Negative incomes in the Pensioners’ Incomes Series

The Pensioners’ Incomes Series
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Foreword

This paper is based on a review of how negative incomes are adjusted during the production of *The Pensioners' Incomes Series* (PI).

The review took place in the second half of 1999. Therefore, any references to 'current' methodology or use of the present tense in this paper refers to the methodology used prior to the 1997/8 edition of PI. The 1997/8 edition was published on 27 January 2000 and followed the recommendations made in this paper.

The main focus of this paper is on the methodology used for adjusting estimates of occupational pension receipt in PI, but it also serves as a useful assessment of the how negative incomes arise in the Family Resources Survey and to what extent negative incomes are indicative of living standards.

Any comments on this paper would be gratefully received.

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Executive summary

Negative net incomes can arise in the surveys that are analysed in the Pensioners' Incomes Series (PI) – the Family Expenditure Survey (FES) and the Family Resources Survey (FRS). Genuine negative incomes can arise for a number of reasons, while negative incomes may also result from errors either in what the respondent reports or in how the information is recorded or processed.

There are strong arguments for adjusting cases with negative incomes, even where the negative amount is thought to be genuine. In this type of analysis, incomes are used as a proxy for living standards, which is a positive concept. People with negative incomes are likely to maintain a 'positive' living standard by drawing on past incomes (in the form of savings and other capital) or future incomes (in the form of loans and other debt). Furthermore, large negative incomes can have a significant effect on estimates of overall mean incomes (medians are not affected).

Under current policy, negative incomes are adjusted in the Households Below Average Income series (on whose data PI is based), and in the PI(FES) data set, but not in the PI(FRS) data set.

The paper examines several options for adjusting negative incomes and recommends adopting the current HBAI policy. Under this policy, all cases with negative net income before housing costs have all their incomes (net before housing costs, gross and components thereof) set to zero; except for net income after housing costs, which is set to zero minus housing costs.

This method is transparent, simple to conduct and benefits from consistency with HBAI and PI(FES). It will result in some genuine negative incomes being set to zero (and some genuine positive incomes from other sources being set to zero). However, this is necessary in order to reduce the effect on means of both erroneous negative incomes and genuine negative incomes that do not reflect genuine living standards.

1. Introduction

This paper examines the policy for dealing with negative incomes in *The Pensioners' Incomes Series*. The rationale for adjusting such incomes is considered, and the reasons that they arise in the FRS-based Pensioners' Incomes data set – "PI(FRS)" – are examined. Finally, four options for future adjustment policy are considered, and one option is recommended.

2. Current PI policy

PI(FES): A benefit unit's income is only adjusted if *net income BHC at the benefit unit level* is negative. If this is the case, all incomes are set to zero. This includes gross income, deductions, net income BHC (before housing costs) and sources, for the head, spouse and benefit unit. Net income AHC (after housing costs) is not adjusted. [The effect of this on overall results is virtually negligible – see Annex A].

PI(FRS): There is currently no consistent policy in PI to make adjustments for negative incomes. HBAI (FRS) 1996/7 data contained one case with very large negative self-employment income, much larger than negative incomes found in previous years. This was having a noticeable effect on overall results. This case was treated as an outlier and excluded from the data set.

3. Current HBAI policy

Analyses in the Households Below Average Income (HBAI) series (on whose data PI is based) make adjustments to negative incomes. For both FES and FRS data, an individuals' household income is only adjusted if *net income BHC at the household level* is negative. If this is the case, the following adjustments are made.

Net income BHC	Set to zero
Net income AHC	Set to zero minus household housing costs
Gross income and sources	Not adjusted (gross incomes not used by HBAI)

Where net income AHC is negative but BHC is positive, no adjustments are made.

N.B. These adjustments do not automatically feed through the HBAI data set to PI because only household incomes are adjusted, while PI is based on benefit unit incomes.

4. Rationale for 'zeroising'

It is possible for someone to have a genuine negative income. The different ways this can happen are discussed below (Section 5). Nevertheless, there are several reasons for considering the adjustment of negative incomes in the PI Series.

- Income is often seen as a proxy for living standards[1], which is a positive concept.
- Some negative income amounts can arise from error either in what the respondent reports or in how the information is recorded or processed.
- Even genuine negative incomes can distort the patterns we are trying to describe.

Where someone has a negative income, this is not a very accurate measure of their standard of living. Living standards are a positive concept. Indeed, people with negative incomes can maintain a minimum living standard by drawing on past incomes (in the form of savings and other capital) or future incomes (in the form of loans and other debt). For these people, a "zero" level of living standards is a better (though not entirely accurate) reflection of true living standards, than a negative level.

The adjustment of negative incomes (both errors and genuine negative incomes) is an important issue for *The Pensioners' Incomes Series* because of their potential effect on published summary statistics. A negative income will reduce the level of the mean income for any group that the person is a member of (*median incomes are unaffected*). The larger the negative income, and the smaller the size of the subgroup of pensioners being considered, the larger the impact of the negative income on the mean.

Analysis of PI data shows that large negative incomes do have a significant effect on estimates of mean incomes. Although errors may occur, setting incomes to zero is not to deny that negative incomes are possible, but rather to lessen their effects on overall estimates. In some respects the zero level is quite arbitrary: People with a negative income from a particular source are treated differently according to whether this is offset by incomes from other sources (i.e. whether total net income from all sources is positive or negative).

5. How genuine negative incomes can arise

There are three main reasons for negative incomes (before housing costs):

Firstly, a person may have deductions such as tax which outweigh their gross income. This will typically be the result of the deduction relating to a different period to the income. For example, a one-year tax bill being deducted from one month's worth of earnings, or a tax bill being paid on self-employment earnings for the previous financial year deducted from self-employment earnings in the current year. In this

[1] The benefit unit level incomes used in the Pensioners' Incomes Series are only broadly indicative of living standards since, unlike HBAI, they do not take account of the income of other benefit units in the household. However, a key consideration of the review is whether a more realistic picture of living standards can be obtained by adjusting negative incomes.

case, the negative income is unlikely to be a true reflection of living standards over the reference period.

Tax or other deductions may also outweigh income over a given period if they are not offset against a specific income source. For example, income tax on earnings is offset against the earnings over a given period, but Council Tax is not offset, so can be greater than income from other sources. Deductions such as child maintenance payments and personal pension contributions also fall into this category. In cases where payments are voluntary, it is likely that the person is drawing on capital or income from another period (e.g. savings) in order to maintain their living standards.

Thirdly, a person may have a negative gross income from a particular source. For most sources, this is highly unlikely. Income from self-employment is the main source affected in this way, since the individual's income is linked to the profit (or *loss*) made by their enterprise. In this case, the negative income may be more of a reflection of living standards, although people are likely to draw on capital (either based on previous incomes or future incomes) to supplement their income.

6. The causes of negative incomes in PI data

A table of all pensioner units in PI(FRS) 1994/5 to 1996/7 with negative net BHC income is given in Annex B, while a summary table is given below.

Table 1: Distribution of negative net BHC incomes, by main reason

Main reason for negative income	**Distribution of negative incomes**				
	All pensioner units	£1 - £100	£100 - £1,000	£1,000+	Average
Self-employment	9	5	4	0	£209
Council tax liability	8	8	0	0	£10
"Other" income tax	7	4	2	1	£762
Child maintenance	1	0	1	0	£202
Personal pens. Contribution	1	0	1	0	£158
All reasons	26	17	7	1	£295

The analysis suggests that the most common cause of negative incomes is self-employment income. This includes people whose business had made a pre-tax loss, as well as those who made a profit which was outweighed by deductions (such as income tax or lump sum National Insurance contributions). Nearly half of these pensioner units had a negative net income of over £100 per week.

Another common cause was council tax liability, not offset by council tax benefit. None of these cases had more than £16,000 of capital (which would exclude them from council tax benefit), so presumably most were entitled non-recipients. Most of these negative incomes were small (averaging £10pw).

A number of negative incomes, including one particularly large amount, were due to "other income tax payments in the last twelve months" [the figures in the tables are expressed as weekly amounts]. These payments appear to be one-off lump sums, possibly relating to income received outside the reference period.

Other possible reasons for negative incomes that arose were child maintenance payments and personal pension contributions, both of which are deducted from net income in HBAI and PI.

Some incomes in the FRS are 'imputed'. Imputation is a procedure carried out on cases where the respondent has refused or did not know the answer to a particular question. A variety of methods can be used to impute a value, based on other information in the data set. It is possible that an imputation method might lead to more negative incomes. However, out of the 26 cases in Annex B, only five cases were negative because of an imputed income amount. Two such amounts resulted directly from a less detailed imputation method in 1995/6, that has since been improved. Overall, the evidence suggests that imputation is not a significant factor behind negative incomes.

7. Issues for a policy of adjustment

Although the majority of negative incomes are small, and may to a certain extent reflect living standards relative to people with positive incomes, there is also a number of cases where negative incomes are over £100pw. It is highly likely that such cases will maintain a higher standard of living than their income suggests, through drawing on capital or savings (as discussed above). Therefore, it seems appropriate for PI to follow HBAI in adopting some form of adjustment for negative incomes.

One difference is that HBAI looks at *household* income before zeroising, whereas PI will look at *benefit unit* income. Other things being equal, this will lead to more cases being selected in PI, since a negative income cannot be counter-balanced by incomes of other benefit units in the household. However, the numbers of cases needing adjustment will still be small (between 5 and 13 cases a year in Annex B).

A further difference is that PI will need a policy for gross income amounts, including income from individual sources. The policy for adjustment may affect not just the source with a negative income, but also sources with apparently genuine positive incomes.

8. Options

It is not considered a viable option to make no adjustment, since we have occasionally seen cases with very large negative incomes, which clearly do not genuinely reflect living standards and have a significant effect on overall estimates. Four options for adjustment are described below. All options are applied to cases with negative net income BHC at the pensioner unit level.

1) HBAI method:

Zeroise all income amounts, except net income AHC which is set to zero minus housing costs.

2) Source-based method

As 1, but adjust the negative source of income such that net BHC income is zero, while leaving positive sources unadjusted.

3) Case-by-case method

Examine each case individually and decide whether the negative income is genuine and whether it genuinely reflects relative living standards.

4) Current method

Adjust large outliers only, by excluding them.

The four options are examined below with reference to consistency with current methods, simplicity/transparency of the method, the theoretical basis and the impact on separate sources of income.

Consistency:

Method 1 is consistent with HBAI (albeit at the pensioner unit rather than household level). Methods 1 and 2 are virtually consistent with PI(FES) (only differing for net income AHC – see Annex A). They are not consistent with earlier years of PI(FRS), so these would need to be re-run. Method 4 requires no re-running of tables, but represents a distinct departure from the HBAI and PI(FES) methods.

Simplicity:

All methods are transparent and easy to conduct apart from method 3, where the treatment of negative incomes would depend on various other characteristics, on a case-by-case basis. Method 4 has the additional advantage of not requiring any re-running of earlier PI(FRS) years.

Theoretical basis:

Method 3 has arguably the strongest theoretical basis, in that people with negative incomes are considered on a case-by-case basis to see whether they have a '*genuine*'

negative income. This method is also the most flexible, allowing us to decide which of the genuinely negative incomes genuinely reflect negative living standards. We can draw on additional information in the survey, but in most cases it will not be obvious whether an income amount is "right" or "wrong". In addition, given that it is not feasible to separately consider every case in the entire sample, there has to be a cut-off point (of net income BHC < 0, say). This cut-off point will be quite arbitrary (as for all methods), although a 'zero' cut off point is consistent with living standards being a positive concept.

The theoretical basis for the other methods operates at the aggregate level. It is argued that for various reasons negative incomes, particularly large ones, may not be an accurate reflection of relative living standards. If we adjust all people with incomes below a certain threshold, some will be right and some will be wrong (and some people above the threshold will not be adjusted even though they should be), but the aggregate level effect will be to reduce the effect on average incomes.

Sources of income:

Methods 1 and 4 distort analyses of particular sources of income by setting them to zero even when they are positive, as long as net income BHC is negative. Method 2 reduces this distortion by leaving positive sources of income unadjusted, while adjusting the negative source just enough to bring net income BHC up to zero. However, it does not distinguish between 'genuine' and 'non-genuine' negative incomes, so it is possible for a large 'non-genuine' source of income to remain if it is offset by a large positive income from a different source.

9. Recommendations

It is recommended that negative incomes be adjusted using method 1 – i.e. for all benefit units where net income BHC is less than zero, to set all incomes (gross and net, totals and sources) to zero; except net income AHC which is set to zero minus housing costs.

This method has the advantage of consistency with HBAI and near-consistency with PI(FES) (see Annex A). It is transparent and a simple process to conduct. It does not have as strong a theoretical basis as method 3 at the individual level, but it achieves much the same result at the aggregate level. Also, method 3 may retain large negative incomes judged to be 'genuine', whereas method 1 reduces the effect of genuine outliers on overall average estimates. The recommended method leads to a slight distortion of analyses of particular sources of income (particularly where positive amounts are reduced to zero), but the alternative (method 2) may lead to even greater distortion where large negative amounts remain.

Annex A: Effect of not adjusting net income after housing costs in PI(FES)

The policy for adjusting cases with negative net income before housing costs (BHC) is the same in both HBAI and PI(FES), except for one feature. In HBAI such cases have their net income after housing costs (AHC) adjusted to zero (i.e. the new BHC figure) minus housing costs. In PI(FES) net income AHC is not adjusted.

As a result, some PI(FES) data sets contain cases where net income AHC is lower than it would be under HBAI-style adjustments. This in turn affects the estimates of mean net income AHC (medians are unaffected). The effect is largest on estimates for small groups.

All PI(FES) data sets were examined for such cases, and the maximum effect on estimates was calculated in each case. No estimate of mean income had been reduced by more than £0.44p (July 1996 prices) as a result of not following the HBAI method. In the majority of cases the estimate had been decreased by less than £0.20p.

The reasons for the effects on estimates being so small are that there were fewer cases with negative incomes in PI(FES) than in PI(FRS) – never more than two per year – and that the size of negative incomes was smaller – the largest negative net income AHC observed was £91pw (July 1996 prices).

Therefore, in the vast majority of cases, the effect will be lost in rounding estimates to the nearest £1pw. In some cases, the rounded estimate will be £1 a week lower as a result of not following HBAI methodology – well within statistical margins of error. It is recommended that PI(FES) estimates should not be recalculated for past years since the work required (significantly more work than involved in the rough estimates above) outweighs the benefits of revising a small number of estimates by £1.

Annex B: Negative incomes in The Pensioners' Incomes Series 1994/5 to 1996/7

The table below lists the basic characteristics of all pensioner units with net income BHC below zero, in any of the last three PI data sets.

1994/5

Serial no. / Ben unit	Income levels			Main reason for negative income ("i" = imputed)
	Gross	Net BHC	Net AHC	
3574091/1	0	-9	-22	Council Tax: -9
7184111/1	395	-8	-21	"Other" income tax: -303
7594061/1	0	-8	-9	Council Tax: -8
9014211/1	86	-7	-31	Self-empt income: -127
10084081/1	0	-11	-25	Council Tax: -11
13004141/1	39	-18	-25	"Other" income tax (i): -48
13424101/1	238	-396	-404	"Other" income tax: -614
16704171/1	-120	-181	-197	Self-empt income: -239

1995/6

Serial no. / Ben unit	Income levels			Main reason for negative income ("i" = imputed)
	Gross	Net BHC	Net AHC	
775061/1	0	-11	-12	Council Tax (i): -11
965011/1	826	-158	-166	Personal pension cont.: -478
1025191/1	-18	-32	-55	Self-empt income: -74
2035041/1	171	-674	-688	Self-empt income (Lump sum NI contribution) (i): -851
3125051/1	4	-4	-10	Council Tax: -7
4955051/1	70	-13	-27	"Other" income tax: -67
9595241/1	159	-56	-91	"Other" income tax: -191
10565121/1	730	-610	-702	Self-empt income: -714
10695041/1	0	-18	-29	Council Tax: -18
10935011/1	73	-57	-295	"Other" income tax: -115
14205171/1	-9	-37	-40	Self-empt income: -238
15875051/1	97	-101	-109	Self-empt income after tax (i): -182
17065191/1	3358	-4783	-4793	"Other" income tax: -7513

1996/7

Serial no. / Ben unit	Income levels			Main reason for negative income ("i" = imputed)
	Gross	Net BHC	Net AHC	
1966131/1	-188	-205	-211	Self-empt income: -303
9746231/1	67	-202	-504	Child maintenance: -269
12936191/1	20	-37	-44	Self-empt income: -180
14596141/1	0	-8	-13	Council Tax: -8
16236101/1	0	-13	-18	Council Tax (i): -13