BRIGHTONROCK

Pension Solvency and Market Volatility

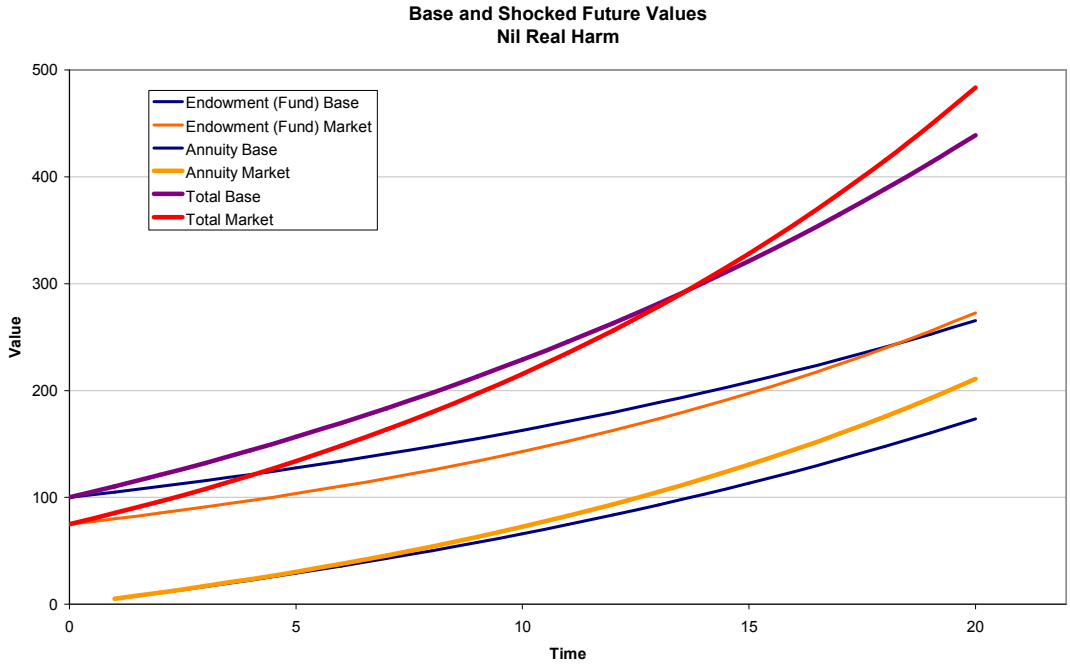
There has been much press commentary about the solvency position of funded pension schemes and shocks to market values. But little commentary presents the complete picture: a pension scheme needs to consider not just the value of its fund (endowment) but also the contribution to be made by future payments into the fund. This gives a perspective which incorporates the long-term and the employer's covenant. It is clear that a solely historic analysis can lead to actions which are detrimental to the employer's covenant and so reduce the probability that members will receive their promised benefits in full.

In terms of the analysis of the investment allocation of the fund, the investment policy is no longer the single period value maximisation of Markowitz or the elementary capital asset pricing model, nor even the inter-temporal CAPM of Merton, where no future inputs are considered, but a rather more complex situation where scheme and sponsor are considered jointly.

We shall consider a simple deterministic model of a scheme with a current principal value in the base case of 100. We will set future contributions at 5 per annum. The investment rate of return, or dividend, is 5%. The horizon of the fund is twenty years. We show the future values of the endowment fund, the accumulated future contributions (labelled as Annuity in the diagram) and the aggregate value of the fund. This is the "Base" scenario.

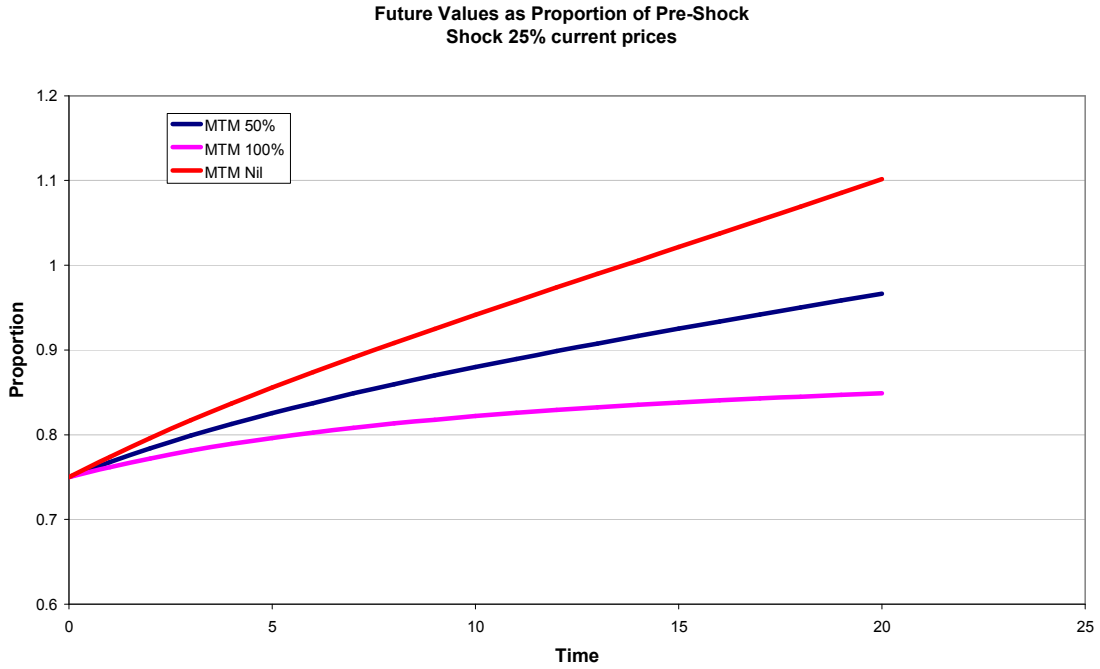
We then apply a shock which consists of the market price of assets declining by 25%. In this first instance there is no loss of income from these investments, i.e. the dividend yield on investments rises as the prices fall. We again show the future values of fund, contributions and aggregate. It is future values that determine the payment of promised pensions. This is the "Market" scenario.

BrightonRock, 150 Minories, London EC3N 1LS, UK



We observe that this immediate 25% decline in market prices results in the aggregate value of the fund lying below the aggregate value of the base scenario (no shock) for some 13 years; thereafter the aggregate value is higher. There are in fact two effects causing this. First, the accumulated value of future contributions is everywhere higher as contributions are buying assets at the lower price. Second, the value of the fund, because it is earning higher returns, ultimately also has a future value above the base case investment.

This simple illustration shows that there are some interesting consequences if the decline in market prices is not reflected in any diminution of the investment income of the assets; that is the yield on assets rises to fully reflect the decline in market price. This, of course, may not be the case. So next we consider the situation when the decline in market prices reflects fully a decrease in income from the assets, together with the situations where this decline is half the decline in market prices and also, as before, no decline at all in income. We show these three circumstances as a ratio of the future values which would have applied in the pre-shock scenario, so at time zero all three stand at 75%.



In the situation where the shock to market prices represented no equivalent shock to dividend income, the fund grows quickly and by year 13 is actually superior to the pre-shock status quo; this we saw previously. When the shock is fully representative of a decline in dividend income, the fund does not recover in the twenty year life of this illustration; however, the coverage ratio is increasing and by year 20 is some 85% of the pre-shock outcome. The intermediate situation is that where dividends or investment returns decline by 50% of the market price shock, and we see that maintaining the status quo of paying future contribution at the same level as was foreseen for the base case scenario (i.e. 5 per annum) ultimately results in similar coverage of committed benefits.

The lesson in this illustration is that we should not be excessively concerned with deficits expressed in immediate terms. The real effect of concern is the extent to which market price declines reflect declines in actual future dividend income from the assets. Moreover there is a degree of closure of the apparent deficit for schemes which continue, arising from the value of future contributions. Scheme funding decision rules based upon the current deficit or surplus can be decidedly misleading.

In the illustration, the base case present value of the sponsor future contributions is 65.4 and for the market value case the present value of these contributions is 58; when the term is perpetual, rather than the twenty years of this particular example, these values are 100 and 75 respectively. The present value of future contributions to the scheme, in general, declines as rates rise. It is clear that the current size of the endowment fund and of future contributions both affect the relative magnitudes of the effects illustrated.

This perspective places an explicit value on the sponsor covenant. The value of future contributions is derived from the sponsor as a future debtor of the scheme. There is also a direct connection to sponsor finances and influence in the sponsor insolvency likelihood both immediately and over time. The multi-period nature of these future contribution effects is also important in the context of stochastic models (uncertainty allowed for) where they serve to reduce point in time dependencies and smooth volatility effects. This reduces the overall risk of the pension provision proposition.

Con Keating is Head of Research at BrightonRock, www.BrightonRockGroup.co.uk