

Consultation on 'Comparisons over time for low income statistics'

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Section A

Report on the Consultation exercise 'Comparisons over time for low income statistics'

1. The use of data from the Family Resources Survey as the source for Households Below Average Income and The Pensioners' Income Series instead of data from the Family Expenditure Survey raises questions about the most appropriate methodology to use in presenting time series which straddle the period of change. In December 1999 a consultation paper was issued to external analysts seeking views on various methodologies. We are grateful for the comments of all those who responded.
2. This paper summarises the comments received and details the resulting actions which will be undertaken in future analysis of time series. HBAI 1994/5 to 1998/9 has incorporated the final recommendations. Readers are asked to refer to the original consultation paper for details of the methodologies, their perceived strengths and weaknesses, and the reasons for the original recommendations. The original paper is attached in section B of this paper.
3. In general, respondents were in agreement with the recommendations and felt that it was preferable that official time series were available rather than individual users deriving their own series.
4. Listed below at paragraph 5 are the recommendations which caused comment and the course of action which will be taken in the light of the responses from analysts. Paragraph 6 reports comments on specific issues. Paragraph 7 provides a complete list of the time series and the methods which will now be used reporting time trends, incorporating any revisions. For convenience the recommendations are listed here with the reference to their occurrence in the consultation paper.

5. Summary of comments on recommendations

a) Percentage of individuals below a contemporary income threshold (F Tables in HBAI)

Recommendation 2

Not to provide a time series of these analyses by family type or economic status.

(Para 34)

This recommendation was opposed by many on the grounds that if the HBAI team did not provide such analysis, others would seek to make their own adjustments. This in itself is not a valid argument if DSS analysts feel that the results may be seriously misleading. A re-examination of the series confirms that for single pensioners and single adult families with children, the FRS provides in general higher estimates at the 40% and 50% thresholds. However the differences are generally small set against the change since 1979. As the recommendation for the population as a whole is to make direct comparisons, it is agreed that DSS will suggest that users apply direct comparisons but will issue an appropriate warning.

b) Percentage of individuals below a fixed income threshold (E tables in HBAI)

Recommendation 3

To discontinue this series.

(Para 36)

The intention of this recommendation was to discontinue the series using 1979 as the reference period, not to discontinue the E series of tables completely (they are published for FRS years with 1994/5 as the base year). However we accept that this recommendation was ambiguous. There was almost unanimous objection to the "recommendation" of discontinuing the series on the grounds that the series is important and frequently used. Users would be forced to construct their own series. It is accepted that there is a strong user demand for this table and therefore HBAI should retain analysis over a longer time period of numbers below fixed thresholds. 1994/5 averages generated from the FRS will be used to provide the fixed thresholds, e.g. the percentages of the population in 1979 below 50% of 1994/5 mean income in real terms. As with the F tables, direct comparisons will be recommended for comparisons. There will be strong warnings issued against making comparisons over short time periods, and indicating the size of the discontinuity for specific groups.

Recommendation 11

That a continuous time series is not calculated for any of the estimates contained in The Pensioners' Incomes Series (PI)

(Para 60)

It was generally recognised that time series of monetary values (which make up the vast majority of time series in PI) were more sensitive to the change in surveys than distributional measures. However, several respondents expressed concern that the absence of a continuous time series would lead to users producing their own series by combining estimates from the two surveys. It was felt that it was preferable to publish time series with appropriate ‘health warnings’ about the discontinuity in the series.

Our view is that the differences between monetary value estimates across surveys are too large to justify publishing direct comparisons, giving them greater credibility. Furthermore, large fluctuations in the difference between surveys for the ‘overlap’ years (1994/5 to 1996/7) mean that in many cases a spliced time series may be no more accurate than the unadjusted series – a general concern expressed by some respondents.

Therefore, PI will not include cross-survey estimates, but it will include information on FES-based time series (1979-1996/7) with prominent ‘health warnings’ about direct comparisons across surveys. In the 1997/8 edition of PI, all tables in the main body of the publication were based on FRS data, but included a column showing the growth between 1979 and 1996/7 based on FES data. In each table, the growth column was clearly labelled as being based on a different data source and was separated from the rest of the table by a solid line. Each table also included a footnote warning users that results from the two surveys were not directly comparable – a point re-iterated in the publication’s introductory text.

Given that an appropriate long-term growth figure is given for each table, and given the health warnings, we believe that the risk of users making their own cross-survey comparisons will be small. From experience, users are mainly interested in long-term growth figures, rather than intervening years. Figures are not robust enough to provide a picture of changes over the latest one or two years and pensioners’ incomes by their very nature rarely undergo dramatic short-term changes. Therefore, the broad picture of long-term trends provided by the 1979-1996/7 growth figures should be sufficient for most users’ needs (until FRS-based growth figures become available). Those who still wish to make cross-survey comparisons will be doing so in full knowledge of the health warnings.

6. Summary of comments on specific issues

In addition to recommendations on specific time series, external analysts were asked to comment on three specific questions.

- Should there be guidelines about the time periods for which series are provided which bear in mind the scale of the discontinuity caused by the survey change compared with the overall change in the trend? A time comparison between 1979 and 1996/7 raises different issues from providing the same comparison between 1991 and 1996/7 (where the step change between the surveys and definitions may be significant compared with the trend change over the period).

The consensus view was that there should be guidelines for those wanting to compare the more recent past. Section C provides some guidance; in general it is recommended that comparisons over shorter time periods (eg from the early 1990s to the late 1990s) are not made.

Percentage change in real income (HBAI tables A1 and A4)

- Using two year splicing with adjustment, how should the effect of the definitional change on the base year be calculated and can it be assumed to be negligible for 1979.

Concern was voiced over handling of comparisons over shorter time periods, but the general consensus was that the splicing with adjustment was the preferred option, albeit one that produced results little different to those of the direct comparison. A minority of respondents preferred direct comparisons to be used wherever possible. No-one opposed the view that the adjustment could be assumed to be negligible in 1979. Splicing with adjustment will be used with appropriate guidance to users, including warnings over shorter time periods. ASD will undertake some sensitivity testing of estimated change over shorter time periods.

- Initial views on the choice of splicing period, 1994/5+1995/6 or 1995/6+1996/7.

Analysts agreed that the later years should be used.

7. Guidance to users

Having considered the comments received, the list below shows which series will be adjusted using each methodology. Appendix 8 of HBAI 1994/5 to 1998/9 provides guidance to users of time series, and information to allow the calculation of some estimates which require splicing. The guidance is reproduced as Section C of this report. However, HBAI will not provide time series showing estimates for each year for every series in the volume.

Direct comparisons will be used for:

Percentage of individuals below a contemporary income threshold (F Tables in HBAI)

Care should be taken with the time series of children below 40% of mean. Some guidance about discontinuities for particular family types is given in Section C.

Percentage of individuals below a fixed income threshold (E tables in HBAI)

Tables will be provided showing the numbers, in selected earlier years, below 1994/5 average income fixed in real terms. Some estimates of change using thresholds based on 1994/5 fixed mean income are provided in chapters 5, 6 and 7 of HBAI 1994/5 - 1998/9. Caution is needed when making comparisons over short periods, and guidance will be issued about discontinuities for the whole population and for children and families with children.

Distribution of individuals below various percentiles of the income distribution (D, G tables in HBAI)

With caveats where appropriate about variations from year to year.

Shares of income (A3 in HBAI)

Two year splicing with adjustment based on 1995/6+1996/7 as the splice period will be used for:

Percentage change in real income (HBAI tables A1)

Percentage change in real income (HBAI tables A4)

These estimates will be provided either as point estimates or as ranges where the confidence intervals are particularly wide.

The confidence intervals will be based on past experience.

Appropriate guidance will be given on comparisons over shorter time periods.

But

That a continuous time series for quintile medians by family and economic type is not calculated.

Likewise, no continuous time series will be published in *The Pensioners' Incomes Series*. Users will be encouraged to use the published growth estimates for 1979-1996/7 based on FES data, while tables will include health warnings against making direct comparisons across surveys.

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Section B

Comparisons over time for low income statistics

1. Context of Consultation

1. Prior to 1996, the data in editions of Households Below Average Income (HBAI) were mainly derived from the Family Expenditure Survey (FES). After the publication of the 1992/93 volume in 1995, a **methodological review** was undertaken in consultation with external analysts, the recommendations of which were published¹. The review recommended that information from the larger Family Resources Survey (FRS) be introduced into the HBAI series, and in future years that the FRS should replace the FES as the main source of information.
2. The review also recommended various changes to the definitions used in HBAI, which should apply to the FRS based results. Appendix 1 details the methodological differences between the FES and the FRS based series.
3. HBAI series based on FES are available for the years 1979, 1981, 1987 (single years), 1988/89, 1990/91, 1991/92, 1992/93 (2 calendar years combined), and 1993/94, 1994/95, 1995/96 (2 financial years combined). Comparisons over time using FES data have generally referred back to 1979. FRS based HBAI is available for the single financial years 1994/5, 1995/6, 1996/7 and 1997/8. Comparisons over time published in HBAI 1997/8 related to the FRS years 1994/5 to 1997/8.
4. It is likely that some users will still be interested in comparisons between the latest period and 1979, the previous base period. Therefore, although we do not intend to make such analysis available in the volume, we do propose to provide on request those comparative figures that are considered sufficiently robust. The FES and FRS series have been run in parallel for the three financial years 1994/5 to 1996/7 enabling several point-in-time comparisons to be made as well as providing a broad indication of the trends of the two time series.
5. A report will soon be published which will compare main estimates derived from both the FRS and the FES. The report shows that the FES and the FRS produce monetary values of

¹ Households Below Average Income: Methodological Review Report of a Working Group, DSS, May 1996

average income which differ by a few percent. The FRS provided distributions of income in 1994/5 and 1995/6 which are slightly shifted downwards relative to those of the FES. In 1996/7 the distributions were much closer. The slightly different levels of income shown by the two surveys, and the different changes in income between years, affect the time series shown by the surveys over the period. However, the comparisons report concludes that, despite the methodological differences, the FES and FRS paint the same broad-brush picture of both the population and the shape of the income distribution as a whole.

6. A copy of this paper has been included for information and a summary of the main findings is at Appendix 2 of this paper.

The Pensioners' Incomes Series (PI)

7. The Pensioners' Incomes Series, also published annually by DSS, derives its data from HBAI. PI has also transferred from FES to FRS, and the construction of long time series is also an issue for PI. Therefore the consultation will also consider time series of PI data. Constructing a consistent time series in PI from two separate surveys presents a special case, since most estimates are money values, where estimates are more sensitive to changes in the survey instrument than, say, measures relative to the income distribution. Furthermore, PI presents time series for various subgroups of pensioners, many of which will be based on small sample sizes, which presents further difficulties when assessing the discontinuity between the two surveys.

2. Consultation

8. The purpose of this consultation is to canvass the opinions of external analysts about:

- a methodology for generating robust figures;
- principles to be followed in the provision, or not, of HBAI series straddling the survey change;
- the level of detail which could be made available (bearing in mind the inherent differences between the FES and the FRS).

9. Please send all comments and suggestions to:

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3. Background Issues

10. Before deciding on which time series should be taken over the discontinuity caused by the change of survey base, and which are the most appropriate methodologies to use, there are a number of issues about any HBAI time series which should be kept in mind.
- a) Both the FES and FRS are sample surveys. There are natural fluctuations in the results and so users have always been cautioned against reading too much into year on year changes.
 - b) There have been changes to the FES over the period that it has been used for HBAI. Some have been definitional changes, but there have also been other changes (to improve the quality of the information collected) such as the introduction of computer aided interviewing in 1994/5. There have also been changes during the short life of the FRS, most notably the improvement to the self-employment questions in 1996/7 and the change to the calculation of students' incomes in 1997/8. These are in addition to the methodological changes initially introduced with the change to the FRS.
 - c) The FES and the FRS have moved in relation to each other in the overlap years. Although the general shape of the income distributions are very similar, for some indicators the FRS moved closer to the FES in 1996/7. One consideration will be which year or years to use as 'splice' year(s).
 - d) In considering which time series to present, there is an issue about the length of time series that should be presented. A view needs to be taken on whether it would be advisable to introduce rules about the time periods for which series are provided which bear in mind the scale of the discontinuity caused by the survey change compared with the overall change in the trend. Comments on this are invited (see paragraph 62). A time comparison between 1979 and 1996/7 raises different issues from providing the same comparison between 1991 and 1996/7 (where the step change between the surveys and definitions may be significant compared with the trend change over the period).

4. Time series in Households Below Average Income and The Pensioners' Incomes Series

Households Below Average Income

11. There are a number of different time series in HBAI which answer different questions. The tables provided at the back of the HBAI volume can be assigned to one of five groupings for the purpose of this consultation.

a) Those that show the percentage of individuals below a contemporary income threshold (F1 - F3, H1)

Questions using these analyses compare, for example, the percentage of individuals below half contemporary average income at two time points, eg "What was the proportion below half average income in 1995/96 and in 1979?"

b) Those that show the percentage of individuals below a fixed income threshold (E1 - E3, H2)

Here the comparison is between percentages of individuals below various thresholds held constant in real terms (fractions of 1979 real terms average income).

c) Those that show the distribution of individuals below various percentiles of the income distribution (D1-D3, G)

The sort of question which can be answered from these tables is "What was the percentage of pensioners in the bottom quintile in 1995/6 and how does this compare with the percentage in 1979?"

d) Those that show shares of income (A3)

The type of question asked here is "What proportion of total income was received by those in the top decile of the income distribution in 1996/7?" We do not receive many enquiries about this comparison over time.

e) Those that show percentage changes in real income (A1, A4), i.e. comparisons of monetary values (provided in A2 and A5).

A typical question would be “What was the rise in average income for all pensioners and for the bottom quintile of pensioners between 1979 and 1995/96?” This is probably the most common type of question.

12. The remaining tables published in HBAI are the B tables (population numbers) and Table C (money values of fractions of income). Neither of these sets of tables is used as a time series. The new tables introduced into the latest volume which look at numbers under thresholds of median income are simply variations of the F and E tables described in a) and b) above.

Pensioners’ Incomes Series

13. The majority of time series show money values of income from various sources and for various subgroups of the pensioner population (similar to HBAI table A5). Estimates of change over time are provided (similar to HBAI table A4). Other series in PI give the proportion of pensioners in receipt of certain types of income.

5. Making decisions about the presentation of time series

14. The method of responding to requests for long time series will depend on a number of factors including the type of time series and the similarity in the level and trend shown by the individual surveys. There may be some time series for which it is decided that it is not methodologically sound to present series back to 1979 or for which the resources required cannot be justified.
15. Successful linking of time series requires a stable base in the link year(s) and it also requires the two surveys which are being linked to maintain their differences (i.e. continue to move in the same way in relation to each other). The comparisons of the FES and FRS have shown that the FRS was more different from the FES in 1994/5 and 1995/6 than it was in 1996/7. For some groups, the FRS showed larger increases in average income between 1995/6 and 1996/7 than did the FES. This brought the surveys closer together but these different changes in income may make the linking of the time series more difficult.
16. In summary, the choice of methodology will depend on:
 - a priori validity: is the approach theoretically valid?
 - the confidence which can be placed in the end product: do the results seem fair?
 - cost in terms of analysts' time: what are the practical implications of the methodology and can the resources be justified?

How to assess results

17. A theoretical argument can be advanced for any methodology used and any proposals can be costed in terms of the amount of work generated to produce the results. However, it is far more difficult to state how to judge the 'goodness' of the results. Comparisons can be made between the results of the methods compared with the existing FES series, but this then raises the question why the definitions were changed when the FRS was introduced. Had the FES had a larger sample size, and the necessary questions been included, the Methodological Review may well have recommended changes to the definitions while continuing to use the FES. We would then be faced with a discontinuity within the same series. As the reason for the change in definition would be to provide a better estimate for the living standards of the population, movement away from the FES result would not be

seen as necessarily undesirable. In the event, there are two effects to consider here: the step change due to change in definition, and the effect of changing the survey. In the discussion that follows, we attempt to tease out these two effects.

6. Potential Methods

The main options for time series would seem to us to be:

The 'Do nothing' option

18. We could elect not to provide combined data from the two surveys in one time-series. This would only be an option if we were convinced that no methodology was theoretically sound, or the proposed methodologies produced results which were not robust or were seriously misleading. A variant of this option would be to quote time series results over the FRS period and compare these only with a much earlier FES year. This would be used only when the difference between the early FES year and the later FRS years was very large and, when compared with the difference over time, the differences between the two surveys in the overlap years could be described as negligible.

Advantages of this methodology

- Transparent. Clear to all users that no attempt has been made to adjust the series for the discontinuity.

Disadvantages of this methodology

- The needs of HBAI users would not be met. Users would be forced to decide on their own individual methods of creating long time series. This could lead to a variety of estimates. In the long run this could lead to a confusion of estimates causing problems for all users of HBAI data.
- HBAI could lose credibility.

Direct comparison of new FRS and old FES

19. We could directly compare FRS data, from the current period, with FES data, from the 1979 base period, without any adjustments to either set. If the data were being presented as a continuous series, e.g. the percentages below thresholds, the two series would be run together and the discontinuity in the series could be indicated by a line. So, for example, in a time series showing the proportion of individuals below half average, percentages could be presented up to 1994/95 (or 1995/96) based on FES and the series continued from 1995/6 (or 1996/7) using FRS data.

20. For percentage change over the period, the estimate would be the ratio of current FRS value to the 1979 FES value. So, for example, to calculate the change in mean income between 1979 and 1996/7, £307 (mean income including the self-employed in 1996/7 - FRS, BHC, in April 1998 prices) would be divided by £217 (mean income including the self-employed in 1979 - FES, BHC, in April 1998 prices). This gives an increase of 42 per cent.

Advantages of this methodology

- Simple to apply. Can be applied for a variety of analyses by any analyst without the need for any additional information.
- Transparent. Clear to all users that no attempt has been made to adjust the series for the discontinuity.
- Could be justified methodologically on the basis that the 1979 estimate based on the FES was our best estimate of living standards at that time, and that the FRS definition and methodology is our current best estimate. The argument could be made that the definitional changes introduced in the FRS were made in the light of the new importance of some income or deductions, e.g. loans to students, private pension payments, items which were less important in 1979.

Disadvantages of this methodology

- Only a viable option if the apparent downward shift due to the change in survey did not materially affect the conclusions which could be drawn about changes over time. Relative to the FES estimate, income growth could be under-estimated using this method because the FRS series is generally lower than the FES.
- Some of the income definition changes should ideally have been made before the introduction of the FRS. Not necessarily sound to compare income in the early 1990's based on FES with late 1990's based on FRS.
- When developing series such as the proportions below low income thresholds, the point-in-time estimates are at irregular intervals, in particular the single year FRS estimates have to join on the end of two-year FES estimates. There is no clear discontinuity point at which to switch series.

Splice (or 'chain-link') the FES and FRS series

21. Two alternative methodologies are presented. They both allow the changes over time in the base FES series to be carried forward from the splice period into the new FRS series. Further details of the splicing methodologies examined are provided in Appendix 3. Both methods require a splice period to be agreed.

The splice period

22. For HBAI and for PI, the FES and FRS were run in parallel for three years (1994/5 to 1996/7) and so there are a number of options for the splicing period. One option would be to splice a single year FES onto a single year FRS. However this option has been rejected in favour of the more robust two year splice. The choice of splice period is therefore between 1994/5 and 1995/6 combined OR 1995/6 and 1996/7. The examples in the appendices all use 1994/5 and 1995/6 (shown as 1994/95) for illustrative purposes. However, 1996/7 may be a good year to include in the splice period because in that year the FRS was closer to the FES (due to FRS under-reporting of income being reduced) and in 1996/7 improved questions on self-employment income were introduced. Therefore, it may be decided that 1995/6 and 1996/7 combined would be a more robust splice period.

Splicing method 1: Two year splice

23. This method of two year splicing overlays the FES with the FRS series, directly matching the time period, and effectively takes the old FES series and imposes from the splice point onwards change as seen by the FRS.

24. The method can be illustrated by taking the same example as in the *Direct Comparison method*: calculation of the change in mean income between 1979 and 1996/7. The figures required are mean income in 1979 (FES) = £217, mean income in 1994/95 (FES) = £304, mean income in 1994/95 (FRS) = £295, mean income in 1996/7 (FRS) = £307. The calculation of the growth over the period 1979 to 1996/7 is then calculated as

the growth from 1979 to 1994/95 (FES) = $304/217 = 1.40 =$ growth of 40%

the growth from 1994/95 to 1996/7 (FRS) = $307/295 = 1.04 =$ growth of 4%

the growth over the whole period = $1.40 * 1.04 = 1.46 =$ growth of 46%.

Advantages of this methodology

- This methodology recognises the step change between the FES and FRS and adjusts estimated income growth rates accordingly. This is theoretically valid if the difference between the survey estimates is principally due to the change in survey and not to the change in definition introduced by the Methodological review.
- The results produced by this method are defensible because they reflect observed increases in income, albeit from two different sources. There is no observable discontinuity in the income growth series.
- The methodology is straightforward and easy to understand in principle.
- There would be an 'official' methodology which all analysts would be able to use, thus reducing the number of alternative time series.

Disadvantages of this methodology

- The results obtained using this methodology can be influenced by the choice of splicing years. It is necessary for the difference between the two sources due to the change in survey to be similar in the splice period to the difference between the sources over time. (It is not necessary, and it would not be expected over time, that the changes due to the methodological changes (i.e. in the definition of income) would remain constant: some of the changes were introduced in response to the growing importance of the sources of income. The differences due to the methodological changes appear to have a broadly constant effect in the overlap years.)
- The methodology assumes that the difference due to change in definition also applies to the base period from which change is measured. Certainly for some elements of the change, e.g. student incomes, this is not the case.
- The method involves investigating which is the better period over which to splice the series.
- It also requires the calculation of FRS estimates for the splice period for any time series to be spliced. Any analysts wishing to use time series which straddle the two surveys would need to be supplied with the splice period data.
- Initial resource costs would be high for any series not already examined.

Splicing method 2: Two year splice with adjustment to FES series

25. A variation on this approach would be to adjust the FES at the splice point to take account of the known effects of change in definition. The assumption would be that the change in definition would affect the FES at the splice point had we been able to incorporate the changes, but would not have affected the FES in 1979 or any other base year.
26. So taking the same example as before, this would be the calculation of the change in mean income between 1979 and 1996/7. The figures required are mean income in 1979 (FES) = £217, (mean income in 1994/95 (FES) = £304,) *adjusted* mean income in 1994/95 (FES) = £300*, mean income in 1994/95 (FRS) = £295, mean income in 1996/7 (FRS) = £307.

*The adjusted mean income has been calculated by deducting from the FES estimate the estimated effect (£4) of the changes to the definition of income.

The calculation of the growth over the period 1979 to 1996/7 is then calculated as

the growth from 1979 to 1994/95 (FES) = $300/217 = 1.38$ = growth of 38%

the growth from 1994/95 to 1996/7 (FRS) = $307/295 = 1.04$ = growth of 4%

the growth over the whole period = $1.38 * 1.04 = 1.44$ = growth of 44%.

Advantages of this methodology

- This methodology builds on the previous one by adjusting for the methodological discontinuity.
- There is no observable discontinuity in the income growth series.
- There would be an 'official' methodology which all analysts would be able to use, thus reducing the number of alternative time series.

Disadvantages of this methodology

- Again, the results obtained using this methodology can be influenced by the choice of splicing years. It is necessary for the remaining difference (i.e. due to the change in survey) to be similar in the splice period to the difference between the sources over time.

- The method involves investigating which is the better period over which to splice the series.
- It requires the calculation of FRS estimates for the splice period for any time series to be spliced and estimates of the effect of the definitional change. Any analysts wishing to use time series which straddle the two surveys would need to be supplied with this data.
- Initial resource costs would be high.
- While it may be reasonable to assume that the definitional changes would have little effect on estimates for 1979 had they been incorporated, the same assumption could not be made for estimates based on an intermediate point, say at the beginning of the 90s. A means of estimating the effects of definitional changes at intermediate points would be required.

7. The HBAI time series - results of our analysis

27. Each of the time series at sections 4.1 - 4.5 above is discussed in turn and a methodology recommended. More details of the comparisons made and analysis undertaken are in Appendix 4.

a) Percentage of individuals below a contemporary income threshold

28. Tables 1 and 2 in Appendix 4 shows the time series for the **whole population** (HBAI publication tables F1, F2) and for **all children** (HBAI, F3) below half contemporary average. Analysis shows that the changes in methodology had only a very small effect on these series, changing the percentages by, at most, only one percentage point.

29. Comparisons show close agreement between the two series in all years for the whole population, but slightly lower estimates of numbers of children below the thresholds defined as 40% and 50% of average income in the FRS in 1994/5 and BHC in 1995/6. The 40% of average income threshold falls very low in the income distribution and is not a first choice indicator. Analysis is usually concentrated on the 50% and 60% thresholds where agreement between the series is better.

30. Recommendation 1:

That the 'Direct comparisons' method be used for time series of numbers below proportions of contemporary average income. The FES series will be presented up to and including 1995/96 and the FRS series shown from 1996/7 onwards. An alternative presentation would be to include all FRS years in addition to the FES years. A caution should be given with the time series of children below 40% of mean.

By family type and by economic status

31. Many of the published results for individual family and economic groups are marked in HBAI as being sensitive to the assumptions. The changes to the definition of income between the FES and the FRS will also affect some groups more than others.

32. In particular the change to the handling of Social Fund loans and grants will have boosted the recorded income of some lone parent families. Table 3 in Appendix 4 shows that the

proportion of lone parents with incomes below half the contemporary average was lower in the FRS than in the FES for the first two years of the overlap. In 1996/7, the results are more similar, and the 1997/8 FRS results confirm the 1996/7 findings.

33. At the other end of the income scale, the deduction of all pension contributions in the calculation of net income will have reduced the incomes of some family and economic types more than others. The various changes appear to have balanced out for the population as a whole and led to very little difference, as already seen, in the proportions of the whole population below 'fractions of average income' thresholds. The changes are probably more significant for smaller groups of the population and therefore the time series for these groups have to be handled more carefully.

34. Recommendation 2:

Not to provide a time series of these analyses by family type or economic status.

b) Percentage of individuals below a fixed income threshold (E tables in HBAI)

35. The thresholds are defined as fractions of 1979 real terms average income. The threshold of most interest has traditionally been half average. The proportion below this threshold in 1995/96 was 5% on the before housing costs basis and 9% on the after housing costs basis. These proportions have been reducing (very slowly) over the last few years. It does not seem appropriate to continue this time series beyond the end of the FES series.

36. Recommendation 3:

To discontinue this series.

c) Distribution of individuals below various percentiles of the income distribution (D, G tables in HBAI)

37. A comparison of the FES and FRS results shows that the two surveys provide slightly different estimates of the composition of the bottom decile and quintile. In all years

compared, there were slightly more pensioners in the FRS bottom decile on some measures, more couples without children, fewer couples and singles with children. There were also fewer in working age workless families. The bottom quintiles were in general more similar.

38. Distributions within quintiles should not present problems. The methodological review of HBAI recommended concentration on the bottom quintile rather than decile and therefore we would recommend users of HBAI data to use the bottom quintile for analyses of people on low incomes. The differences between 1979 and 1994/95 dwarf any differences between the survey estimates for the latter period. If comparing over a shorter time period, say from 1990/91, two situations arise. For some groups, the results from the two surveys are very similar to that of the earlier year. For others, both surveys are either distinctly larger or smaller than the earlier estimate. As with other types of comparisons, warnings would be necessary about the figures being indicative, rather than precisely comparable.

39. Recommendation 4:

That the 'Direct comparisons' method be used with caveats where appropriate about variations from year to year.

d) Shares of income (A3 in HBAI)

40. The degree of income inequality does not appear to have been affected by the changes to the definition of income introduced with the FRS. It might have been expected that inequality would be slightly reduced by the inclusion of Social Fund grants, and student top-up loans (which would tend to boost low incomes) together with the deduction of additional voluntary contributions to occupational pensions (more likely to affect those on high incomes). However, the two surveys show very little difference. The continuation of the series therefore presents no problems.

41. Recommendation 5:

That the 'Direct comparisons' method be used.

e) Percentage change in real income (HBAI tables A1 and A4)

42. Table A1 shows the changes in real income by decile group and Table A4 shows the changes in real income for family type and economic status groups. The two tables are considered together because there are considerable overlaps.
43. Table A1 is based on the money values in A2, similarly Table A4 is based on the money values in A5. Differences in the money values between the FES and FRS, and particularly in year on year changes in the money values where the series overlap, need to be handled carefully. These are two of the more difficult time series to take over the survey change and where some form of splicing may be required.

Table A1

44. It has already been stated (paragraph 5) that the FRS, particularly in 1994/5 and 1995/6, showed a lower value for mean income than did the FES. As part of the exercise to look at 'splicing' the FES based and the FRS based time series, a dataset has been created based on the FRS for the combined financial years 1994/5 and 1995/6. This combined dataset, FRS 1994/95, shows values of mean income to be £295 BHC and £252 AHC compared with £304 BHC and £262 AHC from FES 1994/95. Just over half of the difference between the surveys is due to the change in survey base and under half is due to the methodological changes.
45. A comparison of the decile medians, for 1994/95, shows similar differences between the surveys: for deciles 4 - 9 BHC the FRS is between £7 and £10 lower than the FES, there are smaller differences in the lower deciles and a larger difference at the top. The picture is similar, but with slightly larger differences, AHC.
46. The 'step' change in the money values between the two surveys, partly as a result of the methodological changes, suggests that the 'Direct comparisons' method of deriving a time series would not be appropriate. For the overall mean, the effect of changing the survey outweighs the effect of changing definitions. Moreover, the difference due to change in definition varies little over the three years of overlap. This suggests that splicing would be more methodologically sound. However the different movements estimated from the FES and from the FRS in the means and decile medians between 1995/6 and 1996/7 would suggest that it is difficult to determine the better splice period.

47. Tables showing the time series that would result from the 'direct comparisons' method and from the two proposed splicing methods referred to section 6, are given in Appendix 4. Detailed commentary on the analysis is also in Appendix 4.

48. Recommendation 6:

Table A1:

6) That the 'Two year splice with adjustment' be used for the estimating growth in mean income and for changes in the decile medians, this to be used because it is the only methodologically sound method.

Table A4:

49. This table shows the changes in mean income for family and economic types. Definitional change has more effect for some family and economic types than for others and therefore it would seem important to provide a time series methodology rather than to leave individual analysts to decide on different methodologies.

50. Ascribing the differences between mean incomes for family types derived from the FRS and FES to differences between the surveys and differences between income definitions shows a mixed pattern. For pensioner couples and single pensioners the differences seen are predominantly due to the change in survey. The change in definition had a negligible effect on the results. For singles with children where the overall differences are small, the two effects tend to counterbalance. For other groups, no clear cause of difference emerges. For couples with no children, there is a systematic difference due to change in methodology of about £8 per week on average, but the difference due to the survey is in some years larger and others smaller. For couples with children and singles without children there is a similar picture, with the systematic difference due to change in definition and a variable difference due to the change in survey.

51. Looking at the employment status of families, again a systematic effect of changing income definition emerges, and a rather variable effect of the change in survey. Only for those in families with a full-time worker and a part-time or not working adult is there the clear picture of the change in survey tending to be the larger effect.

52. An additional consideration when constructing any time series for HBAI Table A4 is that many of the growth figures by family type and economic status are already presented in terms of a range of values due to the sampling error on the estimates. More discussion of the confidence intervals is given in Appendix 4.

53. The results in Appendix 4 show that there is very little difference in the time series whichever method is chosen, particularly bearing in mind the inherent uncertainty which already exists in the Table A4 time series.

54. Recommendations 7 to 10:

Table A4:

7) That the 'Direct comparisons' method used to estimate changes in mean income by family and economic type.

8) That these estimates are provided either as point estimates or as ranges where the confidence intervals are particularly wide.

9) That the confidence intervals be based on past experience.

10) That a continuous time series for quintile medians by family and economic type is not calculated.

Implications for The Pensioners'Income Series

55. The majority of time series in PI are based on money values and can be considered equivalent to HBAI tables A4 and A5. Indeed in the context of this paper, there is little difference between the pensioner couple and single pensioner estimates in HBAI table A5, and the net income estimates in PI Table 1. HBAI figures show household income of individuals, while PI looks at benefit unit income; and HBAI income amounts are equivalised (adjusted for the size and composition of the household). However, these differences should not affect our conclusions on which method should be used to produce a continuous time series.
56. This paper recommends that the 'Direct comparisons' method be used in HBAI to estimate changes in mean income by family type (recommendation 7). Likewise, sample sizes in PI are unlikely to be large enough to produce reliable estimates through the 'splicing' method. However, there are several other factors which need to be taken into account when looking at time series in PI.
57. Many PI time series concentrate on particular subgroups of pensioners. Estimates for such groups are based on smaller sample sizes than generally used in HBAI. Small sample sizes make it difficult to produce a continuous time series, because the genuine difference between the results of the two surveys is masked by random sampling variation. Furthermore, particular subgroups may be particularly sensitive to differences between the surveys, rendering the direct comparison method inappropriate. This is illustrated by the results for the bottom quintile by family type (Appendix 4). Therefore, at most it would be possible to provide continuous time series for a few large subgroups of pensioners.
58. The HBAI results in Appendix 4, Table 5, suggest that it may be possible to provide PI estimates of change for pensioner couples and for single pensioners, using the direct comparison method. However, a major concern would be that PI has greater focus on actual money values. Money values in a given year will be a great deal more sensitive to differences between the surveys than estimates of change over a long period. The direct comparison method would encourage users to make comparisons between money amounts over shorter periods, where change estimates are likely to be inaccurate.

59. Another key aspect of PI is comparison of income growth for different subgroups of the population. The direct ratio method is recommended for HBAI change estimates by family status, since it is thought that any potential error is well within the confidence intervals for such estimates. However, when growth rates are compared for different family types, the potential error becomes more significant. For example, under a direct same-survey comparison between 1979 FES and 1995/96 FES, pensioner couples saw 56% growth and singles 48% (Appendix 4, Table 5, sixth column). Under the direct ratio comparison between FES 1979 and FRS 1996/7, the growth rates were 59% and 43% respectively (Appendix 4, Table 5, last column). Clearly there is potential for even greater distortion when comparing growth rates of smaller subgroups of pensioners in PI.

60. Recommendation 11

That a continuous time series is not calculated for any of the estimates contained in The Pensioners' Incomes Series.

Summary of recommendations

61. We welcome comments on the recommendations in this paper. For convenience they are listed here with the reference to their occurrence in the main paper.

a) Percentage of individuals below a contemporary income threshold (F Tables in HBAI)

Recommendation 1

That the 'Direct comparisons' method be used for time series of numbers below proportions of contemporary average income. The FES series will be presented up to and including 1995/96 and the FRS series shown from 1996/7 onwards. An alternative presentation would be to include all FRS years in addition to the FES years. A caution should be given with the time series of children below 40% of mean. (Para 30)

Recommendation 2

Not to provide a time series of these analyses by family type or economic status.

(Para 34)

b) Percentage of individuals below a fixed income threshold (E tables in HBAI)

Recommendation 3

To discontinue this series.

(Para 36)

c) Distribution of individuals below various percentiles of the income distribution (D, G tables in HBAI)

Recommendation 4

That the 'Direct comparisons' method be used with caveats where appropriate about variations from year to year. (Para 39)

d) Shares of income (A3 in HBAI)

Recommendation 5

That the 'Direct comparisons' method be used.

(Para 41)

e) Percentage change in real income (HBAI tables A1)

Recommendation 6

That the 'Two year splice with adjustment' be used for the estimating growth in mean income and for changes in the decile medians, this to be used because it is the only methodologically sound method. (Para 48)

e) (continued) Percentage change in real income (HBAI tables A4)

Recommendation 7

That the 'Direct comparisons' method used to estimate changes in mean income by family and economic type. (Para 54)

Recommendation 8

That these estimates are provided either as point estimates or as ranges where the confidence intervals are particularly wide. (Para 54)

Recommendation 9

That the confidence intervals be based on past experience. (Para 54)

Recommendation 10

That a continuous time series for quintile medians by family and economic type is not calculated. (Para 54)

Recommendation 11

That a continuous time series is not calculated for any of the estimates contained in The Pensioners' Incomes Series (Para 60)

62. Views are welcome on any issues raised in the discussion. We would like to hear opinion on three specific points.

- Should there be guidelines about the time periods for which series are provided which bear in mind the scale of the discontinuity caused by the survey change compared with the overall

change in the trend? A time comparison between 1979 and 1996/7 raises different issues from providing the same comparison between 1991 and 1996/7 (where the step change between the surveys and definitions may be significant compared with the trend change over the period).

- Using two year splicing with adjustment, how should the effect of the definitional change on the base year be calculated and can it be assumed to be negligible for 1979.
- Initial views on the choice of splicing period, 1994/5+1995/6 or 1995/6+1996/7.

Appendix 1

SUMMARY OF METHODOLOGICAL DIFFERENCES BETWEEN THE FAMILY EXPENDITURE SURVEY AND THE FAMILY RESOURCES SURVEY

1. Both the FES and the FRS are continuous surveys of the population living in private households. The FES has an achieved sample size of about 6,500 households each year; the FRS surveys about 24,000 households. Since 1988/89, HBAI has been based on 2 years FES in order to improve the accuracy of the estimates.
2. The FES, when grossed, is representative of households in the United Kingdom whereas the FRS only covers Great Britain. The comparisons work has shown that this difference in geographic coverage makes very little difference to the estimates.
3. The Methodological Review made a few changes to the definition of income as set out in Appendix 2 of HBAI 1979 to 1996/7. The main changes, in the FRS based HBAI, are that all contributions to pensions are deducted from income, student top-up loans are included, maintenance payments are deducted from the individual making the payments, and there are changes to the handling of Social Fund loans and grants. Previously, Social Fund grants and loans were not included as income but repayments of loans were deducted. The post-Methodological Review definition includes Social Fund grants as income but ignores both payments and repayments of Social Fund loans.
4. The Methodological Review also recommended changes to the handling of income flows from insurance policies, and of student income when changes to the questions in the FRS provide the necessary information.

Appendix 2

COMPARISON BETWEEN THE FAMILY EXPENDITURE SURVEY AND THE FAMILY RESOURCES SURVEY - MAIN FINDINGS

Overall distribution

In the first two years of comparison, the FRS after the Methodological Review provided a distribution of income which had slightly lower percentages at the top of the distribution than did the FES and, AHC, had slightly more at the bottom. However in the most recent data the overall distributions are very similar BHC but still show slightly more at the bottom AHC in the FRS.

Means

Mean income (BHC) from the FES information for the UK was £300 in 1993/94, £304 in 1994/95 and £309 in 1995/96 (in April 1998 prices). The FRS estimates for GB present a slightly lower series, £295 in 1994/5, £296 in 1995/6, and £307 in 1996/7 (also in April 1998 prices).

On the After Housing Costs (AHC) measure, the FES series of means was £259, £262 and £267 compared with £251, £253 and £264 from the FRS. The differences are smaller in 1996/7 than in the previous two years.

Comparisons for tables published in HBAI

The attached table details differences in results between the surveys for particular types of analyses. It shows that over the period of overlap of the two surveys, aggregate counts for the whole population were very similar on a number of measures, but counts for particular groups showed more divergence. However, although exact figures may differ, the patterns of income distribution across the groups were similar and the relativities between groups were maintained. The Methodological Review made no major changes that affect AHC income but not BHC income. However, a review of the calculation of mortgage interest has enabled a tighter definition of mortgage interest payments for house purchase, by removal of interest on second loans. The differences in results for AHC income are similar to those for BHC income.

It is recognised that comparisons between the FRS for a single financial year and the FES for two combined financial years are not ideal. However they have been used here because they were more readily available and were assessed to provide a fair picture of patterns of differences between the two surveys.

Table 1: Comparison of FRS and FES by type of analysis

Unless otherwise stated, comments apply to BHC and AHC, including and excluding self-employed

Type of analysis			Comparisons FRS 1996/7 with FES 1995/96	HBAI Table numbers	Comparisons in previous years
Income Shares			Close	A3	Close
Aggregate counts for whole population	Absolute income	Means	Close but slightly lower in FRS on all measures	A2	Greater differences
		Distributions	Close - decile medians lower in FRS by at most £4 in all but 1 BHC deciles. Larger differences AHC in some deciles Proportions below fixed amounts the same	A2, App Tab 9.2	FRS tended to have lower numbers at the top of the distribution, more at the bottom.
	Relative income	Thresholds of mean - whole population	Close	F1,F2	Close
		Thresholds of mean - children	Close	F3	40% and 50% BHC (40% AHC) lower estimates in FRS
Composition of low income groups	Absolute groups	Bottom decile	Slightly more pensioners in FRS on some measures, more couples without children, fewer couples with children (inc SE), fewer singles with children	D1	As current year
			Fewer in families with unemployed head or spouse, or 'Other'	D2	As current year

Type of analysis		Comparisons FRS 1996/7 with FES 1995/96	HBAI Table Numbers	Comparisons in previous years	
Composition of low income groups (cont.)	Bottom quintile	Close	D1	Percentage singles with children lower in FRS As current year	
		Economic status groups more similar than bottom decile	D2		
	Relative groups	40% and 50% of mean	Percentage of singles with children lower in FRS Singles without children and single pensioners higher in FRS	F1	Greater differences in previous years for singles with children
		Other thresholds	Close	F1	Close
		Children	40%,50% 60% BHC (40%,50% AHC) lower estimates of the proportion of children with non-working parent 60%,70%,80% lower for children of SE workers	F3	As current year
Distributions for particular groups	Pensioners	Distribution	Lower mean income for single pensioners in FRS. More at the bottom of the income distribution	App 9.2	As current year
		Bottom quintile medians	FRS lower for single pensioners BHC	A5	Estimates for singles pensioners consistently lower in FRS
	Couples without children	Distribution	Significantly lower mean in FRS. Fewer at top of income distribution	App 9.2	As current year
		Bottom quintile medians	FRS estimate lower	A5	Estimates consistently lower in FRS

Type of analysis			Comparisons FRS 1996/7 with FES 1995/96	HBAI Table Numbers	Comparisons in previous years
Distributions for particular groups (cont.)	Singles with children	Distribution	Means similar. Fewer at bottom of income distribution BHC, more AHC	App 9.2	Difference in means larger
		Bottom quintile medians	FRS estimate higher BHC and AHC	A5	Larger differences in previous years
	Single without children	Bottom quintile medians	FRS estimate higher AHC	A5	As current year
	Economic groups	Distribution	Large differences in mean BHC for families with a full-time and part-time worker. Means lower in FRS for other groups except families with all adults working, BHC and AHC. Differences larger for economic groups than for family types.	App 9.3	Variation between years with some groups showing large differences in particular years.
Bottom quintile medians		FRS lower BHC for all groups except Other. Many differences small FRS lower by larger amounts AHC for all groups, especially for self-employed and Other	A5	FRS tends to produce lower estimates for all groups with a full-time worker	

Appendix 3

METHODOLOGIES

Direct Ratios

Calculated as the $\frac{\text{estimate from the FRS for the current year}}{\text{estimate from the FES for 1979}}$

Two Year splice

A second way of overcoming the timing problem with the direct splice is to use a two year splicing period for both the FRS and FES. A one year splicing period was not considered as the FES sample sizes would be small, and splicing a single year result to a combined two year result presents further technical difficulties.

Let $C_{9495FES}$ be the change from 1979 to 1994/95 as shown by the FES.

Let TYS_{iFRS} the estimated change from 1979 to year i as shown by the FRS.

Let P_i be the FRS estimate of income for year i and P_{9495} be the estimate for the combined years 1994/5 and 1995/6.

Then, for 1994/95, $TYS_{9495FRS} = C_{9495FES}$

And $TYS_{iFRS} = TYS_{9495FRS} * P_i / P_{9495}$

Two Year Splice with adjustment to FES series

Let F_i be the FES estimate of income for year i .

Let D be the average effect due to change in definition (estimated as the average difference over the three year period 1994/5 to 1996/7 between the FRS on the new definition and the FRS on the old definition).

Let AC_{94FES} be the adjusted change from 1979 to 1994/95 as shown by the FES.

Then $AC_{9495FES} = (F_{9495} - D) * 100 / F_{79}$

Let $ATYS_{iFRS}$ the estimated adjusted change from 1979 to year i as shown by the FRS.

Let P_i be the FRS estimate of income for year i and P_{9495} be the estimate for the combined years 1994/5 and 1995/6.

Then, for 1994/95, $ATYS_{9495FRS} = AC_{9495FES}$

And $ATYS_{iFRS} = ATYS_{9495FRS} * P_i / P_{9495}$

Appendix 4

EMPIRICAL RESULTS

Table 1: Percentage of individuals below half contemporary average income, FES and FRS, including the self-employed

FES year	FRS year	Below 0.5 of the contemporary average			
		BHC		AHC	
		FES	FRS	FES	FRS
1979		8%		9%	
1987		16%		19%	
1988/89		19%		22%	
1990/91		21%		24%	
1991/92		21%		25%	
1992/93		20%		25%	
1993/94		19%		24%	
	1994/5		18%		24%
1994/95		18%		23%	
	1995/6		17%		24%
1995/96		18%		24%	
	1996/7		19%		25%
	1997/8		19%		25%

Table 2: Percentage of children below half contemporary average income, FES and FRS, including the self-employed

FES year	FRS year	Below 0.5 of the contemporary average			
		BHC		AHC	
		FES	FRS	FES	FRS
1979		9%		10%	
1987		20%		24%	
1988/89		22%		25%	
1990/91		26%		31%	
1991/92		27%		32%	
1992/93		27%		33%	
1993/94		25%		32%	
	1994/5		23%		31%
1994/95		25%		32%	
	1995/6		22%		32%
1995/96		26%		34%	
	1996/7		26%		35%
	1997/8		26%		34%

Table 3: Percentage of singles with children below half contemporary average income, FES and FRS, including the self-employed

FES year	FRS year	Below 0.5 of the contemporary average			
		BHC		AHC	
		FES	FRS	FES	FRS
1979		16		19	
1987					
1988/89					
1990/91					
1991/92					
1992/93					
1993/94		40		59	
	1994/5		31		55
1994/95		39		60	
	1995/6		28		55
1995/96		40		63	
	1996/7		38		63
	1997/8		40		62

Commentary on Appendix 4, Table 4 - changes in decile medians.

The FES results refer to the combined financial years and hence are centred in time at 1st April of the second year. The FRS results are presented for a single year and therefore are centred at 30th September of the year. In general, with income levels rising faster than prices, it might be expected that estimates for a single year (corresponding to the second year of the estimate based on two years data combined) would be slightly higher than estimates for the combined two year estimate.

Commentary on the results from the 'Direct comparisons' method:

Table 1 (BHC) shows that the estimated change to October 1996 shown by the direct ratio of the FRS for 1996/7 to the 1979 FES gives, in general, rises of 1 to 2 percentage points lower than the estimated change to April 1996 suggested using the FES alone. The AHC differences are slightly larger, between 1 and 5 percentage points lower. In particular, the FES shows for the bottom decile median a rise of 12% BHC between 1979 and April 1996 and a fall of 9% AHC. The FRS ratios suggest a rise to October 1996 of 10% BHC and a fall of 12% AHC. This is due to the FRS having more low income households than the FES which has led to the bottom decile median occurring at a lower income level.

Commentary on the results from the 'Two year splice' method:

The two year splicing methodology produces higher estimates of the percentage change than does the direct comparison. These higher figures are due to the generally higher estimates of decile medians in the FES. The two year splice also provides generally higher estimates of change to October 1996 than does the FES based estimate for April 1996. To some extent this would be expected due to the different centring of the two estimates. But this result also reflects the volatility of the two data series. In some instances the FES showed a fall in estimated median income between 1994/95 and 1995/96 while the FRS showed a rise between 1994/95 (combined year income to provide the splice) and 1996/7 (single year).

Commentary on the results from the 'Two year splice with adjustment' method:

This option produces higher estimates of percentage change than does the direct splice but the differences between the adjusted pair of survey results and the unadjusted pair are very similar. Definition changes have the effect of increasing income levels at the bottom of the income distribution, and decreasing the levels in the top half.

Table 4 (BHC): Growth in decile medians, including self-employed, using various methodologies.

Index		FES and FRS						
		FES 1979	FES 1993/94	FRS 1994/5	splice year 1994/95	FRS 1995/6	FES 1995/96	FRS 1996/7
Decile 1	FES	100	106		110		112	
	FES adjusted (4) ²				114		116	
	<i>Confidence intervals</i>							
	<i>for 1979 - 1995/96</i>			FRS Direct Ratio		107	108	110
	<i>FES change = ± 4</i>			FRS Two year splice				113
	FRS Two year splice with adjustment						114	117
Decile 2	FES	100	114		117		118	
	FES adjusted (3)				119		120	
	<i>Confidence intervals</i>							
	<i>for 1979 - 1995/96</i>			FRS Direct Ratio		113	115	116
	<i>FES change = ± 3</i>			FRS Two year splice				119
	FRS Two year splice with adjustment						119	121
Decile 3	FES	100	117		120		121	
	FES adjusted (1)				121		122	
	<i>Confidence intervals</i>							
	<i>for 1979 - 1995/96</i>			FRS Direct Ratio		116	118	120
	<i>FES change = ± 3</i>			FRS Two year splice				123
	FRS Two year splice with adjustment						121	124
Decile 4	FES	100	120		123		124	
	FES adjusted (0)				123		124	
	<i>Confidence intervals</i>							
	<i>for 1979 - 1995/96</i>			FRS Direct Ratio		118	119	123
	<i>FES change = ± 3</i>			FRS Two year splice				127
	FRS Two year splice with adjustment						123	127
Decile 5	FES	100	125		128		130	
	FES adjusted (-2)				127		129	
	<i>Confidence intervals</i>							
	<i>for 1979 - 1995/96</i>			FRS Direct Ratio		123	123	128
	<i>FES change = ± 3</i>			FRS Two year splice				133
	FRS Two year splice with adjustment						127	132
Decile 6	FES	100	129		131		134	
	FES adjusted (-3)				130		132	
	<i>Confidence intervals</i>							
	<i>for 1979 - 1995/96</i>			FRS Direct Ratio		127	128	132
	<i>FES change = ± 3</i>			FRS Two year splice				136
	FRS Two year splice with adjustment						130	135
Decile 7	FES	100	133		136		138	
	FES adjusted (-3)				134		136	
	<i>Confidence intervals</i>							
	<i>for 1979 - 1995/96</i>			FRS Direct Ratio		132	131	136
	<i>FES change = ± 4</i>			FRS Two year splice				140
	FRS Two year splice with adjustment						134	139
Decile 8	FES	100	137		138		141	
	FES adjusted (-5)				136		139	
	<i>Confidence intervals</i>							
	<i>for 1979 - 1995/96</i>			FRS Direct Ratio		135	134	140
	<i>FES change = ± 4</i>			FRS Two year splice				144
	FRS Two year splice with adjustment						136	142

² Number in bracket denotes amount deducted from 1994/95 FES income before calculation of ratio with 1979 income

Decile 9	FES	100	145	145	149
	FES adjusted (-7)			143	146
	<i>Confidence intervals</i>				
	<i>for 1979 - 1995/96</i>				
	<i>FES change = ± 4</i>				
	FRS Direct Ratio		142	143	148
	FRS Two year splice			145	151
	FRS Two year splice with adjustment			143	148
Decile 10	FES	100	159	160	162
	FES adjusted (-13)			156	159
	<i>Confidence intervals</i>				
	<i>for 1979 - 1995/96</i>				
	<i>FES change = ± 9</i>				
	FRS Direct Ratio		155	156	161
	FRS Two year splice			160	166
	FRS Two year splice with adjustment			156	163
Mean	FES	100	139	140	142
	FES adjusted (-4)			139	141
	<i>Confidence intervals</i>				
	<i>for 1979 - 1995/96</i>				
	<i>FES change = ± 3</i>				
	FRS Direct Ratio		136	137	142
	FRS Two year splice			140	146
	FRS Two year splice with adjustment			139	144

Table 4 (AHC): Growth in decile medians, including self-employed, using various methodologies.

Index		FES and FRS						
		FES 1979	FES 1993/94	FRS 1994/5	splice year 1994/95	FRS 1995/6	FES 1995/96	FRS 1996/7
Decile 1	FES	100	86		92		91	
	FES adjusted (6) ³				99		99	
	<i>Confidence intervals</i>			79		86		88
	<i>for 1979 - 1995/96</i>				92			97
	<i>FES change = ± 5</i>				99			105
Decile 2	FES	100	104		106		105	
	FES adjusted (2)				108		107	
	<i>Confidence intervals</i>			102		104		103
	<i>for 1979 - 1995/96</i>				106			106
	<i>FES change = ± 3</i>				108			108
Decile 3	FES	100	110		112		112	
	FES adjusted (1)				113		113	
	<i>Confidence intervals</i>			107		107		109
	<i>for 1979 - 1995/96</i>				112			115
	<i>FES change = ± 3</i>				113			116
Decile 4	FES	100	118		121		123	
	FES adjusted (-1)				120		122	
	<i>Confidence intervals</i>			115		112		118
	<i>for 1979 - 1995/96</i>				121			125
	<i>FES change = ± 4</i>				120			125
Decile 5	FES	100	125		128		131	
	FES adjusted (-2)				127		130	
	<i>Confidence intervals</i>			121		122		127
	<i>for 1979 - 1995/96</i>				128			134
	<i>FES change = ± 4</i>				127			133
Decile 6	FES	100	131		133		136	
	FES adjusted (-3)				132		135	
	<i>Confidence intervals</i>			128		127		134
	<i>for 1979 - 1995/96</i>				133			139
	<i>FES change = ± 4</i>				132			138
Decile 7	FES	100	136		137		141	
	FES adjusted (-4)				135		139	
	<i>Confidence intervals</i>			133		132		139
	<i>for 1979 - 1995/96</i>				137			144
	<i>FES change = ± 4</i>				135			141
Decile 8	FES	100	140		142		146	
	FES adjusted (-5)				140		143	
	<i>Confidence intervals</i>			139		137		144
	<i>for 1979 - 1995/96</i>				142			149
	<i>FES change = ± 4</i>				140			146

³ Number in bracket denotes amount deducted from 1994/95 FES income before calculation of ratio with 1979 income

Decile 9	FES	100	149	151	154	
	FES adjusted (-7)			149	152	
	<i>Confidence intervals</i>					
	<i>for 1979 - 1995/96</i>					
	<i>FES change = ± 5</i>					
	FRS Direct Ratio		146		147	153
	FRS Two year splice			151		158
	FRS Two year splice with adjustment			149		156
Decile 10	FES	100	165	168	170	
	FES adjusted (-14)			164	166	
	<i>Confidence intervals</i>					
	<i>for 1979 - 1995/96</i>					
	<i>FES change = ± 9</i>					
	FRS Direct Ratio		159		162	168
	FRS Two year splice			168		175
	FRS Two year splice with adjustment			164		171
Mean	FES	100	140	142	144	
	FES adjusted (-4)			140	142	
	<i>Confidence intervals</i>					
	<i>for 1979 - 1995/96</i>					
	<i>FES change = ± 4</i>					
	FRS Direct Ratio		136		137	143
	FRS Two year splice			142		148
	FRS Two year splice with adjustment			140		146

Appendix Tables 5 and 6 - changes in mean income for family and economic types -
HBAI Table A4

Commentary on the results from the 'Direct comparisons' method:

Looking at the latest year, for many family types the 'Direct comparisons' method produces results that are reasonably close, within three percentage points, to the FES result for the previous April. The exceptions are for single pensioners and couples without children, where the ratio method provides, in both instances both BHC and AHC, estimates which are 5 to 7 percentage points lower than the FES series. For single pensioner the lower estimates are due to the change in survey, but for couples without children, half of the difference is due to the change in income definition.

Looking at the growth in mean income by economic status for the latest year, the 'Direct comparisons' method produces results which are close (within 3 percentage points) BHC to the FES results for the previous April for 6 of the 8 economic status groups. The exceptions are couples where one partner is working full time and the other partner is either working part-time or not working. The match is less good AHC and for the earlier years.

Commentary on the results from the 'Two year splice' method:

The two years splicing produces mixed results. For some family types, the results of the two year splice are similar to those produced by the FES: in some instances this is a closer estimate than the direct splice, and in others a wider estimate. However, it should not necessarily be expected that the surveys should produce the same results.

The two year splice by economic status produces mixed results as it did in the analysis by family type. In the latest year it generally provides a fairly good match with the FES series, except for the self-employed and the unemployed where the results are very different. For those in families with a self-employed worker, the FES showed a decline in income over the previous year while the FRS showed a growth - this could be a result of the improvement to the self-employment questions in both the FES and FRS. As a result the final figures diverge. For the unemployed, the same situation occurred, but in reverse.

Confidence in the FES estimates

An additional consideration when constructing any time series for HBAI Table A4 is that many of the growth figures by family type and economic status are already presented in terms of a range of values due to the sampling error on the estimates. The main source of error is in the 1979 base estimate because it comes from single year FES data. The confidence intervals for the latest FES data are shown in tables 5 and 6 in Appendix 4. The size of confidence intervals for growth in mean BHC incomes varies considerably, from $\pm 4\%$ where all adults are full-time employees, and $\pm 5\%$ for singles without children, to $\pm 16\%$ for self-employed and $\pm 14\%$ for families with head unemployed. In most instances the size of the difference between the alternative estimates and the FES estimate is smaller than the confidence interval.

Comparisons for the bottom quintile for family and economic groups

A comparison frequently made is the rise in the bottom quintile median for particular groups in society. (For the whole population, the bottom quintile median is the same as the decile breakpoint at 10%).

The work comparing the FES and FRS results showed that there were significant shifts in the shape of the income distributions for some groups, although mean values may be less affected. In many instances, this could be directly attributed to a particular change introduced by the Methodological Review.

Many of these differences affect the bottom of the income distribution. In 1997/8, a further change occurred with an improved calculation of student incomes. Comparisons of monetary amounts in the bottom quintile of the income distribution will be very sensitive to these changes. Since groups will be differentially affected by the changes introduced by the Methodological Review, comparisons between groups cannot be valid. It is proposed therefore not to provide estimates of change in the bottom quintile median (and so the second half of the question posed in paragraph 11 e) would not be answered).

Table 5 (BHC): Estimates of change in income by family type, including self-employed, using differing methodologies

Index		FES and FRS						
		FES 1979	FES 1993/94	FRS 1994/5	splice year 1994/95	FRS 1995/6	FES 1995/96	FRS 1996/7
Pensioner couple	FES	100	148		152		156	
	FES adjusted (1) ⁴				152		156	
	<i>Confidence intervals</i>			151		148		159
	<i>for 1979 - 1995/96</i>				152			162
	<i>FES change = ± 11</i>				152			162
Single pensioner	FES	100	145		148		148	
	FES adjusted (0)				148		148	
	<i>Confidence intervals</i>			138		139		143
	<i>for 1979 - 1995/96</i>				148			153
	<i>FES change = ± 7</i>				148			153
Couple with children	FES	100	142		143		144	
	FES adjusted (4)				141		142	
	<i>Confidence intervals</i>			140		143		146
	<i>for 1979 - 1995/96</i>				143			147
	<i>FES change = ± 7</i>				141			145
Couple without children	FES	100	138		141		146	
	FES adjusted (8)				138		143	
	<i>Confidence intervals</i>			134		135		140
	<i>for 1979 - 1995/96</i>				141			147
	<i>FES change = ± 6</i>				138			144
Single with children	FES	100	120		118		118	
	FES adjusted (-2)				119		119	
	<i>Confidence intervals</i>			119		122		118
	<i>for 1979 - 1995/96</i>				118			116
	<i>FES change = ± 11</i>				119			117
Single without children	FES	100	129		132		132	
	FES adjusted (3)				130		131	
	<i>Confidence intervals</i>			126		125		131
	<i>for 1979 - 1995/96</i>				132			138
	<i>FES change = ± 5</i>				130			136

⁴ Number in bracket denotes amount deducted from 1994/95 FES income before calculation of ratio with 1979 income

Table 5 (AHC): Estimates of change in income by family type, including self-employed, using differing methodologies

Index		FES and FRS						
		FES 1979	FES 1993/94	FRS 1994/5	splice year 1994/95	FRS 1995/6	FES 1995/96	FRS 1996/7
Pensioner couple	FES	100	156		161		166	
	FES adjusted (1) ⁵				161		165	
	<i>Confidence intervals</i>			158		156		168
	<i>for 1979 - 1995/96</i>				161			173
	<i>FES change = ± 12</i>				161			172
Single pensioner	FES	100	148		152		151	
	FES adjusted (0)				152		151	
	<i>Confidence intervals</i>			138		140		144
	<i>for 1979 - 1995/96</i>				152			158
	<i>FES change = ± 8</i>				152			158
Couple with children	FES	100	141		142		144	
	FES adjusted (4)				140		141	
	<i>Confidence intervals</i>			138		141		146
	<i>for 1979 - 1995/96</i>				142			149
	<i>FES change = ± 7</i>				140			146
Couple without children	FES	100	142		146		151	
	FES adjusted (8)				142		148	
	<i>Confidence intervals</i>			138		138		144
	<i>for 1979 - 1995/96</i>				146		152	152
	<i>FES change = ± 6</i>				142		149	149
Single with children	FES	100	110		106		105	
	FES adjusted (-3)				109		107	
	<i>Confidence intervals</i>			104		107		104
	<i>for 1979 - 1995/96</i>				106			104
	<i>FES change = ± 12</i>				109			106
Single without children	FES	100	128		131		132	
	FES adjusted (4)				129		130	
	<i>Confidence intervals</i>			124		122		129
	<i>for 1979 - 1995/96</i>				131			138
	<i>FES change = ± 5</i>				129			136

⁵ Number in bracket denotes amount deducted from 1994/95 FES income before calculation of ratio with 1979 income

Table 6 (BHC): Estimates of change in income by economic type, including self-employed, using differing methodologies

Index	FES and FRS						
	FES 1979	FES 1993/94	FRS 1994/5	splice year 1994/95	FRS 1995/6	FES 1995/96	FRS 1996/7
Self-employed	FES	100	150		160		159
	FES adjusted (16) ⁶				154		152
<i>Confidence intervals</i>	FRS Direct Ratio		147			146	158
<i>for 1979 - 1995/96</i>	FRS Two year splice				160		172
<i>FES change = ± 16</i>	FRS Two year splice with adjustment				154		165
Single or couple	FES	100	146		145		147
all full-time	FES adjusted (7)				142		145
<i>Confidence intervals</i>	FRS Direct Ratio		144			142	148
<i>for 1979 - 1995/96</i>	FRS Two year splice				145		150
<i>FES change = ± 4</i>	FRS Two year splice with adjustment				142		148
Couple, 1 full-time	FES	100	145		145		151
1 part-time	FES adjusted (5)				142		148
<i>Confidence intervals</i>	FRS Direct Ratio		146			150	157
<i>for 1979 - 1995/96</i>	FRS Two year splice				145		153
<i>FES change = ± 9</i>	FRS Two year splice with adjustment				142		151
Couple, 1 full-time	FES	100	150		146		147
1 not working	FES adjusted (3)				145		146
<i>Confidence intervals</i>	FRS Direct Ratio		140			144	143
<i>for 1979 - 1995/96</i>	FRS Two year splice				146		147
<i>FES change = ± 9</i>	FRS Two year splice with adjustment				145		145
One or more	FES	100	137		138		139
part-time	FES adjusted (2)				137		138
<i>Confidence intervals</i>	FRS Direct Ratio		136			134	136
<i>for 1979 - 1995/96</i>	FRS Two year splice				138		139
<i>FES change = ± 11</i>	FRS Two year splice with adjustment				137		138
Head or spouse	FES	100	153		155		157
aged 60 or over	FES adjusted (0)				155		157
<i>Confidence intervals</i>	FRS Direct Ratio		148			148	154
<i>for 1979 - 1995/96</i>	FRS Two year splice				155		161
<i>FES change = ± 6</i>	FRS Two year splice with adjustment				155		161
Head or spouse	FES	100	119		123		127
unemployed	FES adjusted (-1)				124		128
<i>Confidence intervals</i>	FRS Direct Ratio		127			128	124
<i>for 1979 - 1995/96</i>	FRS Two year splice				123		120
<i>FES change = ± 14</i>	FRS Two year splice with adjustment				124		121
Other	FES	100	136		138		134
	FES adjusted (-4)				140		136
<i>Confidence intervals</i>	FRS Direct Ratio		133			137	131
<i>for 1979 - 1995/96</i>	FRS Two year splice				138		133
<i>FES change = ± 11</i>	FRS Two year splice with adjustment				140		136

⁶ Number in bracket denotes amount deducted from 1994/95 FES income before calculation of ratio with 1979 income

Table 6 (AHC): Estimates of change in income by economic type, including self-employed, using differing methodologies

Index		FES and FRS						
		FES 1979	FES 1993/94	FRS 1994/5	splice year 1994/95	FRS 1995/6	FES 1995/96	FRS 1996/7
Self-employed	FES	100	152		163		164	
	FES adjusted (15) ⁷				156		157	
	<i>Confidence interval</i>			149		148		161
	<i>for 1979-1995/96</i>				163			178
	<i>FES change ±1 7</i>				156			170
Single or couple all full-time	FES	100	147		147		150	
	FES adjusted (7)				144		147	
	<i>Confidence interval</i>			146		143		151
	<i>for 1979-1995/96</i>				147			154
	<i>FES change ±5</i>				144			151
Couple, 1 full-time 1 part-time	FES	100	147		146		153	
	FES adjusted (5)				144		150	
	<i>Confidence interval</i>			148		152		160
	<i>for 1979-1995/96</i>				146			156
	<i>FES change ±9</i>				144			153
Couple, 1 full-time 1 not working	FES	100	151		147		149	
	FES adjusted (3)				145		147	
	<i>Confidence interval</i>			139		145		144
	<i>for 1979-1995/96</i>				147			149
	<i>FES change ±11</i>				145			147
One or more part-time	FES	100	139		139		139	
	FES adjusted (2)				138		138	
	<i>Confidence interval</i>			136		134		136
	<i>for 1979-1995/96</i>				139			140
	<i>FES change ±13</i>				138			139
Head or spouse aged 60 or over	FES	100	158		161		163	
	FES adjusted (0)				161		163	
	<i>Confidence interval</i>			151		152		158
	<i>for 1979-1995/96</i>				161			167
	<i>FES change ±7</i>				161			167
Head or spouse unemployed	FES	100	108		112		113	
	FES adjusted (-2)				114		114	
	<i>Confidence interval</i>			111		112		105
	<i>for 1979-1995/96</i>				112			105
	<i>FES change ±16</i>				114			107
Other	FES	100	129		130		123	
	FES adjusted (-3)				132		126	
	<i>Confidence interval</i>			120		125		117
	<i>for 1979-1995/96</i>				130			124
	<i>FES change ±13</i>				132			126

⁷ Number in bracket denotes amount deducted from 1994/95 FES income before calculation of ratio with 1979 income

Section C

Further guidance on comparisons over time⁸

1. The difficulty analysts face in comparing results from the FRS with those for an earlier period from the FES are two fold.
 - methodological changes were introduced into the definitions used with the FRS to better reflect the current flows of income into households. These changes create a discontinuity in the series, the size of which will vary according to the family or economic group being considered;
 - the two surveys have different underlying methodologies including differing geographic coverage, different response rates and response profiles. This again contributes to a discontinuity in the series.

This section expands on the guidance given in paragraph 7 of Section A.

2. Two methods of comparison are recommended: direct comparisons and splicing (also known as chain linking). Details of the splicing methodology can be found in the technical box at the end of the appendix.

Direct comparison of new FRS and old FES

3. Direct comparisons is the recommended method to use for:

Percentage of individuals below a contemporary income threshold (F Tables)

Percentage of individuals below a fixed income threshold (E tables)

Distribution of individuals below various percentiles of the income distribution (D, G tables)

Shares of income (A3 table)

⁸ Guidance taken from Appendix 8 of 'Households Below Average Income 1994/5 - 1998/9'

4. In this methodology, FRS data from the current period is directly compared with FES data from the 1979 base period, without any adjustments to either set. If the data are being presented as a continuous series, e.g. the percentages below thresholds, the two series should be run together and, optionally, a line used to indicate the discontinuity in the series. So, for example, in a time series showing the proportion of individuals below half average, percentages should be presented up to 1993/94 (or 1994/95 or 1995/96 according to choice) based on FES and the series continued from 1994/5 (or 1995/6 or 1996/7) using FRS data.
5. For percentage change over the period, the estimate should be the ratio of current FRS value to the 1979 FES value.

Robustness of estimates

6. The 'Direct comparison' method is valid when making comparisons over the longer time period, say from 1979 to the current year but care must be taken over shorter time periods, such as over the 1990s. The size of change over the longer time period is generally far larger than any discontinuity caused by the change in the survey but during 1990s there was less change in the income distributions and the size of the discontinuity may be of similar size to any actual change in values. It is not possible to estimate the effect that definitional changes would have had in early 1990s, so there is no estimate of the likely size of the discontinuity. It is recommended that no comparisons over this short time period are made.
7. For specific series, readers should note:

D tables: Care should be taken in the bottom decile because:

- there are slightly more pensioners in the FRS on some measures, more couples without children, fewer couples with children (including the self-employed) and fewer singles with children;
- there are fewer families with unemployed head or spouse, or 'Other'.

Bottom quintile results are more similar. The closeness of results for singles with children have varied over the three years for which comparisons were available.

F tables: Care should be taken in comparing estimates for:

- the percentage of children below 40% and 50% of mean income BHC, 40% AHC, as the FRS tends to produce lower estimates than the FES. In particular, the percentage of children with non-working parents is lower at the 40%, 50% and 60% thresholds BHC (40% and 50% AHC) while the proportions for children of self-employed workers is lower at the 60%, 70% and 80% thresholds;
- the percentage of singles with children below the 40% and 50% thresholds as estimates tends to be lower in the FRS;
- the percentage of singles without children, and of single pensioners below the 40% and 50% thresholds as estimates tends to be higher in the FRS.

E tables: Traditionally the E tables presented estimates for the current year using values derived as thresholds of the 1979 income distribution. Some estimates of change using thresholds based on 1994/5 fixed mean income are provided in chapters 5, 6 and 7 of HBAI 1994/5 - 1998/9.

Two year splicing with adjustment based on 1995/6+1996/7 as the splice period:

8. Two year splicing is the recommended method to use for:

Percentage change in real income (HBAI tables A1)

Percentage change in real income (HBAI tables A4)

Comparison over time for quintile medians by family and economic type is not recommended. Definitional changes are known to have had a significant impact for some small groups in the population, effects which are difficult to estimate with a degree of accuracy. It should also be borne in mind that the percentage changes over the FES period for many quintile groups of family and economic type are subject to warning as being sensitive to assumptions over equivalence scales or as having very large confidence intervals. A methodology which would produce robust estimates is not available.

9. This method is recommended for comparisons of monetary amounts. Two year splicing overlays the FES with the FRS series, directly matching the time period, and effectively takes the old FES series and imposes from the splice point onwards change as seen by the FRS. The FES is adjusted at the splice point to take account of the known effects of change in definition. The assumption would be that the change in definition would affect the FES at the splice point had we been able to incorporate the changes, but would not have affected the FES in 1979 or any other base year. This assumption was thought reasonable by external consultants.
10. The table below shows the uprating factors from 1979 to 1994/5. As an example, this would be the calculation of the change in mean income BHC between 1979 and 1998/9. The figures required are the mean income adjustment factor since 1979 = 1.377, mean income in 1994/5 (FRS February 2000 prices) = £303, mean income in 1998/9 (FRS February 2000) = £334.

The calculation of the growth over the period 1979 to 1998/9 is then calculated as

$$\begin{aligned} & \text{mean income in 1998/9} * \text{uprating factor} / \text{mean income in 1994/5} \\ & = 334 * 1.377 / 303 \\ & = 1.52 \end{aligned}$$

i.e. there was an estimated rise of 52% in mean equivalised income BHC between 1979 and 1998/9.

Robustness of estimates

11. Comparisons made in this way are valid over the longer time period, say 1979 to the current year. It is reasonable to assume that the definitional changes would have little effect on the estimates for 1979, but the same assumption cannot be made for an intermediate point, say at the beginning of the 1990s. Comparisons over a shorter time period are not recommended.
12. For specific series, readers should note:

Tables A1 (comparing results in A2): Results at the top and bottom of the distribution are more sensitive than for those in the middle.

Tables A4 (comparing mean results in A5): Care should be taken with the following groups:

- Mean income for single pensioners is lower in the FRS as is that for couples without children.
- Over the three years for which the FES and FRS were compared, means differences between the two surveys in estimates of incomes for economic groups showed variation between years, with some groups showing larger differences in particular years. The effect of the change in definition was, however, stable across the years.

Uprating factors from 1979 to 1994/5

	Including self-employed		Excluding self-employed	
	BHC	AHC	BHC	AHC
Deciles				
1	1.144	0.905	1.180	0.985
2	1.174	1.059	1.192	1.077
3	1.192	1.114	1.200	1.111
4	1.211	1.203	1.210	1.199
5	1.268	1.265	1.257	1.259
6	1.301	1.318	1.294	1.310
7	1.344	1.364	1.335	1.365
8	1.368	1.411	1.358	1.394
9	1.426	1.475	1.406	1.457
10	1.551	1.604	1.507	1.560
Mean	1.377	1.385	1.355	1.362
Mean income for family type groups				
Pensioner couple	1.531	1.611	1.447	1.546
Single pensioner	1.448	1.464	1.384	1.417
Couple with children	1.372	1.364	1.313	1.328
Couple without children	1.400	1.438	1.278	1.326
Single with children	1.175	1.064	1.151	1.058
Single without children	1.291	1.281	1.222	1.230
Mean income for economic status groups				
Self-employed	1.476	1.506	-	-
Single or couple, all in full-time work	1.435	1.459	1.369	1.415
One in full-time work, one in part-time work	1.413	1.427	1.342	1.379
One in full-time work, one not working	1.423	1.419	1.347	1.370
One or more in part-time work	1.387	1.389	1.327	1.356
Head or spouse aged 60 or over	1.541	1.590	1.467	1.539
Head or spouse unemployed	1.287	1.163	1.264	1.156

Other	1.351	1.246	1.312	1.245
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Technical Box

Two year splicing

Splicing methodology allows changes over time in the base FES series to be carried forward from the splice period into the FRS series. A two year splicing period is used to provide an exact overlay in time at the splicing point of the FRS with the smaller sample from the FES. The sample sizes in the FES are considered to small to provide robust estimates of change using single years. The splicing point chosen is the combined financial years 1995/6 and 1996/7.

Using the FRS, estimates can be derived of the effect of the definitional changes. These are applied to the FES estimate at the splicing point on the assumption that the definitional change would have had the same effect, in percentage terms, on the FES based results, had it been incorporated, as it is observed to have had on the FRS results. However, it is assumed that the definitional changes would have negligible effect on the base year 1979.

Then the estimated change from 1979 to 1998/9 is as follows:

$$\frac{\text{FES } 95/96}{\text{FES } 79} * \frac{\text{FRS } 98/9}{\text{FRS}95/96}$$

As HBAI provides estimates of change from the FRS from 1994/5 to the current year, this needs to be rewritten in terms of change since 1994/5. Hence

$$\frac{\text{FES } 95/96}{\text{FES } 79} * \frac{\text{FRS } 94/5}{\text{FRS}95/96} * \frac{\text{FRS } 98/9}{\text{FRS } 94/5}$$

= Uprating factor * FRS change since 1994/5 (1)

Uprating factors from 1979 are provided in Appendix Table 8.1. Readers wishing to use a different base period should multiply the result calculated using formula (1) by the ratio FES79 / FES at base year.