All findings, interpretations, and conclusions of this presentation represent the views of the author(s) and not those of the Wharton School or the Pension Research Council. © 2009 Pension Research Council of the Wharton School of the University of Pennsylvania. All rights reserved.

# Outsourcing Pension Longevity

April 30, 2009

Igor Balevich

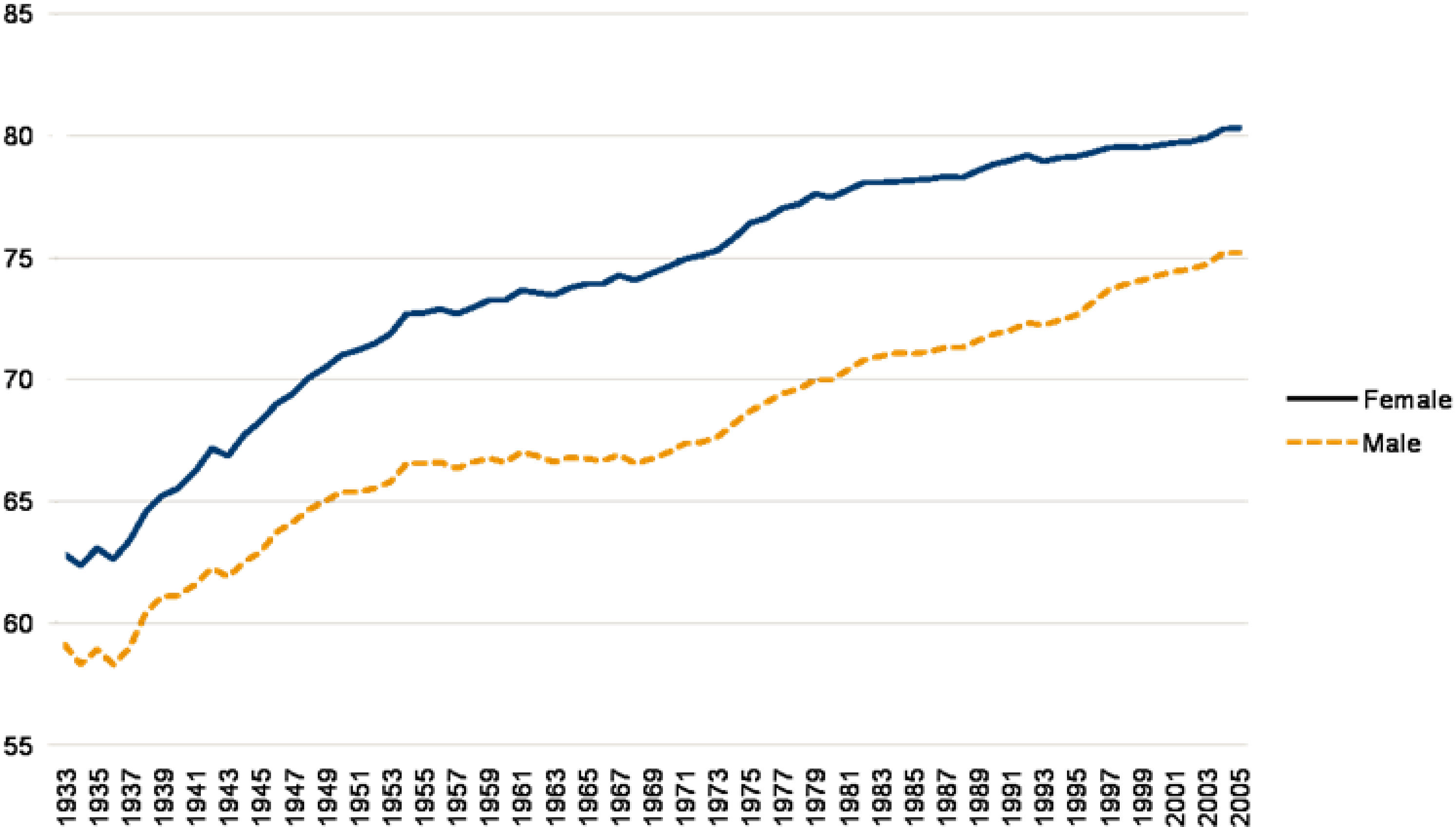
Confidential Presentation

# Overview

**Objective of the paper is to discuss items factoring into pension longevity management decisions and some longevity management alternatives**

- Long-term trend has been for relatively steadily increasing lifespans
  - There is some debate over whether this will continue
- Changes in longevity assumptions can have significant impacts on liabilities
  - Main assumptions are underlying base table and improvements
- There are various alternatives for managing longevity exposures
  - Plan design changes
  - Transfer risk to insurance companies
  - Hedge longevity risk

# Historic Mortality Trend




*Source: The Human Mortality Database (2008).*

# Estimating Future Mortality

- There is considerable debate over whether the historic longevity improvement trends will continue in the future
  - Some argue that factors such as obesity will slow down or reverse the improvement trend
  - Others argue that medical advances will significantly increase lifespans
- The best estimate of the current mortality is one of the most significant assumptions (along with the improvement trend)
  - It is the starting point for mortality projections
- Most US pension plans had historically not focused much attention on mortality assumptions
  - Base table was prescribed for some purposes and improvement trends were not always factored in
  - Pension Protection Act updates assumptions, includes improvement trends, and allows the use of company-specific assumptions

# Impact of Mortality on Pension Liability

| Sample Pension Plan Liabilities Using Different Mortality Assumptions | | | | | | |
|---|---|---|---|---|---|---|
| | No postretirement benefit increases | | | 1.5% postretirement benefit increases | | |
| **Mortality Assumption[2]** | **TVs[3]** | **Retirees** | **Total** | **TVs[3]** | **Retirees** | **Total** |
| 1983 GAM | 263,043 | 178,957 | 442,000 | 299,680 | 202,256 | 501,936 |
| RP-2000 Combined Healthy | 264,011 | 180,535 | 444,546 | 300,786 | 204,018 | 504,803 |
| RP-2000, Proj. Scale AA | 268,746 | 187,150 | 455,896 | 307,411 | 212,671 | 520,081 |
| RP-2000 x 75%, Scale AA[4] | 284,724 | 200,434 | 485,158 | 328,659 | 230,074 | 558,733 |
| RP-2000, Scale AA + 1%[5] | 275,553 | 195,701 | 471,254 | 317,349 | 224,532 | 541,881 |

*Source: Author's calculations.*
1. *Liability calculations use 6% discount rate.*
2. *All mortality assumptions use blended rates (50% male, 50% female).*
3. *Terminated vested participants (TVs).*
4. *Mortality adjustment factor applied to mortality rates below terminal age (120).*
5. *1% improvement applied to mortality rates at all ages below age 101.*

# Deciding Whether to Manage Longevity Risk

- The magnitude of longevity risk relative to other risks is one of the main items factoring into mortality management decisions
  - Longevity risk is not the largest risk facing typical pension plans
    - Equity and interest rate risk are usually the largest risks
  - There are two main components of longevity risk
    - Basis between assumptions and actual mortality
    - Improvement trend differences
- Another factor in longevity management decisions is the alternatives available
  - We give an overview of three main categories of alternatives
    - Plan design changes
    - Transfer risk to insurance companies
    - Hedge longevity risk
- After evaluating the magnitude of the risk and the management alternatives available, a comparison of the cost to the benefit (risk reduction) can be performed

# Alternative 1: Plan Design Changes

- Most longevity management alternatives assume the plan design does not change
  - Considering changes in plan design broadens the set of potential longevity management alternatives
- Defined contribution plans
  - Converting from a defined benefit to a defined contribution plan shifts the longevity and investment risks to participants
- Risk-sharing defined benefit plan designs
  - New plan designs could share certain risks between the employer and employee
  - Example: when longevity increases are greater than assumed, the benefit accrual could decrease or the retirement age could increase
  - These plan designs could have difficulty meeting regulatory guidelines in certain countries

# Alternative 2: Transfer Risk to Insurance Companies

- Traditional method of eliminating all risks is to terminate pension plan (buyout)
  - Group annuity contract purchased from insurance company and liability is transferred
- There are variations on traditional terminations
  - Partial buyouts (for a portion of the population or benefits)
  - Buy-ins involve purchasing and holding annuity contracts from an insurance company as an investment
- New risk transfer methods are being evaluated
  - Several new companies have started in the UK to broaden buyout alternatives (most are insurance-based)
  - Several companies in the US were working on new pension risk transfer alternatives
    - The Treasury Department and IRS essentially banned non-insurance based risk transfers in the US in August 2008

# Alternative 3: Hedge Longevity Risk

- Solutions are being developed to hedge, rather than eliminate, longevity risk
  - It should be possible to focus on only the longevity risk separate from the investment risks
- A longevity swap could lock in a longevity assumption
  - Pension plan would make fixed payments based on mortality expectations and receive floating payments based on mortality experience of underlying population
  - The swap would be in effect for a specified amount of time
  - The basis risk may not be fully eliminated if the reference population for the hedge is not the same as the population covered by the pension
- New solutions are being evaluated which could broaden the set of longevity management alternatives in the future

# Conclusions

- Despite the debate over whether historic mortality improvements will continue at the same pace as they have in the past, there is little debate that longevity assumptions and experience have a significant impact on pension plans
  - As more plans adopt LDI strategies, the portion of total funded status risk due to mortality should increase
- There are a number of interested parties contemplating new alternatives
  - Plan sponsors
  - Insurance companies
  - Investment banks
  - Investors
- It should be only a matter of time until new alternatives emerge and become more common
  - Although plan sponsors are currently more focused on investment risk due to the impact of 2008/2009 market declines

# Disclaimer

This document has been prepared by Barclays Capital, the investment banking division of Barclays Bank PLC ("Barclays"), for information purposes only. This document is an indicative summary of the terms and conditions of the securities/transaction described herein and may be amended, superseded or replaced by subsequent summaries. The final terms and conditions of the securities/transaction will be set out in full in the applicable offering document(s) or binding transaction document(s).

This document shall not constitute an underwriting commitment, an offer of financing, an offer to sell, or the solicitation of an offer to buy any securities described herein, which shall be subject to Barclays' internal approvals. No transaction or services related thereto is contemplated without Barclays' subsequent formal agreement. Barclays is acting solely as principal and not as advisor or fiduciary. Accordingly you must independently determine, with your own advisors, the appropriateness for you of the securities/transaction before investing or transacting. Barclays accepts no liability whatsoever for any consequential losses arising from the use of this document or reliance on the information contained herein.

Barclays does not guarantee the accuracy or completeness of information which is contained in this document and which is stated to have been obtained from or is based upon trade and statistical services or other third party sources. Any data on past performance, modelling or back-testing contained herein is no indication as to future performance. No representation is made as to the reasonableness of the assumptions made within or the accuracy or completeness of any modelling or back-testing. All opinions and estimates are given as of the date hereof and are subject to change. The value of any investment may fluctuate as a result of market changes. The information in this document is not intended to predict actual results and no assurances are given with respect thereto.

Barclays, its affiliates and the individuals associated therewith may (in various capacities) have positions or deal in transactions or securities (or related derivatives) identical or similar to those described herein.

IRS Circular 230 Disclosure: Barclays Capital and its affiliates do not provide tax advice. Please note that (i) any discussion of U.S. tax matters contained in this communication (including any attachments) cannot be used by you for the purpose of avoiding tax penalties; (ii) this communication was written to support the promotion or marketing of the matters addressed herein; and (iii) you should seek advice based on your particular circumstances from an independent tax advisor.

BARCLAYS CAPITAL INC., THE UNITED STATES AFFILIATE OF BARCLAYS CAPITAL, THE INVESTMENT BANKING DIVISION OF BARCLAYS BANK PLC, ACCEPTS RESPONSIBILITY FOR THE DISTRIBUTION OF THIS DOCUMENT IN THE UNITED STATES. ANY TRANSACTIONS BY U.S. PERSONS IN ANY SECURITY DISCUSSED HEREIN MUST ONLY BE CARRIED OUT THROUGH BARCLAYS CAPITAL INC., 200 PARK AVENUE, NEW YORK, NY 10166.

NO ACTION HAS BEEN MADE OR WILL BE TAKEN THAT WOULD PERMIT A PUBLIC OFFERING OF THE SECURITIES DESCRIBED HEREIN IN ANY JURISDICTION IN WHICH ACTION FOR THAT PURPOSE IS REQUIRED. NO OFFERS, SALES, RESALES OR DELIVERY OF THE SECURITIES DESCRIBED HEREIN OR DISTRIBUTION OF ANY OFFERING MATERIAL RELATING TO SUCH SECURITIES MAY BE MADE IN OR FROM ANY JURISDICTION EXCEPT IN CIRCUMSTANCES WHICH WILL RESULT IN COMPLIANCE WITH ANY APPLICABLE LAWS AND REGULATIONS AND WHICH WILL NOT IMPOSE ANY OBLIGATION ON BARCLAYS OR ANY OF ITS AFFILIATES.

THIS DOCUMENT DOES NOT DISCLOSE ALL THE RISKS AND OTHER SIGNIFICANT ISSUES RELATED TO AN INVESTMENT IN THE SECURITIES/TRANSACTION. PRIOR TO TRANSACTING, POTENTIAL INVESTORS SHOULD ENSURE THAT THEY FULLY UNDERSTAND THE TERMS OF THE SECURITIES/TRANSACTION AND ANY APPLICABLE RISKS.

Barclays Bank PLC is registered in England No. 1026167. Registered Office: 1 Churchill Place, London E14 5HP. Copyright Barclays Bank PLC, 2009 (all rights reserved). This document is confidential, and no part of it may be reproduced, distributed or transmitted without the prior written permission of Barclays.