

Chronic and Transitory Poverty over the Life Cycle

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March 2009
Revised June 2009

For presentation in the refereed paper stream of the
2009 HILDA Survey Research Conference,
University of Melbourne
16-17 July 2009

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JEL Code: I32

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Abstract

This study estimates chronic and transitory rates of poverty in Australia using the concept of permanent income and seven years of longitudinal data. We sketch a picture of chronic and transitory poverty over the life cycle by decomposing the poverty rate for the entire population into poverty rates for age categories that range from childhood, through adulthood, to old age. The measure of household income that underlies our poverty rates includes imputed rent on owner-occupied, public and rent-free housing, which has a large influence on measured poverty, particularly among older members of the population. We also document changes in chronic and transitory poverty from 2001-03 to 2005-07 and use a jack-knife procedure to test their statistical significance.

1. Introduction

Conventionally, poverty rates are calculated using current income data, which focus attention on poverty that may be relatively short term in nature. There is, however, increasing recognition of the need to distinguish chronic poverty from poverty that is transitory. Several countries now have longitudinal, unit-record data sets spanning many years and these allow long-term poverty to be identified and measured. The European Union (EU), for example, includes among its primary indicators of poverty and social exclusion the share of persons living in households that are poor in the current year and in at least two of the preceding three years (see Atkinson, Marlier and Nolan, 2004, p.53). Several EU countries have reported these poverty rates since the mid-1990s (European Commission, 2002, p.193).

In the academic literature the distinction between short-term and long-term poverty is becoming common, with the former measured by the proportion of people who are poor in a given time period and the latter typically measured by the proportion of people who are poor in a specified proportion of time periods (for example, Headey, Marks and Wooden, 2005). This ‘x-out-of-n times poor’ approach implicitly assumes that income received in the current time period can be used for consumption in that time period alone, an assumption that denies the ability of people to transfer income between periods by saving and borrowing. The permanent income hypothesis (Friedman, 1957), however, suggests that they do just that.

This study estimates chronic (long-term) and transitory (short-term) rates of poverty in Australia based on the concept of permanent income and seven years of longitudinal data. We sketch a picture of chronic and transitory poverty over the life cycle by decomposing the poverty rate for the entire population into poverty rates for age categories that range from childhood, through adulthood, to old age. Importantly,

and unlike most previous studies of poverty in Australia, the measure of household income that underlies our poverty rates includes imputed rent on owner-occupied, public and rent-free housing. This has a large influence on measured poverty, particularly among older members of the population. We also document changes in chronic and transitory poverty from 2001-03 to 2005-07 and use a jack-knife procedure to test the statistical significance of the poverty-rate changes we observe.

The remainder of the paper is organised as follows. Section 2 describes the data on which the study is based. The basic methodology underlying identification of the poor is outlined in Section 3. Section 4 discusses the measure of permanent income that is used to distinguish the chronically poor from those experiencing transitory poverty. Section 5 explains the jack-knife procedure that is used to compute standard errors of poverty rates and poverty-rate changes. The results of the analysis are presented in Section 6 and some concluding remarks are offered in Section 7.

2. Data

The study employs unit-record data from Release 7.0 of the Household, Income and Labour Dynamics in Australia (HILDA) Survey.¹ The HILDA Survey began in 2001 with a complex random sample of 7,682 Australian households containing 19,914 people of various ages. When appropriate weighting procedures are applied, the original sample is representative of people who were living in private dwellings in non-remote areas of Australia in 2001. Data have been collected annually about the original sample members, about children later born to or adopted by them,

¹ The HILDA Project was initiated and is funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR). The findings and views reported in this paper, however, are those of the author and should not be attributed to either FaHCSIA or the MIAESR.

and about people who later cohabit and have a child with one of the original members or their descendants. From Wave 2 onwards, information has also been collected about other people living in a household with one of the original sample members or their descendants, but only for as long as they remain in the household.²

By 2007, almost twelve thousand of the people who were members of the households that participated in Wave 1 were still in the survey. Longitudinal weights provided with the survey data take account of attrition between waves in an attempt to ensure that people in each balanced panel are representative of people who were living in private dwellings in non-remote areas of Australia, from the beginning to the end of the period spanned by the panel (Watson, 2008, pp.86-87).

Measurement of permanent income, in principle, requires longitudinal data spanning each person's lifetime. In practice, the longer the panel the better. Therefore, most of the analysis reported in this paper was performed using the seven-year balanced panel, which is the longest panel available at the time of writing. Two three-year balanced panels, each containing approximately fifteen thousand people, are used to measure the change in chronic and transitory poverty among resident Australians from the period 2001-03 to the period 2005-07.³

3. Basic Methodology

The methodology employed to compute poverty rates can significantly affect on the results of any analysis. We have adopted several conventions that are commonly used by Australian researchers. First, poverty is identified at the level of the household rather than the family or income unit. Second, each household is

² For a discussion of the original HILDA sample, the rules by which individuals are followed and the reference population see Wooden and Watson (2007).

³ Longitudinal weights for the seven-year balanced panel and the two three-year balanced panels were used in computing poverty rates.

classified as poor or non-poor on the basis of its disposable income, rather than its expenditure.⁴ Third, the modified OECD equivalence scale is used to adjust each household's annual disposable income for household size and composition.⁵ Fourth, all equivalised, annual, disposable incomes have been converted to 2006-07 dollars using the consumer price index. For the sake of brevity, throughout the remainder of the paper we use the term "READ income" to stand for real, equivalised, annual, disposable income. Fifth, each household's READ income is assigned to all its members and the annual poverty rate is computed as the proportion of people with READ incomes less than a given fraction of the median READ income of all people. Finally, we have followed the approach of Headey and Warren (2008, p. 52) and excluded from our analysis people living in households that have non-positive disposable income or negative private income in one or more years, on the assumption that their income data are unreliable.

In one important respect the methodology employed in this paper departs from most other studies: we have added a measure of imputed rent on owner-occupied, public and rent-free housing to the disposable incomes of the households.⁶ This is likely to affect measured poverty because home ownership varies across age groups and is particularly concentrated among the elderly (ABS, 2008a, p.322). We argue that, unlike other durable goods such as cars and home-entertainment centres, shelter fulfils a basic need and therefore investments in owner-occupied housing are similar to investments in income-earning assets. Consider a person who invests \$500,000 in

⁴ The measure of household disposable income recorded in the HILDA data set equals household gross income minus household income tax and the Medicare Levy. 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 from gross income as are transfers in kind, including the Child Care Benefit.

⁵ The modified OECD scale assigns one point to the first adult in the household, 0.5 points to each additional adult and 0.3 points to each child less than 15 years old.

⁶ Households with non-positive disposable incomes and negative private incomes were dropped from the analysis and imputed rent was added to the disposable incomes of the remaining households.

financial securities that earn an income of (say) \$25,000 per annum. If that person were to use the \$500,000 to buy a house instead, no cash payment would be received but a non-cash benefit would be conferred that is conceptually similar to the income earned from the financial securities. From another perspective, we argue that a person living in rental accommodation, with an income that is just above the poverty threshold, is not likely to be materially better off than a person living in their own home, with an income just below the poverty line. Consistent with these examples, there are two main approaches to measuring imputed rent on owner-occupied housing: as the opportunity cost of the funds invested in the property and as the rent that the owner would have to pay for housing of an equivalent standard.⁷ The household imputed rental values included in this study are those contained in the HILDA component of the Cross National Equivalent File (CNEF). Imputed rent on owner-occupied housing is computed as four per cent of the difference between the imputed house value and the remaining mortgage principal. Imputed rent for public housing tenants is the difference between rent paid and typical rent for the location. For people living in rent-free accommodation imputed rent is the rent they would need to pay to rent the property. (See Lillard *et al.*, 2009, p. 2-5.)

4. Permanent Income

Traditional measures of poverty implicitly assume that income received in a given year, can be used for consumption any time within that year but cannot be transferred between years. Exceptions are studies by Duncan and Rodgers (1991),

⁷ The United Nations (1977) recommended imputed rent on owner occupied housing be included in household income. Yates (1994) was the first Australian study to implement the UN recommendations. Recent Australian studies that have included imputed rent on owner-occupied housing are Flatau and Wood (2000), Chotikapanich, *et al.* (2003), Saunders and Siminski (2005) and Headey and Warren (2008). The Australian Bureau of Statistics (2008b) has included experimental estimates of imputed rent on owner-occupied dwellings among the variables provided in the second edition of its Survey of Income and Housing 2005-06.

Chaudri and Ravallion (1994), Mayer (1997) and Hill & Jenkins (2001) who used average income over several years to measure long-term poverty in the US, India, the US and the UK, respectively. Their methodology assumes that both intra-year and inter-year income transfers can be performed at zero cost. In reality, developed countries such as Australia have institutions that facilitate income transfers between time periods, but at market interest rates. People can borrow when young, repay loans and save during middle age, and live off past savings in old age.

Whether saving and borrowing is practised by people at the lower end of the income distribution is an empirical question but there is considerable evidence that they do. Headey and Warren (2008, Table 2, p.47), using income and expenditure data from Wave 5 of the HILDA survey, found that expenditure is much more equally distributed than income. Barrett, Crossley and Worswick (2000, p.117) observed the same phenomenon using data from the ABS' Household Expenditure Surveys (HES) conducted in the 1970s, 1980s and 1990s. Time and again, the ABS itself has reported that for low income people, average weekly household expenditure exceeds average weekly household disposable income (see, for example, ABS, 2008a, p.278). Although this outcome could occur because low-income people misreport their incomes, it is also consistent with saving and borrowing behaviour. Direct evidence about the saving and borrowing behaviour of low-income and high-income people is available from the 'wealth modules' of Waves 2 and 6 of the HILDA survey. Approximately 60 per cent of low-income people report they save, 18 per cent on a regular basis. (Approximately 73 per cent of high-income people save, 25 per cent on a regular basis.) Among low-income people, 62 per cent state that they could use their own savings to access \$2,000 and 13 per cent indicate that they would borrow from a financial institution or use credit to raise \$2,000. (Approximately 65 per cent of high-

income people indicate that they could use their own savings to access \$2,000 and 27 per cent indicate that they would borrow from a financial institution or use credit to raise \$2,000.)⁸ Slesnick (1993) and Mayer and Jencks (1989) provide evidence that many poor people in the United States can and do save and borrow.

Consistent with this evidence, we characterise the chronically poor as people with a deficit of permanent income (Friedman, 1957). Our empirical measure of permanent income is the maximum sustainable annual consumption level that a person could achieve with his or her actual READ-income stream over a given time period, if the person were to save and borrow at prevailing interest rates. We calculate permanent income using the numerical algorithm described in Rodgers and Rodgers (1993, p. 37).⁹ The algorithm produces the following as special cases. If READ income is constant from year to year then permanent income and READ income will be equal. If READ income is variable and 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 READ income stream. If interest rates on saving and borrowing are both zero then permanent income is average READ income over the time period considered.

In our calculations of permanent incomes, the interest rate on savings in each year is the average of the Reserve Bank of Australia's indicator interest rates on cash management accounts of balances totalling \$10,000 and \$50,000 and the interest rate on term deposits of six and twelve months. The rates varied between 3.0% and 4.1% during the financial years 2000-01 through 2006-07. The interest rate on borrowings was calculated as the average of the standard credit card interest rate and the RBA

⁸ See Rodgers and Rodgers (2008, pp.7-9).

⁹ In a working paper that is a precursor to this study Rodgers & Rodgers (2006) implemented the permanent-income method using four years of Australian data.

indicator lending rates for fixed and variable rates on unsecured term loans. These rates ranged from 13.5% to 14.5% during the seven-year period.¹⁰

Rodgers and Rodgers (1993) used an absolute poverty line in their calculations of chronic, transitory and average-annual poverty in the United States. In this paper we modify their procedure to incorporate a relative poverty line. Following convention, we identify people in annual poverty by comparing their READ incomes in a given year with a poverty line equal to a given proportion of the median READ income of all people in that same year. The conceptual choice of a relative-poverty line based on permanent income (that is, a chronic-poverty line) is less obvious. One possibility is to compute each person's permanent READ income, find the median and set the poverty line equal to a given proportion (say, 50 per cent) of that median. The problem with this procedure is that it is possible that someone who is not poor in any year could be classified as chronically poor and someone who is poor in every year could be classified as not chronically poor. This is demonstrated using two hypothetical examples below. The incomes of five people, median income of the group and a poverty line equal to 50 per cent of median income are observed in each of three time periods. For simplicity, each person's permanent income is calculated as a simple average of his or her income levels in the three time periods. In Example A, Person 1's income exceeds the poverty line of 22.5 in all three time periods but her permanent income of 24 is less than half the median permanent income of the group, namely 26. In Example B, Person 1's income is below the poverty line of 30 in every time period but his permanent income of 29 is greater than half the median permanent income of the group, namely 28.5.

¹⁰ RBA F04 Retail Deposit and Investment Rates and RBA F05 Indicator Lending Rates are available at <http://www.rba.gov.au/Statistics/Bulletin/index.html>.

Example A: Person 1 is not poor in any time period

Time period	Person 1	Person 2	Person 3	Person 4	Person 5	Median income	Poverty line
1	23	45	52	44	70	45	22.5
2	24	45	52	80	42	45	22.5
3	25	45	52	44	62	45	22.5
permanent income	24	45	52	56	58	52	26

Example B: Person 1 is poor in every time period

Time period	Person 1	Person 2	Person 3	Person 4	Person 5	Median income	Poverty line
1	29	50	65	60	70	60	30
2	29	62	45	60	63	60	30
3	29	50	61	60	65	60	30
permanent income	29	54	57	60	66	57	28.5

To avoid the inconsistencies demonstrated in the two examples above, the procedure used in this paper sets the chronic-poverty line equal to the permanent READ income of someone who earns a given proportion (say, 50 per cent) of the median READ income in each year. Thus, someone who is on the poverty line in every year will also be on the chronic-poverty line. Someone who is above the poverty line in one or more years and never below it will be classified as not in chronic poverty. This occurs in Example A, where the chronic-poverty line used in this paper would be 22.5. Someone who is below the poverty line in one or more years and never above it will necessarily be classified as chronically poor. This occurs in Example B, where the chronic-poverty line we advocate would be 30.

Over the entire T-year time period each individual is either chronically poor, or not chronically poor. An individual who is not chronically poor but is poor in a particular year is said to be in transitory poverty. It is also 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. Let $p_{it} = 1$ if Person i is poor in cross section t ; otherwise let $p_{it} = 0$. Thus, the poverty rate in a cross section of n people in period t equals $H_t = \frac{1}{n} \sum_{i=1}^n p_{it}$. Person i 's average annual poverty,

$a_i = \frac{1}{T} \sum_{t=1}^T p_{it}$, is the proportion of T cross sections in which he or she is poor.

Average annual poverty in a balanced panel of n people over T time periods is a simple average of the poverty rates in all time periods, or equivalently a simple average of the proportion of time periods in poverty for all people:

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

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 proportion of time periods that Person i is either in transitory poverty or temporarily out of chronic poverty. (If Person i is always in poverty, or is never poor, then $d_i = 0$). In the population as a whole,

$$D = \frac{1}{n} \sum_{i=1}^n d_i = \frac{1}{n} \sum_{i=1}^n a_i - \frac{1}{n} \sum_{i=1}^n c_i = A - C \quad (3)$$

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

5. Standard Errors of Poverty Rates and Poverty-Rate Changes.

The HILDA data constitute a complex, rather than a simple, random sample of people living in households in all but very remote areas of Australia. Standard errors of the poverty rates can be computed using a jackknife methodology (see ABS, 2007, pp.27-29). The process entails computing each poverty rate 45 times using the 45 sets of replicate weights provided as part of the HILDA data and measuring the variability of these multiple estimates around the poverty rate calculated using the ‘main’ weight. Thus, standard errors of poverty rates calculated using a given balanced panel are computed as follows:

$$SE(\hat{p}) = \sqrt{\frac{44}{45} \sum_{j=1}^{45} (\hat{p}_j - \hat{p})^2} . \quad (1)$$

where \hat{p} is the poverty rate (average-annual, chronic or transitory) computed using the full panel and the corresponding longitudinal ‘main’ weight; \hat{p}_j is the poverty rate computed from the sub-sample of the panel that is obtained when the j^{th} set of longitudinal replicate weights are used. The relative poverty line used in computing the poverty rate for each of the random sub-samples must be recalculated for each of the 45 random sub-samples.

To compute the standard error of a poverty-rate change from one sequence of time periods to another it is necessary to take account of the fact that many of the same people will be present in both balanced panels and consequently the panels are

not independent samples. The standard error of a poverty-rate change from one balanced panel to another is calculated as:

$$SE(\hat{p}_2 - \hat{p}_1) = \sqrt{\frac{44}{45} \sum_{j=1}^{45} [(\hat{p}_{2j} - \hat{p}_{1j}) - (\hat{p}_2 - \hat{p}_1)]^2}$$

where \hat{p}_i ($i = 1, 2$) is the poverty rate computed using the i^{th} full panel and its longitudinal ‘main’ weight; \hat{p}_{ij} ($i = 1, 2; j = 1, 2, \dots, 45$) is the poverty rate computed from the sub-sample that is obtained when the i^{th} panel’s j^{th} set of longitudinal replicate weights are used. Once again, the relative poverty line used in computing the poverty rate for each of the random sub-samples from a particular panel must be recalculated for each of the 45 random sub-samples.

6. Results

Table 1 reports estimated poverty rates for the population living in Australia throughout the period 2001 through 2007. The table shows how increasing the length of the income period affects estimates of chronic, transitory and average-annual relative-poverty rates. In Section A of the table, household income includes imputed rent on owner-occupied, public and rent-free housing; in Section B imputed rent is excluded from household income. In both sections, the income period is increased in six one-financial-year increments starting with 2006-07 and ending with the period 2000-01 to 2006-07. The latter is written more compactly in the remainder of the paper, including the tables, as 2001-07. The chronic-poverty line decreases with the length of the income period because real median income has risen over the time period considered.

First consider Section A of Table 1. As income transfers are permitted over more and more years, the rate of chronic poverty decreases by 2.9 percentage points

from 8.6 per cent to 5.7 per cent. Average-annual poverty, which is computed using a separate relative-poverty line for each year, remains approximately constant at 9.5 per cent because annual relative-poverty rates have been approximately constant over the time period. Consequently, the rate of transitory poverty, which is the difference between the average-annual and chronic rates of poverty, increases from 1.0 per cent to 3.7 per cent as the length of the income period increases. Chronic poverty, as a percentage of average-annual poverty, decreases from 89.7 to 61.0.¹¹ Now consider Section B. The poverty lines are lower when household income does not include imputed rent on owner-occupied, public and rent-free housing but the relative-poverty rates are as much as four percentage points higher than those in Section A. Nevertheless, some results occur whether imputed rent is included or not: the rate of chronic poverty declines as the income period is lengthened, the rate of transitory poverty increases, the average-annual poverty rate is approximately constant and the proportion of poverty that is chronic declines.

It might be argued that the declining rate of chronic poverty observed in Table 1 could be caused by an age effect rather than by the ability to smooth income over successively longer periods. Each time the income period is extended, a new year of data is added in which all individuals in the balanced panel are one year younger. If there is no age effect, the rate of chronic poverty should also decline as the length of the income period is increased by one-year increments from 2001 to 2001-07 and all individuals are a year older. Appendix 1 confirms there is no age effect: as the income period is extended forward the rate of chronic poverty decreases, despite concurrent increases in the chronic poverty line.

¹¹ Rodgers and Rodgers (1993) using US data, observed a decrease in the proportion of poverty that was chronic as the income period was increased, but after ten years the ratio stabilized. With only seven waves of HILDA data, Table 1 shows a declining proportion of poverty that is chronic.

Table 2 decomposes estimates of average-annual, chronic and transitory poverty for the population who are present in Australia from 2001 through 2007, into five mutually exclusive and collectively exhaustive age groups that span the life cycle.

- Dependent children are individuals who, in all seven years, are either (a) younger than 15 years or (b) aged 15-24 years, not employed full-time, studying full-time, living with at least one parent, and without a partner or child of their own. When appropriately weighted, dependent children comprise 18 per cent of the population.
- Adults are people who, in all seven years, are aged 25-64 years or are aged 15-24 but are not dependent children. Adults make up 57 per cent of the population.
- Elderly people are individuals who, in all seven years, are aged 65 and older. Ten per cent of the population are elderly.
- The child-to-adult category consists of people who are dependent children in some of the seven years and are adults in the other years. These people make up nine per cent of the population.
- The adult-to-elderly category consists of people who are adults in some of the seven years and are elderly in other years. Six per cent of the population are in this category.

First, consider Section A of Table 2 where imputed housing rents are included in household income. The profile of chronic-poverty rates is U-shaped over the life cycle, falling from 6.4 per cent for children to 4.8 per cent for adults, and rising again to 8.7 per cent for the elderly. The poverty-intensity indices, which equal the poverty rate for the age group divided by the poverty rate for the whole population, emphasise the disparities across the age groups (Rodgers and Rodgers, 1991). Chronic poverty

among adults is only 0.8 times as intense as chronic poverty in the entire population, whereas chronic poverty among the elderly and those approaching old age is 1.5 and 1.4 times as intense, respectively, as that of the population as a whole. The chronic-poverty rate for dependent children and for those approaching adulthood is 1.1 and 1.0 times as large, respectively, as the chronic-poverty rate for all persons.

The profile of transitory-poverty rates across the age groups is quite different. Transitory poverty is highest for people moving into adulthood, for whom it is 7.8 per cent (which is 2.1 times as large as transitory poverty in the entire population), and for people entering old age, where it is 4.8 per cent (or 1.3 times as large as that for the entire population). Transitory poverty is lowest for adults, for whom the rate is 2.6 per cent (which is 0.7 times as large as transitory poverty in the whole population). The transitory-poverty rates for children and the elderly are a little higher than that of the entire population.

Average-annual poverty rates have a different age-group profile, being much lower for adults (7.4 per cent) than for any of the other four groups. Average-annual poverty is highest among those moving into adulthood (13.4 per cent) but also high among the elderly (12.9 per cent), people entering old age (12.8 per cent) and children (10.8 per cent). Average-annual poverty among adults is 0.8 times as intense as in the entire population. Average-annual poverty for the other four groups ranges from 1.1 to 1.4 times that of the entire population.

As a proportion of average-annual poverty in a given group, chronic poverty is smallest for people moving into adulthood (41.7 per cent). In contrast, most of the poverty experienced by the elderly (67.9 per cent) is chronic poverty. However, substantial proportions of poverty experienced by children, adults, and people in the

adult-to-elderly category are chronic in nature (59.3 per cent, 65.2 per cent and 62.1 per cent, respectively).

A comparison of Sections A and B of Table 2, reveals that including imputed housing rental values in household income has a substantial effect on poverty rates for the different age groups. Home-ownership is most common among older people, so, it is not surprising that imputed housing rent has a larger impact on their poverty rates than on poverty rates of other age groups. Both chronic and average-annual poverty rates for the elderly and those approaching old age, are two-to-three times larger when imputed housing rentals are not taken into account. However, children and those entering adulthood have chronic and average-annual poverty rates that are slightly lower when imputed rent is not included in household income. The average-annual and transitory poverty rates for adults are slightly higher when imputed housing rent is not included but the chronic-poverty rate for adults is little affected by the inclusion of imputed rent. In summary, Table 2 shows that the elderly are the most chronically poor, followed by those approaching old age, regardless of whether imputed rent on owner-occupied, public and rent-free housing is included in household income.

Table 3 tests the sensitivity of the results in Table 2 to alternative chronic-poverty lines and alternative methods of measuring chronic poverty. In addition to chronic-poverty rates based upon permanent income, estimates are given of long-term poverty computed using the common ‘x-out-of-n times poor’ method and the method employed by the European Union as a measure of social exclusion (poor in 2007 and at least two of the previous three years). We also computed poverty rates using a simple average of READ incomes over the seven years. A poverty line equal to 50 per cent of the median equivalised income is used with the alternative methodologies. All

poverty rates in Table 3 have been calculated with imputed rent on owner-occupied, public and rent-free housing included in household income.

Based on their permanent incomes, the elderly, and to a lesser extent those approaching old age, are the most chronically poor at chronic-poverty lines considered. As the chronic-poverty line is increased from 40 per cent to 70 per cent, chronic poverty among the elderly increases from 1.4 per cent (1.2 times that of the entire population) to 40.2 per cent (1.8 times that of the entire population). On the other hand, adults are the least chronically poor group, with poverty rates rising from 1.1 (equal to that of the entire population) to 15.7 per cent (0.7 times that of the entire population) as the poverty line increases. Dependent children and people approaching adulthood have similar chronic-poverty rates, which are between 0.9 and 1.3 times that of the population as a whole at the poverty lines considered.

Approximately one per cent of the entire population was poor in all seven years. Among people in the three youngest age groups, the seven-year poverty rates were slightly lower. However, people in the two oldest age groups experienced higher seven-year poverty rates: 1.6 per cent of the elderly and 3.8 per cent of those approaching old age were poor in all seven years. The (at least) 'x-out-of-n times poverty' rate for each age group necessarily increases as x decreases, but the poverty rate for those approaching old age is consistently highest followed by the poverty rate for the elderly.

Approximately 4.8 per cent of the whole population was poor in 2007 and at least two of the previous three years, the EU's concept of long-term poverty. The largest poverty rates occur among the elderly (7.9 per cent) and among those moving into old age (8.3 per cent). These are 1.6 and 1.7 times as large, respectively, as the poverty rate of the population as a whole. In comparison, the poverty rate for adults

(3.8 per cent) is only 0.8 times as large as that of the entire population. The two younger groups fall between the two extremes and are 1.0 and 1.2 times poorer than the population as a whole.

The average-income poverty rates also show the elderly and those approaching old age to be the poorest, and adults to be the least poor, long term. Although the average-income poverty rate for each age group is higher than the corresponding chronic poverty rate (at a poverty line equal to 50 per cent of median income), the two methods lead to similar poverty intensities.

Table 4 investigates changes in chronic, transitory and average-annual poverty since the beginning of the new millennium. Estimated poverty rates for the population that was present in Australia throughout the period 2001-03 are compared with those of the population present in Australia during 2005-07. As before, poverty rates are computed using household incomes that include imputed rent on owner-occupied, public and rent-free housing and are decomposed by age. Poverty-rate changes from the earlier, to the later, three years, together with their standard errors, are presented so that the statistical significance of each poverty-rate change can be determined.

Table 4 presents a picture of static poverty. All but one of the poverty-rate changes are small and not significantly different from zero, statistically speaking. The exception is the increase of 3.3 percentage points in chronic poverty of elderly persons, which, with a P-value of 0.0912, is statistically significant at the ten per cent level. We regard the results in Table 4 as largely exploratory because the time spanned by each panel is so short. However, as successive waves of longitudinal data become available changes in chronic and transitory poverty are likely to display some interesting features.

Summary and Conclusions

This paper has presented rates of chronic poverty that are in the spirit of the permanent-income hypothesis and theories of life-cycle consumption and savings behaviour in that we allow individuals to transfer income between years by saving and borrowing at market interest rates. Based on the first seven waves of HILDA data and a measure of income that includes imputed rent on owner-occupied, public and rent-free housing, we find that 5.7 per cent of the population resident in Australia from 2001 through 2007, were chronically poor, another 3.7 per cent experienced transitory poverty, whereas on average the annual poverty rate was 9.4 per cent. Approximately 61 per cent of average-annual poverty is chronic. The effect of including imputed rent on owner-occupied, public and rent-free housing in equivalised household income is considerable. When it is excluded the rates of chronic, transitory and average-annual poverty are 8.3, 4.5 and 12.8 per cent, respectively. As future waves of HILDA data allow the income period to be extended beyond seven years we would expect the proportion of poverty that is chronic to stabilise at a level below 60 per cent.

A decomposition of our chronic, transitory and average-annual poverty rates by age provides a ‘quasi’ life-cycle profile of poverty. We find that the rate of chronic poverty is a U-shaped function of age: falling from 6.4 per cent for children to 4.8 per cent for adults, and rising again to 8.7 per cent for the elderly. The rate of transitory poverty, on the other hand, is highest for people transiting from childhood to adulthood (7.8 per cent) and from adulthood into old age (4.8 per cent). The impact of including imputed rent on owner-occupied, public and rent-free housing is particularly large for the elderly whose chronic and average-annual poverty rates are almost three times as large when household imputed rental values are not taken into

account. We find that the elderly experience the highest rates of chronic poverty and this result is robust with respect to where the poverty line is set. It continues to hold when several alternative methods are used to measure long-term poverty.

There were no statistically significant changes in the rates of chronic, transitory or average-annual poverty of the population as a whole, or of any of the age groups – with one exception. A marginally significant increase of 3.3 percentage points in chronic poverty of the elderly was observed. The static nature of poverty is not surprising given that the data span only seven years, and cover a period of uninterrupted prosperity in the Australian economy. If the analysis were to be repeated in a few years time, when data incorporating the effects of the global financial crisis become available, inter-temporal changes in chronic and transitory poverty rates may well be different.

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Table 1: Permanent-Income Poverty Rates, Measured over Different Periods

T	Income period	Chronic poverty line (\$)	Chronic poverty (%)	Transitory poverty (%)	Average annual poverty (%)	Amount of poverty that is chronic (%)
<u>A. Household income includes household imputed rental values</u>						
1	2007	20,491			10.1	
2	2006-07	20,004	8.6	1.0	9.6	89.7
3	2005-07	19,629	7.9	1.8	9.6	81.7
4	2004-07	19,230	7.3	2.1	9.5	77.6
5	2003-07	18,803	6.7	2.8	9.5	70.9
6	2002-07	18,401	6.1	3.3	9.4	64.5
7	2001-07	18,059	5.7	3.7	9.4	61.0
<u>B. Household income excludes household imputed rental values</u>						
1	2007	17,615			14.1	
2	2006-07	17,159	11.4	1.7	13.2	86.7
3	2005-07	16,867	11.3	1.9	13.2	85.5
4	2004-07	16,497	10.2	2.8	13.0	78.7
5	2003-07	16,131	9.4	3.6	12.9	72.4
6	2002-07	15,852	8.9	4.0	12.8	69.2
7	2001-07	15,663	8.3	4.5	12.8	64.6

Source: Hilda, Release 7.0 and CNEF-HILDA7.

Notes: Author's computations based on the 2001-07 balanced panel of enumerated persons and longitudinal enumerated person weights. Poverty lines are in 2006-07 dollars.

Table 2: Permanent-Income Poverty, 2001-07, Decomposed by Age

	Dependent children	Child-to-adult	Adults	Adult-to-elderly	Elderly persons	All persons
<u>A. Household income includes household imputed rental values</u>						
Chronic poverty rate (%)	6.4	5.6	4.8	7.9	8.7	5.7
Chronic-poverty intensity	1.1	1.0	0.8	1.4	1.5	1.0
Transitory poverty rate (%)	4.4	7.8	2.6	4.8	4.1	3.7
Transitory-poverty intensity	1.2	2.1	0.7	1.3	1.1	1.0
Average-annual poverty rate (%)	10.8	13.4	7.4	12.8	12.9	9.4
Average-annual poverty intensity	1.1	1.4	0.8	1.4	1.4	1.0
% of poverty that is chronic	59.3	41.7	65.2	62.1	67.9	61.0
<u>B. Household income excludes household imputed rental values</u>						
Chronic poverty rate (%)	5.2	5.1	4.6	20.1	30.5	8.3
Chronic-poverty intensity	0.6	0.6	0.6	2.4	3.7	1.0
Transitory poverty rate (%)	4.7	7.4	3.8	6.5	4.7	4.5
Transitory-poverty intensity	1.0	1.6	0.8	1.4	1.1	1.0
Average-annual poverty rate (%)	9.9	12.5	8.3	26.5	35.3	12.8
Average-annual poverty intensity	0.8	1.0	0.7	2.1	2.8	1.0
% of poverty that is chronic	52.7	40.8	54.8	75.6	86.6	64.6
Sample size	2,500	1,040	6,444	658	1,150	11,792

Source: Hilda, Release 7.0.

Notes: Author's computations based on the 2001-07 balanced panel of enumerated persons and longitudinal enumerated person weights.

Table 3: Sensitivity Analysis of Long-Term Poverty, Decomposed by Age

	Dependent children	Child-to-adult	Adults	Adult-to-elderly	Elderly persons	All persons
<u>Chronic poverty rate (%)</u>						
Poverty line = 40% median income	1.1	1.2	1.1	1.5	1.4	1.1
Chronic-poverty intensity	0.9	1.0	1.0	1.3	1.2	1.0
<i>Poverty line = 50% median income</i>	<i>6.4</i>	<i>5.6</i>	<i>4.8</i>	<i>7.9</i>	<i>8.7</i>	<i>5.7</i>
<i>Chronic-poverty intensity</i>	<i>1.1</i>	<i>1.0</i>	<i>0.8</i>	<i>1.4</i>	<i>1.5</i>	<i>1.0</i>
Poverty line = 60% median income	17.1	13.9	9.7	19.7	24.8	13.6
Chronic-poverty intensity	1.3	1.0	0.7	1.5	1.8	1.0
Poverty line = 70% median income	28.2	24.2	15.7	26.8	40.2	21.9
Chronic-poverty intensity	1.3	1.1	0.7	1.2	1.8	1.0
<u>Other rates of persistent poverty (%), poverty line = 50% median income</u>						
Poor in all 7 years (%)	0.9	0.9	0.9	3.8	1.6	1.1
Poverty intensity	0.8	0.8	0.8	3.4	1.4	1.0
Poor in ≥ 6 years (%)	3.0	2.2	1.9	4.6	4.1	2.5
Poverty intensity	1.2	0.9	0.8	1.8	1.6	1.0
Poor in ≥ 5 years (%)	5.2	3.8	3.3	7.1	6.9	4.3
Poverty intensity	1.2	0.9	0.8	1.7	1.6	1.0
Poor in ≥ 4 years (%)	7.9	7.3	5.4	10.3	9.5	6.7
Poverty intensity	1.2	1.1	0.8	1.5	1.4	1.0
Poor in 2007 & ≥ 2 of prev 3 yrs (%)	4.6	5.8	3.8	8.3	7.9	4.8
Poverty intensity	1.0	1.2	0.8	1.7	1.6	1.0
Average-income poverty rate (%)	6.6	6.1	4.9	9.2	9.9	6.1
Poverty intensity	1.1	1.0	0.8	1.5	1.6	1.0
Sample size, 2001-07	2,500	1,040	6,444	658	1,150	11,792

Source: Hilda, Release 7.0.

Notes: Author's computations based on the 2001-07 balanced panel of enumerated persons and longitudinal enumerated person weights. All poverty rates were calculated with household imputed rental values included in household income.

Table 4: Changes in Permanent-Income Poverty, 2001-03 to 2005-07, Decomposed by Age

Income period	Dependent children	Child-to-adult	Adults	Adult-to-elderly	Elderly persons	All persons
Chronic poverty, 2005-07	8.8	9.9	5.9	10.8	12.2	7.5
Chronic poverty, 2001-03	8.7	8.5	5.9	9.9	8.9	7.1
Δ in chronic poverty	0.1	1.3	-0.1	0.9	3.3*	0.5
SE of Δ in chronic poverty	2.0	2.6	0.9	7.3	2.0	1.0
Transitory poverty, 2005-07	2.4	4.2	1.7	1.2	1.4	1.9
Transitory poverty, 2001-03	2.9	5.5	2.2	4.5	3.1	2.6
Δ in transitory poverty	-0.5	-1.4	-0.5	-3.3	-1.7	-0.7
SE of Δ in transitory poverty	1.7	13.3	1.2	7.7	9.1	1.0
Av-annual poverty, 2005-07	11.2	14.0	7.6	12.0	13.6	9.4
Av-annual poverty, 2001-03	11.6	14.1	8.1	14.5	12.0	9.7
Δ in av-annual poverty	-0.5	-0.1	-0.5	-2.4	1.6	-0.3
SE of Δ in av-annual poverty	1.6	12.7	0.7	9.7	9.1	0.4
Sample size, 2005-07	3,656	559	8,553	278	1,728	14,774
Sample size, 2001-03	4,020	498	8,757	246	1,628	15,149

Source: Hilda, Release 7.0.

Notes: Author's computations based on the 2001-03 and 2005-07 balanced panels of enumerated persons and their accompanying longitudinal enumerated person weights.

All poverty rates were calculated with household imputed rental values included in household income.

* significant at the 10% level.

Appendix 1: Permanent-Income Poverty Rates, Measured over Different Periods

T	Income period	Chronic poverty line (\$)	Chronic poverty (%)	Transitory poverty (%)	Average annual poverty (%)	Amount of poverty that is chronic (%)
<u>A. Household income includes household imputed rental values</u>						
1	2001	16,725			9.5	
2	2001-02	16,862	7.8	1.5	9.3	83.7
3	2001-03	17,065	7.1	2.3	9.4	75.7
4	2001-04	17,318	6.0	3.2	9.2	65.1
5	2001-05	17,575	6.1	3.2	9.3	65.5
6	2001-06	17,810	6.0	3.3	9.3	64.5
7	2001-07	18,059	5.7	3.7	9.4	61.0
<u>B. Household income excludes household imputed rental values</u>						
1	2001	14,925			12.5	
2	2001-02	14,908	10.4	2.0	12.4	83.7
3	2001-03	14,955	9.6	2.9	12.5	77.0
4	2001-04	15,095	8.8	3.6	12.5	70.9
5	2001-05	15,291	8.6	4.0	12.6	68.0
6	2001-06	15,463	8.6	3.9	12.6	68.8
7	2001-07	15,663	8.3	4.5	12.8	64.6

Source: Hilda, Release 7.0.

Notes: Author's computations based on the 2001-07 balanced panel of enumerated persons and longitudinal enumerated person weights. Poverty lines are in 2006-07 dollars.