

For the Student

Poverty Lines and the Measurement of Poverty

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1. Introduction

Modern interest in poverty can be traced to the concern of social observers such as Booth and Rowntree in Britain in the last part of the last century. From those times social policy analysts found it useful to focus debate through reference to minimum desirable levels of income or poverty lines. People whose income failed to attain the poverty line appropriate to their family size and structure were said to be in poverty. Professor Henderson advocated just such a set of poverty lines in the Commission of Inquiry into Poverty in 1975 and since then these poverty lines have been widely used in Australia.

Limitations of both the general idea of poverty lines and the specific character of the Henderson poverty lines have been much discussed in the academic literature in Australia. Much of this criticism has been well meaning and well made and there have been several good recent reviews of the issues.¹ While conceptual and methodological issues relating to poverty lines have been well discussed the precise applicability of particular poverty lines to the measurement of poverty has been less clearly acknowledged. It is my contention that confusion about this lies at the root of residual disagreement concerning poverty lines. In this article the debate is reviewed, necessarily re-

peating much that is already known, in order to develop arguments concerning the appropriate application of poverty lines especially in regard to the measurement of poverty.

Poverty lines have two main roles. First as a standard of adequacy they provide a measuring stick with which to compare individual circumstances, and second, they are a useful and important component in the process of measuring poverty.² However with respect to both the provision of a standard of adequacy and as an input to the measurement of poverty, poverty lines act in a representative fashion.

They are representative both because they rely on a small number of situations to cover the infinitely varying circumstances of families and because they employ the values of the researcher. There is no objective measure of poverty or of poverty lines and value judgments are intrinsic to both. Such judgments occur in the definition, in the process of measurement and in the assessment and discussion of the measurements. *Since judgments are intrinsic it is important that they be made explicit in all reporting and discussion.*

In the remainder of this section I discuss the construction of poverty lines. In the second section I review the properties and uses of poverty lines as a standard of adequacy and in the measurement of poverty. In the third section I discuss the use of poverty lines in Australia, particularly considering the Henderson poverty lines. Recent debate about measurements of poverty in Australia is outlined in the fourth section. Differences in measurements are shown to be mainly a consequence of different views about poverty rather than errors in methodology. Limitations of existing poverty lines

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apparent from this debate suggest further work, also discussed in this section. In the fifth and final section I sum up and make some concluding comments including an outline of further research.

1.1 Construction of Poverty Lines

Poverty lines have three components. First, there is a benchmark level which is set for some reference family type at some point in time and reflects what is thought to be a reasonable minimum income for that family at that time. Second, there is an index for translating the benchmark for the reference family to benchmarks for other families of different structure and size. The index is called an equivalence scale. Third, there is a method of translating the poverty lines to some different time, or a method of updating.

The three components are associated in the following way:

$$\text{poverty line}_{i,t} = \text{benchmark poverty line} \times \text{equivalence scale}_i \times \text{updating index}_t \quad (1)$$

Equation (1) is applied to calculate the poverty line for family type i in period t . For instance suppose the benchmark poverty line is that for a reference family of two adults and two dependent children, where the head is working in the March quarter of 1994. This has a value of \$392.84 per week after tax. We may be interested in knowing the poverty line for an elderly single person in the June quarter of 1990. The table of equivalence scales might show that an elderly single person will achieve the same level of wellbeing as the reference family with 0.43 of its income. The table for the updating index might show that it moved from a value of 271.9 in June 1990 to 303.8 in March 1994. Hence we can find values for June 1990 from the March 1994 values by applying the ratio (271.9/303.8) to the value for March 1994. Applying equation (1) the poverty line for the elderly single person in June 1990 is calculated as \$151.18.

Some possible choices for the benchmark poverty line include the minimum wage for an

unskilled full-time job for an adult, the level implied by social security pensions and benefits, a percentage of mean income, and a percentage of median income. Choices for calculating equivalence scales include scales based on budgets defined by experts, the scales implied by levels of social security benefits and pensions, scales based on expenditure data and consumer demand theories, and scales obtained from undertaking surveys of opinion. Choices for an updating index include average weekly earnings (AWE), household disposable income per capita (HDIPC), the consumer price index (CPI), the GDP deflator, and the change in median income.

A further important choice concerns the unit to which the poverty line refers. Since poverty lines are primarily related to income the most obvious choice of unit is the grouping within which income is shared. This is conventionally known as an income unit and many measurements of poverty have been carried out in relation to this definition. Income units may be single persons or families composed of one or more parents with or without dependent children. Problems may arise in relation to the treatment of non-dependent offspring living at home. Frequently offspring are adult sons and daughters who may be students or in the workforce. In any event they often receive large implicit support from their parents and a measure of their circumstance which did not take this into account would overestimate poverty. Since it is generally not possible to measure the size of the support involved the best way to counter this problem is to consider the circumstance of a broader unit which includes the whole household.

Poverty lines are often spoken of as either absolute or relative. Absolute poverty lines are those which are developed for particular persons or families without reference to other persons or families. The archetypical example is poverty lines defined according to physical criteria such as the nutritional or housing requirements for maintaining health. By contrast relative poverty lines are defined for an individual or family according to the social environment within which the individual or family lives. A good example is poverty lines defined

as a percentage of the average income of the whole society. Of course many poverty lines may incorporate both absolute and relative notions.

With regard to the updating indexes, the use of cost-based indexes such as the CPI, which preserve the purchasing power of the poverty lines, would be appropriate in the definition of absolute poverty lines. By contrast the use of income-based updating indexes such as HDIPC, which preserve the relativity between poverty lines and mean income, is appropriate for the definition of relative poverty lines.

The construction of the poverty lines suggests they will be subject to the following limitations:

- (i) Poverty lines are *subjective*; there is no way of estimating poverty lines on a value-free basis.
- (ii) Poverty lines are *estimates*; since some of their elements depend on aggregate indexes such as those from the national accounts it may be necessary to revise them when national accounts are revised.
- (iii) Poverty lines are *averages*; the poverty lines are normally computed for a very small subset of all possible descriptions of households consequently their application to particular situations must always be circumspect.
- (iv) Poverty lines are based on *income*, an indirect measure of standard of living, whereas poverty is an experience more concerned with expenditure. Expenditure is said to provide a direct measure of the living standard. Also no account is taken of the wealth of persons or families.
- (v) Poverty lines are *summary* measures; whereas poverty is multifaceted and multi-dimensional, poverty lines have been based on a single money scale, though there is nothing precluding the use of poverty lines based on an index which is a weighted average of scores on measures in many dimensions.

These five limitations summarise most of the general criticisms of poverty lines.

2. Properties and Uses of Poverty Lines

2.1 Criteria for Poverty Lines

In what sense may poverty lines represent a standard of adequacy? The most demanding requirement would insist that any family with income below the poverty line would have insufficient while all families above it had sufficient. But poverty lines are defined on just a handful of variables—whereas there are very many factors which affect standards of living. The Henderson poverty lines, published by the Institute of Applied Economic and Social Research (IAESR), distinguish families of single adults with from zero to three dependents and couples with from zero to four dependents all with the head or reference person working or not working—a total of 18 family types. At best such a small number of situations can only be representative of standards of adequacy. So the role of poverty lines as standards of adequacy in no way guarantees that individuals can directly compare their particular circumstance with poverty lines; in many situations it may be necessary to extrapolate from the published poverty lines.³ Thus the role of the poverty lines as a general guide is reinforced and their usefulness as a measuring stick boils down to whether they are a reasonable guide.

Given the previous discussion the following are appropriate criteria for assessing the usefulness of poverty lines both as a standard of adequacy and in the measurement of poverty:

- (i) The first and most important requirement is that the level of the poverty lines should represent the community's consensus view of adequacy.
- (ii) A second and uncontroversial requirement is that they be related to contemporary standards.
- (iii) A third requirement is that they be transparent—their origins and calculation should be readily understood, and given

the problems of establishing a consensus view they should be relatively easy to update over time.

- (iv) Finally, given that an important role is to check the level of pensions and benefits paid by government through the transfer system, a useful criterion is that their calculation should be unrelated to government social security payments.

2.2 *Poverty Lines in the Measurement of Poverty*

Much academic criticism of poverty lines concerns the way they are used in the measurement of poverty.⁴ It is helpful to consider the criticism at three levels: a conceptual level, a methodological level, and an application level.

2.2.1 *Conceptual Issues*

Criticisms include those related to the use of any *summary* measure; those related to a particular summary measure, such as *income*; and those related to a *particular* definition of income. A further important issue concerns the *consistency* of the income measure chosen in determining the level of the poverty line, the method of updating and in establishing the income of the family unit in focus.

Criticism of the use of a summary measure of poverty really refers to the limitations of using a single dimensioned concept (poverty lines) to capture a concept that has many dimensions (poverty). Poverty concerns the living conditions of the poor—their material welfare (as indicated by the nutrition, the standard of shelter, the standard of health and the comforts available to the poor) and their social welfare (the network of friends, relatives and institutions which provide a support system). Each facet of living conditions may be measured in a different unit, for instance income is measured in money, health is measured in average life expectancy, opportunity is measured in years of schooling and so on. Economic studies commonly assume that these units may be expressed in a common metric, most usually money.⁵

Even accepting that it is possible to measure poverty in a single dimension the most logical such summary measure is expenditure or imputed expenditure whereas in most circumstances the measure available is income. Income will only be a reliable proxy for expenditure when poor households spend in the same way as does the community as a whole.

It may be argued that income is the only practical measure available. In most circumstances a cash measure of income is used and while this measure is particularly narrow, for very many situations it will do well enough (as demonstrated by Travers & Richardson 1990, p. 32).

Saunders (1994) noted that there may be problems ensuring the consistency of income measures used in the various facets of poverty line calculation. For instance measured poverty may rise because the national accounts based measure of HDIPC, which may be used to adjust the poverty line, is broader in scope than the income concept in the Australian Bureau of Statistics (ABS) income surveys (Manning 1982). The two measures of average income may thus follow divergent trends. Between 1981–82 and 1989–90 for example the national accounts estimate of HDIPC increased by 8.95 per cent in real terms whereas the same measure derived from the ABS income surveys rose by only 7.16 per cent in real terms.

Mitchell and Harding (1993) amplified this point. In particular they noted that HDIPC includes an amount for the imputed value of housing and for employer contributions to superannuation, and part of the increase in HDIPC in recent years has been a result of changes in these. They argue that superannuation is generally not relevant to the incomes of the poor or the concept of income embodied in the poverty line. However a counter argument is that since the updating index seeks to reimburse the poor for changes in general economic wellbeing and not merely continue the degree of impoverishment, this definition is appropriate.

2.2.2 *Methodological Issues*

The second round of criticisms relate to the methodology involved in the construction of

the poverty lines used in specific poverty measurements; in particular the relevance and meaning of the three constituents of poverty lines: the level chosen for the reference family, the equivalence scales used for translating across family types and the means of updating over time.

The arguments discussed in Section 2 concerning the income level chosen for the reference family and the equivalence scales used to translate the benchmark poverty line to other family types are also relevant here. Ideally we should like to use poverty lines which have consensual support but which are affordable. The consensus support should exist for the level of the reference poverty line and for the equivalence scales.

In the discussion of the use of poverty lines as a standard of adequacy I have pointed out that most researchers would accept the argument that poverty is relative and therefore poverty lines should be updated by a relative means. This same argument applies to establishing some base point from which to measure poverty. It does not, however, necessarily apply to the designation of poverty lines within the study period. This latter situation is dependent on the purpose of the study.

In the process of measuring changes in poverty over time the method of updating is determined by the purpose of the analysis. If it is desired to measure say government performance, then it may be sensible to use an updating method, within the study period, which holds the purchasing power of the poverty line constant such as the CPI. In other situations a relative measure is appropriate. For instance the change in poverty over time based on poverty lines updated by relative measures, such as HDIPC, is a particular measure of inequality which is not influenced by changes in inequality among the rich. For some purposes this is a particularly appealing measure of inequality.

2.2.3 Problems in Application

The final area of criticism concerns the way in which poverty lines are used in the calculation of poverty. First, Atkinson (1987) made the point that over very many reasonable choices

for the level of the poverty line, policy conclusions from comparisons across populations or over time will be the same since proportional differences in income among different groups will be preserved. His findings are broadly supported with Australian evidence by Bradbury and Saunders (1990, p. 36). Hence the necessary and subjective choice of the level of the poverty line does not preclude sensible measurement of *trends* in poverty.

Second, there are concerns about the use of particular *indexes* of poverty. By far the most common method of measuring poverty is to estimate the number of people below the poverty line. Indexes based on this method are known as head-count indexes and the values of the indexes are called poverty rates. Poverty rates, however, take no account of the extent to which poor people are poor. A family with income one dollar below the line is recorded as having the same amount of poverty as one with income one hundred dollars below the poverty line. Use of poverty rates to measure poverty leads to perverse policies in which governments aim to alleviate poverty by concentrating on families just below the poverty line rather than those a long way below the poverty line. To eliminate this problem an alternative index, sometimes known as the poverty gap measure, is used to calculate the total income shortfall. This index measures the total amount of income required to alleviate all poverty.

However welfare and utility are not linearly related to income. For most individuals and families the greater the income the smaller the marginal utility of income. Concomitantly the greater the income shortfall of a poor family the higher the marginal disutility of income. The availability of unit record data makes feasible the estimation of more complex indexes of poverty which account for not only the number of people that are poor and the average extent of their poverty but also the distribution of income within the poor population. This class of indexes has the desirable property that greater weight is placed on successive increments of income shortfall. These indexes may be known as deprivation-weighted poverty indexes or weighted indexes for short.

The three classes of poverty index discussed above are illustrated in Appendix 1 for a hypothetical population. The interpretation of each of the indexes and of differences between them are also illustrated.

The way in which poverty indexes are reported is also important irrespective of the index used. Conventionally the value of poverty rates are quoted. Population *x* is said to contain a level of poverty of *y* per cent. But because of the degree of clustering around the level of the poverty line (see Mitchell & Harding 1993, p. 416; Saunders 1994, p. 258) quotation in this way is very problematic. Which-ever method is used to calculate poverty lines will involve a high degree of subjectivity. It is much safer to use measurements of poverty in an explicitly comparative way. For instance, population *x* has *y* per cent more poor people or more poverty than population *z*, or over a period the amount of poverty in population *x* increased by *y* per cent. It is perhaps fortunate that values of the most desirable type of poverty index, the weighted index, have no intuitive interpretation and consequently discussion is forced to be explicitly comparative. Similarly poverty gap indexes, when used with equivalent income, also have no easy interpretation and discussion relating to them must also be explicitly comparative.

3. Australian Poverty Lines

3.1 Development

The most widely used poverty lines in Australia are those suggested by Professor Henderson and the discussion here will be restricted to them. The benchmark level of the Henderson poverty lines originates from the determinations of the Australian Arbitration and Conciliation Commission. Until 1966 this Commission was legally empowered to use procedures of arbitration and conciliation to fix the minimum wage rate for unskilled manual workers in Australia. Known as the basic wage the initial level was set in 1907 by Justice Higgins and was stated to be the income needed by a worker to support a wife and three children. However over the following sixty years its determination

was influenced by the ability of employers to pay it, as well as the needs of workers. In any case the needs of the worker and his family were not determined in a consistent and objective way. The involvement of competing interests (employers, workers and government) in the process of determination involves, arguably, aspects of both consensus and affordability.

Henderson adopted a poverty line equal to the basic wage for a family of two adults and two dependent children where the head of the household was working. This became the reference or benchmark poverty line. Henderson used equivalence scales of budgeted standards derived for New York in 1954 to determine the relativities between poverty lines for different family types. Since their first use, the Henderson scales have become the most widely used scales in Australia. They are published on a quarterly basis by the IAESR (see, for instance, IAESR 1995) and a recent description of their construction is given in Johnson (1987).

The Henderson poverty lines employ a cash notion of income. Income is restricted to money received from all sources and includes wages, salaries and supplements; government benefits, pensions and allowances; income from rent, dividends and interest; and income from partnerships and business. In an alternative view of income, allowance is also made for the imputed value of the services flowing from assets such as housing, the imputed value of voluntary leisure, and the value of non-cash contributions to the standard of living such as government provision of health or education and home produce. Income which includes amounts for these is known as full income.

Initially the Henderson poverty lines were updated by movements in AWE but since 1980 they have been updated by changes in HDIPC. HDIPC was thought to be a more consistent updating tool because it reflects movements in all household incomes rather than just those of people on salaries and wages. HDIPC is also unaffected by changes in the participation rate of households and to changes in the relative tax burden of households. The shift to HDIPC has made some difference to the movement of the poverty line over time. Whereas in 1973–74 the

poverty line for the reference family of a couple with working head and two dependent children was 56.8 per cent of AWE by 1992–93 the reference poverty line had risen to 61.6 per cent of AWE.⁶

The Henderson poverty lines have attracted a lot of criticism right from their initial uses in the Commission of Inquiry into Poverty in Australia. The criticisms are generally more related to their use in the measurement of poverty but Edwards and Whiteford (1988) also stressed concern about use of the lines as a standard of adequacy. There have, however, been few alternatives, and none has had the general appeal in either the academic community or among the general public to rival the Henderson poverty lines. The most obvious alternative is that implied by the levels of social security pensions and benefits actually paid to pensioners and beneficiaries. These have the support of government but their use in academic work is limited because they can never be an independent reference and also because they are subject to unpredictable and sometimes idiosyncratic movement. Whenever a particular benefit or pension is changed with respect to all others or whenever a new allowance is made available, the implied equivalence scales change.

Researchers have suggested other possibilities. These include variations in both the level of the poverty line, the equivalence scales to measure poverty among households of different type, and in the method of updating the poverty line in the calculation of poverty. Harding and Mitchell (1992) have employed poverty lines set by a percentage of the median income, a standard frequently used in overseas studies.⁷ Many researchers have estimated alternative equivalence scales; for instance Podder (1971), Kakwani (1977), Social Welfare Policy Secretariat (1981), Binh and Whiteford (1990) all estimated equivalence scales based on the application of theories of consumer demand to household expenditure data. The median income standard implies an updating index based on changes in the level of median income. Most researchers have accepted that poverty lines are relative and ought to be updated by a relative standard such as HDIPC but

as has been mentioned AWE was employed in the earlier calculation of the Henderson poverty lines.⁸

3.2 Evaluation

How do the Henderson poverty lines compare with the criteria for standards of adequacy and for use in the measurement of poverty described in Section 2? In considering them it is useful to separate the issue of the level of the poverty lines, as indicated by the reference poverty line, from the issue of equivalence scales and from the matter of the updating index.

Previously it has been inferred that the derivation of the Henderson poverty lines from the basic wage implies some measure of consensus and affordability. A consensus poverty line would ideally be derived from the views of some representative cross-section of the population. Saunders and Matheson (1992) describe a poverty line developed in such a way. The main problem with deriving such a consensus is that noted by Hagenars (1986, p. 43), 'people, will always nominate a high level of minimum income when they themselves don't have to pay it'. However since employers' ability to pay considerations are inherent in its initial determination, the level of the Henderson poverty line can be argued to at least pay some respect to affordability. Nevertheless it is now over thirty years since this affordability was put to the test and the consensus basis of the Henderson poverty line relies on a rather limited grouping of Australians, namely those involved in the arbitration process.

There is other support that the level of the Henderson poverty lines does represent a reasonable measure of minimum income for the reference family. First, in spite of the many criticisms of them, they have endured as easily the most widely used measure in Australia. Second, they are broadly within the range of levels of minimum income used in other countries which are comparable in living standards to Australia. In Europe a commonly used standard is 50 or 60 per cent of median equivalent income. Harding and Mitchell (1992) quote a poverty line level for a single person set

at 50 per cent of equivalent disposable median annual income of \$4467 in 1985–86 and 46 per cent higher than this in 1989–90. So by their methodology the poverty line for a single person in 1989–90 was \$6521 at 50 per cent of median annual income and \$7826 at 60 per cent of median annual income. By comparison the poverty line for a single person in work using the Henderson methodology was \$8603 and \$6974 for a single person not in work, representing respectively 66 per cent and 53 per cent of median annual income.

The poverty line for the reference family may meet the consensus criteria but what about the poverty lines for other family types? Whiteford (1985, p. 102) undertook a detailed comparison of 60 sets of equivalence scales including the Henderson equivalence scales.⁹ Whiteford also provided a comprehensive critique of these sets of equivalence scales outlining their individual strengths and weaknesses. He suggested appraising the many alternatives on three tests: theoretical validity, empirical validity and consensual validity. Theoretical validity refers to the logical consistency, comprehensiveness, realism of underlying behavioural assumptions and the role of subjective judgments in the construction of the scales. Empirical validity refers to the extent to which the scales are correct or given that it is not possible to ascertain correctness, the extent to which they accord with reasonable notions about the scales. Consensual validity refers to the public acceptability of the scales. Whiteford stated that none of the 60 scales met all three tests.

In summarising Whiteford's results, Saunders (1994, p. 251) compared the Henderson scales with those of the middle third of all of the 60 equivalence scales. He showed that the Henderson relativities for particular families were mostly within this middle third and values for families which were outside it were only just outside it. In terms of Whiteford's criteria this would suggest that the Henderson scales meet the test of empirical validity.

While the Henderson equivalence scales may be reasonable estimates of the relativities between family types in Australia, there is no evidence that they represent a consensus.¹⁰ The

Henderson poverty lines, however, do meet the other three criteria set out in Section 2. The method of updating ensures that they will always be related to contemporary standards. The origins of the poverty lines are also well known so the methodology involved in their calculation is transparent. Finally the lines are not determined with reference to the level of government pensions and benefits.

In relation to the updating index, a distinction is drawn between the use of an updating index in the evaluation of changes in poverty over time and its use in establishing some initial benchmark level of poverty. In the following paragraph I am concerned only with the latter situation.

Earlier several updating options for the establishment of a base set of poverty lines have been nominated: movements in the CPI; movements in HDIPC determined from national accounts; or the option suggested by Harding and Mitchell (1992), movements in median disposable income determined from income surveys. Any set of updating scales will be a proxy for determining a new consensus level for poverty lines at a later date. That is, ideally a new level for poverty lines at later points in time ought to be derived in the same way as the level is first established. The reasons for adopting an updating index are essentially pragmatic; does there exist a time series of data which will do the job with a minimum of problems?

One possibility is the change in HDIPC. This provides a broad-based, after-tax measure of change in household fortune but suffers from other problems including a pragmatic consideration; values for a particular quarter are estimates and are subject to (sometimes large) adjustment in later quarters. More recently it has been suggested that the change in median income provides a plausible updating index. However this method relies on having available a distribution of income from which the median may be calculated. Since such distributions have only been available on an intermittent basis it has not generally been possible to produce, say, quarterly updates of median poverty lines.¹¹

The rationale for using an income series rather than cost series is that a relative standard

rather than an absolute standard is relevant in the setting of poverty lines over time. The poor should receive a share in any increase in economic fortune (and concomitantly ought to shoulder a share of the burden should the economy go into decline). Thus adequacy is defined in terms of relative contemporary standards.¹²

The limitations of the role of any small set of poverty lines have already been discussed. This is accentuated by changes in household organisation over the last few decades which mean that the sets of family types devised a generation ago no longer represent all households in the community. For instance there are now many family types with multiple income earners.

In summary I conclude that the Henderson poverty lines meet the criteria listed in Section 2 tolerably well and remain useful as a standard of adequacy¹³ and when used appropriately, in the measurement of poverty. However I also note that it is likely that there will be other choices of poverty line which may also meet these criteria to the same degree.

4. Updating and Some Recent Differences in Poverty Measurements

Recent interest in the discussion of poverty lines has been related to the measurement of poverty in Australia over the period of the 1980s. Two teams of researchers have published articles in which they make quite different measurements of poverty over this period. Both teams employ data from the unit records of the ABS income and housing and income distribution surveys but with some critically different assumptions. Harding and Mitchell (1992, Table 4) present a picture of poverty rising in the period 1981–82 to 1985–86 then falling in the following four years to 1989–90 to either below or just above their 1981–82 value depending on the equivalence scales used. By contrast Saunders and Matheson (1993, Table 2) present a picture of poverty rising over the whole period which they term the ‘ever-rising tide’.¹⁴ Some of the differences between the two measurements of poverty are apparent from the two articles on this matter, and a rejoinder by Mitchell and Harding (1993) to the

Saunders and Matheson (1993) comment. However one aspect of the varying approaches, the choice of within study period method of updating, is not well developed in these articles and it is this matter which is pursued here. In the process I shall demonstrate why the divergence of results in the two approaches is not surprising.

In their 1992 article Harding and Mitchell measure poverty using a poverty line defined as a percentage of median income. Thus the initial benchmark level of their poverty line is the percentage of median equivalent income of a single person at the starting period of the analysis (1981–82), and the method of updating within the study period is the change in median income. Harding and Mitchell use two sets of equivalence scales: the OECD scales and the mean of the scales surveyed by Whiteford (1985). By contrast Saunders and Matheson (1991) use the value of the Henderson poverty line as the initial level of the poverty line and it is updated by changes in HDIPC. Saunders and Matheson were unable to replicate the Harding and Mitchell (1992) results in their 1993 comment on the Harding and Mitchell article, although they do identify many differences in assumptions. These included different ways of treating the data—the choice of the unit of analysis, which households or families were excluded, how tax was treated and so on. In the end they concluded that residual difference was due to further unknown rearrangements of data.

It is, however, possible to understand why differences between the two studies may emerge without nailing them down to particular treatments of the data. The differences may largely be due to the selection of the method of updating during the study period, and this would not be inconsistent with the conclusion made by Saunders and Matheson since the updating method used by Harding and Mitchell is endogenous to the treatment of the data.

During the eight years of the study period the purchasing power of the Henderson poverty lines rose by about 11 per cent, while the purchasing power of Harding and Mitchell’s median equivalent income rose by about 7 per cent.¹⁵ Over the same period income inequality

increased when measured by a range of indexes (see Johnson 1996, Tables 9.2 & 9.4). Consequently measures of average income would have risen faster than measures of median income and it would not be surprising to find that poverty measured using a poverty line updated by mean incomes will rise (or fall less) while poverty measured using a poverty line updated by change in a percentage of median income falls.

The assumptions about the means of updating represent different ways of viewing poverty and all may be valid depending on the purpose. If the purpose is to evaluate the success of public policy in improving the absolute standard of living of the poor then the appropriate updating index within the study period is surely one which holds the purchasing power of the poverty line constant, such as the CPI. If the purpose is to evaluate changes in the relative standard of living of poor people then an updating index which maintains the relative standard of living of the poverty line, such as HDIPC, would be appropriate. The use of an updating index such as the change in median equivalent income offers another means of relative updating but in this instance the relativity applies to the rank of poor incomes; that is, updating by median income will maintain the rank of persons with income at the level of the poverty line. With this updating index, divergence (or convergence) is allowed between average incomes and median incomes. If the divergence between mean and median income is sufficiently great the purchasing power of the poverty line updated by median income may even fall, although mean real income has risen.

The HDIPC measure is concerned with relativity with respect to change in mean income or, expressed another way, the average capacity of the economy to pay. It would be appropriate where it was desired to maintain the relative standard of living of poverty line income. However when the poverty line is updated by changes in median income there is no guarantee that relative income accruing to a person on poverty line income will be maintained. The median income measure is concerned with maintaining the relative position of the poor with respect to the position of all other mem-

bers of the society but not the relative income of the poor relative to the income of other members of the society. Some of the properties of these two updating measures are explored with some simple examples in Appendix 2.

5. Concluding Comments

5.1 Uses and Limitations of Poverty Lines

There are two main uses of poverty lines. First, given their general acceptance they act as a point of comparison of adequacy not only for the level of benefits and pensions but also for any portfolio of income earned by a family. For this purpose the relevant poverty line is that for the appropriate family type updated in a relative way to the point in time to which the income earned by the family is calculated. Second, the poverty lines are important components of the rather more complex process of assessing differences in poverty between groups and changes over time generally with some explicit or implicit policy motive. The role of poverty lines in the measurement of poverty is summarised as principally to *focus* on a representative sample of the poor.

In establishing an initial point from which to evaluate change the (relative) Henderson poverty lines are adequate. However the updating method appropriate within the study period is dependent on the specific purpose of the assessment. If the purpose of the comparison is an appraisal of government policy over a period of time then it would seem sensible to use an absolute method for updating during the period of appraisal. Using a relative method such as HDIPC during the appraisal period will essentially restrict poverty measures to measures of inequality in which poor families are compared to non-poor families. Other more complicated 'poverty indexes as inequality measures' are possible when for instance the poverty line is defined as a percentage of median income.

While cash income is the common metric of poverty measurement there is no reason why some other metric such as full income or one composed of a suitably weighted index of the standard of living measured in different

dimensions could not be used to measure poverty. In relation to cash income, the key point is whether for a *particular* application it is a reasonable proxy for a much broader measure.

Measurements of poverty use indexes such as the head-count index, the poverty gap index and the weighted index. While the head-count index has an immediate intuitive appeal it is deficient in failing to consider the extent of income shortfalls and the observed greater (welfare) cost of marginal dollar shortfalls. Many problems with poverty measurement may be resolved by restricting concern to changes in poverty measurements over time or differences between groups in poverty.

5.2 What of the Henderson Poverty Lines?

The use of the Henderson equivalence scales has rightly attracted much criticism. Why should scales derived from budgets relevant to New York in 1954 be appropriate for Australia in 1996? However the plausibility of the Henderson scales does not derive from their origin. Rather it derives from the observation that they are a well-known and understood set of scales whose values happen to be reasonable for most family types. Nevertheless the Whiteford work on which this observation is based was published in 1985 and it is certainly appropriate to review the situation again. Some Australianised version of the York budget-based scales (see Bradshaw 1993; Bittman 1995) may well be an appropriate starting point for a study to update the Henderson equivalence scales.

This article, like many others, has drawn attention to limitations of the Henderson poverty lines. However it has also put these limitations in context. While an important conclusion is that further work is required to develop new poverty lines for contemporary Australian conditions this does not mean that the Henderson poverty lines should be abandoned. Indeed while all the debate of their limitations has occurred the Henderson poverty lines have continued to provide a useful service both as a standard of adequacy, and, when used carefully, as an important input to the measurement of poverty.

5.3 A Program for Further Research

The discussion in this article suggests several fruitful areas for a reappraisal of the poverty lines. First, in relation to the benchmark *level* of the poverty line, the idea of using an arbitrated minimum income (for instance the basic wage) has been supported on the grounds that it does represent some finable consensus measure of minimum income. While the idea of a universal minimum income was abandoned nearly 30 years ago there are still minimum wage rates applicable to particular occupations. Consequently a useful undertaking would be to investigate the plausibility of using information from these wage rates to evaluate the present poverty line and perhaps to suggest a new level for the poverty line. In the process of this investigation it would seem sensible to compare the level of any proposed Australian poverty line with that employed in comparable overseas countries such as the 60 per cent of median income used by Harding and Mitchell (1992). Other alternatives may also be considered.

Second, it would seem that the equivalence scales embodied in the current Henderson poverty line are long overdue for recalculation for contemporary Australian conditions. Whiteford (1985) has suggested a wide variety of possibilities. The recent work in the development of the York scales and their application to Australia offers a promising point of departure. In addition the research might reconsider equivalence scales based on revealed expenditures of households.¹⁶

Finally the concept of income used in poverty lines ought to be carefully appraised. In particular the feasibility of developing poverty lines based on full income rather than cash income might be investigated.

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Appendix 1: Some Examples of Poverty Indexes

In the following example I demonstrate the use of three classes of poverty index: the head-count index, the poverty gap index and the

weighted index. Table A1 shows a hypothetical population in which there are 11 members in some base period A with real disposable incomes at one of seven levels: \$100, \$200, \$300, \$350, \$400, \$600 and \$900 per week. Average real disposable income is \$377 in the first period, rising to \$386 in periods B and C with new real disposable incomes as shown. Poverty is calculated in each period. In period B the members of the second last class each increase real disposable income by \$50 per week and in period C the member of the last class increases real disposable income by \$100 per week. Using this data, poverty indexes¹⁷ are calculated for incomes with the poverty line set at \$260.

The three indexes are applied to the data and the results are shown in Table A2. The values for the three indexes are calculated in the first three rows and differences between period A and periods B and C in the next two rows. The differences between two points are evaluated at the average distance between them.

Using the head-count index the rate of poverty was the same in all three situations. Using

the poverty gap index poverty fell by 23 per cent going from both A to B and A to C. Using the weighted index poverty fell by 21 per cent going from A to B but by 28 per cent going from A to C.

In Johnson (1991, 1996) the difference between the three indexes of poverty is shown to have useful policy implications. While the head-count index measures the effect of changes in the proportion of the population who are poor, with a small amount of error the difference between the head-count and poverty gap index is interpreted as the effect of changes in the average income shortfall while the difference between the poverty gap and the weighted index measures the maldistribution of poor incomes.

This decomposition may also be shown for the example here. Over the period A to C poverty fell by 28 per cent made up of a 23 percentage point decrease in the average income shortfall and a 5 percentage point further maldistribution of poor incomes, while there was no change in the proportion of poor people in the population.

Table A1 Income Distribution in a Hypothetical Population to Illustrate the Measurement of Poverty by Three Indexes of Poverty
(disposable income per week, dollars)

<i>Number in class</i>	<i>Period A</i>	<i>Period B</i>	<i>Period C</i>
1	900	900	900
1	600	600	600
3	400	400	400
1	350	350	350
2	300	300	300
2	200	250	200
1	100	100	200
Average (11)	377	386	386

Table A2 Value of Various Indexes of Poverty

	<i>Head-count index</i>	<i>Poverty gap index</i>	<i>Weighted index</i>
Period A	0.27	0.0952	0.0542
Period B	0.27	0.0602	0.0354
Period C	0.27	0.0602	0.0308
Difference B/A (per cent)	no difference	-23	-21
Difference C/A (per cent)	no difference	-23	-28

Appendix 2: An Illustration of the Properties of Relative Updating Indexes

In this example I explore the properties of two widely used relative updating indexes: HDIPC and a percentage of median disposable income. The properties are illustrated with the help of the hypothetical population shown in Table A3.

In this population there are 11 persons and poverty is measured at three times: A, B and C. In the initial time, A, the poverty line is set at 60 per cent of the median disposable income of \$350 or \$210. Total disposable income per week is \$4150 in the first period, \$4450 in period B and \$4490 in period C. Poverty rates are calculated for each period using two updating methods: HDIPC and the change in the dispo-

able income of the person at 60 per cent of median disposable income.

Since in all three cases the median income earner earns \$350 per week the poverty line updated by the change in the disposable income of the person at 60 per cent of median disposable income will be \$210 in all three cases. The poverty rates are consequently 27 per cent in periods A and B and 9 per cent in C. However when poverty is updated by mean disposable income, as with HDIPC, the poverty line is \$210 in period A, \$225 in B and \$227 in C. By this updating method the three poverty rates, shown in Table A4, are 27 per cent in all three periods.

The head-count method shows a large fall in poverty when updated by the median index method going from period A to C, largely a

Table A3 Income Distribution in a Hypothetical Population to Illustrate the Effect of Using Two Updating Indexes
(disposable income per week, dollars)

<i>Number in class</i>	<i>Period A</i>	<i>Period B</i>	<i>Period C</i>
1	900	900	900
1	600	900	900
3	400	400	400
1	350	350	350
2	300	300	300
2	200	200	220
1	100	100	100
Average (11)	377	405	406
Poverty line, updated by			
HDIPC	210	225	227
60 per cent median	210	210	210

Table A4 Value of Various Indexes of Poverty

	<i>Head-count index</i>	<i>Weighted index</i>
Poverty line updated by HDIPC		
Period A	0.27	0.0277
Period B	0.27	0.0385
Period C	0.27	0.0302
Poverty line updated by change in the income of person at 60 per cent of median income		
Period A	0.27	0.0277
Period B	0.27	0.0277
Period C	0.09	0.0282

consequence of clustering around the poverty line. This problem is identified when weighted indexes are calculated. Less susceptible to the clustering problem, this index shows only small changes in poverty between periods A, B and C.

If the aim of the comparison is to highlight increased inequality over the whole population then HDIPC will be most appropriate. It can be seen going from period A to B that it picks up changes in inequality caused by increases in income of the rich. This would be compatible with a philosophy that the poverty line reflects the capacity of the economy to pay. On the other hand the researcher may not wish to have changes in incomes of the rich affect the calculation of poverty. Such a view would be consistent with an attitude to poverty in which relative wellbeing were determined by position in society rather than by relative income. In this situation the researcher might choose an updating index such as the change in the income of a person earning 60 per cent of median income. Such an updating index does not preclude changes in the relative income of the poor, only changes in the rank. So long as the order did not change there would be room for the gaps between rankings to change perhaps to allow appropriate incentives to obtain.

Endnotes

1. In recent times Saunders and Whiteford (1989), Richardson and Travers (1989), Oxley, Prosser and King (1991) and Harding and Landt (1992) all review most of the issues concerning the use and limitations of measures of poverty and of poverty lines from differing perspectives. However these contributions do not deal explicitly with the situations in which particular poverty lines or particular poverty indexes are appropriate and the situations in which they are inappropriate.
2. Manning (1982) defines three uses: to assess relative incidence of poverty among different social groups at a point in time, to assess changes in poverty over time and to act as a standard of adequacy. In my definitions the application to the process of measuring poverty incorporates Manning's first two uses. Oxley, Prosser and King (1991) suggest five uses but again these may be collapsed into the two discussed here.
3. One particular cause of variation in circumstances is that occasioned by differences in housing costs. While an average expenditure on housing costs might be around \$80 per week this is applicable to few situations. Most families pay either much more than this, for example those in the private rental market in capital cities, or much less than this, for example those who own their own home, have nearly paid it off, or live in subsidised housing provided by government. Comparisons including housing costs may not be meaningful in many circumstances. To mitigate this problem the Henderson poverty lines use an 'other than housing' poverty line in which housing costs are not included and which must be compared to situations which do not include housing costs.
4. Many commentators confuse the limitations of poverty lines in general in the measurement of poverty, with limitations of particular poverty lines. Often the *role* of the poverty lines is not mentioned and the discussion assumes that they may be equated with a *particular* methodology for measuring of poverty.
5. Utility theory provides a way of converting welfare into money terms. It still remains a problem to measure things like years of life or degree of happiness in money terms, though one alternative is to measure the cost of achieving the desired goal.
6. There was little divergence between movements in HDIPC and AWE over the period 1973-74 to 1986-87, but between 1986-87 and 1988-89 HDIPC rose faster than AWE before moving again at much the same rate for the period 1988-89 to 1992-93. Between 1973-74 and 1992-93 HDIPC rose by a factor of 5.68. Over the same period AWE rose by 5.24. The benchmark poverty line which was 56.8 per cent of AWE in 1973-74 was therefore 61.6 per cent of AWE in 1992-93.

7. See, for instance, Buhmann et al. (1988).

8. It is important to emphasise that updating here refers to the determination of the poverty lines to be used as a base reference point for some study. This is quite distinct from the method of updating employed within some study period—which will depend on the purposes of the study.

9. One thing common to all scales is that dependents are regarded purely as a cost. Seneca and Taussig (1971, p. 255) point out a basic assumption of conventional equivalence scale analysis is that the economic wellbeing of families, at a given level of income, is a negative function of family size, implying that children are exclusively an economic burden to their parents. Revealed preference arguments, however, imply that their very existence implies a higher standard of living over the situation that would pertain in their absence.

Whiteford argues that children are not purely objects of choice (many children are unplanned); indeed poverty may be regarded as a condition of constraint on choices. He notes Muellbauer's observation that fundamentally children are individuals too, and that their consumption levels should be part of the measurement of the overall distribution of income, irrespective of whether they are a positive part of their parents standard of living. It would seem reasonable for social security purposes, and therefore in the consideration of poverty, to ignore the satisfaction derived from dependent children. In considering taxation policies, however, the position is not so clear. It may be reasonable to argue that while dependent children may be regarded as worthy of support no such arguments hold for dependent spouses where, it may be claimed, the decision not to work is a matter of personal choice. Whiteford concludes that the crucial issue is the degree of constraint imposed on whatever choices are involved with having dependent children or dependent spouses.

10. It may be an empirical regularity that the relativity in the cost of living of households of different family composition is reasonably

constant over time and across nations. This is an untested proposition, though were it true, the equivalence scales based on 1954 New York data would be a reasonable proxy for contemporary Australian equivalence scales.

11. Antcliff (1993) outlines the development of computing software which will enable a synthetic population to be updated so that current estimates of median income and of the income distribution may be made. This would enable the use of the median measure on a regular (quarterly) basis. Even so such methodology would involve some strong assumptions which would introduce concerns about the replicability of the estimates.

12. This is an appropriate methodology for updating the benchmark poverty lines. But, as has been noted and is now emphasised, it is not necessarily appropriate for tracking poverty within some study period. This matter shall be discussed further in the next section in relation to the use of particular poverty lines in the measurement of poverty.

13. For instance the Henderson poverty lines are used by many providers of assistance to the poor as reasonable criteria for determining eligibility.

14. In an earlier study Saunders and Matheson (1991) found much the same trend, though in that study the 1989–90 results were generated from a microsimulation model. In Johnson (1996) I have also measured changes in poverty using the unit records of the ABS income surveys and have found a range of patterns depending on assumptions about the updating index and the equivalence scales. Using a relative method of updating (HDIPC) and the detailed Henderson equivalence scales there was a sharp rise in poverty in the period 1981–82 to 1985–86 and then a small rise in the period 1985–86 to 1989–90. With the simplified Henderson equivalence scales poverty fell slightly in the second period. When I used an absolute method of updating (the CPI) and the simplified scales during the course of the study period poverty fell in the second period.

15. The changes can also depend on the equivalence scales used, since the relative importance of different demographic types whose income is concentrated in different parts of the distribution may also change. Harding and Mitchell (1992, p. 282) present a table in which over the period 1981–82 to 1989–90, CPI rose by 83 per cent (in agreement with my calculations) and their measure of median equivalent income rose by 95 per cent (it is not stated which equivalence scales are used in this calculation). Thus the purchasing power of their median equivalent income rose by 6.6 per cent.

16. A problem that occurs with many past estimates of equivalence scales based on consumer demand models is that the cost of extra dependents seems grossly underestimated. One possible reason for this is that conventional consumer demand models do not include the imputed cost of voluntary leisure. It is suggested that much of the additional cost of extra dependents lies in the extra parental time required for nurturing which has thus far been effectively costed at zero. In considering expenditure data it is proposed to employ full income—which does impute a cost for voluntary leisure. While Seneca and Taussig (1971), among others, have queried the implications of viewing dependents as purely a cost it is believed that for a study establishing poverty lines this view is sensible (see endnote 9).

17. The formulae for the three indexes are mathematically described as follows:

$$H = \frac{q}{n}$$

$$G = H - \frac{1}{n} \left(\sum_{i \in Q} \frac{y_i}{z_i} \right)$$

$$W = H - \frac{1}{n} \left(\sum_{i \in Q} h_i \left(\frac{y_i}{z_i} \right)^\alpha \right)$$

H denotes the head-count index, G denotes the poverty gap index and W denotes the weighted index. q is the number of poor people in the set Q of poor families, y_i is the income of poor family i , z_i is the poverty line applying to poor family i , h_i is the number of people in poor fam-

ily i , n is the total population and α is a parameter. In the example α is set equal to 0.5 and h_i is set equal to one. Johnson (1996) provides an extensive discussion of the derivation and properties of these three indexes.

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