An Actuarial Approach to Monitoring Long-term Investment Performance

by Jon Spain (United Kingdom)

The whole of the following is written in the context of a defined benefits exempt-approved (tax-privileged) UK Pension Fund, granting benefits tied to earnings near retirement, where the benefits are both paid, and also funded, over long periods.

Investment performance has certainly been considered by IACA before. In a paper to the 1984 Conference (Hawaii), Paul Jackson pointed out how the traditional approach to investment performance was far from logical in the context of long-term investment requirements. This particular paper is intended to provide a basis which is both logical, and relevant, to long-term finance.

In the UK, most long-term actuarial valuations take the assets into account by means of the discounted value of the anticipated proceeds. Indeed, market value is a discounted value, using the market's aggregate assumptions, which may well be irrelevant to a continuing Pension Fund. One of the advantages of using discounted value is that short-term fluctuations can be smoothed out over time.

If, however, the fluctuations could also be smoothed out for monitoring performance, then the progress of what are, in effect, discounted values should provide useful information. **The concept is of a smooth graph, representing a single set of assumptions, over time, connecting "Fund Values", which are consistently assessed in relation to those assumptions.** Were we to draw such a graph (see later), then we could reasonably claim that this represents the investment return **locked in** over a long period, for the following reason.

Suppose that we thought we knew, in advance, the average rate of return which would be achieved over a long future period. Then, the "true initial value" of the assets could be assessed, using this "knowledge". If we were correct, then, over the long period, the figures would fall into pattern. This is why I postulate that the return is locked in, regardless of short-term market fluctuations. As, of course, we cannot be certain of the future, we have to make the best estimates we can, to be reviewed from time to time.

The concept of a "locked-in" return is surel what is relevant to a Pension Fund Manager, or it should be. For then the assets are being treated just like the emerging liabilities, and the effects of varying scenarios can properly be established. Alternatively, which I am not here pursuing, one could notionally split the return into that which is "more or less certain", and the remainder which is "definitely risky".

If investment performance criteria are shifted away from a heavy reliance upon volatile market values, then this should also release investment managers from commonly experienced unjustified short-term pressures. In itself, this may enable longer-term investment decisions to be taken, which is probably economically desirable. This has actually recently been suggested in the UK by a Director of the Bank of England, which may well be taken as an official view.

So far as technique is concerned, this involves tracking Fund performance, using one set of assumptions for value assessment at all times, over any given period. That set of assumptions must possess one property, which I term the continuum condition. The property is that the initial discounted value, plus net new money, both appropriately "rolled-up" over the period, should give the final discounted value. If this condition is satisfied, then I define the rate of return hypothecated to be what I call the Discounted Value Return ("DVR"), over the period in question.

At first, I thought that any solution to such an equation must be unique. However, I have come across model situations, with two real results, or even none at all. In practice, however, so far as I am aware, this has not yet been a problem.

Suppose that, under my approach, for a particular Fund, the DVR's were 10% pa and 12% pa over 1984 and 1985, respectively. Then one could reasonably assume that the DVR over 1984-85 would be near to 11% pa. Using 11% pa at the beginning of 1984 would lead to a different initial value than that previously obtained by using 10% pa. This could lead to slight confusion, but it is a direct consequence of using more information (namely conditions over 1985). To that extent, my approach is an analogue of adding observations in a statistical exercise.

Using my approach, of tracking discounted values for monitoring what I regard as the underlying long-term investment performance, I recently examined the record of a number of UK Pension Funds over the six years 1979-84. Collectively, the Funds approximated to a half-percent sample of the entire market comprised by similar Funds over the period.

For each Fund, the exercise included the use of a wide variety of methods and assumptions. On the basis of the statistical tests I carried out, I concluded that the approach was sufficiently robust for practical purposes.

As examples of the numbers coming out, I have extracted the six-year results for a few of the Funds, as follows:

Fund	"Largest"	"Smallest"	"Average"
Market Value Return (% pa)			
	20,5	20,6	20,9
Discounted Value Returns (% pa)			
Method			
My Preference-	13,6	12,4	14,0
Lowest	12,8	11,3	13,1
Highest	15,5	14,3	15,9

It is interesting that, in this case, the average is not in the middle, indicating that size of Fund is probably not a dominant factor in monitoring long-term performance.

The simple graph below, shows changes over time in "asset value" for a particular Fund over those six years. The dotted line represents market value. One DVR was calculated for the whole period, and the solid line shows how the discounted values would have moved, based upon that DVR, had it been achieved in each year.

In fact, although it is convenient to use average rates for periods, they rarely precisely apply throughout the period, and this is no exception. I have, therefore, also shown the intermediate discounted values (the "stars") which would have been derived, were the average DVR applied to the actual Fund at the time.

It will be seen that the solid line is always below the dotted line, but this is not inevitable. Further, the stars straddle the solid line, indicating that a smoothing influence is present.

I hope to be able to extend the survey to cover more Funds, over a longer period, the results of which may be presented to IACA at a future Conference.

AN ACTUARIAL APPROACH TO MONITORING LONG-TERM INVESTMENT PERFORMANCE
FUND [02] OVER 1979-84