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More on Actual Versus Hypothetical Replacement Ratios in Ireland

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Abstract: Hypothetical replacement ratios, widely used in both cross-section and time-series analyses, have been subjected to considerable criticism in the UK. This paper focuses on the use of hypothetical benefits and replacement ratios in a time-series context. A hypothetical Unemployment Benefit series, based on those used in a number of Irish studies, is compared with the average benefit actually paid out per claimant over time, published by the CSO but little used. This shows that the hypothetical benefits series tracks the changes in actual average benefits quite well, though it does significantly overstate the effects of introducing Pay-Related Benefit.

I INTRODUCTION

In much of the literature on work incentive effects of social/security taxation systems and on the situation of the unemployed, reliance has been placed on hypothetical replacement ratios — that is, ratios calculated for hypothetical individuals based on assumed benefit entitlements and earnings — rather than observed ratios for actual individuals. This approach has been subject to considerable criticism, both as applied to time-series and to cross-section work, notably in the UK by Atkinson *et al.* (see especially Atkinson and Fleming (1978), Atkinson (1981), Atkinson *et al.* (1984), Atkinson and Micklewright (1985)). Hypothetical benefit and replacement ratios have been used in a number of Irish studies, most recently Walsh and Hughes (1983) and Blackwell (1986). O'Mahony (1983) compared the actual replacement ratios in a sample of the unemployed with those produced by the hypothetical approach and concluded that there was a marked correlation between the two. This finding has been taken to refute, for Ireland, the critique of the use of hypothetical Rs advanced in the UK.[1]

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1. Walsh and Hughes (1983), for example, cite the study as showing that actual amounts received by the unemployed do not differ significantly from their hypothetical measure (p. 102), while Walsh (1983) states that it shows a close relationship between entitlements and actual benefits in Ireland.

Here we question the sweeping nature of this conclusion and explore what some hitherto unutilised evidence on the average benefits actually received over time shows about the hypothetical approach in a time series context. We begin in Section II by briefly outlining the critique of the use of hypothetical ratios in the UK, and attempt to clarify exactly what O'Mahony's evidence does show about the Irish data. Section III analyses data on the amounts actually paid out in Unemployment Benefit over time, and compares average receipts with those produced by the hypothetical approach. Section IV brings together the conclusions.

II ACTUAL VERSUS HYPOTHETICAL REPLACEMENT RATIOS

The Critique of Hypothetical Replacement Ratios

The critique of the use of hypothetical replacement ratios in the UK begins by attacking the "representative" case, usually taken as a married man with dependent wife, two children and full benefit entitlement. Since neither the family situation nor full benefit are typical, this does not reflect the position of the bulk of the unemployed.[2] Even calculations for a range of family and benefit scenarios, such as those produced by the Department of Health and Social Security (DHSS), may be misleading, it is argued. Examination of data on the actual unemployed in the Family Expenditure Survey shows that (a) these hypothetical calculations still fail to represent the family circumstances of the majority of the unemployed, and (b) the benefit actually received in many cases does not bear a close relation to that which would be imputed using standard assumptions, and is most frequently lower.[3] The latter is attributed to the extremely complex nature of the benefit system, compared with the standard model, which abstracts from such factors as disqualification, incomplete contributions and wife's earnings, makes simplifying assumptions about housing tenure, and is based on full take-up of means-tested benefits.

This casts particular doubt on the use of hypothetical figures, rather than actual individual data, to represent the position of the unemployed at a point in time or analyse the effects of changes in the tax/benefit system. The great diversity in the circumstances of the unemployed means that the concept of a "representative" case or range of cases may be misleading, and this may also have time-series implications if different groups are affected differently by changes over time. In addition, if the standard assumptions do not accurately predict benefits for many recipients, they may not reflect actual changes over

2. Early time-series studies such as Maki and Spindler (1975) used such a hypothetical series, and their results were criticised in, for example, Sawyer (1979) for overstating the effects of the introduction of Earnings-Related Supplement.

3. See in particular Atkinson and Micklewright (1985), Ch. 4.

time adequately either. These and other difficulties with time-series applications have led to an increasing trend towards the use of cross-section data on actual households in examining such issues as disincentive effects.[4]

Hypothetical and Actual Replacement Ratios in Irish Studies

Time-series studies by Walsh (1978), Hughes (1981) and Walsh and Hughes (1983) have used hypothetical ratios (Rs) in exploring the effects of unemployment or sickness insurance in Ireland. Recognising the problems with using any one "typical" case, a weighted average has been constructed based on five different situations, viz, single man/single woman/married man with four children on Unemployment Benefit (UB) and single man/married man with four children on Unemployment Assistance (UA). Full entitlement to Benefit — including Pay-Related from its introduction in 1974 — or Assistance is assumed, and the ratio to average industrial earnings net of income tax and social insurance contributions taken. Fixed weights are applied to the five types, based on the composition of the Live Register in 1973, in arriving at the overall average for each period.[5]

Hypothetical Rs have also been used to illustrate the position of the unemployed in Ireland at a particular point, compared with other countries or earlier years, in studies such as OECD Annual Surveys and Blackwell (1986). The latter, like Walsh and Hughes, refers to the criticisms that such hypothetical data may not reflect the amounts actually being paid out to the unemployed, but both cite O'Mahony's (1983) study as showing a high correlation between actual and hypothetical Rs in Ireland, in contrast to the evidence for the UK advanced by Atkinson *et al.*

It is important to clarify exactly what O'Mahony's evidence does and does not show. He gathered information on actual Rs for a sample of the unemployed registering at a particular Labour Exchange in April 1982, the overall average R being 71 per cent. This is compared with hypothetical Rs for several situations and is stated to be highly correlated with each (p. 84). The actual comparison is in fact implemented incorrectly.[6] However, if an overall average hypothetical R based on average earnings is constructed in the manner employed by Walsh and

4. A wide range of estimates of the effects of benefits/replacement ratios on UK unemployment has been produced by time-series approaches, and the difficulties are noted in, for example, Narendranathan, Nickell and Stern (1985). Key cross-section studies for the UK include Nickell (1979a,b), Lancaster (1979) and Atkinson *et al.* (1984).

5. See Walsh (1978) Appendix A. The series is updated in Walsh and Hughes (1983), which presents the full benefit and R series in Appendix Tables A1 and A2.

6. O'Mahony states that the average R across two family types for the 3-27 weeks' duration category is 72 but his Table 2 shows that it is in fact about 86. The second duration category used for comparison is 54-66 weeks, whereas the 67 weeks and over category would represent the UA component of the hypothetical series, and has an average across the two family types of about 50. Thus the two hypothetical Rs are well above/well below the actual average in the sample respectively, rather than each being close to that average.

Hughes, it does turn out to be close to the sample average at about 72 per cent.[7] The hypothetical approach does not reflect the differences between different types of recipient in the sample very accurately, however. These broad conclusions remain valid when the hypothetical Rs for a range of earnings levels and family types, also presented by O'Mahony, are considered rather than just average earnings.

It is important to note in interpreting these results that the actual Rs are defined rather than more broadly than the hypothetical figures with which they are compared, to include income tax rebates, redundancy payments, reduction in Local Authority rents, plus savings on travel to work. Further, the previous earnings of the unemployed are well below the average industrial earnings used in constructing hypothetical Rs in the standard approach, average pre-unemployment earnings in the sample being only 72 per cent of that average. Each of these factors clearly biases actual Rs upwards significantly compared with hypothetical. Since actual Rs were on average close to the hypothetical figures, it follows that the average benefit actually being received must be considerably below the hypothetical level. This is only partly because a high proportion of those on UB do not receive Pay-Related Benefit (PRB) whereas the hypothetical figures assume that all do. Other recipients may be receiving reduced flat-rate UB due to various disqualifications or failure to meet contribution, etc., conditions, while some UA recipients also appear to be receiving less than the predicted level.

While the overall average R produced by the hypothetical approach does not appear to overstate actual Rs in O'Mahony's sample, then, that approach does appear to significantly overstate the level of UB/UA being received. The comparison does *not* prove that recipients receive their entitlements, and the hypothetical figures do not accurately reflect differences in Rs across different situations. This undermines their usefulness for analysing policy effectiveness and changes, at a point in time.

For time-series purposes, the requirements are a good deal less stringent, namely, that the hypothetical series must pick up the major changes over time in actual Rs. The fact that the average R produced by the standard hypothetical approach used in Irish time-series studies is close to the actual average in the sample does provide some reassurances in this context. However, by its nature a comparison at one point in time cannot say very much about adequacy as an indicator of movements over time. Further, the hypothetical approach was not very reliable in predicting the Rs of sub-groups, and since the evidence does not prove that individuals receive the predicted benefits we cannot be sure that

7. This involves taking the 3-27 weeks' duration category — with full PRB — to represent all those on UB, "67 weeks and over" to represent UA, "married with four children" to represent all those with dependants, and applying weights derived from O'Mahony's Table 1.

changes in the latter mirror accurately those in actual benefits over time. In the next section, therefore, we use some time-series evidence on actual benefits paid out to explore the relationship between hypothetical and actual benefits over time.

III HYPOTHETICAL AND ACTUAL UB RECEIPTS IN IRELAND

A little-used series published in the *Irish Statistical Bulletin (ISB)* for many years allows one aspect of the relationship between hypothetical and actual Rs — namely, that between hypothetical and actual benefits paid — to be explored for Ireland. The information which was published through the 1970s in the *ISB* related to UB only, and consisted of:

(i) the number of claimants at the end of each month, and
(ii) the weekly amounts expended in a week at the end of each month.

Dividing (ii) by (i) provides an estimate of the average weekly UB per claimant actually paid over time, and this is shown for the end-quarter months from September 1967 to December 1978 (for comparison with Walsh and Hughes' hypothetical series) in Table 1, Col. (1).

There are a number of problems in using the series, the most important being that short-time workers are included among both recipients and receipts. This could seriously bias the average amounts received, particularly through 1974–1976 when the numbers working short-time on the Register soared. An adjustment can be made to the series to take this into account using data on the numbers working short-time from 1971 (prior to which short-time working was not in any case important), by assuming that all those on short-time worked three days in the week and received half the average full week's benefit. This allows the average weekly benefit which claimants would have got in a full week to be estimated, and the adjusted series is shown in Table 1, Col. (2).[8]

A second problem is that the published series related to the number of claimants rather than the number actually receiving payment. Some claimants will not yet have had their claims verified, etc., and so will not be paid benefit, in general, in at least the first week they sign on. This means that the figures in Table 1 understate somewhat the amount received by those who were actually paid UB in the week in question. However, the numbers involved do not appear

8. The numbers on short-time are published in *Trend of Employment and Unemployment*. It may be the case that short-time workers are more likely to receive PRB than the fully-unemployed. Plausible assumptions about the amounts involved, etc., show that this would not significantly affect the series or any of the results based on it.

Table 1: *Actual and Hypothetical UB Receipts*

		UB per Claimant Actual	*UB per Claimant Adjusted for Short-Time Workers*	*Hypothetical Average* UB
		£ per Week	*£ per Week*	*£ per Week*
		(1)	(2)	(3)
1967:	September	3.41		4.60
	December	3.12		4.59
1968:	March	3.76		4.76
	June	3.79		4.95
	September	3.86		5.09
	December	3.55		5.15
1969:	March	4.46	same	5.45
	June	4.41	as	5.68
	September	4.38	(1)	5.91
	December	4.31		5.80
1970:	March	4.91		6.68
	June	5.08		6.71
	September	4.95		6.61
	December	5.61		7.44
1971:	March	5.55	5.63	7.46
	June	5.51	5.54	7.43
	September	5.56	5.59	7.47
	December	5.61	5.65	7.94
1972:	March	5.95	6.00	7.96
	June	6.03	6.04	7.98
	September	5.97	5.98	8.08
	December	6.53	6.54	9.56
1973:	March	7.03	7.04	9.54

Sources:

1. *ISB*, Economic Series, various issues.
2. (1) Adjusted for effects of short-time workers [where (1) = UB weekly amounts/UB claimants, (2) = UB weekly amounts/(UB claimants — short-time workers/2)].

to be large enough to introduce a serious bias to either the level or the trend over time of the series.[9]

In order to compare the actual average UB estimate with the hypothetical UB series, the nominal (UB only) hypothetical series from Walsh and Hughes (1983,

9. The numbers actually being paid at the end of each month are not published, but the data on the dependency structure in *Trend of Employment and Unemployment* in fact refer to persons "listed for payment" in the week preceding the second Monday of January, April, July and October of each year. Comparing these totals with the number of claimants at end December, March, June and September, respectively, it appears that perhaps 5 to 10 per cent of claimants may not have been paid. This may bias the estimated average receipt downwards by up to about 10 per cent, and, since the proportion not being paid appears to have risen over time, may also lead to the increase in payments over the period being understated slightly.

Table 1: *contd.*

		UB per Claimant Actual	*UB per Claimant Adjusted for Short-Time Workers*	*Hypothetical Average* UB
		£ per Week	*£ per Week*	*£ per Week*
		(1)	(2)	(3)
	June	6.78	6.79	9.54
	September	8.29	8.30	11.96
	December	7.75	7.76	11.76
1974:	March	8.28	8.34	11.79
	June	9.54	9.60	17.64
	September	10.20	10.42	19.82
	December	9.36	9.92	19.35
1975:	March	10.24	10.99	21.87
	June	13.76	14.48	25.36
	September	14.46	14.92	25.70
	December	13.81	14.31	26.43
1976:	March	15.63	15.94	29.14
	June	16.89	17.24	30.92
	September	17.15	17.39	30.82
	December	15.87	16.07	30.69
1977:	March	16.89	17.17	32.37
	June	19.00	19.49	35.04
	September	19.13	19.39	34.90
	December	18.40	18.74	35.98
1978:	March	19.94	20.23	36.62
	June	22.00	22.39	38.74
	September	21.65	22.01	38.98
	December	21.32	21.57	

3. Walsh and Hughes (1983) Table A2 for hypothetical series on single man, single woman and married man with 4 children, all in receipt of UB. Weighted by importance of male no dependant/female no dependant/male with dependant(s) on UB, taken from *Trend of Employment and Unemployment* (various years, Appendix Table AXVII).

Table A2) may be used. In combining the single man/single woman/married man with 4 children series into a single average, Walsh (1978) and Walsh and Hughes used fixed weights for the dependency structure of the Live Register, based on those for 1973, in order to avoid endogeneity in estimation. This would not provide a fair comparison with the actual amounts paid series however, since the latter will obviously be affected by any changes in the relative importance of the different dependency types over time. It is therefore necessary to apply the actual weights for the single man/single woman/married man for each quarter (from *Trend of Employment and Unemployment*) to the three hypothetical UB series

for that quarter, to construct a weighted average over time based on actual rather than fixed weights.

The weighted average hypothetical UB series is shown in Table 1, Col. (3), and may be compared with the actual average amount paid in Col. (1), adjusted for short-time workers in Col. (2). The series are graphed in Figure 1. The comparison reveals some interesting points:

(i) The hypothetical series is significantly above the actual average throughout.

(ii) The hypothetical series is principally intended to pick up changes over time rather than levels: however, the gap between the series widens over time. The percentage change in the (adjusted) actual average from 1967 Q3 to 1978 Q3 is 545 per cent, compared with 747 per cent in the hypothetical average (consisting of 997 per cent for single men, 787 per cent for single women, and 692 per cent for married men).

(iii) The series track each other reasonably well up to 1974, when the introduction of PRB brought a sharp rise in the hypothetical series, of 50 per cent in Q2. There was a much smaller rise in the actual expenditure series, of only 15 per cent. This difference in fact explains almost all of the gap between the two series in terms of the overall increase from 1967 to 1978 described in (ii), the series again tracking each other reasonably well after Q2 1974.

(iv) The correlation coefficient between the hypothetical and actual series over the entire period is 0.99.

Clearly, a strong upward trend over time may be sufficient to produce a high correlation between the series. The relationship may be further analysed by regressing actual on hypothetical benefits, with and without a time trend:

$$\underset{(9.90)\ (64.56)}{ACTUB = 1.54 + 0.50\ HYPUB} \qquad (1)$$

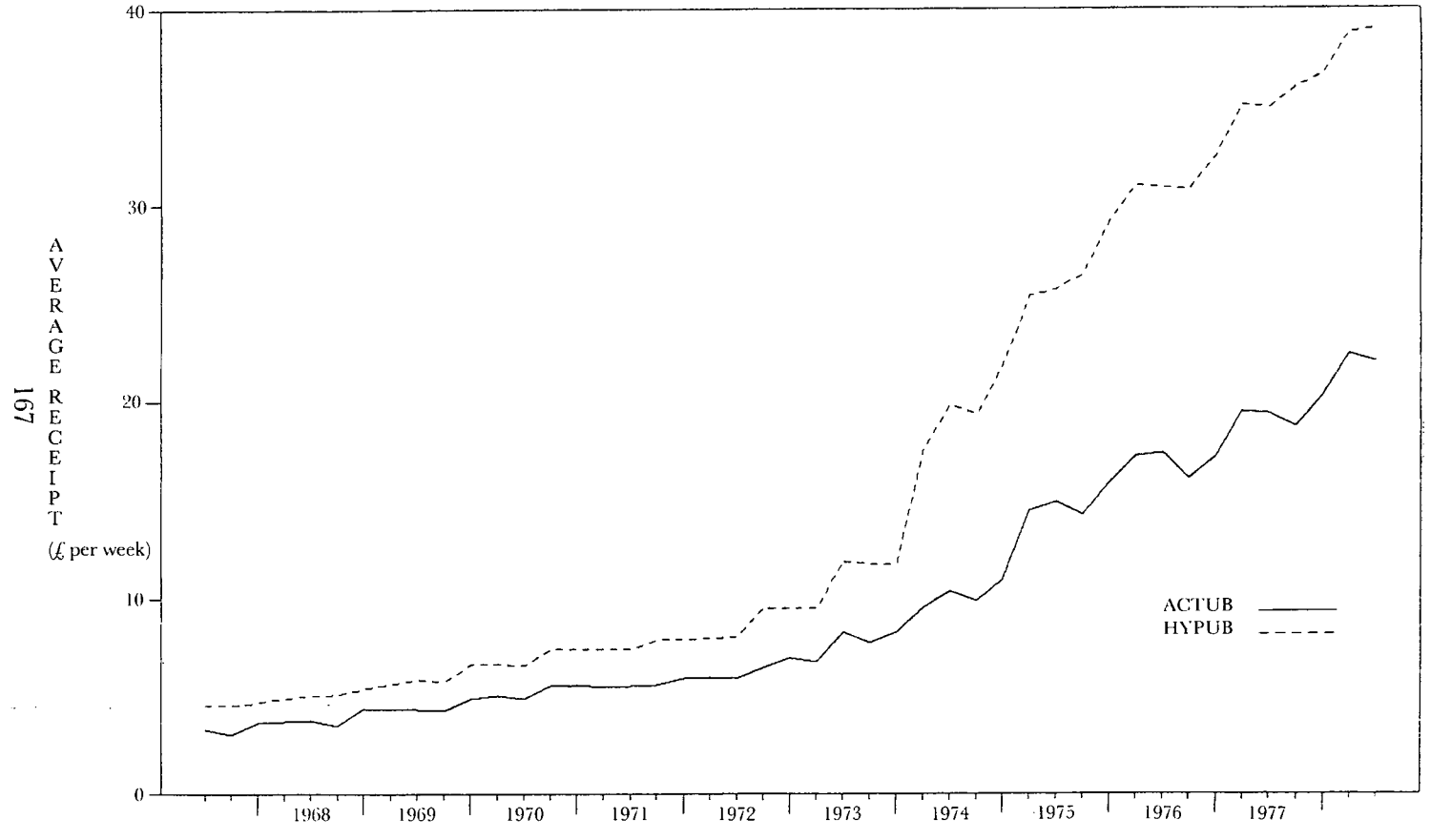
$$R^2 = 0.990; \quad DW = 1.02$$

$$\underset{(6.79)\ (21.58)\ \ (1.83)}{ACTUB = 1.32 + 0.47\ HYPUB + 0.04T} \qquad (2)$$

$$R^2 = 0.991; \quad DW = 1.11$$

where ACTUB = actual average (adjusted) UB receipts
HYPUB = hypothetical average UB receipts
T = linear time trend, 1967Q3 = 1
DW = Durbin-Watson statistic
and t-ratios are shown under the coefficients.

Figure 1: *Actual and Hypothetical UB 1967-1978*



The time trend is significant (at the 5 per cent level) but its inclusion leads to only a small reduction in the coefficient on hypothetical benefits, which remains highly significant. Although each of the benefit variables is strongly trended, with correlation coefficients of 0.94 between them and the time trend, the hypothetical benefit series does predict a high proportion of the additional variation in actual benefits.[10]

The Durbin-Watson statistic in each indicates that autocorrelation may be a problem, however, and we have already noted from Figure 1 the sharp break in the relationship on the introduction of PRB. A dummy variable may therefore be introduced:

$$\underset{}{\text{ACTUB}} = \underset{}{0.88} + \underset{(5.93)}{0.56}\ \text{HYPUB} + \underset{(27.20)}{0.027}\text{T} - \underset{(1.79)}{2.27}\ \text{DUM} \qquad (3)$$
$$\underset{(6.86)}{}$$

$$R^2 = 0.996 \quad DW = 1.79$$

where DUM = 0 from 1967Q3 to 1974Q1 and 1 thereafter.

There is clear evidence of a significant break in the relationship, the dummy variable being significant, and autocorrelation is no longer indicated.[11] Splitting the sample into two sub-periods, before and after the introduction of PRB, leads to the same conclusions.

Examining the two benefit series in first differences rather than levels form, graphed in Figure 2, we see again that the hypothetical series picks up most of the turning points in the actual series, but that in 1974 the increase in the hypothetical series greatly overstates that in actual payments. The correlation coefficient between the first differences is 0.72.

The conclusions which may be drawn from this comparison of actual and hypothetical benefit series appear then to be:

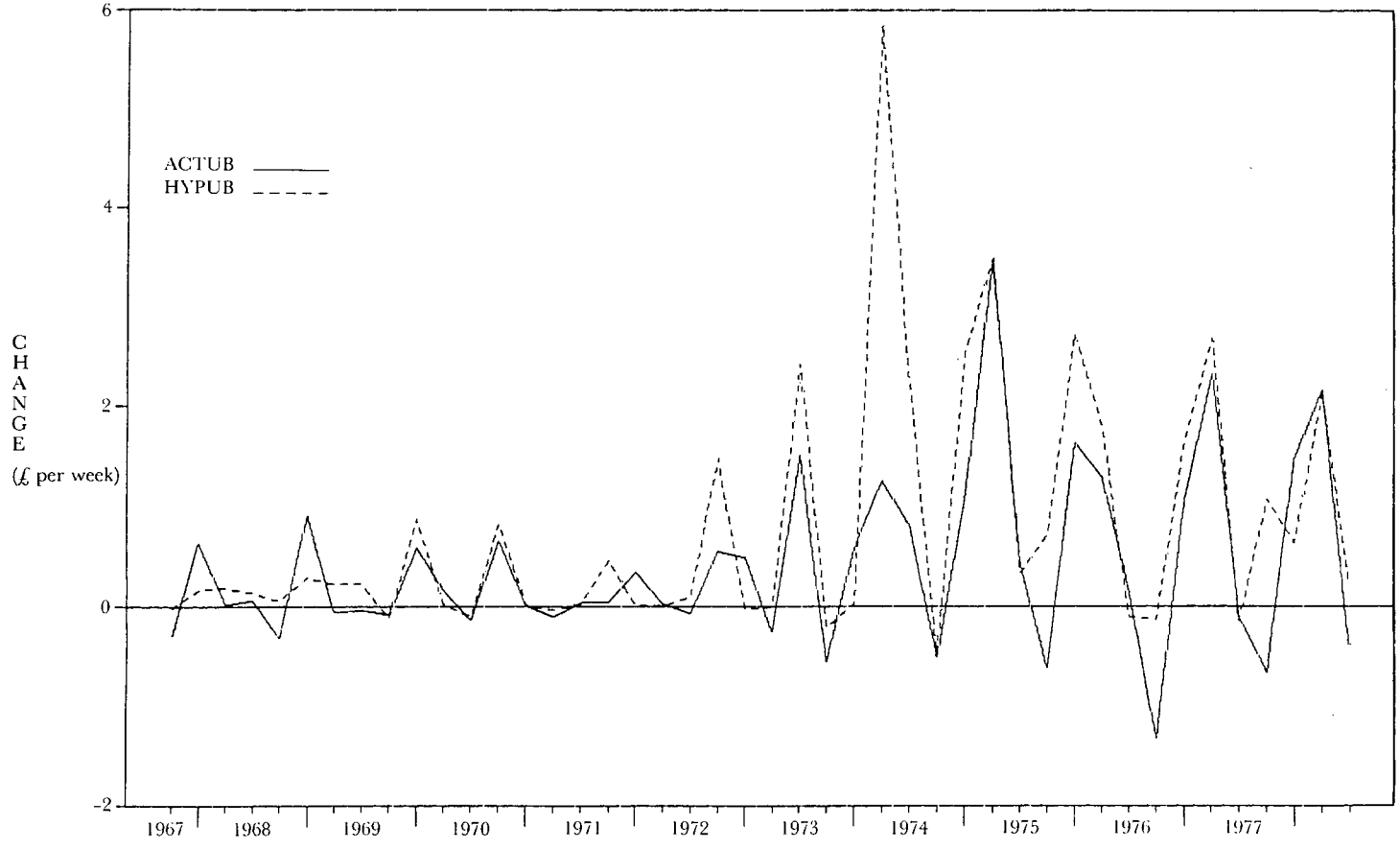
(i) The hypothetical series overstates the average level of benefit paid and the increase over time in that level; this is largely because of its use of the "married man with 4 children" case to represent all those with dependants, and, from 1974, its assumption that all those on UB receive full PRB.

(ii) The hypothetical series picks up many of the features of the actual series over time, with a relatively high correlation in first differences; it does, however, grossly overstate the impact of the introduction of PRB on actual benefits paid, which could bias the estimation of its effects on unemployment.

10. Removing the simple linear trend from each series and then regressing actual on hypothetical benefits, the R^2 in the resulting equation is 0.92.

11. The time trend actually performs better when the benefits variables are expressed in log terms, but still becomes insignificant when the dummy variable is introduced. The coefficient on hypothetical benefits in the logarithmic equation is then not significantly different from 1.

Figure 2: *Changes in Actual and Hypothetical UB: 1967–78*



We have concentrated on a comparison of the hypothetical benefits series used by Walsh and Hughes, which goes up to 1978, with actual benefits. However, it is also of interest to consider briefly the relationship since then. This is made more difficult by the fact that there have been two changes in the *ISB* series, those used above only being available to 1979. From 1980, those on systematic short time and those aged 65 or over were excluded from the Live Register and from the UB claimants series, though their receipts continued to be included in the amounts paid out series. From 1984, the latter was changed to total expenditure in each month rather than in a week at the end of each month (and a corresponding series for UA was introduced). The amount expended each month is affected by the number of pay-out days that month, so this series is considerably more difficult to use to derive weekly average expenditure per claimant. Such an average can easily be calculated for the year as a whole, though, and some general conclusions can be drawn.

Comparing 1978 with 1985, rates of UB payment have increased by about 174 per cent for a single person and 163 per cent for a married man with dependent wife and 4 children. Over the same period, the average UB expenditure per claimant rose by about 157 per cent.[12] The average amount going to each recipient, allowing for claimants who did not receive payment, appears to have risen by about the same.[13] The increase in basic rates and in actual receipts have thus continued to be close. The latter may not have grown quite as rapidly as basic rates because pay-related payments have not kept pace with flat-rate benefits.

It may also be of interest to contrast the increase in benefits with that in earnings. Average male gross industrial earnings grew by 135 per cent between 1978 and 1985. Average take-home pay, after deducting income tax and PRSI contributions, grew more slowly, by about 104 per cent for a single man and 99 per cent for a married man with 4 children. If the previous (or prospective) earnings of the unemployed showed the same trend, then a substantial increase in replacement ratios is clearly implied. Taking the single man on full PRB, for example, Walsh and Hughes's average hypothetical R for 1978 was 46 per cent. If benefits grew by about 160 per cent while after tax earnings grew by only 104 per cent, then an increase in R to about 58-59 per cent by 1985 is implied.[14]

12. The number on systematic short-time and aged 65 or over have to be added back to the number of UB claimants on the Live Register for 1985. These are given in "Statistical Information on Social Welfare Services 1985", Department of Social Welfare (1986), Table 56. Adjustment is also made for short-time workers to estimate average receipt in a full week, as in Table 1.

13. The number actually receiving UB in 1985 is in Department of Social Welfare (1986), Table 57. For 1978, an estimate is made using the data referred to in footnote 9.

14. Calculating a hypothetical R for this case for 1985 in the standard way produces a slightly lower figure of 56-57. This may reflect the more rapid growth in flat-rate than pay-related benefits, so that those on pay-related had smaller increases in R than those on flat-rate benefit alone.

Leaving aside the accuracy of the hypothetical approach in relfecting the level of R for a particular type of recipient, its conclusion that benefits rose much more rapidly than average take-home pay is clearly supported by the evidence on actual benefit expenditure. Incomplete data for 1986 indicate that after-tax earnings grew more rapidly than benefits, serving to reduce replacement ratios somewhat.[15]

It must be noted that we have concentrated here on one element of the replacement rate only, namely UB. As O'Mahony's sample results made clear, other elements such as tax rebates, redundancy payments and rent rebates may also be important. These may not have changed over time in line with benefits, particularly tax rebates as tax rates and coverage have increased. Finally, the averaging of R across family situations and UB/UA recipients avoids the problems associated with the "typical" case, but ideally it is the "marginal" unemployed which would be most relevant to disincentive effects, though difficult or impossible to identify in practice.

IV CONCLUSIONS

The criticisms of the use of hypothetical replacement ratios in the UK have a number of different aspects, and it is important to distinguish between time-series and cross-section applications. O'Mahony's (1983) evidence suggests that the hypothetical approach, as applied in Irish studies, does not overstate the average actual ratio in his sample, but this does not mean that hypothetical ratios form a reliable basis for assessing the actual benefits and situation of the unemployed at a point in time or the effects of changes in tax/transfer policies. In time-series applications, though, the less stringent requirement is that changes in actual benefits and replacement ratios be accurately reflected. In order to assess this, data on actual Unemployment Benefit payments over time were examined. An average UB payment per claimant series was constructed and compared with a hypothetical benefits series based on those used in a number of Irish time-series studies (though with actual rather than fixed weights for the different categories of recipient). The hypothetical series could be seen to track the changes in actual benefits quite well, with the exception of a significant overstatement of the effects of introducing Pay-Related Benefit.

15. UB rates were raised by 4 per cent in July 1986, giving a 5 per cent increase in the annual average compared with 1985. Based on data for the first three quarters, industrial earnings appear likely to rise by 6 per cent or more. In the 1986 Budget, the top rate of income tax was cut and the 1 per cent Income Levy dropped. For the single man example in the text, the implied fall in R may be about 2 percentage points.

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