



Institute
and Faculty
of Actuaries

The Selection Criterion

Ben Randall, Swiss Re
26th May 2017



Agenda

- Selection and Anti-Selection
- The insurance policy timeline
- Mitigation
- Options & Benefits
- Examples across products and borders

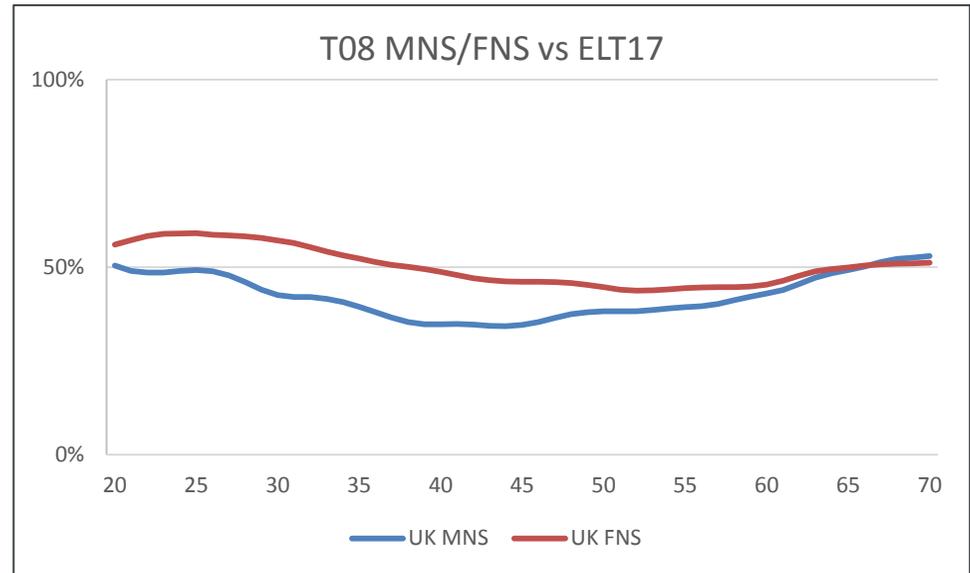
Selection and Anti-Selection

- Selection
 - Risk identification and filtering by the “office”

- Anti-selection
 - Risk identification by an individual against the office
 - Focus here on legitimate anti-selection

Selection

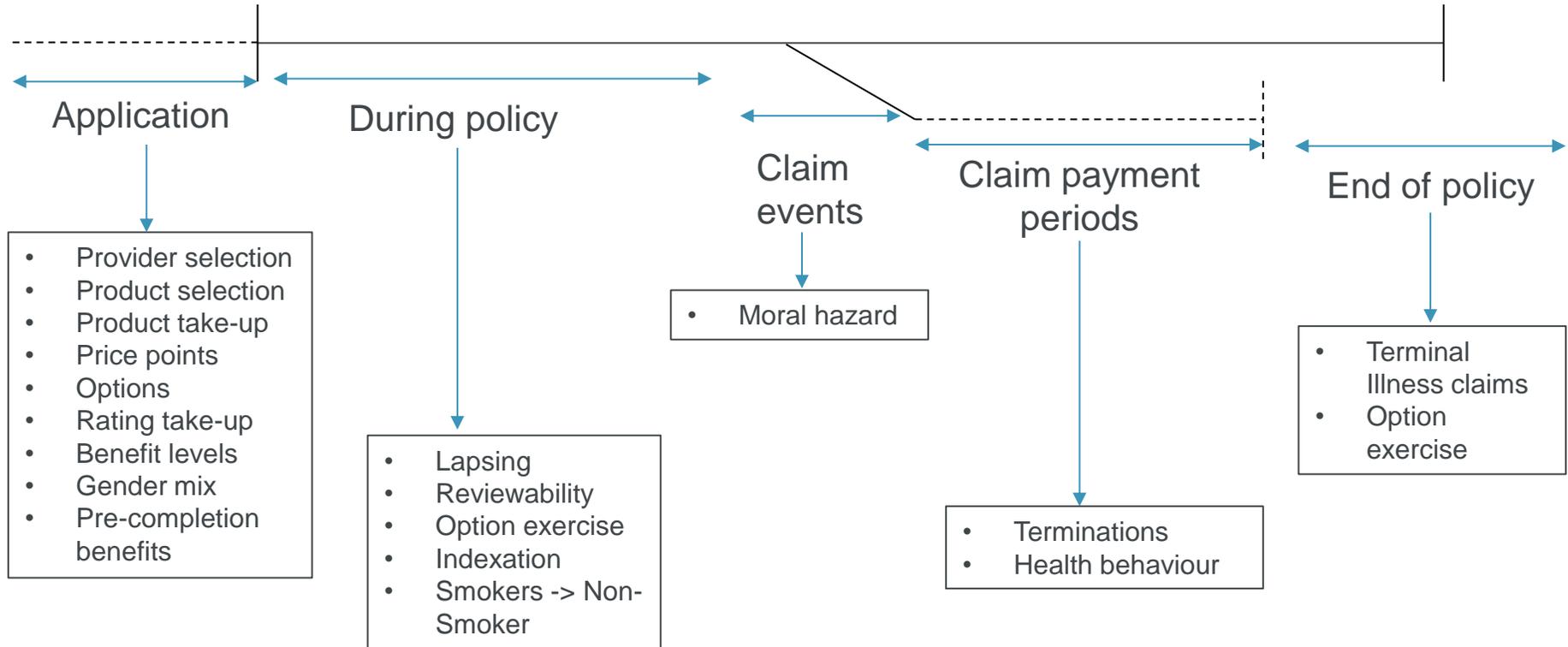
- Significant positives
 - Underwriting
 - Medical
 - Financial
 - Occupational
 - Affordability
 - Bundled with financial advice



Anti-Selection

- Information asymmetry:
 - At offer
 - At exercise
- Contributing to
 - Non-disclosure
 - Fraudulent self-reporting
 - Declined claims
 - Higher costs than expected

The Insurance policy timeline



Mitigation for Anti-Selection

- Prevent
- Restrict
- Allow for and price in

Mitigation for Anti-Selection

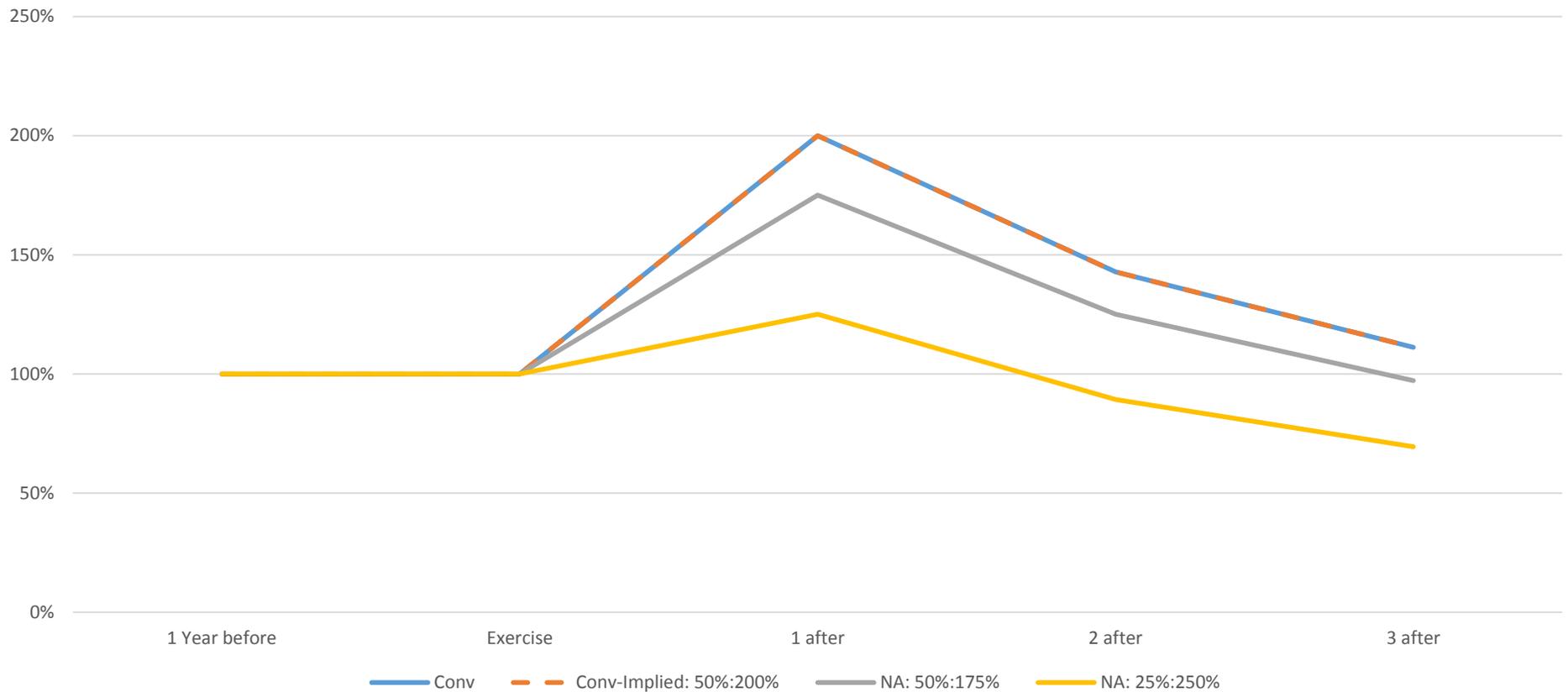
- Restrictions - example
 - Guaranteed Insurability Options (GIOs)
 - Allow mid-term increases in benefit
 - Restricted by age & increase amount
 - Anti-selection restricting by linking to events:
 - Moving house
 - Birth of a child
 - Marriage
 - Increasing in earnings
 - What effect do these really have?

Mitigation for Anti-Selection

- Option pricing approaches
 - Conventional method
 - Makes no/few assumptions
 - Cost of option = Cost of 100% exercise
 - Implicit: 50% exercise would have 200% cost after exercise
 - North-American method
 - Assumptions for exercise, claims/lapse experience

Mitigation for Anti-Selection

Option pricing models
Method: Exercise/Assumption



Mitigation for Anti-Selection

- Anti-selection pricing approaches
 - WaG or SWaG: (Sophisticated) Wild Guess
 - Dukes/Macdonald & Becker/Kitsos models of lapse:
 - “Conservation of deaths”
 - Lapsers assumed fully select
 - Wears off over select period
 - B/K adds assumption for lapses not being fully select

Options & Benefits

- Renewal / Conversion Options
- Indexation Options
- GIOs
- CI Buyback
- Pre-inception benefits

Options & Benefits - Australia

- Life Cover

- Terminal Illness Benefit

Future insurability (GIO)
Premium disability waiver
Accommodation benefit

Life Cover
buyback

Emergency
domestic travel
benefit

- Trauma Cover

- Comprehensive/Premium Cover
- Double Trauma Option

Future insurability (GIO)
Life cover purchase option
Baby Care

Extra Care Cover

Indexation

- TPD Cover

- Spouse retraining benefit

Double TPD

Premium
Holiday

- Income Protection

- Rehabilitation benefit

Comprehensive cover
Specific professionals cover
No Claim benefit

Unemployment
benefit

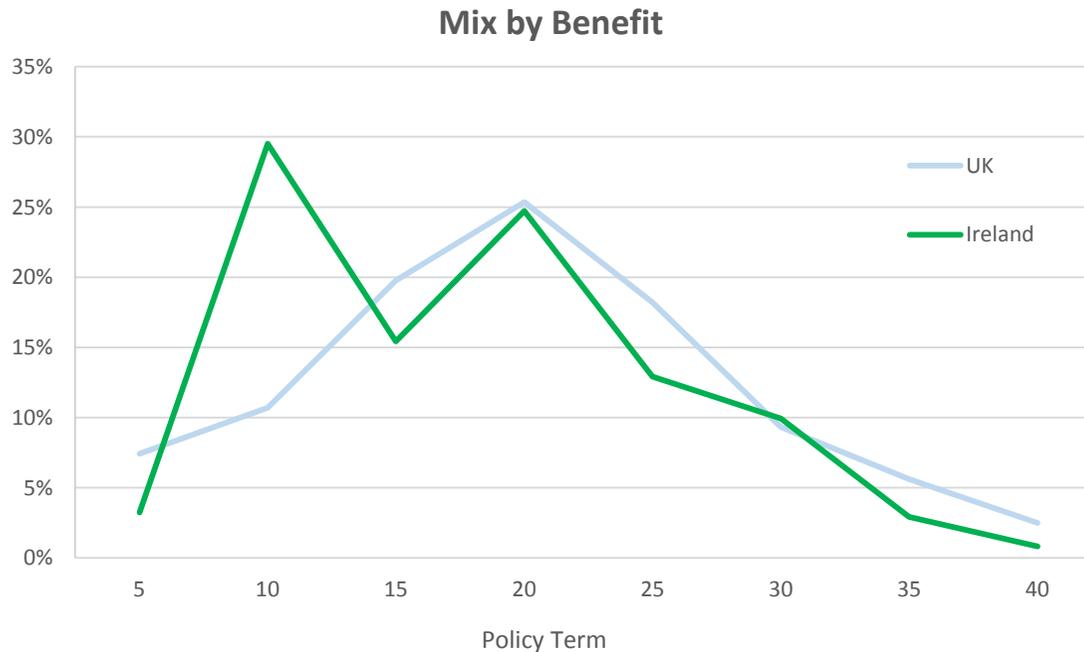
Options & Benefits - Australia

	Refer to page	Special Risk	Basic	Basic SuperLink Non Super	Standard	Comprehensive	Professional	Income Secure SuperLink Super	Income Secure SuperLink Non Super
Key benefits									
Total Disability Benefit	70	✓	✓	✓	✓	✓	✓	✓	✓
Partial Disability Benefit	78	✓	✓	✓	✓	✓	✓	✓	✓
Additional benefits									
Basic Death Benefit	83	✓	✓	✓	✓	N/A	N/A	N/A	N/A
Enhanced Death Benefit	83	N/A	N/A	N/A	N/A	✓	✓	✓	✓
Rehabilitation and Retraining Expenses Benefit	12	✓	✓	N/A	✓	✓	✓	✓	N/A
Rehabilitation and Retraining Incentive Benefit	84	N/A	N/A	N/A	N/A	✓	✓	N/A	✓
No Claim Benefit	84	N/A	✓*	N/A	✓	✓	✓	✓	N/A
Meal Allowance Benefit	84	N/A	N/A	N/A	✓	✓	✓	N/A	✓
Specific Injury Benefit	85	N/A	N/A	✓	✓	✓	✓	N/A	✓
Unemployment Benefit	86	N/A	N/A	N/A	✓	✓	✓	N/A	✓
Trauma Recovery Benefit	87	N/A	N/A	N/A	N/A	✓	✓	N/A	✓
Accommodation Benefit	88	N/A	N/A	N/A	N/A	✓	✓	N/A	✓
Special Care Benefit	89	N/A	N/A	N/A	N/A	✓	✓	N/A	✓
Immediate Family Member Benefit	89	N/A	N/A	✓	N/A	✓	✓	N/A	✓
Nursing Care Benefit	89	N/A	N/A	✓	N/A	✓	✓	N/A	✓
Relocation Benefit	89	N/A	N/A	N/A	N/A	✓	✓	N/A	✓
Childcare Assistance Benefit	90	N/A	N/A	N/A	N/A	✓	✓	N/A	✓
Emergency Domestic Travel Benefit	90	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
Commuter Benefit	90	N/A	N/A	N/A	N/A	N/A	✓	N/A	N/A
Premium and Cover Suspension	91	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓
Standard features									

- Policy documents 150 pages
 - P2: Any questions – ask your financial adviser

Examples – “Conversion” Options in Ireland

- 75% take-up in Ireland vs <10% in UK
- Lion.ie: “Don’t even think about it. Add it to your policy.”



Examples – Conversion Options in Ireland

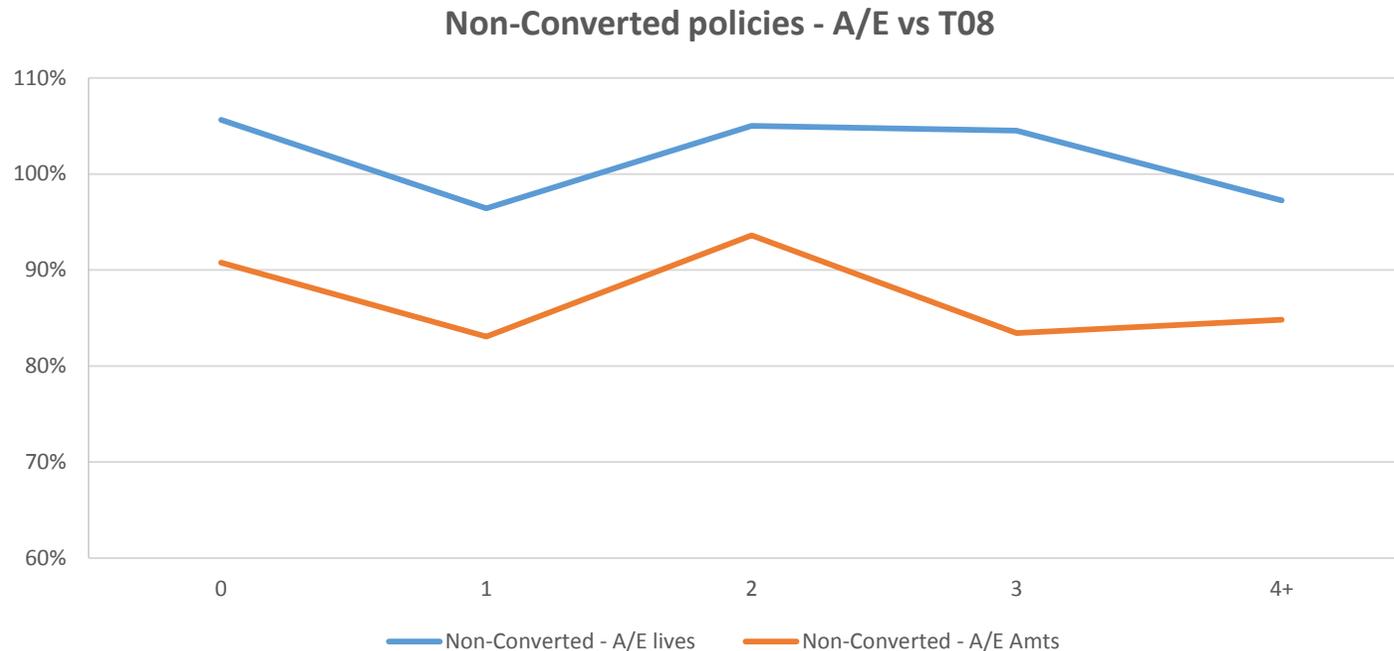
- Cohort of converting policies
 - Age at entry & exercise limits

	Average at Entry by Benefit	
	Age	Term
Converting	53.3*	16.4*
New with Option	41.5	21.4
Other	41.7	27.0

- c. 5% of new business volume from converting policies
- Exercise rates 25-40%

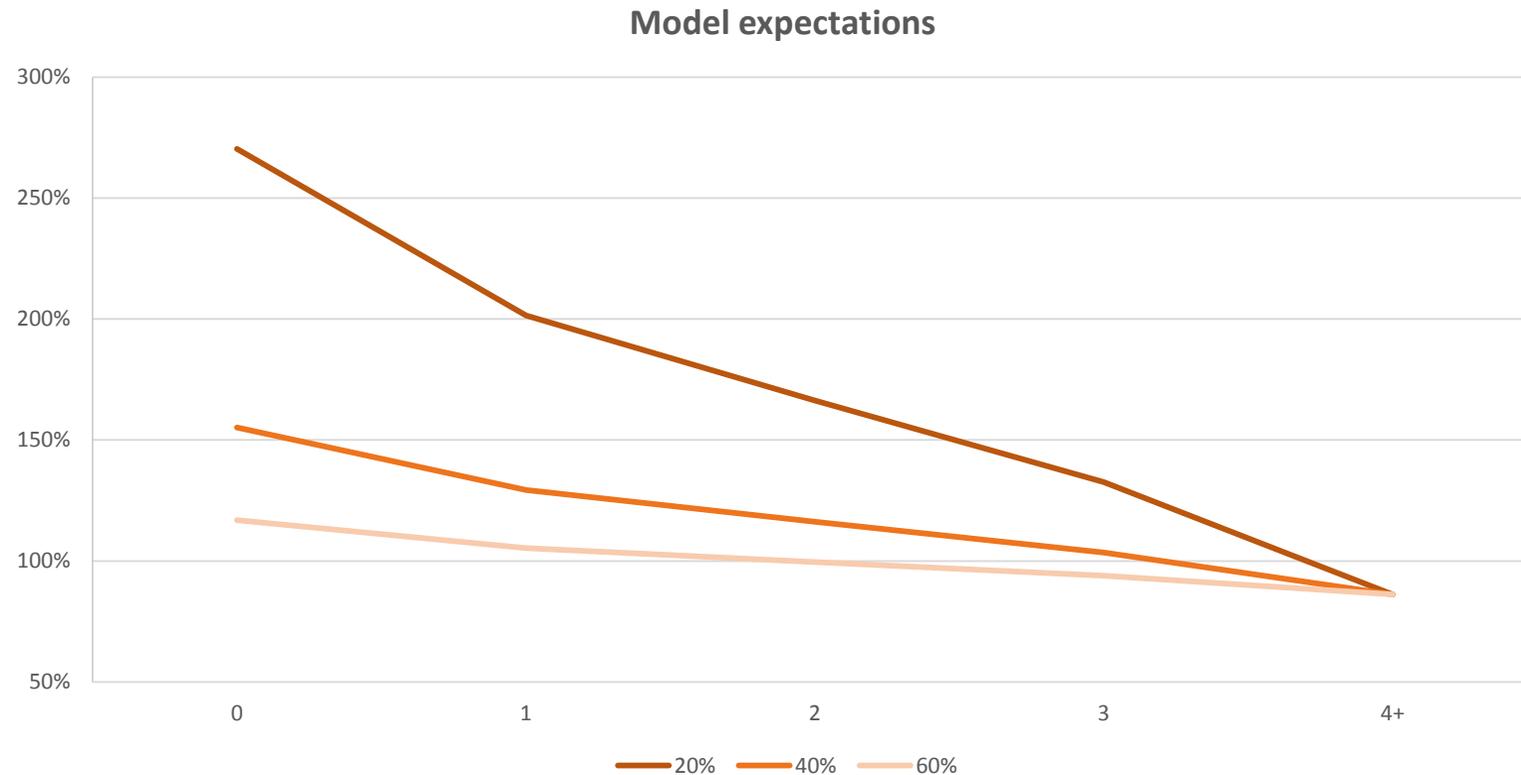
Examples – Conversion Options in Ireland

- Option charges 5-7% - so what is the cost?



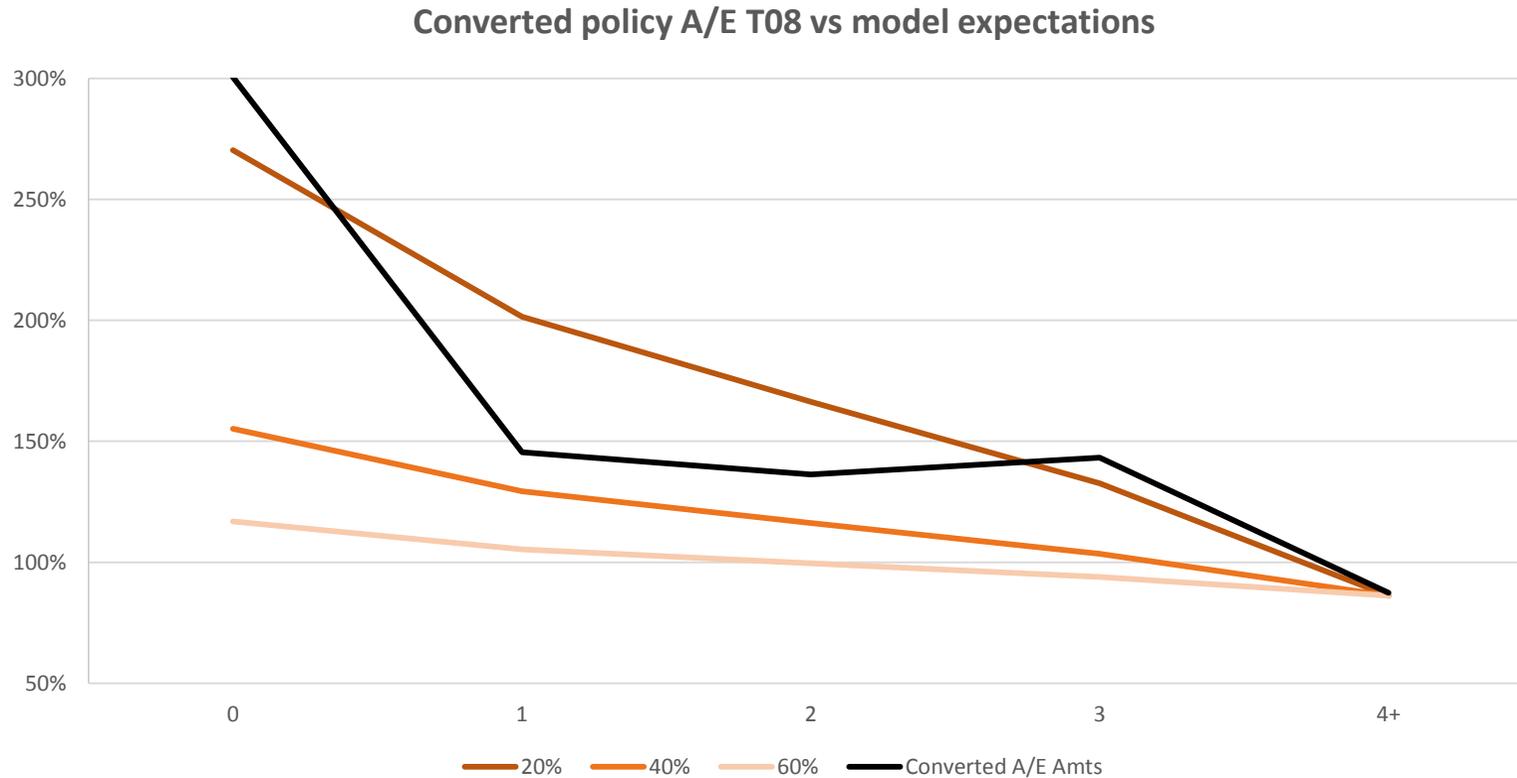
Examples – Conversion Options in Ireland

- Conventional Option method expectations – with x% exercise



Examples – Conversion Options in Ireland

- Actual amounts experience



Examples – Conversion Options in Ireland

- Cost calculations
 - Model point:
 - Male non-smoker
 - Age 40 at entry, Term 20 years
 - Converts to policy with Term 15 years
 - Other assumptions:
 - Anti-selective mortality = 250% Y1 of ultimate, 150% Y2 run down to 100% Y5+
 - Interest rate = 1.5% pa
 - Mortality improvement = 1.5% pa
 - Lapses pre/post conversion

Examples – Conversion Options in Ireland

- Cost calculations
 - Conventional method:
 - Cost = 10%
 - North-American method:
 - Cost per exercise = 29%
 - Allow for 40% exercise => cost = 12%

Term	5	10	15	20	25	30	35	40
Cost	49%	21%	14%	11%	9%	7%	6%	4%

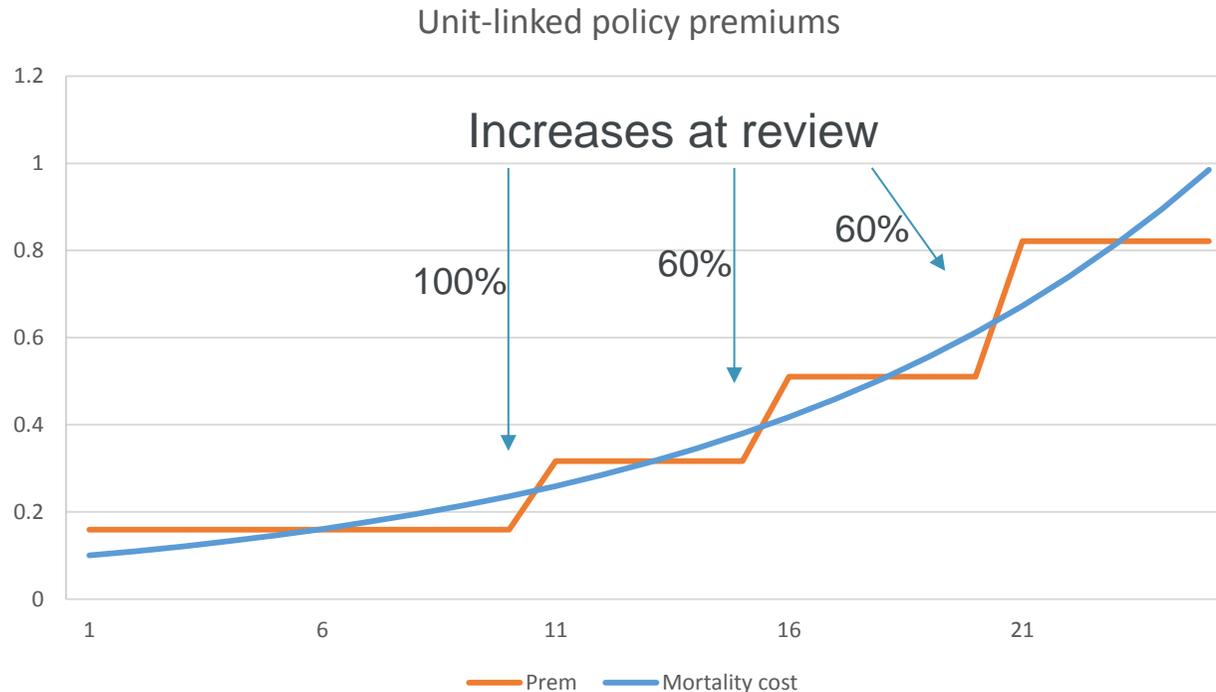
Examples – Conversion Options in Ireland

- Cost calculations - Sensitivities

	Conventional	North-American
<i>Base cost</i>	10%	12%
Interest -1%	+1%	+1%
Lapses -1%	+1%	+0%
Mort imp -0.5%	+0.5%	+0.5%
Exercise 25%	-	-5%
Y1 mortality 300%	-	+1%
Anti-select mortality rundown 10y	-	+5%
Anti-select mortality floor 10%	-	+3%

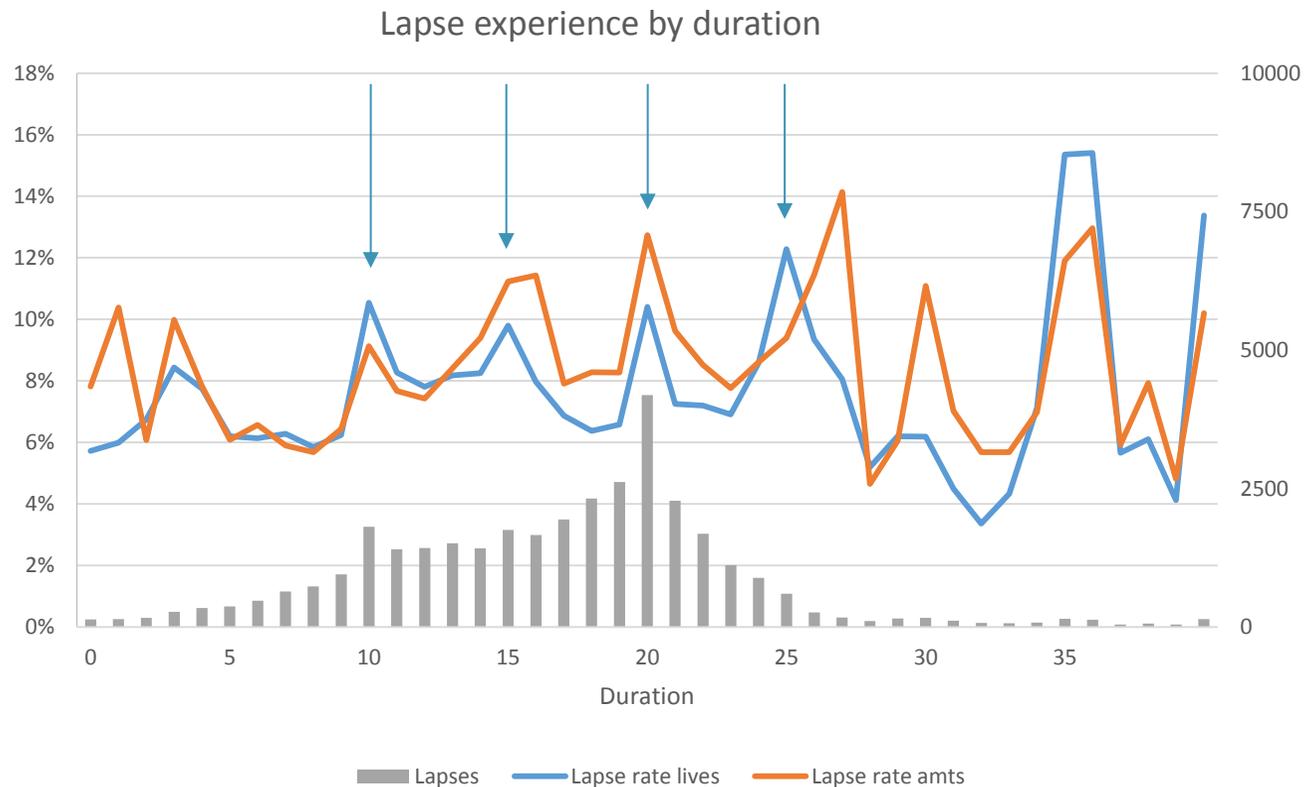
Examples – Unit-linked policies

- Popular during 1990s to share investment return
- Regular reviewable premiums – 5/10-yr



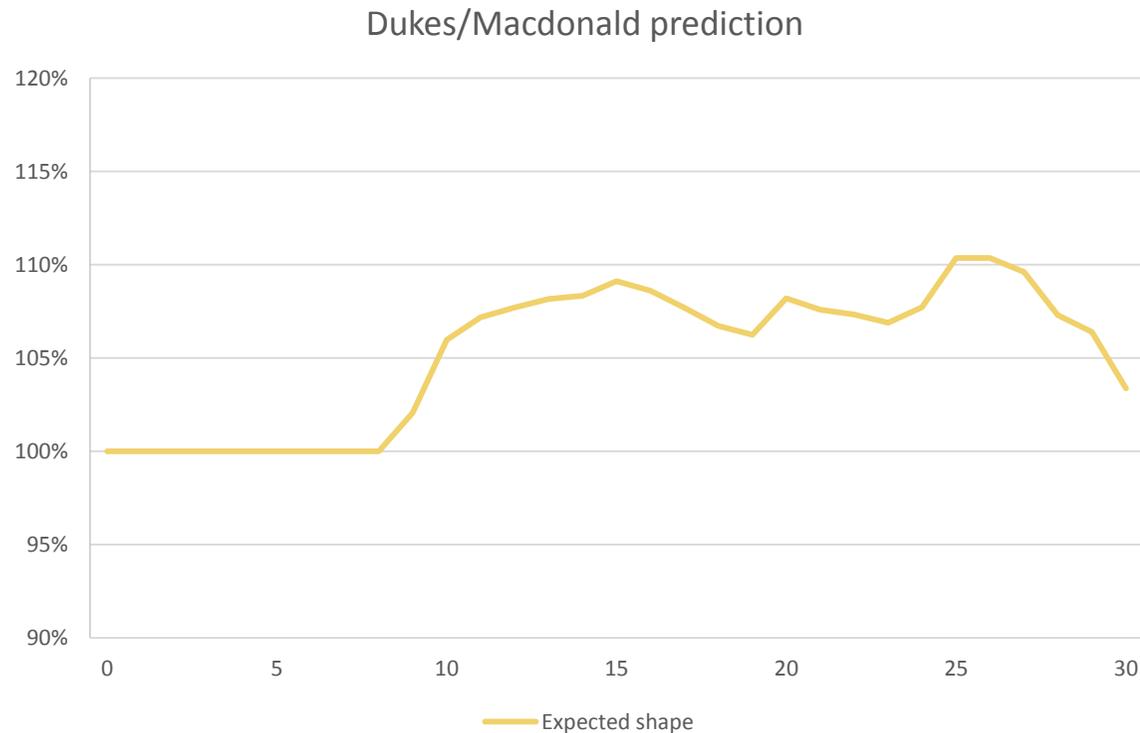
Examples – Unit-linked policies

- Peak lapse behaviour around reviews



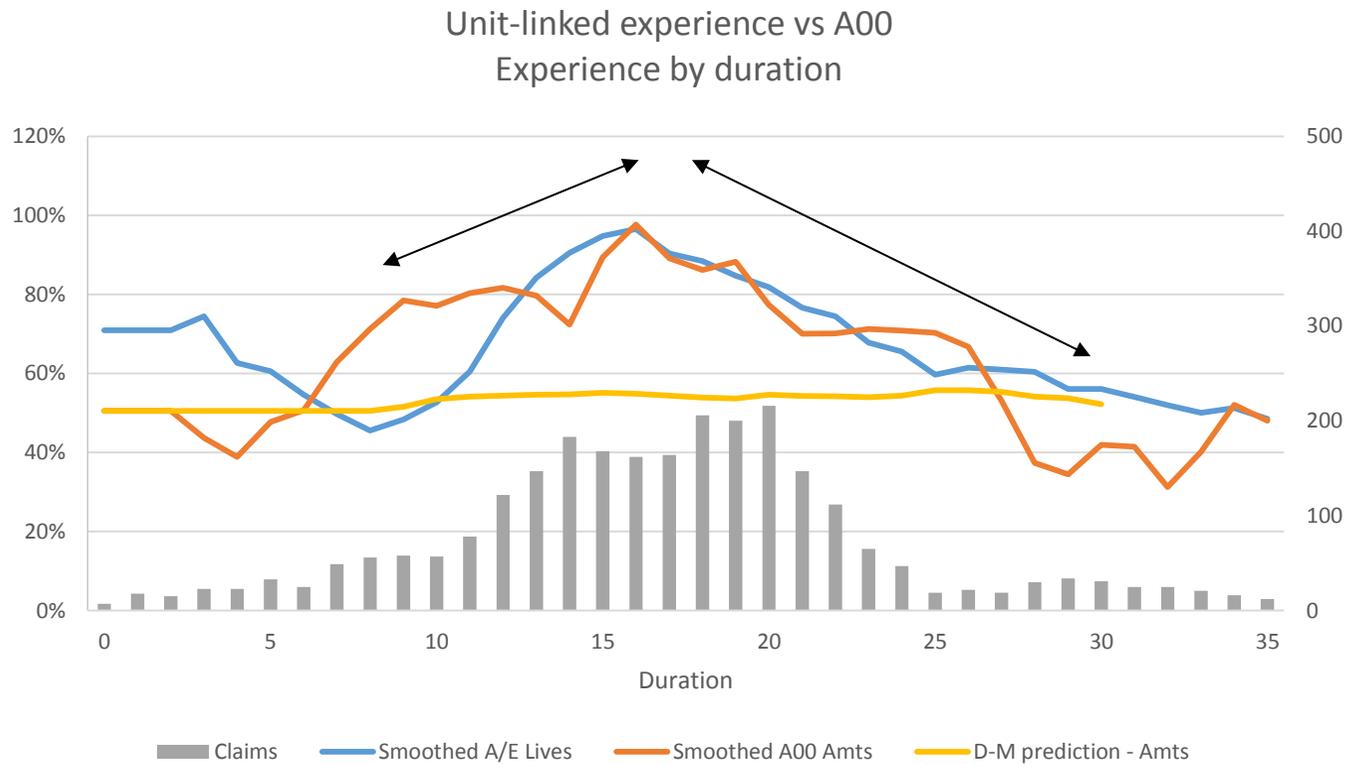
Examples – Unit-linked policies

- Application of anti-selection model – Dukes/Macdonald



Examples – Unit-linked policies

- Actual experience



Examples – Indexation

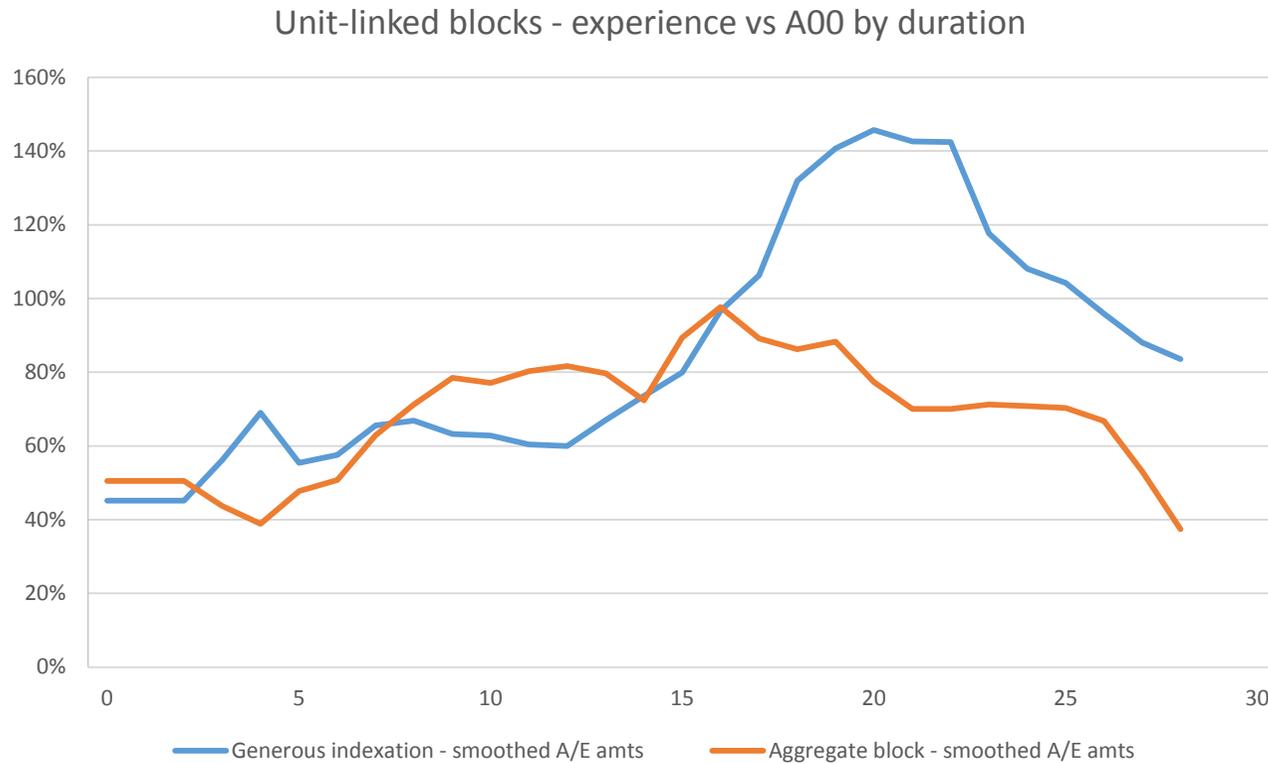
- Non-underwritten benefit increase
- Most newer policies have:
 - Option cancelled after x opt-outs
 - Lower of RPI and fixed rate

	LTA	ITA	DTA
Relative risk ratio	101%	98%	97%

- Term business not fundamentally anti-selective

Examples – Indexation

- Unit-linked policies with generous indexation options



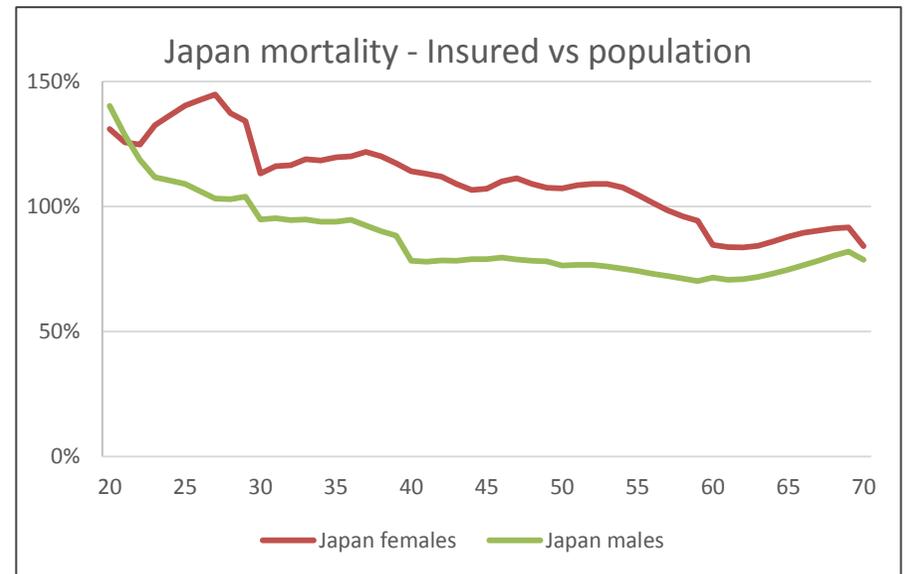
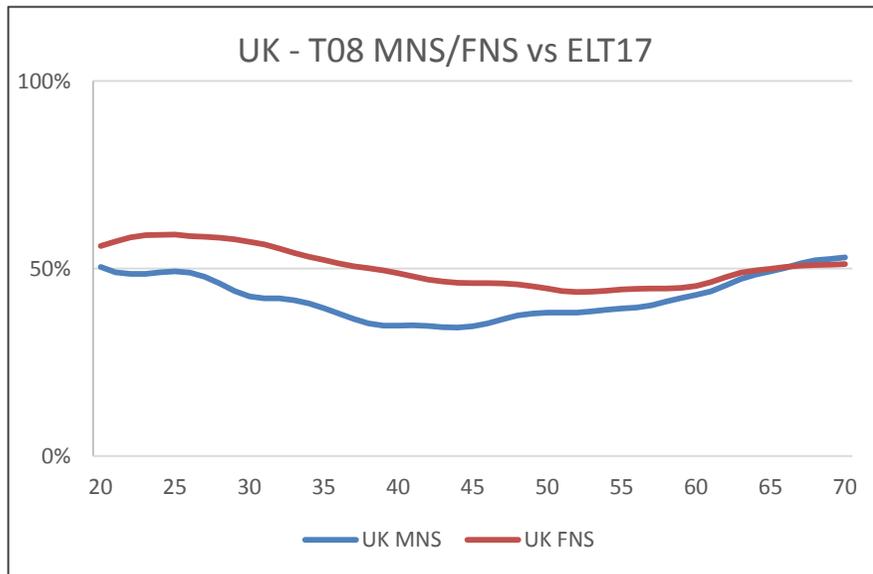
Examples – Indexation

- Unit-linked policies with generous indexation options
 - Indexation behaviour close to death

Years to Death	Relative increase factor
1	139%
2	120%
3+	100%

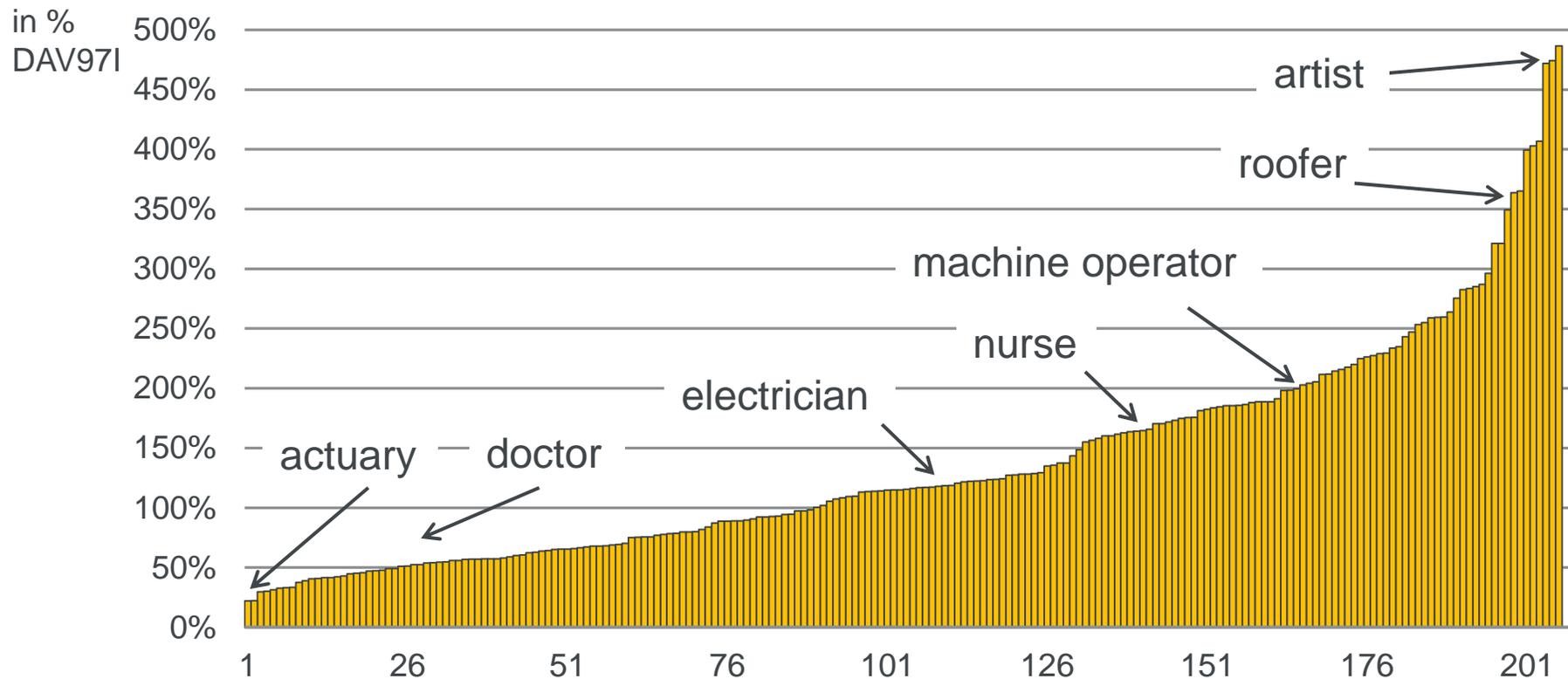
Examples – Japan females

- Super-developed market



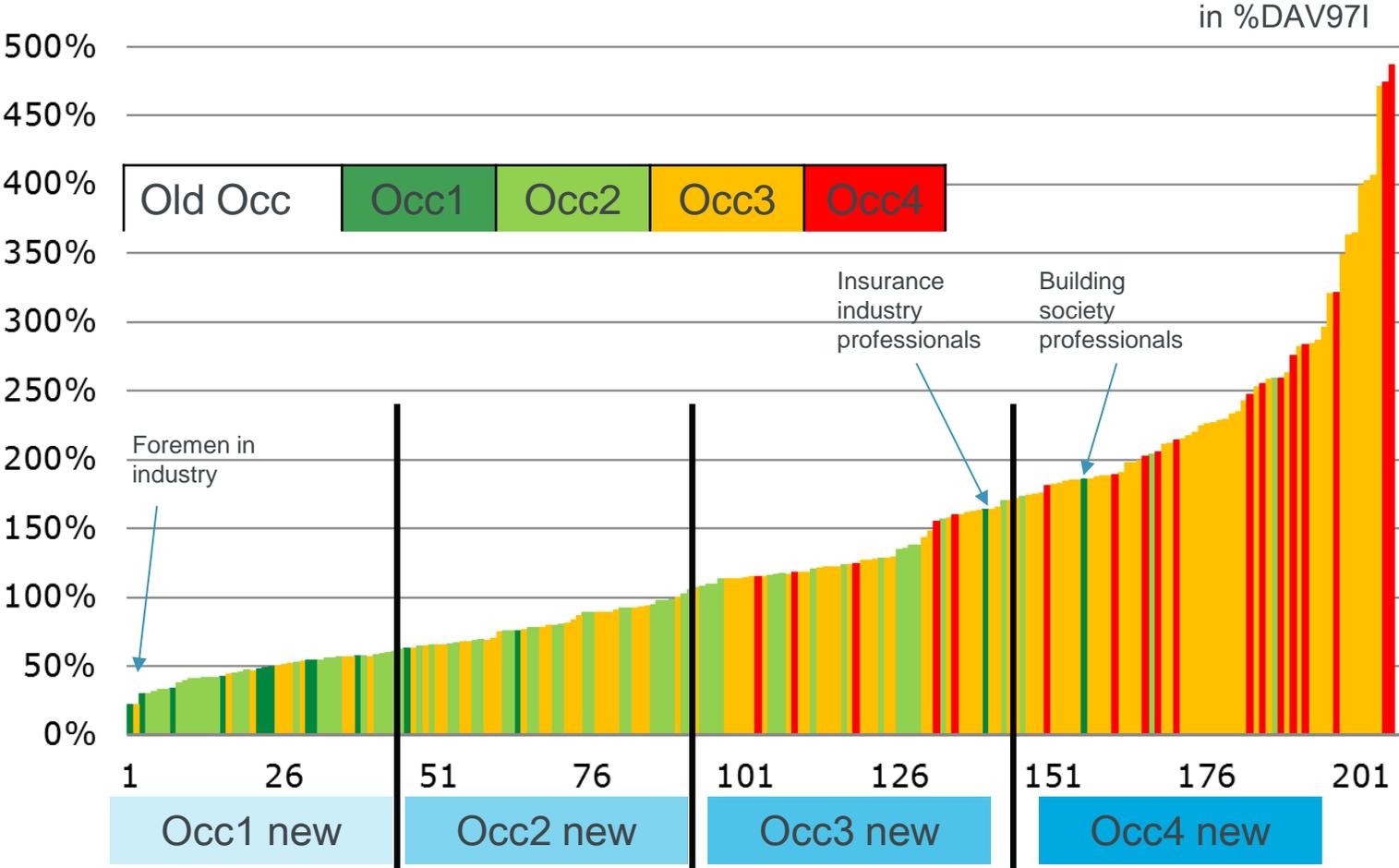
Examples – Actuaries! IP in Germany

- Incidence rates by occupation type



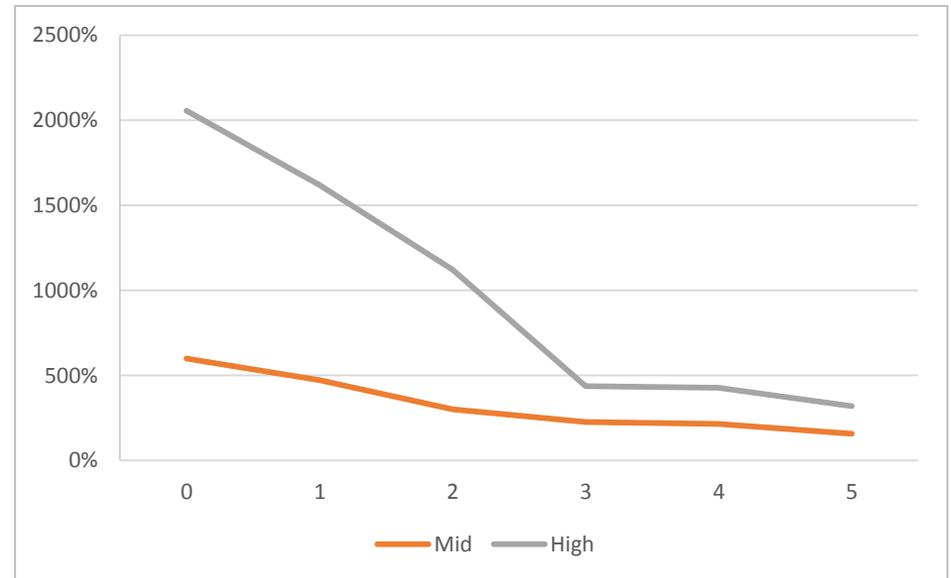
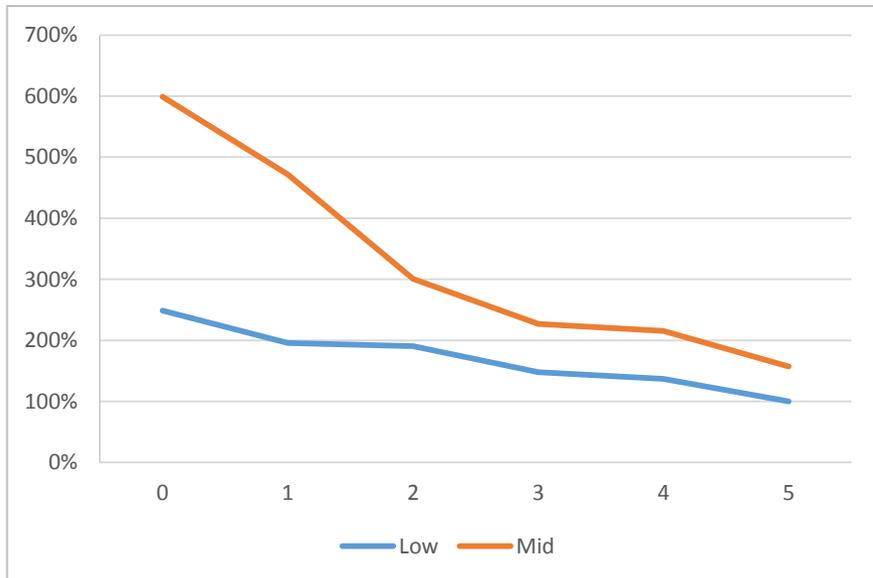
Source : Swiss Re Bestandsmonitoring – Germany (covers ca. 6.6m policies from 35 providers)

Examples – Actuaries! IP in Germany



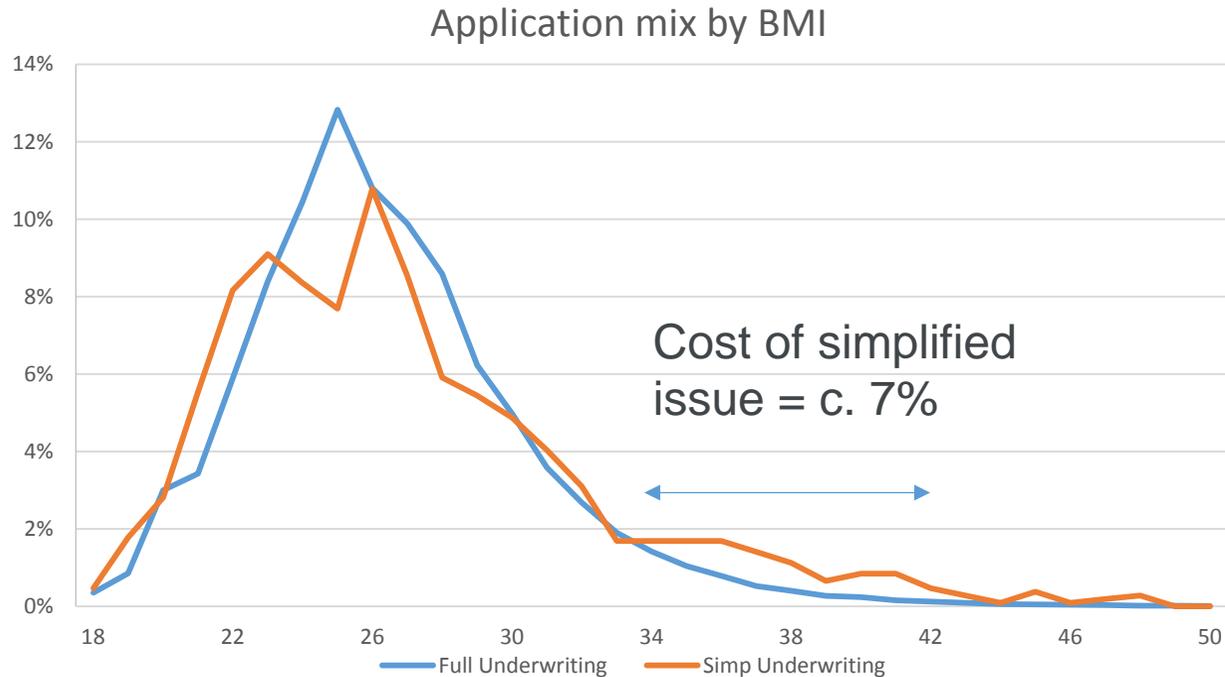
Examples – Application selection

- Guaranteed Acceptance Over 50s
 - Non-underwritten (medical or financial)
 - Moratorium (waiting period) of 1-2 years for full sum assured benefit
 - Mortality at early durations by sum assured band, for a single age:



Examples – Application selection

- Simplified Issue & BMI



- Mitigation – other health questions, BMI range

Examples – Application selection

- Information asymmetry – genetics & family history
- Underwriting of breast cancer vs public awareness

NHS guidelines

- **Moderate risk:** any of:
 - One first-degree relative diagnosed with breast cancer before the age of 40.
 - Two first-degree or second-degree relatives diagnosed with breast cancer at an average age of over 50.
 - Three first-degree or second-degree relatives diagnosed with breast cancer at an average age of over 60.
- **High risk:** any of:
 - Two first-degree or second-degree relatives diagnosed with breast cancer before an average age of 50 (at least one must be a first-degree relative).
 - Three first-degree or second-degree relatives diagnosed with breast cancer before an average age of 60 (one must be a first-degree relative).
 - Four relatives diagnosed with breast cancer at any age (one must be a first-degree relative).
 - One first-degree relative with cancer in both breasts, where the first cancer was diagnosed before 50.
 - One first-degree or one second-degree relative diagnosed with ovarian cancer at any age, and one first or second-degree relative diagnosed with breast cancer before 50.
 - Two first-or second-degree relatives diagnosed with ovarian cancer at any age.

– Underwritten / Partially Underwritten / Not Underwritten

Summary

- Neutral does not exist:
 - Selection & anti-selection present throughout the policyholder-insurer relationship
 - Historic data will always include this
- Management techniques exist
 - Prevent, restrict, allow & price
- Pricing techniques exist
 - Find the right model