A QUANTITATIVE AND QUALITATIVE ASSESSMENT OF VULNERABILITY TO POVERTY IN NIGERIA

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Abstract

The paper attempts a quantitative and qualitative assessment of vulnerability to poverty in Nigeria. In qualitative terms, the paper noted that weak governance structure in the form of absence of rule of law, lack of political effectiveness and efficiency and high level of insecurity are major sources of vulnerability to poverty in Nigeria. The macroeconomic environment especially in terms of sluggish growth, low capacity utilization in the manufacturing sector and high rates of unemployment have increased vulnerability to poverty in Nigeria. However, in quantitative terms, the study applied he Chaudhuri (2000) methodology to assess the level of vulnerability to poverty in Nigeria. The choice of methodology was guided by the type of data available in the country. The findings of the study shows that 87% of Nigerians are vulnerable to poverty. The study further shows that while 41.2% of the population fall into chronic poverty, only 18.1% of the population are vulnerable to chronic poverty. The study also shows that 68.5% of the population are highly vulnerable, whereas only 31.5% of the population have low mean vulnerability. While the paper noted that building a strong and virile governance structure can help to reduce vulnerability in Nigeria, the paper also recommends a pro-poor growth macroeconomic policy environment that would allow the vulnerable and the poor to make use of their hidden assets.

1. Introduction

Nigeria suffers from high levels of poverty and rising inequality in spite of her enormous wealth of human and material resources. Apart from convincing evidence, which suggests that, the country belongs to the group of the lower-income countries (GNP per capita of $US269 at PPP in 2000), the incidence of poverty continues to rise at each passing day. Thus, poverty incidence that was just 28.1% in 1980 rose to 43.6% in 1985. The incidence of poverty dropped minimally to 42% in 1992 only to rise to 67% in 1996. The implication of this incidence of poverty for Nigeria is that about 67 million Nigerians are languishing in poverty out of an estimated population of about 100 million.

The failure of previous programmes and strategies to slow down the incidence of poverty in Nigeria bears a strong testimony to two main issues. First, whether the country lacks capacity to mitigate the social risks faced by households and communities or second, whether the country has not paid sufficient attention to the issue of risk and uncertainty that are important for the understanding of the dynamics leading to and perpetuating poverty. Given the importance of risk and uncertainty, policy makers are beginning to incorporate risk and vulnerability into their strategies to reduce poverty. The need for addressing vulnerability in any human development strategy in conjunction with poverty is two fold (Christiansen and Subbarao (2001). First, not being vulnerable has intrinsic value. To be well, a person must not only have enough to live a comfortable life today, but he must also have good prospect today that he will have enough to live a comfortable life tomorrow. This implies that to be well, a person must not only not be poor today, today, he must also not be vulnerable.

Second, addressing vulnerability also has instrumental value. Because of the many risks household face, they often experience shocks leading to a wide variability in their

income. In the absence of sufficient assets or insurance to smooth consumption, such shocks may lead to irreversible losses, such as distress sale of productive assets, reduced nutrient intake, or interruption of education that permanently reduces human capital, hereby locking their victims in perpetual poverty.

The foregoing suggests that gaining a thorough understanding of the poor and vulnerable – their characteristics, constraints and priorities – is crucial to formulating an effective strategy for reducing poverty and for designing social protection programes. Incidentally, while studies (e.g. FOS, 1999; Okojie et al., 2000; Aigbokhan, 2000) have employed national level survey data to measure the incidence, intensity and severity of poverty in Nigeria, there is a dearth of study on vulnerability. The need for vulnerability assessment is underscored by some gaps that are left out in the study of poverty. For example, the issues of

♦ who is likely to be poor;
♦   what fraction of population are at risk; and
♦ why some people are more likely to be poor than others.

All of these fall within the purview of the dynamics of poverty, which can not be captured by mere static poverty measurement. Therefore, with changing socio-economic status of households, due to changing circumstances, there is the need to go beyond the static measures of poverty hence the issue of vulnerability comes to the fore (Moser, 1998). Vulnerability is a forward-looking ex-ante measure of household's well-being which shows that a household whether or not is poor today, will find itself poor tomorrow (Chaudhuri, 2001). The need for designing and targeting of forward-looking interventions further underscores the need for a vulnerability assessment in Nigeria.

The initial attempt to determine factor that affect vulnerability to poverty in Nigeria dates back to Alayande (2002), albeit in an ad hoc manner. The present study hopes to build on this earlier study from different methodological perspective by estimating an inter-temporal variation in consumption from cross-section variation using the methodology of Chaudhuri (2000).

Therefore, the present study makes a modest contribution by extending the frontier of knowledge in the analysis of poverty and vulnerability in two ways. First, the study deals with ex ante analysis of poverty. Second, the study was able to classify poverty into six broad categories namely the chronic poor, the transient poor, the low level mean consumption vulnerable group, the high vulnerability consumption group, the total vulnerable group and the non-vulnerable non-poor group. The importance of this classification is underscored by the different questions that they pose. For example, the distinction between the transient poor and the chronic poor is based on the question: how often is the household poor?…The distinction between the high vulnerable group an low level mean consumption vulnerable group is based on the question: why is the household poor?

 It is on the basis of the foregoing that the study preoccupies itself with identifying the key vulnerable groups (their living conditions, the risks they face and their incidence);

examine factors that determine welfare as well as examine household characteristics as signals of this vulnerability. The study is thus organized around five sections. The next section deals with the qualitative assessment of vulnerability to poverty in view of the socioeconomic situation of Nigeria. The third section examines some conceptual as well as empirical issues in vulnerability and poverty, while the fourth section presents the empirical methodology and the result of findings We conclude and make some recommendations in section five.

2.0   Vulnerability and the Socio-economic Situation of Nigeria.

2.1   Vulnerability and Governance structure in the 1990s

We situate vulnerability assessment within political and institutional development of the country especially in the 1990s. This is based on the Economic Intelligence ranking of countries between 1993 and 1997, but projected to 2002. The political environment is based on two major indicators – Political stability and political effectiveness. Political stability is measured by the frequency of armed conflict, social unrest, frequency in change of government, terrorism and international disputes. Political effectiveness is measured by the presence of appropriate government policy, the efficacy of these policies, bureaucratic competence in terms of degree of red tape, legal system, corruption and the rate of crime. Although the ranking was based on political and economic environment of 60 countries, Nigeria ranked 58th to lead Iran and Iraq. This is selectively shown in Table 1.

Table 1: Political Environment ranking of countries (1998-2002)

Country	Political Stability	Political Effectiveness	Overall Political Environment	Total Score	Rank
Netherlands	9.6	9.3	9.4	8.82	1
United Kingdom	8.2	9.6	9.0	8.77	2
United States of America	8.2	7.4	7.8	8.59	4
South Africa	6.0	5.1	5.7	6.31	37
Egypt	5.5	5.1	5.3	5.91	41
Nigeria	2.4	1.8	2.0	4.17	58
Algeria	4.2	4.0	4.1	4.73	57
Indonesia	3.3	3.6	3.5	5.63	47
Iraq	1.5	1.8	1.6	2.03	60
Average	**6.9**	**6.1**	**6.5**	**6.78**	
Median	**6.9**	**5.9**	**6.5**	**6.83**	

Source: The Economic Intelligence Unit
Note: Total Score and Rank are based on Political and Economic Environment

Table 1 shows that Nigeria ranks poorest among the African countries (South Africa, Egypt, and Algeria) that were included in the survey. Indonesia, which is supposed to be a proximate economy, has a better political environment than Nigeria. Indeed, Nigeria performed poorly in terms of political stability scoring 2.4 below the average score of 6.9 The reason for this are not far fetched. The country has become politically unstable since 1993 when a presidential election was annulled.

Nigeria falls below average in terms of political effectiveness. It also falls below other African countries included in the survey. On the issue of institutional performance, the governance survey carried out by Development Policy Centre (DPC)/United Nations Economic Commission for Africa in 2002 showed that 72.1% of the people generally believed that the institution of governance was in the 190s.

In terms of security, the current civil strives and disturbances has assumed a frightening height, accompanied by separatist agitation and exhortations of "impending war". Jega (1996) noted that so-called "elder" and "opinion molders", opportunistically interested in the control of power and resources, pitch one region or ethnic group against another as opposition blocks in national politic. The consequences of the foregoing are the various ethnic conflicts witnessed in different parts of the country. The implication of the foregoing is that people become more vulnerable to poverty. Social capital which is one of the greatest assets of the rural poor can not be assured in the face of the absence of law and order and contract enforcement. Economic activities were paralyzed and consequent on the rising tides of poverty in both rural and urban centres.

2.2 Macroeconomic Environment

A qualitative assessment of vulnerability to poverty within the overall context of the Nigerian macroeconomic environment reveals a rather harsh and highly anti-poor environment. The economy has witnessed a rather sluggish economic growth since the early 1990s in the range of between 1.3% and 3% per annum. This has further accentuated the levels of vulnerability to poverty in the country. The 1990s witnessed two period of trough in the growth rate of the nation's GDP i.e.1995 and 1999(see Figure 1). This growth rate is grossly at variance with the 7.5% growth rate recommended for West African countries by the UNECA, in the sub-region were to half poverty by the year 2015.

The country has also witnessed persistent high rates of inflation in the 1990s. Inflation is one of the macro indicators that contribute to people's vulnerability because it undermines investment and impedes economic growth. Inflation erodes people's real wages and their overall purchasing power. This is especially true if people depend heavily on market purchases or their food supply.

The capacity utilization in the manufacturing sector fluctuated through out the 1990s as it hovered around 29% and 39%. This has hindered the employment capacity of the sector (Table1). The consequence of this is the ballooning informal sector as the sector continues to absorb the retinue of the able-body men that are being relieved of their

duties in the formal sector. Indeed, estimates show that the informal sector provides as high as 75% of the employment in Nigeria. Given the productive structure of the sector and its characterized low incomes, Nigeria stands the risk of finding herself in an "artesian trap" of enduring low productivity and income, which really comes down to a "poverty trap".

Figure 1: Annual GDP Growth Rate
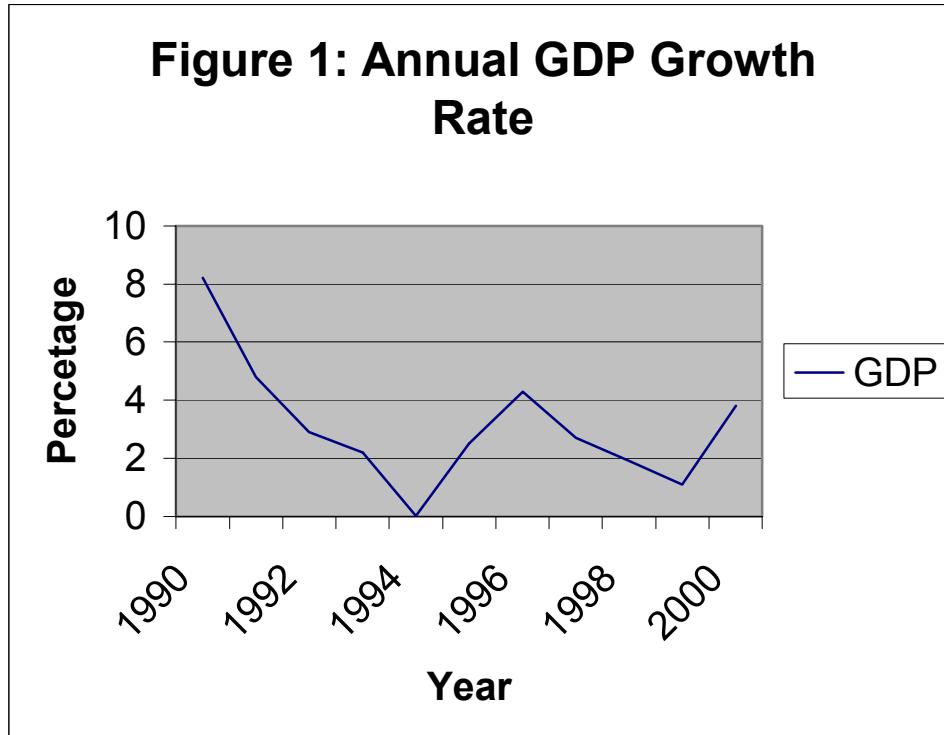
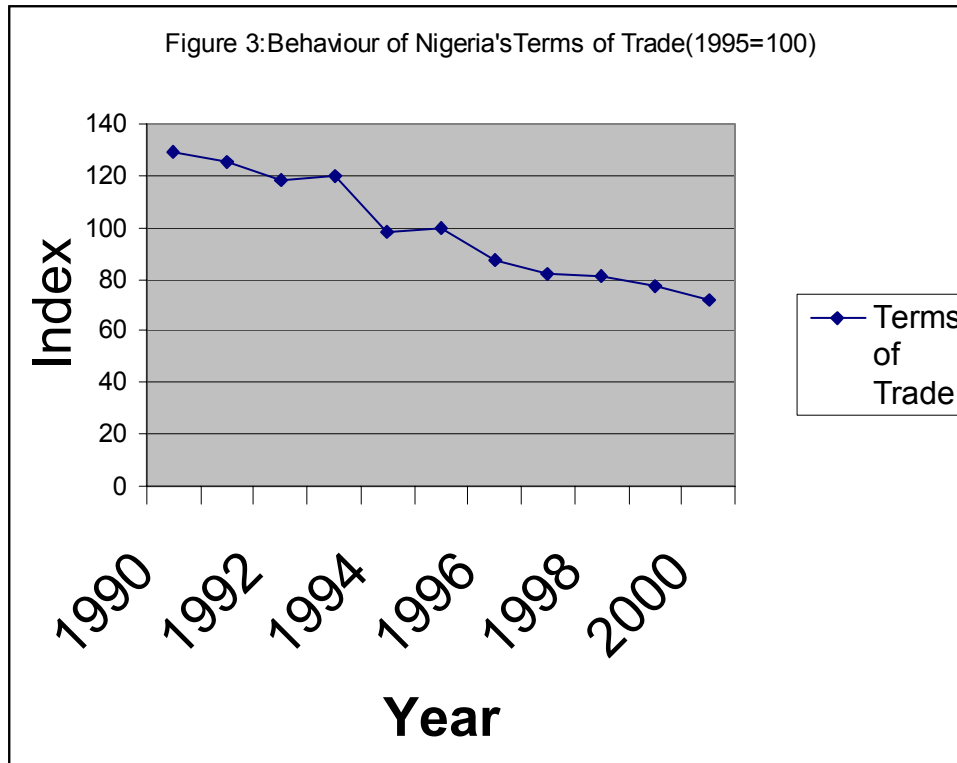Source: African Development Indicators, 2000

Clearly, any meaningful poverty reduction programme in Nigeria must confront the informal sector and find ways not only to increase productivity and incomes in the sector but also to obtain a reasonable transition to formality. This is apart from large interest rate differentials of between 7 and 19% over the review period that has perpetually kept the poor from accessing credit from the conventional financial institutions. The Nigerian macro-economic environment thus portends a picture that makes the people vulnerable to poverty, just as it limits the ability of the poor to tap into economic opportunities that can get them out of poverty. The balance of payment position is highly precarious in the face of huge external debt and debt servicing requirements. All these tend to limit the amount of resources available to revitalize the collapsing basic social and economic infrastructure.

Table 2: Selected Social and Economic Indicators in Nigeria

	1995	1996	1997	1998	1999	2000	2001
Life Expectancy (number of years)	52	53	53	54	54	54	54
Infant mortality Rate (per 1,000 births)	114	114	114	75.1	75.1	75.1	75.1
Manufacturing Capacity Utilization (%)	29.3	32.5	30.4	32.4	35.9	36.1	39.6
Credit to the Private Sector (growth rate)	23.7	34.7	-23.9	27.4	29.2	30.9	43.5
Credit to the Government (Million Naira)	82.5	109.6	-53.5	144.9	32.0	-170.1	79.7
Government Expenditure of Health (% of total expenditure)	3.30	2.57	1.71	2.80	1.71	2.92	4.39
Government Expenditure of Education (% of total expenditure)	6.33	8.12	3.92	5.05	3.33	7.07	5.87
Interest Rate differentials (%)	7.57	8.03	12.3	11.6	17.7	16.0	19.2
Overall Balance of payment as % of GDP	-3.1	-5.6	0.04	-7.7	-9.7	6.3	0.5

Source: Central Bank of Nigeria Annual Report and Statement of Account, 2000

An important source of macroeconomic risk that tends to affect the return on people's endowments is the behaviour of the terms of trade. African countries have generally suffered from a large terms of trade shocks especially in the 1990s because of heavy concentration on primary products. Heavy concentration on primary commodities is correlated with reduced growth (Collier and Gunning, 1999). Indeed available evidences (e.g. Dehn 2000) reported that negative shocks in commodity prices have a long-term negative effect on growth. As demonstrated in Figure 3, Nigeria witnessed a deteriorating terms of trade throughout the 1990s with no sign of improvement even in year 2000. This is a reflection of continuous deteriorating prices of primary commodities (oil and some agricultural products). Figure 3 thus paints a dismal picture of a people (Nigerians) vulnerable to poverty.

Figure 3:Behaviour of Nigeria'sTerms of Trade(1995=100)

Source: African Development Indicators, 2000

2.3 Natural Shocks and the Nigerian Physical Environment

The large total land area of 923,773Km^2 notwithstanding, Nigeria is bedeviled with major environmental hazards that have adversely affected the earning capacity of the people especially in the rural areas. The major environmental problems that have made Nigerian especially the rural dwellers vulnerable to poverty are:

- drought and desertification due to population pressure, over-grazing and continuous exploitation of marginal lands;
- agricultural land degradation which has affected all the 36 states of the federation in an effort to increase agricultural products to meet the demand of the growing population;
- the high incidence of gully, coastal and marine erosion are most noticeable in the south-south and south-western parts of the country. This is part from flooding (coastal, river and urban) which has become a national issue.
- Large industrial pollution and urban waste management are other environmental problems that have seriously affected the health of the people and hence their income earning capacity.

Apart from the physical and other environmental and natural disasters, Nigerians are also vulnerable to various health risks. Infectious diseases characterize the Nigerian epidemiological pattern, which has been worsened by malnutrition and high fertility in recent time. The Nigerian epidemiological environment is dominated by the prevalence

of malaria, which affects 919 people out of every 100,000. This problem is further aggravated by the existence of drug-resistant malaria. The occurrence of resistance to malaria drugs moved from 2% in 1992 to 40% in 1996, while resistance varied between 20% and 50% allover the country in 1999 (Olumese, 1999). There are other common diseases like dysentery, which has a prevalence rate of 386 per 100,000 people; pneumonia, 146 per 100,000 and measles, 89 per 100,000 people (FMOH, 2000).

2.4 Poverty Incidence in Nigeria

Table 3: Incidence of Poverty in Nigeria

	1980	1985	1992	1996
National	28.1	46.3	42.7	65.6
Sector				
Urban	17.2	37.8	37.5	58.2
Rural	28.3	51.4	46.0	69.3
Education of Household Head				
No Education	29.6	51.3	46.4	74.1
Primary	24.8	49.7	43.3	60.5
Secondary	18.5	40.6	30.3	53.5
Post-Secondary	21.4	26.3	25.7	47.8
Occupation of Household Head				
Farming	31.4	53.4	47.8	72.5
Non-Farming	16.0	36.5	36.1	58.3
Sex				
Male	8.8	16.7	16.4	30.9
female	11.1	13.5	17.0	26.8
Zone				
North- East	35.5	54.9	54.0	66.7
North- West	37.6	52.1	36.5	68.0
Central	32.2	50.8	46.0	66.1
South- East	12.9	30.4	41.0	67.7
South- West	13.3	38.6	43.1	66.9
South- South	13.2	45.7	40.8	66.6

Source: Okojie *et al* . (2000), Poverty in Nigeria – An Analysis of Gender Issues, Access to Social Services and the Labour Market

Note: indexes based on Head Count Ratio

The consequences of the country's poor governance structure, harsh and un-conducive macroeconomic environment, natural and physical hazards coupled with other health risks have all accentuated the rising levels and incidence of poverty in Nigeria. Thus, poverty incidence, which was just 28.1% in 1980, had risen to 65.6% by 1996. The occupational distribution of poverty also shows that those in the farming employment are more adversely affected with an incidence level of 72.5%. In terms of geographical or zonal distribution of poverty, the Northwest has the highest incidence of poverty in 1980, 1985 and 1996. In 1992 the central part of the country had the highest level of poverty.

3.1 Review of Some Conceptual and Empirical Issues on Risk, Poverty and Vulnerability

The concept of vulnerability as a risk of shortfall in well-being is often expressed in the literature (e.g. Chaudhuri 2002; Tesliuc and Lindert 2002) as a probability statement regarding the failure to attain a certain threshold of well-being in the future. It is underscored by the following principles:

- it is forward-looking and defined as the probability of experiencing a loss in the future relative to some benchmark of welfare;
- a household can be said to be vulnerable to future loss of welfare and this vulnerability is caused by uncertain events;
- the degree of vulnerability depends on the characteristics of the risk and the household's ability to respond to the risk;
- that the poor and the near-poor tend to be vulnerable because of their exposure to risks and limited access to assets (broadly defined) and limited abilities to respond to risk (Alwang, Siegel and Jorgensen, 2001).

The measurement of vulnerability involves fives main issues namely:

1. definition of time horizon over which the potential of future shortfalls would be assessed. This is the probability that a person would become poor one or more periods ahead;
2. the choice of an indictor of well-being;
3. estimation of an ex ante probability distribution of ex post outcomes regarding the indicator of well-being;
4. definition of a threshold or well-being i.e. the poverty line; and
5. determination of a probability threshold for the purposes of classifying households as being vulnerable.

The definition of "the future" over which shortfall in welfare should be assessed represents one of the major differences between poverty and vulnerability. The choice of the period over which to measure vulnerability affects the level and magnitude of vulnerability. The longer the period, the higher is the probability of a household falling under the threshold (Tesliuc and Lindert 2002). Thus, the definition of vulnerability as the probability that a household would find itself consumption poor in the future bears a strong testimony to the effect that it is a forward-looking measure of household welfare. On the other hand, poverty is an ex post measure of household's well-being (or lack thereof). Therefore, while it is possible to make statements about whether or not a household is currently poor, the level of vulnerability is not (Chaudhuri 2002). Thus, while estimates or inferences about whether a household is currently vulnerable to poverty can be made, the current household's vulnerability level cannot be observed directly.

However, while the two concepts are different in what they measure, vulnerability complements static poverty analysis by providing additional tool for devising effective strategies to reduce current poverty and to prevent future poverty. The measurement of vulnerability has two elements. First is one due to a low level of and limited variance in consumption and a second due to high level of and much variance of consumption.

Vulnerability is therefore important in understanding poverty in two ways (Tesliuc and Lindert 2002). First it makes it possible to identify the characteristics of those impoverished households that lack the means to ascend the economic ladder and to tailor human development policies to their specific needs. Second, it quantifies not only the existing poor but also those in danger of becoming poor in the future and identifies a comprehensive set of sources of vulnerability for this group. This helps policymakers to formulate risk management policies (including a mix of informal, market-based, and public risk management methods) to reduce the effects of these shocks in a cost-effective manner.

At the empirical level is the issue of the household's future shortfall in welfare. The issues here are two folds: First, the choice of indicator of well-being for the purpose of measuring vulnerability. There are various indicators of well-being in the literature. These are consumption expenditure, educational outcomes, health outcomes and malnutrition. The choice of an indicator of well-being is however restricted in the empirical estimation of vulnerability even within the purview of poverty. If poverty reflects deprivation on multiple fronts, vulnerability to poverty ought also to be a multidimensional construct. However, the notion of vulnerability is made concrete in the literature due to limited data application in the empirical assessment of the extent to which various characteristics of households make them more or less vulnerable (Chaudhuri 2002). Hence, the most applied indicator of well-being in the empirical estimation of vulnerability is per-capita consumption expenditure.

Second, the identification of a proper framework for thinking about both the intertemporal aspects and the cross-sectional determinants of consumption patterns at the household level. In dealing with this second issue, evidence in the literature (e.g. Strauss and Thomas 1995) suggests that household's consumption in any period will generally depend on its wealth, its current income, its expectation of future income, the uncertainty it faces regarding its future income and its ability to smooth consumption in the face of various income shocks. These factors are themselves dependent on a variety of household characteristics, those that are observable and possibly some that are not, as well as a number of features of aggregate environment in which the household found itself.

The foregoing suggests that an empirical estimation of vulnerability involves obtaining knowledge about the current endowments and risk factors of household and those of its locality and gain an understanding of the household's stochastic income and consumption generating process. Households reside in environment characterized by physical, economic and institutional features which together determine the risks households are confronted with such as droughts, flooding and earthquakes, macro-economic and terms of trade shocks, as well as theft and violence. These risks reflect the level and variability of the household's endowments and income (Christiansen and Subbarao 2001).

There is also the issue of data in the empirical estimation of vulnerability to poverty. The consensus in the literature (e.g. Glewwe and Hall 1998; Chaudhuri 2000) is that longitudinal data are most appropriate for the study of vulnerability. Longitudinal data allow the same household to be tracked over a sufficient length of time. These data

permit the direct estimation of the inter-temporal variance of consumption at the household-level without the need for auxiliary assumption. Therefore, the historical nature of vulnerability requires the need for trend data, which allows for qualitative mapping process that required identifying household composition at two static points. This involves plotting major household changes during the intervening periods, and categorizing the causes of changes as external or internal factors. The internal factors include household-level factors, which influence or mediate the extent to which household can respond to changes in external environment. These are reflected in household structure, composition and headship (due to birth, marriage, and death), care of children and the elderly, and domestic violence etc. (Evans 1989). In this connection, Moser and Mellwaine (1997) presented a schema for the empirical analysis of vulnerability poverty using longitudinal data of Hungary. The schema, which is adapted in the study, is presented below.

Table 4: Potential Indicators of Increasing and Decreasing Vulnerability at Individual, household and community level

Type of Vulnerability	Indicator of increasing vulnerability	Indicators of decreasing vulnerability
	Individual	
Labour	• Loss of permanent job • Decline in secure, waged work • Increase in short-term casual minimum wage employment • Acquisition of physical disability	• Increase in number of household members working, especially women • Increased home-based enterprises • Increase in number of jobs of individual workers
Human capital	• Decline in access, and/ or quality of social or economic infrastructure • Decline/drop out in school attendance • Decline in health clinic attendance	• Substitution of private for public services such as water pumps, private health care, and private educational
	Household	
Housing	• Increase perception of threat of eviction • Deterioration in house stock • High level of overcrowding	• Resolution of tenure insecurity • Use of ploys for intergenerational "nesting"
Household relations	• Erosion of household as a social unit due to change in structure, marital breakdown, or split household • Household extension that reduces ratio of earners to non-earners-especially the addition "hidden" female household heads • Inability of women to balance multiple responsibilities and community participation • Older daughters undertaking children • Elderly lacking care giver • Increase in domestic violence	• Household extension that increases ratio of income earners to non-earners • Pooling/sharing of childcare, cooking and use of space • Reduction in domestic violence
	Community	
Social Capital	• Increasing personal insecurity in public places • Decline in inter-household reciprocity • Erosion of community-level organization	• Community-based solutions to crime • Inter-household reciprocities • Active community-based organizations

Source:Moser and Mellwaine (1997): Household Responses to Poverty and Vulnerability, Vol.2

The dearth of longitudinal data and their limited cross-sectional coverage render them not quite useful for policy analysis that requires nationally representative samples (Chaudhuri 2001). It is in this regard that Chaudhuri (2000) developed a framework for assessing vulnerability using a cross-sectional household survey. The major advantage of cross-section data is that they are always available because they are relatively cheaper to obtain especially from the point of view of developing countries. Moreover, these cross-sectional data have been used in most countries to obtain assessment and incidence of poverty. However, using cross-sectional data entails making stringent assumptions regarding the stochastic process generating consumption. For example, unlike multi-period panel data, cross-sectional data are based on assumptions[1] which lint the degree of unobservable heterogeneity in the future consumption prospects of households that are, at the time of analysis, observationally identical along a number of dimensions. This implies that we cannot identify the parameters driving persistence in individual consumption levels without a longitudinal data. It also implies that without a long enough macroeconomic or time series of repeated cross-sections, we cannot identify the stochastic process generating the structure of the economy or the macro-economic environment.

3.2 Data

The study employs the merged data from the National Consumer Expenditure Survey of Households and the General Household Survey in conducted by the Federal Office of Statistics (FOS) in 1996/97 under the National Integrated Survey of Households (NISH). The consumer expenditure survey provides data, which can be used to address in some detail issues of household and individual welfare.

More details about this data set has been provided elsewhere (Canagarajah, Ngwafon and Thomas,1995; FOS,1999). The National Consumer Surveys, which are supplemental modules of the National Integrated Survey of Households have been part of FOS activities for a number of decades; the first was in 1953. The NISH programme is run in line with the United Nations Household Survey Capability Programme. The design of the National Consumer Surveys and the General Household surveys follow the general NISH design.

The National Consumer Survey (NCS) and the General Household survey (GHS) cover all the states in the Federation, including the Federal Capital Territory (Abuja). In each state, 120 Enumeration Areas (EAs) are covered annually, with 10 EAs randomly allocated to each month of the survey. From the selected EAs, a sample of households (10) is covered each month for the General Household Survey (GHS), with five households sub-sampled for the NCS. A national household sample of 10,000 is aimed at. By 1996, however, with the number of states increasing to thirty, the sample size was increased. The merged data consists of 9,436 households, spread across all the states of the federation.

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[1] See Chaudhuri (2000) for a detailed description these assumptions.

The main objectives of the consumer expenditure surveys (four surveys to date – 1980, 1985, 1992, 1996) were to provide data to meet the following needs (FOS, 1999):
- revision of weights needed for the construction or revision of the Consumer Price Index (CPI),
- provision of household income and expenditure data needed for preparing some aspects of National Income,
- measurement of welfare and poverty,
- provision of data on expenditure patterns and other socio-economic features of the average household, and
- provision of data for market and private research groups.

The data is rich in providing general information required for an assessment of vulnerability to poverty. Apart from the fact that it provides information on the structure and composition of households, it also provides information on the quality of housing facilities available to the households as well as the quality of economic infrastructure available to the household.

3.3.1   Adjustments for Price Differentials

Differentials over time: If poverty situations are to be compared over time, price indices have to reflect temporal differences. The poverty line at the base year (1985) was kept constant while expenditure data for other years were deflated to base year prices, thus permitting analysis of poverty trends.

Regional price differentials: In order to use total expenditure as the basis of measurement of standard of living, it was necessary to correct for regional price differences or differentials across states. One point in the country was taken as the base and data from other points in the country were deflated to the price level of the base point. Lagos State was taken as the base and deflation was done separately for urban and rural areas. Separate deflators were also computed for food and non-food items where information was available (FOS, 1999). Adjustment was made for seasonal price differentials.

Weighting Procedure

An important consideration in the data cleaning process was the weighting procedure. This is described in the report by the Federal Office of Statistics (1999). The weight used in the analysis (wta) was computed at the World Bank. Using this weighting factor amounted to using population figures as auxiliary variables, an accepted procedure for improving survey estimates (FOS, 1999).

3.3.2 Derivation of Poverty Lines

In the present study, the poverty line defined by the FOS (1999) is used. Their approach was based on the fact that the data collected did not lend itself to intangibles or physical

quantities of food consumed. Total real per capita expenditure was used as a proxy for the standard of living of households interviewed. Households are classified as poor or non-poor in relation to their level of total expenditure (food and non-food). To do this, a line was set relative to the standard of living in the country:

- a moderate poverty line equal to two-thirds of the mean per capita expenditure.

4.1 Model Specification and Estimation Procedure

Our empirical analysis derives from the various arguments in the empirical and theoretical issues raised in this study. Given that the vulnerability level of a household h at time t is defined as the probability that the household will find itself consumption poor at time $t+1$, we specify vulnerability to consumption poverty using the models suggested in the economic literature[2] as:

$$\upsilon_{ht} = \Pr(c_{h, t+1} \leq z) \tag{4.1}$$

Where $c_{h, t+1}$ is the household's per-capita consumption level at time $t+1$ and z is the appropriate consumption poverty line. Here, the level of vulnerability at time t is defined in terms of household consumption prospects a time $t+1$. The argument in the literature is that household's consumption patterns are determined both by inter-temporal and cross-section aspects. This implies that the level and variability of a household's future consumption depends on the risk factors of its environment, the extent to which these affect a household's income (risk exposure) and the capacity and desire of the household to protect its consumption from income shocks. This suggests the following reduced form expression for household consumption as:

$$c_{ht} = c(X_h, \beta_t, \alpha_h, \varepsilon_{ht}) \tag{4.2}$$

Where X_h represents a bundle of observable household characteristics, β_t is a vector of parameter describing the state of the economy at time t, and α_h and ε_{ht} represent, respectively, an unobserved time-invariant household-level effect, and any idiosyncratic factors (shocks) that contribute to differential welfare outcomes for households that are otherwise observationally equivalent.

On the substitution of equation (4.2) into (4.1), we can rewrite the expression for the vulnerability level as:

$$\upsilon_{ht} = \Pr(c_{h, t+1} = c(X_h, \beta_{t+1}, \alpha_h, \varepsilon_{h, t+1}) \leq z | X_h, \beta_{t+1}, \alpha_h, \varepsilon_{ht}) \tag{4.3}$$

The expression in equation (4.3) suggests that a household's vulnerability level derives from the stochastic properties of the inter-temporal consumption stream it faces, and these in turn depend on a number of household characteristics and characteristics of the environment in which it operates. This expression according to Chaudhuri (2002) is general in a number of respects. First, it allows for the possibility of complicated interactions between the multiple cross-sectional determinants of a households

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[2] Our specification derives basically from Chaudhuri (2000 and 2002).

vulnerability level. Second, because a household vulnerability is defined in terms of its future consumption prospects conditional on its current characteristics, both observed and unobserved, the possibility of poverty traps and other non-linear poverty dynamics is implicitly built in. Third, the possible contribution of aggregate shocks and unanticipated structural changes in the macro-economy to vulnerability at the household level is also incorporated through inclusion of some time-varying set of parameters.

However, based on the limitations imposed by the use of cross-sectional data and the consequent need to make some assumptions[3] regarding the stochastic process generating the consumption of a household h, we re-specify

equation (4.3) as:

$$\ln c_h = X_h \beta + \varepsilon_h \tag{4.4}$$

Where c_h is per-capita consumption expenditure, X_h represents a bundle of observable household characteristics, including assets and other risk management instruments, β is a vector of parameters and ε_h is a mean-zero disturbance term that captures idiosyncratic shocks and unobservable characteristics that contribute to different per-capita consumption levels for households that are otherwise observationally equivalent. This suggests that $\varepsilon_h \sim$ i.i.d N $(0, \sigma^2, (X_h)$.

It should be noted from equation (4.4) that the variance of the regression depends on the household characteristics. Thus,

$$\sigma^2_{e,h} = Z_h \theta \tag{4.5}$$

Here, $\mathbf{Z_h}$ is the matrix $\mathbf{X_h}$ augmented with vectors that quantify the occurrence of shocks, and θ is a vector of parameters.

For purposes of estimating our model as specified, a three-step feasible generalized least squares procedure is used to estimate θ (see Amemiya, 1977). We begin by estimating equation (4.4) by ordinary least squares (OLS). The second stage involves taking the estimated residuals from the OLS regression of equation (4.4),

$$\hat{\ell}^2_{OLS,h} = Z_h \theta + \eta_h \tag{4.6}$$

The OLS estimate, $\hat{\theta}_{OLS,}$, is then used to transform equation (4.6) as:

$$\frac{\hat{\ell}_{OLS,h}}{Z_h \hat{\ell}_{OLS}} = \left(\frac{Z_h}{Z_h \hat{\ell}_{OLS}} \right) \theta + \frac{\eta_k}{Z_h \hat{\ell}_{OLS}} \tag{4.7}$$

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[3] The most important assumption here is that cross-sectional variance can be used to estimate inter-temporal variance. Tesliuc and Lindert (2002) noted that cross-sectional variance can explain a part of inter-temporal variance, mostly due to idiosyncratic components or cluster-specific shocks. Our model will

Equation (4.7) is also estimates using OLS. Equation (4.7) provides an efficient feasible generalized least squares estimate $\hat{\theta}$ $_{FGLS}$. This implies that a consistent estimate of the variance of the idiosyncratic component of household consumption ($\sigma^2_{\varepsilon,\ h}$) is given by $Z_h \hat{\theta}$ $_{FGLS}$.

In the final stage, we perform an OLS estimation of the transformed consumption equation as:

$$\frac{\ln c_h}{\sqrt{Z_h \hat{\theta}_{FGLS}}} = \left(\frac{X_h}{\sqrt{Z_h \hat{\theta}_{FGLS}}}\right)\beta + \frac{\ell_h}{\sqrt{Z_h \hat{\theta}_{FGLS}}} \tag{4.8}$$

Equation (4.8) provides a consistent and efficient FGLS estimate of β. The estimates of β and θ obtained by the FGLS method provide information on how various household characteristics affect the mean and the variance of log consumption. On the assumption that consumption is log-normally distributed, the estimates can then be used to form an estimate of the probability that a household with characteristics X_h will be poor, or the household's vulnerability level:

$$\hat{\upsilon} = \hat{\Pr}(\ln c_h < \ln C \mid X_h) = \Phi\left(\frac{\ln C - X_h \hat{\beta}}{\sqrt{X_h \hat{\theta}}}\right) \tag{4.9}$$

Here Φ is the cumulative density of the standard normal distribution.

One of the problems in the implementation of the model that we have specified lies in the probability of some errors in the measurement of consumption. This could lead to an overestimation of the variance of consumption, and thus vulnerability. The estimation procedure – FGLS provides an advantage especially in the estimation of the variance of the idiosyncratic component of household consumption. The FGLS yield a consistent estimate of the true variance of consumption even when consumption in measured with error unless the measurement error varies systematically with some household characteristics. Indeed, the concern for systematic measurement errors account for estimating separate models for rural and urban areas.

4.2 Choice of the Vulnerability Threshold

A division of the population into two groups (those that are vulnerable and those that are not) is another stage in the empirical analysis of vulnerability. This involves choosing a level of vulnerability as the threshold, v, such that a household is considered vulnerable only if its vulnerability level exceeds it, i.e. $v_h \geq v$. This allows us to generate the

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thus produce good estimates of vulnerability for the situations where the distribution of risks and the risk-management instruments are similar in all periods of time.

proportion of the population that s venerable nationally and also within various groups of population and allows us to generate vulnerability profiles. Although the ultimate decision is somewhat arbitrary, various logical choices are available[4]. However, a common choice, which is also adopted in this study, would be to select a vulnerability threshold of 0.5. This suggests that a household that faces higher than even odds of being poor in the next period is considered vulnerable. A second statistical justification for this threshold is that a household with consumption equal to the level of the poverty line, who experiences a "white noise" shock, has a 0.5 probability of becoming poor next period. At the limit, as the time horizon converges to zero, the notion of currently being poor and currently being vulnerable to poverty coincides (Pritchett et al. 2000).

4.3. Poverty and Vulnerability Classification Schemes

The attempt here is to relate the concept of vulnerability to the concept of poverty. Here, we follow the schema by Chaudhuri (2001) and is presented in Figure 4 below. On the basis of current consumption, the population is classified as poor or not, depending on whether heir current consumption exceeds the poverty line. Of this group, the group for which expected consumption is less than the poverty line is termed the chronic poor. Based on the properties of the log normal distribution, this group also has high vulnerability, defined as a greater than 0.5 likelihood of falling into poverty. Households who are poor today, but their expected consumption exceeds the poverty line are termed transient poor, and this group is further divided into those that face high vulnerability (<0.5) who are characterized as the frequently poor and the group that faces low vulnerability (<0.5) who are termed the infrequently poor.

Among the non-poor, those whose expected consumption are less than the poverty line, and therefore have a high vulnerability are characterized as vulnerable to chronic poverty. Non-poor households whose expected consumption exceeds the poverty line but face a high vulnerability are termed vulnerable to frequent poverty. The non-poor who face a low vulnerability are termed the low vulnerability non-poor. We can also make a distinction by dividing the high vulnerable group into those that are vulnerable due to having low expected consumption (which includes the chronic poor and those vulnerable to chronic poverty) and those that are vulnerable due to a high variability of consumption (which includes the frequently poor and those vulnerable to frequent poverty).

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[4] See Chaudhuri (2002) for an exposition on various choices.

Figure 4: poverty and Vulnerability Classification Schemes

		Observed Poverty Status based on current consumption			Expected consumption
		Poor	Non-Poor		
Vulnerability	High Vulnerability >0.5	Chronic Poor	Vulnerable to chronic Poverty	Expected consumption < poverty line	Expected consumption
		Frequently Poor	Vulnerable to frequent poverty		
	Low vulnerability <0.5	Infrequently poor	Low vulnerability non-poor	Expected consumption > poverty line	

Poor = Chronic poor + frequently poor + infrequently poor
   Chronic poor = chronic poor
   Transient poor = frequently poor + infrequently poor

High vulnerability group = chronic poor + frequently poor + vulnerable to chronic poverty + vulnerable to frequent poverty

 Low expected consumption = chronic poor + vulnerable to chronic poverty
 High variability of consumption = frequently poor + vulnerable to frequent poverty

Total vulnerable group = infrequently poor + high vulnerability group = observed poor + high vulnerability non-poor

Source: Adapted from Bidani, B. and Richter, K. (2001): "Household Vulnerability and the Asian Crisis: The case of Thailand," Mimeo, World Bank, Washington DC.

4.4 Estimation of Consumption Model

The consumption model is estimated in line with the specification in section (4). The characteristics of households are carefully chosen so that they are exogenous, so that they are fixed and non-manipulable, at least in the short-run.

Another decision lies in the degree of disaggregation at which the analysis is carried out. Here, we are guided by the analytic domains that make sense and the sample size that we have. We run a separate model for all the four zones as contained in the data. These are the Northeast, Northwest, Southeast and Southwest zones.

4.4.1   Descriptive statistics of Data

In this sub-section, we present a descriptive statistics of data to be employed in the analysis.

Table 5: Descriptive Statistics

Variable	Mean	Standard Deviation	Definition
pce	1,265.52	1,938.88	Deflated per-capita consumption expenditure
Household Structure and composition			
age	44.37	14.24	Age of household head
age^2	2143.88	1302.79	Squared age of household head
hhs	5.38	3.72	Household size
apop	2.42	2.40	Dépendent population
Marital Status			Marital status of household head
Mar1	0.77	0.41	Married
Mar2	0.02	0.18	Divorced
Mar3	0.04	0.21	Separated
Mar4	0.08	0.28	Widowed
Mar5	0.07	0.26	Never married
achild	2.86	2.88	Number of children in the household
wives	1.08	0.90	Number of wives in the household
Sex			Gender of Household Head
Male	0.86	0.34	
female	0.14	0.34	
Space or Geography			
Sector			Sector of residence of household head
Sec1	0.21	0.41	Urban
Sec2	0.79	0.41	Rural
Zone			
Noest	0.20	0.40	North East
Nowest	0.27	0.45	North West
Soest	0.27	0.44	South East
Sowest	0.27	0.44	South West
Human Capital and Social Infrastructure			
Edulevel			Level of education of household head
edu1	0.61	0.49	No education
edu2	0.21	0.41	Primary education
edu3	0.13	0.33	Secondary education

edu4	0.05	0.21	Tertiary education
enrolrt	0.84	0.22	Enrolment ratio
Elecsup			Source of electricity supply
elec1	0.61	0.49	None
elec2	0.35	0.48	NEPA only
elec3	0.03	0.17	Rural electrification only
elec4	0.003	0.06	private generator only
elec6	0.006	0.08	NEPA or rural electricity plan generator
Toilet facilities			
toi1	0.49	0.50	Covered pit
toi2	0.10	0.29	Uncovered pit
toi3	0.006	0.07	pail
toi4	0.07	0.25	Water closet
toi5	0.03	0.17	Toilet on water
toi6	0.30	0.46	Bush/dung hill
toi7	0.003	0.05	VIP Latrine
Water Sources			
Wat1	0.19	0.40	Pipe-borne water treated
Wat2	0.03	0.18	Pipe-borne water untreated
Wat3	0.11	0.31	Well/spring protected
Wat4	0.16	0.36	Well/spring unprotected
Wat5	0.13	0.34	Borehole/hand pump
Wat6	0.02	0.13	Tanker/Truck/Vendor
Wat7	0.35	0.48	Stream/Pond/River/Rain water
Wat8	0.006	0.08	Others
Housing			
Hutype			Type of housing unit
hut1	0.74	0.44	Single room
hut2	0.03	0.18	Flats
hut3	0.01	0.08	Duplex
hut4	0.22	0.41	Whole building
hut5	0.04	0.08	Others
rooms	3.01	2.37	Number of rooms in household
rentrt			Ratio of rent in total expenditure
Labour Market Activities			
aemp	1.21	1.44	Number of unemployed in the household
phou	45.45	12.69	Number of hours worked
aemp1	1.75	1.19	Number employed in the household
Occup			Main occupation of household head
Occup1	0.03	0.18	Professional / Technical
Occup2	0.001	0.04	Administration
Occup3	0.05	0.21	Clerical
Occup4	0.15	0.35	Sales worker
Occup5	0.01	0.11	Service Ind.
Occup6	0.67	0.47	Agric./Forest.
Occup7	0.01	0.12	Production../Transport.
Occup8	0.02	0.13	Manufacture./Process
Occup9	0.03	0.17	Students/Apprentice
Occup10	0.03	0.17	Others

Income sources			
Basicdef	3,630.49	7,205	Wage Income
Cashidef	4,837	9,264	Non-Wage Income
xcashdef	1,396.94	5,476.34	Other sources of Income

Source: Author's computation

4.5 Differences between Poverty and Vulnerability Profiles

Empirical results show that 63.5% of Nigerians are in poverty. The mean vulnerability level is not very much different from this index at 68.5% (Table 6). The Table further shows that there are some differences between the poverty and vulnerability rates in Nigeria. In the aggregate, the number of vulnerable households is 37% higher than the number of households in poverty. However, in terms of vulnerability headcount, our empirical results show that 87.5% of Nigerians are consumption poor.

In terms of rural classification, the rural areas contribute more to poverty than he urban centres. The share of the rural areas in total poverty is 90.2%, whereas the share of he urban populace is only 9.8%. The poverty level of the rural households is much higher than that of the urban centres at 57.8% and 66.8% for urban and rural areas respectively. In terms of vulnerability, mean vulnerability in the rural areas is higher at 70.2% as against urban vulnerability of 65.7%. On the grounds of consumption poverty, the rural households exhibit a vulnerability headcount index of 89.0% as against the urban households that have an index of 70.9%. Also, the rural households have higher poverty and vulnerability differences that the urban households. These are estimated at 23% and 33% for urban and rural households respectively.

A classification of poverty and vulnerability by level of education of household head shows that the levels of poverty and vulnerability are higher in households with no education. These are estimated at 69.2% and 79.4% respectively for poverty and vulnerability levels. Our results show that this group of people contributes most to poverty and vulnerability in Nigeria. The share of the household heads with no education in poverty and vulnerability are 66.9% and 92.7% respectively. It is however worthy to mention that while poverty diminishes as we move up the education ladder; mean vulnerability level does not diminish likewise. Mean vulnerability levels was almost stable among households with primary level of education up till those with tertiary levels of education. Another important note here is the lowest difference between poverty and vulnerability recorded among those with tertiary levels of education. Thus, while it is not up to one fold (0.69), it is as high as 29% among those with secondary levels of education.

Table 6: Poverty and Vulnerability within different Segments of the Population

	Populat-ion Share	Share of poor	Share of vulnerable	Poverty headcount	Mean Vulnerability	Vulnerability headcount	Vulnerability to poverty rate
Total	**100**	**100**	**100**	**63.5**	**68.5**	**87.0**	**1.37**
Sector of Residence							
Urban	21.35	9.8	9.0	57.8	65.7	70.9	1.23
Rural	78.65	90.2	91.0	66.8	70.2	89.0	1.33
Sex of Household Head							
Male	86.42	91.2	99.0	63.8	71.2	77.4	1.21
Female	13.58	8.8	1.0	60.8	61.2	93.4	1.54
Education level of household Head							
No Education	61.13	66.90	92.7	69.2	74.7	78.6	1.14
Primary	21.09	17.33	3.4	55.2	59.7	69.3	1.26
Secondary	12.85	11.47	2.6	55.3	58.6	71.6	1.29
Tertiary	4.93	4.30	1.1	49.0	59.9	33.6	0.69
Occupation of Household Head							
Professional/ Tech.	3.42	3.5	0.40	56.4	66.4	84.4	1.50
Administration	0.15	0.2	4.8	43.7	83.7	87.9	2.01
Clerical & Related	4.56	5.1	2.4	58.2	63.4	81.9	1.41
Sales's Workers	14.59	15.7	3.8	57.6	63.2	56.4	0.98
Service Industry	1.23	1.2	0.3	64.1	54.1	67.9	1.06
Agric& Forestry	67.12	66.1	86.7	68.0	70.8	78.9	1.16
Production & Transport	1.35	1.8	0.4	64.9	79.2	83.5	1.29
Manufacture & Processing	1.63	1.6	0.5	51.7	68.3	80.3	1.55
Others	2.93	2.1	0.6	50.3	64.4	64.7	1.29
Student & Apprentice	3.01	2.7	0.3	47.5	66.0	34.2	0.72

Source: Author's Computation

An assessment of gender of household head, poverty and vulnerability shows that male-headed households are into poverty than the female-headed households. Indeed, the male-headed households have a poverty incidence of 63.8% as against the female-headed households that have an incidence level of 60.8%. The male-headed households also contribute more to poverty than their female-headed counterparts. This is estimated at 91.2% and 8.8% respectively for male-headed and female-headed households respectively. Also, our results show that male-headed households are more vulnerable than the female-headed households. This is estimated at 71.2% for male-headed households and 61.2% for female-headed households. However, in terms of consumption

poverty, our results show that female-headed households are more consumption poor than the male-headed households. This is estimated at 93.4% and 77.4% for female-headed households and male-headed households respectively. In terms of observed differences between poverty and vulnerability, female-headed household have higher difference of 54% as against the male-headed households of 21%.

In terms of occupational distribution of vulnerability and poverty, our results show hat almost all the different occupational groups are vulnerable with vulnerability level that are as high as 83.7% for those in Administration. The least vulnerable occupational groups in Nigeria are those in the services industry, with an estimated vulnerability level of 54.1%.

4.6 Transient versus Chronic Poverty and vulnerability

Figure 5: Poverty and Vulnerability Classification Schemes

		Observed Poverty Status based on current consumption			
		Poor **68.1%**	Non-Poor **31.9%**		
Vulnerability	High Vulnerability >0.5 **68.5%**	Chronic Poor (LM vulnerable) **41.2%**	Vulnerable to chronic Poverty (LM vulnerable) **18.3%**	Expected consumption < poverty line **59.5%**	**Expected consumption**
		Frequently Poor (HV vulnerable) **6.3%**	Vulnerable to frequent poverty (HV vulnerable) **4.5%**		
	Low vulnerability <0.5 **31.5%**	Infrequently poor **20.6%**	Low vulnerability non-poor **9.2%**	Expected consumption > poverty line **40.5%**	

Source: Author's Computation

Our results as demonstrated in the schema show that most poverty and vulnerability arises as a result of chronic rather than transient conditions in Nigeria. The main cause of poverty is low consumption (Tesliuc and Lindert 2002). This could be a result of chronic condition (e.g. low level of assets and endowments) or a transient situation (e.g. a temporary setback due to recent sock). In terms of vulnerability, the main causes as applied in this study are low expected consumption and high variance of consumption. In

order to inform policy, we have followed the literature (e.g. Bidani and Richter, 2001) to divide the pool of vulnerable households into two mutually exclusive groups namely (i) those who are vulnerable due to the high volatility of their consumption (labeled the "HV vulnerable") and (ii) those who are vulnerable due to their low expected mean consumption (labeled the "LM vulnerable") as shown in Figure 6.

Figure 5 shows that while 68% of the Nigerian population are poor, the majority of these (61%) are chronically poor (41.2% of the population). Figure 6 further shows that more than one-third of the population is transitorily poor i.e. 26.9% of the total population. In a similar vein, 68.5% of the Nigerian population is estimated to be vulnerable to poverty in the future. This is dominated by low expected mean consumption (LM vulnerability) accounting for 87% of total vulnerability (or 59.5% of the total population) and only one-quarter accounted for by high volatility of consumption (or 11% of the total population).

The importance of the distinction between the transient poor and the chronic poor and between the high volatility consumption (HV-vulnerable) and the low expected mean consumption (LM-vulnerable) is underscored by the different questions that they pose.. The distinction between the transient poor and the chronic poor is based on the question: how often is the household poor? The distinction between HV-vulnerable and LM-vulnerable households is based on the question: why is the household poor?

4.7 Estimated Regressions

The results of the model for the log of per capital consumption equation and variance of the log of per capita consumption (final FGLS and OLS) are shown in Tables 7a and 7b below. The models (log of per capita consumption and variance of log per capita consumption) generally have most of its coefficients coming up with expected signs. In all the four zones, the education level of the head of household is positively significant in explaining welfare in Nigeria. The enrolment ratio is positively significant in explaining welfare in Nigeria. Equally important in the explanation of welfare across the four geopolitical zones of the country is the n\umber of rooms in the households. This is significantly correlated with welfare in Nigeria. Social infrastructure (water and material for housing) also has some positive significant effect on welfare in Nigeria. Also, the gender of the household head also matters for welfare in Nigeria. Our results show that being a male head is significantly related to welfare for most of the cases under consideration.

Table 7A: Model for the Estimation of Vulnerability to Poverty

Zone1					Zone2			
Variable	OLS		FGLS		OLS		FGLS	
	log(ctn)	Var(ctn)	log(ctn)	Var(ctn)	log(ctn)	Var(ctn)	log(ctn)	Var(ctn)
age	0.030*	0.001	0.027*	0.023*	-0.008**	-0.007*	-0.042*	0.009**
	(3.26)	(0.05)	(3.66)	(2.84)	(-1.68)	(-2.08)	(-7.55)	(1.57)
sqage	-0.001*	0.002	-0.001*	-0.003*	0.001**	0.0007	0.004	-0.001*
	(-3.00)	(0.03)	(-3.70)	(-3.30)	(1.66)	(1.01)	(7.76)	(2.56)
hhs	0.143*	0.005	-0.110*	-0.059**	-0.128*	0.058*	-0.174	-0.092*
	(5.80)	(0.21)	(-5.85)	(-1.82)	(-5.70)	(2.87)	(-9.63)	(-10.12)
achild	0.089*	0.017	0.047*	-0.001	-0.002	0.038**	-0.194**	0.045*
	(3.41)	(0.69)	(2.38)	(-0.03)	(-0.10)	(1.79)	(-1.81)	(4.20)
wives	0.065**	-0.013*	0.042	0.002	0.012	-0.010	0.046*	-0.012
	(1.59)	(-1.75)	(1.36)	(0.05)	(0.36)	(-0.33)	(2.46)	(-1.01)
male	0.206*	0.125*	0.143*	-0.202*	-0.065	-0.153*	9.41*	0.222*
	(2.07)	(1.35)	(2.38)	(-3.78)	(-0.44)	(2.70)	(8.41)	(3.85)
sec2	-0.140**	0.005	0.321*	-0.202*	0.208*	0.007*	-0.163*	0.256*
	(-1.96)	(0.67)	(4.96)	(-3.78)	(3.33)	(2.14)	(-2.56)	(9.95)
Occu1	-0.124	-0.307	-1.339*	-0.248	-0.505**	0.208	-0.250	-0.124
	(-0.36)	(-0.95)	(-3.66)	(-0.41)	(-1.58)	(0.73)	(-0.62)	(-0.38)
Occu3	0.320	-0.001	-0.931*	-0.291	-0.410	0.600*	-0.163**	-0.076
	(1.04)	(-0.00)	(-2.94)	(-0.47)	(-1.34)	(2.17)	(1.62)	(-0.24)
Occu4	0.855*	0.232**	-0.033	-0.160	-0.230	0.146	-0.171	0.359**
	(2.85)	(1.83)	(-0.10)	(-0.26)	(-0.85)	(0.60)	(-0.51)	(1.63)
Occu5	1.087*	0.267	0.377	dropped	-0.552**	0.200	0.545*	0.584*
	(2.97)	(0.78)	(0.91)		(-1.71)	(0.69)	(3.62)	(2.03)
Occu6	0.314	-0.128	-0.825*	-0.303**	-0.387	0.244	-0.289	0.014
	(1.06)	(-0.46)	(-2.66)	(-1.56)	(-1.44)	(1.01)	(-0.84)	(0.38)
0ccu7	dropped	dropped	0.003**	0.012*	0.099	0.378**	dropped	dropped
			(1.89)	(2.01)	(0.25)	(1.76)		
Occu8	0.722**	-0.270	dropped	-0.021**	0.162	0.195**	0.298**	-0.616*
	(1.71)	(-0.69)		(-1.59)	(0.46)	(1.65)	(1.56)	(-2.01)
Occu9	0.324*	-0.90*	-0.840*	-0.376	dropped	droped	0.037*	-0.105
	(2.22)	(-2.30)	(2.62)	(-0.60)			(6.04)	(-0.37)

Occu10	0.554** (1.69)	0.272 (0.09	-0.609** (-1.84)	-0.333* (-2.55)	-0.347 (-1.10)	-0.183 (-0.06)	-0.137 (0.08)	-0.191 (0.69)
hut1	0.286 (0.89)	-0.111 (-0.37)	0.097 (0.43)	0.518 (0.62)	0.102 (0.67)	0.078 (0.59)	0.049 (0.08)	0.886 (1.08)
hut2	0.392 (1.09)	-0.131 (-0.39)	0.115 (0.43)	0.585 (0.69)	0.127 (0.73)	-0.065 (-0.41)	0.207 (0.33)	0.732 (0.56)
hut4	0.478** (1.46)	0.094* (2.31)	-0.095 (-0.31)	0.575** (1.68)	0.143** (1.89)	-0.272** (1.59)	0.072 (0.12)	0.944** (1.65)
hut5	0.202 (0.36)	-0.613 (-1.18)	dropped	0.045** (1.79)	-0.087 (0.24)	0.204** (1.62)	-0.088** (1.59)	1.387 (0.95)
edu1	-0.331* (-4.27)	-0.216* (-2.98)	-0.256** (-1.50)	-0.192 (-0.52)	-0.360* (-2.67)	-0.080 (-0.66)	-0.219* (3.17)	-0.456* (-13.55)
edu2	-0.391* (-4.32)	-.0206* (-2.43)	-0.245 (-1.41)	-0.271** (-1.87)	-0.258** (-1.73)	-0.084** (-1.63)	-0.179 (0.78)	-0.237* (-4.56)
edu3	dropped	dropped	0.049 (0.27)	0.213* (2.07)	0.124 (0.07)	-0.094** (1.59)	dropped	dropped
edu4	0.033* (2.23)	0.267* (2.02)	dropped	dropped	dropped	dropped	0.88* (6.36)	-0.669 (-0.58)
wat1	-0.180** (-1.50)	0.172 (1.22)	0.189 (1.15)	0.334* (3.63)	-0.226 (-0.75)	-0.072 (-0.27)	0.505** (1.93)	0.180 (0.38)
wat2	-0.204* (-1.97)	0.197** (1.92)	0.159 (0.91)	0.061 (0.56)	-0.152 (-0.50)	0.174 (0.64)	0.268 (1.01)	-0.081 (-0.17)
wat3	-0.454 (-0.29)	0.228** (1.58)	0.304** (1.84)	0.203* (2.24)	-0.227* (-2.76)	-0.016** (-1.67)	0.389** (1.52)	0.010** (1.56)
wat4	-0.748 (-0.50)	0.291* (2.07)	0.282** (1.74)	0.167* (1.96)	-0.140 (-0.48)	-0.047** (-1.78)	0.387** (1.54)	-0.142 (-0.30)
wat5	-0.387 (-0.25)	0.274** (1.92)	0.181 (1.12)	0.071 (0.75)	-0.156** (-1.53)	-0.134 (-0.51)	0.314* (6.55)	-0.122 (-0.26)
wat6	dropped	dropped	0.398* (2.30)	0.007 (0.19)	-0.263 (-0.86)	0.081 (0.77)	0.047 (0.18)	-0.141** (1.73)
wat7	-0.005 (-0.20)	0.411* (2.93)	0.321* (1.95)	0.313* (3.23)	-0.183 (-0.62)	-0.043* (1.98)	0.193 (0.77)	-0.045** (1.77)
wat8	-0.225 (-0.84)	-0.105 (-0.42)	dropped	dropped	dropped	dropped	dropped	dropped
enrolrt	0.231* (2.89)	0.174* (2.33)	0.334* (4.48)	0.095** (1.50)	0.228* (3.39)	-0.068 (-1.13)	0.120* (2.14)	0.176* (4.91)
rooms	0.006** (1.85)	-0.006 (-1.03)	0.024* (2.99)	0.006** (1.73)	0.069* (7.53)	0.028* (3.39)	0.116* (11.77)	-0.025* (-3.41)
rentrt	3.22* (14.87)	0.708* (3.49)	-3.332* (16.38)	-2.556 (-0.66)	-3.99* (-17.03)	2.907* (13.77)	-11.31* (-21.50)	-4.424* (-8.45)
aemp0	-0.004** (1.89)	-0.006* (2.54)	-0.313* (1.94)	0.034* (1.94)	-0.014* (-2.65)	0.034** (1.67)	0.008* (12.25)	0.074* (7.38)
constant	5.593* (8.36)	-0.456 -0.72	No constant	No constant	7.86* (10.62)	0.209* (6.31)	No constant	No constant
Adj. R²	0.400	0.09	0.92	0.82	0.43	0.14	0.95	0.86
Prob (F)	0.000	0.000	0.000	0.000	0.00	0.000	0.000	0.000

Source: Author's Computation

Note: log(ctn) = Log of Consumption

Var(ctn) = Variance of Consumption

t-statistics are in parenthesis.

*= coefficient significant at 1% level

**= coefficient significant at 5% level

Table 7B: Model for the Estimation of Vulnerability to Poverty

Zone3					Zone4			
Variable	OLS		FGLS		OLS		FGLS	
	log(ctn)	Var(ctn)	log(ctn)	Var(ctn)	log(ctn)	Var(ctn)	log(ctn)	Var(ctn)
age	0.015*	0.001	0.116**	0.162*	0.002**	0.006	0.162*	0.022**
	(2.29)	(0.14)	(1.75)	(5.87)	(1.62)	(0.78)	(2.56)	(1.69)
sqage	-0.001*	-0.007	-0.001	-0.006	0.012	-0.0006	-0.023**	-0.001
	(-1.96)	(-0.17)	(-0.84)	(0.36)	(0.03)	(-0.75)	(-1.62)	(-0.21)
hhs	-0.126*	0.003	dropped	dropped	-0.151*	-0.017	Dropped	-0.165*
	(-5.70)	(0.15)			(-5.75)	(-0.67)		(-7.35)
achild	0.003*	0.016**	dropped	0.065*	0.036	0.013	0.063*	0.049*
	(6.04)	(1.82)		(8.24)	(1.35)	(0.47)	(3.17)	(2.17)
wives	-0.167	-0.006**	dropped	dropped	-0.039	0.212	0.012	0.035
	(-0.46)	(1.65)			(-0.87)	(0.50)	(0.46)	(0.93)
male	0.130*	-0.084*	0.086*	1.739*	0.208*	-0.099**	0.215*	0.193*
	(3.32)	(-2.10)	(2.31)	(16.56)	(3.75)	(-1.82)	(6.13)	(3.61)
sec2	-0.054	-0.082**	0.050**	1.539	0.097*	0.062	0.091*	7.375*
	(-0.99)	(1.92)	(1.56)	(3.46)	(1.95)	(1.25)	(2.68)	(12.67)
Occu1	-0.323	0.171	0.141	2.115	-0.368*	-0.114	0.155	-0.357**
	(-1.28)	(0.14)	(2.15)	(0.05)	(-1.70)	(-0.54)	(0.52)	(1.67)
Occu3	-0.456**	0.037	-0.196	4.169*	-0.273	-0.079**	0.073	-0.315**
	(-1.77)	(0.26)	(0.57)	(8.25)	(-1.25)	(1.68)	(0.25)	(-1.63)
Occu4	-0.492*	0.092	0.010**	0.618	-0.251	-0.123	0.028*	-0.257**
	(-1.98)	(0.36)	(1.79)	(0.69)	(-1.21)	(-0.61)	(2.11)	(-1.68)
Occu5	-0.381	0.109**	0.067	0.862	dropped	0.115	dropped	dropped
	(-1.34)	(1.64)	(0.56)	(0.36)		(0.87)		
Occu6	-0.423**	0.097*	dropped	dropped	-0.203	0.019	0.019*	-0.235**
	(-1.71)	(2.35)			(-0.97)	(0.09)	(4.12)	(-1.73)
0ccu7	-0.957*	0.143**	0.122**	0.038**	-0.450*	-0.171**	0.027	-0.224**
	(-3.28)	(1.56)	(1.65)	(1.62)	(-2.03)	(1.56)	(0.56)	(-1.91)
Occu8	-0.570*	-0.287	0.070**	0.098*	-0.178	-0.135**	0.108*	0.237*
	(-2.03)	(-0.10)	(1.61)	(3.26)	(-0.80)	(-1.74)	(4.71)	(5.42)
Occu9	-0.523*	0.048	-0.046	-0.135	-0.250	-0.250*	-0.091	0.322*
	(1.99)	(0.18)	(-0.70)	(-0.64)	(-1.06)	(-2.08)	(1.31)	(5.09)
Occu10	-0.163	0.292*	0.136**	0.379	-0.164	-0.169	-0.095**	-0.237
	(-0.62)	(12.65)	(1.69)	(1.23)	(-0.76)	(-0.79)	(1.73)	(-1.02)
hut1	-0.078	0.026	-0.064**	0.168**	0.413*	-0.075**	0.318*	0.401*
	(-0.35)	(0.12)	(-1.73)	(1.57)	2.68	(1.66)	(5.56)	(2.36)
hut2	0.116	0.071	dropped	dropped	0.686*	-0.047	0.271*	0.683*
	(0.50)	(0.30)			(3.96)	(-0.28)	(4.72)	(3.61)
hut4	-0.772**	-0.023*	-0.091**	0.499*	0.541*	-0.052**	0.466**	0.558*
	(1.56)	(2.31)	(-1.56)	(2.27)	(3.47)	(-1.57)	(1.63)	(3.27)
hut5	0.006**	0.128*	-0.110**	0.145	0.812**	-0.503	0.271	dropped
	(1.72)	(4.56)	(1.77)	(0.67)	(1.18)	(-0.74)	(0.57)	
edu1	-0.128	0.014	0.027	.0.175	-0.319*	-0.512	dropped	-0.276*
	(-6.72)	(0.19)	(0.66)	(0.69)	(-3.81)	(-0.63)		(-3.35)
edu2	0.004	-0.059	0.009	-0.252**	-0.090	-0.048	-0.055**	-0.047**
	(0.06)	(-0.81)	(0.35)	(1.55)	(-1.05)	(-0.59)	(-1.56)	(-1.56)
edu3	0.111**	-0.022*	dropped	dropped	-0.027	0.076*	0.087*	-0.001*
	(1.48)	(9.97)			(-0.32)	(3.03)	(2.17)	(-1.67)
edu4	dropped	dropped	0.321*	0.258*	dropped	dropped	0.031**	dropped
			(2.33)	(16.77)			(1.75)	
wat1	-0.041	0.169**	dropped	0.080	0.042	-0.101	0.039	0.117
	(-0.34)	(1.68)		(0.64)	(0.26)	(-0.62)	(0.72)	(0.62)

wat2	-0.089** (-1.63)	0.350* (2.40)	0.157 (1.21)	dropped	-0.035 (-0.14)	-0.313** (-1.62)	-0.224* (-3.08)	0.026** (1.54)
wat3	-0.006 (-0.04)	0.189 (1.36)	0.084 (1.02)	-0.097 (-0.46)	-0.151** (-1.90)	-0.232** (1.87)	0.154 (0.35)	-0.075 (-0.40)
wat4	0.143 (-1.06)	0.052 (0.38)	-0.063 (-1.23)	-0.795* (-1.71)	0.555** (1.61)	-0.312** (-1.82)	0.137* (2.06)	0.172** (1.61)
wat5	-0.166 (-1.37)	0.181** (1.54)	0.131* (2.58)	-0.796 (0.87)	-0.090 (-0.53)	-0.084 (-0.50)	0.162** (2.15)	-0.007 (-0.40)
wat6	dropped	dropped	-0.056** (1.71)	-1.139* (-2.63)	dropped	dropped	0.132 (0.54)	dropped
wat7	-0.158 (-1.34)	0.126 (1.05)	0.002 (0.06)	0.427* (14.47)	-0.036* (6.31)	-0.226 (-1.40)	dropped	0.065 (1.21)
wat8	0.503* (2.29)	0.060 (.27)	-0.233** (-1.87)	2.010* (7.75)	-0.162* (5.56)	-0.405* (-1.93)	-0.084* (-3.21)	-0.129* (2.09)
enrolrt	-0.174** (-1.78)	-0.064 (-0.64)	dropped	dropped	0.289* (2.44)	0.248* (2.14)	dropped	0.325* (2.91)
rooms	0.010** (1.82)	-0.010** (-1.76)	dropped	dropped	0.034* (3.59)	-0.013 (1.43)	dropped	0.029* (3.39)
rentrt	-2.955* (-18.07)	1.230* (7.35)	dropped	dropped	-3.585* (-18.11)	-0.584* (-3.00)	dropped	-3.569* (-18.33)
aemp0	0.017 (0.98)	-0.028** (-1.51)	dropped	dropped	0.081* (3.13)	-0.284 (1.17)	-0.010** (-1.69)	-0.124** (-1.54)
constant	7.130* (9.09)	5.144* (18.96)	dropped	dropped	6.332* (10.54)	19.117* (2.08)	No constant	No constant
Adj. R^2	0.89	0.04	0.33	0.03	0.44	0.02	0.39	0.19
Prob (F)	0.000	0.000	0.000	0.000	0.00	0.000	0.000	0.000

Source: Author's Computation

Note: log(ctn) = Log of Consumption

Var(ctn) = Variance of Consumption

t-statistics are in parenthesis.

*= coefficient significant at 1% level

**= coefficient significant at 5% level

5 Conclusion and Recommendation

The paper implements a new methodology to investigate vulnerability using cross-sectional data in Nigeria. Vulnerability is defined as the ex-ante risk of being poor next year ahead. The findings from the study suggest that most poverty and vulnerability arises as a result of chronic rather than transient conditions in Nigeria. Thus, while 68% of the Nigerian population is poor, the majority of these (61%) are chronically poor (41.2% of the population). Our findings further show that more than one-third of the population is transitorily poor i.e. 26.9% of the total population. In a similar vein, 68.5% of the Nigerian population is estimated to be vulnerable to poverty in the future. The findings from the study also show that vulnerability is dominated by low expected mean consumption (LM vulnerability) accounting for 87% of total vulnerability (or 59.5% of the total population) and only one-quarter accounted for by high volatility of consumption (or 11% of the total population).

In terms of sources of vulnerability, our findings show that geography or sector and zone of residence are important factors in the explanation of vulnerability in Nigeria. The study shows that those in the rural areas are more vulnerable than those in the urban centres. The study also shows that the northern zone of the country is more adversely affected by vulnerability than the southern zone. It is also demonstrated in the study that human capital (education) is an important source of vulnerability in Nigeria. The study shows hat vulnerability tends to diminish as we move up the education ladder. The type of employment that one embarks upon is another major source of vulnerability. Our findings show that those employed in the agriculture and forestry industry have the highest proportion of chronic poverty. It is further revealed that those in the production and transport industry as well as forestry and agriculture are the most vulnerable groups in Nigeria.

Our estimated regression results also show that human capital (education) and social infrastructure (number of rooms in building, water system, type of building materials, etc.) are important factors explaining welfare in Nigeria. Equally important in the explanation of welfare is the rate of students' enrolment in Nigeria.

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