the day.’ This may also be related to violence and political unrests. Violence has been pointed out to undo the developmental gains that have been achieved in various areas of human development such as health, education, employment, income generation, and infrastructure development (OPHI, 2007) which leads further to reinforcing poverty in communities. In Nigeria, the concept of violence and clashes is commonplace. There has been the north-south divide, religious divide, ethnic divide and communal clashes resulting in mass destruction and killing. This instils fear in the minds of its citizens who fear moving within some confines due to the sense of insecurity. For example, the case of the Niger-Delta crises is not new. This area has been tagged ‘hot zone’ in Nigeria and people naturally fear living in these communities and those who work there live in fear. Others have to be paid ‘security premiums’ over and above their normal earnings to live in these areas. Similarly, religious tensions characterise the predominantly Muslim north and the predominantly Christian south. Domestically, women suffer violence and the fear of losing their husbands, or need to cater for their children still keep them in the relationship. This lack of safety, therefore, impedes normal activities of individuals and is likely to increase poverty through fear.

(4) **The Ability to go about without Shame** (Zavaleta, 2007): Shame and humiliation is a likely cause of low self-esteem. When individuals are stigmatized, they seemingly...
develop a great sense of rejection by the society and a feeling of not being wanted. In another sense, individuals react sharply to shame in the negative way. For example, individuals will hate being associated with poverty or associated with a certain disease. In response to this, the individual might get involved in crime or might refuse to work to earn a living as a result of the stigmatization. This either inflicts poverty on others (directly or indirectly) or oneself.

(5) **Psychological and Subjective Wellbeing** (Samman, 2007b): Psychological wellbeing is often based on the perceptions individuals have about the meaning of life and the ability to strive towards excellence in fulfilling the idea (OPHI, 2007). Subjective wellbeing on the other hand measures individual perceptions of satisfaction and happiness. These areas are especially important in considering poverty. This draws from similar idea in Health Economics literature where self assessment of health status has been used for individuals themselves to value their perceived state of health.

**X Methodology**

The way poverty is measured is very important for the understanding of poverty itself and the policy conclusions to be drawn thereof. This is because policies are evaluated based on changes in poverty statistics (Diaz, 2003).

**Data Analytical Tools**

For data analysis, in addition to the use of simple proportions, percentages, correlations as well as cross-tabulations as mentioned under the section on how to achieve the objectives, we propose the following methods for further analysis.

**Method 1: Factor Analysis**

For the use of factor analysis, consider a population of \( n \) persons. Let person \( i \) possess a vector of \( m \) attributes, \( x_i \in \mathbb{R}_+^m \), where \( \mathbb{R}_+^m \) is the non-negative orthant of the Euclidean \( m \)-space \( \mathbb{R}^m \). The matrix \( X \) is an \( n \times m \) matrix, where \( M \) is the set of all \( n \times m \) basic needs (including all the missing dimensions in this case) with entries as non-negative real numbers. The entry \( ij \) of the matrix \( X \) is the quantity of attribute \( j \) possessed by person \( i \).

From the initial matrix, we need to obtain a matrix with binary elements. This suggests that we obtain a matrix denoted by \( D \) (an \( n \times m \) matrix). In this case, entry \( ij \) of the matrix \( D \) represents whether the individual \( i \) possesses above a certain threshold of the attribute \( j \). This will be an indicator (binary)\(^2\). The dimensions of interest include income, education, health, longevity, empowerment, employment, physical safety, and so on.

To reduce to binary the entry of the matrix will require a way of fixing a poverty line or a threshold for each attribute. For example consider the attribute \( j = 1 \), for individual \( 1 \) (i.e. \( i = 1 \)), if we set the threshold for the attribute of a dimension as \( \bar{p} \), and the value of the attribute for the dimension for individual 1 crosses this threshold, we can categorize the

\(^2\) When the indicators in a dimension are binary, they are not transformed.
individual with $D_{11} = 0$. This means that the individual is non-poor with respect to this attribute.

In summary, if $x_{ij}$ is the value of the attribute $j$ for the individual $i$, and $\bar{\sigma}_j$ is the threshold value for attribute $j$, we can simply obtain the corresponding entry in the matrix $D$ as follows:

$$D_{ij} = \begin{cases} 
1 & \text{if } x_{ij} < \bar{\sigma}_j \\
0 & \text{Otherwise} 
\end{cases} \quad \text{for each } i \text{ and } j \quad (1)$$

The full matrix $D_{ij}$ is then analysed using factor analysis (i.e. principal components analysis or the multiple correspondence analysis) to obtain a composite index to rank individuals (poverty index).

Specifically, we propose two ways to obtain the matrix of binary elements. One can be interpreted as the absolute measure while the other a relative measure. For the relative measure, let $\mu_j$ be the median/mean of attribute $j$. Let also $z_j \in \mathbb{Z}$ be the vector of poverty lines or threshold for attribute $j$. Denote therefore $z_j^\gamma = \gamma \mu_j$, where $\gamma \in [0,1)$ as the threshold or poverty line. This is analogous to $\bar{\nu}$ in Equation 1.

As an absolute measure, we may define the threshold or poverty line as $z_{j}^{\text{abs}} = k_j$, where $k_j$ is the minimum level of attribute $j$ which is often determined exogenously or arbitrarily determined. Here, $z_{j}^{\text{abs}}$ is analogous to $\bar{\nu}$ in Equation 1.

It should be noted here however that this initial method is based on a non-normalized or adjusted poverty measure and this has been explored not to satisfy some basic axioms of multidimensional poverty measure. Under the Method 3, we extend analysis beyond the use of the non-adjusted or non-normalized measures to consider normalized and adjusted extensions.

**Method 2: Union versus Intersection definitions**

This method draws from Duclos et al. (2006). Here we consider the union and intersection definitions of poverty using a multidimensional approach. The intersection approach considers an individual poor if she falls below a subsistence level defined for all attributes. If $x_{ij}$ is individual $i$’s level of attribute $j$, and $z_j$ is subsistence level defined for attribute $j$, using the intersection definition, the individual is poor if $x_{ij} < z_j$ for all $j$. This is more of an absolute measure for all attributes. Such a measure is likely not to exhaust the entire poor (See Diaz, 2003). Duclos et al. (2006) then propose the union definition of poverty. Under this definition, a person is poor if she falls below subsistence for at least one attribute. In this case, the individual is poor if $x_{ij} < z_j$ for at least one $j$. 
These cases of union and intersection are two extremes. Intermediate cases exist where poverty domain is defined by a decreasing poverty frontier. In which case, an individual is poor even if she has more than the poverty line in one attribute but sufficiently low in another attribute. Here, cut-off points are used. For example, if there are five dimensions, a cut-off point of 3 dimensions might be used to identify and classify individuals as poor. It should also be noted here that the measure of poverty used here are absolute measures that are not normalized or adjusted. This has raised some criticisms for the use of the union and intersection approaches. Under Method 3, we deal with such issues in brief and provide justification for the use of normalization and adjustments.

**Basic Axioms of poverty**

Following the work by Sen (1976), some basic axioms are expected to be satisfied by poverty measures. In the case of the study, which draws from the literature of multidimensional poverty, the following axioms are expected to be satisfied by the measures proposed. These include the strong focus axiom, weak focus axiom, monotonicity axiom, dimension monotonicity, symmetry axiom, continuity axiom, replication invariance axiom, and subgroup consistency axiom. Other axioms are as a result of inequality considerations or the transfer principle. These include the Pigou-Dalton transfer principle, multidimensional transfer principle, non-decreasing poverty under correlation increasing rearrangement, and non-increasing poverty under correlation increasing arrangement. Poverty measures must also satisfying scale invariance as relative poverty measures and the translation invariance as absolute measures (Diaz, 2003).

**Method 3: The modified FGT index**

It is not difficult to show that the Foster-Greer-Thorbecke (FGT) index for when $\alpha = 0,1$ is not sensitive to inequality in the distribution of income or the attribute of consideration. However, when the measure of poverty aversion $\alpha = 2$, the measure obtained is sensitive to inequality in the distribution. However, this becomes more difficult to interpret. Consider when the FGT index for $\alpha = 0$ is adjusted, it becomes sensitive to absolute changes in poverty but will not be sensitive to changes in the level of deprivation for an individual in a given dimension $j$. Therefore, looking at a normalized poverty gap when $\alpha = 1$, it is possible to obtain a measure of poverty that is sensitive to the changes in the deprivation of individuals in a given dimension. The problem with this however is that it is invariant to the level of initial deprivation level. However, using a normalized FGT measure when the measure of poverty aversion $\alpha = 2$, solves the trick of sensitivity to the initial level of deprivation and satisfies the transfer principle (See Alkire and Foster, 2007) even though it becomes difficult to interpret. These measures can further be decomposed across various divisions of interest. Another modification used in literature is to apportion weights to various dimensions.

The adjusted headcount measure of poverty $P_0^{adj}$ is simply obtained from the matrix obtained in Equation (1). Let $e_{ij}$ be elements of the matrix (of course these are binary entries) and $N$ is the total number of elements (entries) of the matrix,
\[ P^\text{adj}_0 = \frac{\sum_i \sum_j c_{ij}}{N} \]  

Because this does not account for changes in the level of deprivation across dimensions (i.e. if the individual who is deprived in a dimension becomes more deprived), it does not satisfy the monotonicity axiom hence the need for the normalized poverty gap. If we define the normalized gap as:

\[ G_{ij} = \max\left(0, \frac{(z_j - x_j)}{z_j}\right) \text{ for all } i \]  

Then the adjusted poverty gap is measured as:

\[ P^\text{adj} = \frac{\sum_i \sum_j G_{ij}}{N} \]  

In this case, when an individual is more deprived in a dimension, the estimate will increase. However, this is not responsive to the initial size of deprivation.

For the case of adjusted measure where \( \alpha > 1 \) we obtain a measure that weights the deviations by powers. In the general case, we have:

\[ P^\text{adj}_{\alpha} = \frac{\sum_i \sum_j G_{ij}^\alpha}{N} \text{ for } \alpha > 1. \]  

In the application of factor analysis, the matrix obtained from Equation (4) and that obtained from adjusting the gap by a specified power will be conducted. This will be helpful to see the differences that might arise from the use of the unadjusted and the adjusted measures. This will involve the use of a simple correlation analysis.

**Poverty Decomposition**

The measures of poverty obtained can easily be decomposed along various identified groups. If we define \( P(c; z; \alpha) \) as poverty index for each group \( c \) for any \( \alpha \), and \( \varphi(c) \) as the population share of group \( c \). We can obtain the absolute contribution of a given group to overall poverty as well as the relative share of each group to poverty.

The absolute share of any group is given as: \( \phi_c = P(c; z; \alpha) \cdot \varphi(c) \text{ for } c = 1, \ldots, C. \)  

The relative share of any group is given as: \( \gamma_c = \frac{\phi_c}{\sum_c \phi_c} \text{ for } c = 1, \ldots, C. \)  

Sectoral decomposition will be performed on the measure of poverty obtained. This will include decompositions based on arbitrary choice of reference periods (i.e. changes in distribution or changes in two time periods) and the Shapley approach (See Duclos and Araar, 2006).
Specifically, the data to be obtained will be split into two ‘distributions’. The first will be the dimensions without the missing dimension data while the second will involve only the missing dimension. The idea behind this is simply that if there are significant changes observed in the distribution, we can conclude that the missing dimension adds value to our understanding of poverty.

If we let distribution $A$ to be the first distribution and we denote as $P_A(k; \alpha)$ the poverty measure for any $\alpha$, and we let $P_B(k; \alpha)$ be for distribution $B$, the change in poverty is denoted simply as:

$$\Delta P = P_B(k; \alpha) - P_A(k; \alpha).$$

(8)

The change represented by (8) is also identical to the sum of changes in any predetermined subgroup. A similar exercise can be done across each predetermined subgroup of the population (say across gender, marital status, etc.). This is particularly important because there is possibility that while for a group, the two distributions might not be different, another group may show significant difference.

Data Requirements

The data requirement for the study is primarily based on the OPHI missing dimensions of poverty questionnaire in addition to general questions on demographic and socio-economic variables as well as perception based questions. Also included would be an extensive section on health. This is because health and poverty are linked and self-reinforcing (Haan et al., 1987; Wagstaff, 2002). The unit of analysis will be the head of the household.

Study Population

The study population for the research is Nsukka Local Government Area (LGA) of Enugu State of Nigeria. Nsukka LGA is located in the northern part of Enugu State, south-eastern Nigeria. It comprises several communities. It is the largest LGA in the State. The population census figure for 2006 is 309,633 of which about 52% is females (NBS, 2006).

Sample size

The average household size is 6 members (Ataguba et al., Forthcoming). Therefore, the number of households in Nsukka LGA is estimated to be 51,605. We apply the Taro Yamen (1967) specification to determine the appropriate sample size (See Israel, 1992).

$$n = N / (1 + N(e^2))$$

(9)

Where: $n$ = the sample size to be estimated,

$N$ = population size (Household size), and

$e$ = error margin

Allowing for an error margin of $e = 0.05$ or 5%, we obtain a minimum sample size of 397 households.
Selection and Administration of Questionnaire

The missing dimension of poverty questionnaire proposed by the OPHI will be administered on a sample of about 405 households (approximately 2,400 individuals) selected from Nsukka local government area, south eastern Nigeria.

A multi-stage selection procedure will be adopted. The initial stage will be the random selection of some communities as clusters. Within each cluster, we will use the National Bureau of Statistics (NBS) Enumeration listing booklet to select Enumeration Areas (EAs) based on those already demarcated by the NBS. In the subsequent stage, a simple systematic random sampling technique will used to select households from each of the EAs to ensure that the selected households add up to the desired sample size.

Based on initial communications with an officer at the National Bureau of Statistics, the enumerator listing booklet will be made available to the researchers for sampling. Nsukka LGA has approximately 15 communities of which the researchers intend to select 5 or 6 as clusters. Based on these clusters, EAs would be selected randomly within each cluster and households selected accordingly to ensure that the minimum sample size is achieved.

Seasoned professional enumerators would be used as coordinators and these will recruit assistants which will be trained accordingly to ensure that biased are reduced as much as possible.

Pilot testing of the draft questionnaire is an especially important part of the administration of the questionnaire. This will enable the researchers validate some questions and eliminate those that are not suitable for the setting. Questions that are confusing to the respondents would be appropriately adjusted and interpreted well.

XI      Quantitative Data Validity Testing

Validity is the extent to which the study including the questions and questionnaire actually reflect the underlying concept intended to be measured. This could either be external or internal validity. While external validity is linked to the generalizability of the study, internal validity is concerned about the rigour and how scientific the study proceeds. Various types of internal validity have been identified. These include face validity, content validity, construct validity, and criterion validity.

Validity testing is important in this context because the questionnaire to be administered is new in the context of Nigeria and also, the phenomenon to be measured is an unobserved latent variable – ‘poverty or deprivation’. This implies therefore that indicators that in essence measure the same phenomenon should exhibit some correlations among themselves (Haynes et al., 1995). Survey instruments that lack content validity for example will fail to confirm the hypothesized latent structure of the assessment instrument because the instrument may not reflect facets of the construct and may tap variables that are outside the domain of the latent variable – deprivation (Haynes et al., 1995). Validity is also important for aggregating indicators for a dimension such as generating scores or indices or categorization as poor or non/poor.
To address face validity, the researchers aim to consider the questions and answer questions such as: do these questions seem reasonable as they appear? Do they provide insights into the phenomenon to be investigated? Are they well framed and designed? Are we likely to obtain reliable information based on the question? Etc. Piloting the initial questionnaire draft will help ensure that the questions are relevant in the context they are applied and they ‘make sense’.

To address content validity, we ensure that the relevant indicators within each dimension within the context are not omitted. This is because any data obtained from an invalid instrument is as bad as the instrument as it could overestimate, underestimate or omit some important aspects of the dimensions of poverty in the context. This is to reduce erroneous inference from the data in the given context. Specifically, to ensure content validity of the data, we propose the following procedures:

1. Ensure that the construct is well defined. This is simply by subjecting the instrument to expert review including the PEP-OPHI teams.
2. Use of careful open-ended interviews with persons from the target population and experts – (i.e. use of population and expert sampling)
3. Subject each indicator of a dimension to multiple expert judgement to determine if relevant or not (Haynes et al., 1995). This will ensure the refinement of the instrument before administration
4. Ensure the proportional representativeness of the indicators across dimensions. This is because too few indicators could understate or undermine the validity of a dimension compared to another dimension with many indicators.
5. Indices of content validity can be reported where applicable. This will provide a basis for future users of such instruments.

In this regard, we consider Lawshe’s content validity ratio (Lawshe, 1975) given as:

\[
C = \frac{2n}{N} - 1
\]

(10)

Where \(C\) is the content validity ratio; \(n\) is the number of experts or panellists indicating that the indicator is essential; and \(N\) is the total number of experts or panellists. Value of \(C\) close to unity indicates strong validity.

Criterion validity is important and assessed in cases where there is a theoretically valid measure to compare with. In this study, however, correlations among variables that purport to measure the same thing will be used to assess this.

### Table 1: Validity testing and technique(s) to use

<table>
<thead>
<tr>
<th>Validity type</th>
<th>Technique</th>
<th>How it is used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct Validity</td>
<td>1. Multitrait-Multimethod analysis (MTMM) 2. Principal components Analysis (PCA)</td>
<td>I. Look at correlation and covariance matrices II. Use of scree plots and eigenvalue criterion &gt;1; factor loading &gt;=0.40</td>
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<tr>
<td>3. Confirmatory Factor Analysis (FA)</td>
<td>III. Use of Average Fitness Index, Normalized fit index, expected cross-validation index, etc.</td>
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<td>------------------------------------</td>
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<tr>
<td>Content Validity</td>
<td>Expert panels or judges</td>
<td>Degree of consensus; use of Lawshe’s ratio.</td>
</tr>
<tr>
<td>Face Validity</td>
<td>Careful observation of the questions contained in the questionnaire</td>
<td>Basic intuition</td>
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</table>

Source: Adapted from Straub et al. (2004)

**XII Consultation and Dissemination Strategy**

The study would employ various strategies in disseminating the results. These are based on the various audiences. We intend to continue to maintain close ties with the apex statistical organisation in Nigeria throughout the project (from inception to results).

1. From inception, the National Bureau of Statistics (NBS) in Nigeria will be involved in relevant processes of the project. Currently, contacts have been made and are being made with the Regional as well as State offices and officers of the NBS. The contacts are aimed at improving the data collection process as well as intimating these officials about the project and its importance. Those initially contacted are welcoming of the initiative and would like to assist where possible. This is promising given the familiarity of the NBS with fieldwork exercises in Nigeria. As assured by the officials of the NBS, the sampling frame of the NBS will be used to select respondents for the survey.

2. The adapted questionnaire from the project that includes all the modules for the missing dimensions of poverty will be made available to the NBS. This is to facilitate incorporation in further and ongoing data collection process. It is also hoped to facilitate policy debates.

3. At specific intervals during the project, as determined by the researchers, domestic mini-conferences will be conducted with the Enugu State NBS officers about the project. This will involve presentations with the support of PEP-OPHI.

4. Newsletters will be used to disseminate the results of the study through the media in Nigeria.

5. In addition to these, the findings of the research will be disseminated through international and National conferences with the support of PEP-OPHI.

6. Policy briefs are also expected outputs from the research that will be easily communicated to the government, policy makers and other relevant agencies in Nigeria. Scientific journals articles, research publications and working papers are also expected to be produced from the research with all the sources of funding and assistance gratefully acknowledged.

7. The questionnaire used will be disseminated to interested researchers and to the OPHI-PEP groups for future reference.

8. Through the benevolence of the Poverty and Economic Policy (PEP), the report of the research will be made available to the public on the PEP website for the public and academics.
9. Previous research funded through the PEP network involving team member(s) has been disseminated through the use of national conferences, international conferences, PEP working papers, conference papers as well as PEP website. Currently, a national conference is being planned for the effective dissemination of the results from one of the studies involving the researcher.
Reference


List of Team Members (Composition)

The team is composed of three core researchers: John, Ifeoma and Nonye.

1. **John E. Ataguba** - Team Leader
   - Male
   John is a trained economist and a specialized health economist working in Africa. He is interested in poverty research especially those that hinge on human capital. John has training in both quantitative economics as well as qualitative research methodologies. Initially, he was involved in a study of the impoverishing effects of health care payments in Nigeria which involved analysis using techniques of poverty and inequality. He was also involved in a recent study for PEP on the willingness of households to pay for community health care insurance schemes in Nigeria. This used the contingent valuation methodology. He is also involved in domestic research in Nigeria, Ghana, Tanzania and South Africa on health and developmental related issues. In this regard, he is familiar with issues surrounding poverty and inequality in Nigeria.

2. **Christy Ifeoma Mba** - Team Member
   - Female
   Christy is currently a post graduate student of the department of Economics, University of Nigeria. She has shown considerable interest in the field of poverty and statistical analysis. She has a background in statistics as well as economics at her undergraduate level which will be invaluable in the analysis stage of the research. Christy has been involved in the study on the willingness of rural households to pay for health insurance which used the contingent valuation methodology.

3. **Nonye Oragudosu** - Team Member
   - Female
   Nonye is also currently a post graduate student of the department of Economics, University of Nigeria. She has expressed interest in research in poverty especially in the area related to human capital studies. She is currently working on a thesis that is related to government spending and educational performance in Nigeria. She is a young researcher with great interest and zeal in research. Having been involved in studies involving distributional impacts, she is well suited to join the team in the current research.

4. Others: These will include some young members of staff and other post graduate students of the department of Economics, University of Nigeria. Most especially prospective young female researcher.

**Expected capacity Building for Researchers and their Institutions**

The research aims at building a strong capacity network in the University of Nigeria in a way as to further strengthen the knowledge and application of qualitative and quantitative research methodology in the area of poverty research and analysis. Current evidences show that complementarity of qualitative and quantitative research reinforces the understanding of the phenomenon under study. In this regard, the department is weak in application of the qualitative methodologies. The research will put the department of economics,
University of Nigeria as a leading research institution in this area of qualitative-quantitative poverty research and studies in Nigeria.

The research is further aimed at the building and strengthening of capacity of the younger researchers (mainly females) and others who will like to join the team in the course of the study in the empirical application of the methodologies developed in the research to practical issues relating to not only poverty alleviation and analysis but also in the area of national concerns where such methodologies can be adapted and applied. Techniques that the team members will acquire in the course of the study include also validity testing, confirmatory factor analysis and the use of factor analysis to reduce multi-dimensional indicators into a single dimension, application of the FGT index and related indices of poverty to analysis of \textit{categorical data} as well as adaptation to data of \textit{multiple dimensions} which have rarely been applied in poverty research in Nigeria. This will also expose the researchers to cutting-edge issues and literature in the use of the methodologies not only to poverty analysis but to related issues.

One major capacity that the researchers aim at building is in the area of learning from current developments in the field of study. This will involve the researchers advancing their current knowledge of the issues under consideration and learning considerably from developments in other parts of the world. This is through interactive seminars, conferences, and other avenues which are greatly supported by the Poverty and Economic Policy (PEP). It is also hoped that post graduate students of the department of Economics will be engaged in seminars and lectures that are related to the application of these methodologies and others that may arise in the course of the study.

To further ensure that the project is effectively executed, each member of the team will be engaged in one form of activity or a combination of some. Those who have not had previous experiences in the area of poverty analysis will be well integrated. All team members will be involved in the field work activities. Some post graduate students who will be interested in the research will also be engaged in the process. The services of experienced and seasoned enumerators from the National Bureau of Statistics (NBS) will be used for data collection. These enumerators will, however, be given prior training by the team and team members will monitor the overall fieldwork activities.

Particularly, the task division among the researcher is such that the young researchers – Christy and Nonye will be involved in extensive literature search to cover areas of interest to the research. This is particularly helpful to ensure that these young researchers acquaint themselves with the rigour of literature search, especially in the use of keywords. They will also be responsible for proofreading drafts of write-ups prepared to check for consistency and errors and make valuable inputs where necessary. They will also be involved in the data collection process. Data entry will be done by Christy and another postgraduate student of the department of economics. Nonye and Christy will be involved in proof-reading of the reports. The overall co-ordination will be handled by the lead researcher – John who must ensure that the tasks are going on smooth and that deadline are met and strictly kept. John will also provide mentorship in the course of the research and will be a support for the rest of the team members. He alongside other members will formally train enumerators who will proceed to the field to obtain data. John, Christy and Nonye will be involved in the
rigorous data analysis and the writing up of the drafts of reports as well as progress reports. The nature of division of tasks for the write-ups will, however, be decided among the researchers on an iterative basis as the work progresses. Different tasks can be undertaking by any other member. The initial draft of the proposal was prepared by John assisted by Nonye and Ifeoma. The revision based on comments of reviewers was done by John.

**Ethical Issues**

Ethical clearance will be obtained from all necessary bodies, confidentiality and anonymity and the freedom to withdraw from study will be granted to the participants. All PEP ethical procedures will be followed.

**List of past, current or pending projects**

1. **Project Idea:** Redistributive effects of Healthcare financing in Nigeria: A case study of Enugu State. [completed]
   - **Funding institution:** The project was funded by the IDRC through the PEP [2004 – 2006].
   - **Current team member(s) involved:** John Ataguba.

2. **Project Idea:** Willingness to pay for community health insurance in rural Nigeria [completed]
   - **Funding institution:** The project is funded by the IDRC and SIDA [2006 – 2007].
   - **Current team member(s) involved:** John Ataguba; Christy Mba.

The findings from the research have been disseminated through the use of national conference, international conferences, PEP working papers (PMMA-2006-17 and PMMA-2008-10), and conference papers as well as the PEP website. Currently, a national conference is being planned for the effective dissemination of the results from one of the initial studies involving the researcher. These studies have been in the area of health and health financing in Nigeria and it has shaped discussions around health financing arrangements in Nigeria. Such changes include the modification of the National Health Insurance Scheme’s initial design.

**List of some useful personnel at the National Bureau of Statistics (NBS)**, Nigeria

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. C.C. Nweze</td>
<td>Director, Prices, Head Office Abuja, Nigeria</td>
</tr>
<tr>
<td>Mr. Amobi</td>
<td>Zonal Controller, South South Zone, Port Harcourt, Nigeria</td>
</tr>
<tr>
<td>Mr. O. Ibekewe</td>
<td>Zonal Controller South Eastern Zone, Enugu, Nigeria</td>
</tr>
<tr>
<td>Mr. Edeh</td>
<td>State Officer, Enugu State Office, Nigeria</td>
</tr>
</tbody>
</table>

3 The NBS is a result of the merger of the Federal Office of Statistics (FOS) and the National Data Bank (NDB). This is in line with the implementation of the Statistical Master Plan (SMP) for the federal government of Nigeria funded by the World Bank. The NBS is now the apex data producing agency of Government in Nigeria following from the FOS since 1947. The NBS aims to be a world class National Statistical Office (NSO), producing adequate, high quality and timely data relevant to the demands of users in Government, the universities and research Institutes, private sector organizations and international agencies.
Acknowledgements

The researchers wish to thank the anonymous reviewer(s) for their comments and reviews including all the important points raised. We also thank Mr. Anthony Enyi of the National Bureau of Statistics for the efforts made in ensuring contacts and access at the National Bureau of Statistics. We also thank the PEP-OPHI for the opportunity to revise and present our proposal with all the useful comments received. The usual disclaimer applies.