PPI Briefing Note Number 93

Defined Benefits: valuing and managing liabilities

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Introduction
This is the third in a series of four Briefing Notes on the subject of private sector Defined Benefit (DB) pension schemes. The first explored the history of DB pensions in the UK, the volatility of funding positions, the challenges facing different stakeholders and the options available to address those challenges. The second dealt with the issue of governance, the growing complexity of the role of trustees, the characteristics of good governance and the governance gaps that exist.

This Briefing Note explores the subject of DB liabilities and in particular examines:
- The size, trend and shape of UK DB scheme liabilities;
- The mathematics of valuing today, liabilities that are due to be paid in the future;
- The particular impact of bond yields and longevity trends on pension scheme liabilities;
- Current mechanisms for controlling and de-risking liabilities;
- Calls for schemes to have more ability to manage liabilities and the issues raised by the Green Paper ‘Security and Sustainability in Defined Benefit Pension Schemes’.

The fourth and final paper in the series will address the topic of investing pension scheme assets.

Liabilities for many years to come
A DB scheme’s liabilities are essentially a collection of ‘promises’ to pay an income to each member of the scheme, based normally on:
- The individual’s salary with the employer (usually averaged over one or more years prior to retirement);
- The number of years that the individual has been a member of the scheme;
- The accrual rate applied to the scheme (most commonly 1/60th or 1/80th per year of membership); and
- Any other options available to members such as early retirement.

Payments are usually made from the scheme’s Normal Pension Age until the death of the individual, with a lower amount paid to that individual’s surviving dependants (as defined by the scheme rules), if there are any. In the event of ill-health, payments may begin earlier or it may even be possible for the member to receive a lump sum. Schemes may also offer members the ability to start their pension earlier, subject to a reduction in the amount paid.

A typical scheme will have three groups of members: active members who are still employed by the sponsoring employer and are accruing benefits; deferred members who are no longer building up benefits but have preserved pensions that might not start for many years to come; and pensioner members who are receiving their pension.

Valuing liabilities - a complex calculation
Given the number of unknowns, calculating how much money a scheme should have set aside today to be able to pay benefits in accordance with the scheme rules is complex. There is no single correct answer. Not only are there different sets of assumptions, but different

An example of how liabilities build up.
In a scheme with Normal Pension Age 65 and an accrual rate of 1/60ths, someone whose pay at age 65 was £50,000, with 30 years’ service in the scheme will qualify for an annual pension from age 65 of £25,000 if the pension is based on the final rate of salary (30/60th of £50,000). Often individuals have the option to take part of their pension as a tax-free lump sum, in which case a lower amount of pension will be paid.

In the first year of this person’s membership of the scheme at age 35, the liabilities (simplified for this purpose) are based on 1/60th of an, as yet unknown, final salary, payable in 30 years’ time if the member survives, for an unknown number of years and increased in payment at an unknown rate, plus a dependant’s pension of an unknown value for another unknown period of time with unknown rates of increase.
purposes for which these calculations can be used.

Schemes need to put a current value on the amount of money they expect will be paid out in future years. This is normally done by making a prudent assessment of the future cash flows expected to be paid by the scheme each year, and applying appropriate discount rates to them to give them a current value.

Valuing liabilities is a complex calculation involving many assumptions about future economic prospects, inflation, interest rates, investment returns and the longevity and other demographic experience of the scheme members and their beneficiaries. The calculation is typically undertaken by actuaries acting for the trustees, the latter being responsible for the scheme funding valuation. Accountants will also be involved when calculations are being made for the sponsor’s accounts.

In calculating a current value, actuaries will need to refer to the scheme trustees to ensure that the benefits being valued are in accordance with the scheme rules and any subsequent changes introduced by legislation (which may, for example, set out the basis for revaluing deferred pensions and increasing pensions in payment). They must also derive a number of assumptions relating to future possible events, including:

- How much will the earnings of those members still employed by the employer increase between now and their expected retirement or earlier exit from the scheme? Will they grow in line with average wage growth or be higher or lower?
- How long will active members continue to accrue benefits in the scheme?
- How will inflation affect pensions in payment and the revaluation of deferred pensions?
- What assumptions are required to revalue guaranteed minimum pensions (GMPs)?
- What proportion of active and deferred members will survive until the scheme’s Normal Pension Age to claim their pension?
- How long is each current and future pensioner expected to live?
- How many members will have surviving dependants to whom pensions will be payable and how long will they typically live?
- How does the value of a pound of benefit payable in the future compare to the value today – in other words, what discount rate should be applied to a benefit expected to be paid in the future, to estimate how much money might be needed today to be reasonably confident the benefit can be paid.

When establishing the funding of a scheme, the assets invested in today and the returns those assets are likely to deliver are used to calculate whether the scheme will be in a position to pay future liabilities at the time that they fall due. If the combined value of assets and future returns is significantly lower than the projected future liabilities, the employer might be expected to pay special contributions to the scheme to make up the difference over an agreed period of time (a deficit recovery contribution), although trustees cannot demand these payments.

**Different methods complicate further**

A scheme is described as “fully funded”, “in surplus” or “in deficit”, depending on the value of assets held by the scheme and the value of its liabilities.

Assets are usually valued at their market price. However, there are different ways of valuing the liabilities, not just because of different assumptions and calculation methods, but also because of how the valuation is to be used. The scheme’s funding position can be different according to the purpose of and the methods and assumptions used for the calculation.

For the purposes of a company’s balance sheet, an accounting basis is required for valuing the liabilities of the company’s pension scheme. Accounting standards, such as FRS102 or IAS19, mandate that the discount rate used to calculate DB scheme liabilities recognised in employer’s balance sheets must be based on yields on high quality bonds with terms similar to the term of the liabilities, irrespective of the assets held by the scheme.
Changes in the bond yields can therefore have a very significant effect on a company’s balance sheet, either by increasing or reducing the value of the deficit or potentially moving the scheme from surplus to deficit (or in the opposite direction if yields rise).

The effect is particularly marked in a period of rising inflation and low interest rates. To the extent that the scheme holds AA bonds as assets, the value of the scheme’s assets will also rise (or fall) with the change in bond yields. This will somewhat offset the increase in liabilities, depending on how closely the bonds match the liabilities. Bond yields can change suddenly and significantly, mostly in response to changes in interest rates, and can lead to considerable volatility and uncertainty for employers sponsoring schemes and for their shareholders.

For the purposes of calculating the contributions and funding required, schemes have to arrange a regular scheme valuation and calculate “technical provisions” (the cost of paying benefits calculated using the principles set out in the legislation) as required by the Pensions Act 2004. The assumptions used to value liabilities for this purpose will normally be different to that used for accounting purposes. Legislation requires trustees to follow a prudent approach when choosing their assumptions and to add appropriate margins to assumptions to allow for the chance of adverse deviations.

In its policy on an integrated approach to risk management, the Pensions Regulator (tPR) has encouraged trustees to consider its decisions on funding, investment and covenant. Apart from following prudent principles, trustees have some flexibility over how they choose to discount the liabilities and two factors may influence the prudent choice of rate of discount used: the type of assets held by the fund and the strength of the employer covenant. Approaches include using rates that reflect the expected returns of the assets held by the scheme or by the yield on government or high-quality corporate bonds. The extent to which an assumption is more conservative than a “best” estimate, will depend in part on the strength of the employer’s covenant. A weak covenant may drive trustees towards using a more prudent and lower discount rate, while a strong covenant provides trustees with more flexibility.

In its 2016 report on scheme funding (which relates largely to 2014 valuations), tPR2 reported that schemes were using, on average, an effective nominal discount rate of 4.5% (1.06% real), lower than the previous valuations of these schemes, but higher than the average discount rates used in the previous two years. Within the mix of schemes, those with a higher proportion of investments in “return seeking” assets generally adopted a higher discount rate. In practice, seemingly similar schemes can adopt very different discount rates depending on the sponsor’s risk appetite, the strength of the covenant, the recovery plan and investment mix.

For the purposes of estimating the value of liabilities should the scheme seek full buy-out (where schemes pass over the liabilities to an insurance company through the purchase of bulk annuities) the value of the scheme’s liabilities will typically be higher still. A discount rate close to the yield on government bonds might be used in this calculation.
“Section 179” (of the Pensions Act 2004) basis. This number forms the foundation of the Pension Protection Fund’s 7800 Index that tracks changes in pension fund funding on a monthly basis and the annual Purple Book.

Section 179 valuations are based on the estimated premium that would have to be paid to an insurance company if it were to pay scheme members the benefits they would receive if the scheme were to enter PPF. The calculation may result in lower liabilities than a scheme’s technical provisions since PPF compensation is normally less than scheme benefits and this can more than offset the use of the buyout rather than technical provisions measure.

As at December 2016, the value of the liabilities of DB schemes that qualify for PPF entry stood at £1,700 billion, an increase of 16% over the year. During that period, the PPF reports that 15-year gilt yields dropped by 0.7%, triggering an increase in the value of the liabilities. Assets also increased by around 16% over the year, to £1,476 billion, leaving the aggregate funding ratio unchanged.

Liabilities and longevity
Another factor that affects the value of liabilities is the changing assumptions about the longevity of scheme members. DB scheme members exhibit different patterns of longevity to the population as a whole, although longevity varies considerably from scheme to scheme. This leads trustees to adopt caution in setting their longevity assumptions.

Closure of schemes will affect the value of liabilities
Closing schemes to new members or all future accruals has two main effects. Firstly, it limits the growth of future liabilities by limiting or stopping any new benefits being accrued. For the sponsor, this should help contain its obligations towards the scheme. With no further contributions towards new accrued benefits, payroll costs reduce, even after typical replacement arrangements such as employer contributions to Defined Contribution (DC) schemes. In their 2015 survey of occupational pension schemes, the Office for National Statistics (ONS) reported that the average employer contribution to DB pension schemes was 16.2% of pensionable salary, with rates higher for final salary than career average. If replaced with an employer contribution of 10% (which is higher than the average employer contribution), a sponsor would save around 6% of pensionable salary in relation to members of the scheme.

Closure may also reduce the value of benefits accrued to date in some cases and therefore the deficit if there is one. This could arise where the statutory revaluation increases applied to now deferred members’ pensions are less than the growth in salaries assumed when they were active members of the scheme. Alternatively, closure could increase the value of benefits if the cap on increases in pensionable salaries in the scheme rules is less than the statutory revaluation.

Within the past five years, over 900 DB schemes closed to future accrual (100 of which were open to new members at the time). At the point of closure these schemes had £154 billion in liabilities. This resulted in over 360,000 active members being prevented from accruing additional service benefit within the schemes. For these 900 schemes, liabilities are projected to be around £2.5bn lower since closure than would have been the case had they stayed open. While there are no future benefit accruals to these schemes, in many cases a replacement scheme will have been implemented by the employer which may or may not involve Defined Benefits.

However, scheme closure also reduces the average length of time over which benefits have to be paid. If younger people are not joining the scheme, then the date when the last benefit will be paid should get closer, so the calculation will be less sensitive to changes in the discount rate. All other things being equal, each year will see a rise in the current value of the existing liabilities as
At December 2016, 47% of private sector DB schemes were closed to all future accruals and a further 39% were closed to new members. Modelling undertaken by PPI suggests that, by 2030, the number of DB schemes could have fallen from the current 5,792 to around 3,500 schemes, most of which will be closed to future accruals [Chart 1].

Sponsors looking to close their scheme to future accrual are required to establish a sound business case, consult appropriately with members and take into account their expectations. In a case in 2014, the High Court ruled against IBM who planned to close their scheme to future accruals, stating that previous consultations by the sponsor had led to members having ‘reasonable expectations’ about the continuation of accruals under the scheme.8

Changing benefit structures – current legislation

Under current legislation, scheme sponsors have little ability to change the liabilities to which they are already exposed. Closing the scheme only stops or puts a cap on future benefits being accrued. Unlike DB schemes in other countries, notably the Netherlands, UK schemes have limited ability to reduce benefits already built up and, indeed, many benefits have to be increased in line with (capped) inflation.

**Chart 1: Scheme closures and subsequent winding up / PPF entry could reduce the number of schemes to 3,500 by 2030**

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PPI projection of the future number of schemes

The projected number of Defined Benefit pension schemes is based upon tPR scheme data. The PPI has performed data cleaning based upon scheme movements.

Scheme data for the period from 2006 to 2016 has been analysed for trends in scheme transitions. The rate of closures and winding up, as well as the rate of new schemes being introduced, has been stable over the past five years (2012 to 2016).

Transition probabilities have been derived from these observations and used to project the most recent scheme data (2016).

Factors, such as changing future economic conditions, have not been considered in the projection.

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payment approaches. This also has an impact on the way assets are invested, a topic that will be discussed in the final Briefing Note.

As the duration of the liabilities gets shortened, the trustee’s time horizon for funding will reduce. As well as their investment strategy, this is likely to affect their choice of discount rate. Normally it would be expected to reduce, which increases the value of the liabilities further.

Eventually as closed DB schemes mature, the value of the liabilities can be expected to fall. The wind-up of schemes and the entry of some schemes into the PPF following employer insolvency will also lead to a reduction in aggregate DB liabilities, although some of the liabilities will be transferred elsewhere.

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The greatest flexibility to scheme sponsors wishing to limit their future liabilities involves reshaping future benefits. Most will involve consultation with the trustees and membership of the scheme. The biggest gain will come from closing schemes to future accrual and most private sector employers with DB schemes have already taken this step. Less dramatically, future accrual could be amended in the following ways:

- Switching the increase applied to pensions in payment from the, generally, higher Retail Price Index (RPI) to the lower Consumer Price Index (CPI). The Office for Budget Responsibility (OBR) reports that the long-run average difference between the two figures was 0.7% per annum but with the expectation that this will rise in the future to an average of 1.4%.9 Some schemes assume a 1% gap between the two measures. The compound effect of a 1% gap over 20 years would result in liabilities (and the pensions due to members) being 18% lower than they would otherwise have been;

- A move from benefits being based on final salary to career average salary can reduce future liabilities since average earnings with an employer tend to be lower than earnings in the final few years of employment. Some members accruing a career average pension might expect a considerably lower pension than if they had accrued a final salary pension;

- Changing the accrual rate from, for example, 1/60th per year to 1/80th per year, resulting in lower future liabilities (and members having to be members of the scheme for longer to build up the same level of benefit). A change of this type can reduce future liabilities by around 25%;

- Capping the pay eligible for pension benefits thereby putting a limit on future liability growth. Higher earners may find themselves capped in the amount of Defined Benefit pension they can accrue and may find themselves topping up with a DC pension;

- Changing the Normal Pension Age for future members or for future benefit accrual, typically aligning it to the State Pension age.

Other options for simplifying or modifying liabilities
Schemes have a number of other options open to them which can help either to stabilise the value of liabilities or remove them from the DB scheme. Some may in time prove to have reduced the liabilities if the assumptions used prove to be more prudent than reality. If this proves to be the case, it is also true that members collectively will have received less than they would otherwise have done. However, there can be winners and losers in these exercises. In many cases,
individuals and schemes may know only years later who has benefited and who has lost out.

**Converting GMPs simplifies administration and valuation**

Until April 2016, most DB schemes contracted their members out of the Second State Pension (and its predecessor). In return for lower levels of National Insurance, the scheme promises to pay pensions that are no less or broadly equivalent to that which the member would have got had they stayed in the state scheme. For the period between 1978 and 1997, these were known as Guaranteed Minimum Pensions (GMPs).

For most members, this has resulted in their pension being in two parts, the GMP and the scheme pension. For the scheme this adds to the complexity of the valuation of liabilities since the two parts of the pension are treated differently. In terms of revaluation of preserved rights, the two parts are required to be revalued at different rates. This also complicates the administration of the scheme and any buy-out of benefits by an insurer.

Schemes are able to convert GMPs to scheme pensions, subject to certain conditions, in particular a requirement that the new scheme pension is actuarially equivalent to what the member would have received. Converting GMPs should not change the value of liabilities (and therefore the pensions that members receive), although in practice over time, it may do so if assumptions made at the time are not realised.

The process for conversion of GMP into scheme pension is not straightforward or cost free, requiring the scheme to first reconcile its records against those held by HMRC and then equalise the rights of male and female members. The end result may be an increase in liabilities. However, once done, valuation, administration, member communication and buy-out become simpler.

**Buy-out transfers payment of pensions from scheme to insurer**

Sponsors wishing to reduce the uncertainty of liabilities and deficits and trustees wishing to secure member benefits, may opt to transfer the payment of the pension benefits to an insurance company, known as buy-out. In return for a premium, the insurance company takes on the annuity payment, but not the role of trustee. The annuity contract will typically be between the member and the insurer and, in many respects the member has no further contact with the scheme.

In a similar way, schemes can insure the payments of some or all of their pensions through a buy-in where the trustees purchase an annuity. This will be discussed in the next Briefing Note in the series.

In both cases, the full value of the liabilities has been secured with interest rate, inflation and longevity risk transferred to the insurer. While such arrangements provide the member, trustees and sponsor with greater certainty, they come at some cost to the sponsor since the benefits will be valued in full and the insurers profits will be incorporated into the premium paid.

**Other liability management exercises can reduce uncertainty for the sponsor**

Schemes may offer members the ability to exchange future pension increases (PIE) in return for a higher pension today. For the scheme and sponsors, this reduces the uncertainty around pension increases. For the member, it may be difficult to assess the value of what they are giving up. A voluntary code of practice exists to protect members and each member’s informed consent is required before changes are made. Each member can choose to accept or decline the offer. Those declining continue to get increases whereas those who accept are giving up an unknown level of future increase for an unknown number of years (for them and their dependents).

The code requires that members should be offered a ‘balanced deal’ whereby members, as a whole, should not be offered a value that is materially above or materially below what they would receive were they to not take up the offer. A complex set of assumptions is required about future levels of inflation and member and dependent longevity.
As part of that code, sponsors are required to offer, and pay for, individual advice for members. Advisers should consider both the generality of the offer and the specific circumstances of the member. A member in poor health and/or with no dependents may benefit from accepting more money today than in the future. Others may prefer more money today. Such offers play to the bias that exists in many people’s financial decision making. In general, people have difficulty putting a value on money they may receive in the future, thereby creating an information asymmetry between sponsors who can put value on future payments and members who often cannot.

Schemes may also offer members the ability to transfer their pension to another scheme through enhanced transfer values (with any enhancement being funded by the employer, not the scheme) in order to remove certain liabilities from their scheme. Transfers out can have an impact on both the member transferring and the remaining members. If the scheme pays too much in transfer values, the pensions of the remaining members may be less secure. If the scheme pays too little, the member transferring out may be a loser but the funding of the scheme may be more secure.

Since the introduction of the new pension freedoms for DC pensions, DB scheme deferred members can use their right to transfer their benefits to a DC arrangement to gain greater flexibility, subject in some cases to the member receiving independent financial advice. Schemes must value the benefits to be transferred, typically on a cash equivalent transfer basis (CETV) which employs ‘best estimate’ assumptions adjusted, if appropriate, to take account of the funding of the scheme. The CETV may be reduced if the trustees judge that the transfer could put remaining members’ benefits at risk.

Members with total pension benefits that are valued at £10,000 or below can, in certain situations, take their benefits as a lump sum from the scheme, known as trivial commutation. Sponsors can incentivise a member to take their lump sum subject to the code of practice and their funding of the exercise.

Transfers also experience information asymmetry. Members are offered a large lump sum today, with access to it (after tax) through the pension freedoms, rather than a regular flow of income in the future.

While, theoretically, none of these exercises should reduce the value of the liabilities, they can provide the sponsor and scheme with more certainty and less volatility. If the exercise is carried out at a value less than the eventual cost of securing benefits, there will have been some saving. However, they provide the member who transfers to DC much less certainty over their future retirement income, thereby transferring risk from sponsor to member.

Managing liabilities – calls for changes in legislation
Recently there has been a call for schemes to be able to modify liabilities by changing the nature of the promise on benefits already built up. These are considered in the Government’s Green Paper on DB pension schemes published in February 2017. At present, DB schemes are bound by legislation to revalue benefits for members who have left the scheme and to index pension payments (subject to some legislative and scheme rule constraints).

There have, however, been calls for legislation to allow pensions in payment to be subject to conditional indexation. This would allow schemes not to pay increases in line with inflation if it is considered that the scheme cannot afford it. A more extreme change would be to allow schemes to reduce pensions in payment under certain conditions, for example extreme financial circumstances. In the Netherlands, where these rules exist already, pensioners in some DB schemes have experienced reductions in their pensions in recent years or have not experienced increases in line with inflation.

Such a change would be radical for the UK where benefits already
increases. The paper notes that this could reduce the average member pension by £20,000 over the life of the member. For the average member in receipt of around £7,000 in annual DB pension,\textsuperscript{14} this could make a significant difference to their welfare in retirement.

In practice, pensioner households may suffer a very different rate of inflation to other households; different to both RPI and CPI. The ONS produces a measure of pensioner inflation that is typically higher than CPI, but has in recent years often been lower than RPI.\textsuperscript{15}

Conclusions
The trustees of DB pension schemes face a complex set of assumptions and calculations in estimating the value of the liabilities of the scheme. No trustee can know what the future holds in terms of interest rates, investment growth, inflation, salary growth or longevity but assumptions have to be agreed for a valuation to take place.

One of the most important assumptions for valuing liabilities is the discount rate used to value payments due in the future. A seemingly small change in the discount rate can lead to a very significant change in the valuation. This can be concerning for sponsors who are required to put the result of the valuation on their balance sheet and whose shareholders may not welcome the uncertainty and volatility of pension liabilities, even though the discount rate is prescribed by regulation. It can also be unsettling for trustees and members who may see a higher deficit emerge as a result and be concerned about the security of future pension payments.

Trustees have some discretion in choosing a discount rate for the schemes statutory three-year valuations. Where they end up should depend on a range of factors including the strength of the employer covenant and the investments held by the scheme. Trustees with a strong employer covenant may feel that they can adopt a higher discount rate if their investment strategy justifies it, as opposed to trustees of schemes with a weaker employer covenant.

Schemes and sponsors have a few tools at their disposal for controlling the value and volatility of liabilities, although they can hedge the liabilities. The most effective mechanism for limiting the growth in liabilities is closing the scheme to future accruals, an option that the majority of DB schemes have employed. Other devices that can affect the value of liabilities include reshaping the benefit structure.

With the closure of most schemes and the nature of current legislation, the future pattern of DB cash flows and liabilities is already largely determined. However, with calls to allow for schemes to have more flexibility in...
the increases they pay to members and such issues under consideration in the Green Paper, the pattern may yet change. For sponsors, such a change would lead to greater certainty and may make funding more achievable. However, for members the change may appear to break a promise and lead to greater uncertainty of benefits.

1 DWP (2017), Security and Sustainability in Defined Benefit Pension Schemes
2 tPR (2016), Scheme funding statistics
3 TPR defines these as equities, property, commodities, hedge funds, 50% of corporate bonds and assets classed as “other” in scheme returns.
4 PPF 7800 Index
5 PPF (2016) Purple Book
6 PLSA (2015), The Longevity Model
7 ONS (2016) Occupational Pension Scheme Survey
8 IBM UK v Dalgleish and others
9 OBR (2011) The long run difference between RPI and CPI inflation
10 John Lewis Partnership report and accounts 2016
11 Pensions expert February 2017, Diageo DB deadlock set to end after union split
12 FCA (2013), Applying behavioural economics at the Financial Conduct Authority
13 DWP (2017), Security and Sustainability in Defined Benefit Pension Schemes
14 PLSA (2015) Annual Survey — Median average annual (nominal) pension, private sector
15 Economics help.org

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