

**DO MONETARY AND NON-MONETARY
INDICATORS TELL THE SAME STORY
ABOUT CHRONIC POVERTY?
A STUDY OF VIETNAM IN THE 1990s**

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Abstract

This paper investigates whether monetary and non-monetary indicators tell the same story about chronic poverty using a unique two-period household panel from Vietnam in the 1990s. Using transition matrices and a simple measure of immobility, we find that monetary poverty is less persistent than malnutrition among adults and stunting among children (although there is some evidence of “catch-up among stunted children). Monetary poverty is also found to be less persistent than primary and lower secondary school enrolments. Non-parametric tests on common samples reveal that the distributions of all these poverty indicators are different. Furthermore, defining chronic poverty to occur when an individual is monetarily poor, stunted, malnourished or out of school in both waves of the panel, we find the extent of overlap and correlation between the sub-groups of chronically poor is generally quite low. This implies that expanding the number of dimensions used to identify chronic poverty may not lead to greater clarity about the characteristics of chronic poverty.

Introduction

Most quantitative studies of chronic poverty have focused on tracking monetary indicators of poverty, such as whether income or expenditure is below a pre-determined poverty line. Yet it is now commonly accepted that poverty is multi-dimensional, and that the conventional poverty-lines approach misses many of the wider aspects of poverty and ill being.

When considering chronic poverty, whose defining feature is its long duration, the multi-dimensionality and severity of poverty are likely to reinforce one another (Hulme, Moore, and Shepherd, 2001). While it is not possible to capture all of the different dimensions of poverty in conventional household surveys, information on some of the key non-monetary indicators of poverty (such as education, anthropometric status, morbidity and mortality) are often collected. Previous studies have shown, in a static context, that monetary and non-monetary indicators of poverty are poorly correlated in many developing countries (UNDP, 1998; Sahn and Stiffel, 2000). However, it is not known whether this is because static monetary poverty is a poor indicator of long-term poverty or because of divergences (possibly dynamic) between monetary and non-monetary indicators of chronic poverty. This paper investigates this issue using household survey panel data from Vietnam in the 1990s.

Methods

When analysing poverty in a multi-dimensional context, it is important to decide whether to model poverty itself or the underlying welfare measure. In the static (cross-sectional) context, analysing poverty itself usually corresponds to comparing a continuous welfare (such as income or height for age) to some pre-determined minimum cut-off (such as the poverty line or the z-score in the reference population), constructing a dichotomous indicator (of monetary poverty or malnutrition) based on this, and then aggregating over all individuals in the population. Following Lipton (1983), moderate and extreme poverty or mild, moderate and severe malnutrition might also be distinguished. However, this direct approach effectively censors (or throws away) most information on the level of welfare measure, and is roundly criticised by some poverty analysts (e.g., Ravallion, 1995). It is also likely that measurement error in the welfare measure may create misclassifications and “false transitions” between discrete poverty states in a panel data context (Deaton, 1997). At the same time, modelling a continuous welfare measure itself may be criticised for not paying

explicit attention to those below the “poverty line” of “minimum cut-off”, and for giving excessive weight to outliers.¹

In this paper, which is primarily descriptive, we adopt the direct approach to modelling poverty. We construct discrete indicators of monetary and non-monetary poverty, and examine the persistence of strength of association between these indicators using transition matrices for two different years. The underlying continuous measures are divided into sub-groups reflecting the duration and intensity of poverty using absolute cut-offs without explicit consideration of measurement error. For monetary poverty, these cut-offs are the poverty lines needed to obtain 2100 calories per person per day, with and without a modest allowance for essential non-food expenditures. For nutritional poverty among children, we use cut-offs based on -2 or -3 standard deviations of the US reference population to determine whether or not children are moderately or severely stunted. For malnutrition among adults we use the cutoffs for determining mild and moderate chronic energy deficiency using the Body Mass Index adopted by the World Health Organisation and other international organisations. However, for school enrolments, which are inherently dichotomous, no explicit cut-offs are required and we simply classify primary and lower secondary school age children by whether or not they have been attending the appropriate level of school.

We examine the extent to which monetary and non-monetary measures of poverty tell the same story in several ways. First we calculate a Chi-squared test for the independence of two categorical distributions, using the observed frequencies of monetary poverty as the expected frequencies against which to compare the frequencies of non-monetary poverty. This requires that the samples for which the frequencies of monetary and non-monetary poverty are calculated be identical, which usually requires some restriction of the panel. For example, when we compare monetary poverty and educational enrolments, we restrict the sample to those children in the panel of primary or lower secondary school age. Second, to compare the persistence of the different dimensions of poverty, we adapt the immobility measure suggested by Scott and Litchfield (1994):

¹ Note that for some non-monetary indicators of poverty (such as school enrolments or child mortality) the issue of censoring does not arise, since the dependent variable is an inherently discrete variable.

$$I = \frac{\text{trace}(M)}{N}$$

where M refers to the square transition matrix, $\text{trace}(M)$ is the sum of the cell frequencies along the leading diagonal, and N is the number of individuals in the panel. The immobility measure varies between zero when there is complete mobility and one when there is complete immobility.² Third, we examine whether the various sub-groups of the chronically poor overlap. To what extent for example, are those adults who are malnourished in the two waves of our panel also living in monetary poverty in both of these years? To do this we calculate indices of the different dimensions of chronic poverty, and assess their correlation using Spearman rank correlation coefficients.

Finally, recognising the problems introduced by censoring continuous welfare measures, we also examine the correlation of the underlying continuous welfare measures (real per capita expenditures, children's height for age z-scores, and the body mass index among adults).

Data

The data used in this paper is taken from the two waves of the Vietnam Living Standards Surveys (VLSS), a conventional household survey patterned after the World Bank's Living Standard Measurement Surveys. The first VLSS was undertaken between October 1992 and October 1993 with a sample of 4,800 households drawn from a self-weighting sample stratified according to rural-urban location located in 150 communes. The second VLSS was undertaken between December 1997 and December 1998 from a sample of 5,999 households drawn from 10 sampling strata and 194 communes. Two principles underlied the sampling for the second VLSS (hereafter VLSS98). First, as many of the households that were sampled in the first VLSS were re-interviewed as possible. When households moved within the commune they were followed, but if they moved outside the commune they were replaced by other households from that commune. Second, the number of households in each of 10 sampling strata were "topped-up" to ensure that their sample size was large enough for analysis to be conducted at the strata level. This required oversampling in thinly populated

² It should be noted that the values taken by the immobility measure will depend on both the number of rows/columns in the transition matrices and the cut-offs used to distinguish them. We adjust for the former by ensuring the dimensions of the transition matrices being compared are identical.

strata such as the Central Highlands, and undersampling in densely populated strata such as Hanoi and Ho Chi Minh City and the rural Red River Delta.

Three questionnaires (covering household, community/commune and market prices) were administered in the two rounds of the VLSS. Although there are some differences in the questionnaires (for example, in how expenditures on vocational education and tobacco products, patterns of morbidity, categories of land holdings, and the items for which market prices were collected), the information from the two surveys are usually comparable. Special attention was paid to constructing household expenditure aggregates that were comparable across surveys, which is vital in analysing changes in monetary poverty. Comprehensive and comparable information was also collected for all individuals within the household on topics such as education and nutrition.³ Unusually, anthropometric information was collected from all household members (with the exception of individuals who were too unwell to be measured) in both surveys.

The panel component to the VLSS allows 4,272 of the 4,799 households interviewed in 1992-93 to be tracked to 1997-98.⁴ At the individual level, 17,322 of the 24,067 individuals contained in these households are present in both surveys. The higher attrition rate for the individual versus the household panel (28% versus 11%) is because many individuals died, migrated, or split-off from their original households (often because of marriage) in the five years between the two surveys. Since the panel component is central to the analysis conducted in this paper it is important to recognise that the panel design of the study comes with some drawbacks. First, newly formed households are under-represented, as it was households rather than individuals (as in panel surveys in some industrialised countries) that were followed in the VLSS. If newly formed households are more likely to have young children and be poor than others, this will reduce the extent of poverty among children. Second, there are higher levels of attrition in the urban than the rural strata (35% compared to 26% at the individual level). As a consequence, monetary poverty is lower and expenditure levels are higher among individuals that drop out of the panel. When combined with the fact that the sampling frame for both surveys came from 1989 Census, when Vietnam's urban population was around 20% (compared to 25% in the 1999 Census) and the exclusion of

³ For the fertility module, only one woman of child-bearing age was interviewed while for agricultural and household enterprises the most knowledgeable available member of the household was interviewed.

⁴ One household with highly incomplete data is customarily dropped from the sample of the first VLSS.

migrants without registration certificates from the surveys, the means that urban areas are significantly under-represented in VLSS98 and the panel. Finally, because of attrition, we do not use sampling weights for analysis of the 1997-98 data. This is consistent with the self-weighting nature of VLSS93, but means that it is not possible to draw inferences from our analysis of monetary and non-monetary poverty at the national level in 1997-988 (as the second VLSS requires weighting to be considered nationally representative).

Monetary Poverty

Poverty in Vietnam is customarily assessed using per capita expenditure as the welfare measure (GSO, 1999; Poverty Working Group, 1999). We begin by following this practice and calculating the percentage of panel individuals whose per capita expenditures are lower than one of the two poverty lines established by the GSO-World Bank poverty. The first of these poverty lines, the food poverty line, shows the expenditure necessary for a person with normal dietary patterns to obtain 2100 Kcals per day. We shall refer to those with per capita expenditures below the food poverty line as the “food poor”. The second poverty line, the “overall” poverty line also includes a modest allowance for essential non-food expenditures such as fuel and housing. We refer to those people with per capita expenditures between the food line and the “overall” poverty line, as moderately poor. The use of such a dual poverty line to distinguish between poverty and extreme poverty dates back to Lipton (1983) and World Bank (1984).

Table 1 presents a transition matrix showing these three categories of monetary poverty for all 17,322 individuals in the VLSS panel. Just over one-third (35%) of individuals were non-poor (in monetary terms) in both waves of the survey, while approximately 10% were either moderately poor or food poor in both years. Just over one fifth of individuals moved-out of moderate poverty between 1992-93 and 1997-98, while another 7 % escaped from food poverty. In contrast, just over 4 % (3.54 + 0.68) of individuals fell into either moderate or food poverty over this five year period. Finally, just over 8% of food poor individuals in 1992-92 had improved their status to moderately poor by 1997-98, while less than 4% of individuals moved in the opposite direction. Similar movements in and out of monetary poverty have been documented by household panel studies in a number of other developing countries (Baulch and Hoddinott, 2000).

**Table 1: Monetary poverty among all individuals in the VLSS panel
(per capita expenditures)**

	1997-98			
		Non-Poor	Moderately Poor	Food Poor
1992-1993	Non-Poor	35.73	3.54	0.68
	Moderately Poor	20.14	10.63	3.86
	Food Poor	7.10	8.55	9.77
		N =17,322	$\chi^2 =5237.65$	I = 0.561

The Chi squared statistic reported firmly rejects the hypothesis that monetary poverty in 1997-98 is independent of monetary poverty in 1992-93 (and vice-versa). Nevertheless more than half of panel individuals did not change their monetary poverty status between 1992-93 and 1997-98, as indicated by the 0.561 value of the immobility index. Note, however, that the mass in the bottom left hand corner of the transition matrix (36 percent) is much higher than that in its top right-hand corner (8 percent). This is consistent with the large reduction in poverty that occurred in Vietnam during the 1990s (Poverty Working Group, 1999; Haughton et al, 2001).

The use of per capita expenditures to measure poverty is, of course, problematic (Deaton, 1997) First it assume that expenditures are equally divided between all household members, whatever their age, sex or social position. Not only is this patently false but it also ignores the fact that different household members have different needs: young children, for example, need to consume less calories than working adults. Second, the use of per capita expenditures ignores the possibility of household economies of scale. Such economies of scale might derive from jointness in consumption (e.g., the preparation of meals) or because there are public goods within the household (e.g., radios or toilets) which can be used by all household members at no extra cost.

To take account of these two factors, White and Masset (2001) jointly estimated child costs (effectively a truncated equivalence scale) and household economies of scale for Vietnam using two different methods, the Engel and Robarth method, and the two VLSS. The most plausible of their various estimates are those from the Robarth method which gives the cost of an average child under 14 (β) as 0.43 of an adult with household economies of scale (α) at

0.5.⁵ Using these estimates to compute adult equivalent expenditures, and scaling the above poverty lines appropriately, gives the following transition matrix of equivalised monetary poverty:

**Table 2: Monetary poverty among all individuals in the VLSS panel
(equivalised expenditures)**

	1997-98			
		Non-Poor	Moderately Poor	Food Poor
1992-1993	Non-Poor	75.33	1.55	0.21
	Moderately Poor	14.22	2.70	0.57
	Food Poor	2.61	1.71	1.10
		N =17,322	$\chi^2(4) =4031.5$	I = 0.791

This transition matrix reveals a somewhat different picture of movements in and out of monetary poverty than that based on crude per capita expenditures. Again the null hypothesis that monetary poverty in 1992-93 and 1997-98 are independent of one another is firmly rejected by a Chi-squared test. Poverty among children is, however, lower when equivalised rather than per capita expenditures are used to categorise monetary poverty as is poverty among large households (who according to White and Masset's estimates benefit from significant economies of scale in household consumption). As a consequence, the percentage of individuals who are non-poor in both surveys rises from 35.7% to 75.33%. Despite the corresponding reduction in the percentage of the individuals who are moderately or food poor in both years the immobility index rises to 0.791. Note, however, that the percentage of individuals who are food poor in both years, falls from 9.8 % in Table 1 to just 1.1% in Table 2.

As Deaton (1997) points out, there are often large differences between the Robarth and Engel methods for estimating child costs. The procedure used to jointly estimate child costs and household economies of scale by White and Masset is also still new and untested. Furthermore, their (0.5) estimate of the economies of scale coefficient (α) seems exceptionally high for a population in which average household size is just under 5

⁵ An $\alpha=0.5$ implies that if we double household size and double household expenditure, per adult equivalent expenditures increase by 50%.

members.⁶ In the remainder of this paper, we will therefore use the per capita monetary poverty as the standard against which to compare our estimates of non-monetary poverty. The likelihood that these estimates of monetary poverty overstates poverty among children and large household does, however, deserve to be recognised.

Malnutrition

Most LSMS type surveys collect anthropometric information on children under five years old but it is rare to collect such data on older children in large household surveys. Furthermore, the VLSS are almost unique in having collected anthropometric information from not only older children but also all adult members who were available to be measured and weighed (Alderman, 2000). The extensive nature of the anthropometric data collected, combined with the panel component of the VLSS, allows a number of interesting questions concerning stunting among children and variation of the body mass index among adults to be investigated, along with their relationship to monetary poverty.

For children, we take the cohort of 1660 children in the panel aged between one and five years old in 1992-93, calculate their height for age z-scores, and then assess whether or not they are stunted by comparison with the US National Child Health Survey reference population. A child is categorised as moderately (severely) stunted if his or her height for age z score is less than 2 (3) standard deviations below the reference population. For adults, we take the cohort of 8,089 adults aged 20 years or more in 1992-93 and then re-surveyed in 1997-98. We calculate the body mass index (BMI) for each of these adults and, in accordance with standard practice, classify the mildly malnourished as those with BMIs of less than 18.5, the moderately malnourished as those with BMIs less than 17, and the severely malnourished as those with BMIs less than 16 (James, Ferro-Luizzi and Waterlow, 1988).⁷

Table 3 compares stunting and monetary poverty in the cohort of children aged one to five years of age in 1992-93. Children under one year old (who are conventionally included in child anthropometrics) are excluded for two reasons. First, cultural factors discourage parents from allowing infants to be measured (indeed, in some rural areas in Vietnam,

⁶ Average household size was 4.96 members in 1992-93 and 4.70 in 1997-98. Since the mid-1980s, the Vietnam Government has encouraged parents to have no more than two children with a recommended five-year spacing between their births.

⁷ The body mass index (BMI) is computed by a person's weight (in kilograms) squared divided by his or her height (in metres) squared. Nutritionists use BMI as a measure of chronic energy deficiency in adults.

children are not given proper names until they have lived to be one year of age). Second, unlike older children and adults, infants cannot be measured standing-up making accurate recording of their heights more difficult.

Table 3: Stunting and Monetary Poverty among Young Children in the VLSS panel

	1997-98			
	Normal Non-Poor	Moderate Moderately Poor	Severe Food Poor	
1992-1993	Normal	35.30	4.88	0.36
	Non –Poor	23.31	4.16	0.72
	Moderate	17.95	14.10	2.11
	Moderately Poor	19.22	14.04	5.78
	Severe	5.60	12.41	7.29
	Food Poor	7.59	11.93	13.25
	N =1660	$\chi^2 (1) = 201.7$	I =0.567 I = 0.506	

Note: The top number in each cell of this matrix refers to the percentage of children who were normal height, moderately or severely stunted in 1992-93 and 1997-98. The lower number in each cell refers to their monetary poverty status in these years.

Of the 1660 children aged one to five in 1992-93, just over 35% had normal height for age z scores in both 1992-93 and 1997-78. However, 14% and 7% of children in the cohort were moderately and severely stunted in both years. About one-eighth of children who were of normal height for age in 1992 had become moderately or severely stunted by 1998.

However, more than one-half of the children who were moderately stunted in 1993 had regained normal height by 1998, while one-fifth had recovered from severe stunting to normal height. The upward mobility in this matrix, which is similar to the findings of Koch and Nguyen (2001), may surprise some analysts, who have been trained to expect that stunting in early childhood is irreversible. However, recent clinical studies indicate that stunted children who survive into childhood “normally have some degree of spontaneous catch-up” and that almost complete reversal of stunting is possible when diet and environmental factors improve over a sufficient period of time (Golden, 1994).

Paired t-tests shows that stunting among boys and girls was not significantly different in 1992-93 but that by 1997-98 a small gap had emerged with a higher proportion of boys being severely stunted than girls ($t=5.745$). Stunting is more common in rural than urban areas (in 1997-98, 10.7% of children were severely stunted in rural communes compared to 1.8% in urban wards). Within rural areas stunting is highest and most persistent in midland and

mountainous areas. Since these are the regions which are most poorly served by the transportation network (especially in the high mountains), this is consistent with the relationship that has been posited between remote rural areas and the incidence of chronic poverty (Bird, Hulme, Moore and Shepherd, 2002).

Table 3 also shows the percentages of cohort children who lived in monetary poverty (along with the rest of their families). Inspection of the table reveals that the six of the nine cell percentages are within 2 percentage points of one another. However, a much higher percentage of children have normal height for age z-scores in both years than are continuously non-poor. As a consequence, the immobility measure (0.567) for the stunting matrix is higher than that for monetary poverty (0.506). Note, however, that a lower percentage of children have low z-scores in both years of the panel than live in chronic monetary poverty. A more formal Chi squared test of the null hypothesis that the entire distributions of monetary poverty and stunting for the cohort are equal is firmly rejected ($\chi^2=201.07$, $P=0.00$).

Although the cohorts used to classify stunting and monetary poverty in Table 3 are identical, there is no reason why their cell frequencies need overlap. Indeed in the, admittedly unlikely, scenario that monetary poverty and child stunting were equally but oppositely distributed, one would expect the overlap between children would be minimal. To investigate the extent to which chronic monetary poverty and chronic malnutrition are correlated, we constructed an index of chronic stunting. This index takes the value 1 when a child has normal height for age in at least one period, the value 2 when a child is mildly stunted in at least one period, and 3 when the child is moderately or severely stunted in both periods. Similarly, an index of chronic monetary poverty was calculated taking the value one, when per capita expenditures is above the poverty line in at least one year, two when expenditures fall below the poverty line in at least one year, and three when expenditures are below the food poverty line in both years. The Spearman rank correlation coefficient between the two indices is just 0.170 indicating a relatively low (although statistically significant) level of correlation between chronic monetary poverty and chronic stunting. Put differently, less than 14% of chronically food poor children are also chronically stunted.

Why is the correlation/overlap between chronic monetary poverty and chronic stunting so low? Three explanations might be advanced. First, monetary poverty in 1992-93 might be poorly correlated with monetary poverty in 1997-98 while stunting in 1992-93 might be poorly correlated with stunting in 1997-98. This is not, however, the case: the Spearman rank correlation coefficient between monetary poverty in the two years is 0.491 while that for stunting is 0.548. Second, the cut-offs used to distinguish between normal, moderate and severe stunting and between non-poor, poverty and food poverty might be inappropriate and reduce the correlation between the underlying welfare measures. There is some evidence of this, as the Pearson correlation coefficients for the 1660 childrens' height for age scores in 1992-93 and 1997-98 is 0.647 while that for their per capita expenditures is 0.727. Third, correlation between stunting and monetary poverty in 1992-93 or between stunting and monetary poverty in 1997-98 might be low. This turns out to be the case. The rank correlation coefficient between monetary poverty and stunting is 0.161 in 1992-93 and 0.180.⁸ We therefore conclude that it is the weak correlation between stunting and monetary poverty in any one year that is at the root of the low correlation between chronic poverty and stunting.

It is important to point out that attrition is relatively high (30%) from the sub-sample of children aged one to five in 1992-93. However, the null hypothesis of different food poverty levels for attritors and panel children cannot be rejected at the 5% level ($t=1.07$). Indeed, like the full individual panel, overall poverty is higher among panel children than attritors.

Turning to adult malnutrition, we computed the body mass index (BMI) for all adults 20 years of age and above in the panel. To avoid low cell frequencies and make the number of malnutrition categories the same as those for monetary poverty, we combined the moderate and severe categories of chronic energy deficiency (Table 4).

⁸ The Pearson correlation coefficients between childrens' height for age and (real) per capita expenditure were 0.184 in 1992-3 and 0.281 in 1997-98.

Table 4: Malnutrition and Monetary Poverty among Adults in the VLSS panel

	1997-98			
		Normal Non-Poor	Mild Moderately Poor	Moderate-Severe Food Poor
1992- 1993	Normal	58.56	5.92	1.68
	Non-Poor	40.94	3.98	0.74
	Mild	7.64	6.05	3.62
	Moderately Poor	19.89	9.73	3.50
	Moderate- Severe	2.74	3.13	10.66
	Food Poor	6.43	7.08	7.70
	N =8089	$\chi^2 (1)$ -1950.7	I =0.753 I = 0.584	

Note: The top number in each cell refers to the percentage of adults who were normal, mildly malnourished, or moderately-severely malnourished in 1992-93 and 1997-98. The lower number in each cell refers to their monetary poverty status in these years.

Casual inspection of the cell frequencies indicates that the processes determining adult malnutrition and monetary poverty are different. This is confirmed by the Chi squared test of the equality of their distributions, which can be rejected at the highest levels (P-value=0.000). The immobility measure for adult malnutrition in this sub-sample is 0.753 with nearly 11% of individuals being moderately or severely malnourished in both years. By contrast, the immobility index for monetary poverty using per capita expenditures is 0.584, with 7.7% remaining in (chronic) food poverty in both years. As with child stunting, a higher proportion of adults have normal nutritional status in both years of the panel than remain out of monetary poverty. The relative masses in the bottom left hand corner and top right hand corner of the transition matrix suggest that Vietnam is reducing malnutrition less rapidly than it is growing out of poverty.

Like child stunting, it is interesting to disaggregate the transition matrix for adult malnutrition by sex and place of residence. When we do this (results not shown) we find that malnutrition is significantly higher ($\chi^2 (1)$ =21.68) among women than men in rural areas but similar in urban areas. Disaggregating by geographic region, we find that differences in adult malnutrition are not significantly different at the 5% level except in Coastal and Inland Delta areas. However, this seems to be primarily the result of small sample size (particular in the remote high mountainous areas).

Next we investigated the extent to which chronic malnutrition and chronic poverty overlap by calculating two 3 category indices in a similar way to that for child stunting. The Spearman

rank correlation coefficient between the indices of chronic malnutrition and chronic monetary poverty is also low at 0.056. This low correlation appears to stem primarily from the low static rank correlations between adult malnutrition and monetary poverty, which are 0.047 in 1992-93 and 0.086 in 1997-98. In contrast, the rank correlations between malnutrition in the two surveys is 0.65 while that for monetary poverty in 1992-93 compared to 1997-98 is 0.51.⁹

Education

A second dimension of non-monetary poverty that can be examined using the VLSS is educational enrolments and achievements. It is customarily believed that children living in poor households are less likely to be enrolled in school, are more likely to drop-out and/or repeat individual school years, and are less likely to “graduate” from school. Using the cohort of 2,546 children of primary age in VLSS92, we track primary school enrolments and “graduations” in Table 5 below:

Table 5: Primary School Enrolments and Monetary Poverty in the VLSS Panel

1992-1993	1997-98	
	In School	Not in School
	Non-Poor	Poor
In School	86.80%*	4.95%
Non-Poor	31.34%	3.06%
Not in School	5.15%	3.1%
Poor	30.40%	35.20%
N =2,546	$\chi^2(1)=3807.1$	I =0.899 I=0.665

* includes repeaters and primary school “graduates”

Unlike the previous transition matrices, this transition matrix requires some additional explanation. If a child does not drop-out or need to repeat any grades, primary schooling in

⁹ We also examined the extent to which the continuous welfare measures underlying the transition matrices are correlated. The bivariate (Pearson) correlation between the body mass index in 1992-93 and 1997-98 was 0.794 compared to 0.674 for per capita expenditures. Static correlation coefficients between the body mass index and per capita expenditures were somewhat lower (although still statistically different from zero) at 0.169 in 1992-93 and 0.249 in 1997-98.

Vietnam lasts for five years from the ages of 6 to 10 years old. Since there is an average of 5 years 3 months between the two VLSS surveys, 13.5% of the 2210 children described as “in school” in both years have actually just graduated from primary school. The remainder are either children currently enrolled in grade 5 (65.5%) or repeaters (22.0%). The 5.15% of children in the bottom left-hand corner of the matrix, are children who were late-entrants to primary school (a particular common phenomenon among children from ethnic minorities groups), while the 4.95% children in the top right hand corner of the matrix are children who have dropped out of primary school (98% of whom live in rural areas). Finally, the 3.1% in the bottom right-hand corner of the transition matrix is the percentage of primary school age children who have never attended primary school. Note, however, that this figure is almost certainly an underestimate of the non-enrolments, as street children and the children of urban migrants without registration papers are excluded from the sampling frame of the VLSS.

Some 86.8% children in the cohort are either in primary school or have recently graduated from it. This figure is consistent with the extremely high net primary school enrolment rates usually reported for Vietnam (according to the 1999 Population Census, the primary net enrolment rate was 91.4 %). It also accords with the high priority given by both parents and the State to schooling in Vietnam. Primary school enrolments are nearly five percentage points higher in urban than rural areas, but even in the most disadvantaged geographical areas net enrolment rates are close to 90%.

Comparison of the cell percentages for educational enrolments and monetary poverty Table 5 show dramatic divergences. The Chi squared test for the equality of the rank distributions of educational enrolments and monetary poverty is therefore clearly rejected. A Wilcoxon signed-rank test for matched pairs rejects also rejects the equality of either of these distributions with monetary poverty at the highest level of statistical significance (P-value=0.00). Differences in the distribution of educational enrolments and monetary poverty are also reflected in their immobility indices. The immobility index for the cohort of 2,546 primary school age children is 0.899 while that for monetary poverty of 0.655. The primary school enrolment matrix seems consistent with the commonly held belief that poor families in Vietnam sacrifice a lot to ensure that their children attend primary school.¹⁰

¹⁰ Although, primary schooling is officially free in Vietnam, poverty may deter some children from attending primary school: the cost of books, school uniforms, and various local taxes must be paid by the parents of

Given the high level of primary school enrolments, one might expect the overlap between chronic monetary and chronic educational poverty (defined as a primary school age child being out of school in both surveys) to be high. This turns out to be the case: 76% of children in chronic education poverty are chronically poor in monetary terms. On the other hand, just 6.7% of primary school age children who are monetarily poor in both years are also out of school in both years. The Phi coefficient, a measure of association for two dichotomous variables similar to the correlation coefficient, between these two chronic poverty indices is just 0.153.¹¹

Table 6 repeats this analysis for lower secondary school, which lasts for four years between the ages of 11 and 14 in Vietnam. Lower secondary school enrolment rates are known to be much lower than primary school enrolment rates (Haughton, Haughton and Nguyen, 2001). This is reflected in the top left-hand corner of the matrix, which shows that just 40% of the cohort of children of secondary school age in 1992-92 were still attending or had just graduated from lower secondary school by 1997-98 (8% of this 40% are repeaters). Some 29% of eligible children never attend lower secondary school, while the number of late entrants (18%) to lower secondary school is almost double that of drop-outs (13%).

Table 6: Lower Secondary School Enrolments and Monetary Poverty in the VLSS Panel

	1997-98		
	In School	Not in School	
	Non-Poor	Poor	
1992-1993	In School	40.0%	12.72%
	Non-Poor	41.25%	3.23%
	Not in School	18.31%	28.97%
	Poor	28.90%	26.62
	N =1,360	$\chi^2 (1) = 434.3$	I =0.690 I =0.679

* includes lower secondary school “graduates” and repeaters

children attending primary school and these can represent significant expenditures for the poorest families (Poverty Working Group, 1999).

¹¹ The Phi coefficient can vary between 0 and +1.

The immobility index for secondary school enrolments is 0.690, which is similar to the comparable immobility index for monetary poverty of 0.679. The percentage of secondary school age children living in never poor households (41%) is also close to the percentage of children who are in or have graduated from lower secondary school in both years (40%). The percentage of children dropping out from lower secondary school (13%) is, however, much higher than the percentage of children falling into monetary poverty (3%). As a consequence both a Wilcoxon signed-rank and Chi-squared test reject the equality of distributions in the transition matrix. This is again consistent with the priority which most Vietnamese parents give to their childrens' education.

Lower secondary school enrolments are, unsurprisingly, much higher in urban than rural areas (75.1% compared to 54.7% net enrolments in 1997-98). There is evidence of a modest gender gap, as the proportion of girls to boys in lower secondary is relatively high (0.90) and rising. Remote geographical areas such as the high mountains have the lowest level of lower secondary school enrolments, although coastal areas also appear to be disadvantaged.

The overlaps between chronic monetary poverty and chronic education poverty at the lower secondary school level are not substantial. Some 49% of children whose families are monetarily poor in both 1992-93 and 1997-98 never attend lower secondary school. Similarly, 45% of children in the cohort who never attend secondary school are chronically poor in monetary terms. The Phi coefficient between the two dichotomous variables is 0.265.

Summary and Conclusions

This paper has investigated whether monetary and non-monetary indicators of poverty tell the same story about chronic poverty using a unique two period household panel from Vietnam in the 1990s. Using simple tabulations and non-parametric statistics, we ask two distinct questions: (i) is the persistence of monetary poverty and non-monetary poverty similar?; and, (ii) to what extent do different sub-groups of chronic poverty (defined in terms of the intensity and duration of poverty) overlap? Monetary poverty is identified using a three-category scale (non-poor, poor, and food poor) with per capita expenditures as the underlying welfare variable. Nutritional poverty is identified using stunting among children and chronic energy deficiency among adults. Educational poverty is analysed using the enrolment status (out of school, in school) of two cohorts of primary and lower secondary school age children.

Using transition matrices we compare the persistence of monetary and non-monetary poverty. Statistical tests on common samples reveal that the distributions of monetary poverty and child stunting, monetary poverty and adult malnutrition, and monetary poverty and children's school enrolments are all different. By examining cell frequencies and calculating a simple immobility measure, we discover that monetary poverty is less persistent than child stunting and malnutrition among adults. Monetary poverty is also less persistent than primary and lower secondary school enrolments. Such immobility reflects well-known irreversibilities in education and nutrition (though there is also evidence of some “catch-up” among stunted children).¹²

Defining chronic poverty to occur when an individual is monetarily poor, stunted, malnourished or out of school in both waves of the panel, we examine the overlaps between the different dimensions of chronic poverty. Although the null-hypothesis of independence between monetary and non-monetary poverty indicators can always be rejected, the extent of overlap between the different sub-categories of chronic poverty is generally quite low. This is confirmed by examining the rank correlation between the indices of chronic monetary and chronic non-monetary poverty. Generally, there is more correlation between the same poverty indicator over time than between the monetary and non-monetary poverty in the same time period. Hence, the correlation and overlap between any two different indices of chronic poverty is usually quite low.

What implications do these findings have for policy and the work of the Chronic Poverty Research Centre? First, despite the greater immobility of non-monetary poverty indicators, transitions between different categories of non-monetary poverty are still quite high. Static indicators of non-monetary poverty are therefore almost as weak proxies for chronic poverty as static monetary indicators. Second, the lack of association between monetary and non-monetary poverty indicators, both in the static and dynamic context, means that expanding the number of dimensions used to define chronic poverty will not always lead to greater clarity about the characteristics of the chronically poor. Instead taking account of the multiple dimensions of poverty may lead to the sub-grouping of the poor into more non-overlapping sub-categories. This is good news for the design of specific interventions to help the

¹² Monetary poverty may also be less immobile because there is more measurement error in the underlying welfare measure (per capita expenditures).

chronically poor (for example our results suggest that children who never attend school need greater access to schooling rather than more calories or higher expenditure levels) but also multiplies the problems of potential errors of targeting. However, it is important to note that our results come from a single (and possibly unique) country during a five-year period of exceptional economic growth. The CPRC research teams should examine whether there is similar lack of association between monetary and non-monetary poverty indicators of chronic poverty in their own studies countries. It might also be useful to extend this analysis to continuous welfare measures using stochastic dominance techniques. Certainly static comparisons from developing countries (Sahn and Stiffel, 2000; Atkinson and Bourguignon, 1982) suggest that lack of overlap is common. It would also be useful to extend the analysis to examine other dimensions of non-monetary poverty, such as child mortality and the intergenerational transmission of poverty.

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