

# Measure it to manage it

**D**rawing up a list of the risks inherent in defined benefit (DB) pension schemes is not difficult. Behind the current flurry of interest in risk management tools lies a greater appreciation of the economic impact of DB schemes on companies. These include changing accounting standards, falling bond yields, poorly performing equity markets, increasing longevity and tougher legislation. Both trustees and sponsors have had to start thinking about their schemes far more quantitatively.

This involves not only valuations (now available in more flavours than ever: FRS17, IAS19, PPF, technical provisions, and so on) and expense, but also the risks associated with pension schemes.

For financial institutions, a quantitative approach is mandatory. Regulatory capital requirements are almost invariably determined by value at risk (VaR) techniques. Pension funds in the UK have not yet found themselves in this position (although they have in the Netherlands), but an increasing number are voluntarily adopting a quantitative approach to risk budgeting. Despite acknowledged shortcomings, most of these schemes are also using a VaR approach.

**THE MAIN RISK CATEGORIES** The working definition of risk for this article is that of a scheme being unable to meet its commitments. Schemes obviously have explicit assets included within a valuation by way of their investments, as well as implicit assets in the form of contributions and other sums due from the sponsor. The liabilities of a scheme depend on the scheme's benefit entitlements along with financial and demographic assumptions. These factors give rise to the following main risk categories within the scheme:

- Financial risks affecting assets (equity markets, bond prices, exchange rates) and liabilities (general inflation, salary inflation, interest rates);
- Demographic risks affecting liabilities (longevity, staff turnover rates);
- Sponsor credit risk; and
- Legislative risk (fiscal, regulatory, and so on).

This list is not comprehensive. It does not, for example, include operational risks such as maladministration and fraud, although these

## Executive summary

- Risks are rising for defined benefit pension schemes, driven by financial, sponsor credit, regulatory and demographic change. Such risks must be first identified, and then quantified.
- A battery of measures, such as inflation and interest rate swaps, are effective ways to control much of the risk.
- The burgeoning market for bulk annuities could offer the best opportunity for scheme trustees and sponsors to manage risk.

are also amenable to risk management and mitigation processes.

The following sections look in more detail at these risk categories, how they can be managed and the impact of common management tools on the balance sheet and income statement of the sponsor. The final sections take a look at the products offered by some recent providers of pension risk management products.

## FINANCIAL RISKS

**Interest Rates.** Movements in interest rates affect the value of fixed income investments and the present value of future liabilities, but not the value of pension benefits actually paid in the future. Interest rate risk can be mitigated without any use of derivatives, simply by changing the duration characteristics of a bond portfolio to match that of the liabilities more closely. Leaving aside dealing costs, there will be no adverse balance sheet impact and there may even be an apparent improvement to the income statement if duration is lengthened and the yield curve has a positive slope. In practice,

JOHN HAWKINS AND  
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THROUGH THE TOOLBOX FOR  
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coming close to a perfect hedge requires the use of derivatives, usually in the form of a series of long-dated interest rate swaps, or by investing in duration 'bucket' funds (likely to be of more interest to small and medium-sized funds).

Swaps can be used with an existing bond portfolio or as an overlay on a cash portfolio. Swap spreads vary according to notional amount and tenor – two or three basis points is common, but even this can represent a significant amount in present-value terms on a large long-dated swap. Most swaps involve three-month Libor on the floating side paid by pension schemes, so they need to keep in mind how this will be generated, which is not easy without taking some credit and/or yield curve risk. These costs aside, the impact on the balance sheet and income statement will be small and there may be an investment income improvement if duration is lengthened in a positive yield curve environment. For many schemes, however, the proportion of bonds held relative to liabilities will not permit interest rate risk reduction on a large scale.

**Inflation.** Changes in general inflation will affect the future value of liabilities. The liquidity of the long-dated inflation swap market continues to improve, although it still lags behind interest rate swaps. Spreads are similar to those for interest rate swaps. Hedging a future liability that is largely inflation-dependent will require two swaps (interest rate and inflation), or one combined swap with a higher spread (roughly doubling the total spread cost). There is no Libor or yield curve impact, so spread costs are the main issue and these have been falling recently (in comparison with spread costs or index-linked gilts).

Changes in salary inflation cannot generally be managed using market instruments since they will be scheme-specific.

**Exchange Rates.** For most schemes foreign exchange risk is discretionary. There will seldom be non-local currency liabilities and no compulsion to invest in non-local currency assets. For companies that do invest in foreign currency denominated securities, hedging will be straightforward using forward exchange contracts or currency swaps. The costs of such hedging will usually be small.

**Equity Markets.** Any investment in equity markets is implicitly justified on the basis of a superior risk-adjusted return (including some estimate of the equity risk premium), notwithstanding the mismatch it introduces for underlying bond-like liabilities. Ultimately, this is a decision of the scheme trustees, but it is perfectly possible to modify the risk profile of an equity investment without disposing of it entirely. The most common way of doing so is by buying an equity index put option or entering into an equity collar involving the simultaneous purchase of a put option and sale of a call option.

Option premiums are highly influenced by equity market volatility, so the timing of execution of option-related strategies can be important. Spread costs tend to be higher than for long-dated interest rate and inflation swaps, so these must be taken into account even where a collar is 'zero cost' (in other words, constructed in such a way that the two option premiums are equal). In income statement terms, it may well be possible to justify the same expected return on the equity portfolio with a collar as without. Removing equity risk completely – for example, by moving entirely into bonds – will, under current accounting standards, have a negative income statement impact due to the lower expected returns on bonds.

**Other assets.** Investments in other asset classes are almost always justified on the basis of diversification (and thus risk reduction). Such investments should always be made with a clear understanding of whether cost-effective hedging products are available. Their absence is not necessarily a reason for abstaining, but should be an explicit part of the decision process.

#### DEMOGRAPHIC RISKS

**Longevity.** If pension beneficiaries live longer than expected, liabilities will be greater than expected. The rate at which longevity continues to lengthen is practically in the realm of guesswork. While schemes would like more certainty on longevity, currently the only reliable way to cover the risk is to purchase a bulk annuity.

Attempts to develop a market in longevity bonds over the last few years have been unsuccessful, and there is little immediate prospect of this changing. Traditional annuity providers and reinsurance companies are likely to have transacted longevity swaps – whereby schemes pay an amount based on a fixed longevity profile and receive an amount based on 'actual' longevity. Some of the larger pension schemes could certainly do this with investment banks or directly with reinsurers, although the spread costs are difficult to gauge.

**Other.** These are risks associated with actual staff turnover, proportions of staff married, age of spouses and dependants, and so on, being different from the scheme's assumptions. In practice, they are almost impossible to hedge but, like salary inflation, are more within the control of the sponsor.

**SPONSOR CREDIT RISK** All the risks considered so far have a direct bearing on both trustee and sponsor. Sponsor credit risk only directly affects the trustee, although where the creditworthiness of the sponsor is in doubt, the behaviour of the trustee may constrain the sponsor's freedom of action. The principal options available for

reducing sponsor credit risk are funding, documentation enhancement (including security), third-party financial support (such as guarantees), and the use of market instruments.

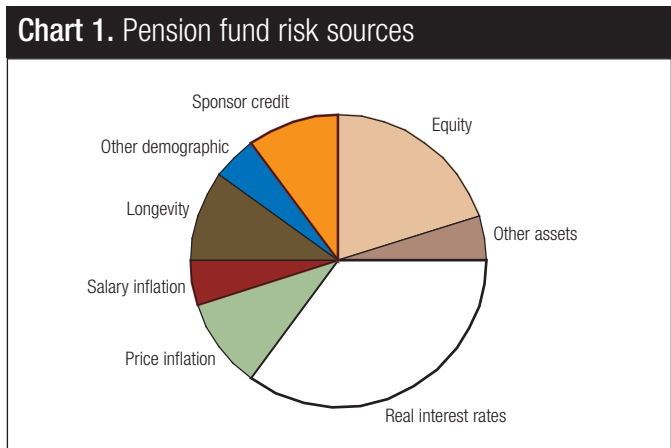
These options were examined in the *Forging the Pension Fund Trustee* article in the July/August 2005 issue of *The Treasurer*. In short, most schemes should review the merits of funding, which include potential tax and Pension Protection Fund levy reductions as well as improved security for members.

**LEGISLATIVE RISK** As long as a sponsor retains legal responsibility for a pension scheme's liabilities it will leave itself open to a wide range of legislative risks, such as the 1997 budget change that removed the right of pension schemes to reclaim tax on dividend income and the 2003 move that prevented sponsors walking away from scheme liabilities. The only way for a sponsor to protect itself against such risks is to pass all the liabilities on to a third party. Under the relevant regulatory regimes (that is, the Pensions Regulator and the FSA), this can only be done by purchasing annuities.

**THE RELATIVE SCALE OF PENSION RISKS** Once identified, the risks in a scheme then need to be quantified. Most pension scheme risks are amenable to quantification using VaR. *Chart 1* illustrates the relative scale of risks, as measured by VaR, for a typical scheme with a high proportion of equities, a significant duration mismatch between bonds and liabilities, and a degree of underfunding.

Complete elimination of risk is only possible if liabilities can be transferred in their entirety, which would involve purchasing annuities for all classes of member. And even this would only really be practicable if the scheme was simultaneously closed to all future accruals. However, removal of much interest rate and general inflation risk is perfectly possible with minimal net adverse impact to the balance sheet and income statement, particularly if combined with additional funding.

**THE ANNUITY MARKET** Annuities can transfer longevity and legislative risks, albeit at a cost, even after taking into account the lower in-house admin costs associated with them. Annuity providers



guard their proprietary investment and risk management strategies jealously, but they will make at least four different assumptions to most pension schemes when setting annuity rates: they will be conservative on longevity; they will assume that assets are matched extremely closely to liabilities, through the use of gilts and derivatives; they will need to hold some regulatory capital; and they will factor in a profit.

Unlike the medium-cohort assumptions used by many FTSE 100 companies, the assumptions of most traditional annuity providers tend to be closer to the long-cohort level. Few experts would argue that they are too conservative or that providers are making super-profits from over-conservative mortality assumptions.

As a result, a pension scheme's buy-out liability (the cost of purchasing annuities to cover all liabilities) will be greater than the FRS17/IAS19 liability at which the scheme appears on the sponsor's balance sheet. Purchasing annuities for some or all membership classes of a scheme will always, therefore, have an adverse impact on the balance sheet and income statement.

Despite the other options available and the incremental costs associated with annuities, there has been an upsurge of interest in this market. This may not be so surprising given that, in a recent

**Box 1: Stepping stones to a fund buy-out**

The Pension Protection Fund (PPF) has just updated its own investment strategy principles for when it starts receiving scheme assets and liabilities, writes Francis Fernandes. Its new principles illustrate just how far pension fund risk management has evolved in a short space of time. Particularly in relation to interest rate and inflation risk, the issue for the PPF – whose approach will be looked on as a model for pension trustees (fashioned by their own specific objectives) – is about forming a clear view about rewarded and unrewarded risks.

In recent years, the increased risks posed by pension schemes to the corporate balance sheet have resulted in benefit changes being made. Some of the so-called 'creative' benefit structures we have seen are simply tinkering at the edges, but employers are now starting to deliver on the true message of the Pensions Act 2004: if you promise a retirement benefit to your employees, make sure you can deliver it.

The first step in controlling pensions risk was to close defined benefit schemes to new hires, and around 75% of schemes have taken this step. More employers are now moving to the next stage: closing schemes to future accrual for existing employee members.

Not only that, but after a year or so of simply talking about liability-driven investment strategies, employers are using the first funding valuation under the Pensions Act 2004 to articulate the strings they are attaching to extra cash to clear the bigger deficits created by the new, tougher funding rules. "We will fund the deficit but in return we don't want the problem coming back again," is the message from the company side.

In addition, many employers are seriously beginning to consider an exit strategy. If they are being forced into funding at even more prudent levels but still left with risk on the table, some are wondering whether now is the time to bite the bullet and pay up the insurance company price. It would give members benefits in full and extinguish the risk for employers. In April, when pension deficits fell sharply as a result of higher yields and benign equity markets, some employers may have found the proposition tempting.

One of the frustrations arises from just how open-ended the risk is from life expectancy. Many employers are most alarmed by the continued uncertainty in future life expectancy. They have suffered the pain of moving to the latest "prudent" mortality tables only to find that the allowance for future longevity improvements has just

Mercer/CBI survey, almost three-quarters of firms with DB schemes said they had experienced a significant or severe reduction in profits due to increased pension costs.

Historically, the only schemes that purchase large quantities of annuities have been those in wind-up, because they are obliged to by legislation. Until only a few months ago no more than two annuity providers would quote on such business, today it is eight or nine. Some of the newcomers are established life companies moving into bulk annuities; others are start-ups backed by substantial amounts of capital specifically to engage in business of this sort.

The greater competition is likely to result in at least three changes: finer pricing (reductions of 4% to 5% have been reported), a deeper market, and more innovative structures.

Adoption of a dramatically different business model seems unlikely to reduce annuity rates, significantly, mainly because of regulatory capital constraints imposed by the FSA.

A number of innovative trends are already becoming apparent. They include:

- **Partitioning of liabilities.** The longer an annuity, the greater the risk, so on a pure premium basis it can be cheaper to buy annuities for those already drawing pensions than for previous employees with deferred pensions or current employees;
- **Deferred premiums.** To defer payments can be attractive to some schemes and sponsors. Since annuity providers will generally be averse to taking on sponsor credit risk, such schemes will normally involve third-party credit insurance or guarantees; and
- **Profit sharing.** Although annuity providers usually invest largely in risk-free assets, they may invest in riskier assets for a higher premium, sharing any outperformance with the sponsor. Profit sharing if other targets (such as mortality) are exceeded may also be feasible, again in exchange for increased premiums.

Will these innovations make bulk annuity purchase the exit route of choice for firms burdened by large pension liabilities? The answer is no, but the option should be considered seriously by trustees and sponsors looking holistically at pension scheme risk reduction. For

example, in certain circumstances a combination of extra funding, annuity purchase for existing pensioner liabilities and cashflow matching using swaps for other liabilities could be attractive.

The argument that annuities are inherently expensive just does not stand up to scrutiny. The regulatory regime for pension schemes in the UK is still not as tight as that for insurance companies. The higher the investment risk taken by insurance companies, the more capital they are required to put to one side. The higher the investment risk taken by pension schemes, the larger the deficit they are allowed to run (since the equity risk premium can be taken into account when the trustee and sponsor agree a recovery plan). In part it is this regulatory arbitrage that makes annuities seem superficially expensive compared to the alternatives – on a risk-adjusted basis the costs are much closer. Once risk is taken into account, the residual cost difference becomes the cost of certainty.

**THE WAY FORWARD** The new legislative environment in the UK requires pension scheme trustees and sponsors to think about risk of all types. Thinking about risks in a quantitative way and using quantitative techniques to evaluate risks is the only effective way to manage a scheme's risk budget, which will in turn affect the sponsor's overall risk budget. Risk management techniques vary between those targeting a very narrowly defined risk (often easy and relatively cheap to implement) and those targeting a broader and more expensive range of risks. There is no reason why these techniques cannot be combined.

Any pension scheme sponsors and trustees that have a thorough quantitative understanding of their risk profile and are happy with it should be very pleased with themselves. For most schemes in the real world there is much left to do, and plenty of opportunity to move the risk profile towards a more desirable position.

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moved again. Some new studies are even suggesting (look away now if you are of a jittery disposition) that the funding reserves set by actuaries today will need to be revised upwards by another 10% or 15% within five years. Faced with this prospect, buy-out levels some 30% to 40% above FRS17 may not seem so expensive.

It's no great surprise that so much hope is pinned on the arrival of new entrants in the bulk purchase annuity buy-out market. It adds capacity and new stepping stones on the way to buy-out. The investment banks are also beginning to spot the opportunities represented by some £1 trillion of funds. The marketing message is compelling: "Just leave your pension scheme at our front door and we'll take care of it for less than the insurance buy-out price." Perhaps using the banks' balance sheets to absorb a bit of longevity risk might be a welcome innovation but the scope for exploiting regulatory arbitrage in the UK would seem limited as Solvency II capital requirements for banks and insurance companies start to converge.

Finally, as corporates are faced with funding up their pension schemes, "stranded assets" in funds are becoming an issue. Treasurers seem to look at the adverse scenarios while trustees sometimes view the pension fund glass as half-full. The compromise may be to look at

the target return required to reach buy-out levels of funding in an agreed timeframe allowing for company contributions – and then selling any more favourable future outcomes above this to provide a floor on the down-side. Derivatives can be tailored to avoid stranded assets and use the proceeds to bolster member security, although work still needs to be done explaining to trustees how these work and what risks remain.

Trustees should look on derivatives to hedge interest rates, inflations or equity risks as simply insurance. They may not like the price, but it may be worth paying when the unlikely happens and there are no other alternatives. Sounds similar to whether to buy out or not? It is a leap of faith but some funding, derivatives and benefit redesign may all be stepping stones on the path to make that leap a little bit easier.

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