

POVERTY DYNAMICS

Abena D. Oduro
Centre for Policy Analysis
Accra, Ghana
Email: abena@cepa.org.gh

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1.0 Introduction

Poverty analysis in Africa has tended to focus on poverty at a point in time or else on poverty trends, i.e. changes in the incidence, depth and severity of poverty over time. There has been very little in the way of analysing poverty dynamics, i.e. investigating the welfare movements of a set of households or individuals over time. This is largely because of the paucity of the type of survey data needed for this kind of analysis. Analysis of movements of a household's welfare over time will provide useful insights into what determines movements into and out of poverty and why some households remain poor. It is agreed that the poor are a heterogeneous group. Using static welfare analysis based on cross-section data, the poor can be differentiated on the basis of how far their consumption expenditure or income lies below the poverty line, and/or on the basis of gender, educational attainment, ownership of assets or occupation type. Poverty dynamics provide an additional dimension to the nature of poverty in a country. Some households that may be observed to be below the poverty line at a point in time when cross-section data is used may only be temporarily poor. A negative shock, for example, illness of a major income earner in the household may have caused the income or consumption expenditure of the household to fall below its average level and therefore take it below the poverty line. Being able to distinguish the transient from the chronic poor will help sharpen the focus of the poverty profile.

Evidence from research on welfare mobility in other regions (for example Jalan and Ravallion, 2000) finds that the determinants of persistent or chronic poverty are different from the determinants of transient or temporary poverty. Such information would be useful in the design of poverty reduction strategies for Africa. This type of information would be useful in determining the target group for safety net programmes. It would assist in making decisions regarding how resources are to be allocated between safety net programmes and programmes dealing with chronic poverty. A decomposition of poverty into its transient and chronic components for

households in Pakistan found that transitory poverty dominated (McCulloch and Baulch, 2000). Simulations were conducted to find out what the effect of income smoothing measures and increases in mean income would have on poverty reduction. It was found that income-smoothing measures would have a greater effect on poverty reduction than would an increase in mean incomes because of the large transitory component in total poverty (McCulloch and Baulch, 2000).

2.0 Defining Chronic and Transient Poverty

Analysis of poverty dynamics involves tracking households or individuals over a period of time. Ideally to analyse poverty dynamics a longitudinal data set is required. Yaqub (2001) outlines the different types of longitudinal data sets that can be used. These are:

- Household panel data
- Individual panel data
- Paper trail data sets that use administrative records to reconstruct longitudinal information
- Retrospective data sets in which people recall their ancestor's or past welfare
- Cohort studies
- Village studies
- Life histories of small samples

Although several African countries have conducted more than one household survey, very few have a longitudinal component (See Table 1 for a summary of longitudinal data sets in Africa). Some of the participatory poverty assessments touch on the issue of poverty over a period of time. However, these studies do not usually provide enough information for a detailed analysis of poverty dynamics.

Table 1. Longitudinal Data Sets in Africa

Country	Years covered	No. of data points	Sample size
Ghana	1987/88-1988/89	2	1600 households
Cote d'Ivoire	1985-1986, 1986-1987, 1987-1988	2 data points for each of the three sets of years	700 households
Egypt	1977-1999	2	347 households
Ethiopia	1994-1995	3	1411 households
Uganda	1992/93 – 1995/96	2	818 households
	1992/93 – 1995/96	4	344 households
	1992/93 – 1999/00	2	
Kwazulu-Natal, South Africa	1993-1998	2	1200 households
Source: Table prepared by the author			

Chronic poverty may be described as the state of being poor over an extended period of time. The transient poor are those who move in and out of poverty during the period being investigated. This definition raises several issues. The first is the definition of being poor. It is accepted that poverty is a multidimensional phenomenon and is more than having a consumption expenditure or income level below a prescribed minimum. The second issue is how long an individual or household should exist in a state of poverty to be described as being in transient or chronic poverty. This question has been answered in different ways by different researchers.

Jalan and Ravallion (2000, p. 83) define transient poverty as “the contribution of consumption variability over time to expected consumption poverty.” Chronic poverty is the “poverty that remains when inter-temporal variability in consumption has been smoothed out.” They identify three categories of poor households. The first group is persistently poor, i.e. households that are poor at every date for which data is available. The second category does not have a consumption level below the poverty line at every date, but the average consumption is below the poverty line. This group is defined as chronic poor. The third comprises of the transitory poor who have an average consumption level above the poverty line but who are poor sometimes. Thus Jalan and Ravallion use a combination of time spent with income or consumption

levels below the poverty line and the relationship between mean consumption and the poverty line to differentiate transient from non-transient poverty.

Murdoch (1994) examines the reasons why households in developing countries may move in and out of poverty and introduces the concepts of stochastic poverty and structural poverty. In many developing countries households may become transient poor because they are unable to protect themselves against stochastic events such as weather changes and price shocks. Thus stochastic poverty occurs when the household's current income is below the poverty line and its permanent income is above the poverty line. Structural poverty occurs when a household moves into poverty because of changes in the structural characteristics of the household, for example the birth of a child or the death of an income earning family member. When a household experiences an event that erodes its asset base or the fundamental income earning capacity that household will become chronic poor because both current and permanent income or consumption expenditure will fall below the poverty line. Thus in discussing the persistence of poverty Murdoch (1994) does not focus on the length of time that the household is poor but on the relationship between the household's current income, permanent income and the poverty line.

Carter and May (1999) develop a typology of poverty similar to that developed by Murdoch (1994). They present a typology of transitory and chronic poverty based on the nature of the shocks that the household faces. Two types of shocks are identified. Stochastic shocks cause consumption expenditures to temporarily diverge from expected consumption given the household's assets and entitlements. Structural shocks permanently affect the asset base and entitlements of the household. They identify two groups of transitory poor: those that are poor because of stochastic shocks that temporarily push their consumption expenditures below the poverty line and those that are poor but are able to build up their asset base so that in the next period they become non-poor. The chronic poor consist of those households that have a low level of assets and are unable to build upon their asset base to levels that will move them out of poverty.

Transitory poverty occurs because of the failure of households to smooth their consumption expenditures. This is largely a reflection of non-existent or poorly functioning credit markets and can arise because of the weakness of the social capital of poor households. Chronic poverty on the other hand may arise due to the structural characteristics of the household and this can be aggravated by poorly functioning insurance and credit systems.

2.1. Measuring Chronic and Transient Poverty

Different methods have been used to measure and identify chronic and transient poverty. Most methods require longitudinal data sets. Recently methodologies have been developed to address the issues of vulnerability and chronic poverty using cross-section data sets. These methodologies will be discussed below.

2.1.1 The Spells Approach

This requires a panel data set. It involves identifying the poverty status of households in the different time periods under investigation. A tool used for this type of analysis is the transition matrix. The transition matrix provides information on the proportion or number that move from state i to state j . The rows of the matrix add up to unity or 100%. The transition matrix can be subdivided on the basis of deciles, quintiles or with respect to the poverty line (See tables 2 and 3 for examples of transition matrices from Egypt and Ethiopia). All the studies on Africa that are available to this author have adopted this approach as part of their analysis of poverty dynamics.

Table 2. An Example of a Transition Matrix using the Poverty Line: Egypt

Households with per capita consumption in 1997	Households with per capita consumption in 1999			
	Below z	Between z and 2z	Above 2z	Total
Below z	66	20	2	88
Between z and 2z	43	78	29	150
Above 2z	6	40	63	109

z is per capita consumption corresponding to the poverty line.

Source: Haddad, L. and A.U. Ahmed (2002) **Avoiding Chronic and Transitory Poverty: Evidence from Egypt, 1997-99** Food Consumption and Nutrition Division Discussion Paper No. 133, IFPRI, Washington D.C.

Table 3. An Example of a Transition Matrix Using Expenditure Quintiles: Ethiopia

Expenditure Quintiles 1994a (from lowest to highest)	Expenditure Quintiles 1995 (from lowest to highest)					Row Sum
	1	2	3	4	5	
1	48	26	15	4	8	100
2	28	25	21	14	13	100
3	11	24	22	29	16	100
4	8	18	26	28	21	100
5	6	9	18	27	42	100

Source : Dercon and Krishnan (2000).

A significant proportion of the poor in the studies are transient poor (Table 4). In Egypt about 52% of the poor were transient poor, i.e. they had per capita consumption levels below the poverty line in one of the two years for which data was available. The percentage in the Kwazulu-Natal study is higher at 57%. In Pakistan although 58% of the households had experienced income levels below the poverty line at some time during a five-year period, a significantly smaller proportion, i.e. 3% were poor in all the five years (McCulloch and Baulch, 2000).

Table 4. A Summary of Transition Matrices Using African Data Sets

Author	Country	Length of Period and number of data points	% Chronic	% Transient	% Non-Poor
Grootaert and Kanbur (1995)	Cote d'Ivoire	2 years; 2 data points	14.5	20.2	65.3
		2 years; 2 data points	13.0	22.9	64.1
		2 years; 2 data points	25.0	22.0	53.0
Haddad and Ahmed (2002)	Egypt	2 years; 2 data points	19.0	20.0	61.0
Dercon and Krishnan (2000)	Ethiopia	12mths; 2 data points	24.8	30.1	45.1
		5mths; 2 data points	22.1	29.0	49.0
		6mths; 2 data points	20.0	30.4	49.6
Okidi and Mugambe (2002)	Uganda	4 years; 2 data points	23.76	20.24	56
		4 years; 4 data points	13.00	57.00	30
Carter and May (1999)	Kwazulu-Natal, South Africa	5 years; 2 data points	22.3	30.7	47.0

Notes: chronic poor households are those households that were found to have welfare measures below the poverty line in all the years for which data is available.

Source: Table compiled by the author.

The Ethiopia and Uganda studies are particularly interesting studies. The Ethiopia study has a shorter period coverage than do the others and the households are visited three times during the period (Table 4). Thus the Ethiopia study is able to capture the effect of seasonality on poverty and therefore intra-year variability of poverty. This is particularly relevant for rural farming communities. The Uganda sample is interesting because it has two sets of households (Table 4). The first sample comprises of over 800 households and the information is available for two separate years. The second sample constitutes a smaller sample of households, however the information is available for these households for every year for four years. Comparison of the two Uganda results needs to be made with the caveat that the sample size is different. However what the comparison does suggest is that tracking households from one year

to the next can reveal a higher incidence of transient poverty compared to when the poverty status at two points in time is compared. In semi-arid rural India a nine-year panel of households found that approximately 22% of the households were always poor during the nine years, 12.4% were never poor and approximately 65% were sometimes poor (Gaiha and Deolalikar (1993). Comparing the poverty status of households at two points in time does not capture information on movements that may have taken place in the intervening period.

The transition matrix provides information on the extent of mobility of the various categories of households. In the Kwazulu-Natal data set 17.7% of households with expenditure levels less than half of the poverty line, i.e. the ultra-poor or extreme poor, remain poor. Approximately half of the extreme poor move to higher expenditure levels but still remain below the poverty line. Approximately a third of the ultra-poor are able to move to consumption levels above the poverty line (Carter and May, 1999). In the Ethiopian data set about a third of the households remain within the same consumption expenditure quintile from one year to the next (Dercon and Krishnan, 2000). There is relatively less movement in households found at the extreme end of the distribution compared to households found in the middle of the distribution. This is a phenomenon evident in the South African and Ethiopian data sets (Carter and May, 1999, Dercon and Krishnan, 2000). In the six-month period between the first two Ethiopian surveys, 41% of the households remain in the first quintile and 42% of households remain in the fifth quintile. The pattern is not much different when movements during a twelve-month period are compared (Table 3).

In both Uganda and Kwazulu-Natal approximately 30% of the ultra-poor households moved out of poverty. In Uganda it was found that the closer is the household's consumption expenditure to the poverty line, the greater was the likelihood that it would move out of poverty (Okidi and Mugambe, 2002). However, in the Uganda sample there was no clear relationship between the distance a household's consumption expenditure was below the poverty line and how far the household was able to move. The evidence on mobility suggests that when longitudinal data is not

available it is not appropriate to discuss chronic poor using the extreme poor or ultra-poor as a proxy.

The information contained in the transition matrix can be used to estimate mobility indices. One such index is the Shorrocks mobility index (See Text Box 1).

Text Box 1. The Shorrocks Mobility Index¹

The mobility index, M for a transition matrix P is given by

$$M(P) = \frac{n - \text{trace}P}{n - 1}$$

where

trace P is the trace of the transition matrix P

n is the number of states, for example quintiles or deciles

The index is normalised to take a value of between 0 and 1 by dividing it by $\frac{n}{n-1}$

The closer is the Shorrocks mobility index to 1 the higher is mobility.

1. Shorrocks, A. F. (1978) "The Measurement of Mobility" **Econometrica** Vol. 45, No. 5 pp.1013-1024.

The spells approach to poverty dynamics provides some useful insights, however some caveats are in order. Classification of a household as transient or chronic poor is sensitive to where the poverty line is drawn. The higher is the poverty line, the greater will be the incidence of chronic poverty. Classification is also sensitive to the welfare measure that is used. The income measure of welfare tends to have more variability than does consumption expenditure because of the possibilities of consumption smoothing. Thus if income is the welfare measure, more households may be classified as transient poor compared to if the consumption measure is used. It is well known that estimating the welfare measure is not without problems, for example the recall errors, problems associated with estimating the value of own consumption or the value of income from self-employment. Measurement errors can increase the incidence of transient poverty. In the Cote d'Ivoire panel data sets Gamanou and Murdoch (2002) find data patterns suggestive of measurement errors in the base period that overestimate the consumption expenditure of the non-poor and

underestimate it for the poor. The accounting period for the analysis is also important. The longer is the time span between different observation points, the higher is the incidence of transient poverty. A shortcoming of the spells approach that compares separate points in time is it does not provide information on what happens during the intervening years. Thus households that may have been classified as chronic poor by comparing two different data points could be classified as transient poor if information is available for the intervening period. Even when information is available for a stretch of years, information is lacking with respect to what happens prior to and in the years following the end of the investigation. A household that may be described as transient poor may actually be starting a long spell of poverty that is not captured in the study. Finally a problem with panel data sets is that they may become unrepresentative because of attrition. Some households may move away over time or else may refuse to participate. In Uganda, Deininger and Okidi (2002) find that the pattern of attrition was non-random, suggesting that their sample was not representative. In the Cote d'Ivoire panel there was an attrition level of 10-15%. Households that had dropped out of the panel tended to have higher per capita expenditure levels than those that had remained (Grootaert, Kanbur and Oh, 1997).

2.1.2 The Components Approach

The components approach to identifying chronic and transient is based largely on the concept of permanent consumption or income. Different methods have been adopted.

Gaiha and Deolalikar (1993) identify two kinds of poverty, i.e. expected poverty and innate poverty. Expected poverty is defined as expected income or consumption that falls below the poverty line. Expected income is predicted from a reduced-form income or consumption equation. A household with expected or predicted income below the poverty line may be described as chronic poor since the predicted income or consumption is purged of random shocks. It therefore identifies those households that are likely to remain poor on average. In addition to expected poverty, Gaiha and Deolalikar (1993) define innate poverty. Households with innate poverty are poor because of innate characteristics that cannot easily be changed in the short or

medium-term. These households are likely to remain poor even within the context of a redistribution of assets. To estimate innate poverty a panel data set is required. Estimation of innate poverty controls for random shocks to income or consumption and allows for the time varying household characteristics such as ownership of assets to be fixed at sample mean values.

Jalan and Ravallion (2000) decompose household poverty into chronic and transient components using panel data. A household is in chronic poverty when its inter-temporal mean consumption is below the poverty line. Jalan and Ravallion also present a method to decompose individual poverty into its chronic and transient components. Transient poverty is the difference between total poverty and chronic poverty and measures the contribution of consumption variability over time (See Box 2).

Haddad and Ahmed (2002) apply this methodology to Egyptian data. They find that chronic poverty forms a large component of total poverty ranging between 50% and 73%. Amongst rural households in Ethiopia, Dercon and Krishnan (2000) find that chronic poverty constitutes between 60% and 90% of the poverty gap. In Pakistan a substantial proportion of the poverty of households (as measured by the squared poverty gap) comprises of transitory poverty even after correction for measurement errors (Baulch and McCulloch, 2000).

2.1.2.1. Measuring Chronic and Transient Poverty using Cross-section data

In recent years researchers have developed methodologies to investigate the incidence of chronic and transient poverty using cross-sectional data. Unfortunately, these data sets do not provide information to conduct an analysis of the determinants of movements in and out of poverty. However, these methodologies are an important first step in drawing policy makers' attention to the phenomenon of chronic and transient poverty.

Box 2. Estimating Jalan and Ravallion's Chronic and Transient Components of Poverty

Household poverty during a period of time T is given by

$$P_{\alpha} = P(y_{i1}, y_{i2}, \dots, y_{iT})$$

where

y_i is a measure of household i's welfare

P_{α} is the welfare measure

Total poverty over the period is measured as the inter-temporal mean of the poverty measure.

$$\bar{P}_{\alpha} = \frac{1}{T} \sum P_{\alpha}$$

where

P_{α} is the mean of the Foster-Greer-Thorbecke measure of total poverty. Jalan and Ravallion (2002) set α equal to 2, i.e. the poverty measure is the squared poverty gap.

T is the number of years

Chronic poverty is measured as:

$$P_{\alpha}^* = \sum_{i=1}^{m^*} \left(\frac{z - \bar{y}_i}{z} \right)^{\alpha} / n$$

Where

z is the poverty line

\bar{y}_i is the mean consumption expenditure of household i

m^* is the number of households below the poverty line

n is the number of households in the sample

P_{α}^* is the measure of chronic poverty for the household

Transient poverty is given by $\bar{P}_{\alpha} - P_{\alpha}^*$

Source: Ravallion (1988)

Gibson (2001) develops a method to measure chronic poverty by making use of the information obtained from the sampling procedures of the cross-sectional household survey. What is required is that a subset of the surveyed households has a repeat observation made on their welfare indicator some time after the initial observation as

part of the conduct of the survey. In several household surveys, households are visited more than once in order to obtain data on expenditure on food and non-food items that are purchased frequently. This information is then used to extrapolate data on annual expenditures (See Box 3 for an example from Ghana).

Box 3.

Estimating Food Consumption Expenditure in Ghana's Household Surveys.

In the collection of data for the third household survey conducted in 1991/92, information on food expenditure for each household was collected using seven recalls at two-day intervals in rural areas and ten recalls at 3 day intervals in urban areas. In the case of data collection on food expenditure in the fourth household survey conducted in 1998/9, the number of recall periods was standardised at five across all regions with a recall period of 5 days. This estimate of annual food expenditure is calculated without the enumerator's first visit which is unbounded and seen as less precise compared to the other bounded recall periods. The individual amounts recorded were summed across the period for each food item and then scaled up by 365/27 (GLSS3, urban), 365/12 (GLSS3, rural) or 365/20 (GLSS 4). These annual estimates were then summed across all food items to get the estimate of the household's annual expenditure on food.

Source: Ghana Statistical Service (2000) **The Estimation of Components of Household Income and Expenditure. A Methodological Guide based on the Ghana Living Standards Survey, 1991/92 and 1998/99.** Accra

The repeat observations on household expenditure provide information with which to estimate the variation in household expenditure over time. Gibson states that “the within-year fluctuations in household expenditures represent transient poverty rather than random noise. Hence the adjusted estimates of annual expenditures that remove this component are suitable for the measurement of chronic poverty” (Gibson , 2001 p. 245). It is expensive to monitor a household's expenditure throughout the entire year in order to obtain information on annual expenditure of frequent purchases. In many household surveys information on frequent expenditures is collected over a short period of time and an extrapolation of annual estimates is made (See Box 3 for the example of food expenditures in Ghana). The variance of extrapolated annual

expenditures will be larger than the variance of annual expenditures that is estimated from data collected from households that are observed regularly over a whole year. This is because the variance calculated from extrapolated expenditure, as in the Ghanaian example, includes the effect of shocks that happen during the short observation period and which are replicated (by the extrapolation) over the rest of the year. Gibson shows that the variance of extrapolated expenditure will equal the true variance only if expenditures of the same household in every pair of observations over time are perfectly correlated. He derives an expression that can be used to adjust the estimated variance in extrapolated expenditure for a household over the year to be equal to what would have been obtained if the household had been observed for a full year. The adjustment to the variance of extrapolated annual expenditure estimates removes the component that is due to within-year fluctuations in expenditure that contribute to transient poverty. Thus:

$$x_{i,A}^{e*} = (x_{it} - \bar{x}_n) \sqrt{A + 2B\bar{r}} + A\bar{x}_n$$

where,

$x_{i,A}^{e*}$ is the adjusted annual expenditure of household i per adult equivalent

x_{it} is expenditure per adult equivalent for household i during period t

\bar{x}_n is the mean annual expenditure per adult equivalent for the recall period

n is the recall period, for example 14 days

$\sqrt{A + 2B\bar{r}}$ is the adjustment to the variance

where

A is the frequency with which data would have been collected if the household had been observed at regular intervals throughout the year. Therefore if data were collected fortnightly, A would be equal to 26.

B is the maximum number of pair-wise correlation coefficients between the same household's expenditures in the year. Thus if data was collected every fortnight over the year B would be equal to 325.

\bar{r} is the mean correlation coefficient between two observations of consumption expenditure for the same household.

The measure of adjusted expenditures does not take into account infrequent expenditures. These are taken care of by the inclusion of an additive term for this group of expenditures.

$$x_{i,A}^{e*} = (x_{it} - \bar{x}_n) \sqrt{A + 2B\bar{r}} + A\bar{x}_n + AP_i$$

where

AP_i is the i th household's annual expenditure per adult equivalent on items that are purchased infrequently.

The adjusted expenditure is the welfare measure that is used to measure chronic poverty. Total poverty is measured using the extrapolated annual expenditures and includes the effects of within year expenditure fluctuations. Using data for Papua New Guinea, Gibson estimates a headcount index of chronic poverty of 0.15 and this is equivalent to 49.4% of the total poverty. He finds that the percentage of total poverty that is chronic poverty is higher amongst urban households compared to rural households.

The spells approach and components approach do not yield the same grouping of households on the basis of chronic and transient poverty. Using the transition matrix, a lower proportion of Ethiopian households are chronic poor (i.e. poor in the two periods for which data is available) compared to the proportion obtained when the Jalan and Ravallion definition of chronic poverty is applied, i.e. households with inter-temporal mean consumption expenditure below the poverty line (Dercon and Krishnan, 2000). In rural India where the nine-year panel makes possible the tracking of household poverty for each year, Gaiha and Delollikar (1993) find that only 34% of the expected poor and 33% of the innately poor are poor in each of the 9 years. The reason for the difference is because the components approach defines as chronic poor households that may not have welfare measures below the poverty line every year,

but whose mean welfare measure lies below the poverty line. Thus it captures households that may be described as transient poor using the transition matrix.

Suryahadi and Sumarto (2001) using cross-section data identify a household experiencing chronic poverty as one that has current and expected consumption expenditure or income below the poverty line. The transient poor “are the poor who have expected consumption levels above the poverty line.” (p. 6). Expected or predicted consumption is obtained using a three-step feasible generalized least square procedure (See Text Box 4 for a discussion of this procedure).

3.0 Characteristics of Chronic Poverty

The evidence reviewed on African studies and studies from other countries reveal that there is a significant group of the poor at point in time who are not poor all the time. This raises several questions. What causes people and/or households to move in and out of poverty? Why are some individuals or households not able to move out of poverty? What are the characteristics of the transient and the chronic poor? Answers to these questions provide important inputs for the design of poverty reduction strategies. In Pakistan, McCulloch and Baulch (2000) find that income smoothing measures have a greater effort on poverty reduction than do measures that raise mean income. This is because there is a large transient component in the poverty of households.

Some of the African studies have attempted to identify the correlates of chronic poverty and the factors that cause changes in welfare over time.

Chronic Poverty and Employment The Uganda study that tracked 344 households each year for four years found that 70% of the households that were persistently poor during the period were self-employed in agriculture. Households that were non-poor in all four years were headed by individuals distributed almost evenly amongst the

various employment categories, although the largest incidence was amongst households headed by persons who had changed the sector of activity (Okidi and Magomba, 2002). In Kwazulu-Natal, South Africa, marginalised households, i.e. households that have no access to wages or remittances from the formal sector and have no access to welfare transfers registered the smallest proportion of households that moved from a poor to a non-poor status, (upward mobility). The households with the lowest incidence of downward mobility, i.e. movement from being non-poor to poor, were those households that have access to wages earned by people living at home and employed in the primary labour market and high income earning households (Carter and May, 1999). Households that earned income from the secondary labour market that is characterised by limited security, skill requirements or opportunities for vertical mobility had a higher tendency to experience a movement downward mobility than did households involved in primary activities.

Chronic Poverty and Location There is a correlation between the incidence of chronic poverty and location. In Egypt 65% of the chronic poor households were rural households. There was an almost even split amongst rural households between those in transient and chronic poverty. This contrasts with the urban sample in which households in transient poverty constituted the majority (Haddad and Ahmed, 2002). In Uganda, comparing the poverty status of households between two years, a larger proportion of urban households, i.e. 61% were classified non-poor in 1996 whilst 39% of rural households were so classified. At the other end of the spectrum 86% of urban households were able to maintain their non-poor classification between 1992 and 1996 compared to 66% of the rural households (Okidi and Magomba, 2002).

Chronic Poverty and Gender of the Household Head The relationship between gender of the household and chronic poverty is mixed. This is not surprising since the group of female-headed households is not homogenous. Households may be female headed for a variety of reasons that can be beneficial or adverse for their welfare. In the Kwazulu-Natal survey chronic poor households were more likely to be headed by women. In Indonesia on the other hand, the proportion of households headed by

women that were classified as chronic poor in both 1996 and 1999 was lower than that of men (Suryahadi and Sumarto, 2001).

Using Multivariate Analysis Jalan and Ravallion (2000) found for rural China that the determinants of chronic poverty are similar to the determinants of total poverty but different from the determinants of transient poverty. Using an identical methodology, Haddad and Ahmed (2002) arrive at similar conclusions for Egypt. The variables found to be significant correlates with chronic poverty in that study are the household size, the number of children in the household, the age of the household head, the area of land under cultivation, value of livestock and involvement in non-farm activities, i.e. manufacturing and recreation sectors. The number of pensioners in the household was positively correlated with transient poverty. There was a positive relationship between transient poverty and the area of land that was cultivated.

Deininger and Okidi (2002) run a multinomial logit on the likelihood of falling into and moving out of poverty. An identical set of variables was significant for the two sets of regressions, with the expected signs. There were two exceptions however. Access to electricity was significant in reducing the likelihood of falling into poverty, whilst having health problems increased the likelihood of falling into poverty.

4.0 Vulnerability

It is important that in defining and measuring vulnerability there is a benchmark. Vulnerability has to be with respect to something. If a benchmark is not specified it becomes difficult to operationalise and identify which individuals, households, communities or countries are vulnerable¹. For the purposes of the present discussion the focus is on vulnerability to poverty. We know however that poverty is a

¹ Vulnerability may be discussed at the micro, meso, macro and global levels. The focus of the present discussion will be on vulnerability at the micro level, in particular on households and individuals.

multidimensional concept, so that it is important to be clear about what aspect of poverty vulnerability is being assessed. Thus one may have vulnerability to consumption expenditures or income falling below a critical threshold, i.e. the poverty line. Alternatively vulnerability to poverty may be assessed in terms of infant mortality rate in a community rising above a critical level or the number of days lost to illness for an individual rising above a minimum level.

Sinha and Lipton (1999) identify a set of events that they describe as damaging fluctuations that will increase the probability of consumption expenditures or income falling below the poverty line. These are:

- Disease or injury
- Violence, i.e. domestic, criminal or war related
- Natural disasters
- Terms of trade deterioration
- Reduced access to productive income or work.

This list is not inexhaustible but presents what they consider the most frequent occurring damaging fluctuations².

Vulnerability has been conceptualised by some researchers as having two dimensions, i.e. sensitivity and resilience. Sensitivity is the magnitude of a household, individual, community or country's response to an external event (Bayliss-Smith, 1991). The second dimension, resilience, is the ease and rapidity of recovery. This conceptualisation of vulnerability focuses on the response to the damaging fluctuation with little emphasis on the risk of the event happening and the factors that might expose the household or individual to the risk especially if is an idiosyncratic event.

Alwang and Siegel (2000) provide a much broader conceptualisation of vulnerability that incorporates the concepts of sensitivity and resilience. Vulnerability has four components. These are risk, exposure, response and outcome (Alwang and Siegel,

2000). Risk is the probability of an event happening. Exposure may be conceived as the value of the assets at risk or what will be lost from the realisation of an uncertain event. Exposure is a function of decisions and actions taken by households, for example, the choice of employment and the asset portfolio. Response is the efforts to mitigate and cope with risk and exposure. This will depend on the assets available to the household or the individual. The type of assets that the household has at its disposal is critical to the nature of the response to the event. The assets must be liquid, i.e. readily changed into cash at minimum cost and must not lose value in the face of the potentially poverty reducing event (Dercon 2000). Response will also depend on the extent to which the individual or household can gain access to credit to help smooth consumption as well as access to private transfers and/or public safety nets. Coping strategies such as increasing the supply of labour are other measures that the individual or household may adopt to respond to the crisis. Some actions that might be taken in response to the damaging fluctuation might contribute to increasing the household or individual's vulnerability to poverty, for example depleting assets for consumption purposes to such an extent that it will be difficult to attain previous levels. Outcome is the end-result of the impact of the damaging fluctuation and is the product of the interplay of risk, exposure and response.

Although risk is a component of vulnerability, households may face damaging fluctuations that are predicted with certainty, for example the long dry season in West Africa. Certainty of the occurrence of this risk will not necessarily reduce a household or individual's vulnerability to poverty. This is because of the household's exposure to the event occurring and its limited ability to mitigate the effect of the event.

On the basis of this conceptualisation of vulnerability, the degree of vulnerability can be said to depend on the characteristics of the risk, exposure, and the ability to respond (Alwang and Siegel, 2000). Dercon (2000) in a similar vein identifies three sets of factors that determine vulnerability to poverty. These are:

² In the Ethiopian study by Dercon and Krishnan (2000), households reported harvest failure, policy problems, labour problems, livestock problems, land problems, asset losses, war and crime as shocks

- The options available to the household making a living including assets, markets and activities.
- The risks faced by the household when making a living
- The ability to handle this risk.

The concepts of vulnerability as presented here indicate that vulnerability is not static. Vulnerability to poverty of a household or individual can change over time as access to consumption smoothing measures and the nature and size of the asset portfolio for example change over time. Vulnerability to poverty will change from one period to the next depending on what the nature of the risks is.

4.1. Vulnerability and Poverty

The concepts of vulnerability and poverty are not the same. Vulnerability is “an ex-ante state that may or may not persist, but it is a condition that implies an outcome in the future after states of nature are realised” (Alwang and Siegel, 2000 p. 26). Poverty is also dynamic as the previous discussion on chronic and transient poverty brings out quite clearly. The difference between vulnerability and poverty that is recognised by all is that poverty is an ex-post state, while vulnerability is ex-ante.

When households and individuals are classified on the basis of poverty and vulnerability to poverty, there may be some overlapping because some households will be poor and vulnerable to poverty. However poverty is not a sub-set of vulnerability to poverty and vulnerability to poverty is not a sub-set of poverty. A classification of vulnerability to poverty developed by Dercon (2000) brings this out quite clearly. Thus the vulnerable to poverty consists of four groups:

- The permanently poor
- Those becoming permanently poor because of trend events, for example erosion of assets that will take them below the poverty line.
- Those likely to become poor because of predictable events

experienced by them.

- Those likely to become poor because of shocks or damaging fluctuations.

Thus households and individuals vulnerable to poverty include some of the poor and some of the non-poor. In a study on vulnerability to poverty in Indonesia in the aftermath of the East Asian crisis it was found that the proportion of households vulnerable to poverty was higher at 33.7% compared to the proportion of poor households at 27.4% in 1999 (Suryahadi and Sumarto, 2001).

4.2. Measuring Vulnerability to Poverty

Some researchers have equated vulnerability to poverty with variability in consumption expenditures or income. This however is incorrect. This is because some households may experience fluctuations in consumption expenditures that will not necessarily take them below the poverty line. These households will be vulnerable to fluctuations in consumption expenditure but will not be vulnerable to poverty. Second, poor households may undertake actions that will smooth income and hence smooth consumption, but which will in the long run prevent an improvement in incomes and consumption expenditure. Murdoch (1994) provides a scenario of a household whose access to credit for consumption purposes is constrained. The household thus chooses a production strategy that is less risky and that is income smoothing over time. Not being able to choose the more risky but income improving production strategy confines the household to low levels of income and consumption. If in the absence of credit for consumption purposes the household sells off assets in order to maintain consumption the household's vulnerability to poverty will increase even though in the short run it is not registering variability in consumption expenditure. Gamanou and Murdoch (2002) analyse the shortcomings of the standard deviation of consumption or income changes as a measure of vulnerability to poverty (See Box 4). The use of this measure is based on the assumption that vulnerability is adequately proxied or measured by variability.

Ownership of assets is usually found to be negatively correlated with poverty. In addition ownership of assets can be important for consumption smoothing. On the basis of these relationships ownership of assets presents itself as a possible measure for vulnerability to poverty. A problem though arises in measuring the value of assets. To begin with households own a wide range of assets, i.e. human capital, physical capital and social capital. Valuation of these assets, particularly social capital is not exactly straightforward. A second consideration is whether the value of the assets will be maintained over time. It is quite possible that the value of these assets could drop exactly at the time that the household needs to transfer them into cash. Third is the issue of whether access to these assets is maintained during the crisis. For example, a household may have strong family ties. However if there is a shock that is not idiosyncratic to the household it may not be able to rely on the support of other households. In Peru, evidence seems to suggest that during the economic crisis of the late 1980s households that received remittances from other households in Peru experienced a drop in the value of these receipts. What was sustained was remittances that were received from abroad (Glewwe and Hall, 1998).

Box 4. Problems with Using Standard Deviation as a Measure of Vulnerability

- Equal weights are given to positive and negative shocks.
- Standard deviations provide no information about the distribution of income over time. If there are two households, one with consumption expenditure increasing over time and the second with a fluctuating consumption pattern, it is quite possible for the two households to have identical standard deviations. However the first household is less likely to be vulnerable to poverty.
- The standard deviation provides no information on persistence of downturns. Over an eight-year period the movements above and below the poverty line for two households may be illustrated as (1, 0, 1, 0, 1, 0, 1, 0) and (0, 0, 0, 0, 1, 1, 1, 1) where 1 indicates poor and 0 indicates non-poor. The two patterns will yield a similar standard deviation although it would appear that the household with the second distribution has a greater exposure to poverty over time because it is persistent.

Source: Gamanou and Murdoch (2002)

Box 5. Estimating the vulnerability of a household to poverty using cross-sectional data.

The vulnerability level of a household at time t is the probability that it will be consumption poor at time $t+1$ thus:

$$v_{ht} = \Pr(c_{ht+1} \leq z)$$

where c_{ht+1} is the household's consumption expenditure at time $t+1$ and z is the poverty line.

Consumption expenditure is determined by observable household characteristics X_h , the state of the economy at time t S_t , unobserved time invariant household level effects α_h , and any idiosyncratic factors that contribute to differential welfare outcomes for households that are otherwise observationally equivalent, ε_{ht} . Thus

$$c_{ht} = c(X_h, S_t, \alpha_h, \varepsilon_{ht})$$

With cross-sectional data there is not enough information to include changes in the structure of the economy and idiosyncratic shocks to household. Thus the following model is estimated:

$$\ln c_h = X_h + \beta + \varepsilon_h$$

In addition the variance of ε_h is allowed to depend on observable household characteristics. Thus

$$\sigma_{\varepsilon,h}^2 = X_h \theta$$

Estimates of β and θ are obtained using a three step feasible generalised least squares procedure (See Chaudhuri, 2000 for details).

The estimates of β and θ are used to obtain estimates of expected log consumption and the variance of log consumption for each household. The estimates of log consumption and the variance of log consumption are used to form an estimate of the probability that a household with characteristics X_h will be poor, i.e. the household's vulnerability level.

$$\hat{v}_h = \hat{\Pr}(\ln c_h < \ln z | X_h) = \Phi \left[\frac{\ln z - X_h \hat{\beta}}{\sqrt{X_h \hat{\theta}}} \right]$$

To deal with measurement error it is recommended that the estimates are applied at a disaggregated level.

Source: Chaudhuri (2002)

Chaudhuri (2002) has developed a methodology to estimate vulnerability to poverty (See Box 5) using cross-section that data. Using Philippines data for 1997 Chaudhuri and Datt (2001) find that they are able to predict which households will be poor in 1998. Suryahadi and Sumarto (2001) have adopted this methodology to identify households that are vulnerable to poverty and to identify the chronic poor in Indonesia. They do this by making use of information on vulnerability to poverty based on current consumption, the estimated degree of vulnerability and the estimated expected consumption. Five categories of households are developed. These are poor, non-poor, high vulnerability to poverty, low vulnerability to poverty and the total vulnerable group. The total vulnerable group includes non-poor households. These are households that are currently non-poor but are expected to become poor in the future. The critical vulnerability level that is adopted in their study is (0.5). A household is described as being highly vulnerable to poverty if the probability that it will be poor is equal to or greater than 0.5³.

The poverty and vulnerability categories are illustrated in the diagram below.

Diagram 1.

- Poor = A +B+C
Chronic Poor = A
Transient Poor = B+C
- Non-Poor = D + E + F
High Vulnerability Non-Poor = D + E
Low Vulnerability Non-Poor = F
- High Vulnerability Group = A + B + D + E
Low level of Consumption = A + D
High Variability of Consumption B + E
- Low Vulnerability Group = C + F
- Total Vulnerable Group = A + B + C + D + E

³ An alternative critical level to differentiate high vulnerability from low vulnerability households that has been suggested is the poverty rate. Households with the probability of being poor next period that have a value higher than the mean poverty rate will be classified as high vulnerability households (Chaudhuri and Datt, 2001).

		Current Consumption			
		$c < \acute{c}$	$c > \acute{c}$		
Vulnerability to Poverty (v)	$v \geq 0.5$	A	D	$E[c] < \acute{c}$	Expected Consumption($E[c]$)
	$v < 0.5$	B	E	$E[c] \geq \acute{c}$	
		C	F		

Source: Suryahadi and Sumarto (2001).

Gamanou and Murdoch (2002) develop a methodology to measure vulnerability that uses panel data (See Text Box 6). Vulnerability is defined as “the difference between the expected value of a poverty measure in the future and its current value” (Gamanou and Murdoch, 2002 p. 15).

Application of this methodology to the panel data set for Cote d’Ivoire for the period 1985-1986 finds that though the headcount index in Abidjan the capital city is the lowest, it has the second highest vulnerability index to poverty. The category of other cities registered a decline in the observed headcount index, however a positive poverty vulnerability index is registered. The authors interpret this result as “many more households were ‘vulnerable’ to poverty than actually became poor ..”. In three localities the vulnerability index was negative. The authors however do not discuss the implication of this result.

There is some debate as to which type of data set is best suited for the measurement of vulnerability to poverty. Alwang and Siegel (2000) argue that panel data sets are not necessary for the measurement of vulnerability. This is because the panel data set will not necessarily provide information on the sources of risks that the household is exposed to. Dercon (2000) on the other hand argues that using cross-section data requires that strong assumptions have to be made about how shocks evolve over time and space. It is assumed that the error process contains sufficient information.

Box 6. Measuring Vulnerability to Poverty Using a Panel Data Set

$$EP_{\alpha+1} - P_{\alpha} = \frac{1}{N} \sum_{i=1}^{G_{t+1}} \sum_s \Pr(s, y_{it+1}) \left(\frac{z - y_{it+1}}{z} \right)^{\alpha} - \frac{1}{N} \sum_{i=1}^{G_t} \left(\frac{z - y_{it}}{z} \right)^{\alpha}$$

where

E is the expectations operator

s is a given state of the world for which the joint probability distribution with Y_{t+1} is $\Pr(s, y)$.

G_t and G_{t+1} are the number of poor households in the current and future period respectively.

y_{it} and y_{it+1} are the current and future consumption of household i.

It is assumed that the true distribution of the possible outcomes in the next period could be known. However, the joint distributions of s and y_{it+1} is not known. To address this problem a possible future distribution of outcomes for households is generated based on their observed characteristics and the observed consumption fluctuations of “similar” households. The bootstrap technique is used to construct several versions of possible future data.

Each bootstrap sample is used to run to obtain a prediction of the change in consumption based on its correlation with a set of household variables.

Monte Carlo estimates of per capita income \hat{y}_i^{mcb} for the future period is obtained by

$$\hat{y}_i^{mcb} = y_{li}^b (1 + \hat{\delta} + \varepsilon^{mc})$$

where

$\hat{\delta}_i$ is the predicted change in consumption for household i

ε^{mc} is a random draw for the empirical distribution of the residuals from the regression.

b are the bootstrap samples drawn by resampling with replacement

The estimate of income for the following period is used to generate a poverty measure for each bootstrap sample b, of size n.

$$\hat{P}_{\alpha 2}^{mcb} = \frac{1}{n} \sum_{i=1}^{G_b} \left(\frac{z - \hat{y}_i^{mcb}}{z} \right)^{\alpha}$$

The estimate of the poverty measure for the future period $EP_{\alpha+1}$ is the mean of the bootstrap estimates $\hat{P}_{\alpha 2}^{mcb}$.

The Monte Carlo bootstrap estimate of the vulnerability for the population for the period is

$$V_{\alpha}^{mcb} = \hat{P}_{\alpha 2}^{mcb} - P_{\alpha}$$

Source: Gamanou and Murdoch (2002)

4.3 Investigating the Determinants of Vulnerability

Glewwe and Hall (1998) propose hypothesis between household and individual characteristics and economic vulnerability. Thus rural residence, white collar employment, government employment, high household assets, households with diverse kinship networks and high education levels are hypothesised to reduce vulnerability. The characteristics that are hypothesised to increase vulnerability are small sized households and blue collar employment. The higher the number of women, elderly, infirm members and children the more likely it is that the higher is the likelihood of vulnerability.

Glewwe and Hall make use of a panel data set for the periods 1985/86 and 1990 to investigate the determinants of vulnerability to macroeconomic shocks in Peru. Unfortunately vulnerability is not rigorously defined. It is defined as the change in consumption expenditure over the period. Vulnerability is not defined with respect to a benchmark. The definition gives equal weight to different consumption changes. Thus a 5% fall in consumption expenditure of one household is given the same weight as that of a household facing a 15% or 20% fall in consumption expenditure. This measure of vulnerability does not differentiate between where on the income distribution the household that is facing a change in consumption expenditure is placed. A household with consumption expenditure below the poverty line has the same measure of vulnerability compared to a household that is above the poverty line that experiences the same percentage drop in consumption expenditure. Thus what the study by Glewwe and Hall does is indicate the household and individual characteristics that are correlated with changes in welfare. This is similar to the study by Grootaert et al (1997) for Cote d'Ivoire. They investigate the determinants of change in welfare between 1987 and 1988. Separate regressions are run for urban and rural households. The explanatory variables consist of initial condition variables, the change in explanatory variables over the period and variables capturing the state of the environment in which the household operates. In both the urban and rural regressions they find that the coefficient of the variable for the 1987 level of per

capita expenditure is negatively signed and significant. This suggests that the higher is per capita expenditure the more likely it is that it will drop in the following year. They interpret this to mean that there are large transitory components in the expenditure of most households. They find that households that experience an increase in per capita expenditure over the period are well educated, have young heads of household, have few children and live in Abidjan. In the rural sample, households that have larger and better equipped farms were more likely to register an increase in per capita expenditure as were households that had heads younger than 45, produced export crops and were headed by women.

The type of analysis conducted by Glewwe and Hall (1998) and Grootaert et al (1997) provides information on variables that explain changes in welfare. The analysis does not identify the variables that are correlates of vulnerability to poverty.

Dercon and Krishnan (2000) identify the shocks that are important in explaining changes in welfare amongst rural Ethiopian households. The shocks included household level and village level shocks. They found that village level rainfall and livestock disease variables are ~~important~~ significant in explaining changes in welfare. Dercon and Krishnan's analysis also shows that fluctuation of consumption by the household can be the result of a choice made by the household. Their analysis shows that "households may choose to let consumption fluctuate in response to seasonal incentives related to prices and returns to labour" (Dercon and Krishnan, p. 44). They found that during peak labour periods households would choose to consume more. It is suggested that this is because improved nutrition would contribute to higher labour productivity. Households also chose to consume more when prices were low. They were able to establish that seasonal effects cause variability in poverty over time. Thus fluctuations in consumption expenditure are not entirely reflective of a lack of consumption smoothing mechanisms or vulnerability.

5.0 Conclusion

Most of the work on chronic and transient poverty in Africa has been on measuring and on identifying the correlates of chronic and transient poverty. More work needs to be done on understanding what causes chronic poverty and why it is that certain categories of individuals and households may not be able to accumulate assets that generate incomes that make possible consumption expenditures above the minimum acceptable level.

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