

**DISTINGUISHING THE CHRONICALLY
FROM THE TRANSITORILY POOR:
EVIDENCE FROM RURAL PAKISTAN**

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SUMMARY

Anti-poverty programs often seek to improve their impact by targeting households for assistance according to one or more criteria. Such targeting criteria are, however, often based upon measurements of key welfare indicators, such as income or consumption, in a single time period. This paper investigates whether it is possible to improve the accuracy of targeting by distinguishing between the chronically and transitorily poor on the basis of household characteristics. We use the IFPRI household food security panel which tracked 686 households from rural Pakistan between 1986/87 and 1990/91. Multinomial and ordered Logit analysis are used to identify which characteristics have the greatest influence upon a household being chronically or transitorily poor. We show that most of the characteristics which distinguish the chronically poor from the transitorily poor are similar to those which distinguish the poor from the non-poor. However, policymakers may be able to distinguish between the chronically and transitorily poor using the dependency ratio.

The paper then compares the poverty impact of policies designed to increase mean incomes ('growth' policies) and those designed to even out fluctuations of income over time ('smoothing' policies). Since the overwhelming majority of poverty in our sample is transitory, large reductions in poverty can be achieved by interventions (such as micro-credit for consumption, seasonal public works, crop insurance or price stabilisation schemes) designed to 'smooth' incomes. However, reducing chronic poverty in the long-term will require large and sustained growth in household incomes.

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1 INTRODUCTION

Anti-poverty programs often seek to improve their impact by targeting households for assistance according to one or more criteria. Such targeting criteria are, however, often based upon measurements of key welfare indicators, such as income or consumption, in a single time period. This can result in the inclusion within the target group of transitorily poor households who are suffering from temporary misfortunes but who would not be considered poor when judged according to their permanent income or consumption. Similarly, chronically poor households, whose long-run income or consumption falls below the poverty line, may be excluded from the target group due to temporary good fortune.

The distinction between these two types of poverty is clearly of importance to policymakers since the interventions appropriate for reducing transitory poverty may be quite different from those needed to combat chronic poverty. Numerous short, recurring spells of poverty indicate that priority should be given to measures such as safety nets, credit and insurance schemes that are designed to ‘smooth’ the incomes (or consumption expenditures) of the transitorily poor. In contrast, extended spells of poverty point to more structural policies such as education, land reform or pensions, that aim to permanently augment the income and assets of the poor.

This paper uses a five-year panel of 686 households from rural Pakistan to classify households into three groups: the chronically poor; the transitorily poor; and the never poor. Ordered and multinomial Logit regressions are used to identify the characteristics which distinguish between these groups. The impact of two types of policy interventions (those designed to smooth incomes over time, and those designed to promote income growth) on the severity of chronic and transitory poverty is then examined.

The next section describes the methodology we use to classify households into the three groups as well as the techniques used to identify the characteristics distinguishing these groups. It also details the impact of different levels of smoothing of incomes on aggregate chronic and transitory poverty. The following section describes the data and the derivation of our poverty line. This is followed by presentation of the results and our conclusions.

2 METHODOLOGY

When defining aggregate chronic and transitory poverty we have adopted the decomposition proposed by Jalan and Ravallion (1998). They define household poverty as:

$$P_i = P(y_{i1}, y_{i2}, \dots, y_{iT}) \quad (1)$$

where y_{it} is a measure of household i 's welfare (which it may be useful to think of as income) at time t , and there are T periods in which it is measured. P is some well defined poverty measure, such as those in the Foster-Greer-Thorbecke class of poverty measures (Foster, et al., 1984). Thus using the squared poverty gap measure, they define household total poverty P_i as the expectation over time of the poverty measure at each point in time p_{it} .

$$P_i = \frac{1}{T} \sum_{t=1}^T p_{it} \quad (2)$$

where p_{it} is

$$p_{it} = \begin{cases} \left(\frac{z - y_{it}}{z} \right)^2 & \text{if } y_{it} < z \\ 0 & \text{if } y_{it} \geq z \end{cases} \quad (3)$$

and z is the poverty line.

A household's chronic poverty is then defined to be:

$$C_i = P(E_t(y_{it})) \quad (4)$$

that is the poverty associated with the household's mean income over the T periods. Again, this can be written as the expectation over time of the household's chronic poverty at each point in time c_{it} , but since the household's chronic poverty does not change over time, $C_i = c_{it}$ where:

$$c_{it} = \begin{cases} \left(\frac{z - E_t[y_{it}]}{z} \right)^2 & \text{if } E_t[y_{it}] < z \\ 0 & \text{if } E_t[y_{it}] \geq z \end{cases} \quad (5)$$

and $E_t[y_{it}]$ is the expected value over time of the income of household i . The transitory poverty of household i , T_i is then defined to be the residual $P_i - C_i$.

Jalan and Ravallion estimate Tobit and censored quantile regressions on chronic and transitory poverty against a wide variety of explanatory variables in order to identify the correlates of each kind of poverty for a panel of households in rural China. This approach is particularly useful when the intention is to identify policies which are likely to reduce chronic and transitory poverty in general. However, our concern here is to be able to distinguish between chronically and transitorily poor households and between these two categories and households which have never been poor within the period of the panel survey. We therefore classify households into one of three mutually exclusive groups: the chronically poor; the transitorily poor; and the never poor.¹ Our definitions of each of the three groups is as follows:

- Chronically poor: if $E_t(y_{it}) < z$
- Transitorily poor: if $E_t(y_{it}) > z$ but $y_{it} < z$ for some t
- Never poor: if $y_{it} > z$ for all t

Thus a household is deemed to be chronically poor if its mean income is below the poverty line, while a household is transitorily poor if mean income is above the poverty line but its annual income falls below the poverty line at least once during the period under consideration². Never poor households are simply those in which annual income is always above the poverty line³.

Note that our approach is not the only way to classify households as chronically or transitorily poor: for example we could define the chronically poor as those who have been poor for more than a certain number of periods and the transitorily poor as those who have been poor for fewer periods – a definition which might correspond more closely to intuition. However, our choice is motivated by its similarity to the traditional decomposition of income into permanent and transitory components and to the decomposition of aggregate poverty which we use later in the paper. See Gaiha and Deolalikar (1993) for an application of the alternative approach to Indian data.

A consequence of our definition is that chronically poor households are not necessarily always poor. Indeed it is theoretically possible that a chronically poor household might have an annual income below the poverty line in just one year, but have a sufficiently low income in that year to pull its average intertemporal income below the poverty line. Similarly, a transitorily poor household could be poor for every year except one, but have a sufficiently large income in that one year to raise their average intertemporal income above the poverty line. However, such outcomes are likely to be rare.

Our aim is to identify characteristics which distinguish the chronically poor from the transitorily poor. We therefore estimate a multinomial Logit regression to assess the impact of such characteristics on the chances of a household being chronically or transitorily poor (relative to being never poor) and test whether particular characteristics have a different impact on the probability of a household being chronically rather than transitorily poor. However, given that the three groupings are likely to have (and in our dataset do have) an ordering in terms of income, we also estimate an ordered Logit to assess the influence that different characteristics have on a household being in each of the three categories.

Once the characteristics of the chronically and transitorily poor have been identified, what anti-poverty policies should then be adopted? We focus on two broad categories of policies, those designed to raise the mean incomes of households ('growth promoting policies') and those designed to even out their fluctuation over time ('smoothing policies'). Growth policies may be thought of as policies which aim to reduce poverty by producing distributionally neutral growth in household incomes⁴. They would include sectoral investments in human and physical capital not targeted at specific sections of the population. Smoothing policies would include measures such as safety nets, micro-credit and insurance schemes that are designed to 'smooth' the incomes (or consumption expenditures) of the poor.

It is possible to simulate the impact of growth promoting and smoothing policies upon chronic and transitory poverty using Jalan and Ravallion's measure of aggregate intertemporal poverty. For growth promoting policies this can be done by considering the impact of increasing the real adult equivalent income of all households. In what follows we apply arbitrary increments of 10 percent to mean income ranging from zero to 50 percent as follows:

$$y_{it}^{new} = (1 + g) \cdot y_{it}^{old} \quad (6)$$

where g is the percentage shift in household i 's mean income.

For smoothing policies, a set of simple moving average filters is applied to the intertemporal income of each household. These allow us to assess the possibility of households being able to smooth their incomes (with no change in their overall mean) over different numbers of years. It may be helpful to explain the moving average filters used in our simulations sequentially. First consider the introduction of a policy which allows households to smooth their incomes such that their new set of incomes over time is the average of their current income and the income of the previous year. This means that we replace our T period series of income measures for each household with a set of $T-1$ two-period averages of income. Next consider an intervention which allows households to smooth over three periods, creating a set of $T-2$ three-period averages of income. This can be continued until we have complete smoothing with a single value for each household equal to the inter-temporal average of income for the duration of the panel. That is

$$y_{it}^s = \frac{1}{s} \sum_{j=0}^{s-1} y_{i,t-j} \quad (7)$$

where y_{it}^s is the smoothed income series and s is the number of periods over which income is smoothed.

Clearly such smoothing will reduce the number of transitorily poor households by reducing the size of income fluctuations and therefore preventing incomes falling below the poverty line for some households. Jalan and Ravallion's aggregate measures of total, chronic and transitory poverty can also be redefined to incorporate such smoothing as follows:

$$P_i = \frac{1}{T-s+1} \sum_{t=s}^T p_{it}^s \quad (8)$$

which is the same as equation (2) except that the expectation over time is of p_{it}^s , the total poverty of household i in period t after income has been smoothed for s periods.⁵ The total poverty of household i in period t after income has been smoothed for s periods can then be written as:

$$p_{it}^s = \begin{cases} \left(\frac{z - y_{it}^s}{z} \right)^2 & \text{if } y_{it}^s < z \\ 0 & \text{if } y_{it}^s \geq z \end{cases} \quad (9)$$

where y_{it}^s is defined in equation 7 above.

The chronic poverty of household i after s periods of income smoothing is exactly as described by equation (5) above except that the expectation over time is of y_{it}^s instead of y_{it} . That is:

$$C_i = c_{it} = \begin{cases} \left(\frac{z - E_t[y_{it}^s]}{z} \right)^2 & \text{if } E[y_{it}^s] < z \\ 0 & \text{if } E[y_{it}^s] \geq z \end{cases} \quad (10)$$

and the expectation over time of smoothed income is taken over the reduced length income series

$$E_t[y_{it}^s] = \frac{1}{T-s+1} \sum_{t=s}^T y_{it}^s \quad (11)$$

Transitory poverty may then be calculated as the residual $T_i = P_i - C_i$. In the simulations reported below, we calculate the reduction in total, chronic and transitory poverty for different lengths of smoothing period s .

Smoothing incomes using even a two-year moving average filter constitutes a very high level of intertemporal transfers. It would therefore be useful to design a filter which could capture different degrees of income smoothing. The simplest way to do this is to amend equation (7) above by applying a set of negative exponential weights to incomes from previous years as shown below:

$$y_{it}^s = \frac{\sum_{j=0}^{s-1} (e^{-\theta j} y_{i,t-j})}{\sum_{j=0}^{s-1} e^{-\theta j}} \quad (12)$$

When θ is zero, equation (12) is identical to equation (7) and therefore constitutes perfect (n period) smoothing; as θ tends to infinity the right hand side of equation 12 tends to y_{it} constituting no smoothing. However, it is helpful for our smoothing parameter to be bounded – we therefore define $\gamma = e^{-\theta}$, so that $\gamma = 0$ as θ tends to infinity (no smoothing) and $\gamma = 1$ when $\theta = 0$ (perfect two period smoothing). Thus by varying γ between zero and one, it is possible to simulate different degrees of income smoothing. Thus the income series, y_{it}^s , smoothed over two periods can be written as:

$$y_{it}^s = \frac{y_{i,t} + \gamma \cdot y_{i,t-1}}{1 + \gamma} \quad (13)$$

In the simulations reported below, we explore the reductions in total, chronic and transitory poverty that would result from different degrees of smoothing (i.e., different values of γ) over just two time periods. The reductions from such smoothing policies are then compared with the reductions arising from interventions intended to raise mean incomes via (distributionally neutral) growth. Strictly this comparison requires a measure of the costs of pursuing growth promoting and income smoothing policies. However, in the absence of reliable data on such costs, we assume that both growth and smoothing policies may be achieved

costlessly. Clearly this is an unrealistic assumption, but the differential impact of adopting these two types of policies are so stark, that we believe this is still a useful, illustrative exercise.

3 THE IFPRI PAKISTAN PANEL

The data set used in this paper is taken from a panel data survey of around 800 households in 52 villages in rural Pakistan conducted by the International Food Policy Research Institute (IFPRI) between July 1986 and October 1991. Each household in the survey was interviewed a total of fourteen times between these dates, although due to the uneven spacing of visits it has only been possible to construct a panel for five annual rounds. Data collection took place in three provinces: Punjab, Sind and North-West Frontier Province (NWFP), and within each province in one purposively sampled least developed district (Attock in Punjab, Badin in Sind and Dir in NWFP). In Punjab, a second more prosperous district, Faisalabad, was also included in the panel as a control. Originally, the IFPRI team had also planned to include one least developed district (Kalat) from Pakistan's fourth province, Baluchistan, but survey work had to be suspended in this district after one year due to 'special logistic conditions in that province' (Adams and He, 1995). So the final sample that we have available contains households from 52 villages in four districts and three provinces. It should be stressed that this sample cannot be regarded as representative of Pakistan, but, with the exception of Faisalabad, it may be representative of poor rural areas within Pakistan.

The IFPRI survey collected information on households' composition and characteristics, their land ownership and use, crop production and distribution together with livestock and poultry ownership. Two specific concerns of the study were to document rural households' sources of income and details of their farm and non-farm expenditure (including weekly recall of food intakes), and detailed questions on these were administered to both men and women within the household. Unfortunately, the data collection procedures used to collect information on expenditure in rounds 13 and 14 are not strictly comparable to those in previous rounds, so that our attention in this paper is restricted to poverty measures based on income. Information on land, livestock and other asset ownership together with labour use of household members was also collected. A specialised module on education, migration and employment was administered in round 10 of the survey and a separate module on credit in round 13.

We are able to 'track' the incomes, assets and household characteristics of 686 household over all five years of the sample. Together with its geographical coverage this places the IFPRI panel in between the large-scale panels constructed from national sample surveys in China, Ethiopia and India with 3,000 or more households, and smaller micro-panels constructed for specific studies such as the ICRISAT panel in southern India, Muller's (1997) work in Rwanda, Kinsey *et al.*, (1998) in Zimbabwe, and Scott and Litchfield, (1994) in Chile. It is also important to recognise that unlike many data sets described as panels (including all the World Bank's Living Standard Measurement Surveys), the IFPRI panel allows for households to be tracked between more than two points in time. This enables the comparison of policies designed to increase average incomes with those designed to smooth incomes over increasing lengths of time – which is done later in this paper.

All previous studies using the IFPRI Pakistan panel have used a relative poverty line set equal to the bottom quintile of the distribution of either incomes or consumption expenditures, both expressed in per capita terms (Alderman and Garcia, 1993; Adams and He, 1995). Although this differs from the way in which the Pakistan Household Income and Expenditure Survey sets its poverty line, the adoption of a relative poverty line may be justified in two ways.⁶ First, there is no clear basket of goods to use within the sample districts/villages for constructing a poverty line using the cost of basic needs method. Second, when the alternative food energy intake method is used, the level of expenditure required for an individual to acquire Kcal 2,100 per day turns out to be remarkably similar to the bottom quintile of the per capita consumption distribution. Furthermore, as Alderman and Garcia argue, the consumption and income distributions of the panel are so well correlated that the cut-offs from their distributions may be used interchangeably.

Among the 686 households we are able to track through time, there is a remarkable increase in household size—from 8.7 members in 1986/87 to 10.7 members in 1990/91. Further examination of the age distribution of households shows that the majority of this increase comes from an increase in the numbers of infants and children per household. So if the poverty line is set equal to the bottom quintile of the per capita income distribution, poverty will increase rapidly over the sample. To obtain a more realistic assessment of the evolution of poverty over time, we have used a WHO caloric equivalence scale to account for the fact that the majority of household size growth came from a larger number of children.⁷ Our poverty line was then set equal to the bottom quintile of the per adult equivalent income distribution in the first year of the panel – a figure of Rupees 2,000 per adult equivalent unit.

4 RESULTS

The results are presented in three sub-sections. First, we examine the numbers of chronically and transitorily poor households in our panel and the relationship between static poverty and membership of these categorical groups. The second sub-section estimates multinomial and ordered Logit models in an attempt to identify the characteristics which may be used for distinguishing between chronically poor, transitorily poor and never poor households. The final section compares the impact of policies designed to promote income growth and those intended to help smooth incomes over time.

Magnitudes of the Chronically and Transitorily Poor

The numbers of chronically and transitorily poor households (calculated according to the definitions in the methodology) in the IFPRI panel can be compared with the number of years in which households are below the poverty line - this is shown in Table 1 using a poverty line of Rs 2000 in 1986 prices. Of the 686 households in the panel, 400 experience poverty at least once during its five year period. Of these 400 households, 295 are transitorily poor and 105 are chronically poor (286 households are never poor).

Table 1: Number of periods poor by poverty category

| Number of periods poor | Chronically Poor | Transitorily Poor | Total |
|------------------------|------------------|-------------------|------------|
| 1 | 1 | 164 | 165 |
| 2 | 7 | 92 | 99 |
| 3 | 33 | 37 | 70 |
| 4 | 44 | 2 | 46 |
| 5 | 20 | 0 | 20 |
| Total | 105 | 295 | 400 |

Note: The units are households – thus 164 transitorily poor households were poor for 1 period.

Table 1 shows that, as might be expected, chronically poor households generally are poorer for more periods than transitorily poor households.⁸ However, one household in the panel had such a low income in one year that its average income was below the poverty line in all five years, while seven chronically poor households were only poor for two years. Transitorily poor households are generally poor for only a few years, with 55 percent only experiencing one period of poverty during the five years of the panel and 87 percent only poor for one or two years. Two households had a sufficiently high income in one period to raise them above the poverty line on average despite being poor for four of the five years.

Although the transitorily poor account for almost three-quarters of households experiencing poverty over the five years of the panel, in any given year chronically poor households account for almost half the number of poor households.⁹ Table 2 shows which households are poor in the first year of the panel by their chronic/transitory classification. Similar results can be presented for all the subsequent years.

Table 2: Poor/non-poor vs chronically/transitorily poor

| | Chronically Poor | Transitorily Poor | Total |
|-----------------|------------------|-------------------|------------|
| Poor | 70 | 69 | 139 |
| Non-poor | 35 | 226 | 261 |
| Total | 105 | 295 | 400 |

In any year, the largest category consists of those households who are not poor and are classified as transitorily poor, whilst the smallest category consists of the chronically poor who are not poor that year. On average, 54 percent of those who are poor in any one year are transitorily poor.

It is also useful to examine the average incomes and the relative variability of income for each of the groups. Table 3 shows the average inter-temporal mean, standard deviation and coefficient of variation for all three groups of households¹⁰.

Table 3: Inter-temporal statistics for chronic, transitory and never poor households

| Average Inter-temporal: | Chronically Poor | Transitorily Poor | Never Poor |
|--------------------------------|-------------------------|--------------------------|-------------------|
| Mean income | 1,594 | 3,148 | 5,998 |
| Standard deviation | 716 | 1,715 | 2,482 |
| Coefficient of variation | 0.449 | 0.545 | 0.414 |

Note: Units for mean income are real annual adult equivalent incomes in 1986 Rupees.

Table 3 shows that the coefficient of variation for the transitorily poor is 21 per cent higher than that of the chronically poor. This is consistent with evidence that poor households with inadequate access to methods for smoothing consumption (due to credit and insurance market constraints) may choose instead to smooth their income over time by, for example, choosing lower yielding but more drought resistant crops (Morduch, 1994; Kurosaki, 1998).¹¹ Interestingly, the coefficient of variation of the chronically poor is also higher than that of the never poor – the never poor not only have higher incomes, but more stable ones too.

Identifying the Characteristics Associated with Chronically and Transitorily Poor Households

Given that more than half of poor households in any given year are transitorily poor, it would be useful to be able to distinguish between chronically and transitorily poor households for targeting purposes. We attempt to do this by asking two distinct but related questions:

- What is the relative influence of different characteristics on the probability of a household being chronically, transitorily or never poor?; and
- What characteristics are more prevalent amongst the transitorily poor than the chronically poor (relative to the never poor)?

Table 3 showed that the transitorily poor have higher incomes than the chronically poor (recall that the average income (per adult equivalent) of the chronically poor is Rs 1,594 per month compared to Rs 3,148 for the transitorily poor and Rs 5,998 for the never poor). This suggests that an ordered Logit estimation may be used to address the first question above. Table 4 shows the marginal effects from such an ordered Logit regression together with the P statistic and significance of the coefficient associated with each of the explanatory variables¹². If a coefficient is statistically significantly different from zero then this indicates that it contributes towards the probability of being in all three categories. However, the marginal effect of a change in a variable on the probability of being in one group may be quite different from the marginal effect on the probability of being in the other groups. Thus by comparing the sign and size of the marginal effects one can gain an understanding of the contribution of characteristics to the probability of being in each category.

Table 4: Ordered logit estimation of the probability of being chronically, transitorily and never poor

| Variable | Marginal Effect on: | | | P value and significance of coefficient |
|----------------------|---------------------------------------|--|---------------------------------|---|
| | Probability of being Chronically Poor | Probability of being Transitorily Poor | Probability of being Never Poor | |
| Faisalabad | -0.0165 | -0.0106 | 0.0270 | 0.552 |
| Attock | 0.1583 | 0.1016 | -0.2599 | 0.000 ** |
| Dir | -0.0388 | -0.0249 | 0.0637 | 0.174 |
| Household size | 0.0178 | 0.0114 | -0.0293 | 0.000 ** |
| Age of hh head | -0.0006 | -0.0004 | 0.0010 | 0.404 |
| Dependency Ratio | 0.0231 | 0.0148 | -0.0380 | 0.036 ** |
| Basic education | -0.0016 | -0.0011 | 0.0027 | 0.727 |
| Secondary education | -0.0533 | -0.0342 | 0.0875 | 0.000 ** |
| Education of hh head | -0.0621 | -0.0399 | 0.1020 | 0.004 ** |
| Do not own land | 0.0358 | 0.0230 | -0.0589 | 0.068 * |
| Value of livestock | -0.0047 | -0.0030 | 0.0077 | 0.000 ** |
| Value of capital | -0.0013 | -0.0008 | 0.0021 | 0.000 ** |

** indicates that a coefficient is statistically different from zero at the 5 % level

* indicates that a coefficient is statistically different from zero at the 10 % level

The ordered Logit results show that living in Attock, household size, dependency ratio (the number of children and elderly people in a household as a proportion of total household size), and landlessness all increase the probability of a household being chronically or transitorily poor. In contrast, secondary education, education of the household head, the value of livestock owned and other capital owned increase the probability of a household being never poor. It is notable that the factors which make panel households more likely to be chronically or transitorily poor are exactly the same as the factors which make these households more likely to be poor rather than non-poor (Baulch and McCulloch, 1998). Further, the marginal effect of an increase in any explanatory variable has the same sign on the probability of a household being chronically and transitorily poor but the opposite sign on the probability of being never poor. Consequently it is not possible to point to a variable which allows one to distinguish between the chronically and the transitorily poor (i.e. a variable which increases the probability of being chronically poor while decreasing the probability of being transitorily poor, or vice versa).

The marginal effects of any explanatory variable on the probability of being chronically poor are roughly 50 per cent larger than the marginal effects on the probability of being transitorily poor. For example, a small increase in household size would increase the probability of being chronically poor by 56 per cent more than the increase in the probability of being transitorily poor. It is, however, perhaps more intuitive to compare the size of the marginal effects of different variables. A decrease in household size by one person would have approximately the same effect on the probability of being chronically poor as a Rs 4,000 increase in the value of livestock owned by the household. Similarly an increase by one in the number of household members educated to secondary school level would reduce the probability of being chronically poor by around 0.05, which is equivalent to increasing the value of livestock by Rs 11,500.¹³

While the ordered Logit regression is useful for understanding the relative influence of different household characteristics on their poverty status, it is less useful for distinguishing between the categories. This suggests the use of a multinomial Logit model to identify the characteristics which are more prevalent amongst the chronically poor than the transitorily poor. In our multinomial Logit model, the probabilities of being chronically or transitorily poor are estimated relative to the probability of being never poor. This is because the likelihood function for the multinomial Logit (or Probit) suffers from an identification problem which makes it impossible to identify unique coefficients (and hence marginal effects) for all three categories of the dependent variable (Greene, 1993). Consequently one category must be taken as a reference category — in our case we chose the never poor category. Once this reference category is chosen, the multinomial Logit estimates separate sets of coefficients for the remaining categories and marginal effects can be calculated relative to the excluded category. Therefore it is possible for a household characteristic or any other variable to be significantly associated with being chronically poor rather than never poor, but not significantly associated with being transitorily poor rather than never poor or vice versa. Table 5 shows the results of estimating the multinomial Logit model.

Table 5: Multinomial logit of the chronic and transitorily poor

| Variable | Marginal Effect on Prob (Chronically Poor) | P value and significance of coefficient | Marginal Effect on Prob (Transitorily Poor) | P Value and significance of coefficient |
|----------------------|---|---|--|---|
| Faisalabad | -0.0243 | 0.123 | -0.1249 | 0.995 |
| Attock | 0.0790 | 0.000 ** | 0.4056 | 0.005 ** |
| Dir | -0.0246 | 0.093 * | -0.1266 | 0.833 |
| Household size | 0.0104 | 0.000 ** | 0.0533 | 0.004 ** |
| Age of hh head | -0.0002 | 0.581 | -0.0011 | 0.729 |
| Dependency Ratio | 0.0146 | 0.006 ** | 0.0750 | 0.826 |
| Basic education | -0.0015 | 0.551 | -0.0075 | 0.960 |
| Secondary education | -0.0324 | 0.000 ** | -0.1664 | 0.001 ** |
| Education of hh head | -0.0284 | 0.011 ** | -0.1460 | 0.042 ** |
| Do not own land | 0.0147 | 0.141 | 0.0756 | 0.276 |
| Value of livestock | -0.0030 | 0.000 ** | -0.0156 | 0.003 ** |
| Value of capital | -0.0013 | 0.003 ** | -0.0066 | 0.007 ** |

** indicates that a coefficient is statistically different from zero at the 5 % level

* indicates that a coefficient is statistically different from zero at the 10 % level

The results of the multinomial Logit show that residence in Attock significantly increases the probability of being chronically or transitorily poor relative to being never poor, as does having a larger household size. Secondary education, education of the household head and the value of livestock and capital all reduce the chances of being in either of the poor categories. The marginal effects on the probability of being transitorily poor are substantially larger than the marginal effects on the probability of being chronically poor.¹⁴ However, no great importance should be attached to this since it merely reflects the ordered nature of the categories.¹⁵ However, it is worth noting the relative size of the marginal effects within a single category: a Rs 10,000 increase in the value of livestock held has the same effect on the probability of being chronically poor as an additional member of the household having secondary schooling. Similarly a reduction in household

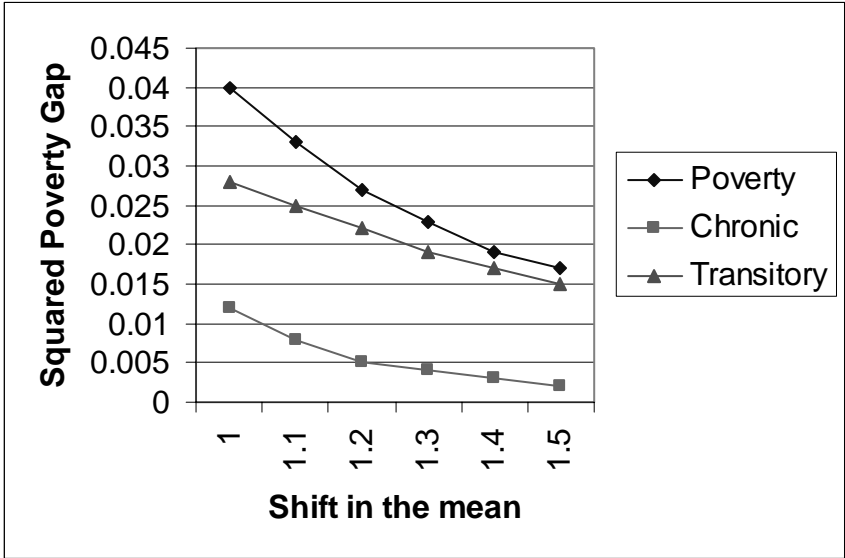
size by one member would have the same marginal effect on the probability of being chronically poor as an increase of Rs 10,000 in capital.

Almost the same variables are statistically significant when distinguishing the transitorily poor from the never poor as those which are significant when distinguishing the chronically poor from the never poor. The only exception is the dependency ratio - Table 5 shows that the chronically poor have a significantly higher dependency ratio than the never poor, whereas the transitorily poor do not. This is a potentially important result since it suggests that the dependency ratio may be one characteristic which enables policymakers to distinguish between the chronically and transitorily poor for targeting purposes.¹⁶

Comparing Growth and Smoothing Policies

Multinomial and ordered Logits help to identify the characteristics correlated with households being chronically or transitorily poor. Policies to assist each group are often focused upon improving poor households’ endowments of those elements of human and physical capital found to be most strongly associated with membership of each group. Such policies can be characterised as aiming to promote income growth, since the assumption is that improved endowments will enable those households to increase their productivity or earning capacity. The impact of economic growth on chronic and transitory poverty can be simulated directly by increasing household incomes. To illustrate we have adopted the Jalan and Ravallion (1998) decomposition which, rather than categorising individual households as chronically or transitorily poor, allows any well defined poverty measure to be partitioned into a part accounted for by chronic poverty and a part accounted for by transitory poverty.¹⁷ The effect on the Jalan and Ravallion measures of chronic and transitory poverty of increasing incomes by between 10 and 50 per cent are shown in Figure 1.¹⁸

Figure 1: The effect of income growth on chronic and transitory poverty

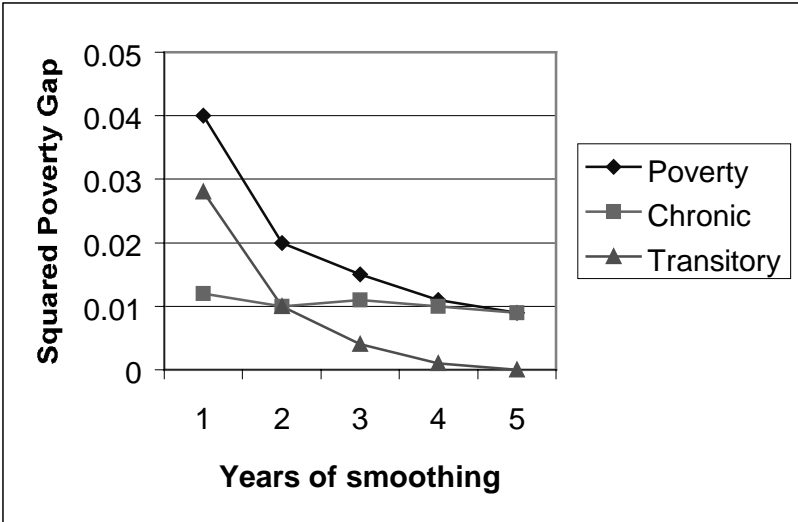


Note: The poverty measure used is the squared poverty gap. Shift in the mean indicates the proportionate shift in the mean income. Thus the value 1.1 indicates a 10 per cent increase in the mean.

Figure 1 shows that increases in income cause large reductions in both chronic and transitory poverty¹⁹.

How chronic and transitory poverty changes when household incomes are smoothed may be simulated using a set of moving average filters as described above. Figure 2 shows the impact of perfect smoothing of incomes over different numbers of years on chronic and transitory poverty in the Pakistan panel.

Figure 2: The effect of income smoothing on chronic and transitory poverty



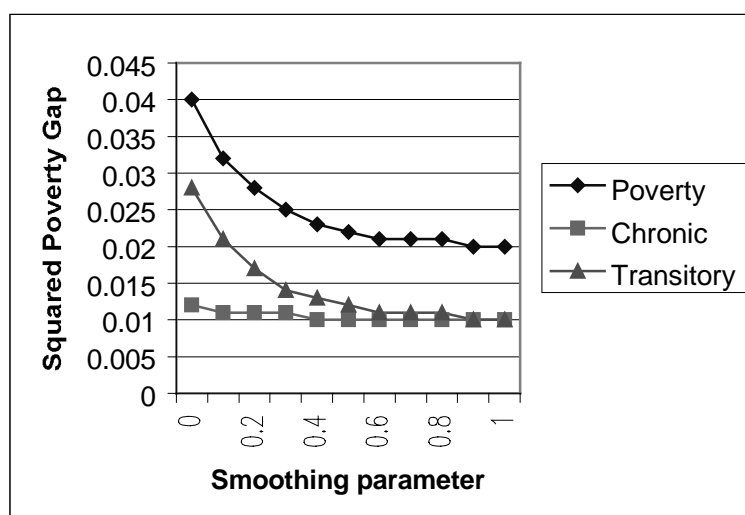
Note: Years of smoothing indicates the number of years in the moving average filter; when this has the value 1 there is no smoothing.

Figure 2 shows that smoothing gives a dramatic reduction in poverty with the squared poverty gap falling by 50 per cent from 0.04 to 0.02, due to a 64 per cent reduction in transitory poverty by applying a two-year filter.²⁰ Since there is no change in mean incomes, chronic poverty remains virtually unchanged over the period.

It is instructive to compare the reductions in poverty due to growth and those due to smoothing. Comparing Figure 1 and Figure 2 it is apparent that smoothing incomes over two years achieves a far larger reduction in overall poverty than that achieved by most plausible growth rates. A two year smoothing achieves the same reduction in overall poverty of an increase in mean real adult equivalent income of almost 40 per cent (which with current rates of economic and population growth would not be achieved for many years). However, the overall reduction in poverty is achieved entirely through reducing transitory poverty - chronic poverty may only be reduced through growth.

Given the large reduction in transitory poverty resulting from smoothing using a two-period filter, it is interesting to consider the effect of smoothing by less than this amount. This can be done by parameterising the smoothing filter as described in the methodology. Figure 3 shows the impact upon chronic and transitory poverty of smoothing for different values of the smoothing parameter from zero (no smoothing) to one (perfect two-period smoothing as above).

Figure 3: Parameterising the smoothing function



The smoothing parameter γ ranges from 0 (no smoothing) to 1 (perfect two-period smoothing). Thus the starting values of Figure 3 are the same as for Figure 1 and Figure 2 while the finishing values are the same as Figure 2 with two years of smoothing.

As Figure 3 shows transitory poverty is more than halved when the smoothing parameter $\gamma = 0.3$. Thus the major part of the poverty reduction takes place with a relatively low level of the smoothing parameter. Comparing this result with the impact of growth in Figure 1 it is clear that smoothing with a parameter value of $\gamma=0.1$ achieves approximately the same reduction in overall poverty as that achieved by a 10 per cent increase in mean incomes.

The simulations above are clearly stylised. Real policy interventions, whether in the form of investments in human and physical capital or improved access to the means of consumption or income smoothing, are likely to impact upon both chronic and transitory poverty. However, the simulations do suggest that policy makers face a dilemma: although households clearly already have some ability to smooth their consumption over time, the largest reductions in overall poverty may still best be secured through improving the ability of poor households to smooth incomes and consumption over time; however, chronic poverty will persist in rural Pakistan without large and sustained growth in incomes. Thus the balance between interventions to improve households' abilities to smooth incomes over time and those designed to promote growth must depend not only on the effectiveness and feasibility of each type of intervention but on the relative weight which policymakers place upon the welfare of the chronically versus the transitorily poor.

5 CONCLUSIONS

Anti-poverty interventions are often based on static conceptions of poverty even though it is well-known that household living standards vary over time. This paper has investigated the magnitude of chronic and transitory poverty using a five year panel survey from rural Pakistan, together with the characteristics of chronically and transitorily poor households. Using a conventional income-based definition of poverty, 74 per cent of poor households in our sample are shown to be transitorily rather than chronically poor. Employing the Jalan and Ravallion measures of chronic and transitory poverty and accounting for the

severity of poverty, some 70 per cent of aggregate poverty is shown to be transitory. This is largely because the incomes of transitorily poor households vary widely over time: not only do transitorily poor households have average incomes that are almost half that of the never poor, the intertemporal coefficient of variation for transitorily poor households is around 12 percent higher than that of the never poor. The incomes of transitorily poor households also vary much more than those of the chronically poor. Such variability explains why, as we have noted elsewhere, the poor are always with us but only temporarily (Baulch and McCulloch, 1998).

Different types of anti-poverty interventions will be needed to address chronic and transitory poverty, so it would be useful to be able to identify characteristics which may be used to distinguish chronically from transitorily poor households. Using ordered and multinomial Logits, we show that both chronically and transitorily poor households are more likely to be larger, less well educated and to live in certain districts than never poor households. They are also likely to have fewer livestock and less land and other physical capital. The one characteristic which distinguishes the chronically from the transitorily poor is the dependency ratio. Chronically poor households tend to have larger dependency ratios than households which are never poor, whereas transitorily poor households do not. This suggests that the dependency ratio may be one characteristic which enables policymakers to distinguish between the chronically and transitorily poor for targeting purposes.

We then move on to examine the impact of two types of stylised anti-poverty interventions on the chronically and transitorily poor. Our simulations show that interventions which enable households to smooth their incomes over time achieve a large reduction in transitory poverty and therefore, given the relative importance of this type of poverty, in total poverty. This finding remains valid even when the extent of smoothing is quite small. However, simulated ‘smoothing’ makes little difference to chronic poverty, which is reduced only by large and sustained growth in real incomes.

These findings have important implications for anti-poverty policy. They suggest that the current emphasis on sectoral (and in some countries geographical) interventions to improve the human and physical capital of the poor are likely to be successful in the long-run in reducing chronic poverty. However, in the short-term potentially much larger reductions in aggregate poverty might be achieved by enhancing households’ ability to smooth incomes and consumption across time. Interventions to achieve such improvements might include the provision of micro-credit for consumption, seasonal public works, crop insurance and food price stabilisation schemes. However, the most appropriate ways of smoothing incomes will clearly depend upon the nature of market failures in specific contexts. Further work is also needed to determine the extent to which such policies can smooth incomes and consumption in order to provide policymakers with realistic forecasts of the poverty reducing impact of different policy mixes.

APPENDIX 1: ADULT EQUIVALENCE SCALE

| Age | Male Weight | Female Weight |
|------------|--------------------|----------------------|
| 0 | 0.33 | 0.33 |
| 1 | 0.46 | 0.46 |
| 2 | 0.54 | 0.54 |
| 3-4 | 0.62 | 0.62 |
| 5-6 | 0.74 | 0.70 |
| 7-9 | 0.84 | 0.72 |
| 10-11 | 0.88 | 0.78 |
| 12-13 | 0.96 | 0.84 |
| 14-15 | 1.06 | 0.86 |
| 16-17 | 1.14 | 0.86 |
| 18-29 | 1.04 | 0.80 |
| 30-59 | 1.00 | 0.82 |
| 60+ | 0.84 | 0.74 |

The equivalence scale is based on a World Health Organisation equivalence scale quoted in Dercon (1998).

APPENDIX 2: MEANS AND STANDARD DEVIATIONS OF THE VARIABLES

| Variable | Mean | Standard Deviation |
|--------------------------------|------|--------------------|
| Household size | 8.71 | 4.14 |
| Age of household head | 47.0 | 13.9 |
| Dependency ratio | 1.17 | 0.88 |
| Basic education | 2.40 | 2.19 |
| Secondary education | 0.61 | 1.09 |
| Education of household head | 0.37 | 0.48 |
| Do not own land | 0.39 | 0.49 |
| Value of livestock (Rs 1,000s) | 17.4 | 15.8 |
| Value of capital (Rs 1,000s) | 18.8 | 53.9 |

Dependency ratio is defined as the ratio of the number of household members under 16 or over 64 years old to the number of members between 16 and 64 years old.

Basic education is the number of household members with primary and middle school education.

Secondary education is the number of household members with secondary or college education.

Education of household head is one if s/he has had some formal education and zero otherwise.

Do not own land is one if the household does not own land and zero otherwise.

Averages are across 686 households for the first year of the panel.

**APPENDIX 3: MEANS OF THE VARIABLES FOR CHRONICALLY,
TRANSITORILY AND NEVER POOR HOUSEHOLDS**

| Variable | Chronically Poor | Transitorily Poor | Never Poor |
|--------------------------------|-------------------------|--------------------------|-------------------|
| Household size | 9.2 | 8.7 | 8.5 |
| Age of household head | 45.7 | 47.4 | 47.1 |
| Dependency ratio | 1.46 | 1.12 | 1.11 |
| Basic education | 2.4 | 2.4 | 2.4 |
| Secondary education | 0.2 | 0.5 | 0.9 |
| Education of household head | 0.29 | 0.32 | 0.45 |
| Do not own land | 0.57 | 0.42 | 0.30 |
| Value of livestock (Rs 1,000s) | 10.1 | 16.7 | 20.9 |
| Value of capital (Rs 1,000s) | 5.5 | 12.9 | 29.9 |

Note: Definitions of the variables are in Appendix 2. Values refer to the first year of the panel 1986/87.

NOTES

- ¹ Note that classifying households into the categories chronically, transitorily and never poor is quite different from decomposing aggregate poverty into chronic and transitory components.
- ² To avoid cases in which a household ‘trips’ over the poverty line, we require that a household must both cross the poverty line and experience a change in real income of 10 per cent or more before it is said to enter or exit poverty. This avoids including in the transitorily poor households who are fractionally below the poverty line for one year but in reality never poor.
- ³ We could also define a category of permanently poor households whose incomes are always below the poverty line.
- ⁴ Of course growth can also be pro-poor or anti-poor, but for simplicity here we focus on distributionally neutral growth.
- ⁵ The length of an income series which has been smoothed over s periods is $T-s+1$ rather than T periods (for example two-period smoothing produces an income series of length $T-1$)
- ⁶ Malik, (1993) provides a useful survey of previous studies of poverty in Pakistan. The most common approach used to define a poverty line has been in terms of the consumption expenditure required to meet a minimum per capita calorie requirement – this is the approach used by Irfan and Amjad (1984), Ahmad and Allison (1990) and Ercelawn (1990). Typically a calorie requirement of Kcal 2,550 per day is used, as suggested by the Nutrition Cell of the Planning and Development Division of Pakistan, although lower figures such as Kcal 2,100 have also been used.
- ⁷ The equivalence scale used was taken from West, et al., (1988) quoted in Dercon (1998) and is given in Appendix 1.
- ⁸ Note that the years in poverty need not be consecutive.
- ⁹ This reason for this paradox is similar to the well-known problem of measuring the number of beds occupied by patients with long-term illnesses in a hospital ward.
- ¹⁰ Note that these are inter-temporal averages, not cross-sectional ones.
- ¹¹ Other interpretations are also possible, for example, if the transitorily poor have access to occasional but unpredictable and unsustainable sources of income (e.g. seasonal labour or trading opportunities). We are grateful to Stephen Devereaux for this point.
- ¹² Appendix 2 shows the means and standard deviations of the explanatory variables for the first year of the panel.
- ¹³ Of course increasing the number of household members educated to secondary school level by one or adding Rs 11,500 to the value of livestock are not small changes. Therefore the marginal effects may not remain constant over such a change.
- ¹⁴ Wald tests for the equality of the coefficients were rejected both jointly and for all pairs of variables individually with the exception of the education of the household head.
- ¹⁵ Maximum likelihood estimation of the multinomial Logit model will tend to increase the magnitude of the coefficients for the transitorily poor for all explanatory variables since the transitorily poor are on average better endowed in all positive characteristics (and less well endowed in all negative ones) than

the chronically poor. Note that this means that it is not valid to compare the relative size of the marginal effects on being chronically and transitorily poor between the multinomial and ordered Logit models since in the former case they arise from estimating two separate coefficient vectors whereas in the latter case a single coefficient vector is estimated.

- ¹⁶ Appendix 3 shows the mean values of the explanatory variables for the first year of the panel for chronically, transitorily and never poor households.
- ¹⁷ It would also be possible to construct categories of households on the basis of whether or not they have a positive amount of chronic or transitory poverty.
- ¹⁸ Similar results are obtained using the headcount and poverty gap poverty measures.
- ¹⁹ The result uses the last four years of the panel to facilitate comparison with smoothing policies later. In addition 9 households with negative incomes have been excluded from the analysis.
- ²⁰ This arises in part because of the use of income rather than consumption as the welfare measure. Income is considerably more volatile than consumption (the inter-temporal coefficient of variation for income is 0.39 whereas it is 0.18 for consumption for the three years in which consumption data is available). Alderman, (1996) also shows that households are able to smooth consumption across years although they are not perfectly insured. However, the concern here is not with insurance and consumption smoothing but with the impact on *income* poverty of growth and income smoothing policies.

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