Longevity risk management, corporate finance and sustainable pensions

Guy Coughlan
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There are just two long-term, strategic alternatives for DB pension plans

- **Transfer**
  - Execute a pension buyout or termination with an insurer
  - Sell the longevity risk along with everything else

- **Keep**
  - Commit to maintaining the plan for the long term
  - Manage the longevity risk along with the other risks

- Both require paying attention to longevity
- The starting point is ensuring that:
  - Base mortality assumptions are up to date
  - Future mortality projections reflect the latest data and models
## Instruments used for managing longevity risk

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Type of contract</th>
<th>Risks transferred or hedged</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buyout or termination</td>
<td>Insurance</td>
<td>Longevity risk and all other financial and demographic risks</td>
<td>Removes pension obligation from sponsor’s balance sheet</td>
</tr>
<tr>
<td>Buy-in</td>
<td>Insurance</td>
<td>Longevity risk and all other financial and demographic risks</td>
<td>Annuities become assets of the pension plan and the plan remains on the sponsors balance sheet</td>
</tr>
<tr>
<td>Longevity swap</td>
<td>Capital markets or Insurance</td>
<td>Longevity risk only</td>
<td>Exchanges actual pension benefit payments (based on realized longevity) for a fixed set of payments</td>
</tr>
<tr>
<td>Lump sum offer</td>
<td>Agreement between sponsor and beneficiaries</td>
<td>Longevity risk and all other risks</td>
<td>Removes pension obligation from sponsor’s balance sheet</td>
</tr>
</tbody>
</table>
2012 saw the announcement of three large and very different longevity risk management transactions

- Ford:
  - Lump sums to retirees and terminated vested employees

- GM:
  - Lump sums to retirees
  - Spin off of actives and terminated vesteds into new plan
  - Termination of retiree plan

- Verizon:
  - Annuity purchase with accounting settlement

Diversity of these transactions emphasizes the importance of understanding the pension plan, the sponsor and their interdependencies.

Diversity reflects the uniqueness of each sponsor and pension situation.
Pension plan and sponsor impact each other economically

- Business plan execution
- Risk profile
- Creditworthiness
- Capital structure
- Valuation

Value of “sponsor covenant”
- Ability of sponsor to make up underfunding and ensure pensions are paid in full

Longevity risk management must reflect both perspectives and their interdependencies
Holistic balance sheets for sponsor and plan capture the interdependencies between them

Holistic Pension Plan Balance Sheet

Assets
- Economic deficit
- Sponsor covenant
- Contingent assets
- Pension (financial) assets

Liabilities
- Pension liability

Holistic Corporate Balance Sheet

Assets
- Operating assets
- Pension assets

Liabilities
- Debt
- Equity
- Pension-related contingent claims
- Pension liability

A framework for addressing longevity risk management decisions
Two key determinants of pension longevity exposure

Demographics
- Number of members
- Age profile
- Gender profile
- Socio-economic profile
- Aggregate health profile
- Profile of spouses and dependents
- Willingness to take lump sums (if available)
- Utilization of other optional benefits

Benefit Structure
- Fixed benefits vs. inflation- or COLA-linked
- Lump sum options
- Spouse and dependent benefits
- Other optional benefits and payment adjustments

Longevity exposure is different each pension plan and must be measured specifically for that plan
Step 1: Current mortality rates and expected future mortality improvements

- Base mortality needs to reflect up-to-date data for the pension plan demographics
- Estimates of future mortality improvements are generally based on history
  - A mortality improvement of 1% p.a. means mortality falls by 1% each year

* These are “graduated” mortality rates that have been smoothed.

Source: LifeMetrics data for the US national population. www.lifemetrics.com
Understand the risk associated with mortality improvements

- Mortality improvements have historically exhibited:
  - An upward trend
  - Volatility

* Considering each 5-year age group and 5-year time period

Source: LifeMetrics data for the US national population. www.lifemetrics.com
Step 2: Impact on the pension liability

- Cost of pension payments depend on interest rates and mortality improvements

- Sensitivity measured by “duration”:
  - Interest rate duration = % increase in liability for a 1% fall in interest rates
  - Mortality q-duration = % increase in liability for a 1% increase in mortality improvements
Sensitivity to interest rates and mortality improvements are intertwined

- Mortality improvement sensitivity is smaller than interest rate sensitivity
- But the combination of both of them has a magnified impact

Longevity risk and interest rate risk should be managed together
Summary

- The management of longevity risk in defined benefit pension plans cannot be pursued in isolation
- Decisions need to be made in a holistic framework that takes account of interdependencies between the pension plan and its sponsor
  - This is in the best interest of the beneficiaries
- The holistic balance sheet framework is an approach for evaluating these decisions
  - Holistic pension plan balance sheet
  - Holistic sponsor balance sheet