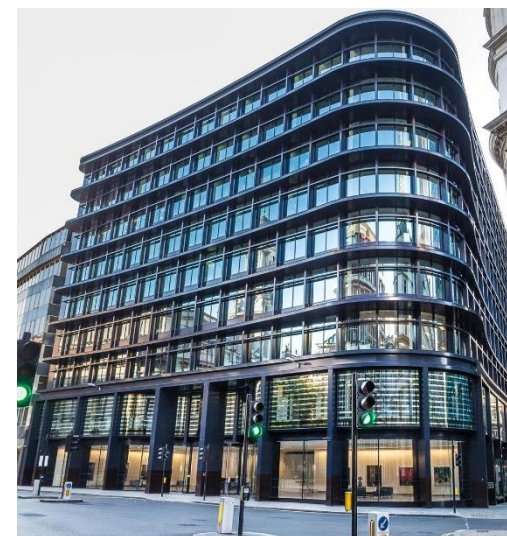




Life risks, pensions and asset-liability management



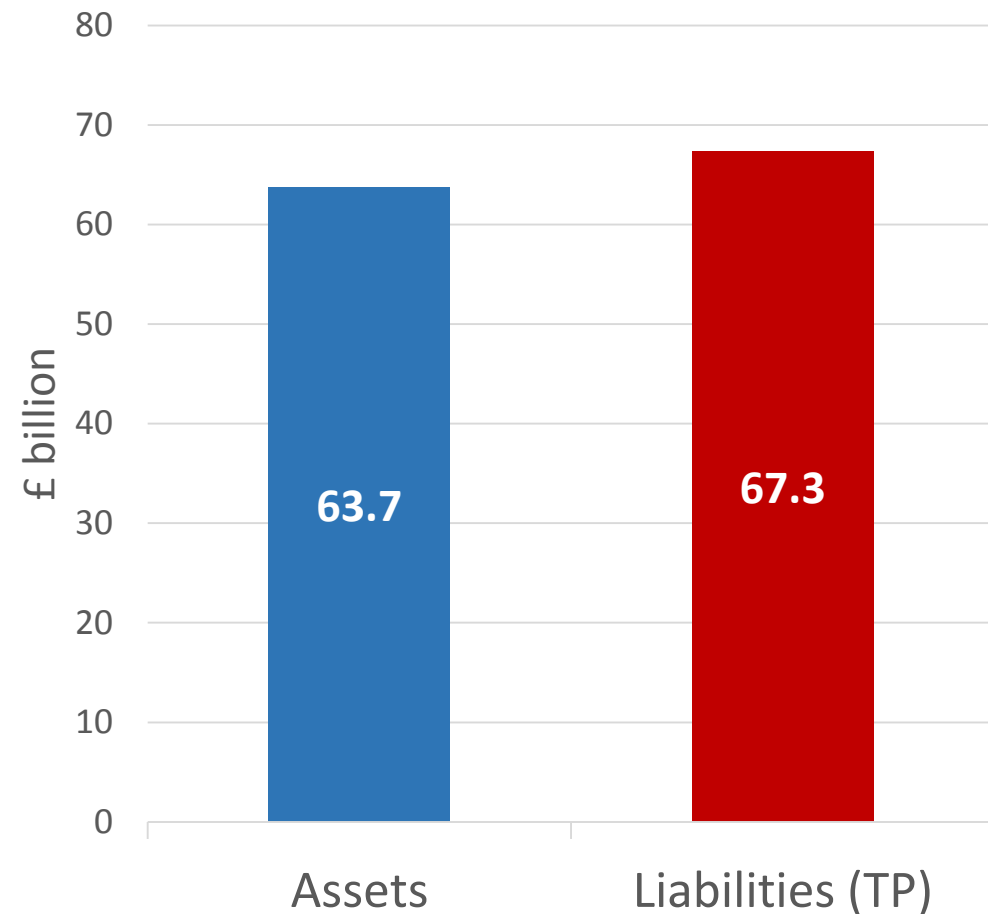
Guy Coughlan
Chief Risk Officer
15 May 2019



USS is an open pension plan for the UK higher-education sector

- **A hybrid pension plan**
 - Defined Benefit (DB) *plus* Defined Contribution (DC) section
 - Employers: c. 350
 - Beneficiaries: c. 400,000
- **USS Limited is the trustee of the plan**
 - c. 500 staff
 - In-house investment team
 - Administration, policy and support teams
- **DB Section – 31 Mar 2018**
 - Assets: £63.7bn
 - Liabilities (Technical Provisions): £67.3bn¹⁾
 - Deficit: £3.6bn¹⁾
- **DC Section**
 - Assets: c. £0.7bn

DB Section – 31 March 2018¹⁾



1) 2018 actuarial valuation

2) TP = Technical Provisions basis

Life-related risks: The ALM (asset-liability management) perspective

Liabilities

DB Pension Liability

- Annuity-like exposure
- Longevity

Life insurance

- Term life exposure
- Mortality

Ill-health benefit

- Enhanced pension benefits
- Mortality/longevity/morbidity



Complex life-linked exposures
Specific, homogeneous demographics

Assets

Direct life exposure

- Direct linkage to mortality/longevity/morbidity

Indirect life exposure

- Indirect linkage to mortality/longevity/morbidity

No life exposure

- No linkage to mortality/longevity/morbidity



Complex life-linked exposures
Mixed demographics
(much smaller exposure)

DB pension liability

Accrual rate

- Pension amount paid in retirement:
 - Increases each year worked by **1/75 x Salary** (up to a cap)
 - Compounded with **inflation (CPI)**

Pension paid in retirement

- **Monthly pension payment** in retirement:
 - Sum of amounts accrued each year (grossed up with inflation)
 - Minimum payment time 5 years
- **Lump sum payment** on retirement
 - 3 x annual pension amount

Spouse pension

- Annual pension of **50% paid to spouse**
 - Paid following death of the member

CPI linkage:

0% for CPI < 0%
100% for CPI 0%-5%
50% for CPI 5%-15%
0% for CPI > 15%

Ill-health pension liability

Ill health liability

- Pension paid immediately
 - Pension **grossed up** on basis of expected service to normal retirement date
 - All remaining years to retirement are credited to pension amount

Serious ill health liability

- If life expectancy < 1 year:
 - Pension grossed up as above,
 - ...but converted to a **lump sum payment**

Spouse pension

- Annual pension of 50% paid to spouse

Life insurance liability

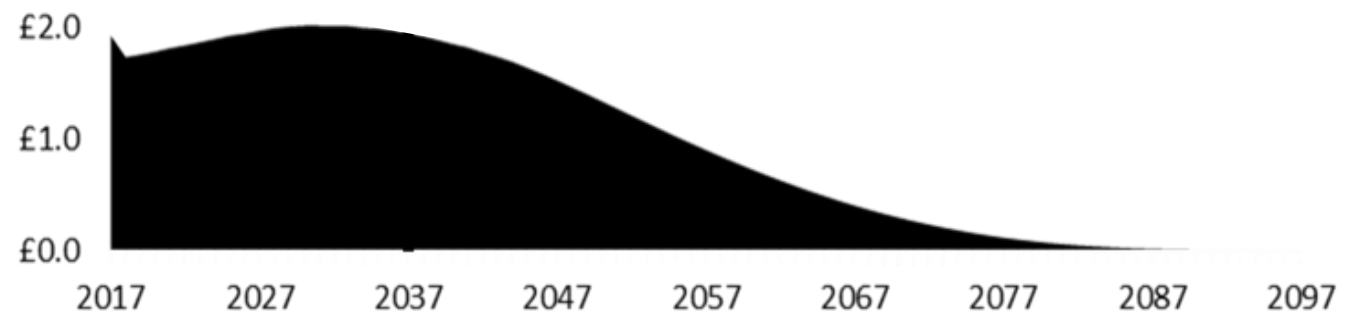
Lump sum payment

- 3 x salary paid on death of an “active” member (employee)

Spouse pension

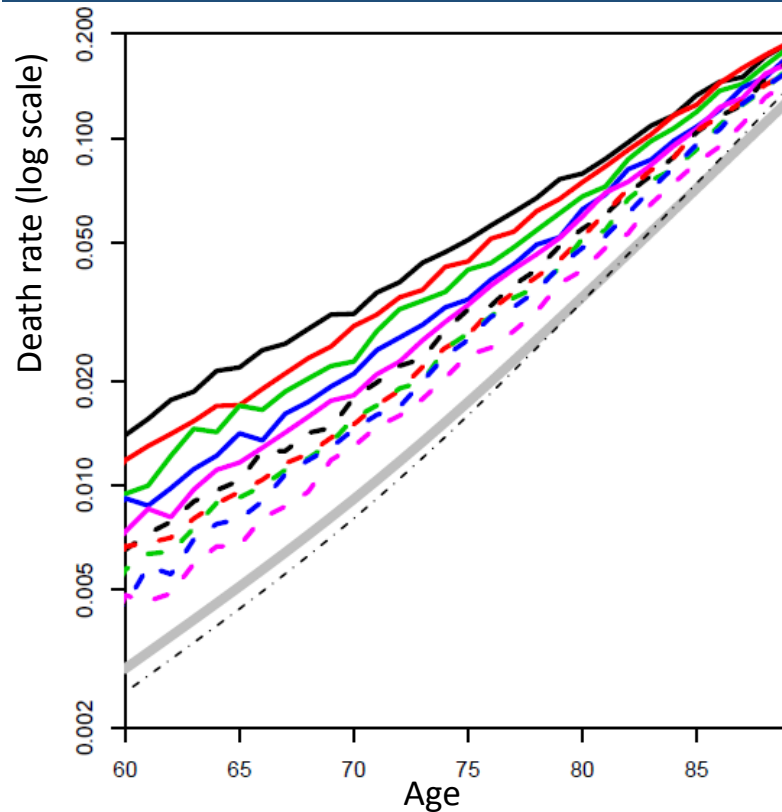
- Annual pension of 50% paid to spouse
 - Salary cap does not apply

Expected liability cash flows (£ bn) From benefits accrued as of 31 Mar 2017

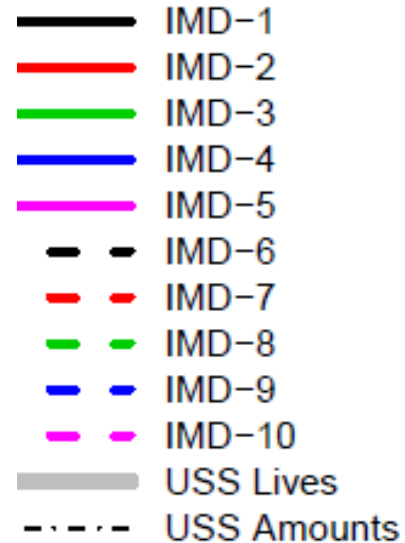


USS mortality is lower than the most long-lived decile of the national population

Male death rates 2015 by age England

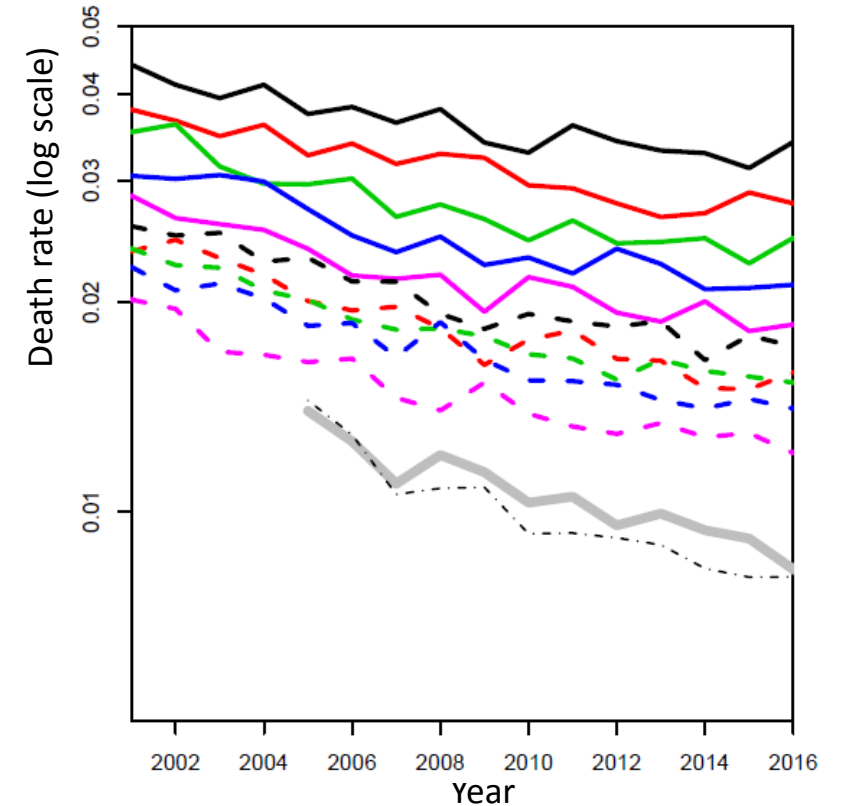


*Socio-economic group**



Source: USS, Cairns et al 2018 unpublished

Male death rates history age 70



* Socio-economic groups reflect deciles of the UK "index of multiple deprivations" (IMD)

Evidence for a strong occupation-related longevity effect

The other side of the balance sheet:

Life-linked assets provide alternative risk premia

Life insurance equity

- Exposure to mortality and longevity risk
- ...via life policies and annuities

Equity release mortgages

- Exposure to mortality risk

Life settlements

- Exposure to selected longevity risk
- ...via life policies

Crematoria / Cemeteries

- Exposure to longevity risk

Healthcare/pharma sector

- Exposure to mixed life-linked risks

Care homes

- Exposure to mixed life-linked risks

Exposure Format:

Equity,
Debt,
Portfolio,
Royalty,
Etc.

ALM perspective

Demographics

- **Demographics** differ significantly across asset and liabilities
 - ➔ Very different mortality / longevity profiles

Structure

- **Structure of exposures** differs across assets and liabilities

Risk

- **Life-related risks:**
 - Potential for **risk offset** is limited
 - Excessive **risk concentration** can be avoided
 - Potential for **diversification** of life-related risks is high
 - ➔ Alternative risk premia have low correlations with other assets

Investments

- **Life-related assets** must stand on their own in terms of their **investment case**