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Mortality: drivers of change

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Plan of talk

1. Actuaries and mortality
2. Modelling and analysis
3. Socio-economic status
4. Projections
5. Conclusions

1. Actuaries and mortality

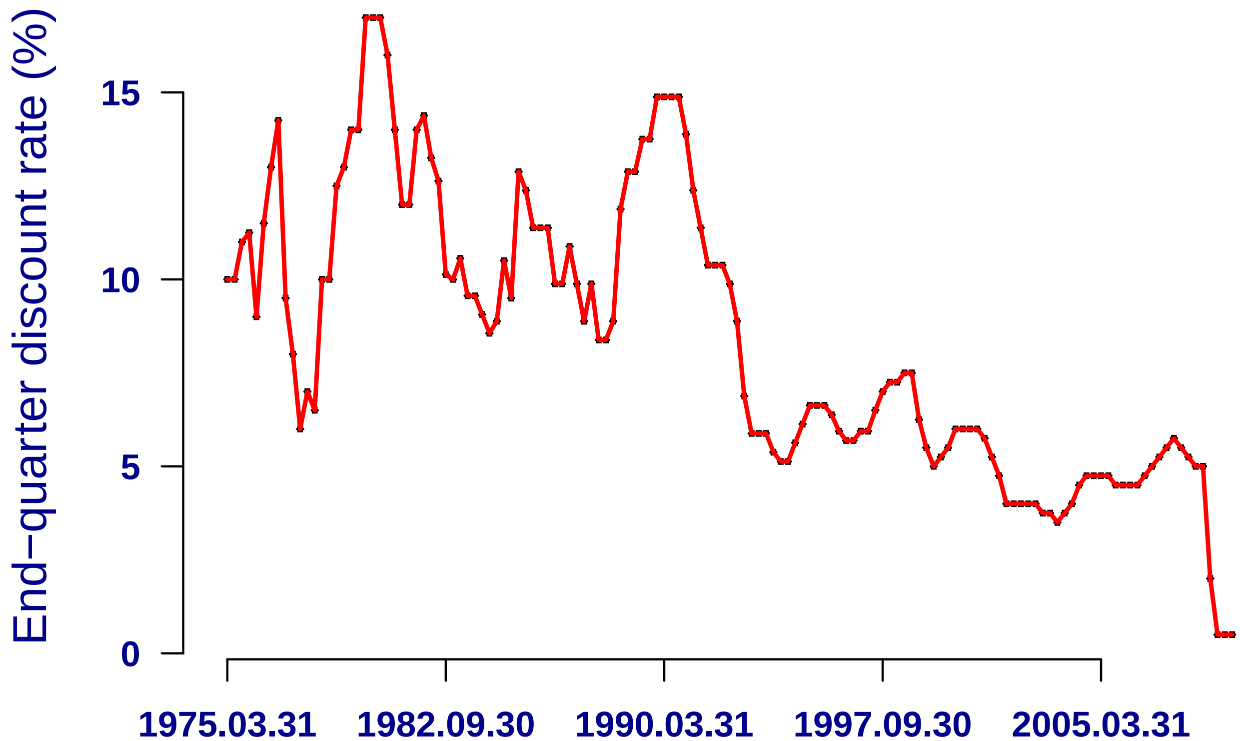
Actuaries and mortality

- Among the first to study mortality scientifically
- Interest lapsed from 1970s
- Interest reawakened in late 1990s

Actuaries and mortality

- Actuarial interest inversely linked to interest rates
- High interest rates, low liability values
- Low interest rates, high liability values

UK end-quarter interest rates



Source: Bank of England

2. Modelling and analysis

Modelling and analysis

- Actuaries have rapidly caught up on modern techniques
- Survival models now widely used
- Sessions B1 (Eugene Milne) and C1 (Andrew Dean)

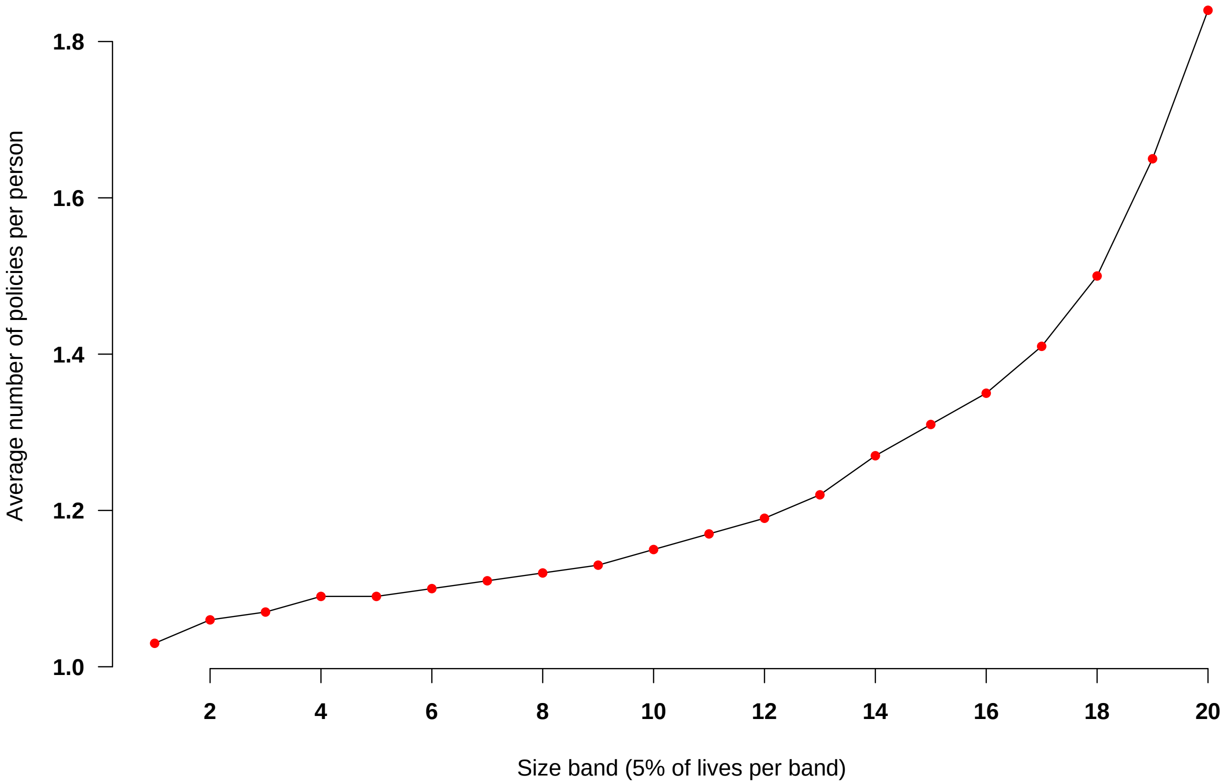
Life-insurance policies

- Longitudinal study with continual recruitment
- Detailed personal data
- High-quality: role of money and legal liability!
- Large-scale: typically tens or hundreds of thousands of policies
- Left-truncated: only adults buy insurance policies

Data preparation

- Data is policy-oriented
- People have multiple policies
- Need to ensure independence assumption
- Need to find n independent lives behind p dependent policies $(p \geq n)$
- Process of *deduplication*

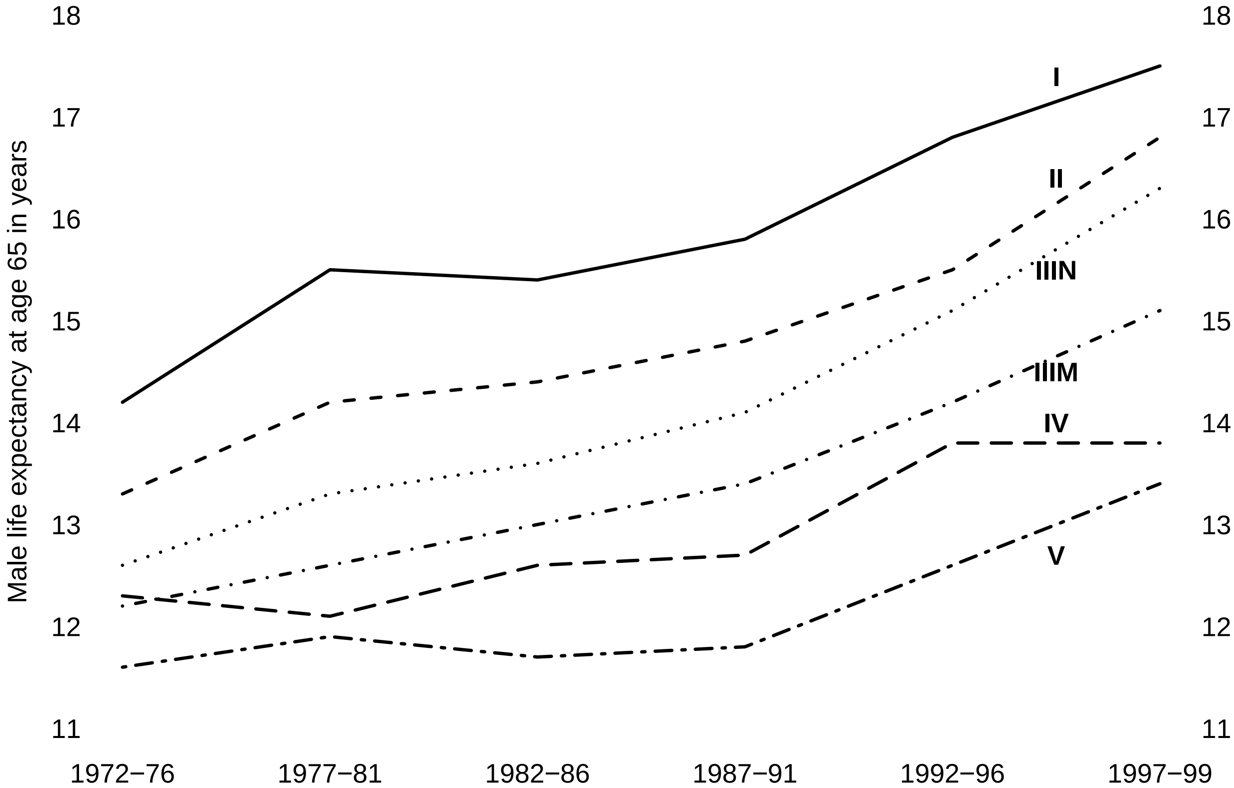
Wealth and duplicates



Source: Richards and Currie (2009)

3. Socio-economic status

Retirement life expectancy by socio-economic group



Source: ONS Longitudinal Survey.

Postcodes and geodemographics

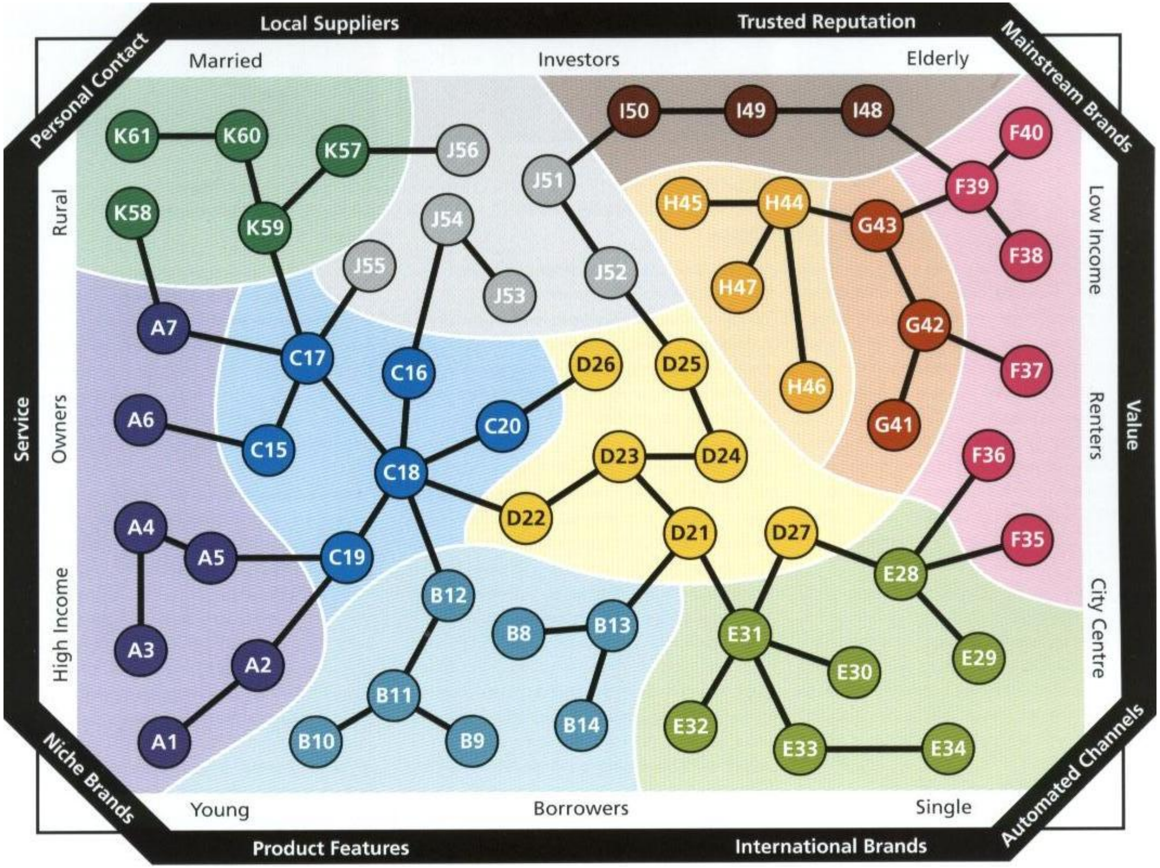
- Postcodes widely used in annuity pricing
- Details in Richards (2008) and Madrigal et al (2009)
- Session D1 (Gordon Fletcher)

Anatomy of a UK postcode

Postcodes

- 1.6 million residential postcodes
- Each maps to a *geodemographic type*

Geodemographic example — Mosaic



Source: Experian Ltd.

4. Projections

Projections

- Survival models and geodemographics help estimate *current* mortality
- Actuaries very concerned about *future* rates
- Sessions A1 (Coburn and Woo), E1 (Di Cesare and Murphy) and F1 (Brown and Suter) describe alternative methodologies

5. Conclusions

- Actuarial interest in mortality strongest for many decades
- Rapid actuarial uptake of survival models and geodemographics
- Strong interest in projections, especially stochastic models

LONGEVITAS

References

Madrigal, A. M., Matthews, F. E., Patel, D. D., Gaches, A. T. and Baxter, S. D. **2009** *What longevity predictors should be allowed for when valuing pension scheme liabilities?*, British Actuarial Journal (to appear)

Richards, S. J. **2008** *Applying survival models to pensioner mortality data*, British Actuarial Journal **14** (to appear)

Richards, S. J. and Currie, I. D. **2009** *Longevity risk and annuity pricing with the Lee-Carter model*, British Actuarial Journal (to appear)