

Momentum Convention 2008, Hilton Hotel, Berlin

# Postcode ratings for mortality

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# Plan of talk

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1. Background
2. Why we need to rate for socio-economic group
3. Why pension size is not wholly reliable
4. Postcodes...and why we can't them directly
5. Geodemographics
6. Postcodes...and why we can't use parts of them
7. Conclusions

# 1. Background

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- Postcodes routinely used in the bulk-annuity market
- Three insurers now use them for individual annuities\*
- How are postcodes used?
- How should they *not* be used?

Source: \* Legal and General, Norwich Union and Prudential

## 2. Financial impact of risk factors

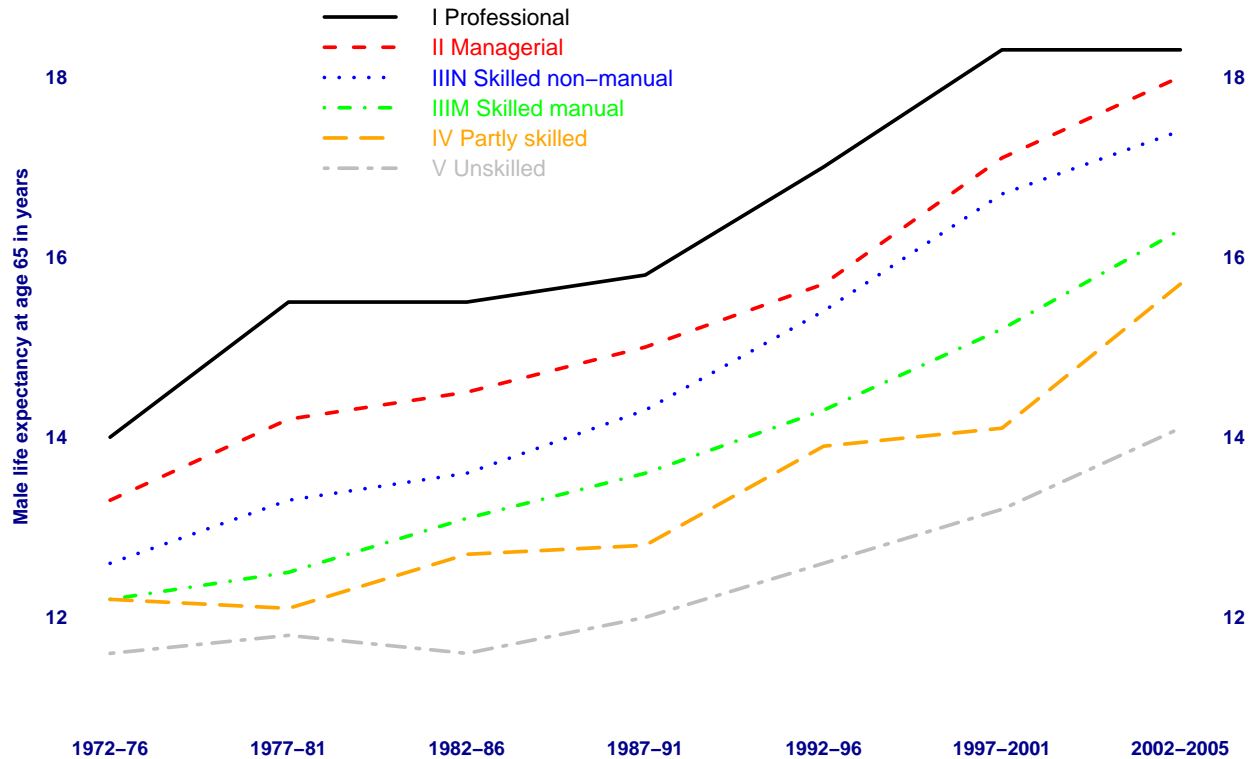
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### Financial impact of mortality rating factors

<b>Factor</b>	<b>Step change</b>	<b>Reserve</b>	<b>Change</b>
Base case	-	13.39	-
Gender	Female-male	12.14	-9.3%
Lifestyle	Top-bottom	10.94	-9.9%
Duration	Short-long	9.88	-9.7%
Pension size	Large-small	9.36	-5.2%
Region	South-North	8.90	-4.9%
Overall	-	-	-33.6%

Source: Richards and Jones (2004), page 39.

# Retirement life expectancy by socio-economic group



Source: ONS Longitudinal Survey.

## 2. What is socio-economic group?

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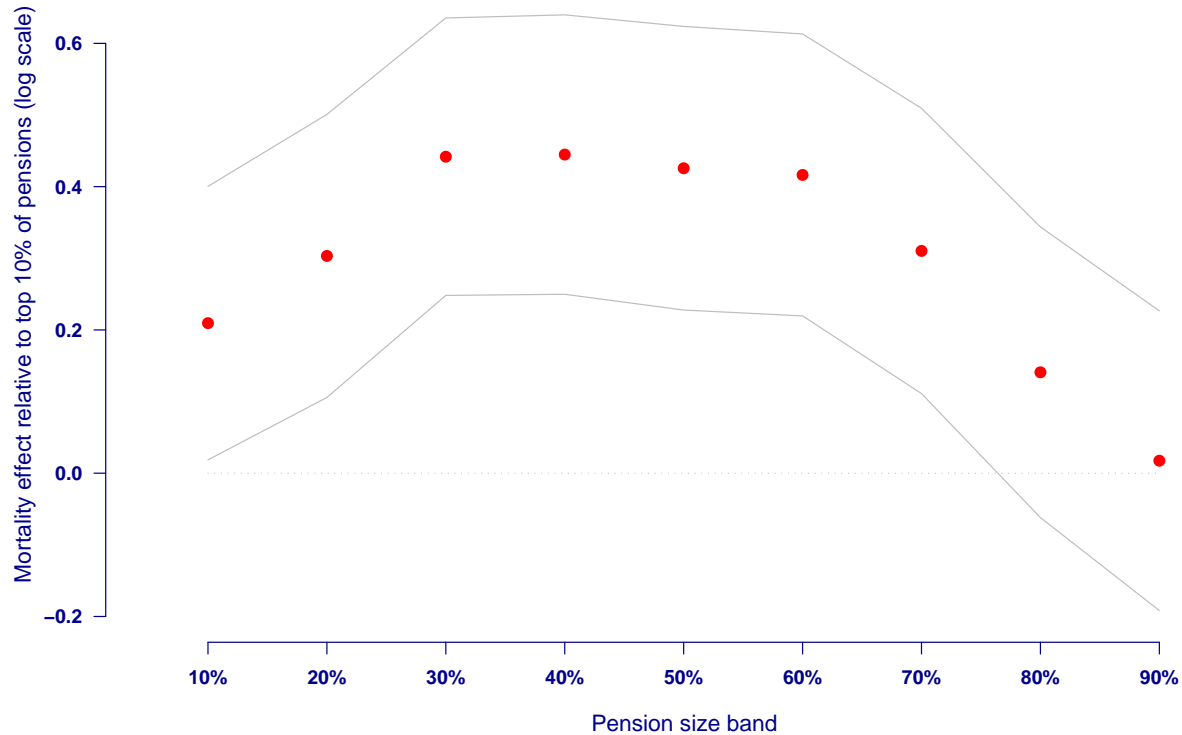
- Classification by occupation
- Subjective
- Scope for exaggeration
- Not consistent between schemes
- Not easy to use for reserving
- Traditionally use pension size as *proxy*

# 3. Why pension size is not wholly reliable

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# 3. Why pension size is not wholly reliable

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Source: Longevity Ltd. Effect of pension size-band relative to top 10% in a model including age and gender for a portfolio of UK annuities.



## 4. Anatomy of a UK postcode

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## 4. Problems with postcodes

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1. Regions, districts and sectors are *geographic*...  
...and geography has little to do with mortality

## 4. Problems with postcodes — example

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- Consider a Scottish lawyer in AB10 6HX...  
...and a Yorkshire one in YO10 4BG
- Geographically, they are separate...  
...but clearly they are of the same social group

## 4. Problems with postcodes — example

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- Consider the Scottish lawyer in AB10 6HX again...  
...and a casual labourer in AB10 6BN
- Geographically, they have the same postcode sector...  
...but clearly they have little in common socially

# 5. Geodemographics

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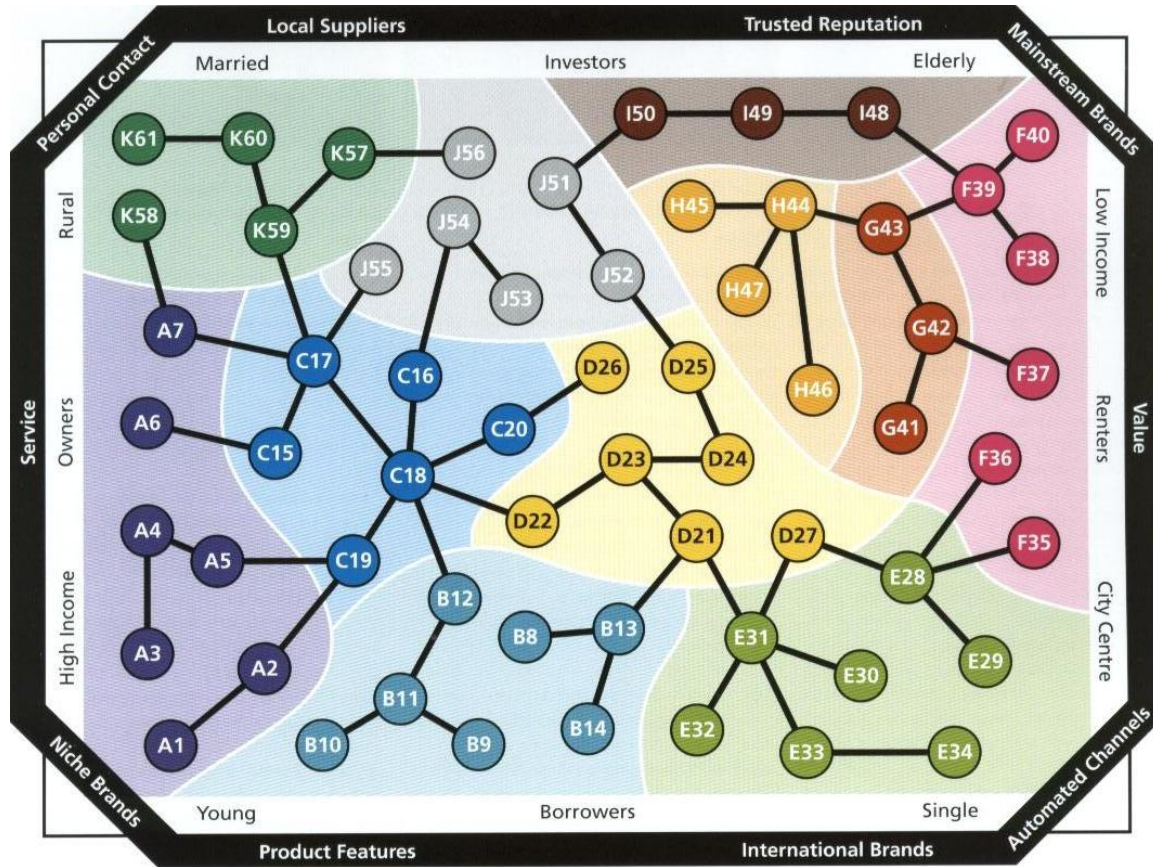
- Group people by shared characteristics, not geography
- Profile at postcode level, i.e. street
- Can use broad *geodemographic group* . . .  
...or a narrower *geodemographic type*

## 5. Geodemographics — providers

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- Mosaic from Experian (61 types)
- Acorn from CACI (57 types)
- CAMEO from Eurodirect (57 types)

# Geodemographics — Mosaic



Source: Experian Ltd.

## 5. Geodemographics — Mosaic example

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- AB10 6HX → A02 “Cultural leadership”
- AB10 6BN → F35 “Welfare borderline”
- YO10 4BG → A02 “Cultural leadership”
- Our two lawyers have the same type code...

...and the casual labourer and the lawyer are separated...

...so geodemographic profiles are more powerful than mere geography

Source: Postcode Mosaic 2008 directory from Experian Ltd.



## 6. Postcode statistics

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Postcodes	1,706,823
Postal sectors	10,156
Postal districts	2,951
Postal regions	121
Mosaic types	61
Mosaic groups	11

Source: Own calculations using Postcode Mosaic 2008 directory from Experian.

## 6. Problems with postcodes

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1. Regions, districts and sectors are *geographic*...  
...and geography has little to do with mortality
2. Regions, districts and sectors require *lots* more data

## 6. Number of annuities in typical category

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<b>Category</b>	<b>Annuities</b>
Mosaic group	31,290
Mosaic type	4,842
Postal region	3,682
Postal district	150
Postal sector	44

- Postal district and sector are worse than useless as rating factors
- Grouping districts or sectors treats random variation as real effects

Source: Own calculations using portfolio with over 500,000 annuities. “Typical” means the median number of annuities in each category, rounded to the nearest integer. Figures are for annuities, not lives, i.e. prior to deduplication — see Richards (2008).

## 6. Postcodes

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- Postcode districts and sectors are not homogeneous...  
...yet they require large volumes of data!
- Geodemographic types *far* more efficient and useful

# 7. Conclusions

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- Pension size is important, but has weaknesses
- Use postcodes to augment pension size in rating, not replace it
- Postcodes cannot be used directly in mortality modelling...  
...while parts of postcodes can be worse than useless
- Geodemographic types *far* more efficient and useful

More details on postcodes in our blog at [www.longevity.co.uk](http://www.longevity.co.uk)



# References

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