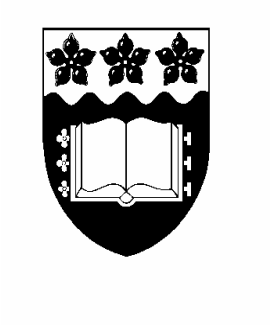

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by

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Abstract

Sampling variation should be taken into account when sample data are used to estimate changes in the poverty rate over time. This paper reports poverty rates and their standard errors, calculated using data from the 1997-98 and 2002-03 Surveys of Income and Housing, and tests whether the poverty rate in Australia has changed significantly over this time period. The results depend on where the equivalised poverty line is set and whether its real value is held constant. With a constant real poverty line, a decrease in the poverty rate is observed and, except at low poverty thresholds, the reduction is statistically significant. However, with a relative poverty line set equal to half the median, or half the mean, current income, a significant increase in the poverty rate is observed, which is due to an increase in the average real income of the Australian population between the two survey dates.

1. Introduction

During the last several decades there have been a number of empirical studies of poverty in Australia, including several that have compared poverty rates at different points in time (for example, Saunders and Bradbury, 2006; Harding, Lloyd and Greenwell, 2001; Harding and Szukalska, 2000; Mitchell and Harding, 1993; Saunders and Matheson, 1993; Harding and Mitchell, 1992). All of these studies have been based upon sample data, the Surveys of Income and Housing (SIH) conducted by the Australian Bureau of Statistics (ABS) being the most frequently used data source. However, none of these studies has tested the statistical significance of the poverty-rate changes they have observed[1]. This omission is surprising because the ABS provides replication weights with which standard errors of poverty rates can be calculated with a jack-knife procedure. In view of the controversy generated by some of the poverty studies (Hughes, 2001; Tsumori, Saunders and Hughes, 2002; Saunders, (CIS) 2002, Saunders, (SPRC) 2002; Saunders, (SPRC) 2005) it would seem prudent, before debating other issues, to ascertain whether any observed change in the poverty rate can be explained by sampling variation.

This paper reports poverty rates and their standard errors, estimated using the basic, confidentialised, unit-record files (CURFs) from the 1997-98 SIH and 2002-03 SIH and tests whether the observed change in the poverty rate is significantly different from zero, statistically speaking. A five-year time frame is short enough for the standard of living that society regards as minimally acceptable to remain approximately constant. The period 1997-98 through 2002-03 is the most recent five-year period for which data are available that are comparable in terms of scope,

[1] Chotikapanich *et al.* (2003) calculate standard errors of poverty and inequality indices at a point in time but they do not test for significant changes in the indices over time.

weighting procedures, definitions and data collection practices.[2] The poverty-rate estimates have been calculated under various choices of methodology, which are described in Section 2. Sufficient detail is given to allow other researchers to replicate the results, which are reported in Section 3. Poverty-rate profiles, which graphically display the sensitivity of poverty rates, and changes in poverty rates, to the poverty line, are presented in Section 4. The empirical findings of the study are summarised in Section 5 and some policy-relevant comments are offered.

2. Methodology of Poverty Measurement

The poverty rate will depend upon the methodology used to calculate it. Therefore, in this study, the poverty rate is computed under a number of scenarios. Three different types of social unit are identified as poor: the income unit, the family and the household, as defined by the ABS (2002-03, Catalogue No. 6541.0, Glossary). Each type of social unit consists of either a single adult living alone, or two or more persons who live in the same private dwelling. In the case of social units containing more than one person, the income unit is the most narrowly defined and the household is the most broadly defined. Multiple-person income units are either married couples (registered or de facto), married couples with dependent children or single parents with dependent children. Dependent children are either persons younger than 15 years, or full-time students aged 15 through 24 years who live with a parent, but have no partner or child of their own resident in the same dwelling. Families and households are made up of one or more income units. Families contain only people who are related by blood, marriage, adoption, step or fostering. Households contain

[2] In 2003-04, the SIH was integrated with the Household Expenditure Survey, and confidentiality requirements and data collection practices were changed. The quality of data in the SIH prior to 2002-03, and other surveys conducted by the ABS, has been analysed by Siminski, *et al.* (2003a and 2003b) and found to be deficient in some respects.

related or unrelated people who usually live together and make common provision for food and other essentials of living.

All individuals within a poor social unit are classified as poor, and the poverty rate is computed as the estimated proportion of people in the population who are poor. The poverty rates presented in this paper are based on 18,060 people of all ages living in private dwellings that were selected for the 1997-98 SIH and 24,674 people of all ages covered by the 2002-03 SIH.[3] When appropriate weighting procedures are used these people constitute a random sample of individuals living in private dwellings in all but the most remote areas of Australia. The two per cent (or so) of Australians who are outside the scope of the surveys include the homeless and people living in institutions such as boarding schools, prisons and military barracks.

The variable used to identify poverty in this paper is the disposable income of the social unit. Disposable income is gross income minus income taxes, both of which are recorded in the SIH-CURFs at the income-unit and household levels. Gross income and taxation at the family level have been computed by aggregating these variables over the income units that comprise each family. Gross income consists of income from wages and salaries, business income, investment income, private pensions and transfers, and Australian government pensions, benefits and allowances. Income taxes are imputed by the ABS, rather than being reported by respondents to the surveys. Gross income and taxation are recorded in the SIH-CURFs on both a weekly and an annual basis. Weekly income is income in the week prior to the interview and annual income is income during the previous financial year, 1996-97 or 2001-02. The consumer price index was used to convert all weekly data to 2002-03

[3] The 1997-98 SIH-CURF contains 8,778 income units, 7,472 families and 7,025 households. The 2002-03 SIH-CURF contains 12,439 income units, 10,753 families and 10,210 households. The numbers of people aged 15 years or older in the 1997-98 SIH-CURF and the 2002-03 SIH-CURF are 13,931 and 19,378, respectively.

dollars (as of the same quarter in which the interview was held) and annual data were converted to 2001-02 dollars.[4]

Although weekly gross income and taxation are available for all income units and households in the SIH-CURFs, annual gross income and taxation for certain income units and households are flagged as 'out-of-scope'. The recommendation of the ABS to exclude such social units from analyses that use annual income data (ABS, 2002-03, p.9) was followed.[5]

Two different equivalence scales are used to compare the needs of social units of different sizes and composition: the modified OECD equivalence scale and the Henderson equivalence scale. In the OECD version, the first adult in the social unit receives a weight of one point, each additional person aged 15 years or older receives 0.5 points, and each child under 15 years of age receives 0.3 points. Thus a couple with two children is considered to have needs that are (1 + 0.5 + 0.6 =) 2.1 times as large as those of a single adult. In other words, the social unit contains 2.1 adult equivalents.

The Henderson equivalence scale is described by Johnson (1987). Points are allocated according to the number of adults and the number of dependent children in the social unit. The head of the social unit receives 20 points if working, 13 points otherwise. The Henderson equivalence scale was originally constructed for income units, which contain at most two adults: the head and the spouse (if there is one). The spouse receives 18.5 points if working and 9.5 points otherwise. Families and households, however, may contain additional adults and, in this study, each such

[4] The consumer price index used is: CPI, All Groups, Weighted Average of the Eight Capital Cities (ABS, Catalogue No. 6401.0).

[5] In the 1997-98 survey, 315 income units and 310 households were flagged out of scope. In the 2002-03 survey, 641 income units and 634 households were identified as out-of-scope. When computing poverty rates based on annual family income, 312 families were excluded from the 1996-97 analysis and 636 families from the 2001-02 analysis because they contained at least one income unit that was out of scope.

person has been assigned 18.5 points if working and 9.5 points otherwise. Dependent children receive 7.5 points each. Additional points are assigned for housing[6] and for fuel, power and ancillary costs.[7] Finally, each social unit's point score is converted to adult equivalents by dividing by (20 + 12.1 + 4.9 =) 37, which is the number of points allocated to a social unit consisting of one working adult. Thus, a social unit consisting of a working head, a non-working partner and two dependent children would receive [20 + 9.5 + (2)(7.5) + 15.7 + 9.3 =] 69.5 points and would contain (69.5/37 =) 1.9 adults equivalents.

Disposable income divided by the number of adult equivalents gives the equivalised disposable income of the social unit, which can be compared with the poverty threshold for a single adult to determine whether or not the social unit is poor. The poverty line with which equivalised disposable income is compared comes in two basic types: absolute and relative. An absolute poverty line for a single adult is an amount of money that is deemed necessary for that person to attain a minimally acceptable standard of living. An absolute poverty line is independent of the distribution of equivalised disposable incomes within the community (Johnson, 1996, pp.111-112). Budget-based poverty lines of the type used in the United States are absolute. The first study of poverty in Australia (Henderson, Harcourt and Harper, 1970) set an absolute poverty line for a typical family (a working head, a nonworking spouse and two children) equal to the basic wage plus child endowment at the time. In contrast, a relative poverty line takes a value equal to a certain point in the distribution

[6] Some studies deduct housing costs from disposable income and exclude points for housing when computing the Henderson equivalence scale. All the calculations in this paper are inclusive of housing costs.

[7] Housing points for social units containing from one through 12 people are: 12.1, 13.3, 14.5, 15.7, 16.9, 18.2, 19.4, 20.0, 21.2, 21.8, 22.4 and 24.2. Points for fuel, power and ancillary costs for social units containing from one through 12 people are: 4.9, 6.7, 8.0, 9.3, 10.6, 11.8, 12.6, 14.0, 14.8, 16.2, 17.6 and 19.8.

of equivalised disposable incomes of all people in the population. The most common examples are 50 per cent of median equivalised disposable income and 50 per cent of mean equivalised disposable income. Both absolute and relative poverty lines are used in this paper. Mean and median equivalised disposable incomes have been calculated by weighting the equivalised disposable income of each social unit by the number of people residing in that social unit, as well as by the 'main' weight provided by the ABS, which indicates how many social units in the population are represented by the social unit in the sample.

Studies of inter-temporal poverty must confront the question of how to update the poverty line over time. One approach is to adjust the poverty line for a given year by changes in the cost of living, which keeps the standard of living represented by that poverty line constant through time. Analysts who favour absolute poverty lines, typically use constant real poverty lines. A second approach, which is used by those who favour relative poverty lines, is to set the poverty line in a given year equal to a particular point in *that year's* income distribution. This allows the real value of the poverty line to change over time. It should be pointed out that a measure of poverty that is based on a poverty line that varies in real terms will violate most of the desirable properties of poverty indices. For example, the head-count will violate the desirable property of 'focus' (Sen, 1981, p.186) in that it will not be independent of the incomes of people who are not poor.

Rodgers and Rodgers (2006) prefer to keep the poverty line constant in real terms, provided the time period over which poverty is measured is short enough that the standard of living that society regards as minimally acceptable remains approximately constant. For example, the Henderson poverty line adjusted by the consumer price index keeps the real value of the poverty line constant. It is common

practice, however, to use a variable poverty line. For example, the Melbourne Institute adjusts the Henderson poverty line using per capita household disposable income, thereby allowing the real value of the poverty line to vary. Studies of inter-temporal poverty, including those by the OECD and many researchers of Australian poverty, use a relative poverty line equal to half of median (or mean) income of the *current* year's income distribution. Changes in poverty rates reported in these studies are affected by both changes in the real value of the poverty line and changes in the real incomes of people in the lower part of the income distribution. It would be informative to report the extent to which each component contributes to the change in the poverty rate but this is rarely done.

The data in the SIH-CURFs constitute a complex random sample of people living in private households throughout urban and most rural areas of Australia. The standard errors produced by most statistical packages assume simple random sampling and consequently are incorrect when the data are a complex random sample. Standard errors of the poverty rates reported in this paper were computed using the jack-knife methodology described by the ABS (2002-03, Catalogue No. 6541.0, pp.10-11). The process entails computing each poverty rate 30 times using the 30 sets of replicate weights provided on the SIH-CURFs and measuring the variability of these 30 estimates around the poverty rate calculated using the 'main' weight. Thus:

$$SE(\hat{p}) = \sqrt{\frac{29}{30}\sum_{j=1}^{30}(\hat{p}_j - \hat{p})^2} \qquad (1)$$

where $\hat{p}$ is the poverty rate computed from the full sample using the 'main' weight and $\hat{p}_j$ is the poverty rate computed from the sub-sample that is obtained when the j^{th} set of replicate weights are used. The SIHs are independent samples so the standard

error of the change in the poverty rate between the two survey dates is the square root of the sum of squared standard errors of poverty rates from the two surveys:

$$SE(\hat{p}_{02-03} - \hat{p}_{97-98}) = \sqrt{SE(\hat{p})^2_{02-03} + SE(\hat{p})^2_{97-98}} \quad (2)$$

where 02-03 refers to data from the 2002-03 SIH-CURF and 97-98 refers to data from the 2002-03 SIH-CURF. In this paper, a five per cent significance level is used. Hence, the change in the poverty rate is considered statistically significant if the standard normal statistic:

$$Z = \frac{\hat{p}_{02-03} - \hat{p}_{97-98}}{SE(\hat{p}_{02-03} - \hat{p}_{97-98})} \quad (3)$$

lies outside the range -1.96 to 1.96.

3. Poverty Rates and Poverty-Rate Changes, 1997-98 through 2002-03

Poverty rates based upon several commonly used procedures are presented in Tables 1 through 5. The tables all have the same format. Columns 1 through 3, display the poverty line, the poverty rate, and the standard error of the poverty rate computed using data from the 1997-98 SIH-CURF. Columns 4 through 6 list the same variables but computed using data from the 2002-03 SIH-CURF. Columns 7 through 9 give the change in the poverty rate between the two survey dates, the standard error of that change, and the standard normal statistic. Sections A and B of each table contain poverty rates that were calculated using equivalised weekly disposable incomes. Sections C and D record poverty rates computed using equivalised annual disposable incomes. Within each of the four sections of each table, estimates are presented of the proportion of people living in poor income-units, families and households. Thus, 24 different measures of the poverty rate, and 12 measures of the change in the poverty rate, are reported in each table. This enables us to see how sensitive poverty rates, and

changes in poverty rates, are to the methodology used to calculate them. The discussion below focuses upon the change in the rate of poverty rather than on the poverty rate itself.[8]

Tables 1, 2 and 3 were constructed using the OECD equivalence scale. Table 1 reports poverty rates and their changes based upon two relative poverty lines calculated using the 1997-98 SIH-CURF: half the median equivalised disposable income of all people and half the mean equivalised disposable income of all people. These poverty lines apply at both the beginning, and the end, of the time span considered. For example, income units have an equivalised poverty line equal to $192 per week, which is half the median equivalised disposable income calculated using the 1997-98 SIH-CURF. This poverty line applies to both 1997-98 and 2002-03 (see Columns 1 and 4).

In all but two of the scenarios in Table 1, a decrease in the poverty rate is observed and the change is statistically significant at the five per cent level. The two exceptions occur when income units are classified as poor or non-poor using median equivalised weekly (Section A, Row 1), or annual (Section C, Row 1), disposable income. The magnitude of the poverty-rate reduction ranges from one to four percentage points, depending upon the methodology used.

Table 2, like Table 1, employs relative poverty lines that are constant in real terms and equal to half the median, and half the mean, equivalised disposable income

[8] Four of the poverty rates reported in this paper are comparable with those in Figure 5 of Saunders and Bradbury (2006, p. 351). Saunders and Bradbury's poverty rates for 'Current, relative (Inc Surv), 1997-98', 'Annual, relative, ABS pop, 1996-97', 'Current, relative (Inc Surv), 2002-03' and 'Annual, relative, ABS pop, 2001-02' can be compared with the poverty rates appearing in my 'Table 1, Section A, Row 3, Column 2', 'Table 1, Section C, Row 3, Column 2', 'Table 2, Section A, Row 3, Column 5' and 'Table 2, Section C, Row 3, Column 5', respectively. The differences in our poverty rates are small (at most 0.5 percentage points) and could be due to the fact that I have used the ABS' Basic CURF whereas Saunders and Bradbury may have used the Expanded CURF that is only available through the ABS' remote access data laboratory. The Basic CURF's top coding of some of the variables used in this paper is more restrictive than that found in the Expanded CURF. For example, the number of adults in the household is top coded at six in the Basic CURF and eight in the Expanded CURF.

of all people. However, unlike Table 1 the relative poverty lines in Table 2 are calculated using the 2002-03 SIH-CURF. For example, income units have an equivalised poverty line of $210 per week, which equals half the median, equivalised disposable income in 2002-03 and this poverty line applies to both 1997-98 and 2002-03. The poverty rate is observed to decrease by an amount that varies between two and five percentage points in the various scenarios. However, the change in the poverty rate is statistically significant at the five per cent level according to every measure presented in Table 2.

In Table 3, like Tables 1 and 2, half the median, and half the mean, equivalised disposable income are used as poverty lines. Unlike Tables 1 and 2, however, the poverty lines have been calculated using both the 1997-98 SIH-CURF and the 2002-03 SIH-CURF, and so the real value of the poverty line varies through time. Readers will note that the poverty lines, poverty rates and standard errors in Columns 1, 2 and 3 of Table 3 are the same as those in Columns 1, 2 and 3 of Table 1, and the poverty lines, poverty rates and standard errors in Columns 4, 5 and 6 of Table 3 are the same as those in Columns 4, 5 and 6 of Table 2. The methodology underlying Table 3 is the most common approach in studies of Australian poverty. The results are substantially different from what is observed in Tables 1 and 2. The poverty rate is observed to increase under all twelve scenarios, and the magnitude of the increase is as large as three percentage points. In all but three cases (Section B, Row 2 and Section D, Rows 2 and 3) the poverty-rate change is statistically significant at the five per cent level.

Whereas Tables 1, 2 and 3 employ the OECD equivalence scale, Tables 4 and 5 employ the Henderson equivalence scale. Table 4 also uses the Henderson poverty line. In Sections A and C of Table 4, the Henderson poverty line is updated using the

consumer price index (CPI) and consequently its real value is constant through time. However, in Sections B and D the poverty line is updated using per capita household disposable income (PCHDI), and consequently the real value of the poverty line varies through time. Table 4 portrays a different outcome to the previous tables. Although the poverty rate is observed to decrease in all but one case (Section D, Row 3), only one poverty-rate change (Section C, Row 1) is statistically significant. This change of approximately one percentage point occurs with the Henderson poverty line held constant in real terms.

The final table, Table 5, like Table 3, uses a variable poverty line equal to half the median (Sections A and C), and half the mean (Sections B and D), equivalised disposable income in the current year. However, unlike Table 3, which uses the OECD equivalence scale, the Henderson equivalence scale is used in Table 5. The poverty rate increases under all twelve scenarios in Table 5, and in all but two cases (Section A, Rows 2 and 3) the changes are statistically significant at the five per cent level.

Tables 1 through 5 show that a crucial methodological choice is whether to keep the real value of the poverty line constant through time as in Tables 1 and 2, where significant reductions in the poverty rate are observed, or whether to allow the real value of the poverty line to vary over time as in Tables 3 and 5, where significant increases in the poverty rate occur. The value of the poverty line in each period, the equivalence scale and, to a lesser extent, the social unit are also important choices. These issues that will now be explored in more detail.

4. Poverty-Rate Profiles

The sensitivity of the poverty rate, and the change in the poverty rate, to the choice of poverty line and the way it is updated can be seen in Figures 1 through 12. Each figure applies to a particular combination of social unit (the income unit, family or household), equivalence scale (OECD or Henderson), and time period over which income is measured (weekly or annual). The figures contain poverty-rate profiles, which graph the poverty rate and its inter-temporal change against the real, equivalised poverty line. In Figures 1, 3, 5, 7, 9 and 11, equivalised poverty lines range from $100 to $350 per week (in 2002-03 dollars). In Figures 2, 4, 6, 8, 10 and 12 equivalised poverty lines range from $8,000 to $18,000 per annum (in 2001-02 dollars).

The figures all contain five profiles: poverty rates calculated using the 1997-98 SIH-CURF, poverty rates based on the 2002-03 SIH-CURF, changes in poverty rates between the two survey dates, upper and lower limits of 95 per cent confidence intervals for the poverty-rate changes, all graphed as functions of the real, equivalised poverty line. If both the upper and lower limits of the 95 per cent confidence interval are below zero at a given poverty line then the change in the poverty rate between the two survey dates (calculated using that poverty line) is significantly different from zero.

The twelve figures show that the change in the poverty rate is not significantly different from zero at low values of the real, equivalised poverty line. But as the poverty line is increased, the poverty-rate profile based on data from the 2002-03 SIH-CURF drops below the profile calculated using the 1997-98 SIH-CURF, which implies that the poverty rate has decreased. The point at which the poverty-rate change becomes statistically significant depends upon the equivalence scale and

whether disposable income is measured on a weekly or annual basis. The social unit used in the analysis has less impact on the critical poverty line.

When the OECD equivalence scale is used and disposable income is measured on a weekly basis, the critical, equivalised poverty line for all social units is approximately $200 per week, which converts to $10,400 per annum. When disposable income is measured on a yearly basis, the critical, equivalised poverty line is approximately $10,000 per annum for all social units. Beyond the critical poverty line(s), the reduction in the poverty rate continues to become larger and more statistically significant.

When the Henderson equivalence scale is used the critical, equivalised poverty lines are higher. With disposable income measured on a weekly basis, the critical poverty line is approximately $250 per week for all social units, which is equivalent to approximately $13,000 per year. With disposable income is measured on a yearly basis, the critical, equivalised poverty lines are $10,800, $11,600 and $12,100 per annum for income units, families and households (respectively).

The results contained in Tables 1 through 5 are depicted graphically in the figures. Table 6 documents how the poverty lines in the tables are labelled in the twelve figures. When the real value of the equivalised poverty line is not constant, as in Tables 3 and 5 and in Sections B and D of Table 4, poverty rates at the beginning and end of the time period lie on different poverty profiles. The horizontal distance between the two poverty profiles shows by how much the poverty line can change before there is a change in the poverty rate.

The poverty-rate changes in Table 3 are presented graphically in Figures 1 through 6 by movements from Point a to Point b (when the poverty line is half of median income) and from Point c to Point d (when the poverty line is half of mean

income).[9] It is clear from Figures 1 through 6 that the observed increase in the poverty rate reported in Table 3 is a consequence of the increase in the real value of the poverty line between the two survey dates. Each poverty rate increase in Table 3 can be decomposed into a decrease from the beginning-of-period poverty-rate profile to the end-of-period poverty-rate profile with the poverty line held constant at its beginning-of-period value plus an increase along the end-of-period poverty-rate profile to the end-of-period poverty line. For example, the poverty rate increase in Row 1 of Table 3 from 9.59 per cent to 11.01 per cent can be decomposed into a fall from 9.59 per cent to 8.73 per cent, which is due to a change in the incomes that occupy the lower end of the income distribution, and an increase from 8.73 per cent to 11.01 percent, which is due to an increase in half of the median income.

The poverty-rate changes in Section B and Section D of Table 4 are represented by the movement from Point e to Point f in Figures 7 through 12. The figures show an increase in the real value of the poverty line over the time period of the study, although one that is not sufficiently large to induce an increase in the poverty rate.

The poverty-rate changes in Table 5 are represented in Figures 7 through 12 by movements from Point a to Point b (when the poverty line is half of median income), and from Point c to Point d (when the poverty line is half of mean income). It is evident that the observed increase in the poverty rate reported in Table 5 is a consequence of the increase in the real value of the poverty line between the two survey dates.

[9] Points a and c are located on the poverty-rate profile calculated using the 1997-98 SIH-CURF while Points b and d are on the poverty-rate profile calculated using the 2002-03 SIH-CURF.

5. Summary and Conclusions

There are several lessons that policy makers, and others, can learn from this study. First, inter-temporal changes in poverty rates that are calculated with sample data need to be tested for statistical significance before any conclusion is drawn about whether poverty has increased or decreased. Had this been done in past studies, some of the acrimony in the debate about changes in Australian poverty rates might have been avoided. Second, methodological choices can have a huge impact on measured poverty rates. This paper has shown that the change in the poverty rate between 1997-98 and 2002-03, and whether that change is statistically significant, depends upon two crucial methodological choices: (a) where to set the poverty line and (b) whether to hold the poverty line constant in real terms over the time period considered. This point is well known. Cynics might argue that it can be exploited for political purposes. To achieve transparency, not only should the methodology be stated explicitly, the sensitivity of results to the choice of methodology should also be reported. Poverty-rate profiles of the type given in this paper will be helpful in this respect.

Given that there is no need to choose a single poverty line, the question of whether the poverty line should be absolute or relative becomes less important. However, the method of updating the poverty line over time remains an issue as the results of this study clearly demonstrate. When the real value of the poverty line is held constant, poverty rates calculated using 2002-03 survey data are lower than poverty rates calculated using 1997-98 survey data and, except at very low poverty lines, the decrease in the poverty rate is statistically significant. The poverty line at which the decrease in the poverty rate becomes statistically significant depends upon the equivalence scale used. Under the OECD equivalence scale significant poverty-rate reductions were observed at real, equivalised poverty lines beyond $200 per week

or $10,000 per year. Under the Henderson equivalence scale the poverty rate decreased significantly at poverty lines larger than $250 per week or $12,000 per year.

When the real value of the poverty line is allowed to vary through time, generalisations are difficult because the change in the poverty rate depends upon the combination of poverty lines chosen for the two periods. The common practice of using half of median, or half the mean, disposable income in the *current* year, as the poverty line, produced statistically significant increases in the poverty rate in most of the scenarios investigated in this study, regardless of whether the OECD or Henderson equivalence scales was used. However, the increases in the poverty rate occur because of increases in the real value of the poverty line, not because of decreases in the real incomes of people at the bottom end of the income distribution.

Policy makers, like analysts, will have an opinion as to whether the poverty line should be held constant in real terms or be set equal to a given percentile in the current year's income distribution. A decomposition of a poverty-rate change into a component due to a change in the real value of the poverty line and a component due to changes in the real incomes of people at the bottom end of the income distribution is likely to be informative to those on either side of the issue.

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Table 1: Changes in Poverty Rates, 1997-98 to 2002-03

Based on a Constant Poverty Line Set at the Beginning of the Period and the OECD Equivalence Scale

	SIH-CURF, 1997-98			SIH-CURF, 2002-03			1997-98 to 2002-03		
	Poverty line ($) (1)	Poverty rate (2)	Standard error (3)	Poverty line ($) (4)	Poverty rate (5)	Standard error (6)	Change in poverty rate (7)	Standard error of change (8)	Z statistic (9)
(A) Constant poverty line equal to half the 1997-98 median equivalised weekly disposable income, updated by the CPI									
(1) Income unit	192	0.0959	0.0034	192	0.0873	0.0031	-0.0085	0.0046	-1.86
(2) Family	206	0.0970	0.0034	206	0.0801	0.0034	-0.0169	0.0048	-3.49
(3) Household	205	0.0889	0.0034	205	0.0734	0.0031	-0.0155	0.0046	-3.38
(B) Constant poverty line equal to half the 1997-98 mean equivalised weekly disposable income, updated by the CPI									
(1) Income unit	221	0.1654	0.0043	221	0.1430	0.0042	-0.0224	0.0060	-3.73
(2) Family	234	0.1672	0.0050	234	0.1330	0.0039	-0.0342	0.0064	-5.38
(3) Household	233	0.1571	0.0045	233	0.1279	0.0038	-0.0291	0.0059	-4.92
(C) Constant poverty line equal to half the 1996-97 median equivalised annual disposable income, updated by the CPI									
(1) Income unit	9790	0.1078	0.0028	9790	0.1003	0.0035	-0.0075	0.0044	-1.70
(2) Family	10557	0.1079	0.0039	10557	0.0875	0.0040	-0.0204	0.0056	-3.65
(3) Household	10514	0.1056	0.0042	10514	0.0812	0.0039	-0.0244	0.0058	-4.24
(D) Constant poverty line equal to half the 1996-97 mean equivalised annual disposable income, updated by the CPI									
(1) Income unit	11313	0.1916	0.0037	11313	0.1545	0.0048	-0.0371	0.0061	-6.10
(2) Family	11946	0.1796	0.0047	11946	0.1359	0.0040	-0.0437	0.0062	-7.08
(3) Household	11892	0.1705	0.0057	11892	0.1319	0.0037	-0.0386	0.0068	-5.69

Source: Author's computations using the Australian Bureau of Statistics' 1997-98 and 2002-03 Surveys of Income and Housing.

Note: All weekly equivalised disposable incomes and poverty lines are in $2002-03. All annual equivalised disposable incomes and poverty lines are in $2001-02.

Table 2: Changes in Poverty Rates, 1997-98 to 2002-03

Based on a Constant Poverty Line Set at the End of the Period and the OECD Equivalence Scale

	SIH-CURF, 1997-98			SIH-CURF, 2002-03			1997-98 to 2002-03		
	Poverty line ($) (1)	Poverty rate (2)	Standard error (3)	Poverty line ($) (4)	Poverty rate (5)	Standard error (6)	Change in poverty rate (7)	Standard error of change (8)	Z statistic (9)
(A) Constant poverty line equal to half the 2002-03 median equivalised weekly disposable income, updated by the CPI									
(1) Income unit	210	0.1380	0.0037	210	0.1101	0.0039	-0.0279	0.0054	-5.18
(2) Family	225	0.1367	0.0041	225	0.1162	0.0040	-0.0205	0.0058	-3.55
(3) Household	225	0.1315	0.0042	225	0.1146	0.0038	-0.0169	0.0057	-2.95
(B) Constant poverty line equal to half the 2002-03 mean equivalised weekly disposable income, updated by the CPI									
(1) Income unit	243	0.2372	0.0048	243	0.1966	0.0047	-0.0406	0.0067	-6.07
(2) Family	256	0.2173	0.0054	256	0.1805	0.0048	-0.0368	0.0073	-5.06
(3) Household	255	0.2097	0.0056	255	0.1739	0.0042	-0.0358	0.0070	-5.12
(C) Constant poverty line equal to half the 2001-02 median equivalised annual disposable income, updated by the CPI									
(1) Income unit	11008	0.1749	0.0033	11008	0.1406	0.0048	-0.0343	0.0059	-5.84
(2) Family	11747	0.1686	0.0041	11747	0.1272	0.0041	-0.0414	0.0058	-7.15
(3) Household	11657	0.1613	0.0053	11657	0.1233	0.0038	-0.0380	0.0066	-5.79
(D) Constant poverty line equal to half the 2001-02 mean equivalised annual disposable income, updated by the CPI									
(1) Income unit	12571	0.2571	0.0049	12571	0.2097	0.0050	-0.0474	0.0070	-6.77
(2) Family	13183	0.2282	0.0051	13183	0.1852	0.0045	-0.0430	0.0068	-6.36
(3) Household	13101	0.2252	0.0053	13101	0.1834	0.0046	-0.0418	0.0070	-5.94

Source: Author's computations using the Australian Bureau of Statistics' 1997-98 and 2002-03 Surveys of Income and Housing.

Note: All weekly equivalised disposable incomes and poverty lines are in $2002-03. All annual equivalised disposable incomes and poverty lines are in $2001-02.

Table 3: Changes in Poverty Rates, 1997-98 to 2002-03

Based on a Variable Poverty Line and the OECD Equivalence Scale

	SIH-CURF, 1997-98			SIH-CURF, 2002-03			1997-98 to 2002-03		
	Poverty line ($) (1)	Poverty rate (2)	Standard error (3)	Poverty line ($) (4)	Poverty rate (5)	Standard error (6)	Change in poverty rate (7)	Standard error of change (8)	Z statistic (9)
(A) Variable poverty line equal to half the current median equivalised weekly disposable income									
(1) Income unit	192	0.0959	0.0034	210	0.1101	0.0039	0.0142	0.0052	2.74
(2) Family	206	0.0970	0.0034	225	0.1162	0.0040	0.0192	0.0053	3.64
(3) Household	205	0.0889	0.0034	225	0.1146	0.0038	0.0257	0.0051	5.01
(B) Variable poverty line equal to half the current mean equivalised weekly disposable income									
(1) Income unit	221	0.1654	0.0043	243	0.1966	0.0047	0.0312	0.0064	4.91
(2) Family	234	0.1672	0.0050	256	0.1805	0.0048	0.0134	0.0070	1.92
(3) Household	233	0.1571	0.0045	255	0.1739	0.0042	0.0168	0.0062	2.71
(C) Variable poverty line equal to half the median equivalised annual disposable income in the previous financial year									
(1) Income unit	9790	0.1078	0.0028	11008	0.1406	0.0048	0.0328	0.0056	5.89
(2) Family	10557	0.1079	0.0039	11747	0.1272	0.0041	0.0193	0.0056	3.44
(3) Household	10514	0.1056	0.0042	11657	0.1233	0.0038	0.0177	0.0057	3.10
(D) Variable poverty line equal to half the mean equivalised annual disposable income in the previous financial year									
(1) Income unit	11313	0.1916	0.0037	12571	0.2097	0.0050	0.0181	0.0062	2.90
(2) Family	11946	0.1796	0.0047	13183	0.1852	0.0045	0.0057	0.0064	0.88
(3) Household	11892	0.1705	0.0057	13101	0.1834	0.0046	0.0128	0.0074	1.74

Source: Author's computations using the Australian Bureau of Statistics' 1997-98 and 2002-03 Surveys of Income and Housing.

Note: All weekly equivalised disposable incomes and poverty lines are in $2002-03. All annual equivalised disposable incomes and poverty lines are in $2001-02.

Table 4: Changes in Poverty Rates, 1997-98 to 2002-03

Based on the Henderson Poverty Line and Equivalence Scale

	SIH-CURF, 1997-98			SIH-CURF, 2002-03			1997-98 to 2002-03		
	Poverty line ($) (1)	Poverty rate (2)	Standard error (3)	Poverty line ($) (4)	Poverty rate (5)	Standard error (6)	Change in poverty rate (7)	Standard error of change (8)	Z statistic (9)
(A) Constant poverty line equal to the equivalised Henderson weekly budget, updated by the CPI									
(1) Income unit	214	0.0859	0.0031	214	0.0789	0.0029	-0.0070	0.0042	-1.66
(2) Family	214	0.0635	0.0029	214	0.0582	0.0030	-0.0053	0.0041	-1.28
(3) Household	214	0.0577	0.0027	214	0.0517	0.0027	-0.0060	0.0038	-1.56
(B) Variable poverty line equal to the equivalised Henderson weekly budget, updated by PCHDI									
(1) Income unit	277	0.2077	0.0054	289	0.1983	0.0047	-0.0094	0.0071	-1.32
(2) Family	277	0.1630	0.0054	289	0.1569	0.0047	-0.0060	0.0071	-0.85
(3) Household	277	0.1480	0.0053	289	0.1429	0.0042	-0.0051	0.0068	-0.76
(C) Constant poverty line equal to the equivalised Henderson annual budget, updated by the CPI to the previous financial year									
(1) Income unit	10774	0.1012	0.0029	10774	0.0919	0.0035	-0.0093	0.0045	-2.06
(2) Family	10774	0.0695	0.0035	10774	0.0649	0.0031	-0.0047	0.0047	-1.00
(3) Household	10774	0.0619	0.0031	10774	0.0583	0.0032	-0.0036	0.0044	-0.82
(D) Variable poverty line equal to the equivalised Henderson annual budget, updated by PCHDI to the previous financial year									
(1) Income unit	13735	0.2098	0.0043	14772	0.2069	0.0054	-0.0029	0.0069	-0.42
(2) Family	13735	0.1641	0.0040	14772	0.1623	0.0049	-0.0018	0.0063	-0.29
(3) Household	13735	0.1501	0.0045	14772	0.1514	0.0047	0.0013	0.0066	0.20

Source: Author's computations using the Australian Bureau of Statistics' 1997-98 and 2002-03 Surveys of Income and Housing.

Note: All weekly equivalised disposable incomes and poverty lines are in $2002-03. All annual equivalised disposable incomes and poverty lines are in $2001-02.

Table 5: Changes in Poverty Rates, 1997-98 to 2002-03

Based on a Variable Poverty Line and the Henderson Equivalence Scale

	SIH-CURF, 1997-98			SIH-CURF, 2002-03			1997-98 to 2002-03		
	Poverty line ($) (1)	Poverty rate (2)	Standard error (3)	Poverty line ($) (4)	Poverty rate (5)	Standard error (6)	Change in poverty rate (7)	Standard error of change (8)	Z statistic (9)
(A) Variable poverty line equal to half the current median equivalised weekly disposable income									
(1) Income unit	205	0.0798	0.0033	223	0.0914	0.0030	0.0116	0.0045	2.59
(2) Family	221	0.0719	0.0031	239	0.0800	0.0030	0.0081	0.0043	1.87
(3) Household	225	0.0690	0.0030	243	0.0756	0.0031	0.0066	0.0044	1.52
(B) Variable poverty line equal to half the current mean equivalised weekly disposable income									
(1) Income unit	232	0.1089	0.0035	254	0.1247	0.0040	0.0158	0.0053	2.99
(2) Family	245	0.0958	0.0035	267	0.1169	0.0043	0.0211	0.0055	3.84
(3) Household	249	0.0920	0.0037	271	0.1153	0.0040	0.0233	0.0055	4.27
(C) Variable poverty line equal to half the median equivalised annual disposable income in the previous financial year									
(1) Income unit	10483	0.0938	0.0030	11709	0.1109	0.0040	0.0171	0.0050	3.43
(2) Family	11183	0.0771	0.0033	12422	0.0932	0.0037	0.0161	0.0049	3.26
(3) Household	11402	0.0734	0.0033	12624	0.0881	0.0038	0.0147	0.0050	2.92
(D) Variable poverty line equal to half the mean equivalised annual disposable income in the previous financial year									
(1) Income unit	11919	0.1290	0.0038	13211	0.1471	0.0048	0.0181	0.0061	2.97
(2) Family	12552	0.1155	0.0039	13812	0.1322	0.0041	0.0168	0.0057	2.97
(3) Household	12789	0.1168	0.0041	14002	0.1297	0.0041	0.0129	0.0058	2.22

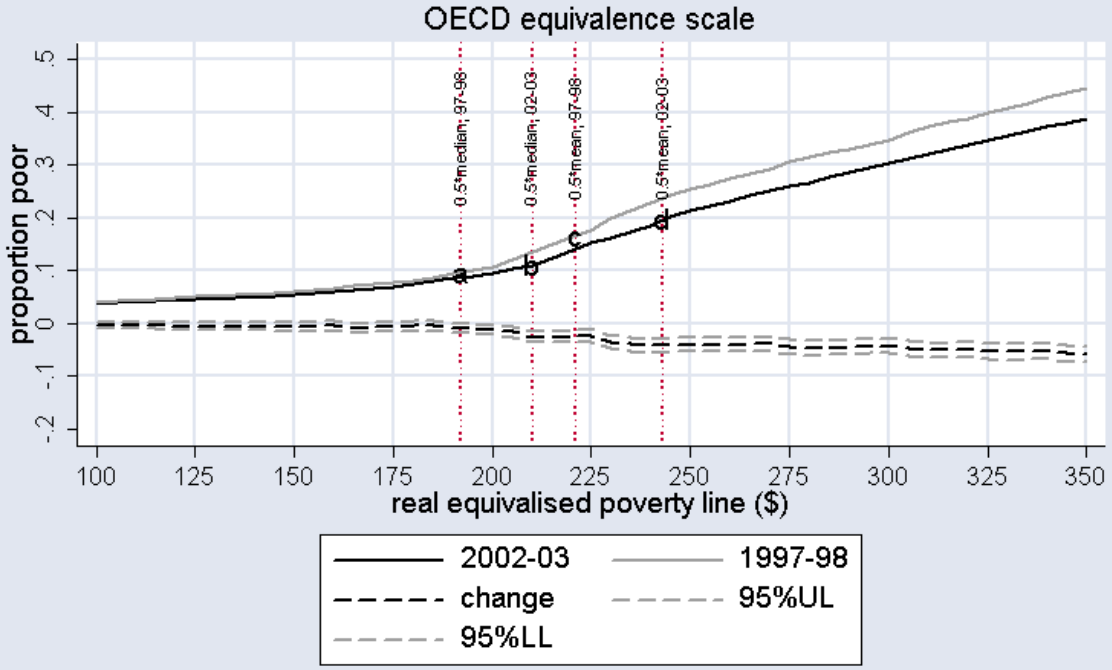
Source: Author's computations using the Australian Bureau of Statistics' 1997-98 and 2002-03 Surveys of Income and Housing.

Note: All weekly equivalised disposable incomes and poverty lines are in $2002-03. All annual equivalised disposable incomes and poverty lines are in $2001-02.

Table 6: Poverty-Line Labels in Figures 1 through 12

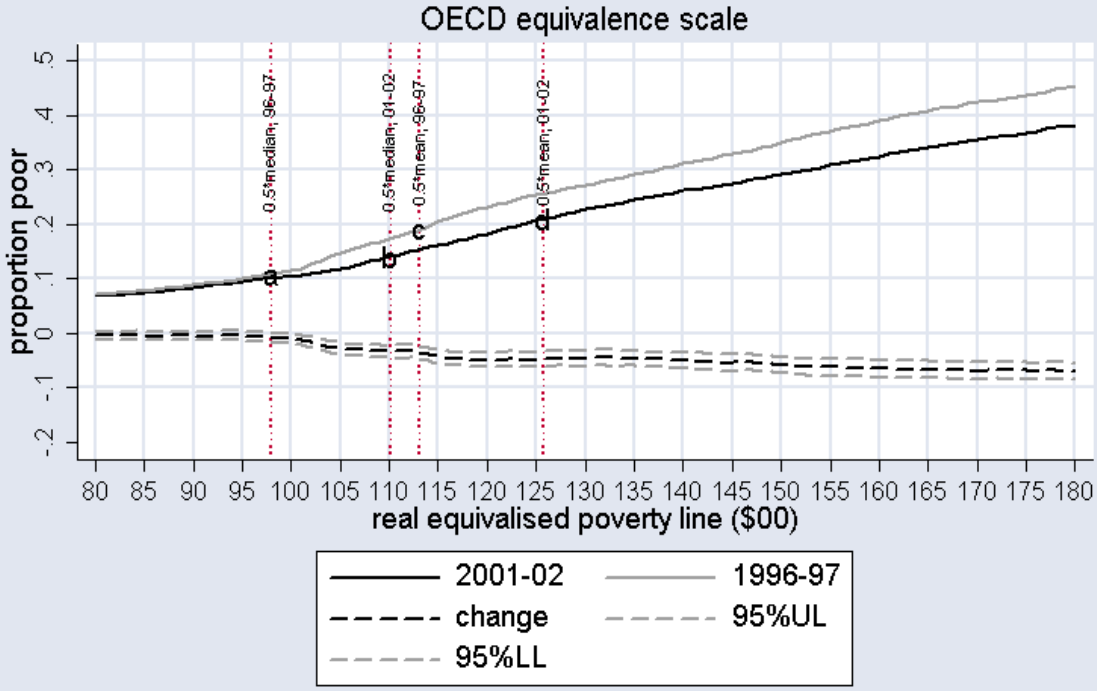
Table	Section	Column	Label in Figure	Figure
1 and 3	A	1	0.5 median, 97-98	1, 3 and 5
1 and 3	B	1	0.5 mean, 97-98	1, 3 and 5
1 and 3	C	1	0.5 median, 96-97	2, 4 and 6
1 and 3	D	1	0.5 mean, 96-97	2, 4 and 6
2 and 3	A	4	0.5 median, 02-03	1, 3 and 5
2 and 3	B	4	0.5 mean, 02-03	1, 3 and 5
2 and 3	C	4	0.5 median, 01-02	2, 4 and 6
2 and 3	D	4	0.5 mean, 01-02	2, 4 and 6
4	A	1 and 4	Henderson, CPI	7, 9 and 11
4	C	1 and 4	Henderson, CPI	8, 10 and 12
4	B	1	Hend, HDI, 97-98	7, 9 and 11
4	B	4	Hend, HDI, 02-03	7, 9 and 11
4	D	1	Hend, HDI, 96-97	8, 10 and 12
4	D	4	Hend, HDI, 01-02	8, 10 and 12
5	A	1	0.5 median, 97-98	7, 9 and 11
5	A	4	05 median, 02-03	7, 9 and 11
5	B	1	0.5 mean, 97-98	7, 9 and 11
5	B	4	05 mean, 02-03	7, 9 and 11
5	C	1	0.5 median, 96-97	8, 10 and 12
5	C	4	05 median, 01-02	8, 10 and 12
5	D	1	0.5 mean, 96-97	8, 10 and 12
5	D	4	05 mean, 01-02	8, 10 and 12

Figure 1: Poverty rates, IU real disposable weekly income



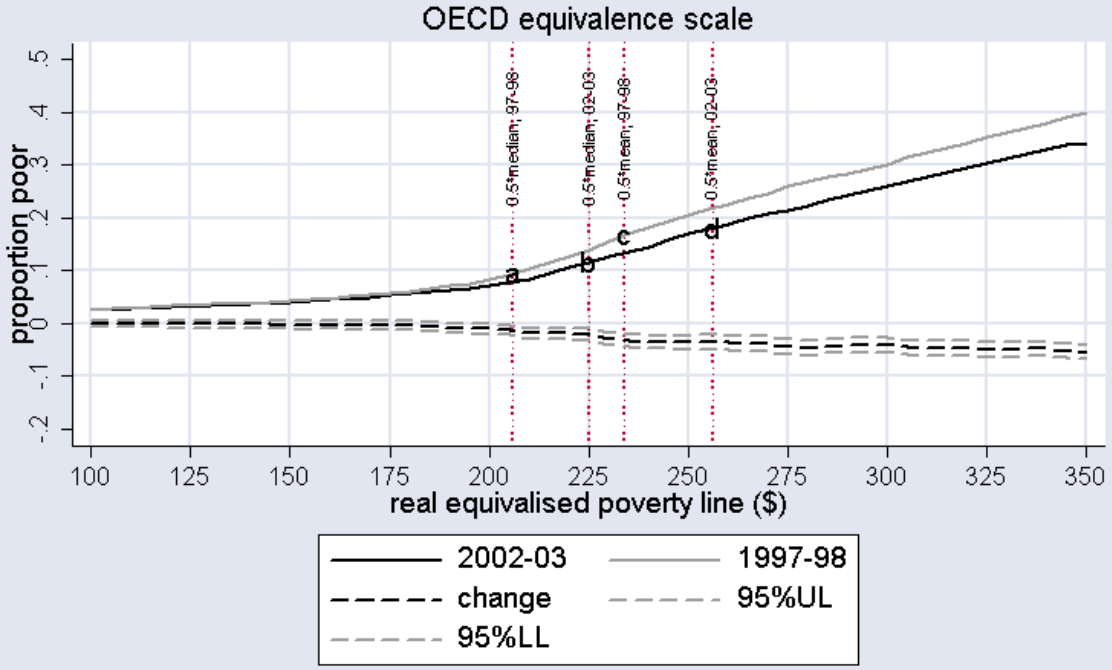
Data: ABS, SIH-CURF, 1997-98 and 2002-03

Figure 2: Poverty rates, IU real disposable annual income



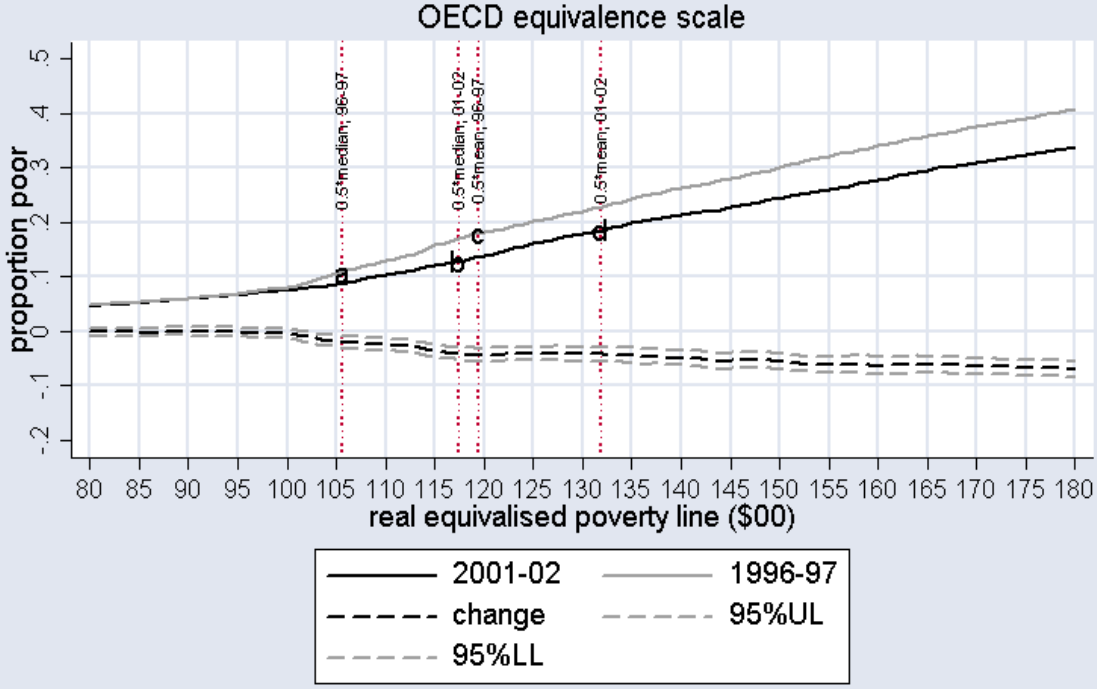
Data: ABS, SIH-CURF, 1997-98 and 2002-03

Figure 3: Poverty rates, Family real disposable weekly income



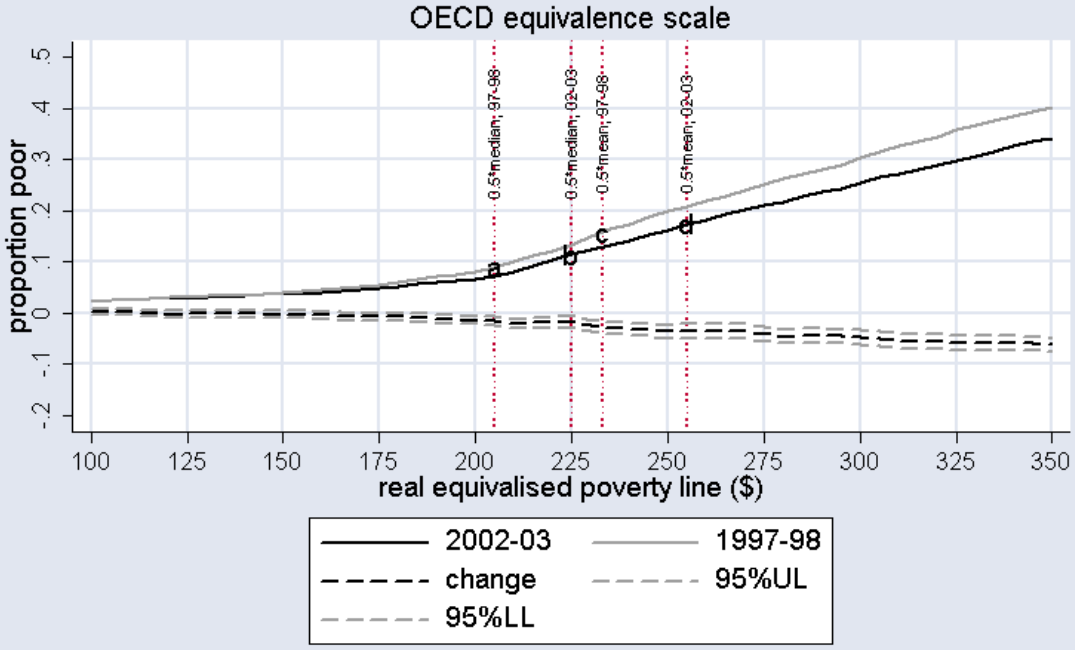
Data: ABS, SIH-CURF, 1997-98 and 2002-03

Figure 4: Poverty rates, Family real disposable annual income



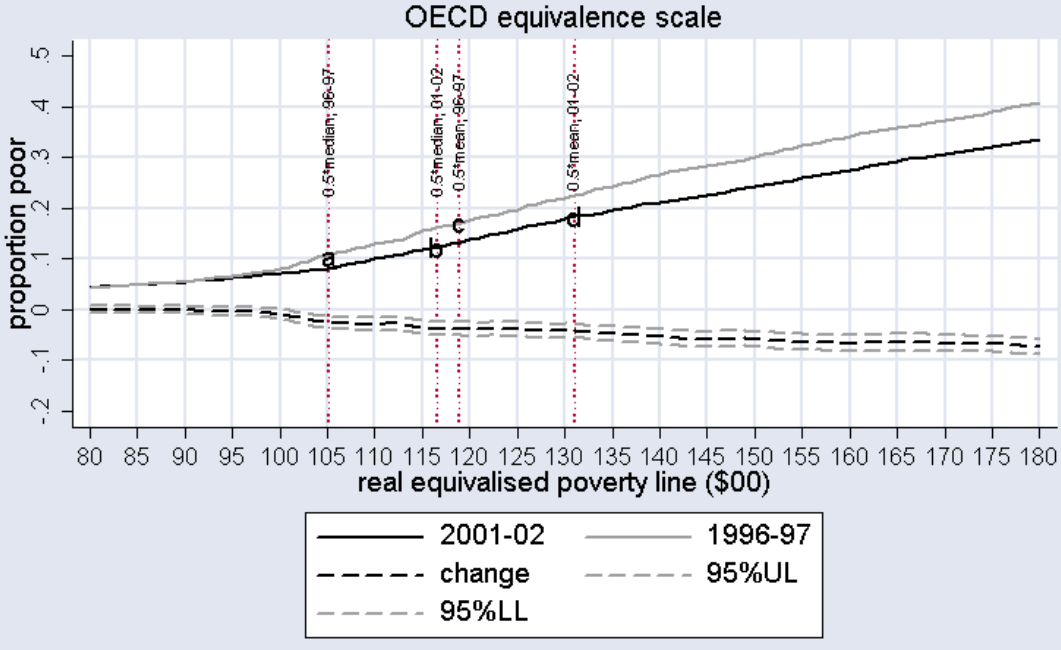
Data: ABS, SIH-CURF, 1997-98 and 2002-03

Figure 5: Poverty rates, HH real disposable weekly income



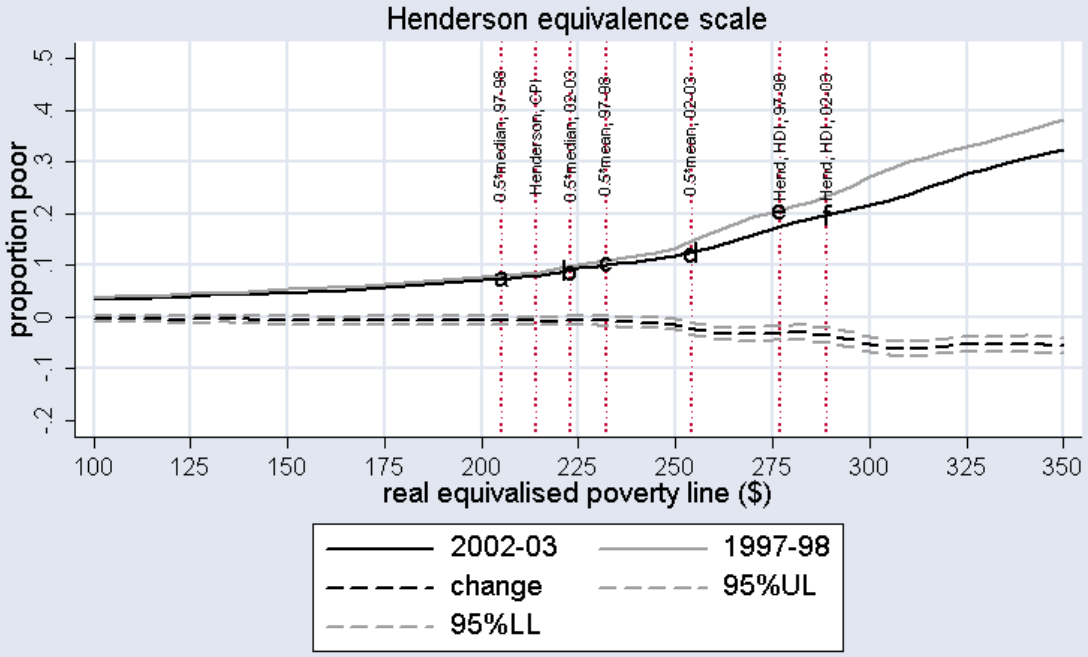
Data: ABS, SIH-CURF, 1997-98 and 2002-03

Figure 6: Poverty rates, HH real disposable annual income



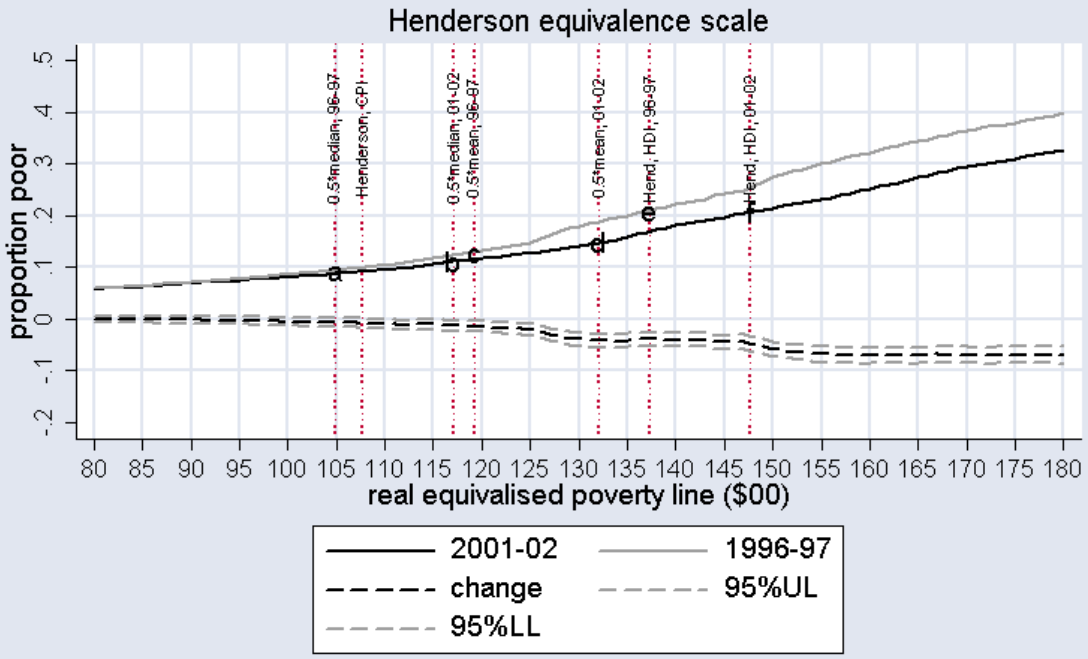
Data: ABS, SIH-CURF, 1997-98 and 2002-03

Figure 7: Poverty rates, IU real disposable weekly income



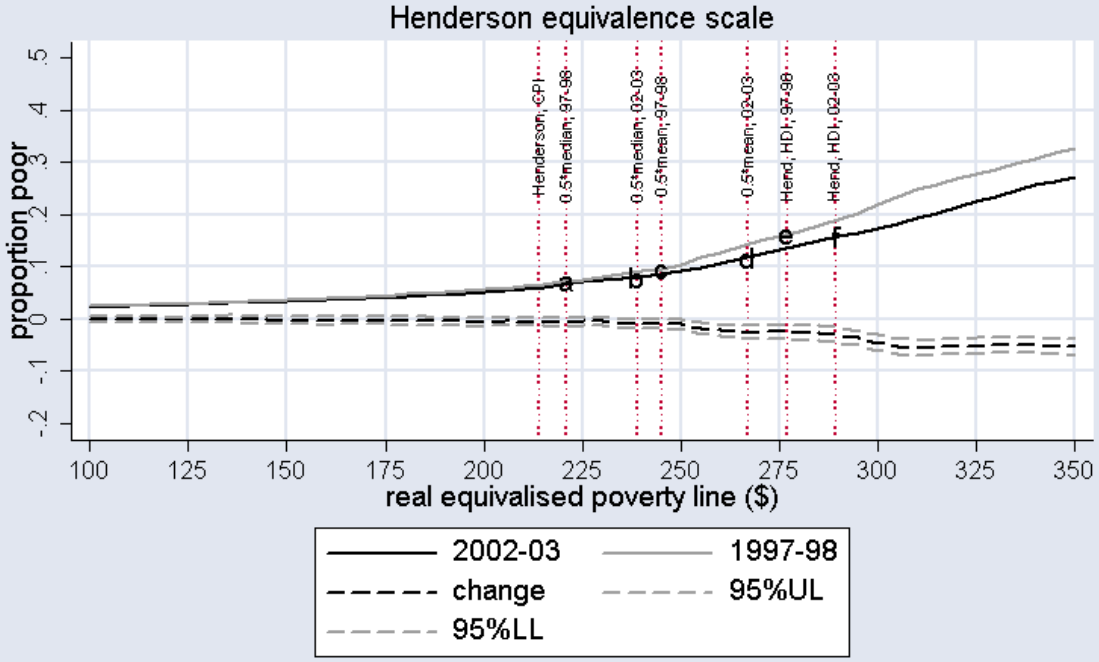
Data: ABS, SIH-CURF, 1997-98 and 2002-03

Figure 8: Poverty rates, IU real disposable annual income



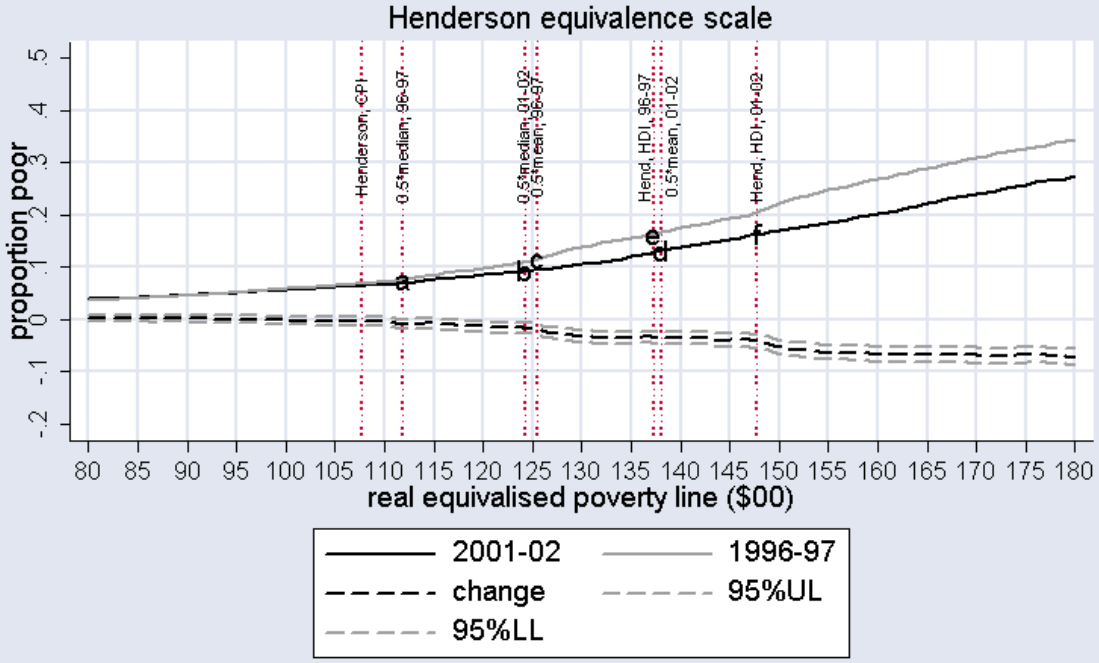
Data: ABS, SIH-CURF, 1997-98 and 2002-03

Figure 9: Poverty rates, Family real disposable weekly income



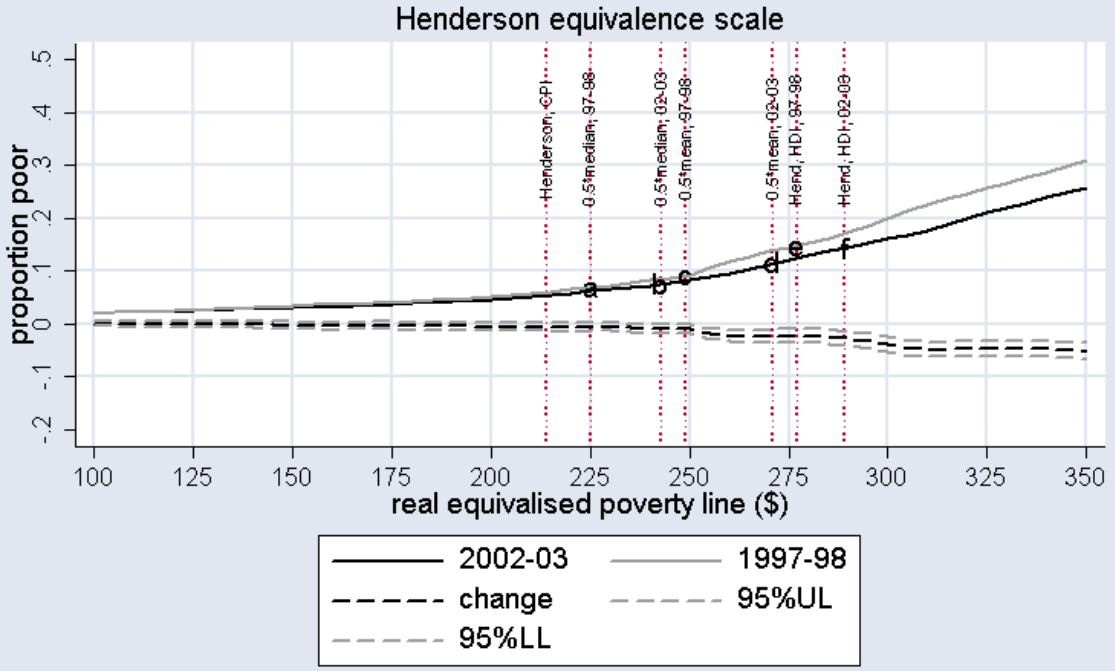
Data: ABS, SIH-CURF, 1997-98 and 2002-03

Figure 10: Poverty rates, Family real disposable annual income



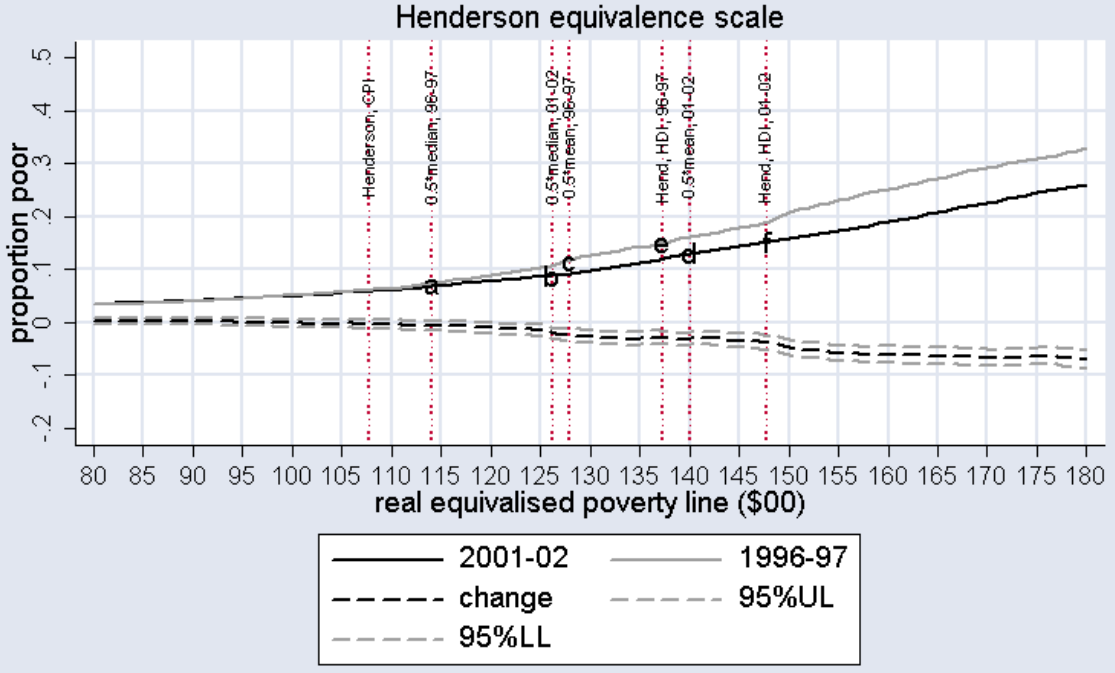
Data: ABS, SIH-CURF, 1997-98 and 2002-03

Figure 11: Poverty rates, HH real disposable weekly income



Data: ABS, SIH-CURF, 1997-98 and 2002-03

Figure 12: Poverty rates, HH real disposable annual income



Data: ABS, SIH-CURF, 1997-98 and 2002-03