It is well understood and accepted these days that the nature of a pension plan’s liability affects its investment strategy—which is why liability-driven investing (LDI) is finally taking hold as a strategy for these plans. A better understanding and wider application of LDI may have saved some pension plans if it had been applied earlier, so it’s somewhat ironic that LDI is an equally important strategy when a plan sponsor is considering terminating a plan.

Note that terminating a pension plan is a step beyond just closing it to new entrants or freezing the benefit accruals. In a plan termination, all of the benefits are paid out, either as lump sums for participants who choose that option or through a group annuity purchase for those who select that alternative.

We estimate that about 40% of defined benefit (DB) pension plans were fully frozen at year-end 2010. A fully frozen plan adds no value to a benefits program and still costs money to maintain, so many of these plans are likely to be terminated in the next several years—provided they can achieve the full funding that’s required for termination. Many of these plan sponsors are also waiting for rule changes related to lump-sum distributions to be fully phased in at the beginning of 2012, which will make lump sums less expensive.

This paper discusses the financial preparation and strategies that need to be considered as part of terminating a pension plan. Most sponsors with fully frozen plans should begin thinking about these issues as soon as possible, even if terminating the plan is not imminent.

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Benefits paid at termination will be higher than the PPA funding target

Before terminating a pension plan, a plan sponsor must fully fund all of the participant benefits that are earned as of the time of the termination. All the benefits are then paid out, either as lump-sum payments or by purchasing a group annuity contract from an insurance company.

Because insurance companies must charge for taking on risk, as well as for administration, the cost to buy annuities for a termination is significantly more—usually 10% to 30% more—than the funding target while the plan is still operating, as defined in the Pension Protection Act (PPA), calculated using spot interest rates. (The PPA funding target is similar to the projected benefit obligation or PBO.)

In March 2011, long AA corporate bond rates had yields around 5.75%. Meanwhile, an insurance company might use an effective discount rate of about 4.25% to calculate the premium for an annuity purchased as part of a plan termination. For a pension plan with duration of 12 years, this means the additional cost to terminate the plan by buying annuities for all participants could be about 18%.

Lump-sum payments for participants may also be more expensive than the amount included in the PPA funding target, depending on the actuarial assumptions used. But lump sums are getting cheaper. Before the PPA rule that became effective in 2008, lump-sum amounts were determined using 30-year Treasury yields. Because Treasury yields are low compared with yields on other bonds, lump-sum amounts have been generous (i.e., larger than they would be if the value were calculated using higher yields).

The new PPA rule introduced corporate bond yields as the standard for calculating lump-sum values, and this rule is being phased in over five years, from 2008 through 2012. Plans that may be terminating in the next several years have many considerations related to this rule change. In general, the change will make DB lump-sum payments less valuable for participants and cheaper for plan sponsors. This means the total cost for terminating a pension plan will be lower going forward.

Let’s look at a typical plan termination and see how the liability is ultimately determined upon distribution of the assets.

Settling with retired participants

The usual practice for settling with retired participants is to buy annuities from an insurance company that provides payments under the same terms as the pension plan (life annuity, joint and survivor annuity, etc.). As we noted previously, because insurance companies take on significant risk and administrative functions when they take over responsibility for pension payments, they calculate liabilities more conservatively than is required under accounting rules or under PPA. Typically, the cost to buy an annuity for a retiree will be about 110% to about 120% of the ongoing PPA funding target for this group.

Although it is not required, it is possible to offer retired participants the option of a lump-sum payment equal to the present value of the annuity they are receiving. While this is not commonly done, it could become more common in coming years as lump sums become more cost-effective. In any case, participants always have the option to receive the annuity they have earned, and many retirees are likely to continue their annuity payments even if the lump-sum choice is offered.

For our purposes, we’ll assume that retirees have their benefit obligations settled with an annuity purchase.

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2 Source: Citigroup Pension Liability Index.

3 When lower yields are used to calculate a present value, the present value is bigger. To see this, imagine that a friend owes you $100 next year. If you can earn 6% interest in a secure account (savings account, CD, or Treasury bond) then you’d be willing to accept about $94 today instead of the $100 next year. However, if the secure account only paid 5%, you’d ask for about $95 today from your friend to settle his/her promise to you. The interest rate dropped from 6% to 5%, which caused the present value of your friend’s promise to increase from $94 to $95. When interest rates go down, present values go up, and vice versa.

4 These considerations are discussed in the Vanguard publication, Are some defined benefit plans approaching the end of the road?, November 2010.
Give active and terminated-vested participants a choice

Some pension plans offer lump-sum payments to their participants on an ongoing basis, and that option will be available when plan assets are distributed upon termination. Other pension plans introduce a lump-sum option once they decide to terminate the plan.

Both active participants and terminated-vested participants can be offered the option of a lump-sum payment, rather than a deferred annuity that begins at retirement. However, they should still have the option to select an annuity—and, because lump-sum payments will be less generous than in the past, more participants may take the annuity option. But data suggests most participants will still probably choose a lump sum.

As we noted previously, once 2012 rolls around, the lump-sum amount that is equivalent to the annuity benefit a participant has earned will be calculated using corporate bond yields. Since corporate bond yields are also used by actuaries to calculate pension liability, the cost of the benefits paid out as lump sums when the plan is terminated will be about the same as the PPA funding target. In some plans with generous early-retirement provisions, the cost of a lump-sum option at termination may be even lower than the ongoing plan liability, because the value of early retirement subsidies or supplements does not need to be included in a lump-sum payment.

Some active and terminated-vested participants will still choose to keep the annuity payments they earned, and the plan will need to purchase annuities from an insurance company to provide for that option. The annuities for this group are likely to be even more expensive, relative to the ongoing liability, than is the case for retirees. This is because of uncertainty about when these participants will retire and the very long-dated nature of the liability, both of which make it difficult to hedge (reduce) risk for this liability. Typically, annuities for this group will cost 115% to 130% of the PPA funding target.

A hypothetical example of what termination can cost

Let’s look at a hypothetical situation to see how this might play out and get a sense of how much it really can cost to terminate a plan. (See Figure 1, page 4.)

Assumptions

- PPA funding target for retirees: $40M.
- PPA funding target for active and terminated-vested participants: $60M.
- 100% of retirees get annuities at a cost of 15% more than the PPA funding target.
- 25% of active/terminated-vested take an annuity at a cost of 30% more than the PPA funding target.
- 75% of active/terminated-vested take a lump sum.

<table>
<thead>
<tr>
<th>Participant group</th>
<th>Retirees</th>
<th>Active and term-vested participants who choose annuities</th>
<th>Active and term-vested participants who choose lump sums</th>
<th>Total liability</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPA liability</td>
<td>$40M</td>
<td>$60M x 25% = $15M</td>
<td>$60M x 75% = $45M</td>
<td>$100M</td>
</tr>
<tr>
<td>Additional cost for buying annuities</td>
<td>$40M x 15% = $6M</td>
<td>$15M x 30% = $4.5M</td>
<td>N/A</td>
<td>$10.5M</td>
</tr>
<tr>
<td>Plan termination liability</td>
<td>$40M + $6M = $46M</td>
<td>$15M + $4.5M = $19.5M</td>
<td>$45M</td>
<td>$110.5M</td>
</tr>
</tbody>
</table>
So in this hypothetical situation, the liability for terminating the plan is about 10.5% higher than the PPA funding target would be while the plan is still maintained by the plan sponsor. In other words, the plan would need to have assets equal to 110.5% of the PPA funding target before there would be enough money to terminate the plan.

**Five action items toward an effective funding and investment strategy**

Once a decision has been made to terminate a plan, careful thought should be given to the funding of the plan and the investment strategy. The key thing to keep in mind is that excess contributions may be wasted. When the plan is terminated, any assets that are left after the benefits are paid off cannot revert to the employer until both income tax and a 50% excise tax are paid—so not much is left after the government gets its share.

How to use a surplus is a complex topic, so if there is any potential for excess assets, the plan should seek expert advice as soon as there is any thought about termination.

This potential for stranded assets drives much of the consideration around funding and investing when a plan termination is under way. For this reason, an LDI approach to the investment strategy can be important.

To terminate a DB pension plan efficiently and effectively, plan sponsors can apply the following five key action items in developing a funding and investing strategy:

1. **Measure the liability on a termination basis.**
   It’s important to understand the difference between the plan’s termination liability and the liability while the plan is still maintained by the plan sponsor (the PPA funding target). If the termination liability is 110% of the PPA funding target, this is the level that will drive future funding and investment decisions.

   The liability calculation should be split based on the benefits expected to be paid as annuities and the benefits expected to be paid as lump sums. The nature of these two liabilities is slightly different, and the investment strategies that match the liabilities can be different as well. No smoothing of assets or averaging of interest

   ![Figure 1: Termination liability compared with PPA funding target: Hypothetical example](image)

   *The termination liability is higher than the active plan liability because of the cost of buying annuities for participants.*
rates should be used. All measurements should be on a market basis because the termination distributions will be based on market interest rates. Assets that match the changes in the liability can best be identified only if the liability is measured using market interest rates.

2. Get the funded status up (but not too far).
As explained previously, it will take additional assets above the ongoing liability to terminate the plan, but plan sponsors must be careful not to overfund (Figure 2). Sponsors will want to keep the asset level close to, but below, the level of the full cost to terminate the plan. When assets are distributed (lump sums are paid and annuities are purchased), the plan sponsor can make the final contribution to fully fund the plan.

As an example, if the ongoing liability is $100 million and the anticipated amount needed to terminate the plan is $110 million, then funding to about $105 million may be about right. The final $5 million will be contributed at the time assets are distributed. Until an appropriate level of funding is reached, return-seeking assets may make sense. However, once that funding level is achieved, the higher investment risk that accompanies higher potential returns is not advisable.

There is no upside to the risk of stranded assets, but plenty of downside. If equities or other return-seeking assets are used at lower levels of funding, they should be eliminated gradually as the funded status nears this final state.6

3. Invest in assets that match the liability for expected annuity purchases. As explained previously, the termination liability will be higher than the PPA funding target—perhaps 120% of the PPA funding target for this group of participants. Another perspective on this liability is simply that the discount rate used to measure it is lower, now that the plan is to be terminated. A lower discount rate results in a higher liability, and insurance companies will use much lower discount rates to price group annuity contracts for a termination than PPA requires for calculating the funding target while a plan is operating.

Once the decision to terminate is made, the focus should be on matching this termination liability. A portfolio of bonds that closely matches

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5 For ideas on investment strategies while the plan’s funded status is improving, see A dynamic investment policy that intuitively adapts to DB funding objectives, November 30, 2009, on institutional.vanguard.com.
the liability is the right strategy. The expected cash flows from the bonds and the pension plan can be matched so duration risk and curve risk are addressed to the greatest extent possible. Treasury bonds are likely to fit in the portfolio because of the lower discount rate (higher liability) being matched. This is especially true in a normal credit environment, i.e., when corporate spreads are not unusually high.

It is not possible to precisely identify the portion of the liability that will be settled through an annuity purchase, since it is not possible to know how many or which participants will choose to take a lump-sum distribution of their benefits. However, reasonable estimates can be made in order to split the assets into the “annuity portion” and the “lump-sum portion.”

4. Invest in the assets that match the liability for expected lump-sum payments. This portion of the plan liability will be about equal to the ongoing PPA funding target (remember we are assuming use of the spot yield curve). Therefore an investment in long-duration, high-quality corporate bonds will match this liability well until the interest rate for determining lump-sum payments is fixed. The duration of this liability can be high (because the short-duration retiree payments are not part of it), so extended-duration investments such as long Treasury STRIPS may also be part of this portfolio. At some point before the actual distribution of assets, the lump-sum interest rate will be identified. This may occur from a few months to a year ahead of the actual distributions. As soon as the rate is identified, the liability no longer changes with market interest rates, and short-duration bonds and cash-type investments should be used to cover the expected amount to be paid as lump sums.

5. Identify the final liability, true-up assets, and distribute. A plan sponsor will not know until close to the time of distribution what the split between lump-sum payments and annuity purchases will be. Therefore, the estimated split of the liability described previously will need to be trued-up just before distribution. A final contribution to bring the assets up to the required level is then made so all of the lump-sum payments and the group annuity purchase are fully funded.

From the time that a plan sponsor decides to terminate the plan until the time that assets are actually distributed, at least 12 months will pass—but in some cases, it may take several years, if the funding level is still low. Whatever the circumstances, the five-phase process described above provides a good financial framework for moving toward plan termination.

**Conclusion: LDI is key**

The termination of a DB plan takes careful thought and planning on many fronts, and an effective strategy around funding and investments is important to mitigating risk during the process. The ultimate cost of terminating the plan becomes clear when annuities are purchased in the termination process. The option to pay some participants a lump sum instead of purchasing an annuity for them is likely to reduce the total cost of terminating the plan, but also introduces new considerations for funding the plan and investing the assets. LDI, in the form of matching assets, becomes a key component to limiting risk as different elements of the termination process are implemented.
All investing is subject to risk.

Annuity income guarantees are subject to the claims-paying ability of the issuing insurance company.