



Presentation to Younger Members Convention
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ANNUITANT MORTALITY AND LONGEVITY RISK

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INTRODUCTION



- Key player in individual and bulk annuity markets in U.K.
- Longevity risk management critical
- Dedicated three-man "Mortality Risk Unit"
- Major contributor to CMIB data


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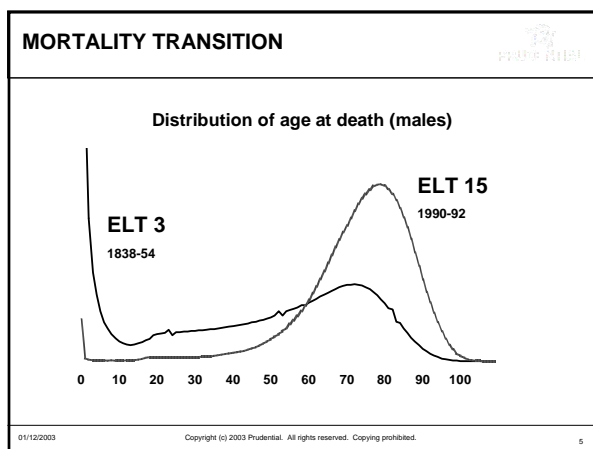



- Mortality transition
- Mortality improvements
- Rating factors
 - Socio-economic group
 - Gender
- Open discussion

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MORTALITY TRANSITION

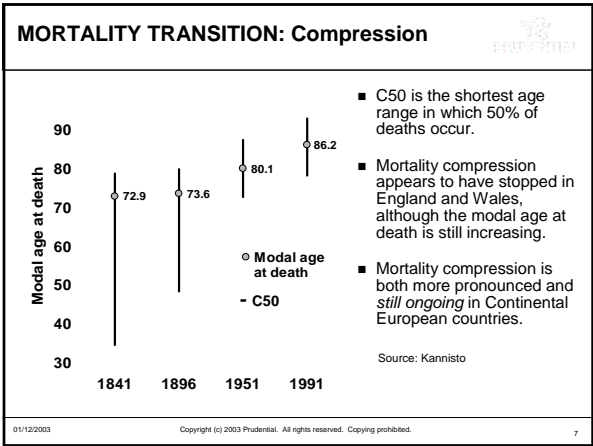


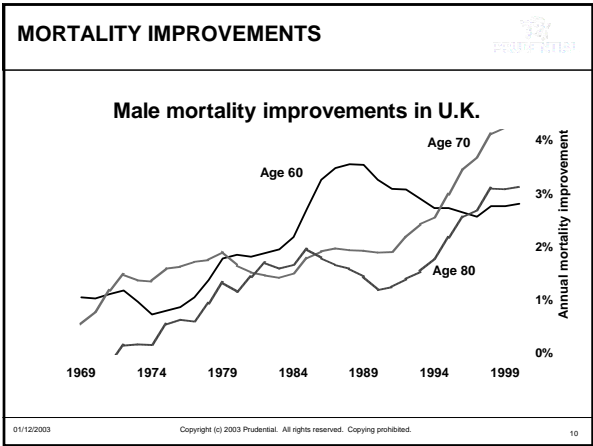


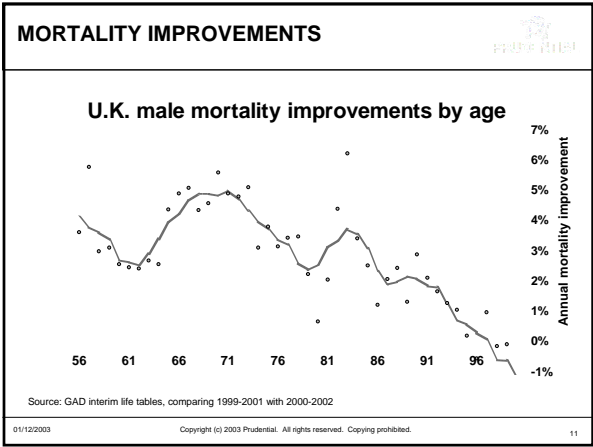
MORTALITY TRANSITION: Compression

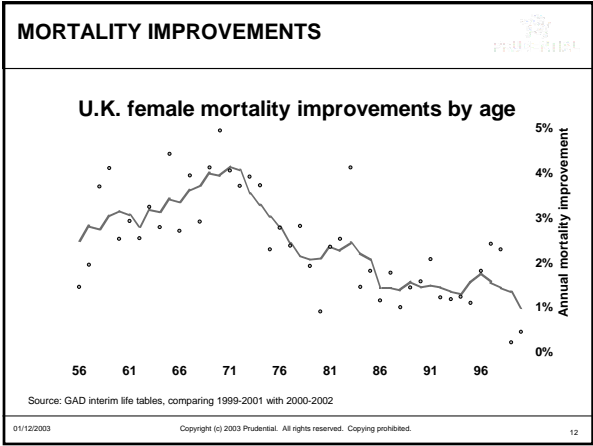
- *Mortality compression* occurs when the ages at death become increasingly concentrated in a narrower range.
- A lack of mortality compression is an indicator of premature deaths.
- Mortality compression differs substantially between even developed countries, with large differences even between genders *within* a country.


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<h2 style="margin: 0;">RATING FACTORS</h2>


<h3 style="margin: 0;">RATING FACTORS: Quiz</h3>
<p>Three of the following are predictors of future mortality experience. Only one says nothing - good or bad - about your life expectancy. Which is the odd one out?</p> <p>A. Adult height B. Parents' at age below 70 C. Leg length at age 15 D. Month or season of birth</p>
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<h3 style="margin: 0;">RATING FACTORS</h3>
<ul style="list-style-type: none"> ■ It is crucial to know how long an annuitant may live. ■ A <i>rating factor</i> explains variation in life expectancy. ■ Traditional rating factors are <i>age</i> and <i>gender</i>. ■ Less common rating factors include <i>purchase price</i> and <i>fund source</i>. ■ There is a <u>very</u> wide choice of additional rating factors...
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RATING FACTORS: The obvious...and others

■ Other obvious rating factors include:

- Social class
- Occupation
- Geography
- Smoking status
- Diet

■ While some slightly less obvious rating factors include:

- Lifespan of mother
- Annuity options
- Marital status
- Height

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RATING FACTORS: The illegal...to the bizarre

■ Some potential rating factors are illegal:

- Genetic markers
- Race or ethnicity
- Religion
- Sexual orientation
- Gender?

■ While some significant rating factors are little short of bizarre:

- Month or season of birth
- Birth order
- Age of father at conception
- Leg length

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RATING FACTORS: Economics

■ Perfect risk classification is, however, not wanted.

■ Rating factors must be *economic* (cost-benefit trade-off).

■ Actuarial risk classification aims to *cheaply* and *accurately* classify individuals into *reasonably* homogeneous groups.

■ Many of these rating factors are *statistically significant*...

■ ...but they are not all *economically useful*.

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Rating factor	Variation explained
Age	80%
Gender	7%
Lifestyle/class	2%
Size	0.7%
Policy type	0.4%
<i>Total</i>	<i>90%</i>

Source: Prudential figures

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- Membership of a particular socio-economic group does *not* cause mortality differentials...
- ...but it is correlated with behaviours which *do*:
 - smoking
 - diet and drinking habits
 - other lifestyle factors
 - income and wealth

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SOCIO-ECONOMIC GROUP

■ Many ways to classify people into socio-economic group:

- income
- education level
- occupation
- housing tenure
- car ownership

■ ONS¹ Longitudinal Survey uses occupation.

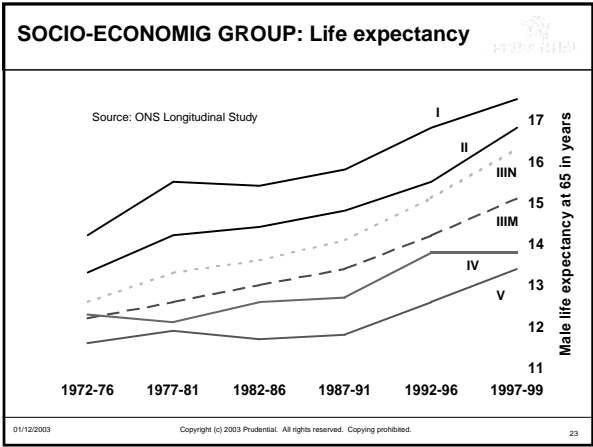
■ Class I (professional) to class V (unskilled), with III (skilled) split into IIIN (non-manual) and IIIM (manual).

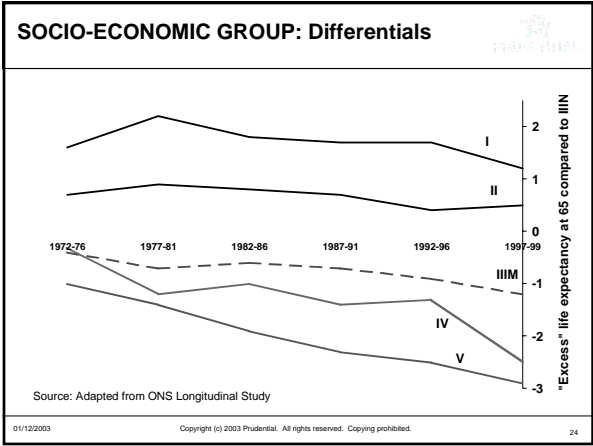


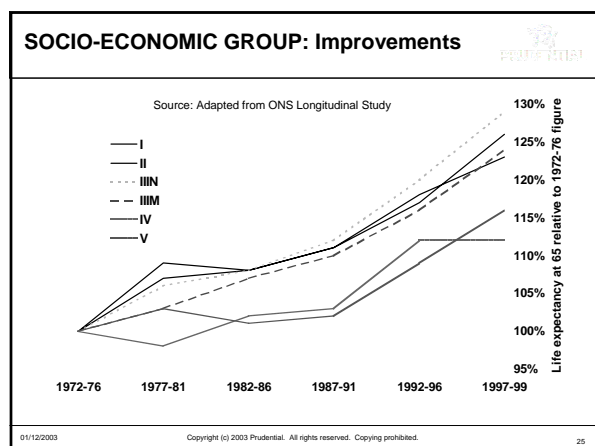
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QUIZ

We know of the importance of mortality improvements, gender and socio-economic group in longevity and annuity pricing. But which is *most* important?

- A. Mortality improvements (CMIR17 v. long cohort)
- B. Gender
- C. Socio-economic group

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GENDER

GENDER: EU Draft Directive

- On 5th November 2003 the European Commission issued a draft directive under Article 13.
- Covers gender equality of access to goods and services
- Gender-rated insurance declared contrary to Article 13.
- Justification centred on annuities and life expectancy.
- The “justification” is a string of falsehoods and unsubstantiated claims...

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GENDER: EU Draft Directive

- *“There are a number of studies that show that sex is not the main determining factor for life expectancy.”*
- Age is the main factor. Gender is the second-most important factor in every EU member state.

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GENDER: EU Draft Directive

- *“Other factors are shown to be much more relevant, such as marital status, socio-economic factors, [...] and nutritional habits.”*
- These are undeniably important. However, they actually apply more to men than women:
- Mortality of the recently-widowed women does not rise nearly as much as that of recently-widowed men
- Gender differences actually *widen* for “lower” socio-economic groups.

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GENDER: EU Draft Directive

- *"This leads one to the conclusion that gender differences in life expectancy are not purely biological."*
- Oestrogens protect circulatory system...
- ...while androgens (testosterone) damages it
- Males more susceptible to diet-related cancers
- Males have weaker immune systems

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GENDER: EU Draft Directive

- *"The overwhelming majority of men and women (about 86%) die around the same age."*
- US statistic, not from any EU member state!
- Applies to overlap in age at death
- Statistic is misleading, but linked to compression
- Varies by EU member state (c.f. France and U.K.)
- Many EU states have a lower statistic

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OPEN DISCUSSION
