

**The Use of In-year Deflation in
the Pensioners' Incomes Series**

**The Pensioners' Incomes Series
Methodological Paper No. 10**

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Executive summary

'In-year deflation' is the process of adjusting the incomes reported by survey respondents throughout the year so that they are all expressed in the same price base. It takes account of the price inflation throughout the year which means that someone reporting £100 income in (say) December has less spending power than someone with £100 income in July. All incomes in the Pensioners' Incomes Series undergo in-year deflation and are expressed in July prices.

The conceptual arguments are mixed. In-year deflation reduces the artificial dispersion caused by inflation, but it may emphasise some aspects of genuine income dispersion through the year. This means that PI results may not present an entirely accurate 'point-in-time' picture of the income distribution. However, this type of income dispersion would be present in some form, even without the process of in-year deflation. Overall, the adjustment for artificial dispersion seems to justify retaining in-year deflation, provided that the impact of adjustment is large enough to make it worthwhile.

Currently (1999/00), the impact of in-year deflation on estimates in PI is small but significant. The impact is partly due to inflation throughout the year and partly due to how evenly interviews of pensioners are spread across the year. However, most of the effect on PI results is caused by the 'non-central' choice of price base (i.e. July is not in the middle of the financial year), rather than by the deflation itself.

Although the impact on results, and therefore the need for in-year deflation, is currently small, it will increase in future if there is a period of higher inflation. This may be accentuated by the unequal distribution of interviews throughout the year for different subgroups of pensioners. Therefore, it is recommended that the process of in-year deflation is retained.

The choice of price base in which incomes are expressed is purely a presentational issue. PI estimates are expressed in July prices. It is recommended that future editions of PI should express incomes in 'year-average' prices, since this is a more 'central' price base which represents the average level of prices throughout the year and is more user-friendly.

Comments

Any comments on this paper would be gratefully received:

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1. Introduction

All income estimates in the Pensioners' Incomes Series (PI) are based on incomes that have undergone 'in-year deflation'. This is a process by which individuals' incomes are adjusted to a common price base (July prices in PI) – 'adjusting for inflation' so that they can be directly compared. It should be noted that this is a different process to the 'uprating' of previous years' income estimates to (July of) latest year prices, although the principle – of adjusting for inflation so incomes from different time periods can be compared meaningfully – is the same.

2. Conceptual arguments

As mentioned above, the purpose of in-year deflation is to adjust for inflation over the year. This is necessary because someone reporting £100 income in (say) December would not have as much spending power as someone reporting £100 income in July, because prices have gone up in the intervening period. It would be misleading to present these two individuals as having the same spending power. Expressing all incomes in July prices reduces the artificial dispersion of incomes in PI.

Although in-year deflation reduces the artificial dispersion in incomes caused by inflation over the year, it may lead to a different type of income dispersion. In practice, many types of income see a nominal increase just once a year, for example an annual increase in rate of earnings or benefit rates. If a person's nominal income stays the same throughout the year, price inflation means that their actual spending power decreases over the year. The process of in-year deflation adjusts for that effect, creating a genuine dispersion of incomes over the year. For example, a group of people with the same nominal income, interviewed at different points in the year, will have a selection of different *deflated* incomes, reflecting the genuine differences in spending power at different times of the year.

Therefore, the genuine dispersion in deflated incomes in PI is partly a result of interviewing people at different times of the year. A problem arises because PI aims to present a 'snapshot' of incomes at a given point in time. The distribution of deflated incomes over the year may be wider than the distribution at any precise point during that year.

This may call the practice of in-year deflation into question. However, even nominal (non-deflated) incomes would be subject to this type of income dispersion. Due to the unpredictable nature of many nominal rises in income, dispersion occurs because some people will be interviewed before the rise and some after. For example, if a group of people received their sole income from earnings of £200 a week, which increased in August to £220 a week, any 'point-in-time' distribution of their income should show equal incomes. However, since they are interviewed at different times in the year, some will be recorded as having £200 ('group A') and some £220 ('group B'). In this case, in-year deflation would reduce the dispersion between group A and group B, but would emphasise the dispersion *within* each group.

The arguments are mixed concerning income dispersion caused purely by interviewing across the whole year, while the benefits of using in-year deflation to reduce artificial income dispersion caused by inflation are clearer. Based on conceptual arguments alone, it is recommended that in-year deflation should be retained. However, we should also consider whether the impact of the adjustment on results is large enough to justify in-year deflation.

3. Effects on estimates published in the PI Series

The simplest way to assess the effects on published estimates is to reproduce estimates without using in-year deflation.

Table 1 compares estimates of average pensioner incomes in 1999/00, as shown in Table 1 of the PI publication, with the corresponding estimates calculated with no in-year deflation (first two columns). The third column shows the difference in the *unrounded* estimates. For smaller income estimates, the effect of in-year deflation is lost in the subsequent rounding of PI estimates. For larger estimates, in-year deflation has a small but significant effect, for example reducing estimated average gross income of pensioner units by £2 a week.

Table 2 examines the effect of in-year deflation on the *distribution* of income, by comparing the results from Table 13 of the PI publication with the non-deflated estimates. Again, there are small but significant differences caused by the process of in-year deflation. The difference (column 3) is larger for the top quintile in each distribution, but *proportionally* it is similar to the difference for the other quintiles. For each distribution, Table 2 shows the ratio between the median incomes of the top fifth and the bottom fifth. The effect of in-year deflation on this ratio is very small for the pensioner couples ‘after housing costs’ distribution and negligible for the other distributions. Therefore, there is no evidence of in-year deflation having a significant effect on the distribution of income.

The effect of in-year deflation on PI estimates will depend on two main factors:

Firstly, it depends on the distribution of when pensioners were interviewed during the year. For example, if all pensioners were interviewed towards the end of the year, the effect of in-year deflating to July prices would be larger than if all pensioners were interviewed in July.

The second factor is differences between monthly deflation factors, i.e. how much inflation there was over the course of the year. A related factor is how “central” the price base for in-year deflation is. For example, the in-year deflation process will produce higher income estimates if we use a price base late in the year, because most pensioners will have their incomes adjusted upwards to take account of inflation up to the end of the year.

Table 1 shows the combined effect of these factors. It would be a large task to separate out the effect of the first factor, since this would involve re-weighting the sample. However, we can look at the separate effect of the “centrality” of the price base. The fourth column of Table 1 shows what the published estimates would be if we deflated to ‘average 1999/00’ prices rather than July 1999 prices. The effect on estimates (fifth column) is again small but significant. Indeed, the effect is very similar to having no in-year deflation at all. This is borne out by the sixth column, which shows that the differences between estimates deflated to a ‘central’ price base and non-deflated estimates is negligible.

A very similar pattern is observed for the distribution of income (Table 2), with the effect of in-year deflation caused almost entirely by the choice of price base, rather than the deflation itself.

Table 1: The average incomes of pensioner units, 1999/00

	<i>Results based upon data from the FRS</i>						<i>Incomes in £ per week</i>
	Deflation regime and price base						
	Published deflated estimates (Jul'99 prices)	Non-deflated estimates (interview prices)	Effect of deflation on estimates	Alternative deflated estimates (1999/00 prices)	Difference between published and alternative deflation regimes	Effect of alternative deflation on estimates	
	(1)	(2)	(3) = (1) - (2)	(4)	(5) = (1) - (4)	(6) = (2) - (4)	
All pensioner units							
Gross income	235	237	-2	237	-2	*	
Of which:							
Benefit income	122	123	-1	123	-1	*	
Occupational pension	61	61	*	61	*	*	
Investment income	32	32	*	32	*	*	
Earnings	19	19	*	19	*	*	
Other income	2	2	*	2	*	*	
Net income before housing costs							
Mean	201	203	-2	203	-2	*	
Median	158	159	-1	159	-1	*	
Net income after housing costs							
Mean	180	181	-1	181	-1	*	
Median	135	136	-1	136	-1	*	
Pensioner couples							
Gross income	333	336	-3	336	-3	*	
Of which:							
Benefit income	146	147	-1	147	-1	*	
Occupational pension	95	96	-1	96	-1	*	
Investment income	53	54	*	54	*	*	
Earnings	37	37	*	37	*	*	
Other income	2	2	*	2	*	*	
Net income before housing costs							
Mean	281	283	-2	283	-2	*	
Median	221	223	-2	223	-2	*	
Net income after housing costs							
Mean	263	264	-1	264	-1	*	
Median	205	206	-1	206	-1	*	
Single pensioners							
Gross income	171	172	-1	172	-1	*	
Of which:							
Benefit income	106	107	-1	107	-1	*	
Occupational pension	38	38	*	38	*	*	
Investment income	18	18	*	18	*	*	
Earnings	7	8	*	8	*	*	
Other income	1	1	*	1	*	*	
Net income before housing costs							
Mean	149	150	-1	150	-1	*	
Median	126	127	-1	127	-1	*	
Net income after housing costs							
Mean	126	126	-1	126	-1	*	
Median	98	98	-1	98	-1	*	

Notes:

(1) *Estimates of less than £0.50 are labelled *.*

(2) *Differences may not correspond exactly to the income estimates shown due to rounding.*

Table 2: The median net income of pensioner units by quintile of the net income distribution, 1999/00

Results based upon data from the FRS

Incomes in £ per week

	Deflation regime and price base					
	Published deflated estimates (Jul'99 prices)	Non-deflated estimates (interview prices)	Effect of deflation on estimates	Alternative deflated estimates (1999/00 prices)	Difference between published and alternative deflation regimes	Effect of alternative deflation on estimates
	(1)	(2)	(3) = (1) - (2)	(4)	(5) = (1) - (4)	(6) = (2) - (4)
Net income						
Before housing costs						
Pensioner couples						
Bottom fifth	134	135	-1	135	-1	*
Next fifth	178	180	-2	180	-1	*
Middle fifth	221	223	-2	223	-2	*
Next fifth	288	290	-2	291	-2	*
Top fifth	462	466	-4	465	-4	*
Ratio Bottom : Top fifth	3.44	3.44	0.00	3.44	0.00	0.00
Single pensioners						
Bottom fifth	75	76	-1	76	-1	*
Next fifth	105	105	-1	105	-1	*
Middle fifth	126	127	-1	127	-1	*
Next fifth	158	159	-1	159	-1	*
Top fifth	236	238	-2	238	-2	*
Ratio Bottom : Top fifth	3.13	3.13	0.00	3.13	0.00	0.00
Net income after housing costs						
Pensioner couples						
Bottom fifth	114	115	-1	115	-1	*
Next fifth	158	159	-1	159	-1	*
Middle fifth	205	206	-1	206	-1	*
Next fifth	274	275	-1	275	-2	*
Top fifth	449	450	-1	451	-3	-1
Ratio Bottom : Top fifth	3.94	3.92	0.01	3.94	0.00	-0.01
Single pensioners						
Bottom fifth	60	61	*	61	*	*
Next fifth	77	77	*	77	*	*
Middle fifth	98	98	-1	98	-1	*
Next fifth	137	137	-1	137	-1	*
Top fifth	218	219	-1	219	-1	*
Ratio Bottom : Top fifth	3.62	3.62	0.00	3.62	0.00	0.00

Notes:

(1) Estimates of less than £0.50 are labelled *.

(2) Differences may not correspond exactly to the income estimates shown due to rounding.

It is important to note that there is no “correct” choice of price base for in-year deflation. Although the choice has a small effect on levels of income estimates, the effect is the same for all estimates, and so it has no effect on comparisons between different estimates or comparisons over time. As long as estimates are clearly labelled (e.g. labelled in PI as being “in July 1999 prices”) then they are perfectly valid. The issue of which price base to use then becomes a presentational issue – an issue discussed in more detail later in this paper.

4. Future prospects

If the remaining impact of in-year deflation is negligible, this may cast doubt on whether we should continue to use in-year deflation. However, it is also important to consider whether the effects are likely to remain small in future.

In recent years, inflation has been relatively low and stable and so the in-year deflation process has not needed to make large adjustments to income data. However, the process will become more important if we experience periods of higher and fluctuating inflation.

Furthermore, the spread of interviews across the year may be liable to fluctuate from year to year, particularly for smaller subgroups of pensioners. **Figure 1** shows how pensioner interviews were distributed across the year in 1999/00. The most obvious thing to note is that the number of interviews increases significantly in November and decreases in December. This is because cases sampled for December are deliberately interviewed earlier (starting in the last week of November), to pre-empt any problems with completing interviews over the Christmas period.

It is interesting to note that even this large imbalance does not have a large impact on non-deflated estimates, because inflation between November and December was small in 1999. However, periods of high inflation in future years may lead to artificial changes in income estimates.

There are also smaller fluctuations in interviews completed in other months, due to a mixture of seasonal and random effects. An examination of a selection of pensioner subgroups revealed that these fluctuations differed from group to group. **Figure 2** demonstrates this, using different age groups of pensioner couples as an example. Therefore, in periods of high inflation comparisons between the incomes of different subgroups of pensioners could be distorted.

To summarise, while the effect of in-year deflation on estimates is currently negligible (ignoring the effect of the choice of price base), it is by no means certain that this will be the case in future years.

Recommendation 1

Given the small impact in-year deflation currently has on PI results, the arguments for retaining the adjustment are mixed. However, the possibility exists of higher and more unstable inflation rates in future years. In such circumstances, the arguments will shift more in favour of in-year deflation. *Therefore, it is recommended that the existing practice of in-year deflation should be retained.*

Figure 1: Distribution of FRS interviews over the year, all pensioner units, 1999/00

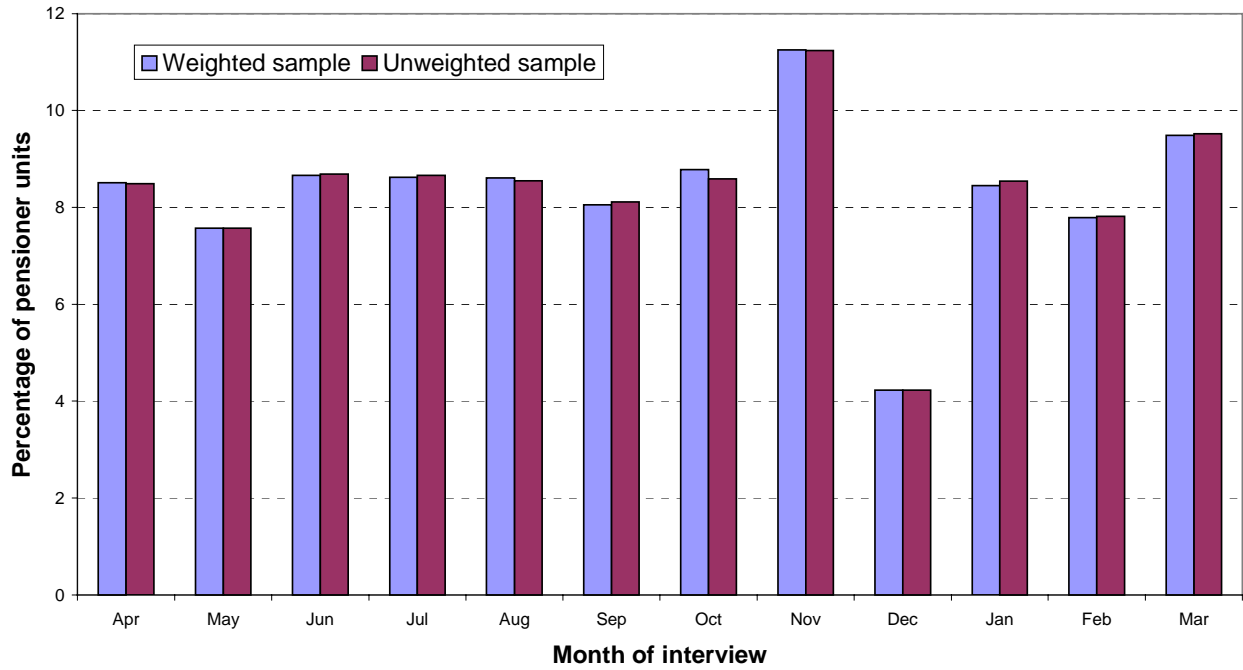
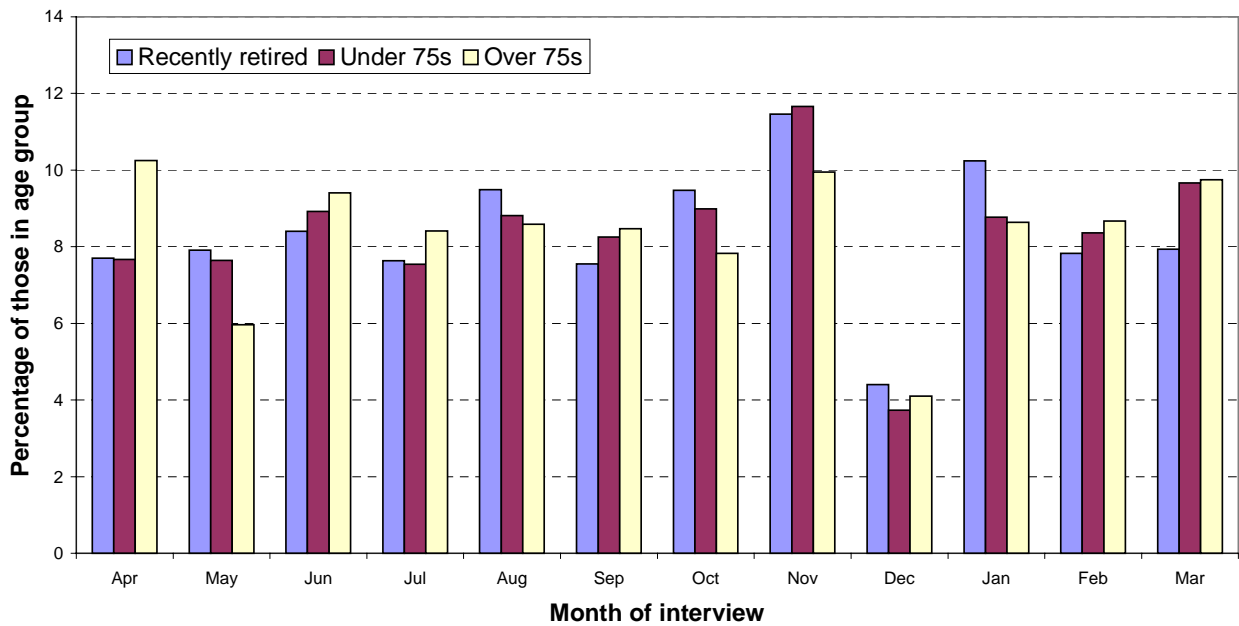


Figure 2: Distribution of FRS interviews over the year, pensioner couples, by age, 1999/00



5. Choice of price base

As noted above, the choice of price base for in-year deflation will affect the level of incomes but not any comparisons between incomes or over time: The choice of price base is purely a presentational issue.

The current price base for PI estimates (July of the latest reference year) is partly the result of historical factors. When estimates were produced for calendar years, July was approximately in the middle of the year. When analysis moved to financial years, estimates were still expressed in July prices since that was what users were accustomed to.

The Households Below Average Income (HBAI) publication will be changing its practice for deciding on a price base in time for the 2000/1 publication. Current HBAI practice is to use the most recent price base possible (usually much later than the end of the latest reference year). Future practice will be to express incomes in 'latest reference year prices'. This change represents an opportunity for both HBAI and PI to review which price base within the year to use.

While estimates expressed in July prices are perfectly valid, it is felt that there would be less room for misinterpretation if a more "central" price base were chosen. Choosing September or October would be approximately half way through the year, but would not necessarily be representative of the different price levels throughout the year. This can be resolved by using the average price index over the whole year. Estimates for (say) 1999/00 are then said to be expressed in (average) "1999/00 prices". This has the added advantage of being easier for users to interpret. It also eliminates the risk of misinterpretation where latest year estimates are quoted outside of the publication without reference to the price base.

Recommendation 2

Therefore it is recommended that both PI and HBAI publications express income estimates in 'latest year average' prices.