

# WHAT ARE “ACTUARIAL” CONTRIBUTIONS AND PROPERTY INCOME?

## (Defined benefits schemes)

Note by John Walton

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This paper was written in September 2003 and has been only partially revised to take account of the UK Accounting Standard FRS 17. It deals, however, with matters which have been addressed in a particular way in that Standard but which could be addressed in other ways.

### **Introductory, and actuarial values of assets**

1. There is a problem in the sense that, if actuarial estimates of flows are used, when these differ from actual amounts, a complicated set of adjustments between stocks and flows would be needed in the financial account, unless the stocks of both assets and liabilities (not just liabilities) are also measured on the actuarial basis<sup>1</sup>. Even if this were done, adjustments to the levels of assets and liabilities would be needed to make them consistent with the values generally used for land and for liabilities in the form of financial instruments. Adjustments would also be necessary in the primary distribution of income account, if the amounts of property income attributed to policy-holders were on the actuarial basis, because at some point the amounts receivable by pension funds must be recorded as actual amounts, in order to preserve articulation with the amounts payable by the occupiers of land or the issuers of financial instruments.

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<sup>1</sup> Actuarial values of assets are arrived at in the same way as actuarial values of liabilities, that is by discounting to the present estimates of income and outgoings in the long-term, using the same discount rate for assets as that for liabilities. Actuarial values of assets use the same theoretical model as the market – an expectation of income – but take a long-term view. They are sensitive to the assumption made about future increases in income, but are less volatile than market values because they are based on current levels of income.

In consequence they have been used as the basis for decisions about the funding rate and, it seems, may be used as the basis of the actuarial estimates of the current service cost to the employer of the scheme, which needs checking. However, this not what is recommended for the rather different concept of the “expected return on assets” in the UK Standard, FRS 17, which applies long term assumptions of the rate of return on assets to their *current* market value (see the appended note, page 7, on this question).

I believe that other ways of avoiding volatility in asset values are used when taking decisions on the funding rate, for instance, averaging, or other smoothing, of market values over a number of recent years.

Much depends on whether the actuarial basis of asset valuation is still commonly used when taking funding decisions, which also need checking; if it is (or other methods of smoothing are used), there is the potential to identify by surveys the differences between these and market values.

2. The discount rate used by actuaries, in my experience<sup>2</sup>, is an estimate of the return expected in the long-term on risk-free investments. It can be nominal or real. In my experience it was nominal – that is, embodying but not distinguishing an estimate of future inflation in the long term. If assets are valued on an actuarial basis, the same discount rate is used for both assets and liabilities. In these circumstances, there would be little difference between a nominal and a real discount rate, in the outcome of an actuarial review, unless a fund is seriously under- or over-funded, or unless there is reason to suppose that in the long term the impacts of inflation, upon the return to risk-free investments and upon the definition of benefits, would be different.
3. This discount rate includes an estimate of the net holding gains (whether nominal or real) expected on risk-free investments in the long term. (I use the words “return on investments” as including the expectation of net holding gains.) In my experience, the expected return on shares was thought likely to exceed that on risk free investments, so that the expectation was of net benefit to the fund from investment in shares – and the fund’s assets were for a long time wholly invested in shares.

**The link between successive actuarial reviews.**

4. Suppose that we compare notional figures for two actuarial reviews (for simplicity, assuming a ‘young’ scheme, in an inflation-free environment).

**TABLE 1 : ACTUARIAL VALUES OF ASSETS**

→	<b>Assets (actuarial)</b>		<b>Liabilities (actuarial)</b>	<b>Surplus (+) / Deficit (-)</b>
Stocks (1 <sup>st</sup> review)	1000	Stocks (1 <sup>st</sup> review)	1000	0
Inter-review flows:-				
Contributions (actuarial)	300	Pensions (actual)	100	
Investment return (actuarial)	200	Provisions (actuarial)	400	
Total accumulated	1500		1500	0
Stocks (2 <sup>nd</sup> review)	1400	Stocks (2 <sup>nd</sup> review)	1500	- 100
Inter-review discrepancy	- 100			- 100

On this entirely actuarial basis, a discrepancy is shown between the two forward-looking estimates of assets (which are based mainly on the assumed return on investments in successive years). It is due, shall we suppose, either to a new assumption being made about the long-term rate of increase in dividends and/or to the starting point for the projection of the investment return in the second review year being different from that implied for the same year at the time of the first review. For simplicity, no discrepancy between the successive estimates of liabilities is assumed. The inter-review discrepancy has to be accounted for somewhere, even when figures are on actuarial basis<sup>3</sup>.

**What is “current service cost” in the accounting standards?**

5. In my experience as a “Trustee”, the actual contributions (sum of employers’ and employees’) were always those recommended by the actuary; that is, the fund concerned was not “partly funded” – its aim was always to get back to a position of nil actuarial surplus or deficit. (Note, however, that this

<sup>2</sup> This may be out of date. From the 1970s until the mid-1990s I was a “Trustee” (member of the management board) of a small UK defined benefits pension fund. It was a ‘young’ fund initially.

<sup>3</sup> In my experience, the “Trustees” were not given a reconciliation of this kind. Each successive actuarial review was free-standing, and the recommendations about the future funding rate varied substantially. But such a reconciliation is now required by the UK actuarial profession.

position depends on the objective chosen about the degree of security of the liabilities, to cover possible situations which were not at the centre of expectations; and our actuarial advisers recommended strongly that the funding objective should be explicit and well understood.)

6. Let's expand Table 1 as follows:-

**TABLE 2 : ACTUARIAL VALUES OF ASSETS**

→	<b>Assets (actuarial)</b>		<b>Liabilities (actuarial)</b>	<b>Surplus (+) / Deficit (-)</b>
Stocks (1 <sup>st</sup> review)	1000	Stocks (1 <sup>st</sup> review)	1000	0
Inter-review flows:-				
Contributions (actuarial)	300	Pensions (actual)	100	
Investment return (actuarial) :		Provisions (actuarial):		
On accumulated current Service contributions	170	For current service: From contributions	300	
		From property inc.	170	
		<i>Total</i>	470	
On accumulated contributions For retired members	30	For those retired (= - (100 - 30))	- 70	
<i>Total investment return</i>	200	<i>Total provisions</i>	400	
<i>Total accumulated</i>	1500		1500	0
Stocks (2 <sup>nd</sup> review)	1400	Stocks (2 <sup>nd</sup> review)	1500	- 100
Change : inter-review discrepancy	- 100			- 100

It seems, therefore, that the accountants' term "current service cost", if this is based on the flow on the liabilities side, is the amount *net* of the actuarially estimated property income related to current service. In the illustration, that is the total increase in current service provisions (470) less the actuarial property income on accumulated current service contributions (170), or 300, which in the illustration is the same as the actuarially determined level of contributions.

7. The usual decision, when a deficit emerges on the actuarial basis, is to increase the total funding rate over a period of years shorter than that in which the main liabilities will crystallise; and the reverse when a surplus emerges. It seems, from what I have read so far, that some accounting standards accept the forward phasing of the additional funding necessary, when there is a deficit, which begs the question what valuation basis for assets is used. But this may no longer be so, under new accounting proposals such as the UK's FRS 17, which carry all fluctuations in the deficit valued at market values immediately into the balance sheet. Similar proposals for life insurance companies have led to vigorous opposition from the insurance industry in Europe, on the grounds of excessive volatility in figures of profit, if changes in assets values are to be carried through the profit and loss account.

**Use of market values of assets in combination with actuarial values of liabilities**

8. Now suppose that assets are valued at market values but liabilities continue to be at actuarial values. Let's assume also that market values fall in relation to actuarial values in the inter-review period and that contributions continue to be based on the actuarial assessments. Market values of assets necessarily require recording of actual property income receivable and of actual net holding gains, if one is to compile a reconciliation over the inter-review period between assets and the flows/entries on the resources side of the accounts.

Table 3 is on page 4

**TABLE 3 : MARKET VALUES OF ASSETS (AS EXISTING SNA)**

→	Assets (market)		Liabilities (actuarial)	Surplus (+) / Deficit (-)
Stocks (1 <sup>st</sup> review)	1100		1000	+100
Inter-review flows:-				
Contributions (actuarial=actual)	300	Pensions (actual)	100	
Investment return (actual) :				
Property income	50			
Net holding gains	- 300			
Total investment return	- 150	Provisions (actuarial)	400	
Total accumulated	1250		1500	- 250
Stocks (2 <sup>nd</sup> review)	1250		1500	- 250

9. Clearly any mis-match between the market and actuarial value of assets has to be accounted for somehow, at both review dates. In terms of stocks alone this could be done, in the existing SNA, by signalling net worth on both bases, as follows :-

**TABLE 4 : SUBDIVIDING NET WORTH (EXISTING SNA)**

1 <sup>st</sup> review date		2 <sup>nd</sup> review date	
Actuarial basis	0	Actuarial basis	- 100
Difference, actuarial to market values of assets	+ 100	Difference, actuarial to market values of assets	- 150
Net worth, existing SNA	+ 100	Net worth, existing SNA	- 250

Thus it is clear that changes to the accounts would be needed, if actuarial values of the investment return were introduced (as in Tables 1 and 2). If actual values of property income were retained on the resources side of the account for the pension funds, and the same for holding gains and losses, but on the uses side actuarial values were substituted, when recording the amount attributed to members of the scheme (the policy-holders), the same distinction between income and holding gains/losses could not be followed, it seems.

10. There would be another difficulty if the liabilities for future pensions of unfunded schemes were explicitly introduced, using notional figures on an actuarial basis throughout (? including the valuation of the notional assets?). Then the question would arise, what should be done with a partly funded scheme, that is one where actual contributions regularly fall short of the actuarial? If full actuarial amounts were substituted in the case of the partly funded schemes, for consistency with the unfunded schemes, the differences between full actuarial contributions and actual contributions would have to be accounted for. This would affect the financial account, and (as for unfunded schemes) and would also affect compensation of employees. Alternatively, the figures for the partly funded schemes could be left unchanged, on the grounds that there is not full security of the liabilities (promises to pay), whilst there is full security of promises to pay of unfunded schemes when these are for employees of general government, as they mostly are.
11. At present, my preference would be to retain actual contributions and property income on both sides of the non-financial accounts, with a question mark about the inclusion of actual holding gains and losses (hgl) in these accounts: inclusion of actual hgl would make little difference when bonds are

held; and there would no difference for defined contribution schemes, where the same amounts of hgl would be added to both sides of the accounts; for defined benefits schemes, however, there is a question about what are the “technical provisions” to be attributed to the members (e.g. who owns a surplus or deficit on break-up) and so how far actual hgl should be shown on both sides of the accounts, and/or included in the output algorithm.

12. The reconciliation with actuarial amounts would then be confined to the figures of stocks, on the lines of Table 4, which might show large or ‘structural’ differences in the case of “partly funded” defined benefits schemes, but would show only volatility, with no persistent difference in the long term, because most defined benefits schemes choose the actual contributions according to an objective to achieve in the long term an exact match between assets and liabilities, when both are measured on the actuarial basis or in some form which removes short-term fluctuations.

### **Solvency**

13. It is interesting to follow through what I understand to be the proposals of the UK actuarial profession (still in the form of an exposure draft) for covering the risk of shortfall of assets on premature wind-up. They call this “solvency”. My understanding – though this is not entirely clear – is that the funding decisions would be based as before on periodic reviews in which the valuations of both assets and liabilities could still be actuarial ones, but that an another comparison would be made, annually, between the market and the estimated actuarial values of assets, which would be the starting point for a calculation of solvency.
14. My understanding is that this would not require the full amount of any deficit in regard to solvency (which includes any shortfall of the market values of assets on the actuarial values) to be paid immediately. Rather a calculation would be made based on the concept of the (annual or single?) ‘premium’ needed to buy-out with an insurance company the risk of premature wind-up, at a time when the market value of assets was below the actuarial one. (This could be either because the scheme was under-funded on the actuarial basis or because market values were lower).
15. This proposal implies that a market exists for reinsuring such risks, which was hardly the case. But, more or less at the same time, the UK Government announced proposals for a “Pension Protection Fund”, to which premiums would be paid (presumably annually), the premium rates being affected by the severity of under-funding. As yet these proposals have not been enacted or even clarified much, but the Government’s professed aim is to avoid any Government guarantee of the protection fund.
16. How might the accounts look in this scenario, which also brings in a market valuation of assets?

Table 5 is on page 6

**TABLE 5 : ACTUARIAL BASIS OF ASSET VALUATION**

→	Assets (actuarial)		Liabilities (actuarial)	Surplus (+) / Deficit (-)
Stocks (1 <sup>st</sup> review)	1000	Stocks (1 <sup>st</sup> review)	1000	0
Inter-review flows:-				
Contributions (actuarial)	300	Pensions	100	
		Reinsurance premium to cover insolvency risk	50	
Investment return (actuarial)	200	Provisions (actuarial)	400	
Total accumulated	1500		1550	0
Stocks (2 <sup>nd</sup> review)	1400	Stocks (2 <sup>nd</sup> review)	1550*	- 150
Change : inter-review discrepancy	- 150			- 150

**TABLE 6 : EXISTING SNA BASIS (MARKET VALUES OF ASSETS)**

→	Assets (market)		Liabilities (actuarial)	Surplus (+) / Deficit (-)
Stocks (1 <sup>st</sup> review)	1100	Stocks (1 <sup>st</sup> review)	1000	+100
Inter-review flows:-				
Contributions (actuarial=actual)	300	Pensions (actual)	100	
Investment return (actual) :		Reinsurance premium to cover insolvency risk	50	
Property income	50			
Net holding gains	- 300			
Total investment return	- 150	Provisions (actuarial)	400	
Total accumulated	1250		1550*	- 300
Stocks (2 <sup>nd</sup> review)	1250	Stocks (2 <sup>nd</sup> review)	1550	- 300

\* Assumes that future premiums to cover the insolvency risk are not capitalised.

**TABLE 7 : SUBDIVIDING NET WORTH (EXISTING SNA)**

1 <sup>st</sup> review date		2 <sup>nd</sup> review date	
Actuarial basis	0	Actuarial basis	- 150
Difference, actuarial to market values of assets	+ 100	Difference, actuarial to market values of assets	- 150
Net worth, existing SNA	+ 100	Net worth, existing SNA	- 300

These Tables are virtually the same as Tables 1, 3 and 4, with actual premiums to cover the insolvency risk added to the flows on the uses side during the inter-review period, on the assumption that this element of costs became necessary for the first time after the first review year, and that the premiums are expensed, that is not capitalised when assessing liabilities at the time of the second review year.

### Attribution of surpluses and deficits to sponsoring employers

17. Table 5 indicates that, on an actuarial basis for valuing assets, the scheme is fully funded on the first review date but has a deficit of 150 at the second review date. On the market values of assets, it has a surplus of 100 at the first review date and a deficit of 300 (twice that on the fully actuarial basis) at the second review date. On a long-term view, assuming that the scheme remains in being, at the first review date the employer has no asset (in the form of a fund in surplus), and has a potential liability at the second review date which is half that measured on basis of market values of assets. I describe his liability at the second review date as potential, because the risk of a deficit crystallising on early wind-up is reinsured. In effect, the difference between 150 on the actuarial values basis and 300 on the market values basis is only a contingent liability, because reinsured.
18. Suppose that, on the actuarial basis for valuing assets, the scheme is fully funded, but that the market value of assets falls short of the actuarial value. On this fully actuarial valuation basis, the employer does not have an effective liability to the fund at the accounting date because the scheme is fully funded on the actuarial basis of valuation of assets and the risk of shortfall on premature wind-up is reinsured. Under- or overfunding would then be measured by the difference between assets and liabilities when both are valued on an actuarial basis.
19. The employer's apparent liability to a scheme which is fully funded on the fully actuarial basis is measured by the shortfall of assets at market values to actuarial values; this is also a reasonable estimate of the employer's potential claim on the reinsurer, if there had been premature wind-up at the same date of such a scheme. However, as this potential claim is regarded, when there is no wind-up, as only a contingent asset of the employer and a contingent liability of the reinsurer, further consideration is needed of recording in SNA. Options are: to regard the shortfall of assets at market values to actuarial values, being amounts potentially claimable from the reinsurer, by convention as an actual asset of the employer and an actual liability of the reinsurer; to attribute these short-term elements of deficit or surplus to the employees; or to leave a short-term element of net worth with the fund, which will tend to average out to zero over a number of years.

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#### Appended note : stability of estimates of the "expected return on assets"

(see footnote 1)

FRS 17 seems inconsistent, in my view, in saying (in the middle of 54) that the expected return on assets (a monetary amount) is expected to be stable, when, for equities, it should be calculated by applying the *rate* of return 'expected over the long-term' to the fair (=market) value of the assets. Suppose that in year 1, the rate of return expected in the long term is 7% (nominal, including net h.g.l.). Then in year 2, the market value of assets falls by 30%, but dividends are not cut – it is mainly an adverse movement of 'sentiment'. This is largely what happened in 2001. In the short-term, expectations of increased dividends plus net h.g.l. will have fallen, but probably by less than 30%. So does the year 2 estimate of the long-term *rate* of return rise by 30%, to compensate fully for the fall in the market value in year 2, or does it rise by less, so reducing the estimated monetary return expected in the long term? If so, arguably the latter is not "reasonably stable". All these problems are avoided when actuarial valuations are used, for assets held in the form of equity shares; when assets are held in the form of bonds, the difficulties are less (because the actuarial and market values of the bonds differ by less).