Pension Research Council 2013 Symposium:
Recreating Sustainable Retirement: Resilience, Solvency, and Tail Risk
April 25-26, 2013
The Wharton School

# Longevity risk management, corporate finance and sustainable pensions

Guy Coughlan

PACIFIC GLOBAL ADVISORS

This report is provided for informational purposes only. Do not use this report as a primary basis for investment decisions or for decisions pertaining to plan funding, accounting, or related regulatory requirements. In preparing this report, Pacific Global Advisors may have relied upon and assumed, without independent verification, the accuracy and completeness of information provided by various third parties such as investment managers. Pacific Global Advisors is not able to independently verify the accuracy and completeness of such information and makes no representation as to the information's accuracy or completeness. This report may contain projections, forecasts or estimates. Pacific Global Advisors makes various assumptions in connection with such forward looking information. Actual events or conditions may differ from those assumed and not all relevant events or conditions may have been considered in developing the assumptions. Changes to the assumptions could have a material impact on the information presented herein. No representation is made that the performance presented herein will be achieved. Nothing contained herein should be construed as legal, actuarial or accounting advice. You must retain an actuarial firm which is independent of Pacific Global Advisors to provide all actuarial services with respect to statutory and regulatory requirements.

Pacific Global Advisors and its affiliates do not provide tax advice. Accordingly, any discussion of U.S. tax matters included herein (including any attachments) is not intended or written to be used, and cannot be used, (a) in connection with the promotion, marketing or recommendation of any of the matters addressed herein to another person or (b) for the purpose of avoiding U.S. tax-related penalties.

This report may not be distributed to any person other than the recipient and may not be replicated in any form without the prior written consent of Pacific Global Advisors.

# 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

| Instrument | Type of contract | Risks transferred or hedged | Comments |
|---|---|---|---|
| Buyout or termination | Insurance | Longevity risk and all other financial and demographic risks | Removes pension obligation from sponsor’s balance sheet |
| Buy-in | Insurance | Longevity risk and all other financial and demographic risks | Annuities become assets of the pension plan and the plan remains on the sponsors balance sheet |
| Longevity swap | Capital markets or Insurance | Longevity risk only | Exchanges actual pension benefit payments (based on realized longevity) for a fixed set of payments |
| Lump sum offer | Agreement between sponsor and beneficiaries | Longevity risk and all other risks | Removes pension obligation from sponsor’s balance sheet |

# 2012 saw the announcement of three large and very different longevity risk management transactions

- Lump sums to retirees and terminated vested employees

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

- Annuity purchase with accounting settlement

- Diversity reflects the uniqueness of each sponsor and pension situation

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

# Pension plan and sponsor impact each other economically

**Pension Plan** → **Sponsor**

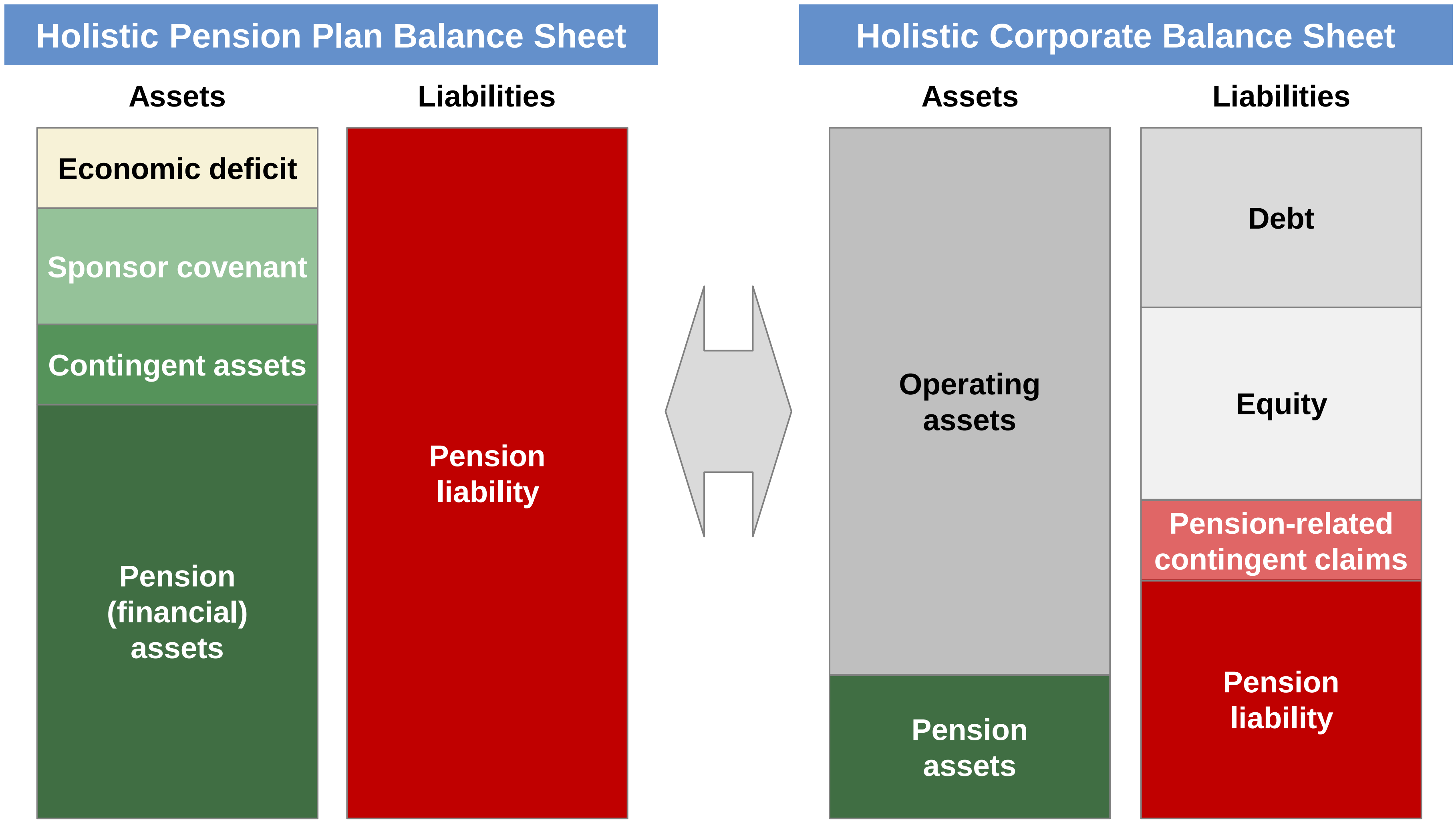
- Business plan execution
- Risk profile
- Creditworthiness
- Capital structure
- Valuation

**Sponsor** → **Pension Plan**

- 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




Not to scale

**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

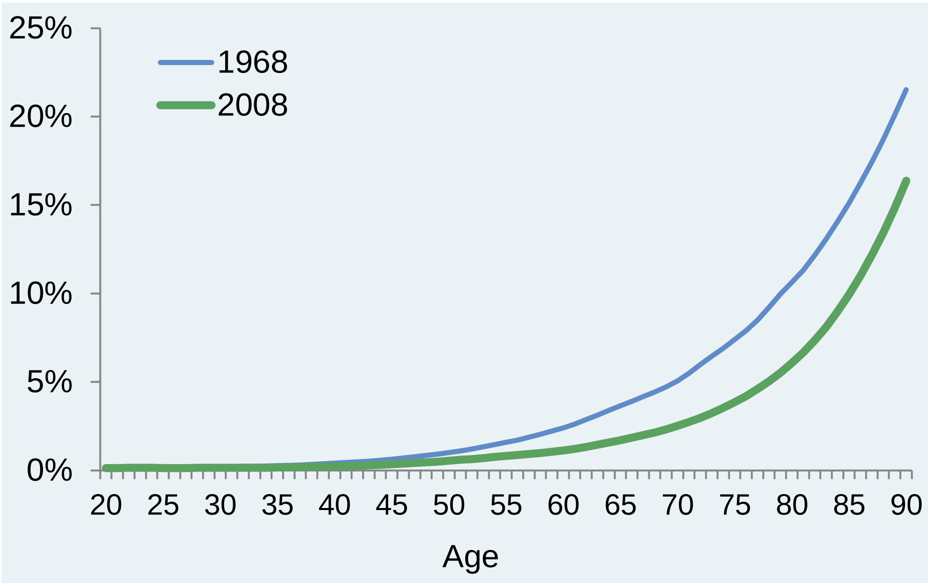
**Benefit Structure**

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

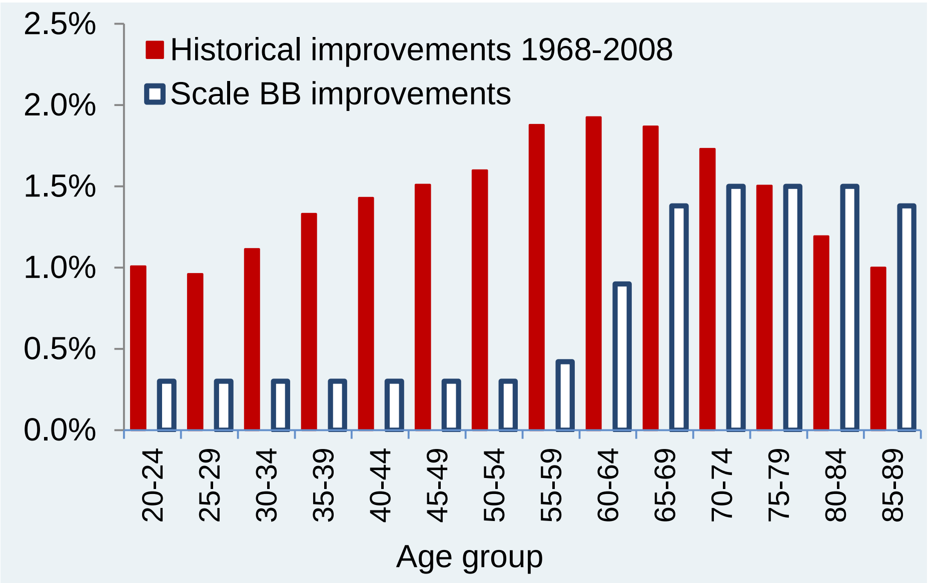
**Longevity exposure is different each pension plan and must be measured specifically for that plan**

# Step 1: Current mortality rates and expected future mortality improvements

**Mortality rates* for US males**




**Average mortality improvements 1968-2008 (%pa)**




- 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.

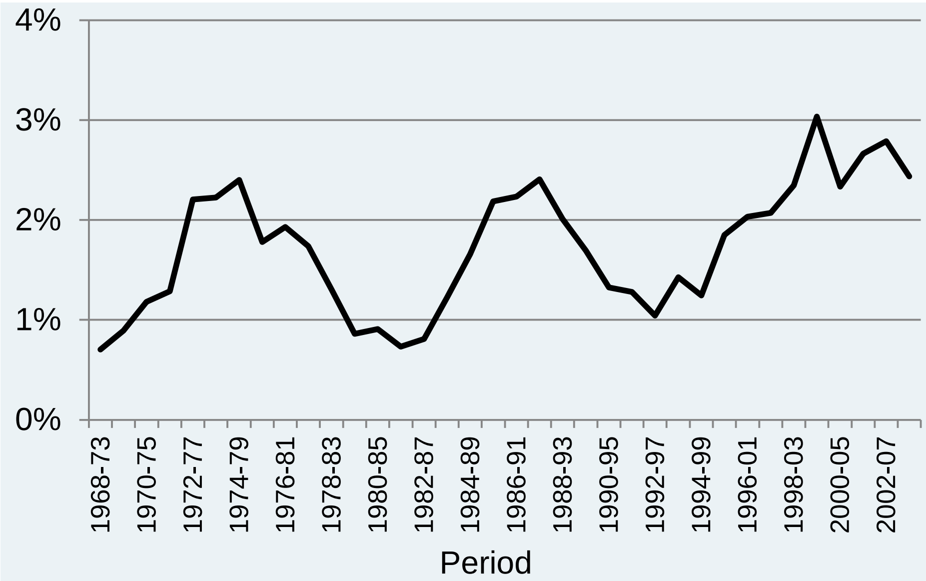
Source: LifeMetrics data for the US national population.  www.lifemetrics.com



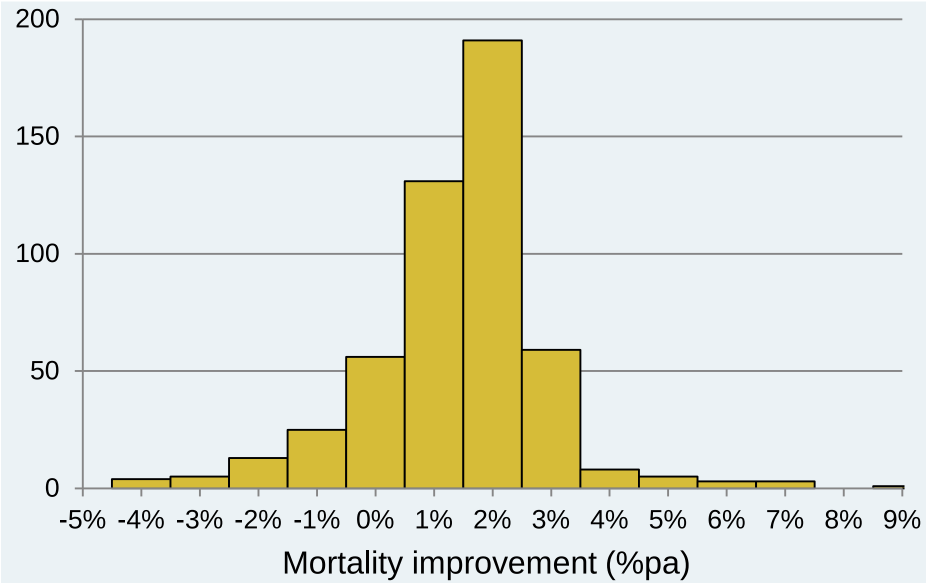
PACIFIC GLOBAL ADVISORS

# Understand the risk associated with mortality improvements

**Five-year mortality improvements age 70-74 (%pa)**




**Distribution of historical improvements* 1968-2008**




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

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

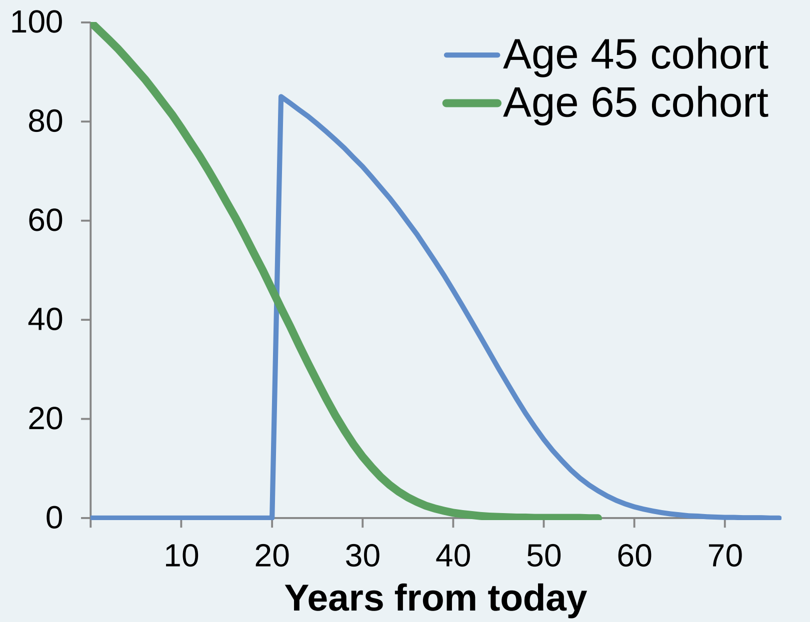
Source: LifeMetrics data for the US national population. www.lifemetrics.com



PACIFIC GLOBAL ADVISORS

# Step 2: Impact on the pension liability

**Expected liability payments (normalized)**



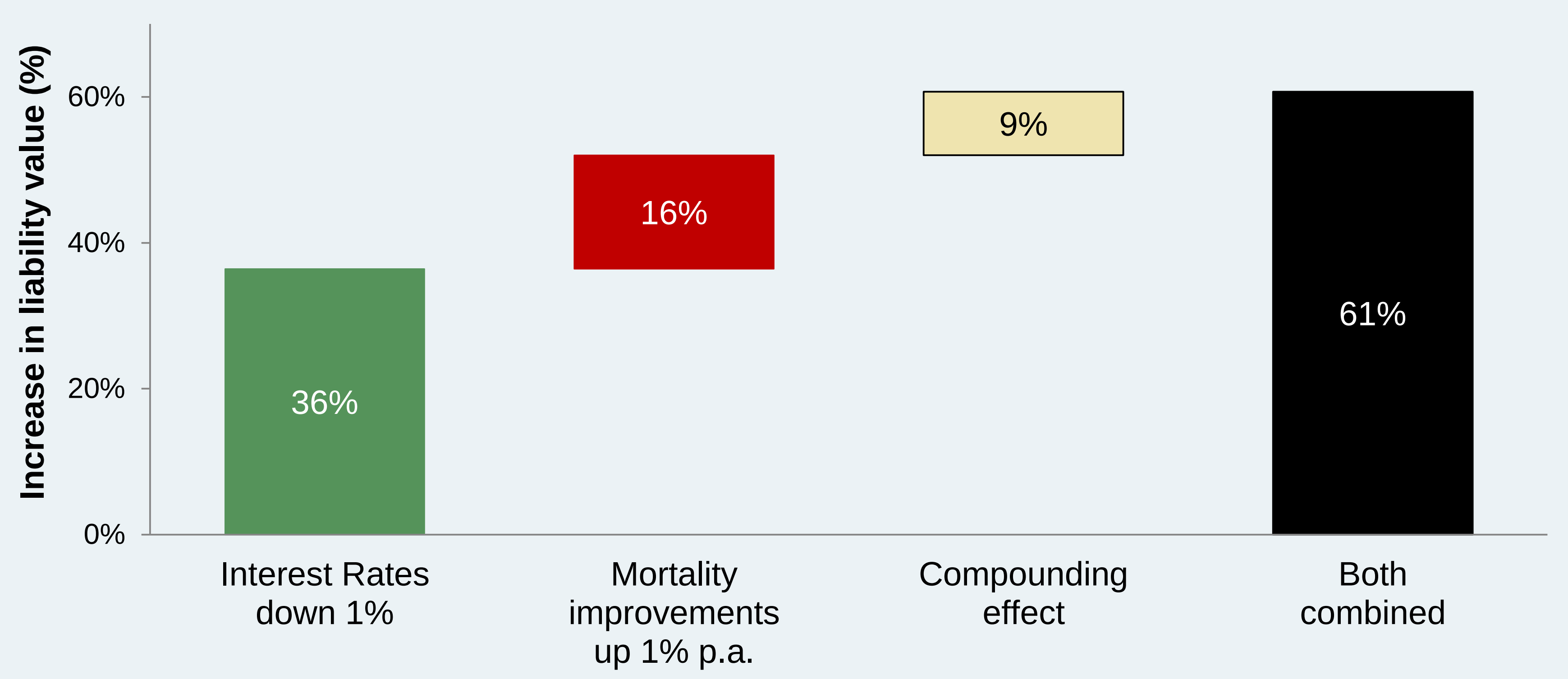

**Liability sensitivity**

| | Age 45 | Age 65 |
|---|---|---|
| Interest rate duration | 36 | 11 |
| Mortality q-duration | 16 | 5 |

- 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

**45-year-old pension liability sensitivity**




- 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