A fair-value enterprise

When Danish pension company ATP switched to fair-value accounting, it became necessary to develop a new business model that could manage a now volatile balance sheet. This case study looks at the issues involved

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Introduction

Pension companies have traditionally based their business model on a principle of caution where financial and insurance elements are set according to a so-called technical basis, representing a worst-case scenario of the future (Norberg, 2004). The conservative assumptions are intended to protect the solvency of the company against all 'plausible' events. The timespan of pensions is decades and events that seemed implausible, say, in the 1980s have become painful reality since then. In particular, assumptions of the actuarial rate – the (minimum) interest rate underlying all actuarial computations – have proven critical and sent many pension companies into severe problems following the steady decline in interest rates since then.

In the same period, capital markets have developed tremendously and are now providing liquid trading of long-dated bonds and financial derivatives, essentially providing a 'markets' expectation of future interest rates. The possibility of actually trading future payments long into the future is essential to the new fair value accounting standard now in preparation. Rather than discounting insurance cash flows by a conservatively set actuarial rate, the fair-value accounting standard uses (observable) market rates instead.

This new fair value accounting standard is still under development by the International Accounting Standards Board (IASB) as Phase II of the Insurance Contracts project. However, some countries, including Denmark, Sweden and Holland, have already put the new principles to action by changes in local legislation. Results of phase I of the project are available (International Accounting Standards Board, 2004).

An intended consequence of the fair value reporting standard is to use financial analogues of insurance cash flows when possible. The incentive for pension companies to match these cash flows by assets is immense, since major business risks are then transferred from companies – and their clients – to financial markets. By their very nature, the scale of such hedging programmes is the size of the balance of the companies. Hedging a company's liabilities is therefore not just some financial 'fix' to a short-term problem but is a true redefinition of the very business model of the company.

It is our belief that the consequences of fair value accounting reaches even further than hedging. Discounting liabilities by market rates and reporting assets at their true market value mean that they will both become very volatile quantities. In the future, operating a pension company therefore becomes a tight balance of managing the net volatility of the balance sheet against surplus reserves of the company – or a sponsor's appetite for risk. The good news is that, exactly because assets and liabilities are treated equally, it is possible to design dynamic strategies which virtually eliminate the risk of insolvency; however, we will not pursue that topic here.

Case study

The Danish labour market supplementary pension scheme (ATP) is a nationwide compulsory scheme founded in 1964 providing old-age annuities to virtually all Danes as a supplement to their state pension. By the end of 2005 the fund had €48 billion under administration. ATP switched to fair value accounting in 2002 during which year the main part of an extensive hedge programme was implemented. The aim of the hedge programme is to fully match the interest rate sensitivity of liabilities at all times.

The purpose of this paper is two-fold. First, to illustrate a number of practical

Figure 1. Expected benefit cash flow of ATP based on pension rights, end of year 2005

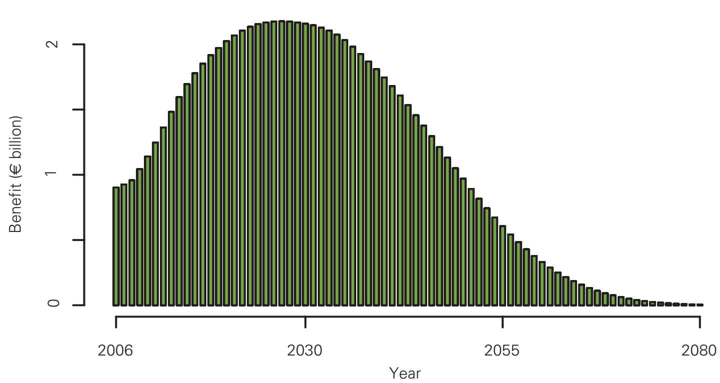
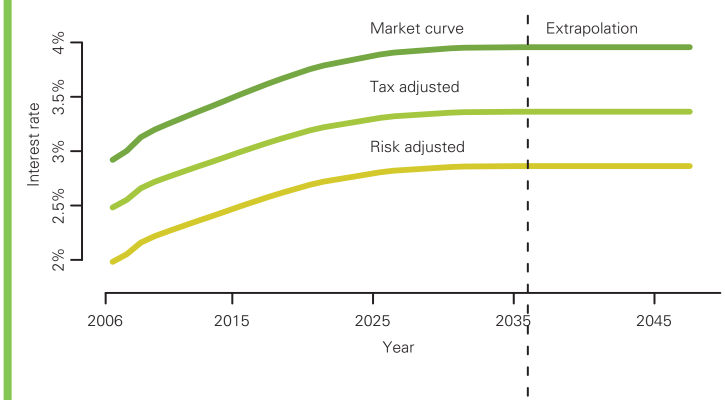


Figure 2. From market quotes to discounting term structure



issues and considerations arising when constructing and maintaining a hedge to match liabilities. Second, to discuss how the business model has changed as a consequence of the new capital structure of the company. In essence, the new business model is based on a conceptual and physical separation of investment and hedging portfolios leading to a clear identification of their different goals and risks. The exposition is based on actual problems faced and decisions made by ATP since 2002. Although certain aspects of ATP are unique, we do believe that many of our experiences are of such a general nature as to illustrate the challenges faced by pension companies. We must stress, however, that views and opinions expressed are exclusively by the authors and do not necessarily reflect those of ATP.

Economic versus reported value

The Financial Accounting Standards Board (FASB) offers the following definition of fair value: "Fair value is the price that would be received for an asset or paid to transfer a liability in a transaction between market participants at the measurement date." (Financial Accounting Standards Board, 2006). The purpose of reporting standards, in which both assets and liabilities are measured at fair value, is thus to give the best possible, objective, economical description of the current status of a company. The fair value principle is to use an economic valuation of, say, pension liabilities as a yardstick for the reserve. (Jørgensen, 2004). Therefore, in principle, the fair value reserve of pension liabilities is the present value of the (net) expected cash flow of the company.

Leaving aside the substantial difficulties and uncertainties involved in estimating future cash flows, in the following we will focus on the risks and problems arising from discounting them. The first question to address is: what interest rate to use for discounting? This, however, is mainly a concern of the regulators, but as a rule of thumb, market rates used for 'similar' liabilities are to be used. In reality the underlying market rates used for discounting are thus externally given from the point of view of the companies, although they may have some degree of freedom in certain cases. In the case of ATP, the quotes on Danish kroner swaps are to be used.

It is common actuarial practice to account for certain risk factors, say longevity, by adjusting parameters independent of these factors, for example, the interest rate. Further, regulatory requirements may dictate additional modifications of observed term structures before being used for valuation of liabilities. We shall give concrete examples of this pertaining to Danish legislation in the next section.

An actual hedge programme must be implemented by transactions in some market with a liquidity large enough to support the entire hedging needs of the company. There is no *a priori* guarantee that the market dictated for valuation actually supports transactions the size of a hedge programme; although ideally this has been part of the regulator's considerations. The company may therefore need to identify an alternative market suitable for hedging. We will return to this point later on in this paper.

All these issues, of course, strongly depend on local legislation and their implications will be company specific. Since they all affect the value and duration of reported liabilities, they are a more or less controllable risk to the company. The point is that in determining the risk profile of a pension company, the risk to be concerned about is the one hitting the bottom line of the annual report and not the economic risk, despite the best intentions of the fair value reporting standard.

Market reserve of liabilities

In principle, the fair value reserve of €1 to be paid out T years from now is the discounted value, using the current market quote, multiplied by the probability of the payout. In practice, however, this principle is modified for various reasons. Below we will describe three modifications arising from longevity, tax and extrapolation considerations, all of which directly effect the value and dynamics of the reserve.

The analysis applies directly to the liabilities of ATP, which consist of whole life annuities with additional lump sum death benefits. The annuity is supplemented by a bonus scheme where – at the discretion of the board – pension rights may be irrevocably increased by a bonus percentage. Apart from that, there are no other options attached. In particular, surrender of pensions is not possible, that is, pensions cannot be moved out of the company by capitalisation or, say, moved to another pension company. Premiums are paid as a series of single premiums, in the sense that the terms for converting premiums to pension rights can be changed at any time for all future premiums. Consequently, the reserve of ATP's liabilities is the discounted value of the expected cash flow based on current pension rights (and current estimate of future mortality) only. This cash flow is shown in Figure 1.

In general, life contingencies come with a variety of embedded options in the form of, for example, surrender options, indexation or minimum rate of return guarantees and conversion rights of the policyholder. Obviously this entails further complications, but the point made below that discounting factors are obtained by non-trivial modifications of market quotes, and that this impacts hedging strategies, still applies.

Some notation: In the following we will use standard actuarial notation for the computation of reserves with the modification that a (market) term structure is used for discounting rather than some (assumed) actuarial rate. The reserve today, V, for a pure endowment of 1 at time T for a person aged x today, is given by

1
$$V = e^{-R_T T} e^{-\int_0^T \mu_{x+s} ds}$$

where the first factor is the discount factor with R_T being the (market) zero coupon rate used for discounting, and the second factor is the survival probability of the person experiencing age $x+T$ with μ_{x+s} being the mortality intensity at time s. (Gerber, 1997).

Modifying the curve: As can be seen from (1) the interest rate and the mortality intensity appear on an equal footing despite their conceptual difference. This and similar observations have lead to the aforementioned actuarial practice of building in safety margins from insurance business into financial variables to account for various risk factors. A concrete example is to reserve for, say, longevity by deducting a spread from the discounting rate rather than modifying mortality assumptions themselves. Reserving for longevity therefore takes the form:

2
$$V = e^{-(R_T - \Delta)T - \int_0^T \mu_{x+s} ds}$$

rather than:

3
$$V = e^{-R_T T - \int_0^T \hat{\mu}_{x+s} ds}$$

where $\hat{\mu}$ is a modified mortality intensity taking longevity explicitly into account, whereas Δ is a spread deducted from the discounting rate to reserve for longevity. In the following we shall assume a spread of Δ=50 basis points (bp). A quantitative discussion of the spreads needed to accommodate the observed decline in Danish mortality during the 20th century has previously been undertaken (Fledelius and Nielsen, 2001).

Deducting a spread is not the only modification of the discounting term structure to take into account. A multiplicative factor can also be applied to the discounting rate. A concrete example is reservation for future taxes. In Denmark, capital gains on pensions savings are taxed by a 15% pensions return tax. The reported reserve to hedge then becomes:

4
$$V = e^{-((1-c)R_T - \Delta)T - \int_0^T \mu_{x+s} ds}$$

where c is the rate of taxation[1]; in the following we will use c=15%. Finally, pension cash flows extend up to 100 years into the future, whereas market liquidity typically extends only to 30 years with the possibility to trade maturities up to 50 years at larger cost. A truncation of market information either directly by markets (largest tradable maturity) or by accounting/regulating at, say 30 years, is therefore inevitable. The 'market' term structure to use is therefore truncated at some maturity, M, and the zero rate kept constant at R_M for maturities beyond this. The reported reserve to hedge then becomes:

5
$$V = e^{-((1-c)R_{\min(M,T)} - \Delta)T - \int_0^T \mu_{x+s} ds}$$

In the following we will use M=30 years. The steps involved in modifying the discounting term structure is illustrated in Figure 2.

Constructing a hedge portfolio

When we, in the following section, discuss hedging of liabilities, it will be liabilities already booked. In a seasoned pension company like ATP, the ratio between stock and flow is of the order 40:1, which is why precautious measures in premium principles only impacts the risk-profile on a very long timescale. A general reference to the hedge instruments discussed is available (Hull, 2005). As discussed in the previous sections, the construction of a hedging portfolio is in general not equivalent to an economic hedge of the expected (benefit)cash flow. We could further strengthen this point with the following assertion: there exists no static hedge portfolio in zero coupon bonds of reported liabilities. This is quite easy to see. Consider for simplicity an (expected) payment of €1 at time $T < M$ regardless of whether the insured is alive or not. The corresponding reserve is:

6
$$V = e^{-((1-c)R_T - \Delta)T}$$

with duration:

7
$$D_V = (1-c)TV$$

Note that although the capital gains tax does not apply to liabilities, the rate of taxation nevertheless enters into D_V, since liabilities are being evaluated on an after-tax curve. The liability must be hedged by a position in a zero coupon bond with maturity T as the hedge must be sensitive to the market rate R_T. This bond has market value:

8
$$Z = e^{-R_T T}$$

and after-tax duration:

9
$$D_Z = (1-c)TZ$$

The after-tax duration D_Z measures the change of value of a portfolio consisting of one bond after capital gains tax of assets has been deducted. For durations to match, the hedge must be composed of more zero coupon bonds than the single, nominal cash needed for the purely economical hedge. The number of bonds needed is given by:

10
$$N = D_V / D_Z = V / Z = e^{(cR_{T+\Delta})T}$$

1 In the actual implementation the tax reduction is applied to the zero coupon, discrete interest rate, not the continuous rate. However, for expositional clarity we will adhere to the continuous notation.

The hedge factor N is, in particular, T-dependent, thus the hedge has to be adjusted as time passes as claimed above. In fact, N depends on all parameters introduced and, hence, will have to be adjusted in response to any parameter changes. To emphasise the dynamic nature of the hedge, we note that in the presence of tax only a first order match has been achieved, that is, after-tax convexities do not match.

Notice also, that N is decreasing in calendar time (since time-to-maturity, T, is decreasing). Therefore, the hedge will produce a carry by the continuous sale of surplus zero coupon bonds as time passes. The carry can be split in two components: a tax component which, in theory, exactly corresponds to payable tax, and a Δ-component that produces a generic surplus on liabilities.

For maturities above the cut-off maturity, M, it is no longer possible only to trade in zero coupon bonds of the liability maturity. In this case the hedge consists of:

11
$$N = \frac{T}{M} e^{(cR_{M+\Delta})T - R_M(T-M)}$$

M-year zero coupon bonds which in principle must be continuously rolled into new M-year zero coupon bonds or hedged by a constant maturity swap or similar instrument (Hull, 2005).

Where to hedge? According to the FASB-quote above, the intention is to value pension liabilities as if they were exchanged in a financial transaction. Not only does this require knowledge of the characteristics of the expected cash flow, but it also presumes that such a transaction can actually be conducted in the market.

This may sound rather theoretical but it is indeed a very practical consideration since the requirement of a market to have a depth at least the size of total liabilities is equivalent to identifying a market to actually hedge these. Valuing liabilities in a market too small is of little use to pension companies and rather leads to systemic effects like inversion of the yield curve than fair valuation of liabilities.

This point is illustrated in Figure 3 where the outstanding amounts of Danish Government bonds are shown together with the expected benefit cash flow from Figure 1. Even buying the entire Danish Government market would supply only about half the duration required to hedge the liabilities (let alone the shortage of bond issues beyond 10Y). Informal discussion with counterparties revealed that turning to the Danish swap market would not improve matters.

Given that the domestic market basically does not support a pension company of ATP's size, the obvious choice for hedging was the € market. Within this market, the choice between a bond or a swap hedge was determined by the much better liquidity and associated lower costs of €-denominated swaps. The fact that swaps are not exchange-traded instruments but individual contracts with investment banks as counterparties, meant that a start-up burden of negotiating (standardised) terms and conditions, collateral agreements and so forth had to be overcome.

Unfortunately, it is not permitted to use foreign interest rates for discounting in Denmark. This is therefore an example of a problem that cannot be solved exclusively by financial means. The solution for ATP has been to act as if liabilities were discounted using the European swap curve by internally setting aside a reserve accounting for the difference in value of liabilities using the Danish and the European swap curve.

Figure 3. Expected benefit cash flow of ATP based on pension rights, end of year 2005 (green bars) and outstanding volumes of Danish government bonds with maturities above 1Y (brown bars)

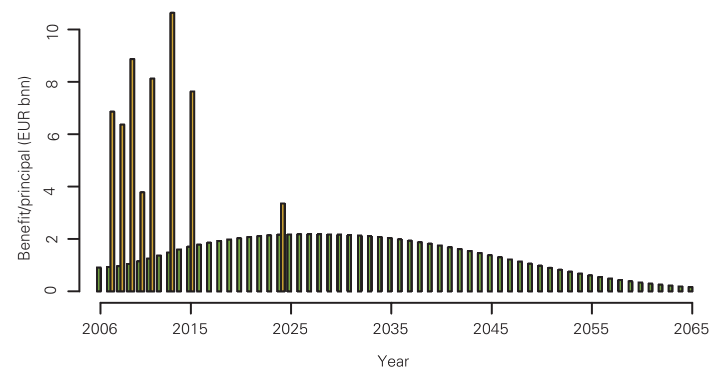
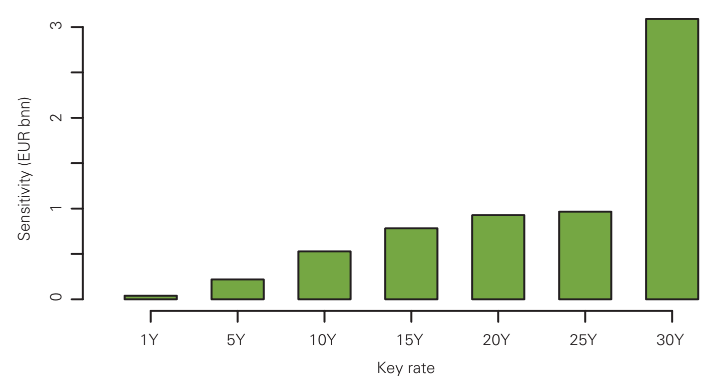


Figure 4. Sensitivity of reported reserve of cash flows in figure 1 to changes in sub-segments of the zero coupon market term structure at various key rates



Life as a δ-hedger: Market size and cost effectiveness considerations lead pension companies, in particular large companies, to operate in plain, liquid instruments only. Concerning hedging this implies, as demonstrated above, that the only viable strategy is a δ-hedge. Of course, any δ-hedge can be seen as a static hedge in a (complicated) instrument implementing the dynamic strategy. Buying such a static hedging instrument may be of interest to smaller companies in order to make better use of scarce resources.

For companies with enough resources to make δ-hedging feasible, it was shown above how to design a dynamic hedge of a single payment. In principle, one could hedge each payment of the benefit cash flow individually, however, for cost and operational reasons this is not desirable. At the other extreme one could hedge only against parallel shifts in the market term structure, i.e. match the total duration of liabilities. In practice, one chooses a compromise between the two extremes and constructs the hedge to immunise against changes in specific segments of the market term structure, the so-called delta-vector method.

Figure 4 shows the sensitivity of the reserve of the liability cashflow in Figure 1 to changes in the zero coupon market term structure. In the analysis, we have assumed a truncation of market rates at 30Y which is the reason for the profound exposure to the 30Y key rate. For the same reason, the sensitivity is zero to market rates beyond 30Y.

Matching a delta-vector profile with a heavy right skew like the one in Figure 4, using only par-swaps, will involve large opposing positions at different maturities due to the 'flat' delta-vector profile of par-swaps. This points to zero coupon swaps as the primary hedge instrument (Hull, 2005).

A new business model

The hedge programme, in terms of the nominal of the swap portfolio is the size of liabilities of the company, that is, the size of the balance of the company. The sheer size of the hedge programme therefore impacts the overall capital structure of the pension company at the balance level.

To illustrate the impact of hedging, we have drawn the simplified gross balance of a fully hedged pension company in Figure 5. Splitting the swap position into its long leg and short leg, the assets consist of investments comprising, in this simplified example, only bonds and equity and the long leg of the swap, while the liabilities are composed of the fair value reserve, the free reserve and the short leg of the swap. The split is best illustrated by swaps where the notional is exchanged at expiry, whereas the normal case of no-exchange requires introduction of a so-called funding account (see discussion below).

If we assume the hedge has just been re-balanced, the net position of swap, long leg and liabilities is a δ-neutral position, up to the number of key rates used to construct the hedge. Financial risk therefore no longer comes from liabilities but must originate from the part of the balance above the line.

As a consequence of the hedge programme, the business objectives of the pension company have therefore shifted to manage a new liability, a short floating rate position funding the cash portfolio of the company. In the following example, we will assume the company to be solvent in market value terms, that is, the size of the new liability is smaller than assets held by the company. The surplus is the free reserve which at all times must be positive to stay solvent.

Now, the good news is that a safe strategy exists. By safe strategy, we mean an investment strategy guaranteeing zero insolvency risk regardless of future capital market movements. It is by no means a particularly spectacular strategy, rather, it is the simplest of them all. If the company liquidates all assets and invests the proceeds in the money market, this would produce (at least) a floating rate cash flow that would cover payments with certainty. The investment strategy will then fund the short leg of the swap hedge, whereas the fixed leg would produce a cash flow (at least) covering guaranteed pension benefits. The bad news is that the safe investment strategy will provide little – if any – surplus return, and therefore in reality lead to a deterioration of pensions in real terms.

Funding account: As pointed out above, the floating leg of the swap hedge serves as a funding basis for the investment portfolio. Now, over time the swap hedge will be adjusted as market rates change. As the hedge portfolio is adjusted, the notional, and thereby the funding base of the investment portfolio, will change. Further, the actual implementation of the swap may dictate use of instruments inflating the notional of the swap contracts, say, use of par-swaps rather than zero coupon swaps.

The resulting volatility in the funding base of the investment portfolio is highly undesirable. Either the size of the investment portfolio must be adjusted by buying or selling physical assets when the funding base changes, or the funding rate changes by adding or subtracting a spread from the generic six-month rate of the floater leg. This, of course, is not a good model for professional management of an investment portfolio.

A solution to this problem is to physically separate the hedge portfolio from the investment portfolio. This can be done by introducing a funding account which is just two internally opposing accounts between a now independent hedge portfolio and a stable funding base of the investment portfolio.

The principle is illustrated in Figure 6, where the hedge portfolio now is composed of the swap portfolio, long as well as short legs, and a funding account receiving six-months LIBOR, which is mirrored in the funding base of the investment portfolio. Inaugurating the hedge programme, the funding account is set to the fair value of liabilities which roughly[2] is the amount necessary to fund the floating leg of the hedge. As the company expands its business, the effect is to increase the funding account as new cash flows are hedged. Similarly, when benefit payments fall due, the funding account is decreased. Two other important events that influence the funding account are the decision to index liabilities, that is, attributing bonus, and the re-evaluation of liabilities due to, say, longevity.

Normally, the actual hedge portfolio will have a notional larger than the fair value reserve due to choice of hedge instruments. On a normal yield curve this is a positive carry position within the δ-portfolio, which more or less will cover the excess expense on the actual swap short legs that are financed through the funding account.

Separation of investment and hedge portfolios: The hedge portfolio – or δ-portfolio – is now a physical portfolio which can be attributed an individual risk budget and managed independently of the investment portfolio. The risk budget must tie the risk profile of the δ-portfolio to the duration of liabilities, whereas it is an option for the pension company to make the δ-portfolio a profit centre by allocating a generous risk budget for active management or a tight risk budget to minimise funding costs of the investment portfolio.

A major advantage in separating the hedge portfolio from other investment management activities is that inefficiencies in – or the active management of – the δ-portfolio can be consistently measured. Given the δ-portfolio is of the size of the balance of the company, even small deviations can significantly impact the overall result of the company. In real world operations, surplus or deficits of the δ-portfolio are transferred to – or withdrawn from – the free reserve, say, every quarter.

Extensions

Up until this point, we have discussed the implications of fair value reporting – as implemented currently in Denmark – to the specific structure of ATP. Given the simplicity of ATP's liabilities, the tool to minimise financial risk was the use of interest rate swaps as a hedging instrument.

When we explicitly reported both the long and the short leg of the swap contract at each side of the balance sheet in Figure 5, we were able to identify the floater as the true funding base of the investment portfolio (together with free reserves). The long leg of the swap neatly netted the pension liability off the balance sheet.

We believe this model can be extended far beyond the simple structure of ATP and generalised to – in principle – any pension company's balance sheet.

The general funding account: In general, the funding account emerges as

2 Actually, the notional amount needed to δ-hedge liabilities may deviate from the fair value reserve, cf. Eq. (10), which in principle should be used instead.

Figure 5. Gross capital structure of fully-hedged pension company when swap hedge portfolio is split into long (fixed leg) and short (floating leg) positions

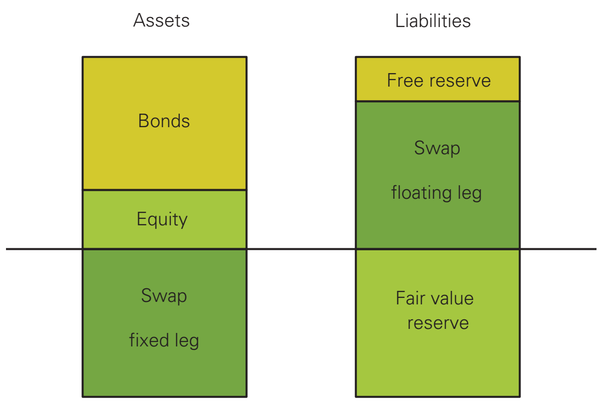
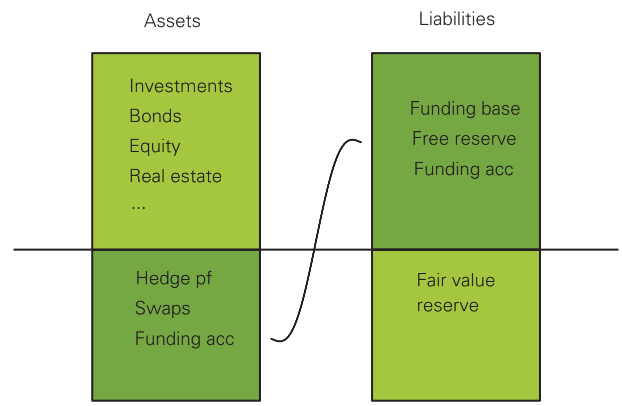


Figure 6. Gross capital structure of fully-hedged pension company with separation of hedge portfolio and investment portfolio



the financial cost of implementing a perfect hedge of the liabilities of the company. This cost is not necessarily equal to the reported reserve of the company – even within the fair value reporting standard. As an example, consider a newly issued single-premium with-profits annuity with an up-front premium of €1. Assume further that the contract is based on a technical rate r_{act} and contains a surrender option to terminate the contract at the technical value at any time. Under fair value reporting, the company must at any time, t, hold a reserve, R_t, which is the larger of the present value, V_t, of the expected cashflow and the surrender value, $S_t = (1 + r_{act})^t$, of the contract: $R_t = \max\{S_t, V_t\}$

Notice that V_t potentially is affected by the factors discussed in Section 4. At the outset, $V_t < S_t$, since the actuarial rate obviously is chosen cautiously, that is, well below the current market rate. Over time, V_t will fluctuate with market rates and there will be some – perhaps very small – risk that it will drop below the actuarial rate. In this case, V_t will dominate S_t, and the reserve, R_t, has to be increased. This is illustrated in Figure 7, where the reserve, R_t, is shown as a function of the prevailing market rate (after tax, etc.)

The fair value liability to be hedged is the 'hockey-stick' of Figure 7. It is beyond the point – and scope – of this paper to discuss in general how to hedge such liabilities. It suffices to notice that the financial value of any liability with – potentially – an initial payout of €1 (if the contract is discontinued immediately) is larger than €1!

The amount needed to physically establish the hedge is exactly the (general) funding account. The funds to finance the hedge could be drawn directly from the asset pool. Funds beyond that would be the true free reserves of the company and reflect the company's true risk capacity since losses beyond this amount would result in insolvency.

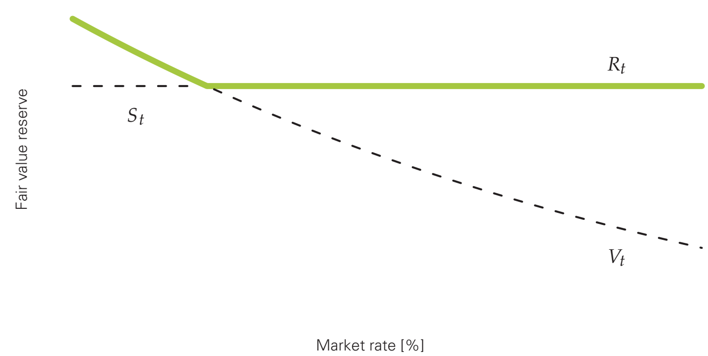
The objective of the company is to optimally utilise this risk capacity for its investment activities to produce the highest return possible. Formally, these investment activities are completely remote from the liability originally producing the funds to invest, and the funding account is simply the physical separation of the two. Hence a new business model.

Choice of hedging instrument: The choice of hedging instrument(s) obviously should reflect the character of the liability to hedge. Contracts with minimum return guarantees will be of long duration from the minimum cash flow that must be repaid to the client. If, additionally, some option-type clause is added, say, a surrender option, then the financial value depends on current interest rate levels as well as interest rate volatility.

In principle, a specialised derivatives package can be constructed to exactly match the profile of the net liability. As discussed above, a number of real world obstacles prevents such an ideal situation and a dynamic approach has to be adopted. We therefore again point to the importance of the liquidity of the hedge portfolio. Since swaptions – in particular, at-the-money swaptions – are the most liquid interest rate option, a strategy similar to delta-hedging – so-called vega hedging – is in our opinion a more robust solution than complex – and illiquid – derivatives packages (Hull, 2005).

Future premia: A common pensions product is to include future premia into the contract. Reserving for such products is slightly more complex than the single premium contract discussed above, since initially the fair

Figure 7. Fair value reserve, R_t (arbitrary scale) of single premium annuity with (par) surrender options



At high market rates the reserve is dictated by the value, S_t, of the surrender option, whereas the present value of the expected cash flow, Vt, dominates at low market rates value reserve is negative.

To see this, consider a client opting for a whole-life annuity pension scheme financed by annual premium, π, until retirement. The premium is calculated such that the present value of (expected) premium payments exactly matches the present value of (expected) pension payments, using the actuarial rate. The actuarial value of the contract (net expenses) therefore is zero at inauguration. In contrast, the fair value of the contract is negative since the longer dated benefit payments would be discounted harder than the near term premium payments due the higher market rate. To avoid this obvious moral hazard, some additional reserve must be intro-duced to ensure the total reserve becomes zero. This reserve will – together with any other characteristic of the contract – enter into the determination of the optimal hedge to implement, and thereby into the definition of the funding account.

Conclusion

Controlling financial risks is an inherent aspect of fair value accounting in practice, as adverse market movements immediately impact the funding status of the company. Hedging liabilities does not imply that there should be no financial risks. On the contrary, free reserves should be used actively to take on risks and hopefully generate high returns and larger pensions.

It is an important point that the reason for hedging is to reduce risk in order to put it to better use in the investment portfolio. As such there are strong reasons to hedge no matter how high or low market rates are – the level of the guaranteed rate, if any, is irrelevant and should not be part of the decision to hedge. Of course, if one believes that interest rates are at a historic low and likely to rise there might be good reasons to go short in duration. This however should be an active investment decision not implicit via non-hedging. An interest rate bet like this must be balanced against other investment opportunities and its risk budget allocated accordingly.

To help keep the purposes and risks of investment and hedging apart, we advocate a separation in distinct portfolios. The purpose of the hedging portfolio is to fully hedge liabilities, and in effect to transform these to a manageable floating rate target. The purpose of the investment portfolio is to create, in the long-run, excess returns compared to the floating rate target. The two portfolios have their own risk budget, which, however, cannot be set independently as they must obey an overall risk constraint reflecting the level of free reserves and the company's appetite for risk.

The new business model thus described emerged from the specific need to hedge liabilities in response to a change in reporting standard. As such, it is a concrete example of what is now known as liability-driven investment. But why should it be liabilities that define investments? Acknowledging this technology, it is exactly as natural to ask what guarantee the market can offer. It is therefore our belief that a new generation of pension products, offering higher (hedgeable) guarantees than traditional products, will emerge as the fair value accounting standard is more widely adopted – they will be investment-driven liabilities.

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Submission guidelines for technical articles

Life & Pensions welcomes the submission of technical articles on topics relevant to our practitioner readership. Core areas include solvency and economic capital modelling, the measurement and management of financial, biometric and operational risks, market-consistent valuation and financing of life and pension balance sheets and cashflows, and investment management. This list is not an exhaustive one.

The most important publication criteria are originality, exclusivity and relevance. In the interests of our readers, we attempt to strike a balance between these. Thus, while we will not publish executive summaries of longer papers (on the grounds of exclusivity), we may accept papers that draw partially but not completely on research submitted elsewhere should our referees recommend it on the grounds of originality and relevance to practitioners.

Given that *Life & Pensions* technical articles are shorter than those in dedicated academic journals, clarity of exposition is another yardstick for publication. Once received by the editor and his team, submissions are logged, and checked against the criteria above. Articles that fail to meet the criteria are rejected at this stage.Articles are then sent to one or more anonymous referees for peer review. Our referees are drawn from the actuarial, risk management, treasury and investment departments of major life and pensions companies, in addition to academia and regulatory bodies. Depending on the feedback from referees, the technical editor makes a decision to reject or accept the submitted article. His decision is final.

We also welcome the submission of brief communications. These are also peer-reviewed contributions to *Life & Pensions* but the process is less formal than for full-length technical articles. Typically, brief communications address an extension or implementation issue arising from a full-length article that while satisfying our originality, exclusivity and relevance requirements, does not deserve full-length treatment.

Submissions should be sent to the editor at *technical@incisivemedia.com*. The preferred format is MS Word, although Adobe PDFs are acceptable. The maximum recommended length for articles is 3,500 words, and for brief communications 1,000 words, with some allowance for charts and/or formulas. We expect all articles and communications to contain references to previous literature. We reserve the right to cut accepted articles to satisfy production considerations. Authors should allow four to eight weeks for the refereeing process.