Departament d'Economia Aplicada

DOCUMENT DE TREBALL

03.07

Relating Severe Poverty and Chronic Poverty

Shahin Yaqub

Universitat Autònoma de Barcelona

Facultat de Ciències Econòmiques i Empresarials

Relating Severe Poverty and Chronic Poverty

May 2003

Shahin Yaqub[1]
Sussex University
s.yaqub@sussex.ac.uk

[1] I completed this paper whilst visiting the Department d'Economia Aplicada at the Universitat Autonoma de Barcelona. Xavi Ramos and Magda Mercader Prats at Universitat Autonoma helped organise my visit, and the Generalitat de Catalunya funded it. David Hulme and Andrew Shepherd at Manchester University, and seminar participants at Universitat Autonoma gave helpful comments. Takashi Kurosaki personally communicated some results not yet available elsewhere.

CONTENTS

LIST OF TABLES

LIST OF FIGURES AND ANNEX

ABSTRACT

The severely poor are very poor since their consumption is far below the absolute poverty line, and the chronically poor are very poor since their consumption persists for long periods below the absolute poverty line. A combination of chronic poverty and severe poverty (CSP) must represent the very worst instance of poverty. Yet the exercise in this paper of asking simple questions about CSP shows large research gaps. Quantified statements on CSP at the country level can be made for just 14 countries, and at the household level in just six countries. This data suggests a positive correlation between severe poverty and chronic poverty, both at the country level and the household level. Understanding the CSP relationship – whether it is strong, where it arises, what causes it – may improve our explanation of observed cross-country variation in the elasticity between macroeconomic growth and poverty reduction, and why within countries, some households take better advantage of opportunities afforded by macroeconomic growth. Some limited data suggests similarity in socioeconomic characteristics of the severe poor and the chronic poor in terms of location, household size, gender, education and economic sector of work. Of concern is that microlongitudinal datasets drop large proportions of their base year samples, and how this affects our understanding of CSP is not well evaluated. On causal mechanisms, evidence suggests that CSP may be caused by parental CSP (i.e. an intergenerational CSP cycle) and in households not previously poor, CSP may be caused by a morbidity cycle.

1. Introduction

This paper will examine the relationship between the severity of poverty and the chronicity of poverty. The terms 'severity' and 'chronicity' are used to disaggregate the poor as a group. Poverty severity indicates how far below the poverty line is the consumption of the poor. People below the poverty line might consume at different levels ranging between, in principle, nothing and the poverty line. This allows a distinction between the moderately poor (closer to the poverty line) and the severely poor (further below the poverty line). Poverty severity is a static concept. In contrast, poverty chronicity is a longitudinal concept, capturing the fact that the poor are not equally poor over time. People may be poor for short or long periods, unusually or typically, transitorily or chronically. If making interpersonal and intertemporal welfare comparisons, we might anticipate two poor people to differ from each other in the severity of poverty, and over time the severity of poverty may fluctuate for either or both, increasing or decreasing over varying lengths of time. This paper examines whether chronic severe poverty (CSP) exists, and if so, why.

The paper continues in seven more sections. Section 2 discusses poverty measures to explain the selection criteria for the poverty data analysed in the paper. Clearly some definitions of 'severe' and some definitions of 'chronic' would make CSP impossible by definition. In collecting the poverty data for the paper, considerable attention was paid to the details of methodology – often relegated to footnotes, annexes, and unpublished manuscripts – that underlie available poverty estimates. Despite a big effort towards constructing this dataset, there remained a scarcity of poverty data useful for examining CSP. The dataset included just 14 countries.

Section 3 tests whether severe poverty and chronic poverty coincide at the country level. Does the severest poverty occur in the same countries where poverty is most chronic? The question is argued to be important at least to further understand why the elasticity between macroeconomic growth and poverty reduction varies so much across countries. In a sense, the question of country-CSP appears in macroeconomic literature on 'country convergence', but this is posed in terms of country-means. This paper characterises the consumption dynamics of a country by the consumption dynamics of just its poorer members, rather than its country-mean, with the view that macroeconomic growth may be less effective in reducing poverty in places where poverty is most severe. Simple scatters show a positive correlation between

severe poverty and chronic poverty at the country level, but as explained later, the size of the correlation is affected by differences in the way chronic poverty is estimated.

Section 4 considers again the coincidence of severe poverty and chronic poverty, but at the household level. Are the severely poor and chronically poor the same households? The issue can be understood as serial processes in consumption, and whether unconditional or conditional regression to the mean exists (or neither). In countries with data, regression to the mean conditional on household characteristics appears, but regression to the unconditional mean does not appear. Thus whilst households tend to return to consumption levels typical of their observed characteristics, the severely poor show lower rates of poverty escape than the moderately poor.

Section 5 considers whether there is a coincidence of correlates in CSP. Do the socioeconomic characteristics that correlate with severe poverty also correlate with chronic poverty? This would seem to be an important question for antipoverty policy, both for its content and targeting. The presentation relies on breakdowns of severe poverty and chronic poverty estimates by socioeconomic characteristics, searching for similarity between the sets of characteristics associated with each.

Section 6 examines more closely the microlongitudinal data upon which earlier sections relied. A priori, there should be suspicion that microlongitudinal datasets could, in a lot of developing country contexts, find it harder to retain in the sample those that are, or become over time, severely poor. Therefore section 6 examines survey design information underlying microlongitudinal datasets in use.

Section 7 examines causal paths in CSP to try to explain the correlations in earlier sections. CSP is detected in countries, households and correlates of poverty – so do the various ways people cope with, adapt to and survive severe poverty sustain poverty chronically? Two possible causal mechanisms are proposed.

1. Adaptations in biology and behaviour make it more likely that people born into CSP avoid death when subjected to poverty severe enough to kill others, but adaptations also prevent escape from poverty. Hence CSP.

2. Steps people take to cope with poverty make it more likely they enter a morbidity cycle that keeps them in CSP. This may affect people not born into CSP.

The presentation attempts to break down each mechanism into possible causal steps, substantiating each step as far as possible using relevant empirical literature.

Section 8 concludes.

2. Measures of severe poverty and chronic poverty

Incidence, poverty gap, and squared poverty gap measures are used routinely in poverty measurement (Foster, Greer, Thorbecke 1984; Lipton 1997; Ravallion and Lipton 1995). These measures can be stated in general form as:

$$P_\alpha = \frac{1}{N}\sum_{i=1}^{k}\left[\frac{z - y_i}{z}\right]^\alpha$$

where y_i is the consumption of the i^{th} poor person, k is the number of poor people, N the total population, and z the poverty line. Setting alpha = zero gives the incidence measure (P_0), setting alpha = one gives the poverty gap measure (P_1), and setting alpha = 2 gives the squared poverty gap measure (P_2). The following explains how incidence, gap and squared-gap have been applied to measure severe poverty (SP_0, SP_1, SP_2) and chronic poverty (CP_0, CP_1 and CP_2).

Severe poverty incidence, SP_0

The incidence of severe poverty (SP_0) reports the headcount below a severe level of consumption (or income), expressed as a proportion of the total population (SP_0 *population*) or as a proportion of the total numbers of poor (SP_0 *poor*). This requires definition of what constitutes a 'severe level'. Poverty data exists in several countries where a severe level has been defined based on *food consumption only*, making no allowance for non-food consumption. These definitions of 'food poverty' typically identify people that are expected to consume insufficient calories even if their total consumption is entirely devoted to food. Food poverty is pertinent for relating poverty severity and poverty chronicity because food poverty lines usually target calories required for minimal functionings that, in turn, are

supposedly minimal for avoiding poverty (amongst other things). A reference commonly cited for this is the following:

> "…the level of energy intake from food that will balance energy expenditure when the individual has a body size and composition, and level of physical activity, consistent with long-term good health… for the maintenance of economically necessary and socially desirable physical activity… [and] in children and pregnant or lactating women… the deposition of tissues or the secretion of milk at rates consistent with good health" (WHO 1985).

Food poverty lines encountered in practice may have a less precise relationship to functionings than implied above, at least because:

1. the money amount of the food line is affected by the composition, in terms of different foodstuffs, of the reference food basket; this is because the cost per calorie varies by foodstuff;
2. energy requirements are not uniform, depending on sex, age, climate, physical activity, physical growth, morbidity, pregnancy, lactation, etc..

On the first point, this paper excludes food lines using normatively or arbitrarily determined food baskets, and includes only food lines that budget foodstuffs actually consumed at 'low-incomes', as revealed by survey data. Not all studies reported exactly how they defined 'low-incomes' (typically the poorest third or half of the population). The intention was to include only poverty lines anchored to minimal calories, in the sense of the quote above, even if this incorporated varying consumption preferences across populations. The second point about varied energy requirements is well recognised, but difficult to address in practice. Often adult equivalence scales are applied, with considerable methodological difficulty, but these best capture variations in requirements according to observable characteristics, like sex and age. Many estimates included just used per capita measures.

Chronic poverty incidence, CP_0

Chronic poverty incidences presented in this paper will be with reference to the poverty line, rather than the food line just mentioned. The poverty line adds to the food line an allowance for non-food consumption necessary for survival. Two definitions of 'chronicity' have been used to obtain incidences of chronic poverty (CP_0): *chronic duration* (i.e. poor in all periods)

and *chronic shortfall* (i.e. poor in a measure of 'permanent' welfare).[2] Both require microlongitudinal datasets that track people over time. Chronic poverty duration incidence (CP_0 *duration*) reports the proportion of the population poor in all survey-waves in the longitudinal dataset. Many microlongitudinal datasets in developing countries contain only two survey-waves, in which case chronic poverty duration incidences are obtained from a simple transition matrix of poverty statuses at two points in time. For chronic poverty shortfall incidence (CP_0 *shortfall*), the measure of permanent welfare commonly applied is the average over time of consumption. CP_0 *shortfall* reports the proportion of the population whose intertemporal averaged consumption is below poverty levels. Notice duration and shortfall approaches to chronic poverty incidences are not equivalent and do not classify people consistently. For example, in Gaiha and Deolalikar (1993), only one-third of those chronically poor using the shortfall approach were classified poor all nine years of the panel. Similar inconsistent classifications appear in Jalan and Ravallion (1998), Baulch and McCulloch (1999), Dercon and Krishnan (2000). An important difference is that in taking the intertemporal average, the shortfall approach assumes the poor smooth consumption perfectly over time (which may not be the case for the severely poor).

Poverty gap and squared poverty gap for severity and chronicity

All data presented on poverty gap and squared poverty gap – for both severe and chronic poverty – will be with reference to the poverty line, i.e. food plus non-food consumption. The severe poverty gap (SP_1) gives the population-mean consumption shortfall expressed as a proportion of the poverty line. Importantly, this measure is insensitive to differences amongst the poor in the severity of poverty, indicating just average severity. The squared gap for severe poverty (SP_2) reveals inequality amongst the poor by giving the population-mean *squared* consumption shortfall as a proportion of the poverty line. For chronic poverty, the poverty gap and squared poverty gap can be applied in an analogous way using a measure of permanent consumption, such as the intertemporal average (i.e. '$\bar{y}_i$ over a few years' instead of 'y_i at time t' in the formula above). Chronic poverty gap (CP_1) indicates how far below the

[2] Andrew Shepherd drew my attention to a possible third definition of 'chronicity', arising from an interpretation of recent literature on vulnerability. A person might be seen as chronically poor if they are poor now, and given their characteristics now, statistically likely to be also poor in the future. See Barrientos and Shepherd (2003) for further discussion. For applications see Bidani and Richter (2001) on Thailand, Chaudhuri et al. (2002) on Indonesia, Christiaensen and Boisvert (2000) on Mali, Kamanou and Morduch (2001) on Côte d'Ivoire, and Pritchett et al. (2000) on Indonesia.

poverty line the chronically poor typically lie, and chronic poverty squared gap (CP_2) squares the poverty gap to account for inequality amongst the chronically poor. These measures exist for few countries.

3. Coincidence of severe poverty and chronic poverty at country-level?

This section examines whether patterns exist at the country-level between severe poverty and chronic poverty. An interest in country-level CSP exists in macroeconomic literature on 'country convergence', which aims to work out whether poorer economies grow faster (e.g. Pritchett 1995). A drawback with this is that inequality *within* countries is not included since the question is posed at the level of country-means. A better understanding of CSP at country level, incorporating within-country inequality, might offer insights important for a more clearly articulated pro-poor agenda within macroeconomic policy. Research showing that macroeconomic growth reduces poverty, also shows that the elasticity between growth and poverty varies considerably across time and place. The average elasticity between mean expenditure and the proportion of the population living below $1/day (at 1993 purchasing power parity) is reported as 2.5, and ranges between 0.6 to 3.5 (Ravallion 2001). Explanation of the variation in the growth-poverty elasticity has included openness to the international economy, quality of government, political stability, asset inequality and income inequality (see review by Lipton and Eastwood 2001). A striking aspect of the debate on the growth-poverty elasticity is its lack of micro-foundation in explaining how macroeconomic growth eliminates poverty, and why that latter relationship appears to vary across contexts. There remains a well-noted concern over the much lower poverty-growth elasticities in sub-Saharan Africa (the 'African dummy' puzzle).

This section uses poverty data based on household surveys to ask a similar, but modified, question about country income dynamics. The modification is to characterise the consumption dynamics of a country by the consumption dynamics of just its poorer members, rather than its country-mean. In short, the idea is that if a population is preoccupied with securing its very survival (severe poverty), then it will find it impossible to engage in the longer-term processes required for material accumulation (chronic poverty). This may be regardless of the larger economic opportunities that may in principle be available to the poor

from macroeconomic growth. Section 7 of the paper will offer more specific hypotheses in this respect.

Dataset construction

A dataset was created including countries with estimates for *both* severe poverty and chronic poverty. Severe poverty estimates exist for the majority of countries, but chronic poverty estimates require longitudinal household datasets, and so exist for just a few countries (as reported in my earlier paper, Yaqub 2003). Even then, only a subset of available chronic poverty estimates is useful in the present context. The selection criteria for poverty estimates are listed below, and countries that thereby were excluded are listed in footnotes.

1. Poverty estimates based on household survey data on consumption expenditure or income.
2. Datasets with sample sizes exceeding 200 households (an arbitrary cut-off, still on the small side).[3]
3. Households or individuals tracked over periods spanning three years or more (i.e. *not* consecutive years).[4]
4. Severe poverty estimates for the same base and terminal years as microlongitudinal datasets used for estimating chronic poverty. Rural/urban locations have been matched also.
5. Estimates of *absolute* chronic poverty, rather than *relative* chronic poverty.[5]
6. Documented methodology for poverty lines to ensure selected pairs of severe poverty estimates were reasonably comparable across time, and reasonably comparable with chronic poverty estimates. Sometimes severe poverty data was available on the same microlongitudinal sample used to estimate chronic poverty, and these are reported.[6]

---

[3] This excludes microlongitudinal datasets in western Kenya with 103 households (Place, Hebinck, and Omosa 2003), rural Chile with 155 households (Scott 2000), rural India with 83 households (Swaminathan 1991), rural India with 143 households (Lanjouw and Stern 1991), Bombay India with 110 households (Swaminathan 1997), rural Burkina Faso with 55 households (Ndoruhirwe 2000), rural Burkina Faso with 150 households (Reardon et al. 1992), rural Kenya with 120 households (Place, Hebinck and Omosa 2003).

[4] This excludes microlongitudinal datasets for Mexico (Cunningham and Maloney 2000), Côte d'Ivoire (Grootaert and Kanbur 1995), Venezuela (Freije 2000), Indonesia (Skoufias, Suryahadi and Sumarto 1999), urban China (Gibson 2001)

[5] This excludes microlongitudinal datasets for Malaysia (Randolph and Trzcinski 1989), China (Benjamin, Brandt and Giles 2002; Nee and Liedka 1997; Nee 1991), Hungary (Galasi 1998), Peru (Glewwe and Hall 1998), South Korea (Goh, Kang and Sawada 2001), Mexico (Lanjouw 1998), Madras India (Noponen 1991)

[6] Hungary (World Bank 2001), Poland (Okrasa 1999) and Russia (World Bank 1999) have microlongitudinal datasets, but are excluded because chronic poverty studies applied 'social minimum' poverty lines prevailing in each country, without stating methods or calorie anchors. To determine methodology for Hungary, at least, I

7. Food lines and poverty lines comparable to those used in chronic poverty estimates. Nationally determined 'food lines' targeting 2100 to 2400 calories per capita per day, and nationally determined 'poverty lines' targeting 2100 to 2400 calories per capita per day plus essential non-food items. Food baskets defined using prevailing consumption patterns of those who typically achieve the calorie target, as determined by survey data (i.e. *not* normatively defined).

The resulting dataset covers 25 samples in 14 countries. It is most complete for two measures of severe poverty (poverty gap and squared poverty gap) and one measure of chronic poverty (chronic duration incidence). These three series are presented as Table 1, and the full dataset as Annex 1. As shown, included are different units of analysis (populations or households), welfare indicators (expenditure or income), and time periods. Calorie targets for 'food lines' are as shown. As discussed already, food lines were used for severe poverty incidences only (SP0). All other poverty estimates reported here are based on poverty lines with the same calorie targets, but also with allowances for non-food consumption.

queried at World Bank, who passed me to Tarki (the research institute that collected Hungary's microlongitudinal data), who passed me to the Hungarian Central Statistical Office, who have not replied.

Table 1: Severe poverty and chronic poverty, abridged dataset

			Severe absolute poverty					Chronic abs pov			
Country	Sample	Period	SP1	SP2	Unit	Indic	Min calorie	CP0 durtn	Unit	Indic	Source
Bangladesh	rural	1991	18.1	7.2	Pop	Exp	2112				World Bank (1998)
Bangladesh	rural	1995	15.4	5.7	Pop	Exp	2112				World Bank (1998)
Bangladesh	rural	1990-94						38	Hh	Inc	Sen (2001)
Bangladesh	rural	1988	13.1	4.8	Pop	Exp	2112				Sen (2003)
Bangladesh	rural	2000	11.3	4.0	Pop	Exp	2112				Sen (2003)
Bangladesh	rural	1988-00						31	Hh	Exp	Sen (2003)
China	rural Sichuan	1991	4.3	1.2	Hh	Exp	2100				McCulloch & Calandrino (2002)
China	rural Sichuan	1995	2.9	0.8	Hh	Exp	2100				McCulloch & Calandrino (2002)
China	rural Sichuan	1991-95						6	Hh	Exp	McCulloch & Calandrino (2002)
Egypt	rural and urban	1995	3.4	0.9	Pop	Exp	2305				World Bank (2002)
Egypt	rural and urban	1999	3.0	0.8	Pop	Exp	2305				World Bank (2002)
Egypt	rural and urban	1997-99						19	Hh	Exp	Haddad and Ahmed (2002)
Ethiopia	Tigray	1997	29.0	17.0	Pop	Exp	2200				Hagos & Holden (2003)
Ethiopia	Tigray	2000	27.0	14.0	Pop	Exp	2200				Hagos & Holden (2003)
Ethiopia	Tigray	1997-00						33	Pop	Exp	Hagos & Holden (2003)
Ethiopia	rural	1994	16.8	8.8	Pop	Exp	2100				Bigsten et al. (2003)
Ethiopia	rural	1997	12.7	6.2	Pop	Exp	2100				Bigsten et al. (2003)
Ethiopia	rural	1994-97						7	Hh	Exp	Bigsten et al. (2003)
Ethiopia	urban	1994	13.8	6.9	Pop	Exp	2100				Bigsten et al. (2003)
Ethiopia	urban	1997	12.6	6.1	Pop	Exp	2100				Bigsten et al. (2003)
Ethiopia	urban	1994-97						13	Hh	Exp	Bigsten et al. (2003)
El Salvador	rural	1995	32.4	20.9	Pop	Inc	2200				Conning, Olinto & Trigueros (2000)
El Salvador	rural	1997	38.8	28.6	Pop	Inc	2200				Conning, Olinto & Trigueros (2000)
El Salvador	rural	1995-97						19	Hh	Inc	Sanfeliu & Gonzalez-Vega (2000)
India	rural	1968	19.0	8.2	Pop	Exp	2400				World Bank (2000)
India	rural	1970	16.6	6.8	Pop	Exp	2400				World Bank (2000)
India	rural	1968-70						33	Hh	Exp	Gaiha (1988)
India	rural	1970	16.6	6.8	Pop	Exp	2400				Bhide & Mehta (2003), World Bank (2000), pers comm
India	rural	1983	12.7	4.8	Pop	Exp	2400				Bhide & Mehta (2003), World Bank (2000), pers comm
India	rural	1970-81						25	Hh	Exp	Bhide & Mehta (2003)
India	rural	1974	17.2	7.1	Pop	Exp	2400				World Bank (2000)
India	rural	1983	12.7	4.8	Pop	Exp	2400				World Bank (2000)
India	semi-arid rural	1975-83						22	Hh	Inc	Gaiha & Deolalikar (1993)
Kenya	rural	1994	27.0	15.0	Hh	Exp	2250				Geda et al. (2001)
Kenya	rural	1997	19.3	9.2	Hh	Exp	2250				Kimalu et al. (2001)
Kenya	rural nonpastoral	1994-97						13	Cluster	Exp	Christiaensen & Subbarao (2001)
Madagascar	Antananarivo	1997	44.7	29.3	Pop	Inc	2300				Herrera & Roubaud (2001)
Madagascar	Antananarivo	1999	42.6	28.1	Pop	Inc	2300				Herrera & Roubaud (2001)
Madagascar	Antananarivo	1997-99						65	Pop	Inc	Herrera & Roubaud (2001)
Pakistan	rural	1987	8.3		Pop	Exp	2250				World Bank (1995)
Pakistan	rural	1990	7.8		Pop	Exp	2250				World Bank (1995)
Pakistan	rural	1986-90						5	Hh	Inc	Baulch & McCulloch (2000)
Pakistan	rural NWFP	1996	30.8	14.3	Hh	Exp	2250				Kurosaki personal communication
Pakistan	rural NWFP	1999	29.4	13.2	Hh	Exp	2250				Kurosaki personal communication
Pakistan	rural NWFP	1996-99						63	Hh	Exp	Kurosaki (2001; 2003)
Peru	Lima	1990	11.3	5.2	Hh	Exp	2300				Herrera (1999)
Peru	Lima	1996	9.0	3.4	Hh	Exp	2300				Herrera (1999)
Peru	Lima	1990-96						13	Hh	Exp	Herrera (1999)
Peru	urban	1997	10.4	5.1	Pop	Inc	2300				Herrera & Roubaud (2001)
Peru	urban	1999	10.2	5.2	Pop	Inc	2300				Herrera & Roubaud (2001)
Peru	urban	1997-99						23	Pop	Inc	Herrera & Roubaud (2001)
South Africa	KZ-Natal non-white	1993	27.1	0.0	Hh	Exp	2300				Carter & May (2001)
South Africa	KZ-Natal non-white	1998	33.0	0.1	Hh	Exp	2300				Carter & May (2001)
South Africa	KZ-Natal non-white	1993-98						18	Hh	Exp	Carter & May (2001)
Uganda	rural and urban	1992	20.4	9.9	Pop	Exp	2280				Appleton et al.
Uganda	rural and urban	1995	16.3	7.6	Pop	Exp	2280				Appleton et al.
Uganda	rural and urban	1992-95						30	Hh	Exp	Derived from Okidi & McKay (2003)
Vietnam	rural and urban	1992	19.0	8.0	Pop	Exp	2100				Vietnam (1999)
Vietnam	rural and urban	1997	10.0	4.0	Pop	Exp	2100				Vietnam (1999)
Vietnam	rural and urban	1992-97						29	Hh	Exp	Houghton et al. (2001)
Zimbabwe	rural	1992		0.1	Pop	Exp	2100				Owens & Hoddinott (1998); Alwang et al. (2002)
Zimbabwe	rural	1995		0.1	Pop	Exp	2100				Owens & Hoddinott (1998); Alwang et al. (2002)
Zimbabwe	rural	1992-95						11	Hh	Inc	Baulch & Hoddinott (2000)

Correlation between severe poverty and chronic poverty, and its robustness

Scatter plots of data in Table 1 indicates a correlation between severe poverty and chronic poverty at the country-level. Figure 1 shows the correlation with base year severe poverty and Figure 2 shows the correlation with terminal year severe poverty, and both are positively sloping. These suggest countries with more severe poverty have subsequent higher incidences of chronic poverty, and countries with high incidences of chronic poverty have subsequent high levels of severe poverty. The correlation is robust to whether severe poverty is measured using the poverty gap or squared poverty gap. The incidence measure of severe poverty (defined as food poor), also shows positive sloping scatter plots with chronic poverty, i.e. the larger the proportion of the population severely poor, in base and terminal year, the larger the proportion of the population chronically poor. These scatters are not shown because of small sample sizes (N=11).

Figure 1: Severe poverty in base year and chronic poverty, full sample

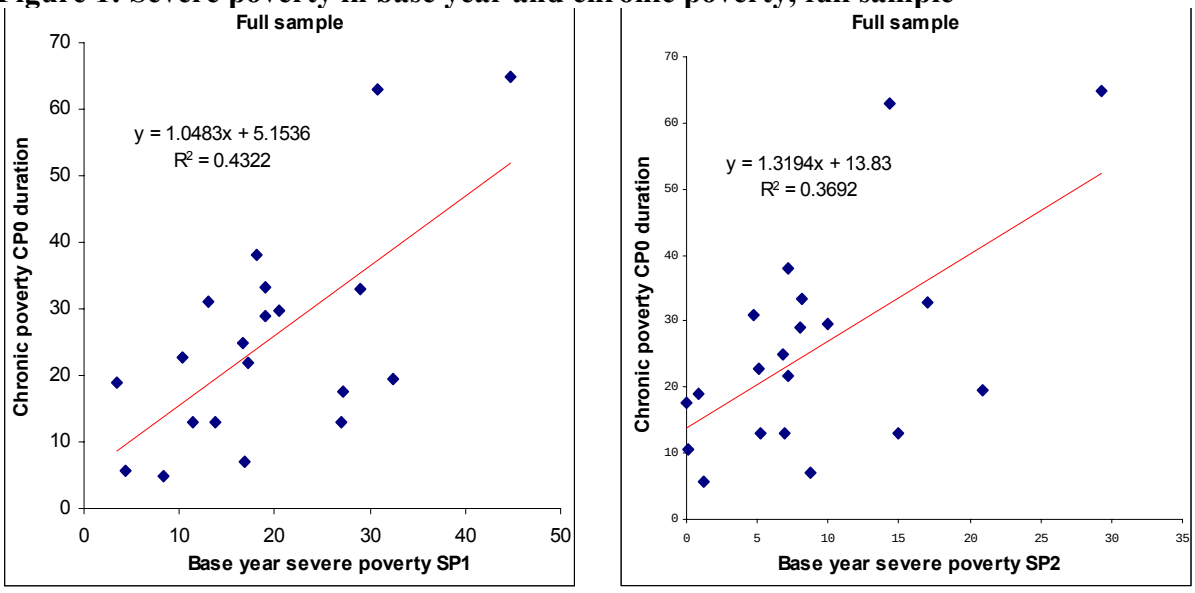
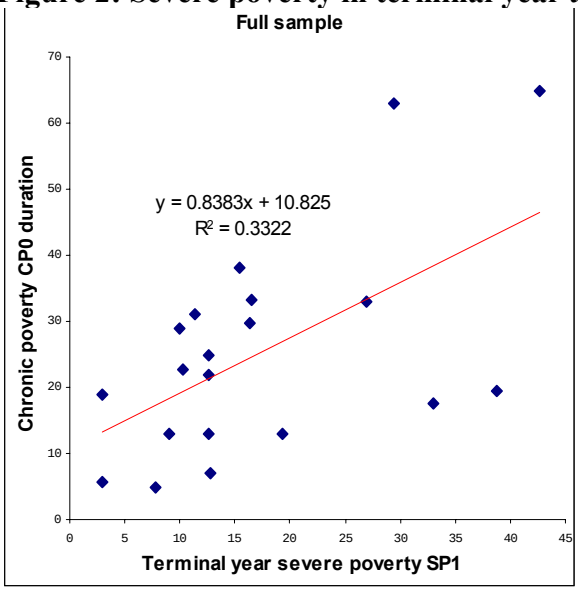
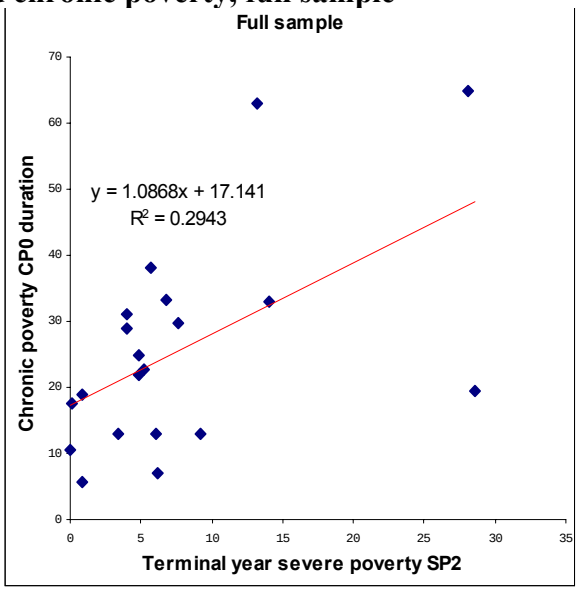


Figure 2: Severe poverty in terminal year and chronic poverty, full sample





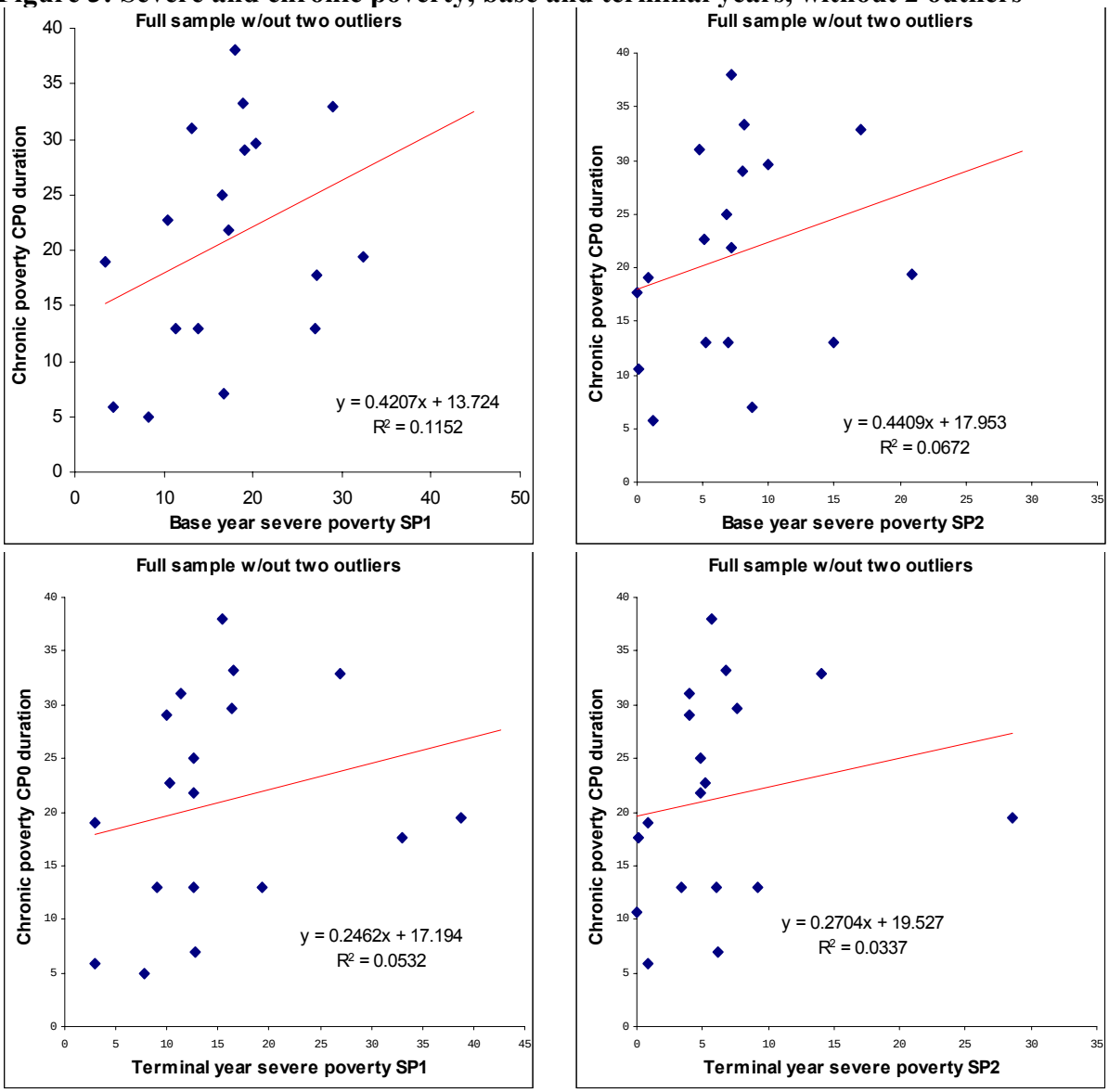
The strength of the correlation was:

1. hardly altered whether using the poverty gap or squared poverty gap, i.e. giving greater weight to those most severely poor; it was much reduced using the incidence measure of severe poverty;
2. stronger for base year than terminal year (Figure 1 v. Figure 2);
3. strongly dependent on Madagascar and Pakistan NWFP, outliers with high chronic poverty – Figure 3 shows scatters without them, and Table 2 shows that without them correlations previously statistically significant become insignificant at given sample sizes, and insignificant correlations become significant.

Table 2: Pearson correlation coefficients for chronic poverty incidence and severe poverty, with and without two outliers

		Poverty gap		Sqd pov gap		Sev pov incidence in pop		Sev pov incidence in poor	
		Base year	Terminal year	Base year	Terminal year	Base year	Terminal year	Base year	Terminal year
Full sample	Pearson corr w/ CP0 durn	0.66	0.57	0.60	0.54	0.20	-0.17	0.39	-0.03
	Sig. (2-tailed)	0.00	0.01	0.00	0.01	0.55	0.64	0.27	0.93
	N	20	20	20	20	11	10	10	9
Excluding two outliers	Pearson corr w/ CP0 durn	0.34	0.23	0.25	0.17	0.59	0.35	0.80	0.58
	Sig. (2-tailed)	0.17	0.37	0.32	0.50	0.07	0.35	0.01	0.13
	N	18	18	18	18	10	9	9	8

Figure 3: Severe and chronic poverty, base and terminal years, without 2 outliers



Even if the two outliers are retained, the robustness of the correlation observed between severe poverty and chronic poverty is suspect. An important worry is that the definition of 'chronicity' varies across countries, because of differences in microlongitudinal datasets from which chronic poverty was estimated. Microlongitudinal datasets differ in the number of resurveys (or waves) and in the length of time over which the sample is tracked. This information is reported in Annex 1.

To examine the effect of different notions of 'chronicity' in the dataset, scatter plots were repeated for subsamples, separately, if microlongitudinal datasets had:

1. two waves, i.e. 'chronic poor' meant being observed poor twice (see Figure 4);
2. three waves, i.e. 'chronic poor' meant being observed poor three times (see Figure 5).

The scatter plots show that the correlation is consistently positive in all subsamples, for both base and terminal years, but the size of the correlation is unstable. In the two-wave subsample the size of the correlation depends considerably on choice of poverty measure (poverty gap or squared poverty gap), but not in the three-wave subsample. As before, the correlation with base year severe poverty is stronger than with that in the terminal year. Removing the two outliers mentioned earlier still gives positive slopes, but again, reduces the size of the correlation.

Figure 4: Severe poverty in base year and chronic poverty, by subsamples

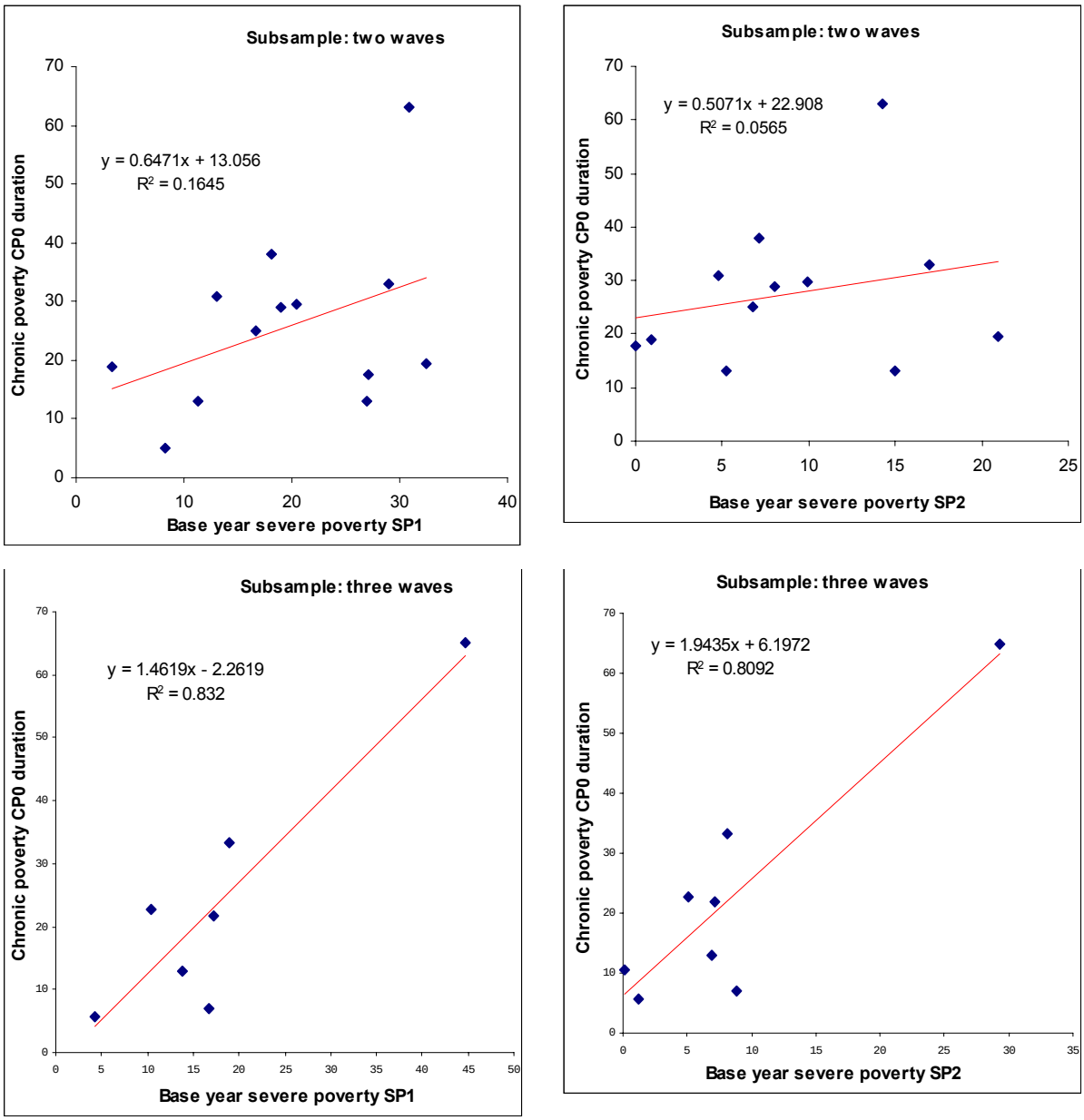
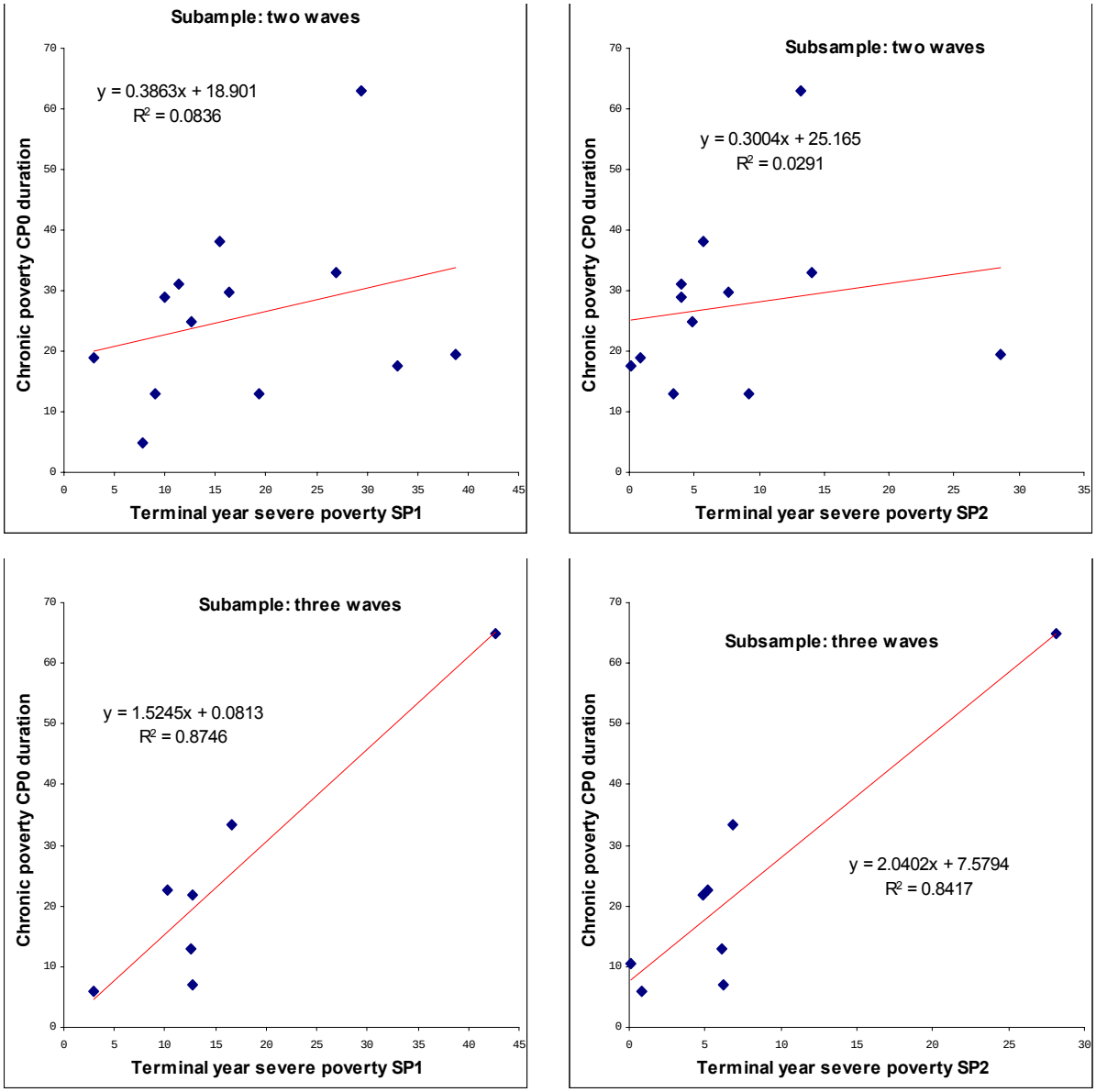


Figure 5: Severe poverty in terminal year and chronic poverty, by subsamples



In addition, a more strictly controlled analysis was done, whereby countries with microlongitudinal datasets of identical numbers of waves *and* observation periods were paired, and compared. The comparison is shown as Table 3. There are five pairs. The comparisons are made across countries of rather different levels of income and industrialisation, the pairs having been selected entirely to control for differences in the microlongitudinal datasets. Table 3 notes trends over time in severe poverty for each country,

which of the pair had greater severe poverty and which had greater chronic poverty (different poverty measures generally gave consistent answers for each of these judgements).[7]

Table 3: Comparison of poverty severity and poverty chronicity in paired countries

	Comparison pair	Severe poverty trend		Severe poverty level	Chronic poverty level
1	China Sichuan v. Pakistan	Sichuan slightly down	Pakistan hardly any change	Sichuan slightly lower than Pakistan	Sichuan and Pakistan similar
2	Egypt v. El Salvador	Egypt hardly any change	El Salv rise	Egypt lower than El Salv	Egypt and El Salv similar
3	Madagascar v. Peru	Madag hardly any change	Peru hardly any change	Madagascar higher than Peru	Madagascar higher than Peru
4	South Africa v. Vietnam	South Africa up	Vietnam down	South Africa lower than Vietnam	South Africa lower than Vietnam
5	Bangladesh v. Kenya	Bdesh down	Kenya down	Bdesh lower than Kenya	Bdesh higher than Kenya

In comparisons labelled as pair 1 (Sichuan China v. Pakistan) and pair 2 (Egypt v. El Salvador), countries had similar chronic poverty levels, similar severe poverty levels, and no trends in severe poverty. In pair 3 (Madagascar v. Peru) and pair 4 (South Africa v. Vietnam) the country with greater chronic poverty levels also had greater severe poverty levels. Neither country in pair 3 showed much change in severe poverty, but in pair 4 the difference in severe poverty in these two countries was narrowing. The pairwise comparisons so far are consistent with the positive correlation depicted in the scatters earlier. However in pair 5 (Bangladesh v. Kenya) the country with the lower severe poverty shows greater chronic poverty levels, and both countries show downward trends in severe poverty. Pair 5 is contrary to CSP. It might be noted though that the chronic poverty estimate for Kenya is unlikely to be as low as the 13 percent, as indicated by the data.

The overall conclusion is that a positive correlation likely exists between severe poverty and chronic poverty at the country level. Some caution over this result exists because of low sample sizes and the effects of two outliers in the data. Even with the most complete set of poverty data at hand, it is not possible to draw precise estimates, in the sense of narrow confidence intervals, of any relationship that may exist between severe poverty and chronic poverty at the country level. Efforts to check the robustness of the presence of a correlation suggest that some CSP is observable at the country level.

[7] An inconsistency might be the lower severe poverty ranking of South Africa compared to Vietnam on incidence and squared-gap poverty measures, but not poverty gap.

4. Are the severely poor and chronically poor the same people?

This section considers whether the severely poor and the chronically poor are the same people. The issue can be framed as a question about whether serial dependence in consumption (or income) – i.e. its chronicity – is related to base year consumption levels. Does consumption regress to the mean? This question can be formulated in two senses: *unconditional* and *conditional* on household characteristics. Notice each of these refers to regression towards different 'means', as explained next.

- Regression to the unconditional mean, given by a negative relationship between base year consumption level and its growth, would indicate poorer households experience greater consumption growth. So over time, consumption of poorer households 'regresses' or tends towards the mean consumption across all households. In that case the poorest would tend to catch-up with the rest, and so severe poverty and chronic poverty would relate only while the poorest households 'adjust' to the mean. The coincidence between the severe poor and chronic poor would be slight.
- Regression to the conditional mean examines the same dynamics, but controls for household characteristics. A negative relationship between base year consumption level and its growth, if controlling for household characteristics, says that households regress towards the conditional mean, where the conditional mean is the mean consumption across households of identical observable characteristics (rather than the mean across all households).

An important drawback with available literature on these issues is that most studies model the serial process of the *average* household, whereas obviously CSP is concerned with serial processes in the *poorest* households. The literature search did not reveal studies modelling serial processes specifically in the poorest percentiles of the distribution, say using quantile regressions.

Regression to the unconditional mean

A transition matrix examines regression to the unconditional mean. Gaiha (1988; 1989) reported results using a longitudinal sample spanning 1968-70 in rural India. Gaiha (1988) found 12 percent of households were poor in both years and became poorer, and 21 percent of households were poor in both years but not poorer. In other words, poverty severity increased in nearly 37 percent of chronically poor households. Gaiha (1989) argued the "chronically poor were not *necessarily* the poorest – in fact a substantial number were

moderately poor". The data for this is reproduced in Table 4. It shows how households poor for three years during 1968-70, i.e. chronically poor, were distributed across income deciles and classes. Gaiha (1988) used a poverty line of Rupees 355 for 1968, i.e. the right-hand panel refers to income classes all below the poverty line. Gaiha (1989, p.301) comments that "the poorest were not necessarily chronically poor… and the chronically poor were not necessarily the poorest".

Table 4: India: poverty severity 1968 and poverty chronicity 1968-70

1 Per cap income decile 1968	2 % chronic poor in each decile	3 % of total chronic poor	4 Per cap income class 1968, Rs	5 % chronic poor in each class	6 % of total chronic poor
Poorest	56.7	21.0	under 101	51.1	9.6
2	54.2	20.1	101-200	56.5	33.5
3	53.3	19.5	201-300	46.9	43.5
4	44.2	16.5	301-355	31.5	13.4
5	43.6	16.0			
6	18.5	6.9			

Note. Poverty line in 1968 was Rupees 355.
Source. Gaiha (1989)

Other studies using microlongitudinal data report poverty transitions from classes defined according to fractions of the poverty line (i.e. according to classes of poverty severity). In this kind of analysis, usually, those below the poverty line in the base year are split into two groups: poor *below* half the poverty line (labelled here 'severely poor'), and poor *above* half the poverty line (labelled here 'moderately poor'). Then each group's poverty transition in the terminal year is determined. Figure 6 shows the percentages of each group observed non-poor in the terminal year. Clearly Gaiha's conclusions need qualification in the light of this data, covering seven countries, of which India is represented by a resurvey of Gaiha's original sample. In every case a larger proportion of the moderately poor escaped poverty in the terminal year, even if not all the poorest were chronically poor. Detailed data for Uganda in Figure 7 shows poverty escape decreasing quite steadily with poverty severity (subject to the caveat noted below the figure).

Figure 6: Transitions into non-poverty, by severity of poverty

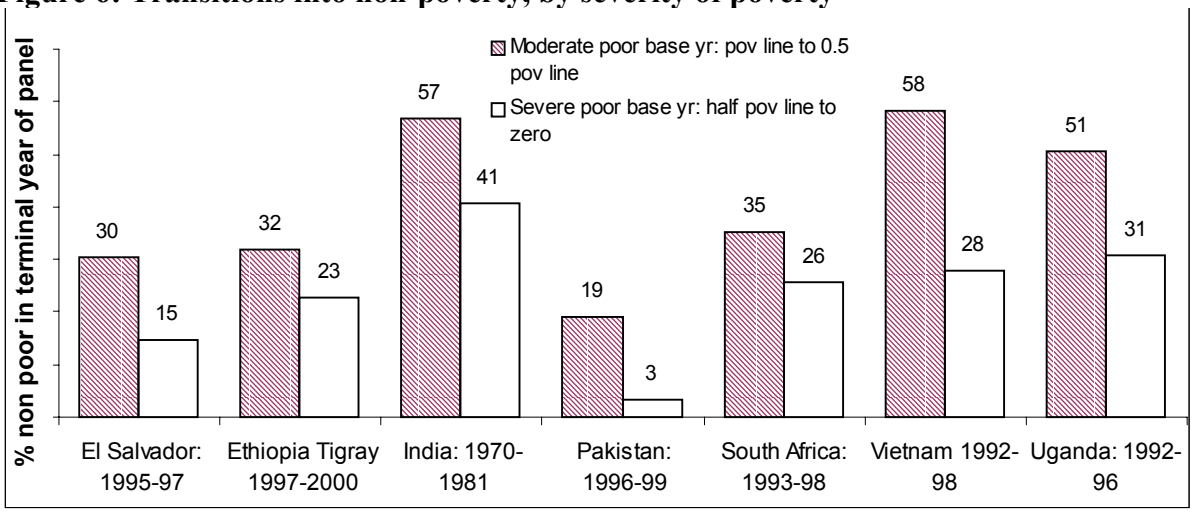
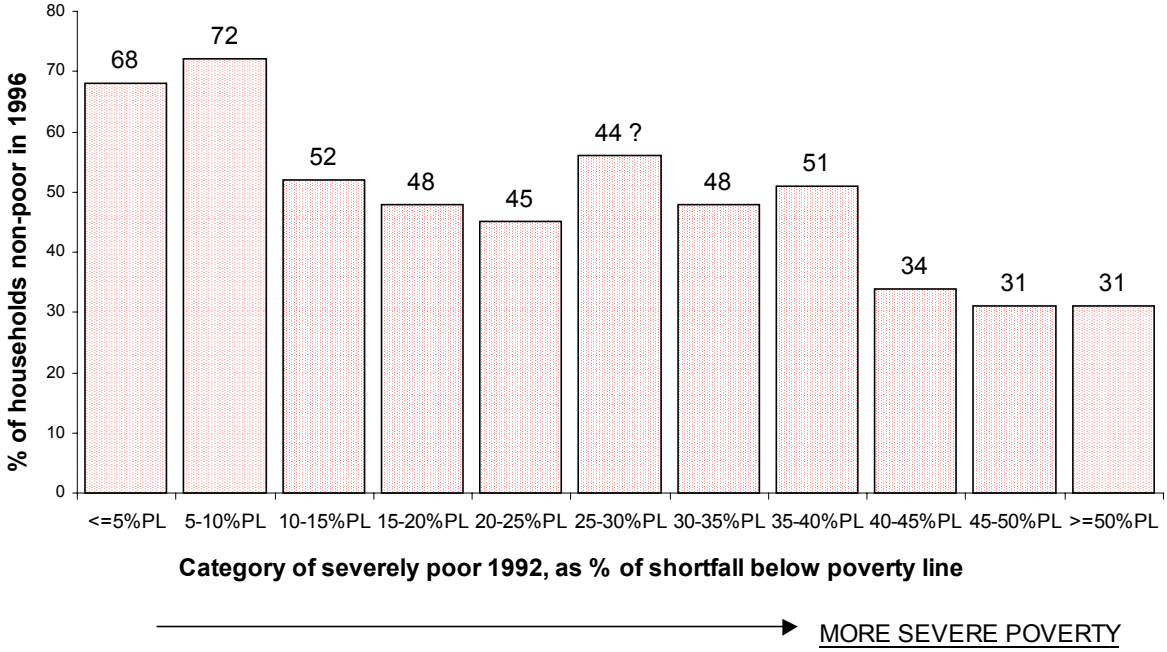


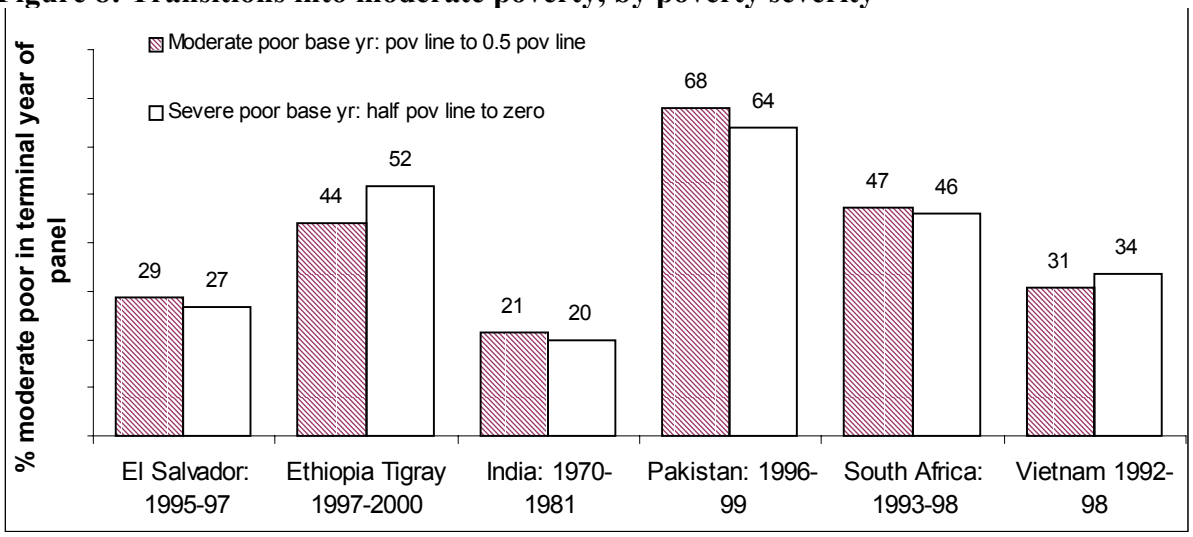
Figure 7: Uganda: poverty chronicity 1992-96 by poverty severity 1992



Note. The question mark over the data for '25-30% PL' is there because I suspect a typo in the original source. I contacted the authors for clarification, but without reply.
Source. Okidi and McKay (2003)

Transitions into moderate poverty are shown in Figure 8. Interestingly, and perhaps surprisingly, the severe poor in the base year and the moderate poor in the base year have similar chances of being moderate poor in the terminal year.

Figure 8: Transitions into moderate poverty, by poverty severity



Transitions into severe poverty are shown in Figure 9. Clearly a large proportion of the severely poor in the base year – between 26 and 58 percent, depending on country – are severely poor in the terminal year, sometimes as much as 11 years afterwards.

Figure 9: Transitions into severe poverty, by poverty severity

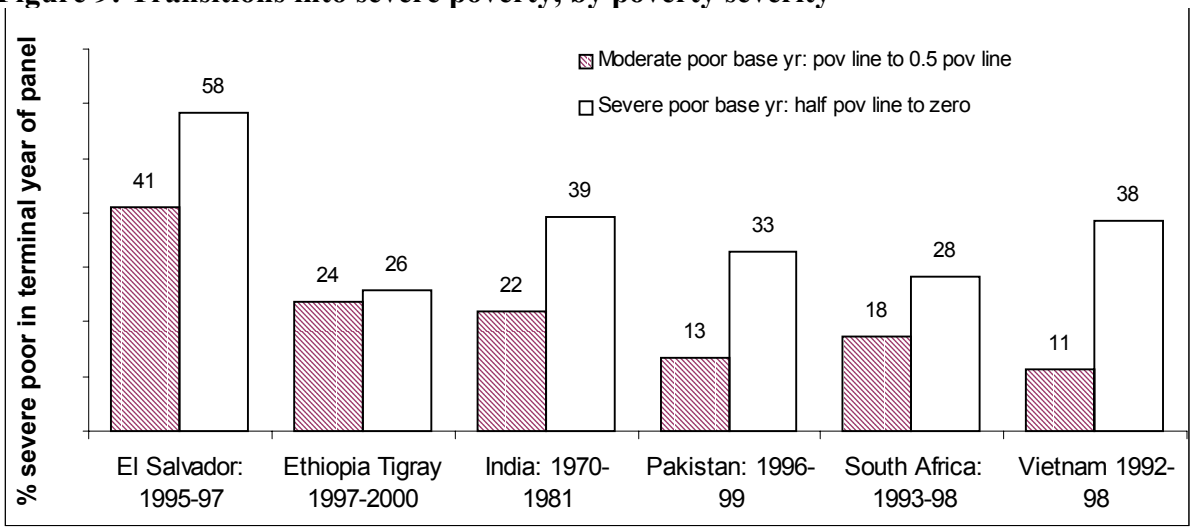


Figure 8 and Figure 9 indicate substantial dynamics below the poverty line, with poverty severity increasing for some of the poor and decreasing for others. In several countries, dynamics *below* the poverty line exceeds dynamics *crossing* the poverty line. This is consistent with evidence reported in Yaqub (2003) that economic insecurity, in the form of consumption volatility through time, may rise in conjunction with poverty. Not shown are similar poverty transitions using year-on-year data (hence excluded earlier in the paper, but

relevant for insecurity). These exist for Peru in 1997-1998 and 1998-1999 (Herrera 2001), Indonesia in 1997-1998 (Skoufias et al. 1999) and Côte d'Ivoire in 1985-1986, 1986-1987 and 1987-1988 (Grootaert and Kanbur 1995).

Regression to the conditional mean

Out of 27 microlongitudinal samples, with which multivariate models of economic dynamics have been estimated, 11 included as a regressor some measure of base year income or consumption. Details of the 27 mobility models are in Table 5, and discussed further in Yaqub (2003). The models employ five different concepts of economic mobility (study types 1 to 5 in the table), viz. 1/ changes over time in the levels of income or consumption, 2/ intertemporal mean income or consumption, 3/ duration of poverty, 4/ exit probabilities from poverty, 5/ relative mobility.

Table 5: Summary of multivariate mobility models using panel data

Type	*Study*	*Sample*	Mobility concept	Country	Period	N waves	N hhlds	Indicator	Source
1	1	1	Change in levels	Chile, rural	1968-86	2	146	Income per capita	Scott & Litchfield 94
	2	2	Change in levels	China, rural	1987-97	10	3100	Income per prime age	Giles 02
	3	3	Change in levels	Côte d'Ivoire, rural	1987-88	2	250+	Exp per capita	Grootaert et al. 97
		4	Change in levels	Côte d'Ivoire, urban	1987-88	2	250+	Exp per capita	Grootaert et al. 97
	4	5	Change in levels	El Salvador, rural	1995-97	2	489	Income per capita	Conning et al. 00
	5		Change in levels	El Salvador, rural	1995-97	2	494	Income per household	Sanfeliu & Vega 00
	6	6	Change in levels	Ethiopia, rural	1994-95	2	1411	Exp per capita	Dercon & Krishnan 00
	7	7	Change in levels	India, Bombay slum	1987-92	2	220	Earnings of hhld head	Swaminathan 97
	8	8	Change in levels	India, rural cultivating hhold	1975-83	9	873	Income per capita	Gaiha & Deolalikar 93
		9	Change in levels	India, rural non-cultivating hh	1975-83	9	657	Income per capita	Gaiha & Deolalikar 93
	9	10	Change in levels	Indonesia, rural	1993-97	2	6768	Income per capita	Fields et al. 01
	10	11	Change in levels	Indonesia, rural	1997-98	2	8141	Exp per capita	Skoufias et al. 99
	11	12	Change in levels	Mexico, rural ejido	1994-97	2	1017	Income per hhld	Davies et al. 99
	12	13	Change in levels	Peru, Lima	1985-90	2	699	Cons per cap	Glewwe & Hall 98
	13	14	Change in levels	Poland	1995-96	2	4919	Exp equivlsd	Okrasa 99b
	14	15	Change in levels	Russia	1994-98	2	2390	Exp per capita	Jovanovic 00
	15	16	Change in levels	South Africa, KZ-N non-white	1993-98	2	1393	Exp per capita	Maluccio et al. 00
	16		Change in levels	South Africa, KZ-N non-white	1993-98	2	1003	Income per capita	Fields et al. 01
	17	17	Change in levels	South Korea	1994-98	5	3000+	Exp per capita	Goh et al. 01
	18	18	Change in levels	Venezuela	1997-98	2	7747	Income per capita	Freije 00
	19	19	Change in levels	Zimbabwe, rural	1994-97	4	320+	Net crop income hhld	Owens & Hoddinott 98
2	20	20	Intertemporal-mean shortfall	China, rural	1985-90	6	5854	Cons per capita	Jalan & Ravallion 99
	21	21	Intertemporal-mean shortfall	Egypt	1997-99	2	346	Exp per capita	Haddad & Ahmed 02
3	22	22	Status: 4yrs poor or not	Hungary	1992-97	6	1800+	Income equivlsd	World Bank 01
			Number years poor	Poland	1993-96	4	4919	Exp equivlsd	Okrasa 99b
4	23	23	Exit abs pov	Madagascar, Antananarivo	1997-99	3	1249	Income per hhld	Herrera & Roubaud 01
	24	24	Exit abs pov	Pakistan, rural	1986-90	5	686	Income per capita	Baulch & McCulloch 98
	25	25	Exit abs pov	Peru	1997-98	2	3100	Exp per hhld	Herrera 01b
			Exit abs pov	Poland	1993-96	4	4919	Exp equivlsd	Okrasa 99b
			Exit abs pov	Venezuela	1997-98	2	7747	Income per capita	Freije 00
			Move to richer income band	Chile, rural	1968-86	2	146	Income per capita	Scott & Litchfield 94
5	26	26	Move to richer decile	Malaysia	1967-76	2	1000+	Male head earnings	Trzcinski & Randolph 91
	27		Change rank	Mexico, rural ejido	1994-97	2	1046	Income per hhld	Lanjouw 98
			Exit poorest quintile	Venezuela	1997-98	2	7747	Income per capita	Freije 00
	28	27	Exit p'rst 40% to r'chst 40%	Vietnam	1992-97	2	4305	Exp per capita	Haughton et al. 01

These models show regression to the conditional mean. A negative coefficient was reported on base year consumption (or income) in all 11 models of mobility that included it as a

regressor. In all but one of these, the coefficient was statistically significant. The details are reported in Table 6, which shows regressors controlling for other household characteristics. This suggests the poorer the household, the greater the subsequent mobility, controlling for other household characteristics.

Table 6: Evidence of regression to the mean from mobility models

		Chile Scott	CIV-r Grootaert	CIV-u Grootaert	ESLV Sanfeliu	IDON Fields	RUS Jovanovic	SAF Fields	SKOR Goh	VZLA Freije	POL Okra	Chile Scott
Regrsn to mean	Inc level base yr	–**	–**	–**	–**	–**	–**	–**		–**		–**
	If poorest 20%?								–**			
	Num yrs poor										–**	
Spatial	Provincial effect?	Sig	Sig	Sig		Sig	Sig			Sig		
	If urban?					+**		+**	+**			
	Km to paved road				–							
Hhold type	Hh size								+**			
	Num dependents		–**	–**		–**	–	–**	–**	–**	–	
	Age hh head	+**	+**	–		–	+	–		+	–	–*
	Age-sq hh head		–**	+		+**	–	+		–		
	Lone adult hh					–**		+**		–	+	
	Female hh head		+**	+		–	–	–**	+**	+	+	
	Racial effect?		Sig	Sig								
Hhold human capital and labor	Illness hh or head	–										–
	Tot hh educ		+	+**	+**					+**		
	Educ head	+				+**	+**	+**		+**	+	–
	Formal job, head					+		+		+**	–	
	Sectoral effects?		Sig	Sig	Sig						Insig	
Hhold physcl capital	Land	+	+**	–	+**							+**
	Livestock	+**										–
	Tools		–	+								
	Own house		–	+								
	N rooms	–										–
	Own durables		+	+**								
Change hhold type	*Rise hh size*	+	–**	–**								–
	Rise # dependts	+		–**		–**		–**		–**		+**
	Rise # adults					+		–				
	Into female head					–		–**				
	Into male head					+*		+				
	Marriage									–		
	Sepratn /divorce									+		
Change human capital or labor	*Hh educ rise*		–	+	+**							
	Into formal job	+				+**		+		+**		
	Lost formal job	–				–*		–				
	Change sector		Sig	Sig	Sig							
Change hhold physcl assets	*Gain land*	+*	+	+	+**							+**
	Gain livestock	+**										+**
	Gain tools		+	+								
	Gain debt								+**		–	
	Gain durables		+**	+**								
	Sell assets								+**			
Shocks	Windfall	+										+
	Earthquake	–**										
	N	134	90+	90+	475	4999	2390	857	9788	7744	798	113
	R-sqr	0.55	0.22	0.18	0.59	0.45	0.28	0.52	0.05	0.46		0.40

Note. ** indicates statistical significance of the coefficient at the 5 percent level
Source. See Table 5

The result of regression to the conditional mean generates a new question about determinants of conditional mean consumption, and why it lies below the poverty line for households with certain observable characteristics, i.e. CSP households. The next section of the paper considers whether household characteristics are the same for severely poor and chronically poor households.

5. Coincidence of correlates of severe poverty and chronic poverty?

This section examines whether socioeconomic characteristics that identify chronic poverty are the same socioeconomic characteristics identifying severe poverty. Characteristics correlating with chronic poverty were determined in a previous literature, mentioned above (Yaqub 2003). Briefly, the method to determine the list of correlates of chronic poverty was as follows. First, all socioeconomic characteristics included as regressors in household models of socioeconomic mobility were listed, also noting their direction of effect and statistical significance. Second a 'vote counting method' tallied the number of discrete samples in which a socioeconomic characteristic showed a statistically significant correlation with upward mobility (i.e. a positive effect on mobility different from zero at the five percent significance level). The vote counting method has drawbacks, but is simple.[8] The results are shown as Table 7. The chronically poor tend to be spatially concentrated, in larger households with more dependants, and have lower education levels and fewer physical assets. The effect of sex and age of household head could not be generalised.

[8] Vote counting has recognised limitations as a meta-analytic method because it wastes statistical information (Hunter & Schmidt 1990; Bushman 1994). It is biased towards studies with large samples detecting small effect sizes, and so variations in sample sizes across studies may cause erroneous conclusions. The studies in this review with sample sizes below 400 did not report markedly unusual significant results. A 'publication bias' towards reporting 'significant' results might be assumed, in which case votes for 'not significantly different from zero' would be attenuated. Moreover, the focus on significance ignores the important issue of effect sizes. Ideally, for example, we would want to compare the sizes of effect on mobility of one characteristic relative to another characteristic, across different country contexts. For example, it may be that in some countries the effects of 'region' are largest, and in other countries 'ethnic' effects dominate. Detecting such cross-country variation in effect sizes could provide a way for micro-longitudinal literature to be better related to macro-societal factors, a concern already mentioned.

Table 7: Correlates of upward mobility, vote counting across 27 study samples

		Positive significant	Negative significant	Not significantly different from zero	Not included	Total samples
1 Spatial	Provincial effects?	Sig effects in	12 samples	5	10	27
2 Regression to mean	Base-yr inc level. If poorest 20%? Num yrs poor.	0	10	1	16	27
3 Household type	Age hh head	6	2	10	9	27
	Household size	4	6	3	14	27
	Rise household size	2	5	2	18	27
	Num dependents	3	12	4	8	27
	More dependents	2	8	1	16	27
	Female hh head	3	3	10	11	27
4 Human capital	Hhold educ, head's and total	12	0	9	6	27
	More education	3	1	4	19	27
5 Physical capital	Land	9	0	3	15	27
	Gained land	6	0	3	18	27

Based on these characteristics of chronic poverty, I constructed a series of tables using severe poverty with the following socioeconomic breakdowns:

- rural vs. urban – Table 8
- household size – Table 9
- sex of household head – Table 10
- no education vs. secondary education – Table 11
- agricultural workers vs. industrial workers – Table 12.

The focus remained on the 14 countries selected earlier for having absolute chronic poverty estimates based on microlongitudinal datasets. These tables are presented below, and indicate the approach taken for the analysis. Each table shows, for each subgroup, measures of severe poverty. The tables are incomplete for many countries. The difficulty has been to find estimates of severe poverty by subgroups that are reasonably comparable and presented in a way consistent for the tables. A summary of the conclusions from these tables is given as Table 13. It was possible to fill several cells in the summary table using results that were not easy to present in the earlier tables – those additional sources are cited in brackets in the table.

Table 8: Severe poverty, by rural-urban breakdown

Country	Year	Rural				Urban				
		P0- rural pop	P0-rural poor	P1	P2	P0-urban pop	P0-urban poor	P1	P2	
Bangladesh	1995	40	70	15.40	5.74	14	41	9.19	3.44	World Bank (1998)
China	1988			5.60	3.02			0.12	0.08	Shi (2001)
China	1995			2.60	1.43			0.73	0.25	Shi (2001)
Egypt	1995			4.33	1.16			1.99	0.55	Derived from World Bank (2002)
El Salvador	1992	14				7				World Bank (1994)
Ethiopia	1994			16.80	8.80			13.80	6.90	Bigsten et al. (2003)
Ethiopia	1997			12.70	6.20			12.60	6.10	Bigsten et al. (2003)
India	1993			8.39	2.79			7.41	2.42	World Bank (2000)
Kenya	1994	52	81	27.00	15.00	20	54	13.00	6.00	Geda et al. (2001)
Madagascar	1993	66	86	36.90	21.50	35	74	17.60	8.70	World Bank (1996)
Pakistan	1998			7.90	2.51			5.00	1.51	World Bank (2002)
Vietnam	1992			21.00	9.20			6.00	2.30	Glewwe et al. (2001)
Vietnam	1997			12.00	4.40			2.00	0.50	Glewwe et al. (2001)
Zimbabwe	1995	48				8				Alwang et al. (2002)

Table 9: Severe poverty by household size

Country	Year		Household size, persons										
			1	2	3	4	5	6	7	8	9	10	
Egypt	1999	SP1	0.04	0.09	0.25	0.51	1.17	2.32	3.94	6.54	8.89	10.14	World Bank (2002)
Egypt	1999	SP2	0.01	0.02	0.05	0.11	0.27	0.55	0.96	1.81	2.69	2.99	World Bank (2002)

Table 10: Severe poverty by sex of household head

Country	Year	Male hhold head				Female hhold head				
		P0-male hd	P0-poor male hd	P1	P2	P0-fem hd	P0-poor fem hd	P1	P2	
China	1995			2.6	1.4			2.8	1.5	Shi (2001)
Egypt	1999			3.0	0.8			2.6	0.7	World Bank (2002)
Kenya	1994	21	35			44	55			Calc from PPA in World Bank (1995)
Madagascar	1993	52				54				Derived from World Bank (1996)
Vietnam	1992			19.0	8.3			15.0	6.4	Glewwe et al. (2001)
Vietnam	1997			10.0	3.6			7.0	2.9	Glewwe et al. (2001)

Table 11: Severe poverty by education of household head

		No education				Secondary level				
Country	Year	P0 popn	P0 poor	P1	P2	P0 popn	P0 poor	P1	P2	
Bangladesh	1995	48				6.9				World Bank (1998)
Egypt	1999			5.1	1.40			1.1	0.20	World Bank (2002)
Ethiopia	1997				0.06				0.04	Dercon (2000)
Madagascar	1993	65				13				Derived from World Bank (1996)
Vietnam	1992			28	14.10			13.0	5.00	Glewwe et al. (2001)
Vietnam	1997			20	9.00			5.0	1.70	Glewwe et al. (2001)

Table 12: Severe poverty by employment sector

Country	Year	Agricultural workers				Industrial workers				Professional				
		SP0-pop	SP0-poor	SP1	SP2	SP0-pop	SP0-poor	SP1	SP2	SP0-pop	SP0-poor	SP1	SP2	
Egypt	1999			3.53	0.94			3.12	0.86			0.57	0.13	World Bank (2002)
Madagascar	1993	72.4		41	24.6	45.9		25.5	14	2.2		1.4	0.6	Derived from World Bank (1996)
Vietnam	1992			23	9.8			12	4.2			6	2.1	Glewwe et al. (2001)
Vietnam	1997			13	4.9			6	1.9			2	0.7	Glewwe et al. (2001)

Table 13: Which subgroup has the more severe poverty? Summary matrix

Country	Spatial	Household size	Sex hhold head	Education hhold head	Econ sector of hhold head
Bangladesh	Rural			Illiterate	
China	Rural		No diff		
Egypt	Rural	Large hhold	No diff	Illiterate	(Agric = Indust) > Professional
Ethiopia	Same	Large hhold (Dercon 2000)			
El Salvador	Rural	Large hhold (World Bank 1994)		Illiterate (World Bank 1994	
India	Rural				
Kenya	Rural		Female		
Madagascar	Rural	Large hhold (World Bank 1996)	No diff	Illiterate	Agric > Indust > Professional
Pakistan	Rural	Large hhold (World Bank 2002)			
Vietnam	Rural		Male	Illiterate	Agric > Indust > Professional
Zimbabwe	Rural				

Table 13 shows patterns of severe poverty by socioeconomic subgroups that are consistent across countries for which data is available. In all countries, poverty in rural populations is at least as severe or more severe than in urban populations. This corresponds to strong spatial effects in chronic poverty, noted in socioeconomic mobility models. Larger households have the more severe poverty, as do households with heads with no education and heads working in agriculture. The sex of household head appears not to have an obvious effect. These characteristics of the severe poor, including the result of 'no effect' of sex of household head, are similar to those obtained for chronic poverty. The conclusion would be that the severe poor and chronic poor share similarity in at least some household characteristics.

6. Why panel datasets may omit people of interest

It is possible that the above results actually *understate* the differences between the moderate poor and severe poor, because it may be harder to track the most severely poor longitudinally. If so, samples in microlongitudinal datasets could under-represent CSP. This difficult issue is analysed here using sampling information reported in microlongitudinal studies, and in some cases, literature cited by them.

Sample retention rates

Table 14 shows that whilst most microlongitudinal datasets lost large proportions of base year samples, few studies mentioned sample attrition (i.e. five did so). In a few cases the relevant information was unreported for even the elementary calculations attempted for the table. Base year sample sizes are reported in column 1, and sample sizes on which poverty transitions were actually analysed are reported in column 3. In some cases, further sample loss might have occurred in analyses using additional data, such as socioeconomic groupings.

The base year sample retention rate, given as column 3 over column 1, ranges between 8 and 99 percent. In at least Egypt and Bangladesh loss of some of the base year sample was intentional and done randomly to maintain sample representativeness. Other datasets attempted to maintain sample sizes over time, and others still, extracted the longitudinal sample from a series of surveys with overlapping samples. To the extent that relevant information was reported by studies, column 2 shows the sample size that was targeted for longitudinal tracking. The proportion calculated as column 3 over column 2 gives the target sample retention rate, and this ranges between 42 and 99 percent.

Table 14: Sample retention in microlongitudinal datasets

		1	2	3	3/1	3/2			
Country	Period	Base year N	Target N for panel	Estimation panel N	Base N retention	Target N retention	Attrition analysed	Note	Source
Bangladesh	1988-2000	1245	695	379	0.30	0.55		Hhold splits excluded	Sen (2003); Hossain et al. (2002)
Bangladesh	1990-94	1200	1200	Unstated	?	?			Sen (2001)
China Sichuan	1991-95	5500	5500	3311	0.60	0.60		Hh remained even if head died, migrants not tracked	McCulloch & Calandrino (2002)
China southeast	1985-90	9896	9896	5854	0.59	0.59		Hh remained even if head died, migrants not tracked	Jalan & Ravallion (1999); Chen & Ravallion (1996)
Egypt	1997-99	2450	380	348	0.14	0.92	Yes	Migrants not tracked	Haddad and Ahmed (2002)
Ethiopia Tigray	1997-2000	400	400	397	0.99	0.99			Hagos & Holden (2003)
Ethiopia rural	1994-97	1500	1500	1403	0.94	0.94			Bigsten et al. (2003)
Ethiopia urban	1994-97	1500	1500	1330	0.89	0.89		Homeless not tracked - stated as important	Bigsten et al. (2003)
El Salvador	1995-97	628	628	494	0.79	0.79			Sanfeliu & Gonzalez-Vega (2000)
India	1968-70	5115	5115	4118	0.81	0.81			Gaiha (1988; 1989)
India	1970-81	5115	5115	3139	0.61	0.61			Bhide & Mehta (2003); Gaiha (1988; 1989)
India	1975-83	240	240	170	0.71	0.71	Yes		Gaiha & Deolalikar (1993)
Kenya	1994-97	981	981	808	0.82	0.82			Christiaensen & Subbarao (2001)
Madagascar	1997-99	3000	3000	1249	0.42	0.42			Herrera & Roubaud (2001)
Pakistan	1986-90	Unstated	800	686	?	0.86			Baulch & McCulloch (1998)
Pakistan NWFP	1996-99	355	355	299	0.84	0.84		Hhold splits tracked, migrants not tracked	Kurosaki & Khan (2001)
Peru Lima	1990-96	1528	Unstated	421	0.28	?		Resurveys on dwellings, not hholds	Herrera (1999)
Peru	1997-99	4022	4022	1720	0.43	0.43			Herrera & Roubaud (2001)
South Africa	1993-98	1400	1400	1171	0.84	0.84	Yes	Incl 50 migrants, tracks hhold splits	Cater & May (2001)
Uganda	1992-95	9924	Unstated	818	0.08	?	Yes	Only 314 in panel all years 1992 thru 1995	Okidi & McKay (2003)
Vietnam	1992-97	4800	4800	3842	0.80	0.80		Migrants not tracked	Glewwe & Nguyen (2002)
Zimbabwe	1994-97	400	400	Unstated	0.85	0.85	Yes		Owens & Hoddinott (1998); Baulch & Hoddinott (1998)

Tests of attrition and panel construction

Of course random sample loss, even if large, might not bias analysis of CSP, assuming the severely poor were properly represented in the base year. This might seem to be the conclusion from the testing of some microlongitudinal datasets by Haddad and Ahmed (2002), Falaris (2003), Maluccio (2000), and Alderman et al. (2000). Whilst all these studies

found that characteristics of attritors differed from those retained by the dataset, all except Maluccio found that attrition had little effect on parameters in the particular multivariate models they tested.

Yet the worry remains that this evidence of a lack of effect from attrition, whilst possibly true at the regression mean for a wide range of models, may not apply to the extreme poorest tail of the distribution. Available descriptions of the process of construction of microlongitudinal datasets suggest cause for concern, or at least reason enough to call for more careful testing of the effects of attrition on results on poverty dynamics in general, and in the present context, poverty dynamics of the severely poor in particular. Often, dataset construction involves difficult decisions on how to treat households experiencing change, sometimes with no 'correct answer'. Real-life changes in households make longitudinal tracking more complicated. Yet at the same time, many such household changes are associated with, or even causally related to, CSP. Examples include the following.

- Base year households temporarily splitting, recognised as a coping mechanism in poverty. Are all, or any, of the splinter households tracked? Are stronger, less poor, more easily identifiable, household splinters more likely to be retained?
- Deaths of the household head, more likely amongst the severe poor. Is the household less easily identifiable for the purposes of tracking after death of head? Does that depend on who in the household is left alive, for example, the disabled or elderly who might be cared for (or not) elsewhere? Does it matter if the dead household head was male or female?
- Separation and divorce. Who gets tracked? Are better-off households with separation or divorce more likely to be tracked because resources are enough for both splinters to remain economically viable?
- Migration. Some recent evidence suggests the severely poor may be more mobile than previously assumed (Hossain et al. 2003). Are migrants tracked? Is the information on them as reliable, if collected by proxy via other household members, who may receive occasional remittances and visits?

The following quotes illustrate the complications that may arise, and how they were addressed in constructing some microlongitudinal datasets cited already. Unusually, the reasons for sample loss were reported step-by-step in Peru and Vietnam, and these are reproduced as Table 15 and Table 16. Apart from the difficulties in tracking households, a

recurring theme in these quotes is the difficulty in interpreting household change observed in the data, viz. if a change represents a 'true' change in the household's circumstances or a change in the household's identity.

India NCAER panel

"The households that are considered to be part of the panel, have following features:

1. The head of the household in 1970-71 was alive in 1981-82 and the household was intact.
2. The head of the household was alive, but all the members of the household had not stayed together.
3. The head of the household in 1970-71 was dead in 1981-82 but rest of the household was intact.

The number of households that formed the panel in the final analysis was 3139" (Bhide and Mehta 2003, p.8).

Ethiopia urban panel

"Such a sampling frame misses an important social group from the point of view of poverty measurement, the homeless, a group whose ranks are swelling in most urban centers in Ethiopia, particularly the larger ones" (Bigsten et al. 2003, p.90).

Peru Lima panel

The dataset consisted of resurveys of dwellings, from which a panel was constructed matching on sex and birth year of household head (Herrera 2001).

South Africa KIDS panel

"Because the 1993 survey sampled physical dwellings (and then built up households based on the set of people who lived in those dwellings), decisions had to be made about the definition of the unit that was to be reinterviewed in 1998. For each household in the 1993 survey, a set of core household members was identified based on age, economic activity and likely status and decision-making power within the household. The fieldwork protocol developed dictated that in the event that a 1993 household fractured (in the sense that core people split off into multiple household units), then all new household units would enter the 1998 survey" (Carter and May 2001). To examine sample attrition, Carter and May (2001, p.1994) compared poverty estimates in the KwaZulu-Natal panel against a nationally representative sample and found that estimates in the panel were lower.

China Sichuan and southeast provinces panels

Both the Chinese panels were constructed from Rural Household Surveys fielded by China's State Statistical Bureau (SSB). The longitudinal sampling arose from administrative convenience for the SSB in fielding survey enumerators. "If the household head died during the period of the survey, the household still stayed in the panel. However if the whole household moved away, then it was replaced although we were informed that this is rare" (McCulloch and Calandrino 2002, p.4).

"Households were deleted [from the panel dataset] if the household was not surveyed every year (i.e. variables indicating county, village and household were not present for each year)… [and locational] variables Geography, Early Liberated Area, Boarding Area and Minority Area do not have the same value between 1991 and 1995" (McCulloch and Calandrino 2002, p.8).

"The resulting set of households still contained a measure of ambiguity [about whether they were the same households]. A scoring approach was therefore applied. A score of one was added to the household score when: the variable Family Type [household demographic composition] had the same value across all five years; the number of person in the household had the same value across all five years; the difference between year-end deposits and year-beginning deposits between adjacent years lay within the range ±200; and the difference between year-end cash-in-hand and year-beginning cash-in-hand between adjacent years lay within the range ±200. Households with a score of three or less were then dropped from the panel" (McCulloch and Calandrino 2002, p.8).

"Lack of rotation can also entail that the sample becomes less representative of the rural population over time due to sample ageing and/or attrition. We were told, however, that attrition is nearly zero… Our interviews confirmed that the monthly fee makes participation attractive for the poor. But it may be quite inadequate compensation for the rich. In better-off counties the fee is topped up by the local government-apparently a doubling is not uncommon. Assistant interviewers are told to develop a good relationship with the sampled households, and that local officials emphasize that it is one's "duty" to participate if selected. Apparently these factors do reduce attrition" (Chen and Ravallion 1996, p.28).

"In interviews with county officials we were told that it was normal to find at least one literate member. When none is literate then the assistant interviewer is supposed to do the bookkeeping for that household. In one county in Guangxi, an official told us that this was a problem, due to literate (typically younger) members of the sampled household leaving for work elsewhere. In this case, neighbors were relied upon to help fill in the diaries. However, there is clearly a temptation to drop that household in favor of a seemingly similar household with at least one literate member. Thus, there may be some sample bias, entailing under-sampling of illiterate and (undoubtedly) poor households" (Chen and Ravallion 1996, p.28).

Uganda panel

"The sample frame incorporated panel elements but during data entry panel identification numbers were not created but a sizeable number of the panel observations were recovered by a group of experts from Gothenburg University and the World Bank. The recovered set has 344 observations. When we subset it to observations in 1992 and 1996 only, we obtain 818 observations. This subset is used… Due to the small sample size of the four-year panel and the fact that the panel recovery exercise referred to earlier could not identify all the surveyed panel households, resulting in non-random attrition, it is farfetched to claim its representativeness."

"However, we investigate the seriousness of the representativeness issue by comparing within each year the consumption expenditures for the panel households with those of the households that were excluded from the panel… [M]ean consumption expenditure for the panel is higher than for the non-panel observations by five to nine percent [in any given year of the panel]. The P-values reported in the tables indicate that the mean differences are not statistically different from zero at the standard levels of significance. We conclude that sample statistics based on expenditure data from the panel and non-panel observations do not significantly differ" (Okidi and McKay 2003, p.5). Stochastic dominance tests comparing 1996 against 1992 gave similar results regardless of whether the sample consisted of only panel households or each year's full sample.

Peru, Lima

"Return visits in 1990 to the 1280 dwellings in Lima surveyed in 1985–1986 yielded panel data on 699 households... [see Table 15 below]. In 1990, 1057 households were interviewed,

of which 312 were dropped because all 1985 members were gone by 1990. Of the remaining 745, 93% had the same head in both years. For the other 7%, three outcomes were possible:

1. the household head changed, but the 1985 head was still a member in 1990;
2. the 1985–1986 head was absent in 1990, but the 1990 head was a member in 1985–1986; and
3. the 1985–1986 head was absent in 1990 and the 1990 head was absent in 1985–1986.

For the first outcome, the 1985 head was treated as the head in both years, and the 1990 head was so treated for the second outcome. Twelve households of the third type, and 34 others with incomplete data, were dropped" Glewwe and Hall (1998).

Table 15: Panel attrition in Lima Peru panel, 1985-90

Total number of dwellings in 1985 sample	1280
Address lost by 1990	20
Dwelling demolished or unoccupied or no longer private residence	83
Occupants refused interview or interview incomplete	101
Informant absent or speaks only foreign language	5
Dwellings with interviews	1032
Households reinterviewed in 1990	1057
Minus households with no 1985 members	312
1985 hhold head not present in 1990, and 1990 head not present in 1985	12
Households lacking complete consumption data	18
Households lacking complete parents of head data	13
Households with outlying consumption data	1
Households lacking data in education of head	2
Total number of households in panel	699

Source. Glewwe and Hall (1998), Table 6

Vietnam

"…interviewers were instructed to return to the dwelling that the household inhabited in the 1992-93 survey. If the household had moved within its village, interviewers attempted to find it and complete the interview. If the household moved outside of the village, no attempt was made to reinterview it. If some members moved while others remained in the original dwelling, the interview was done using all the current inhabitants of the original dwelling (both original members and "newcomers")" Glewwe & Nguyen (2002).

"… of the 4800 households interviewed in 1992-93, 4300 were reinterviewed in 1997-98… However, some of the households that remained may have rather tenuous links to the original household. First, one should probably exclude households for which the head has changed and the new head was not a member in the 1992-93 survey. Doing this eliminates 24 households… The remaining 4276 households are the first sample used in this paper. A

stricter definition of household retention would require that at least half of the individuals who were members in either 1992-93 or 1997-98 were members in both years. Doing this eliminates another 440 households… The remaining 3842 households are the second sample used in this paper" Glewwe & Nguyen (2002).

Table 16: Panel attrition from 1992-1993 to 1997-1998, Vietnam

		Households	Individuals
1992-93 households		4800	23,839
	Excluded from 1997-98 survey	96 (2.0%)	421 (1.8%)
	All household members moved	404 (8.4%)	1,786 (7.5%)
Remaining households		4300 (89.6%)	21,632 (90.7%)
Among remaining 4300 households:			
Head is the same in both years		4276 (89.1%)	21,538 (90.3)
50% or more members are the same in both years		3836 (79.9%)	19,100 (80.1)
50% or more members are the same in both years, plus 6 "natural" cases		3842 (80.0%)	19,119 (80.2)

Source. Glewwe & Nguyen (2002), Table 1

Note 1. The six natural cases refer to households in which no one moved in or out of the household in the past five years, but death or birth led to cases where the number of household members present in both years was less than 50% of the individuals who were members in either year. Examples are a household with 3 adults in 1992-93 of which two had died by 1997-98, and a household with a married couple in 1992-93 who had had three children by 1997-98.

Note 2. The figure of 19,119 includes individuals in panel households who joined in the household after 1992-93. When those individuals are excluded, the number of individuals who were members in the 3,842 households in both years is 17,459, which is 74.5% of the individuals originally surveyed in all 4,800 households in 1992-93.

Question of sample size

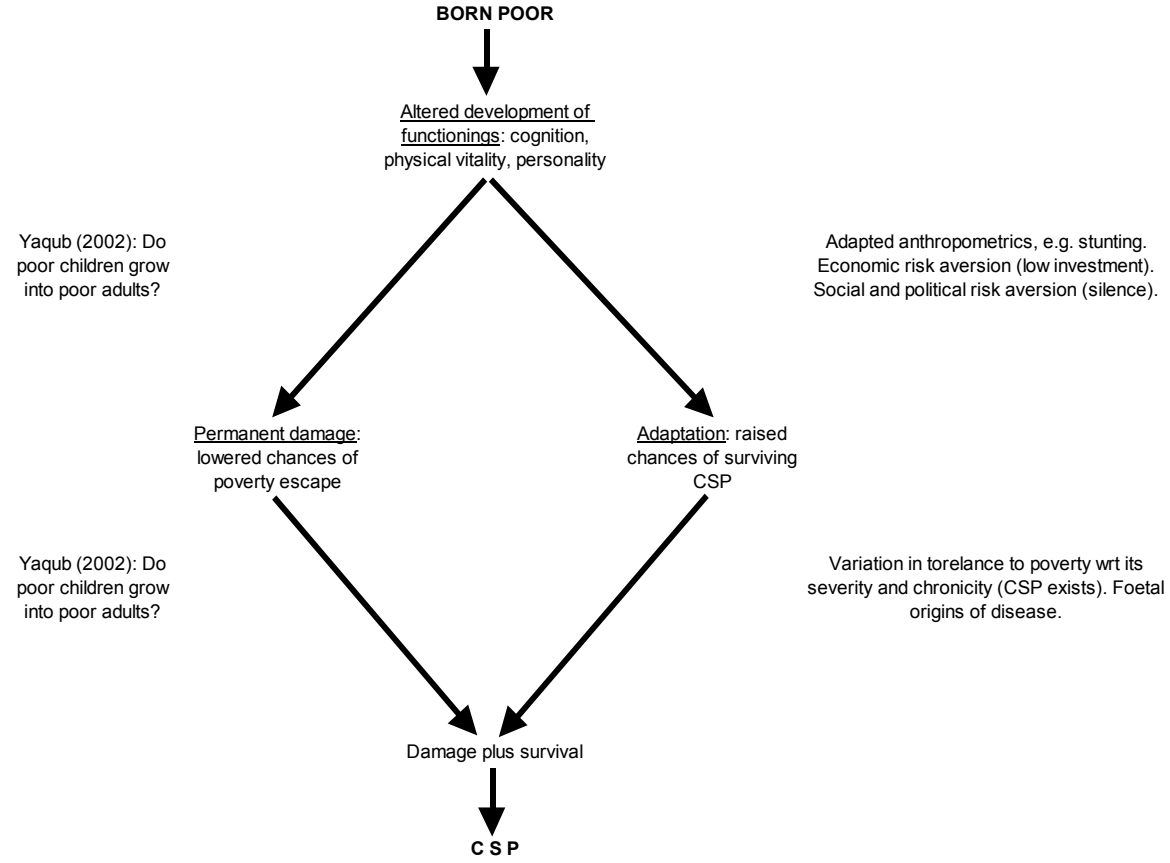
Longitudinal sample retention rates reported in Table 14 correlate strongly with base year sample sizes. The larger the sample size, the lower the retention rate. This may be an obvious finding that larger samples are harder to track longitudinally. However it poses some interesting questions about research methodology with respect to CSP, especially in terms of the precision (low standard errors) versus the consistency (bias) of statistical results. Larger samples offer more precise estimates, and therefore statistical confidence. Yet smaller samples show higher retention rates (and in some small samples almost perfect retention), and so *potentially* these are less prone to inconsistency arising from longitudinal attrition. For researching CSP in particular, there may be situations where small samples (possibly also involved in participatory research processes) have advantages over large samples on statistical grounds, apart from advantages in qualitative data. The difficulty is that small samples may have low statistical density at the poorest tail of the distribution, thus limiting the possibility to enrich the analysis by involving many variables, or even to check the robustness of results.

7. How might severe poverty and chronic poverty be causally related?

This section forwards two hypotheses to relate causally severe poverty and chronic poverty. Where available, evidence is cited to justify the sequence of causal steps proposed. Nevertheless without direct testing of each causal chain *as a whole*, there must be caution. The causality is never perfect at each step, and so as an entire sequence, the causality of the chain may fail. The first hypothesis is about how CSP is caused by parental CSP (i.e. intergenerational CSP), and whether the adaptations needed to survive severe poverty hinder subsequent escape from severe poverty. The second hypothesis is about how chronic poverty may arise from a cycle of 'chronic morbidity', where this does not kill. This may result from coping strategies triggered by untreated transitory severe poverty. This may apply to people who are *not born* CSP.

Hypothesis 1: CSP survival hinders CSP escape. People are born into poverty. If this poverty is severe and chronic (i.e. if their parental poverty is CSP), and if they survive parental CSP through childhood, people are left better adapted to survive poverty as adults. Adaptations make it more likely that CSP-born people avoid death when subjected to poverty that is severe enough to kill others, but adaptations also prevent their escape from poverty. Hence CSP. This sequence is shown as Figure 10.

Figure 10: Hypothesis 1: CSP survival hinders CSP escape



Testing the whole chain would involve looking at nonlinearity in intergenerational correlations of poverty. That is to focus not just on people that are born poor and stay poor (i.e. intergenerationally poor), *but also to ask whether*, below the poverty line, the intergenerationally poor are over-represented amongst the CSP (or whether CSP is equally constituted of those born *non*-poor). The intergenerational literature is limited in developing countries, and the issue of nonlinearity is absent (a limited industrial country literature on intergenerational nonlinearity exists). Another test of the whole chain might relate anthropometric measures to socioeconomic *mobility*, but so far only the relationship with socioeconomic *levels* has been investigated in developing countries (Strickland 2002). Notice that estimates of the entire chain would need to address potential selection bias, i.e. if adaptation exists, as shown on the right-hand side of Figure 10, and people in CSP represent a 'selected' group of resilient survivors, then estimates may be biased (see, Gørgens et al. 2002 for application to the Chinese famine between 1959-61).

In terms of causal steps, Yaqub (2002) reviewed some of the evidence for steps shown on the left-hand branch of Figure 10. That paper considered whether childhood poverty leads to

adult poverty, based on longitudinal evidence that shows childhood is a sensitive period for developing a person's cognition, physical vitality and personality. All of these are key for avoiding poverty throughout life. Evidence includes specific biological and behavioural mechanisms by which functionings may be permanently harmed by poverty. Importantly the paper also highlighted examples of how damage to functionings from childhood poverty can – at least sometimes and partially – be resisted or reversed, both during childhood, and later in adulthood after the damage is sustained.

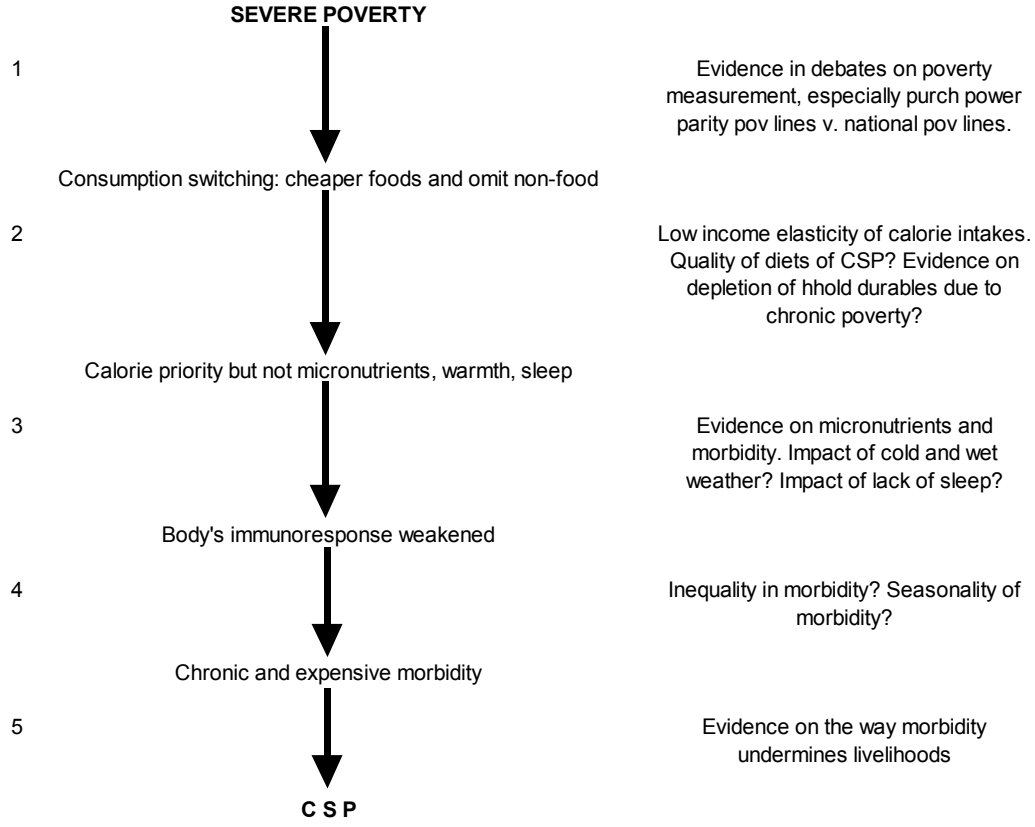
To read the right-hand side of Figure 10 begin with the observation that CSP does not kill everybody that experiences it. This rather obvious point is mentioned because CSP claims people survive below food lines that, by definition, indicate expected calorie intakes *typically* insufficient for survival, even when non-food consumption is zero. In this sense people in CSP are atypical, physically labouring whilst consuming for long periods far less than believed minimal for survival. Obviously the issue could be that food lines are more generous than survival requires, but as explained already, this paper focused on frugal food lines strictly anchored to around 2100 calories (equivalent to around eight bars of Snickers chocolate). Whilst zero alimentation is lethal typically within two months for people of normal weight, even small energy intakes – as little as 20 percent of requirements – can prolong life to six months (Faintuch et al. 2000; Allison 1996). Moreover, even after zero alimentation for over a month, the body can recover seemingly fully in just over a week, albeit under clinically controlled refeeding (Faintuch 2001). Such evidence on the body's tolerances underlines how some people survive CSP, and others die, indicating a variance across people in biological tolerances to the severity and duration of poverty, i.e. those CSP may be a 'selected' sample of resilient survivors.

A variance in tolerance to poverty might arise, partly, if people adapt – biologically and behaviourally – when faced with the expectation of a lifetime of scarcity. This idea has been explored, with some evidence, in the nutrition literature (Edmundson, Sukhatme and Edmundson 2000; Payne and Lipton 1994; James 1987; Spurr 1987; Strickland 2002). Biological adaptations are thought to include reduced body size and altered body composition, to lower basal metabolic rates and be more energy efficient. Also a range of behavioural adaptations are suggested, like prioritising energy-intensive foods, or performing tasks in ways that consume less energy. More recent literature has found that people of foetal age in the Dutch famine of 1944-5 were as adults more vulnerable to diabetes, high blood

pressure and coronary heart disease (Lumey et al. 1993; Roseboom et al. 2001). This is argued to be due to foetal programming of body tissues and systems for an anticipated – but unrealised – life of scarcity (Scrimshaw, 1997). Economics has explored risk aversion as a behavioural adaptation to poverty (Sinha, Lipton and Yaqub 2002; Morduch 1994). Social and political 'silence' could also be another aspect of risk aversion, given evidence showing the poor are victimised, rather than protected, by many organs of state power (e.g. the police) (see for example, Purvez et al. 2003).

Hypothesis 2: Cycles of morbidity hinder CSP escape. Imperfect mechanisms for intertemporal smoothing of income fluctuations force households to switch consumption away from non-food and towards cheaper foods. This prioritises calorie intakes, but weakens the body's immune response and so increases morbidity. Morbidity hinders income gain and prevents improvements in consumption. Hence CSP. This sequence is shown as Figure 11.

Figure 11: Hypothesis 2: Cycles of morbidity hinder CSP escape



The first step of the morbidity chain says that households cope with poverty by switching consumption towards cheaper foods and avoiding non-food consumption. Evidence on the variable composition of consumption, across income and space, is a feature of the poverty

measurement literature. For example, Appleton (1999) explored how the choice of reference population used to determine the composition of consumption, affects where the poverty line is subsequently set. Across countries, poverty lines correlate with average country income because in richer countries people tend to consume more expensive calories from meat, fish, dairy products, and processed foods (Vandemoortele 2002; Deaton 2002; Meade and Rosen 1996). Partly for this reason, purchasing power parity poverty lines, rather than national poverty lines, are argued to be better for international comparisons.

The second step in the chain argues that, of the various nutrients, households prioritise calories in making food choices under scarcity. In a sample of 103 households in the western Kenyan highlands, surveyed in 2000 and 2002, Place, Hebinck and Omosa (2003, p.4) found that "most households are able to acquire sufficient levels of carbohydrates, mainly milled maize, even in relatively difficult times... Hence fewer than 12% are classified as chronically poor according to this measure... [But using] protein intake, the percentage chronically poor climbs to 35%… While beans are modestly affordable, most other good protein sources are much more expensive to purchase… despite being able to satisfy basic staple food needs, most households are not able to be nutritionally secure". Carbohydrates and proteins are macronutrients often, but not always, consumed together. This behaviour corresponds to the biology of hunger that prioritises carbohydrates in fuel selection, in order to prolong survival (Faintuch et al. 2000; Elia 2000; Halsted 2001).

There is some controversy about whether the elasticity of calories with respect to income is low or high, with estimates typically ranging between 0.1 to 0.5 (e.g. Bouis and Haddad 1992; Skoufias 2002; Gibson and Rozelle 2000). Income-calorie elasticities depend on whether some part of rising income buys food characteristics other than calories, like taste, texture, variety and quality. The special concern here is that as cheaper diets are consumed, even if sufficient in calories, they may be increasingly insufficient in micronutrients like vitamins and trace elements. In India as "income increases, there is an increase in the consumption of 'protective' foods such as pulses, fruits, milk and diary products, which, while adding to calories, contribute significantly to the increase in other nutrients whose intake, is particularly lacking in the diet of the poor" (Subramanian 2001, p.15). Research in Uganda (Ntale-Lwanga and McClean 2003) and South Africa (Swardt 2003) noted the changing quality of diets due to poverty. In several developing countries, obesity exists in low-income groups (Pena and Bacallao 2002). Whilst such groups are not likely to be severe

poor, this does suggest that with declining incomes households buy cheap calories but not always nutritious diets.

Step 3 relies on literature showing that micronutrients, not just calories, have an important role in morbidity. For example, whilst protein-energy malnutrition is associated with greater malarial morbidity and mortality, so too are micronutrient deficiencies in vitamin A, vitamin E and zinc (Nussenblatt and Semba 2002; Shankar 2002). Interestingly, controlled trials show that not all micronutrients are of value in malarial prevention and treatment (Shankar 2002). Micronutrients are related to resistance and recovery from a wide range of illnesses by altering the functioning of the body's immune response (Bhaskaram 2001; Bhaskaram 2002; Erickson et al. 2000; Oken and Duggan 2002). Many of these illnesses are typical – and chronic – in CSP households. Biological mechanisms with micronutrients remain unclear at the cellular and molecular level (Taylor and Higgs 2000). Nevertheless the influence of micronutrients on morbidity is found even at subclinical levels of deficiency, and in affluent countries where protein-energy malnutrition is rare (Bhaskaram 2001; Ames 1998).

The morbidity circle is particularly vicious because morbidity raises energy needs, and insufficient energy delays healing. Whilst "unstressed hospitalized patients at bed rest usually require 1.2 times their resting energy expenditure, whereas those who are stressed, febrile, and catabolic require 1.5 to 2 times their resting energy expenditure. Intestinal malabsorption may decrease net utilizable energy to as little as 25% of ingested energy... Fever increases energy expenditure by 10 to 13% per degree Celsius above normal… [and] burns 40 to 100%, trauma 40 to 100%, and hyperthyroidism 10 to 100%" (Dwyer 2001, p.1). Elia (2000, p.383) highlights the importance of the rate of weight loss, not just its final extent: "…liveliness, vigour, efficiency and activity levels deteriorated considerably whilst weight was being lost (starvation period) but the scores improved almost to pre-fasting levels when the reduced weight was clamped using a weight maintenance diet… [Similarly for muscle fatigue and wound healing…] Therefore both chronic nutritional state and recent nutrient intake independently affect body function". Little is known about the potentially intensifying effects of depletions in non-food consumption, like clothing, shelter and means to clean water, especially if these affect warmth, sleep and sanitation (see Bidinger et al. 1991 for some information during drought conditions in Andhra Pradesh, India).

Evidence is lacking to evaluate variations in this causal chain based on gender or generation. This is of interest for several reasons. First, in some countries, there may be intrahousehold differences in consumption of 'small foods' rich in certain micronutrients, e.g. the slice of fruit bought in the street, fruit obtained directly off the tree or donations of unwanted fruit. It is not obvious which groups – male or female, young or old – might be disadvantaged overall. Second, differences based on sex, rather than gender, have been detected in physiological and pathological function, leading to differences in the prevalence and severity of a broad range of illness (Wizemann and Pardue 2001). Third, households may better protect certain members during scarcity. For example, Hoddinott and Kinsey (2000) show intrahousehold differences in changes in body mass indices during drought in Zimbabwe. Yaqub (1999) cites other evidence on intrahousehold variations in dynamics, finding it in some places but not in others.

8. Conclusion

It would seem straightforward to say a correlation exists between severe poverty and chronic poverty (CSP). Even if true, nevertheless such first impressions are not enough. If CSP is obvious, then obviously too, it should be well documented for policy purposes since a combination of severe poverty and chronic poverty must represent the very worst instance of poverty. The exercise in this paper of asking simple questions about CSP, to separate our assumptions from knowledge, shows large research gaps. Quantified statements on CSP at the country level can be made for just 14 countries, and at the household level in just six countries. Information is limited on important questions like how people in extreme poverty for long periods avoid death, and the long-term welfare costs of doing so. This means causal links between severe and chronic poverty remain obscure. Even supposing a severe-chronic correlation exists, as is likely, the direction of (the most important) causality is not obvious, i.e. whether severity-to-chronicity or chronicity-to-severity.

Specific conclusions in the paper are as follows.

1. A positive correlation likely exists between severe poverty and chronic poverty at the country level. This result may be important for understanding the variable relationship between macroeconomic growth and poverty reduction. Some caution over the result exists because of low sample sizes and the effects of two outliers in the data.

2. In all places with data, at the household level too, there appears an overlap between those severely poor and those chronically poor. Whilst regression to the mean conditional on household characteristics appears, regression to the unconditional mean does not appear. Thus whilst households tend to return to consumption levels typical of their observed characteristics, the severely poor show lower rates of poverty escape than the moderately poor.
3. In terms of socioeconomic characteristics, some tentative evidence points to similarities between severe poverty and chronic poverty in location (worse in rural areas), household size (worse in larger households), and characteristics of households heads, in terms of education levels, gender, and economic sector. The evidence base for these statements is limited.
4. Most microlongitudinal datasets dropped large proportions of their base year samples, and few studies evaluated sample attrition. Longitudinal sample retention rates correlate with base year sample sizes. Of course, sample loss, even if large, might not necessarily bias analysis of CSP. However descriptions of the process of construction of microlongitudinal datasets suggest cause for concern, or at least reason enough to call for more careful testing of the effects of attrition on poverty dynamics of the severely poor in particular. Often, dataset construction involves difficult decisions on how to treat households experiencing change, many of which complicate longitudinal tracking and may be associated with CSP.
5. Evidence suggests that CSP may be caused by parental CSP (i.e. an intergenerational CSP cycle). Adaptations in biology and behaviour make it more likely that CSP-born people avoid death when subjected to poverty severe enough to kill others, but adaptations also prevent their escape from poverty.
6. Evidence suggests CSP may be caused by a morbidity cycle, even in households not previously poor. Households experiencing poverty cope by prioritising calorie intakes, but this may weaken their immune response against morbidity. The cycle may continue because without good health, subsequent improvements in consumption may be delayed.

Annex 1: Severe poverty and chronic poverty, full dataset (page 1 of 3)

			Severe absolute poverty							Chronic absolute poverty							
Country	Sample	Period	SP0 pop	SP0 poor	SP1	SP2	Unit	Indic	Min calorie	CP0 durtn	CP0 shtfll	CP1	CP2	Unit	Indic	N waves	Source
Bangladesh	rural	1991	46	75	18.1	7.2	Pop	Exp	2112								World Bank (1998)
Bangladesh	rural	1995	40	70	15.4	5.7	Pop	Exp	2112								World Bank (1998)
Bangladesh	rural	1990-94								38				Hh	Inc	2	Sen (2001)
Bangladesh	rural	1988			13.1	4.8	Pop	Exp	2112								Sen (2003)
Bangladesh	rural	2000			11.3	4.0	Pop	Exp	2112								Sen (2003)
Bangladesh	rural	1988-00								31				Hh	Exp	2	Sen (2003)
China	rural Sichuan	1991	16	62	4.3	1.2	Hh	Exp	2100								McCulloch & Calandrino (2002)
China	rural Sichuan	1995	10	60	2.9	0.8	Hh	Exp	2100								McCulloch & Calandrino (2002)
China	rural Sichuan	1991-95								6				Hh	Exp	5	McCulloch & Calandrino (2002)
China	rural and urban	1985			2.1	0.8	Pop	Inc	2150								World Bank (1992)
China	rural and urban	1990			2.5	0.9	Pop	Inc	2150								World Bank (1992)
China	rural southeast	1985-90									21		3.4	Pop	Exp	6	Jalan & Ravallion (1998)
China	rural Guangdong	1985			2.2	0.6	Pop	Exp	2400								Chen & Ravallion (1996)
China	rural Guangdong	1990			0.7	0.1	Pop	Exp	2400								Chen & Ravallion (1996)
China	rural Guangdong	1985-90											0.0	Pop	Exp	6	Jalan & Ravallion (1999)
China	rural Guangxi	1985			4.9	1.2	Pop	Exp	2400								Chen & Ravallion (1996)
China	rural Guangxi	1990			6.2	1.5	Pop	Exp	2400								Chen & Ravallion (1996)
China	rural Guangxi	1985-90											0.8	Pop	Exp	6	Jalan & Ravallion (1999)
China	rural Guizhou	1985			9.7	3.0	Pop	Exp	2400								Chen & Ravallion (1996)
China	rural Guizhou	1990			9.3	3.3	Pop	Exp	2400								Chen & Ravallion (1996)
China	rural Guizhou	1985-90											1.6	Pop	Exp	6	Jalan & Ravallion (1999)
China	rural Yunnan	1985			4.5	1.2	Pop	Exp	2400								Chen & Ravallion (1996)
China	rural Yunnan	1990			6.8	2.1	Pop	Exp	2400								Chen & Ravallion (1996)
China	rural Yunnan	1985-90											0.6	Pop	Exp	6	Jalan & Ravallion (1999)

Annex 1: page 2 of 3…

			Severe absolute poverty							Chronic absolute poverty							
Country	Sample	Period	SP0 pop	SP0 poor	SP1	SP2	Unit	Indic	Min calorie	CP0 durtn	CP0 shtfll	CP1	CP2	Unit	Indic	N waves	Source
Egypt	rural and urban	1995			3.4	0.9	Pop	Exp	2305								World Bank (2002)
Egypt	rural and urban	1999			3.0	0.8	Pop	Exp	2305								World Bank (2002)
Egypt	rural and urban	1997-99								19				Hh	Exp	2	Haddad and Ahmed (2002)
Ethiopia	Tigray	1997	49	80	29.0	17.0	Pop	Exp	2200								Hagos & Holden (2003)
Ethiopia	Tigray	2000	50	76	27.0	14.0	Pop	Exp	2200								Hagos & Holden (2003)
Ethiopia	Tigray	1997-00								33				Pop	Exp	2	Hagos & Holden (2003)
Ethiopia	rural	1994			16.8	8.8	Pop	Exp	2100								Bigsten et al. (2003)
Ethiopia	rural	1997			12.7	6.2	Pop	Exp	2100								Bigsten et al. (2003)
Ethiopia	rural	1994-97								7				Hh	Exp	3	Bigsten et al. (2003)
Ethiopia	urban	1994			13.8	6.9	Pop	Exp	2100								Bigsten et al. (2003)
Ethiopia	urban	1997			12.6	6.1	Pop	Exp	2100								Bigsten et al. (2003)
Ethiopia	urban	1994-97								13				Hh	Exp	3	Bigsten et al. (2003)
El Salvador	rural	1995			32.4	20.9	Pop	Inc	2200								Conning, Olinto & Trigueros (2000)
El Salvador	rural	1997			38.8	28.6	Pop	Inc	2200								Conning, Olinto & Trigueros (2000)
El Salvador	rural	1995-97								19				Hh	Inc	2	Sanfeliu & Gonzalez-Vega (2000)
India	rural	1968			19.0	8.2	Pop	Exp	2400								World Bank (2000)
India	rural	1970			16.6	6.8	Pop	Exp	2400								World Bank (2000)
India	rural	1968-70								33		41.0		Hh	Exp	3	Gaiha (1988)
India	rural	1970	28		16.6	6.8	Pop	Exp	2400								Bhide & Mehta (2003), World Bank (2000), pers comm
India	rural	1983	21		12.7	4.8	Pop	Exp	2400								Bhide & Mehta (2003), World Bank (2000), pers comm
India	rural	1970-81								25				Hh	Exp	2	Bhide & Mehta (2003)
India	rural	1974			17.2	7.1	Pop	Exp	2400								World Bank (2000)
India	rural	1983			12.7	4.8	Pop	Exp	2400								World Bank (2000)
India	semi-arid rural	1975-83								22	48			Hh	Inc	9	Gaiha & Deolalikar (1993)
Kenya	rural	1994	52	81	27.0	15.0	Hh	Exp	2250								Geda et al. (2001)
Kenya	rural	1997			19.3	9.2	Hh	Exp	2250								Kimalu et al. (2001)
Kenya	rural nonpastoral	1994-97								13				Cluster	Exp	2	Christiaensen & Subbarao (2001)

Note 1. Kenyan panel longitudinal on 'clusters' of about 100 geographically proximate households, from which a dozen households were randomly drawn in each wave.

Annex 1: page 3 of 3

			Severe absolute poverty							Chronic absolute poverty							
Country	Sample	Period	SP0 pop	SP0 poor	SP1	SP2	Unit	Indic	Min calorie	CP0 durtn	CP0 shtfll	CP1	CP2	Unit	Indic	N waves	Source
Madagascar	Antananarivo	1997			44.7	29.3	Pop	Inc	2300								Herrera & Roubaud (2001)
Madagascar	Antananarivo	1999			42.6	28.1	Pop	Inc	2300								Herrera & Roubaud (2001)
Madagascar	Antananarivo	1997-99								65				Pop	Inc	3	Herrera & Roubaud (2001)
Pakistan	rural	1987			8.3		Pop	Exp	2250								World Bank (1995)
Pakistan	rural	1990			7.8		Pop	Exp	2250								World Bank (1995)
Pakistan	rural	1986-90								5	26			Hh	Inc	5	Baulch & McCulloch (2000)
Pakistan	rural NWFP	1996	19	26	30.8	14.3	Hh	Exp	2250								Kurosaki personal communication
Pakistan	rural NWFP	1999	15	19	29.4	13.2	Hh	Exp	2250								Kurosaki personal communication
Pakistan	rural NWFP	1996-99								63		0.2	0.1	Hh	Exp	2	Kurosaki (2001; 2003)
Peru	Lima	1990	16	46	11.3	5.2	Hh	Exp	2300								Herrera (1999)
Peru	Lima	1996	5	13	9.0	3.4	Hh	Exp	2300								Herrera (1999)
Peru	Lima	1990-96								13				Hh	Exp	3	Herrera (1999)
Peru	rural and urban	1997			10.4	5.1	Pop	Inc	2300								Herrera & Roubaud (2001)
Peru	rural and urban	1999			10.2	5.2	Pop	Inc	2300								Herrera & Roubaud (2001)
Peru	rural and urban	1997-99								23	36			Pop	Inc	3	Herrera & Roubaud (2001)
South Africa	KZ-Natal non-white	1993	3	12	27.1	0.0	Hh	Exp	2300								Carter & May (2001)
South Africa	KZ-Natal non-white	1998	10	24	33.0	0.1	Hh	Exp	2300								Carter & May (2001)
South Africa	KZ-Natal non-white	1993-98								18				Hh	Exp	2	Carter & May (2001)
Uganda	rural and urban	1992	36	65	20.4	9.9	Pop	Exp	2280								Appleton et al.
Uganda	rural and urban	1995	28	58	16.3	7.6	Pop	Exp	2280								Appleton et al.
Uganda	rural and urban	1992-95								30				Hh	Exp	2	Derived from Okidi & McKay (2003)
Uganda	rural and urban	1992-95								13				Hh	Exp	4	Okidi & McKay (2003)
Vietnam	rural and urban	1992	37	64	19.0	8.0	Pop	Exp	2100								Vietnam (1999)
Vietnam	rural and urban	1997	15	60	10.0	4.0	Pop	Exp	2100								Vietnam (1999)
Vietnam	rural and urban	1992-97								29				Hh	Exp	2	Houghton et al. (2001)
Zimbabwe	rural	1992	19	54		0.1	Pop	Exp	2100								Owens & Hoddinott (1998); Alwang et al. (2002)
Zimbabwe	rural	1995	15	47		0.1	Pop	Exp	2100								Owens & Hoddinott (1998); Alwang et al. (2002)
Zimbabwe	rural	1992-95								11				Hh	Inc	4	Baulch & Hoddinott (2000)

Bibliography

Alderman, Harold, Jere R. Behrman, Hans-Peter Kohler, John A. Maluccio, Susan Cotts Watkins (2000). Attrition in Longitudinal Household Survey Data: Some Tests for Three Developing Country Samples. Policy Research Working Paper 2447, World Bank, Washington DC

Allison, Simon Philip (1996). *Nutrition in Medicine: A physician's view*. Danone Institute, Brussels

Alwang, Jeffrey and Bradford F. Mills, Nelson Taruvinga (2002). Why Has Poverty Increased in Zimbabwe? World Bank, Washington DC

Ames, Bruce N. (1998). Micronutrients prevent cancer and delay aging. *Toxicology Letters* 102-103, pp. 5-18

Appleton, Simon, Tom Emwanu, Johnson Kagugube and James Muwonge (1999). Changes in poverty in Uganda 1992-97. Working paper WPS/99.22, Centre for the Study of African Economies, University of Oxford

Barrientos, Armando and Andrew Shepherd (2003). Chronic Poverty and Social Protection. Paper for CPRC Conference, Manchester

Baulch, B., & Hoddinott, J. (2000). Economic mobility and poverty dynamics in developing countries. *Journal of Development Studies*, *36*(6), 1-24.

Baulch, B., & McCulloch, N. (1998). *Being poor and becoming poor: poverty status and poverty transitions in rural Pakistan*. Working Paper No.79. Brighton: Institute of Development Studies.

Benjamin, D., Brandt, L., & Giles, J. (2001). *Income persistence and the evolution of inequality in rural China*. Mimeo, University of Toronoto.

Bhaskaram, Padbidri (2001). Immunobiology of mild micronutrient deficiencies. *British Journal of Nutrition* 85, Supplement 2, pp. S75-S80

Bhaskaram, Padbidri (2002). Micronutrient malnutrition, infection and immunity: an overview. *Nutrition Review* 60(5), pp. S40-S45

Bhide, Shashanka and Aasha Kapur Mehta (2003). Chronic poverty in rural India: analysis using panel data. Paper for CPRC Conference, Manchester

Bidani, Benu and Kaspar Richter (2001). Household Vulnerability and the Asian Crisis: the Case of Thailand. Mimeo, World Bank

Bidinger, P.D., T.S. Walker, B. Sarkar, A. Ram Murthy, P. Babu (1991). Consequences of mid-1980s drought. *Economic and Political Weekly*, 28 Sept., pp. A105-113

Bigsten, Arne, Bereket Kebede, Abebe Shimeles, and Mekonnen Taddesse (2003). Growth and Poverty Reduction in Ethiopia: Evidence from Household Panel Surveys. World Development Vol. 31, No. 1, pp. 87–106.

Bouis, Howarth, and Lawrence Haddad (1992). Are estimates of calorie income elasticities too high? A recalibration of the plausible range. *Journal of Development Economics* 39(4): 333-364

Braithwaite, J. (2001). Long-term consumption based poverty. In World Bank. *Hungary: long-term poverty, social protection and the labour market*. Report 20645-HU, Volume II: Technical Papers. Washington DC: World Bank

Carter, M. R., & May, J. (2001). One kind of freedom: poverty dynamics in post-apartheid South Africa. *World Development*, *29*(12), 1987-2006.

Chaudhuri, S., & Datt, G. (2001). *Assessing household vulnerability to poverty: methodology and estimates for the Philippines*. Mimeo, Economics Department, Columbia University.

Chaudhuri, Shubham, Jyotsna Jalan, Asep Suryahadi (2002). Assesing Household Vulnerability to Poverty from Cross-sectional Data: A Methodology and Estimates from Indonesia. Mimeo, Department of Economics, Columbia University

Chen, Shaohua and Ravallion Martin (1996). Data in transition: assessing rural living standards in Southern China. *China Economic Review* 7(1), pp. 23-56

Christiaensen, L. J., & Subbarao, K. (2001). *Towards and understanding of vulnerability in rural Kenya*. Mimeo, World Bank, Washington DC.

Christiaensen, Luc J. and Richard N. Boisvert (2000). On Measuring Household Food Vulnerability: Case Evidence from Northern Mali. Working Paper 2000-05, Department of Applied Economics and Management, Cornell University

Cunningham, W., & Maloney, W. F. (2000). *Measuring vulnerability: who suffered in the 1995 Mexican crisis?* Paper presented at 'Annual Bank Conference on Development in Latin America and the Caribbean: Economic Insecurity in LAC', World Bank, Washington DC (September).

Deaton, Angus (2002). Counting the world's poor: problems and possible solutions. Research Program in Development Studies, Princeton University

Dercon, S. (1998). Wealth, risk and activity choice: cattle in western Tanzania. *Journal of Development Economics*, *55*(3), 1-42.

Dercon, S., & Krishnan, P. (2000). Vulnerability, seasonality, and poverty in Ethiopia. *Journal of Development Studies*, *36*(6), 25-53.

Dercon, Stefan (2000). Changes in poverty and social indicators in Ethiopia in the 1990s. Mimeo, World Bank, Washington DC

Drèze, J., Lanjouw, P., & Stern, N. (1992). *Economic mobility and agricultural labour in rural India: a case study*. Development Economics Research Programme No. 35, London School of Economics.

Dwyer, Johanna (2001). Nutritional requirements and dietary assessment. In Harrison's Principles of Internal Medicine, by Eugene Braunwald, Anthony S. Fauci, Dennis L. Kasper, Stephen L. Hauser, Dan L. Longo, J. Larry Jameson (editors). 15th Edition. McGraw-Hill, New York. http://harrisons.accessmedicine.com/ (Accessed 22/04/2003)

Eastwood, Robert and Michael Lipton (2001). Pro-poor Growth and Pro-growth Poverty. Reduction: What Do they Mean? What Does the Evidence Mean? What Can Policymakers Do? Mimeo, Sussex University

Edmundson WC, Sukhatme PV, Edmundson SA. (2000). Diet, Disease, and Development in India and Indonesia. http://www.midcoast.com.au/~wedmunds/ (Accessed 14/03/03)

Elia, M. (2000). Hunger disease. *Clinical Nutrition*. 19(6), pp. 379-386

Erickson, Kent L., Edward A. Medina and Neil E. Hubbard (2000). Micronutrients and innate immunity. *Journal of Infectious Diseases* 182 (Supplement 1), pp. S5-S10

Faintuch, Joel, Francisco Garcia Soriano, José Paulo Ladeira, Mariano Janiszewski, Irineu Tadeu Velasco and Joaquim J. Gama-Rodrigues (2000). Changes in body fluid and energy compartments during prolonged hunger strike. *Review Hospital Clinic Faculty Medicine San Paulo* 55(2), pp.47-54

Faintuch, Joel, Francisco Garcia Soriano, José Paulo Ladeira, Mariano Janiszewski, Irineu Tadeu Velasco and Joaquim J. Gama-Rodrigues (2001). Refeeding procedures after 43 days of total fasting. *Applied Nutritional Investigation* 17, pp.100-104

Falaris, Evangelos M. (2003). The effect of survey attrition in longitudinal surveys: evidence from Peru, Côte d'Ivoire and Vietnam. *Journal of Development Economics* 70 pp. 133– 157

Foster, J., Greer, J., & Thorbecke, E. (1984). A class of decomposable poverty measures. *Econometrica*, *52*(3), 761-766.

Frankenberg, E., Thomas, D., & Beegle, K. (1999). *The real costs of Indonesia's economic crisis: preliminary findings from the Indonesian Family Life Surveys.* California: RAND Corporation,.

Freije, S. (2000). *Income, positional and poverty dynamics in Venezuela.* PhD, Department of Labor Economics, Cornell University.

Gaiha, R. (1988). Income mobility in rural India. *Economic Development and Cultural Change*, *36*(2), 279-302.

Gaiha, R. (1989). Are the chronically poor also the poorest in rural India? *Development and Change*, *20*, 295-322.

Gaiha, R., & Deolalikar, A. B. (1993). Persistent, expected and innate poverty: estimates for semi-arid rural South India. *Cambridge Journal of Economics*, *17*(4), 409-421.

Galasi, P. (1998). *Income inequality and mobility in Hungary 1992–1996*. Innocenti Occasional Paper No. 64. Florence: UNICEF.

Geda, Alemayehu and Niek de Jong, Germano Mwabu, Mwangi S. Kimenyi (2001). Determinants of poverty in kenya: a household level analysis. Institute of Social Studies and Addis Ababa University

Gibson, J. (2001). Measuring chronic poverty without a panel. *Journal of Development Economics*, *65*(2), 243-266.

Gibson, J., Huang, J., & Rozell, S. (2002). *Improving estimates of inequality and poverty from urban China's household income and expenditure survey*. Department of Economics Working Paper No. 1/02, University of Waikato, New Zealand.

Gibson, John and Scott Rozelle (2000). How Elastic is Calorie Demand? Parametric, Nonparametric, and Semiparametric Results for Urban Papua New Guinea. Department of Agricultural and Resource Economics, University of California Davis

Giles, J. (2002). Is life more risky in the open? Household risk-coping and the opening of China's labor markets. Mimeo, Michigan State University.

Glewwe, P., & Hall, G. (1995). *Who is most vulnerable to macroeconomic shocks? Hypotheses tests using panel data from Peru.* Living Standards Measurement Study Working Paper No. 117. Washington DC: World Bank.

Glewwe, P., & Nguyen, P. (2002). *Economic mobility in Vietnam in the 1990s*. Mimeo, World Bank, Washington DC.

Glewwe, Paul, Michele Gragnolati and Hassan Zaman (2001). Who Gained from Vietnam's Boom in the 1990's? Mimeo, World Bank, Washington DC.

Goh, C., Kang, S. J., & Sawada, Y. (2001). *Identification of vulnerable groups and coping strategies in Korea*. Mimeo, World Bank, Washington DC.

Gørgens, Tue, Xin Meng, Rhema Vaithianathan (2002). Selection and Stunting Effects of Famine: A Case Study of the Great Chinese Famine. Mimeo, Australian National University

Grootaert, C., & Kanbur, R. (1995). The lucky few amidst economic decline: distributional change in Côte d'Ivoire as seen through panel data sets, 1985-88. *Journal of Development Studies*, *31*(4), 603-619.

Grootaert, C., Kanbur, R., & Oh, G. (1997). The dynamics of welfare gains and losses: an African case study. *Journal of Development Studies*, *33*(5), 635-657.

Haddad, L., & Ahmed, A. U. (2002). *Avoiding chronic and transitory poverty: evidence from Egypt 1997-99*. FCND Discussion Paper No. 133. Washington DC: International Food Policy Research Institute.

Hagos, Fitsum and Stein Holden (2003). Rural Household Poverty Dynamics in Northern Ethiopia 1997-2000. Paper for CPRC Conference, Manchester

Halsted, Charles H. (2001). Malnutrition and nutritional assessment. In Harrison's Principles of Internal Medicine, by Eugene Braunwald, Anthony S. Fauci, Dennis L. Kasper, Stephen L. Hauser, Dan L. Longo, J. Larry Jameson (editors). 15th Edition. McGraw-Hill, New York. http://harrisons.accessmedicine.com/ (Accessed 22/04/2003)

Herrera, J. (1999). *Ajuste económico, desigualdad y movilidad*. Working Paper No. DT/99/07. Paris: DIAL.

Herrera, J. (2001). *Dynamique de la pauvreté permanente et transitoire à Madagascar et au Pérou.* Paper presented at the 'Conference on Poverty in Madagascar', Antananarivo (February).

Herrera, J. (2001b). *Poverty dynamics in Peru 1997-1999*. Working Paper No. DT/2001/09. Paris: DIAL.

Herrera, J., & Roubaud, F. (2001). *Dynamique de la pauvreté urbaine au Pérou et à Madagascar.* Mimeo, DIAL, Paris.

Hossain, Mahabub, Manik L. Bose, Alamgir Chowdhury and Ruth Meinzen-Dick (2002). In V.K. Ramachandran and Madhura Swaminathan, *Agrarian Studies: Essays on Agrarian Relations in Less Developed Countries*, Tulika, New Delhi

Hossain, Munshi, Iqbal Alam Khan, Janet Seeley (2003). Surviving on their feet: charting the mobile livelihoods of the poor in rural Bangladesh. CPRC conference, Manchester

Houghton, D., Houghton, J., Loan, L. T. T., & Phong, N. (2001). Shooting stars and sinking stones. In D. Houghton, J. Houghton, & N. Phong (Eds.), *Living standards during the economic boom: the case of Vietnam*. Hanoi: Statistical Publishing House.

Jalan, J., & Ravallion, M. (1998). Transient poverty in postreform rural China. *Journal of Comparative Economics*, *26*(2), 338-357.

Jalan, J., & Ravallion, M. (2000). Is transient poverty different? Evidence for rural China. *Journal of Development Studies*, *36*(6), 82-99 .

Jalan, Jyotsna and Ravallion, Martin (1999). Do Transient and Chronic Poverty in Rural China Share Common Causes? Mimeo, World Bank, Washington DC

James, W.P.T. (1987). Research relating to energy adaptation in man. In *Chronic Energy Deficiency: Consequences and Related Issues*. Edited by Beat Schurch and Nevin S. Scrimshaw, Nestle Foundation, Lausanne

Jovanovic, B. (2000). Russian Roulette – Expenditure Inequality in Russia, 1994-1998. Department of Economics Working Paper No. 358, Texas A & M University.

Justino, P., & Litchfield, J. (2002). Poverty dynamics in rural Vietnam. Poverty Research Unit Working Paper No. 11, Sussex University.

Kamanou, Gisele and Jonathan Morduch (2001). Measuring Vulnerability to Poverty. Mimeo, New York University

Kimalu, Paul, Nancy Nafula, Damiano Kulundu Manda, Germano Mwabu, Mwangi S. Kimenyi (2001). A Situational Analysis of Poverty in Kenya. WP/6/2002, Kenya Institute for Public Policy Research and Analysis, Nairobi

Kinsey, B., Burger K., & Gunning, J. W. (1998). Coping with drought in Zimbabwe: survey evidence on responses of rural households to risk. *World Development*, *26*(1), 89-110.

Krishnan, P. (1996). Family background, education and employment in urban Ethiopia. *Oxford Bulletin of Economics and Statistics*, Special Issue: Human Capital in Economic Development, *58*(1), 167-185.

Kurosaki, T. (2001). Consumption vulnerability and dynamic poverty in the North West Frontier Province, Pakistan. Mimeo, Hitotsubashi University.

Kurosaki, Takashi (2003). Measurement of chronic and transient poverty: theory and application to Pakistan. Paper for CPRC Conference, Manchester

Kurosaki, Takashi and Anwar Hussain (1999). Poverty, Risk, and Human Capital in the Rural Northwest Frontier Province, Pakistan. IER Discussion Paper Series B No. 24, Hitotsubashi University

Kurosaki, Takashi and Humayun Khan (2001). Human Capital and Elimination of Rural Poverty: A Case Study of the North-West Frontier Province, Pakistan. IER Discussion Paper Series B No. 25, Hitotsubashi University.

Lanjouw, P. (1998). Poverty and the non-farm economy in Mexico's ejidos: 1994-1997. Mimeo, World Bank, Washington DC.

Lanjouw, P., & Stern, N. (1991). Poverty in Palanpur. *World Bank Economic Review*, *5*(1), 23-55.

Lipton, M. (1983). Demography and poverty. Staff Working Paper No. 623. Washington DC: World Bank.

Lokshin, M., & Ravallion, M. (2001). *Household income dynamics in two transition economies*. Mimeo, World Bank, Washington DC.

Luttmer, E. F. P (2000). *Inequality and poverty dynamics in transition economies: disentangling real events from noisy data*. Mimeo, World Bank, Washington DC.

Maitre, B., & Nolan, B. (1999). *Income mobility in the European Community Household Panel Survey*. European Panel Analysis Group Working Paper No. 4, University of Essex.

Maluccio, J., Haddad, L., & May, J. (2000). Social capital and household welfare in South Africa 1993-98. *Journal of Development Studies*, *36*(6), 54-81.

Maluccio, John (2000). Attrition in the Kwazulu Natal income dynamics study, 1993-1998. FCND Discussion Paper No. 95, IFPRI, Washington DC

Mayer, S. E. (1997). *What money can't buy. family income and children's life chances*. Cambridge: Harvard University Press.

McCulloch, A., & Joshi, H. E. (2001). Neighbourhood and family influences on the cognitive ability of children in the British NCDS. *Social Science and Medicine*, *53*, 579-591.

McCulloch, N., & Baulch, B. (1999). *Distinguishing the chronically from the transitorily poor: evidence from Pakistan*. Working Paper No. 97. Brighton: Institute of Development Studies.

McCulloch, N., & Baulch, B. (2000). Simulating the impact of policy upon chronic and transitory poverty in rural Pakistan. *Journal of Development Studies*, *36*(6), 100-130.

McCulloch, N., & Calandrino, M. (2002). *Poverty dynamics in rural Sichuan between 1991 and 1995*. Working Paper No. 151. Brighton: Institute of Development Studies.

Meade, Birgit and Stacey Rosen (1996). Income and Diet Differences Greatly Affect Food Spending Around the Globe. *Food Review* September-December

Morduch, Jonathan (1994). Poverty and Vulnerability. *AEA Papers and Proceedings* V84 N2, pp. 221-225

Mroz, T. A., & Popkin, B. M. (1995). Poverty and the economic transition in the Russian Federation. *Economic Development and Cultural Change*, *44*(1), 1-32.

Muller, C. (1997). *Transient seasonal and chronic poverty of peasants: evidence from Rwanda*. Working Paper No. 97-8, Centre for the Study of African Economies, Oxford University.

Ndoruhirwe, Emmanuel (2000). Analyse de la Dynamique Des Conditions De Vie Des Ménages Ruraux Au Burkina Faso Suite À La Dévaluation Du Franc CFA. Université Laval

Neri, M., Amadeo, E., Carvalho, A., Nascimento, M., Daltrino, M., & Rangel, F. (1999). *Assets, markets and poverty in Brazil*. Latin American Research Network Working Paper No. R-357. Washington DC: Inter-American Development Bank.

Ntale-Lwanga, Charles and Kimberley McClean (2003). Face of chronic poverty in Uganda as seen by the poor themselves – constraints and opportunities. Paper for CPRC Conference, Manchester

Nussenblatt, Veronique and Richard D. Semba (2002). Micronutrient malnutrition and the pathogenesis of malarial anemia. *Acta Tropica* 82 pp.321–337

Oken, Emily and Christopher Duggan (2002). Update on micronutrients: iron and zinc. *Current Opinion in Pediatrics*, 14:350–353

Okidi, John and Andrew McKay (2003). Poverty dynamics in Uganda: 1992 to 2000. Paper for CPRC Conference, Manchester

Okrasa, W. (1999). *Who avoids and who escapes from poverty during the transition? Evidence from Polish panel data, 1993-96*. Policy Research Working Paper No. 2218. Washington DC: World Bank.

Okrasa, W. (1999b).*The dynamics of poverty and the effectiveness of Poland's safety-net, 1993-96*. Policy Research Working Paper No. 2221. Washington DC: World Bank.

Owens, T., & Hoddinott, J. (1998). Investing in development or relief: quantifying poverty tradeoffs using Zimbabwe household panel data. Centre for the Study of African Economies Working Paper No. 99-4, Oxford University.

Payne, Philip and Michael Lipton (1994). How Third World Households Adapt to Dietary Energy Stress: The Evidence and the Issues. IFPRI Food Policy Review 2, Washington DC

Place, Frank, Paul Hebinck, Mary Omosa (2003). Chronic poverty in rural western Kenya. Paper for CPRC Conference, Manchester

Pritchett, Lant (1995). Divergence, Big Time. Policy Research Working Paper 1522, World Bank, Washington DC

Pritchett, Lant, Asep Suryahadi, Sudarno Sumarto (2000). Quantifying Vulnerability to Poverty: A Proposed Measure with Application to Indonesia. Working Paper 2, Social Monitoring and Early Response Unit, Jakarta

Purvez, Salim Ahmed, Iqbal Alam Khan, S.M. Zubair Ali Khan, Janet Seeley (2003). Describing their poverty: what the poorest say about being poor in rural Bangladesh. Paper for CPRC Conference, Manchester

Randolph, S., & Trzcinski, E. (1989). Relative earnings mobility in a third world country. *World Development*, *17*(4), 513-525.

Ravallion, Martin (2001). Growth, Inequality and Poverty: Looking Beyond Averages. World Development 29(11), pp.1803-1815

Reardon, T., Delgado, C., & Matlon, P. (1992). Determinants and effects of income diversification amongst farm households in Burkina Faso. *Journal of Development Studies*, *28*(2), 264-296.

Rutkowski, J. (2001). Labor market disadvantage and poverty: evidence from Hungary panel data 1992-97. In World Bank. *Hungary: Long-term Poverty, Social Protection and the Labour Market*. Report 20645-HU (Volume II: Technical Papers). Washington DC: World Bank.

Sanfeliu, M. B., & Gonzalez-Vega, C. (2000). *Dynamics of rural household incomes in El Salvador*. Mimeo, Ohio State University .

Scott, C. D., & Litchfield, J. A. (1994). *Inequality, mobility and the determinants of income among the rural poor in Chile 1968-86*. Development Economics Research Programme DEP No. 35, London School of Economics.

Scott, Christopher D (2000). Mixed Fortunes: A Study of Poverty Mobility Among Small Farm Households in Chile, 1968–86 *Journal of Development Studies* 36(6)

Sen, B. (2001). *Risks, vulnerability and poverty in Bangladesh*. Mimeo, Bangladesh Institute of Development Studies, Dhaka.

Sen, Binayak (2003). Drivers of escape and descent: changing household fortunes in rural Bangladesh. World Development 31(3), pp.513-534

Shankar, Anuraj H. (2000). Nutritional Modulation of Malaria Morbidity and Mortality. *Journal of Infectious Diseases*182 (Supplement 1):S37–53

Shi, Li (2001). Changes in poverty profile in China. Discussion paper 2001/21, WIDER

Sinha, S., Lipton, M., & Yaqub, S. (2002). Poverty and damaging fluctuations: how do they relate? *Journal of Asian and African Studies*, *37*(2), 387-421.

Skoufias, E., Suryahadi, A., & Sumarto, S. (1999). *The Indonesian crisis and its impacts on household welfare, poverty transitions, and inequality: evidence from matched households in 100 Village Survey*. Mimeo, Social Monitoring and Early Response Unit, World Bank, Indonesia.

Skoufias, Emmanuel (2002). The Sensitivity of Calorie-Income Demand Elasticity to Price Changes: Evidence from Indonesia. FCND Discussion Paper No. 141, IFPRI, Washington DC

Spurr, G.B. (1987). Effects of chronic energy deficiency on stature, work capacity and productivity. In *Chronic Energy Deficiency: Consequences and Related Issues*. Edited by Beat Schurch and Nevin S. Scrimshaw, Nestle Foundation, Lausanne

Strickland, Simon S. (2002). Functional consequences of adult malnutrition in developing countries: a review. *Journal of Physiological Anthropology and Applied Human Science* 21(1), pp.1-9

Subramanian, Arjunan (2001). Are Income-Calorie Elasticity's Really High in Developing Countries? Some Implications for Nutrition and Income. Paper for Session 10 (Poverty and Inequality) of the IUSSP XXIVth General Population Conference, Salvadore, Brazil, August 18-24, 2001.

Swaminathan, M. (1991). Measuring mobility in wealth: some estimates from a south Indian village. *Oxford Bulletin of Economics and Statistics*, *53*(2), 171-183.

Swaminathan, M. (1997). The determinants of earnings among low income workers in Bombay: an analysis of panel data. *Journal of Development Studies*, *33*(4), 535-551.

Swardt, Cobus de (2003). Unravelling chronic poverty in South Africa: some food for thought. Paper for CPRC Conference, Manchester

Taylor, Christopher E. and Elizabeth S. Higgs (2000). Micronutrients and infectious diseases: thoughts on integration of mechanistic approaches into micronutrient research. *Journal of Infectious Diseases* 182 (Supplement 1), pp. S1-S4

Vandemoortele, Jan (2002). Are we really reducing global poverty? United Nations Development Programme, New York

Walker, T. S., & Ryan, J. G. (1991). *Village and household economies in India's semi-arid tropics*. Baltimore: Johns Hopkins University Press.

WHO (1985). Energy and protein requirements. Report of a Joint FAO/WHO/UNU Expert Consultation. World Health Organisation, Geneva. Online at http://www.fao.org/.

Wizemann, Theresa M. and Mary-Lou Pardue (2001). *Exploring the Biological Contributions to Human Health: Does Sex Matter?* Committee on Understanding the Biology of Sex and Gender Differences, Board on Health Sciences Policy, Institute Of Medicine, National Academy Press, Washington, D.C.

Woolard, I., & Klasen, S. (2002). *Income mobility and household dynamics in South Africa*. Paper presented at '27th General Conference of the International Association for Research in Income and Wealth', Sweden (August).

World Bank (1992). China: Strategies for Reducing Poverty in the 1990s. Report No. 11245

World Bank (1994). El Salvador. The Challenge of Poverty Alleviation. Report No. 12315-ES

World Bank (1994). Poverty in Poland. Report No. 13051-POL

World Bank (1995). Kenya: poverty assessment. Report No. 13152-KE, World Bank, Washington DC

World Bank (1995). Pakistan: poverty assessment. Report No. 14397-PAK, World Bank, Washington DC

World Bank (1996). Madagascar: Poverty Assessment. Report No. 14044-MAG

World Bank (1998). Bangladesh: From Counting the Poor to Making the Poor Count Report. Report No. 17534-BD, World Bank, Washington DC

World Bank (1999). Russia: Targeting and the Longer-Term Poor. Report No. 19377-RU

World Bank (1999). Vietnam development report 2000: attacking poverty. Report No. 19914-VN, World Bank, Washington DC

World Bank (2000). India: policies to reduce poverty and accelerate sustainable development. Report No. 19471-IN, World Bank, Washington DC

World Bank (2001). Hungary: Long-Term Poverty, Social Protection, and the Labor Market. Report No. 20645-HU, World Bank, Washington DC

World Bank (2002). Poverty in Pakistan: Vulnerabilities, Social Gaps, and Rural Dynamics Report No. 24296-PAK, World Bank, Washington DC

World Bank (2002). Poverty Reduction in Egypt: Diagnosis and Strategy. Report No. 24234-EGT

Yaqub, Shahin (1999). Risk in Poor Households: Is it “Women and Children First”? Background Paper to WDR 2000/1, World Bank, Washington DC

Yaqub, Shahin (2002). Poor children grow into poor adults: harmful mechanisms or over-deterministic theory? *Journal of International Development* 14(6), 1081-1093.

Yaqub, Shahin (2003). Chronic poverty: scrutinising estimates, patterns, correlates and explanations. Working paper 21, CPRC, University of Manchester

Aquest document pertany al Departament d'Economia Aplicada.
Data de publicació: ***juny 2003***

Departament d'Economia Aplicada
Edifici B
Campus de Bellaterra
08193 Bellaterra

Telèfon: (93) 581 1680
Fax: (93) 581 2292
E-mail: d.econ.aplicada@uab.es
Http: //www.uab.es/dep-economia-aplicada/