2009

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Abstract

Chronic poverty is of greater social consequence than transitory poverty but its measurement requires longitudinal data. This article uses six waves of data from the Household, Income and Labour Dynamics in Australia Survey to explore the extent to which longitudinal data contribute to what is known about poverty from cross-section data. We find an imperfect correspondence between people's annual poverty status and chronic poverty status. Consequently, policies that aim to reduce chronic poverty using means-tested benefits may be partially misdirected if beneficiaries are identified using annual income. Furthermore, some households experiencing chronic poverty may fall through the safety net.

Contributions of Longitudinal Data to Poverty Measurement in Australia*

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Chronic poverty is of greater social consequence than transitory poverty but its measurement requires longitudinal data. This article uses six waves of data from the Household, Income and Labour Dynamics in Australia Survey to explore the extent to which longitudinal data contribute to what is known about poverty from cross-section data. We find an imperfect correspondence between people's annual poverty status and chronic poverty status. Consequently, policies that aim to reduce chronic poverty using means-tested benefits may be partially misdirected if beneficiaries are identified using annual income. Furthermore, some households experiencing chronic poverty may fall through the safety net.

I Introduction

Many people experience poverty at some time in their lives. Tertiary students are an example, but most of them will escape poverty at the conclusion of their studies. People in transition between jobs may drop into poverty until new employment is found. This type of poverty – transitory poverty – is of less concern than prolonged, chronic poverty. Concepts such as the 'working poor', a 'cycle of poverty' and 'intergenerational poverty' apply to poverty that is chronic, rather than transitory, in nature. Chronic and transitory poverty are likely to have different causes, different effects and are likely to call for different policy responses.

The measurement of chronic poverty requires longitudinal data on household resources and needs. With the publication of successive waves of data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey, a sufficiently long panel is now available with which to distinguish chronic from transitory poverty.[1] To date, however, only a small number of published studies have utilised the HILDA data to measure poverty over more than 1 year. Both Headey *et al.* (2005) and Saunders and

[1] The HILDA Project was initiated and is funded by the Commonwealth Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR). Findings and views reported in this article are those of the authors and should not be attributed to either FaHCSIA or the MIAESR.

Bradbury (2006) used the first three waves of HILDA data and found that roughly 4 per cent of Australians were poor in all three financial years 2000–2001, 2001–2002 and 2002–2003. Of those who were poor in the first year, about half escaped poverty in the later years. Rodgers and Rodgers (2006) estimated that almost 5 per cent of Australians had real equivalised disposable incomes less than $14,000 (2003–2004) per annum in the 4 years from 2000–2001 through 2003–2004. Buddelmeyer and Verick (2008) used the first five waves of HILDA data and found approximately 4 per cent of the population to be relatively poor in all 5 years. These authors identified some factors associated with becoming or remaining poor: lack of education and employment, long-term disability, living in outer-regional or remote areas and family break-up.

Six waves of data from the HILDA Survey are now available allowing the measurement of chronic and transitory poverty from 2000–2001 to 2005–2006 as well as snapshots of current poverty in each of the 6 years. This study investigates the extent to which the longitudinal data add to information about poverty obtained from the cross-section data. We acknowledge that poverty has many dimensions but, like most other researchers in this field, we are concerned with the measurement of income poverty.[2] Two related questions are addressed: How much poverty observed in any given cross-section is chronic in nature and how much is transitory? How much chronic poverty escapes observation in a given cross-section snapshot? The answers to these questions have clear policy implications. If the aim is to reduce chronic poverty, then means-tested benefits that identify recipients using current income will be more appropriately targeted the larger the overlap between people who are in chronic poverty and people who are poor in any given year, and the smaller the overlap between people who are in chronic poverty and people who are not poor in any given year.

Three methods are commonly used to identify people in chronic and transitory income poverty. The Organisation for Economic Cooperation and Development (OECD; 2001, ch. 2), for example,

used all three methods. The first method compares a person's permanent (or smoothed) income over a number of time periods with a given poverty line. A person who has permanent income below the poverty line is in chronic poverty during all the considered time periods. A person who has permanent income above the poverty line but is poor in at least one time period is said to be in transitory poverty. This measure is consistent with the permanent-income hypothesis (Friedman, 1957), which holds that consumption is a function of permanent, not current, income. By implication, someone with a low permanent income will have a low material standard of living – involuntarily and long-term.

The second method is the 'multiple-times poor' approach, which identifies a person as chronically poor if he or she is poor in a large proportion of time periods. People in transitory poverty are poor in a small proportion of time periods. What constitutes 'large' and 'small' is the analyst's choice and it is common to investigate multiple definitions. Under both the permanent-income and the 'multiple-times poor' methods, it is possible for a chronically poor person to be temporarily non-poor in some year(s). The 'multiple-times-poor' approach is the most commonly used of the three methods, probably because it is simple and transparent.

The third method, the duration approach that was first used to analyse poverty by Bane and Ellwood (1986), identifies a person as chronically poor if he or she is in the midst of a long poverty spell. A person experiencing a short poverty spell is said to be in transitory poverty. With only 6 years of data available for this study, we encounter the problem that many poverty spells are censored – they either begin in the first year, end in the last year, or both – and consequently their length is indeterminate. The longest uncensored spell observable in 6 years of data is 4 years in duration. Censored spells of 3 or fewer years could, in fact, be much longer.[3] The duration method is well suited to identify

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[2] The most influential multidimensional approach is that of Sen (1999), who conceptualises the poor as those with such low 'capabilities' (such as education and health as well as financial resources) that they are unable to freely function within the society.

[3] The permanent-income and 'multiple-times poor' methods are also affected by censored data although less so than the duration approach. If a sequence of annual incomes were to be re-arranged in time, the 'multiple-times poor' method would give the same measure of chronic poverty. So would the permanent-income method in its simplest form. In general, the duration approach would not. Ideally, all three methods would be applied to lifetime income.

factors causing a poverty spell to begin or end but it has limitations for poverty measurement, even if a long panel is available and few spells are censored. The problem is that a person with multiple short poverty spells, each separated by a period just above the poverty line, would be incorrectly classified as in transitory poverty. For these reasons, we decided not to consider the duration approach in this study.

The remainder of this paper is organised as follows. The suitability of the HILDA data for the measurement of chronic poverty is examined and the conventions we use to identify the poor are specified in Section II. In Section III, we examine the temporal variability of people's real incomes and the extent to which low-income people save and borrow. Our findings support the case for using permanent income to measure chronic poverty. In Section IV, we examine the overlap between cross-section poverty and chronic poverty measured by the permanent-income approach. The overlap between cross-section poverty and chronic poverty measured by the multiple-times poor approach is investigated in Section V. Section VI concludes.

II The Data and Measurement Conventions

This study uses unit-record data from Release 6.0 of the HILDA Survey, conducted by the Melbourne Institute of Applied Economic and Social Research. The HILDA Survey began in 2001 with a complex random sample of 7682 Australian households containing 19,914 people of various ages. When appropriate weighting procedures are applied, the original sample is representative of all Australians who were living in private dwellings in non-remote areas in 2001. Information has been collected annually on members of the households that participated in Wave 1, on any children later born to or adopted by them, and on people who later joined a household and had a child with one of the original sample members or their descendents. Other people who, in Wave 2 or later, joined a household of one of the original sample members or their descendents, have also been followed and information has been collected on them too, but only for as long as they remained in the household.[4]

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[4] For a discussion of the original HILDA sample, the rules by which individuals are followed and a definition of the reference population, see Wooden and Watson (2007).

By 2006, 12,798 of the people who were members of the households that participated in Wave 1 were still in the survey. Longitudinal weights, which take account of attrition between Waves 1 and 6, are provided with the survey data and when applied, ensure that people in the 6-year balanced panel remain representative of all Australians who were living in Australia (in private dwellings in non-remote areas) in the period 2001 through 2006 (Watson, 2008, pp. 86–7). The balanced panel is well suited to this study because we are able to measure poverty among the same group of people, using data from both cross-section snapshots and the entire 6-year period.

In any empirical study of poverty there are a number of decisions that the researcher must make, which are largely judgement calls but which will affect the results of the analysis. For the most part, we have followed conventions that are commonly used by Australian researchers. Therefore, poverty is identified at the household level on the assumption that one important reason why people live together in households is to improve their standard of living by taking advantage of economies of scale in consumption and household production that arise from sharing accommodation, utilities and other amenities.

The variable that is used to identify poor households is annual disposable income (gross income minus income taxes) adjusted for household size and composition using the modified OECD equivalence scale (Australian Bureau of Statistics (ABS), 2006a, pp. 52–3). Gross income is comprised of wages and salaries, business income, investment income, private pensions and transfers, Australian government pensions and benefits, family tax benefits and maternity allowances. Windfall income is excluded to obtain a measure of regular income. Transfers in kind, including the Child Care Benefit, are of necessity excluded because of lack of quantitative data. Although losses incurred from unincorporated business or investment income logically may equal or exceed positive income from other sources, we heed the warning of Headey and Warren (2008, p. 52) that such data in HILDA are not reliable. Therefore, we have excluded 269 people living in households from the balanced panel that have non-positive disposable income in 1 or more years. All our calculations have been performed after converting household annual disposable income data to $2005–2006 using the consumer

price index. For the sake of brevity, throughout the remainder of the article we use the term 'equivalised income' to stand for real, equivalised, annual, disposable income.

The poverty line with which we compare each household's equivalised income is relative, rather than absolute, in nature. It is equal to a specified percentage of median equivalised income of all people in the balanced panel. Rather than select a single percentage figure, we explore the sensitivity of our results to where that percentage is set. Relative poverty lines are the choice of most Australian researchers and they are commonly used in European countries and in international comparisons of poverty. Each household is classified as poor or non-poor and, on the assumption that income is equally shared among household members, every member of a poor household is considered to be poor.
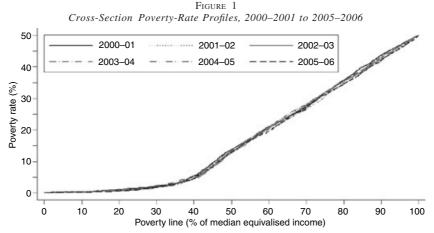
Annual poverty-rate profiles for the six cross-sections are presented in Figure 1. Each profile is a graph of the poverty rate against the poverty threshold for a single adult, which ranges from 1 to 100 per cent of the median equivalised income. It is clear from Figure 1 that, at any given poverty line, the variation among the poverty rates for the 6 years is small, the largest difference between poverty rates in any 2 years being two percentage points. Furthermore, in any given year the poverty rate is both small and unresponsive to the poverty line, provided the poverty line is less than approximately 35

per cent of the median equivalised income. At such low poverty lines, poverty rates do not exceed 3 per cent and a 1 percentage point increase in the poverty line elicits a change in the poverty rate of no more than 0.3 percentage point. Therefore, the tables in this article document the overlap between chronic poverty and cross-section poverty using a poverty line equal to 40 per cent of median equivalised income, as well as the two most commonly used relative poverty lines, 50 and 60 per cent of median equivalised income. Table 1 shows cross-section poverty rates at these poverty lines.

TABLE 1
Cross-Section Poverty Rates (%)

Year	Median equivalised income ($2005–$2006)	Poverty line as a % of median equivalised income		
		40	50	60
2000–2001	$28 922	5.3	13.7	20.9
2001–2002	$28 723	4.7	12.7	20.1
2002–2003	$29 237	4.5	13.2	20.7
2003–2004	$29 959	4.4	12.7	20.3
2004–2005	$30 721	5.4	13.4	21.1
2005–2006	$32 133	4.6	12.9	19.7

Notes: Author's computations based on a 6-year balanced panel of persons present in Household, Income and Labour Dynamics in Australia (HILDA) households. Longitudinal enumerated person weights were used.
Source: HILDA, Release 6.0.

FIGURE 1
Cross-Section Poverty-Rate Profiles, 2000–2001 to 2005–2006

Note: Longitudinal enumerated person weights were used. *Source*: HILDA, Release 6.0.
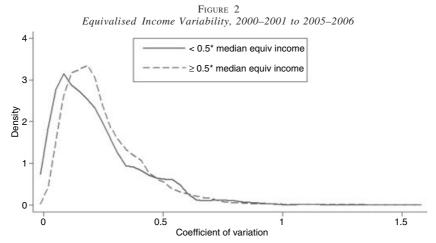
III Income Variability, Saving and Borrowing

Affluent countries such as Australia have financial institutions that allow individuals to save and borrow. Whether people *actually do* save and borrow depends in part upon the variability of their incomes over a given period. Economic theory suggests that among people with stable rates of time preference, those with incomes that vary substantially over time will have more incentive to save and borrow than those with incomes that are more stable, *ceteris paribus*. In this section, we investigate the extent to which people's equivalised incomes varied over the 6 years, 2000–2001 through 2005–2006, and the extent to which they saved and borrowed.

For each individual in HILDA's balanced panel we computed the 6-year average, standard deviation and coefficient of variation in his or her equivalised income. We then separated people into low- and high-income groups according to whether the person's 6-year smoothed equivalised income is less than, or not less than, half the median of the smoothed equivalised incomes of all people. The frequency distributions of the coefficients of variation of the two groups are plotted in Figure 2. They show that both high- and low-income people have coefficients of variation that range from close to zero, meaning there is virtually no temporal variation in their equivalised incomes, to approximately 1.5, meaning that the 6-year standard deviation is

1.5 times as large as the 6-year average. The median coefficient of variation for low-income people is 0.18 whereas the median coefficient of variation for high-income people is 0.21. This means that low-income people experience almost as much relative income variability as high-income people. To put these figures in perspective, consider the following income streams. Someone who experiences a 10 per cent increase, or a 9 per cent decrease, in equivalised income in each of the six consecutive years has a coefficient of variation equal to 0.18. Someone with a 6-year equivalised income stream of $\{X, 0.77X, X, 1.23X, X, 0.77X\}$ (for any positive X) has a coefficient of variation equal to 0.18. When viewed in this light, the coefficients of variation in Figure 2 indicate substantial variation in equivalised income for at least half the low-income people in the panel, and also for at least half the high-income people in the panel. Hence, there appears to be a *prima facie* incentive for many people in both groups to save and borrow.

The extent to which people actually do save and borrow can be gleaned from Table 2, which has been constructed using data from the special 'wealth modules' that were part of the HILDA Surveys in 2002 and 2006. This time, individuals have been split into two groups in each year according to whether or not the person's equivalised income was less than half of the current median equivalised income. The top panel of

Figure 2
Equivalised Income Variability, 2000–2001 to 2005–2006

Note: Longitudinal enumerated person weights were used. *Source*: HILDA, Release 6.0.

TABLE 2
Frequency Distributions of Saving and Borrowing

| | People with equivalised income | | | | | |
| | 2001–2002 | | | 2005–2006 | | |
(1)	<½ median (2)	≥½ median (3)	All people (4)	<½ median (5)	≥½ median (6)	All people (7)
Household equivalised bank accounts ($2005–$2006)						
Nil	4.9	1.6	2.0	3.5	1.7	1.9
$1–$1000	44.9	25.7	28.2	44.4	21.6	24.3
$1001–$5000	20.2	31.2	29.8	21.4	29.4	28.5
$5001 or more	30.0	41.5	40.0	30.7	47.3	45.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Household equivalised non-mortgage debt ($2005–$2006)						
Nil	69.6	45.7	48.8	67.6	44.2	47.0
$1–$1000	10.4	11.0	10.9	13.4	10.0	10.4
$1001–$5000	11.7	18.9	18.0	10.7	16.6	15.9
$5001 or more	8.3	24.4	22.3	8.3	29.2	26.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Notes: Computations are based on persons present in Household, Income and Labour Dynamics in Australia (HILDA) households in Waves 2 and 6, respectively. Cross-section enumerated persons weights were used.
Source: HILDA, Release 6.0; combined files, Waves 1 through 6.

Table 2 gives a frequency distribution of the equivalised bank accounts of the two groups. Although slightly less than 50 per cent of the low-income people, and 23–27 per cent of high-income people, hold no more than $1000 in bank accounts, a substantial proportion of both groups have quite large savings of this type. For example, 30.7 per cent of low-income people and 47.3 per cent of high-income people, have equivalised bank-account balances of more than $5000 in 2005–2006. Similar figures were reported in 2001–2002. The second panel of Table 2 displays a frequency distribution of equivalised, non-mortgage debt, which is the total of credit-card debt, car loans, hire purchase debt, overdrafts and loans from people not in the household. Borrowing is less prevalent than saving and, as one might expect, low-income people borrow less than the high-income people. Nevertheless, borrowing is still common even for low-income people: 19 per cent of low-income people and 45.8 per cent of high-income people had borrowed more than $1000 in 2005–2006; 8.3 per cent of low-income people and 29.2 per cent of high-income people had a total debt of more than $5000 in 2005–2006. Similar results were obtained in 2001–2002.

The statistics in Table 2 are consistent with ABS findings,[5] overseas research[6] and with HILDA respondents' statements about their saving and borrowing behaviour. Sixty per cent of the low-income people, and 73 per cent of the high-income people, report that they save, either irregularly or regularly. Eighteen per cent of the low-income people, and 25 per cent of the high-income people, report that they save on a regular basis. Thirty-nine per cent of the low-income people, and 55 per cent of the high-income people, report that they could easily raise $2000 in a period of 1 week. Sixty-two per cent of the low-income people and 65 per cent of the high-income people indicated that they would use their own savings to access $2000 if the need

[5] Based on data from the Household Expenditure Survey, the ABS cautiously concludes that people in the lowest and second lowest income quintiles spend more than they earn (ABS, 2003–04, pp. 11–12; 2006b, p. 204), which could indicate savings and borrowing behaviour.
[6] Slesnick (1993) and Mayer and Jencks (1989) provide evidence that many poor people in the United States can and do save and borrow.

arose. Among low- and high-income people of 13 and 27 per cent, respectively indicated they would borrow from a financial institution or use credit to raise $2000.

IV Permanent-Income Approach to Chronic Poverty

Measures of poverty based on annual data assume that individuals can make intra-year income transfers at zero cost but that inter-year income transfers are impossible. The fact that low-income people experience considerable variation in their incomes from year to year, and the fact that many low-income people save and borrow, suggest that chronic poverty is better analysed using some measure of permanent, rather than annual, income.

Headey (2008, pp. 24–6) invokes the permanent-income hypothesis as a conceptual basis for measuring chronic poverty. His is a multidimensional approach whereby a household is considered to be poor only if it has low income, low consumption and low wealth in a given year. A different measure of permanent income is employed by Duncan and Rodgers (1991), Chaudhuri and Ravallion (1994), and Hill and Jenkins (2001). These authors use average income over several years to measure long-term poverty in the United States, India and the United KIngdom, respectively. Their approach assumes that both intra- and inter-year income transfers can be performed at zero cost. More realistically, in developed countries such as Australia people can transfer income between time periods at market interest rates, borrowing when young, repaying loans and saving during middle age and living off past savings in the old age.

We define permanent income as

the maximum sustainable annual consumption level that the agent could achieve with his or her actual income stream over …. T years, if the agent could save and borrow at prevailing interest rates (Rodgers & Rodgers, 1993, p. 31).

If the same interest rate applies to both saving and borrowing and is constant through time then permanent income is an annuity of equivalent value to the actual income stream. Otherwise, permanent income is calculated using a numerical algorithm described in Rodgers and Rodgers (1993, p. 37). We have used an interest rate on savings equal to 5 per cent per annum and an annual interest rate on borrowing of 15 per cent to compute each individual's permanent income during the 6-year period, 2000–2001 to 2005–2006.

Chronic poverty is identified by comparing an individual's permanent income with a selected poverty line. In this article, we modify the method of Rodgers and Rodgers (1993) to accommodate a relative, rather than an absolute, poverty line. Our relative poverty line is set equal to the permanent income of a person whose equivalised income equals a given percentage of median equivalised income in each year. Therefore, over the entire T-year time period each individual is either chronically poor, or not. An individual who is not chronically poor but is poor in a particular year is said to be in transitory poverty. It is possible for an individual who is chronically poor to be non-poor in a particular year, in which case that person is said to be temporarily out of poverty.

The concepts of chronic and transitory poverty that apply to the individual also apply to the population to which the individual belongs. If person i is poor in cross-section t, then let $p_{it} = 1$, otherwise $p_{it} = 0$. Therefore, the poverty rate in cross-section t of size n equals $H_t = \frac{1}{n}\sum_{i=1}^{n} p_{it}$ and person i's average annual poverty, $a_i = \frac{1}{T}\sum_{t=1}^{T} p_{it}$, is the proportion of periods he or she is poor according to T cross-sections.

Average annual poverty in the population is a simple average of the proportion of cross-sections in poverty for all people in the panel, or equivalently a simple average of the poverty rates for the T time periods:

$$A = \frac{1}{nT}\sum_{i=1}^{n}\sum_{t=1}^{T} p_{it} = \frac{1}{n}\sum_{i=1}^{n} a_i = \frac{1}{T}\sum_{t=1}^{T} H_t. \quad (1)$$

This average annual poverty index is decomposable into chronic and transitory components, as we shall now show.

If person i is chronically poor then let $c_i = 1$, otherwise $c_i = 0$. Chronic poverty in the population is the proportion of people, C, who are chronically poor:

$$C = \frac{1}{n}\sum_{i=1}^{n} c_i. \quad (2)$$

The difference between average annual and chronic poverty for person i, $d_i = a_i - c_i$, indicates whether that person experiences transitory, rather than chronic, poverty during the T time periods ($d_i > 0$), or is chronically poor but

temporarily escapes poverty in some time periods ($d_i < 0$). The absolute value of d_i gives the proportion of time periods that person i is either in transitory poverty, or temporarily out of chronic poverty. (If person i is always in chronic poverty, or is never poor, then $d_i = 0$.) In the population as a whole,
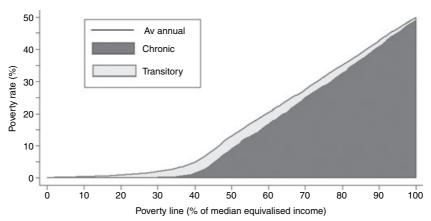
$$D = \frac{1}{n}\sum_{i=1}^{n} d_i = \frac{1}{n}\sum_{i=1}^{n} a_i - \frac{1}{n}\sum_{i=1}^{n} c_i = A - C. \quad (3)$$

A positive value of D measures the net rate of transitory poverty in the population. It is also possible for D to be negative, in which case it is interpreted as the net rate of chronic poverty that is temporarily absent in the population.

Average annual, chronic and transitory poverty-rate profiles for 2000–2001 through 2005–2006 are presented in Figure 3. It is evident that the rate of chronic poverty is quite sensitive to the choice of poverty line once the latter reaches approximately 35 per cent of the median equivalised income. At a poverty line equal to 40 per cent of the median equivalised income, 1.4 per cent of the people are in chronic poverty (see Table 3). The chronic poverty rate increases to 9.0 per cent, and then to 16.7 per cent, as the poverty line increases to 50 per cent, and to

FIGURE 3
Permanent-Income Poverty-Rate Profiles, 2000–2001 to 2005–2006

Note: Longitudinal enumerated person weights were used. *Source*: HILDA, Release 6.0.

TABLE 3
Permanent-Income Poverty Rates (%)

Demographic group	Type of poverty	Poverty line as a % of median equivalised income		
		40	50	60
All people	Average annual poverty	4.8	13.1	20.5
	Chronic poverty	1.4	9.0	16.7
	Transitory poverty	3.4	4.1	3.7
Aged 25–54 years	Average annual poverty	3.5	7.9	12.8
in 2001	Chronic poverty	1.1	4.9	9.7
	Transitory poverty	2.4	3.1	3.0
	Poverty line ($2005–$2006)	$11 879	$14 848	$17 818

Notes: Author's computations based on a 6-year balanced panel of persons present in Household, Income and Labour Dynamics in Australia (HILDA) households. Longitudinal enumerated person weights were used.
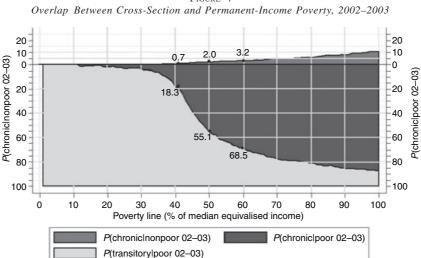*Source*: HILDA, Release 6.0.

FIGURE 4
Overlap Between Cross-Section and Permanent-Income Poverty, 2002–2003

Note: Longitudinal enumerated person weights were used. *Source*: HILDA, Release 6.0.

60 per cent, of the median equivalised income, respectively. The transitory poverty rate is approximately 3 to 4 per cent and is largely independent of the poverty line. The proportion of average annual poverty that is chronic ranges from 30.1 per cent when the poverty line is 40 per cent of the median equivalised income, to 81.8 per cent when the poverty line is 60 per cent of the median equivalised income. As a sensitivity test, we calculated average annual, chronic and transitory poverty for people aged 25–54 years in 2001 (see Table 3). Poverty rates are lower than those for the whole population but the rate of chronic poverty among these prime-age people is highly sensitive to the poverty line whereas their rate of transitory poverty varies little as the poverty line is increased.[7]

[7] We also repeated the analysis for people who in 2001 were aged 19 or younger and for people aged 60 or older. Chronic poverty rates for the young were 1.1, 7.0 and 15.8 per cent given poverty lines equal to 40, 50 and 60 per cent of the median income, respectively. Chronic poverty rates for the elderly were 2.9, 27.1 and 42.2 per cent at poverty lines equal to 40, 50 and 60 per cent of the median income, respectively. Home ownership is high among the elderly (ABS, 2006a, p. 231) so their poverty rates would likely be lower if imputed rent on owner-occupied housing were to be included in the household income.

Figure 4 and Table 4 depict how much chronic poverty is captured by cross-section poverty rates. If there were little to be learned from the longitudinal data then the overlap between cross-section poverty and permanent-income poverty would be almost complete. Figure 4 shows the overlap in a typical year, 2002–2003, at poverty lines from 0 through 100 per cent of the median income. Table 4 shows the overlap in all years, at poverty lines equal to 40, 50 and 60 per cent of the median income. In fact the overlap is far from complete, particularly at low poverty lines. The bottom sections of Figure 4 and Table 4 show that with the poverty line equal to 40 per cent of the median equivalised income, between 14.9 and 19.0 per cent of the people who were poor in any given year had a permanent income below the poverty line. A poverty line equal to 50 per cent of the median equivalised income implies that between 50.8 and 55.1 per cent of the people who were poor in any given year were chronically poor. Even at the highest poverty line, 60 per cent of the median equivalised income, between 64.8 and 69.0 per cent of the people who were poor in any given year were also chronically poor; more than 30 per cent were transitorily poor.

If an absence of cross-section poverty is accompanied by little or no permanent-income

TABLE 4
*Overlap between Cross-Section and
Permanent-Income Poverty (%)*

		Poverty line as a % of median equivalised income		
	Year	40	50	60
P(chronic|non-poor$_t$)				
All people	2000–2001	0.6	2.1	4.0
	2001–2002	0.7	2.3	3.6
	2002–2003	0.7	2.0	3.2
	2003–2004	0.6	2.5	3.8
	2004–2005	0.7	2.4	3.5
	2005–2006	0.7	2.8	4.3
Aged 25–54	2000–2001	0.4	1.1	2.3
years in 2001	2001–2002	0.5	1.5	2.2
	2002–2003	0.5	1.1	2.1
	2003–2004	0.5	1.2	2.3
	2004–2005	0.5	1.4	2.3
	2005–2006	0.4	1.7	2.6
P(chronic|poor$_t$)				
All people	2000–2001	16.5	52.9	64.8
	2001–2002	16.7	54.9	69.0
	2002–2003	18.3	55.1	68.5
	2003–2004	19.0	54.3	67.5
	2004–2005	14.9	51.5	66.2
	2005–2006	16.5	50.8	67.4
Aged 25–54	2000–2001	17.3	43.9	56.8
years in 2001	2001–2002	17.9	45.7	60.8
	2002–2003	20.1	48.2	62.7
	2003–2004	18.0	47.4	61.9
	2004–2005	16.2	44.7	59.2
	2005–2006	22.0	45.3	63.4

Notes: Author's computations based on a 6-year balanced panel of persons present in Household, Income and Labour Dynamics in Australia (HILDA) households. Longitudinal enumerated person weights were used.
Source: HILDA, Release 6.0.

poverty then there is little to be learned from the longitudinal data. In fact there is chronic poverty that is not observed in cross-sections, and more so the higher the poverty line. The top sections of Figure 4 and Table 4 show that when the poverty line equals 40 per cent of the median equivalised income, less than 1 per cent of the people who were non-poor in any given year had a permanent income below the poverty line. A poverty line equal to 50 per cent of the median equivalised income implies that between 2.0 and 2.8 per cent of people who were non-poor in any given year were chronically poor. At the highest poverty line, 60 per cent of the median equivalised income, between 3.2 and 4.3 per cent of people who were non-poor in any given year were also chronically poor. As a sensitivity test we repeated the analysis using people aged 25 to 54 in 2001 (see Table 4). Similar results were obtained for prime-age people as for the population as a whole.[8]
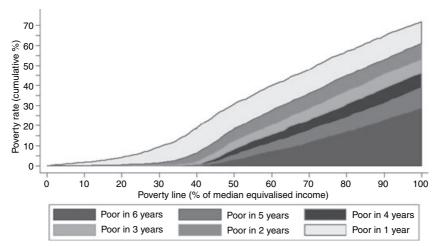
V The 'Multiple-Times Poor' Approach to Measuring Chronic Poverty

We also investigated whether the degree of overlap between chronic and annual poverty observed in the previous section holds when chronic poverty is measured using the 'multiple-times poor' approach. Figure 5 graphs the proportion of people who are poor in exactly 1 through 6 years against poverty lines from 0 through 100 per cent of the median equivalised income. Table 5 displays the proportions of people with equivalised incomes that fell below each of the three poverty lines multiple times during the 6-year period. For example, the percentage of people who are poor in at least 4 years is 1.0 per cent when the poverty line equals 40 per cent of the median equivalised income, but is 8.4 and 15.9 per cent at poverty lines equal to 50 and 60 per cent of the median equivalised income, respectively. What constitutes chronic poverty is essentially arbitrary but the definition that gives results most similar to those based on permanent income is 'poor in at least 4 of the 6 years'; so we adopt that definition in this section of the article.

Figure 6 and Table 6 have the same format as Figure 4 and Table 4, respectively. They reveal how much 'multiple-times' poverty is captured, and how much is missed, by cross-section analyses. It is apparent that the overlap between cross-section poverty and 'multiple-times' poverty is far from complete, and less so

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[8] Results for people aged 19 or younger in 2001 resembled those for the prime-age people. Among elderly people who were poor in any given year, between 62.9 and 73.2 per cent (75.5 and 83.6 per cent) were also chronically poor given a poverty line equal to 50 per cent (60 per cent) of the median equivalised income. In contrast, quite a large proportion of elderly people who were not poor in a given cross-section were in fact chronically poor: between 6.1 and 8.6 per cent at a poverty line equal to 50 per cent of the median income and between 7.1 and 10.8 per cent at a poverty line equal to 60 per cent of the median income.

Multiple-Times Poverty-Rate Profiles, 2000–2001 to 2005–2006

Note: Longitudinal enumerated person weights were used. *Source*: HILDA, Release 6.0.

TABLE 5
Multiple-Times Poverty Rates (%)

Number of years poor	Poverty line as a % of median equivalised income		
	40	50	60
6	0.1	2.9	7.2
5	0.3	2.5	4.3
4	0.6	3.0	4.4
3	1.4	4.3	4.6
2	4.1	5.7	7.2
1	12.4	12.5	12.3
0	81.2	69.1	60.0

Notes: Author's computations based on a 6-year balanced panel of persons present in Household, Income and Labour Dynamics in Australia (HILDA) households. Longitudinal enumerated person weights were used.
Source: HILDA, Release 6.0.

the lower the poverty line. Even at a poverty line equal to 60 per cent of the median equivalised income, 68.5 per cent of the people who were poor in 2002–2003 were also poor in at least 4 years. The other 31.5 per cent were poor in 1, 2 or 3 years only. Similar results are obtained using the other cross-sectional data. In contrast, a small amount of 'multiple-times' poverty is missed by cross-section poverty rates. For example, of those people who were non-poor in 2002–2003, the percentage of poor in at least 4 years is 0.2, 1.2 and 2.1 per cent at poverty lines equal to 40, 50 and 60 per cent of the median equivalised income, respectively.

The 'multiple-times poor' method is not our preferred approach because it can lead to intuitively unappealing results. For example, if Person A is just below the poverty line in four out of six time periods but well above it in the other two, she would be classified as chronically poor according to the 'multiple-times poor' methodology used here. Person B, who is just above the poverty line in four of the six time periods but well below it in the other two, would be classified as in transitory poverty. Yet Person B is surely more financially disadvantaged than Person A. The permanent-income approach, in contrast, takes account of the extent to which annual incomes deviate from the poverty line and would classify Person B in chronic poverty and Person A in transitory poverty. We found such cases in this study. With a poverty line set at 50 per cent of the median income, 13.5 per cent of the people who were poor in four or more years were not permanent-income poor whereas 7.9 per cent of the people who were poor in 1, 2 or 3 years were permanent-income poor. Among people with permanent incomes below the poverty line, 19.8 per cent were poor in 1, 2 or 3 years whereas 1.2 per

FIGURE 6
Overlap Between Cross-Section and Multiple-Times Poverty, 2002–2003

Note: Longitudinal enumerated person weights were used. *Source*: HILDA, Release 6.0.

TABLE 6
Overlap between Cross-Section and Multiple-Times Poverty (%)

	Year	Poverty line as a % of median equivalised income		
		40	50	60
$P(n\text{-years poor}|\text{non-poor}_t)$				
4–6 years	2000–2001	0.4	2.2	3.8
	2001–2002	0.3	1.8	2.8
	2002–2003	0.2	1.2	2.1
	2003–2004	0.2	1.3	2.4
	2004–2005	0.2	1.2	2.0
	2005–2006	0.3	2.0	3.1
$P(n\text{-years poor}|\text{poor}_t)$				
4–6 years	2000–2001	10.6	47.2	61.2
	2001–2002	13.3	53.4	67.8
	2002–2003	16.1	55.3	68.5
	2003–2004	17.0	57.1	68.4
	2004–2005	12.4	54.3	67.5
	2005–2006	14.4	51.4	67.9

Notes: Author's computations based on a 6-year balanced panel of persons present in Household, Income and Labour Dynamics in Australia (HILDA) households. Longitudinal enumerated person weights were used.
Source: HILDA, Release 6.0.

cent of the people with permanent incomes above the poverty line were poor in four or more years. Therefore, in practice the two methods of measuring chronic poverty identify different people as chronically poor.

VI Conclusions

We have found that a substantial amount of poverty that is observed in a cross-section is transitory, rather than chronic, in nature. In contrast, a small proportion of people who are observed to be non-poor in a given cross-section are, in fact, in chronic poverty over the entire 6 years considered in the study. This is true whether chronic poverty is measured by the proportion of people with permanent income over the 6 years that is below the poverty line, or by the proportion of people who are poor in at least 4 of the 6 years. Our conclusion, therefore, is that the panel data add an important dimension to chronic poverty measurement, a dimension that cannot be observed using cross-section data.

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