Swiss Re
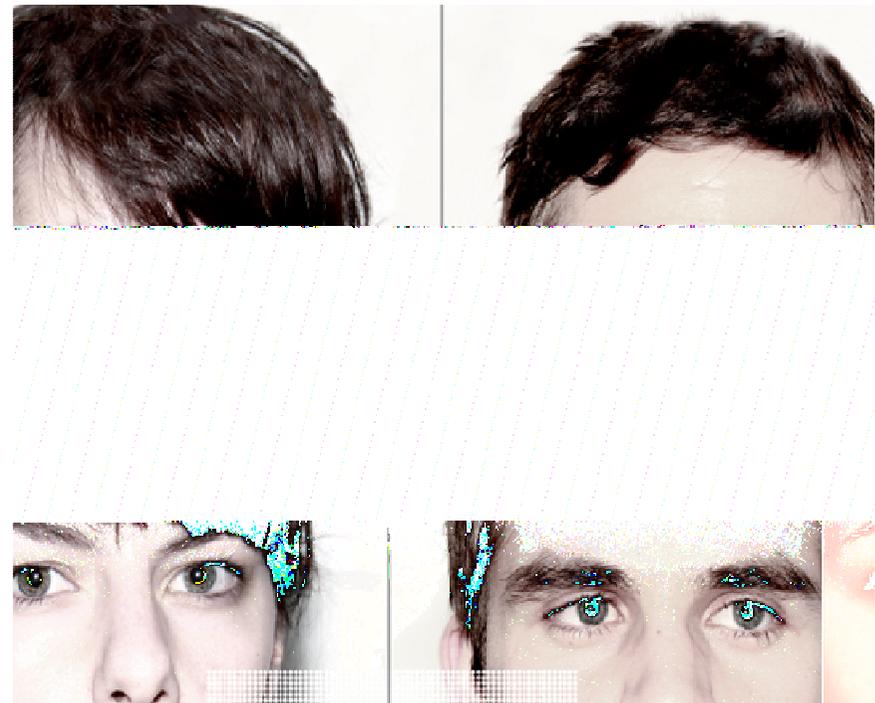
Quantitative Impact of the Unisex Ruling

Dr. Ralf Krüger

Warsaw, 30th May 2012

Agenda

- Pricing challenges

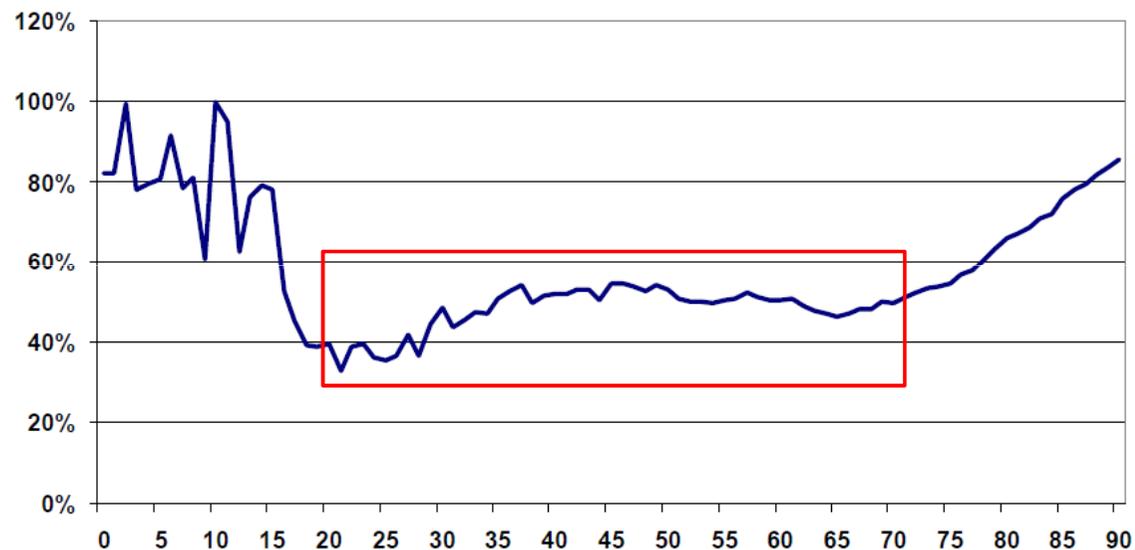- Pricing strategy / requirements for success

- New product opportunities

Where to set the unisex rate?

Average life expectancy at birth (EU 27 countries) if born in 2008:

Males 76 Females 82

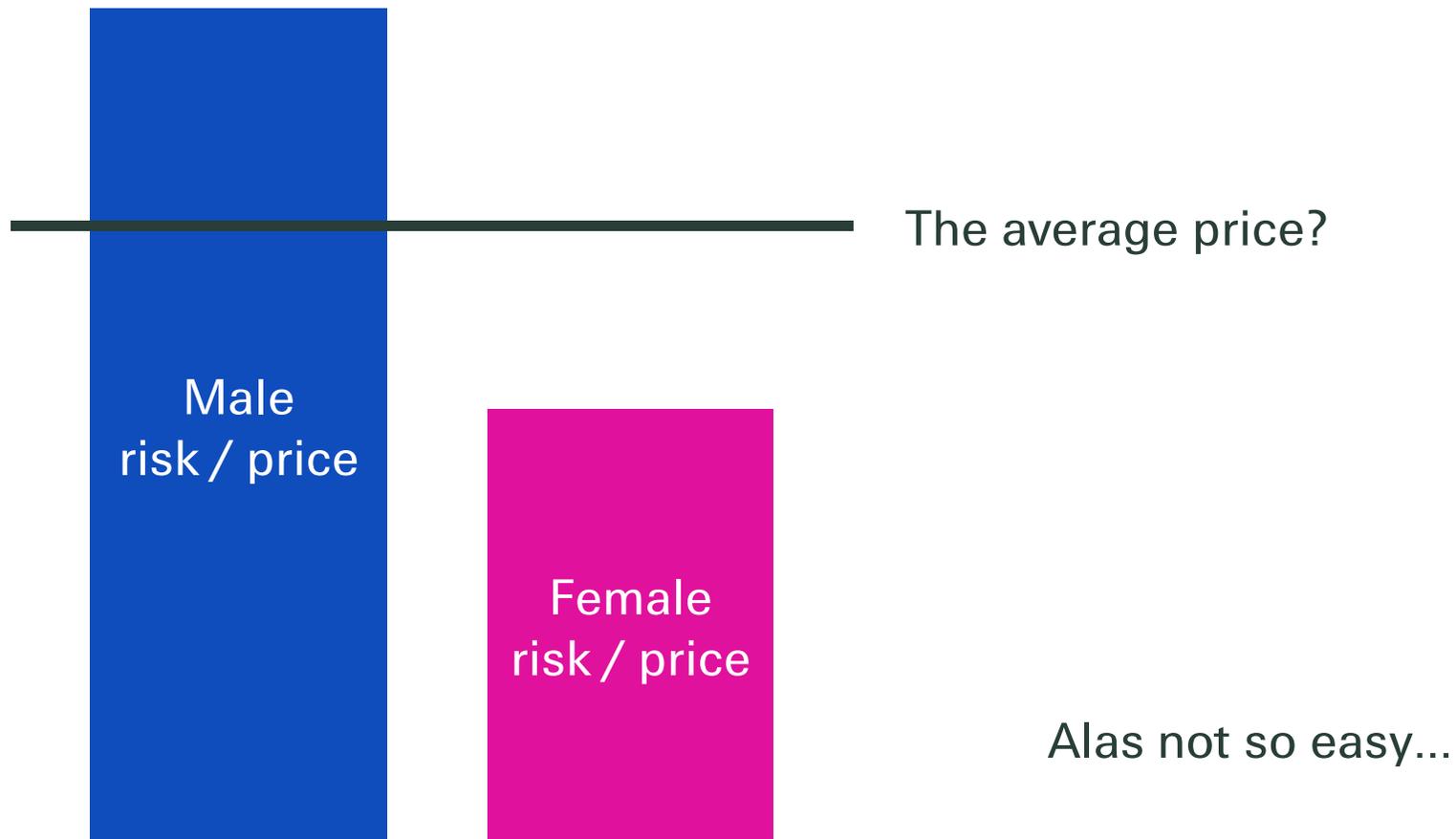Source: Eurostat Newsrelease for International Women's Day - 5th May 2010

Female/male relative risk of death by age − German population:

Women on average less than half the risk of men during insurance ages

Source: German Statistical Bureau, population table 2004-2006

Where to set the unisex rate?

The average price?

Male risk / price

Female risk / price

Alas not so easy...

Factors influencing gender mix

Basically the gender mix may vary with every differentiation factor and product feature.

- company

- age at entry

- age attained

- sum insured

- distribution channel

- duration of insurance

- postcode

- smoker status

- occupational group

- lump sum settlement and other options

- changes over time (competitor behaviour, changes in the general framework)

History of the Swiss Re - Bestandsmonitoring in Germany

1996: First portfolio analysis

- 14 direct insurance companies
- tariffs: endowments, term life, disability riders, annuities
- roughly 6 million data sets

2011: 16th client event

- 31 direct insurance companies (<u>one third</u> of Germany's direct insurance market)
- 20 tariffs (... + special annuities, stand-alone disability insurance, LTC etc.)
- 35 million data sets

Number of policies of key products

	Male	Female	Total
Term life	2.4	1.4	3.8
Endowments	6.8	4.6	11.4
Unit-linked	1.5	1.1	2.6
Annuities	4.2	3.8	8.0
Disability rider	2.5	1.3	3.8
Stand-alone disability insurance	0.8	0.4	1.2

Figures in million policies
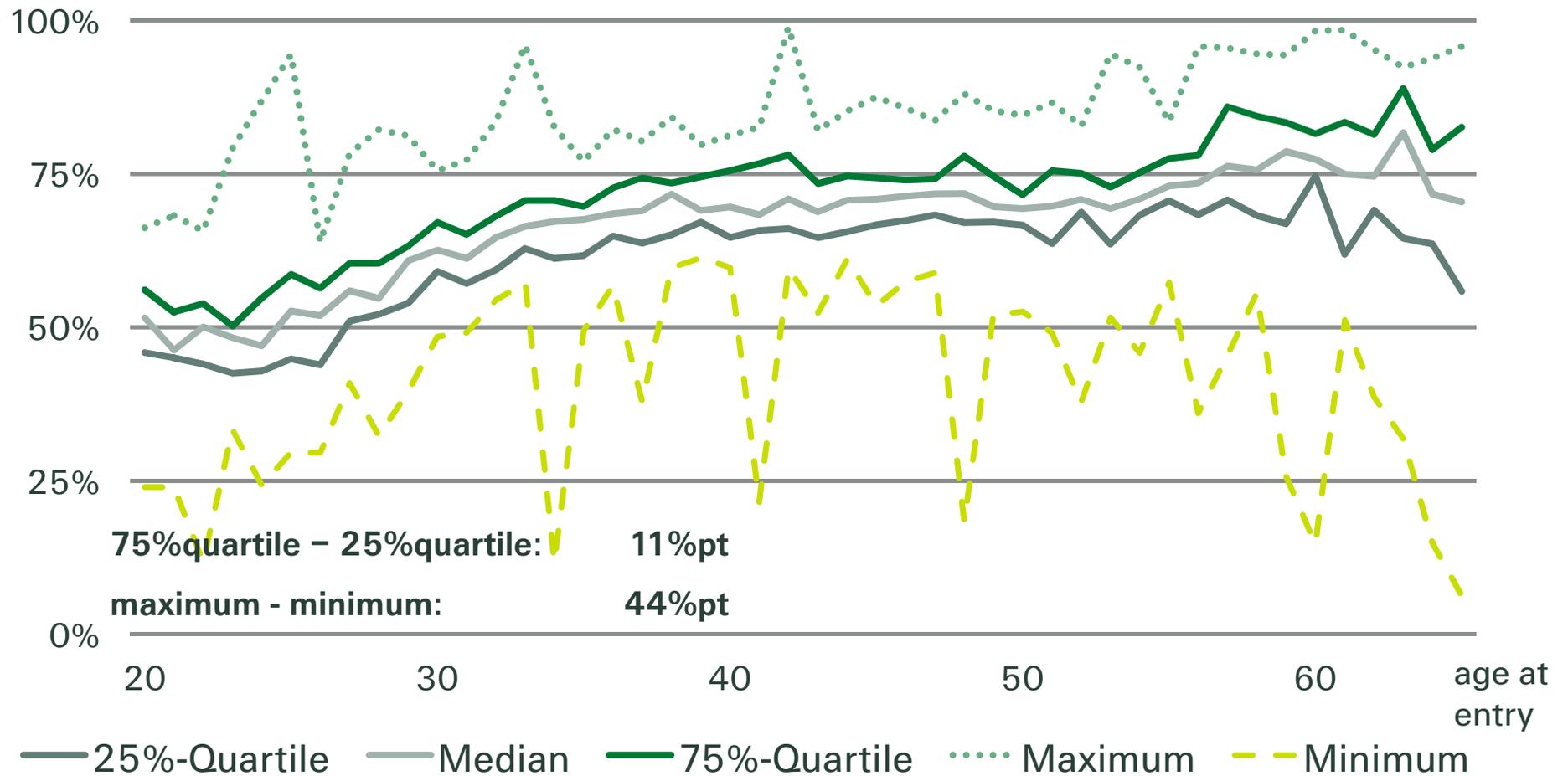
Influencing factor: sum insured

Male Ratio, by classes of sum insured, new business (2005 – 2009)

Legend: ■ Endowment ■ Term life ■ Unit-linked
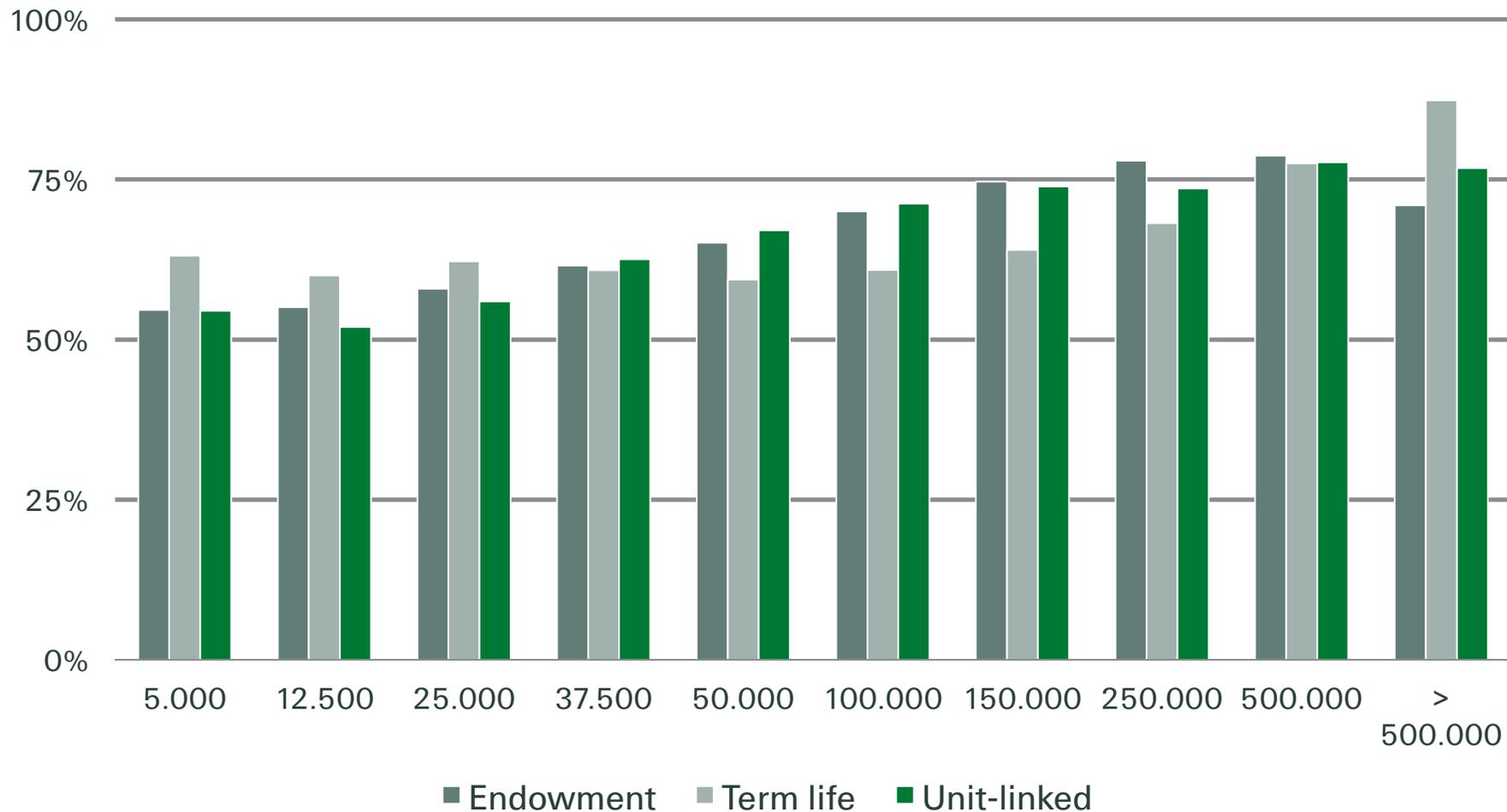
Influencing factors: age at entry and company

Term Life - male ratio, weighted by si, new business (2005 – 2009)

75%quartile – 25%quartile: 11%pt

maximum - minimum: 44%pt

Legend: 25%-Quartile — Median — 75%-Quartile ···· Maximum – – Minimum

Influencing factors: age at entry and company

Disability Rider - male ratio, weighted by si, new business (2005 – 2009)

75%quartile – 25%quartile: 12%pt

maximum - minimum: 44%pt

Legend: 25%-Quartile — Median — 75%-Quartile ⋯⋯ Maximum – – Minimum
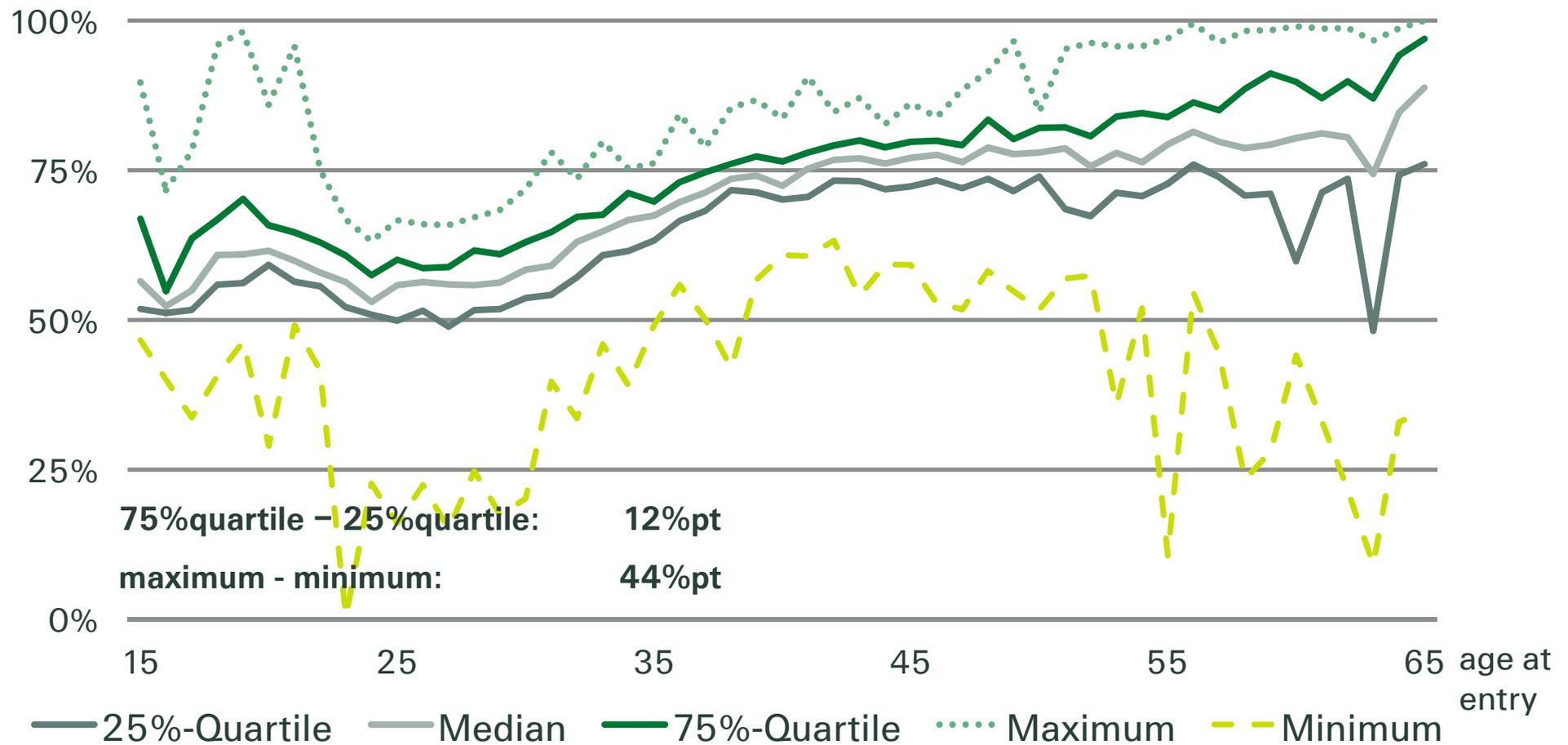
age at entry

Influencing factors: age at entry and company

Conventional Annuity - male ratio, weighted by si, payment period, new business (2005 – 2009)

75%quartile − 25%quartile: 23%pt

maximum - minimum: 60%pt

— 25%-Quartile — Median — 75%-Quartile --- Minimum ···· Maximum
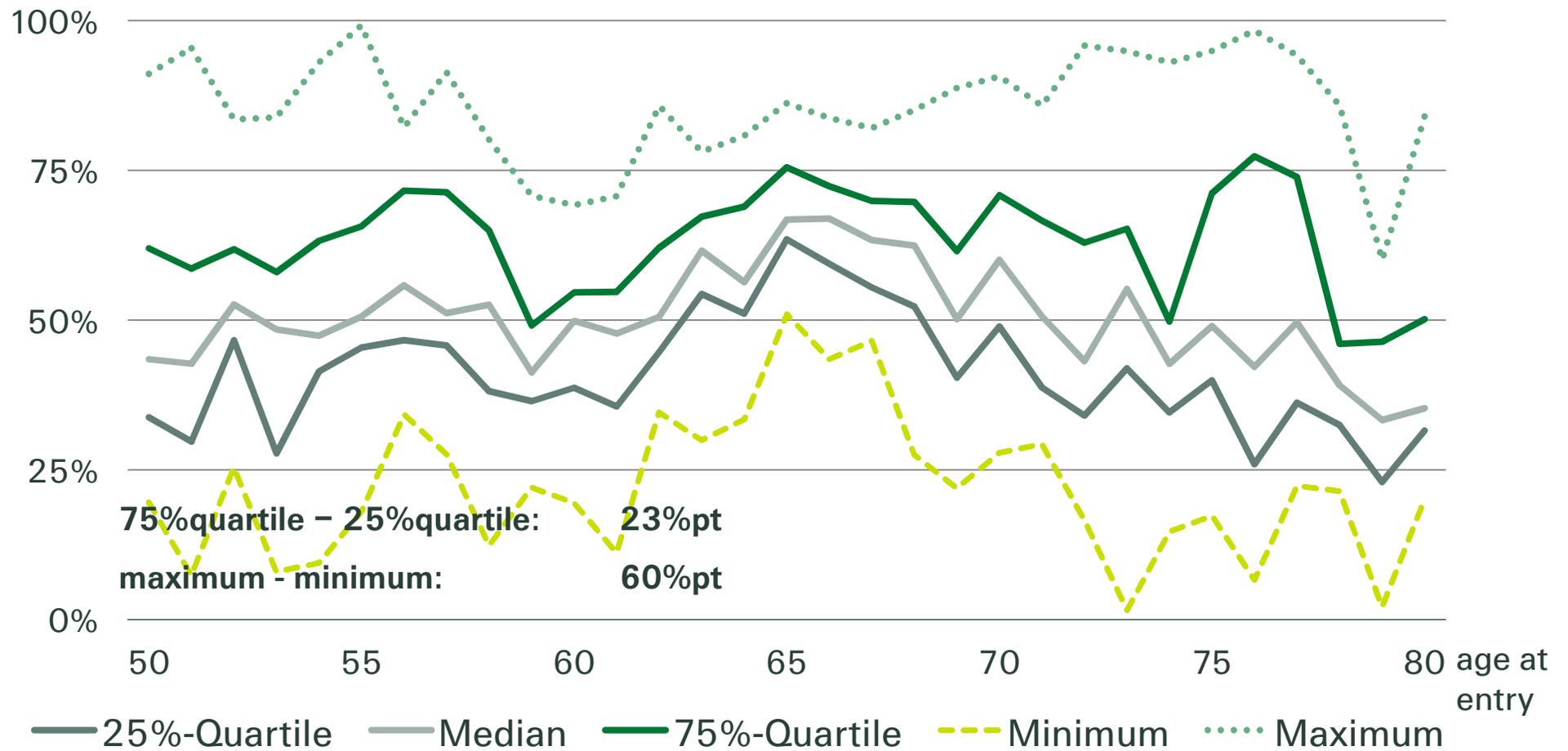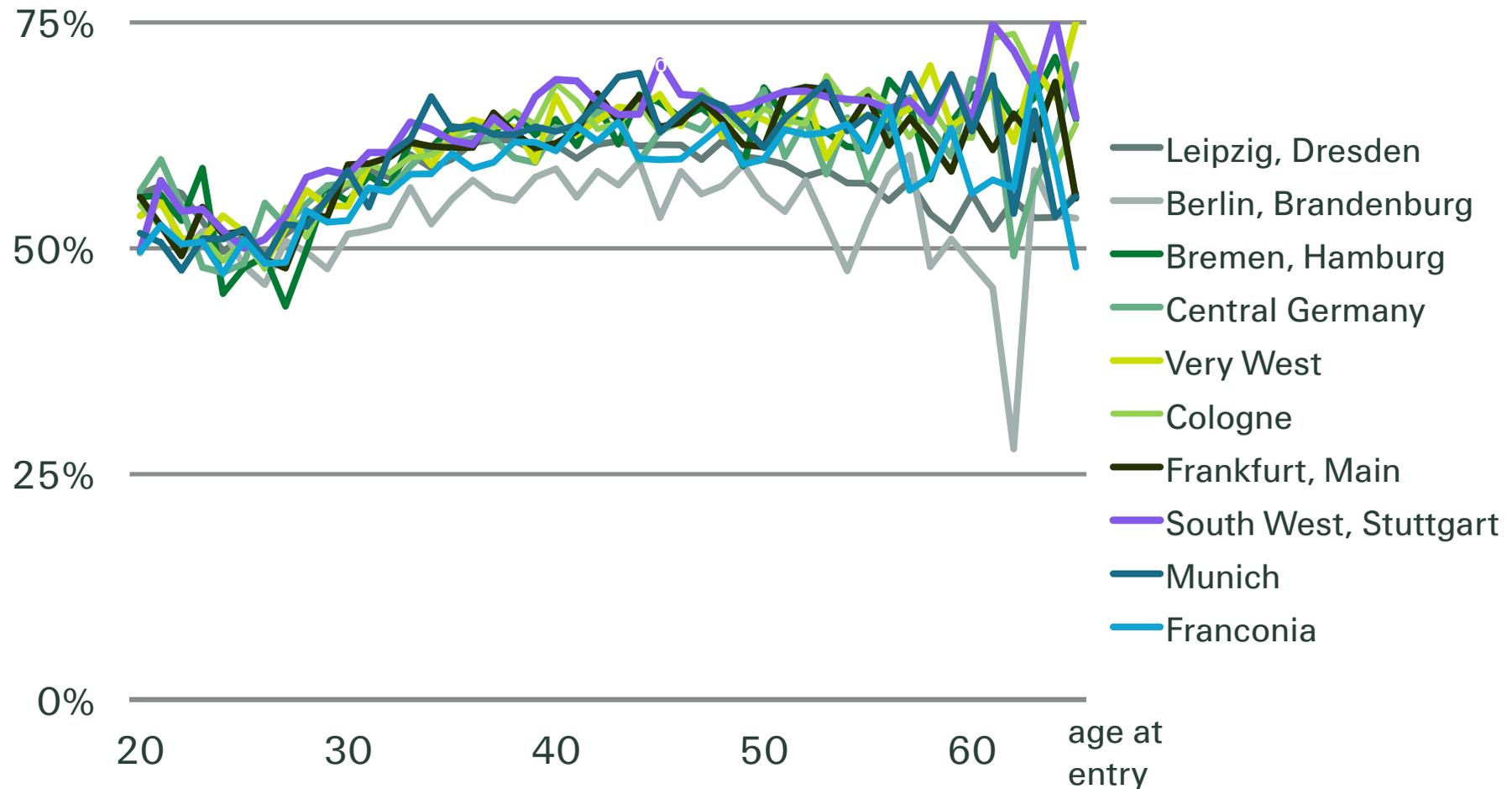
Influencing factor: sales channel

Term Life - male ratio, weighted by volume, new business (2005 − 2009), by sales channel
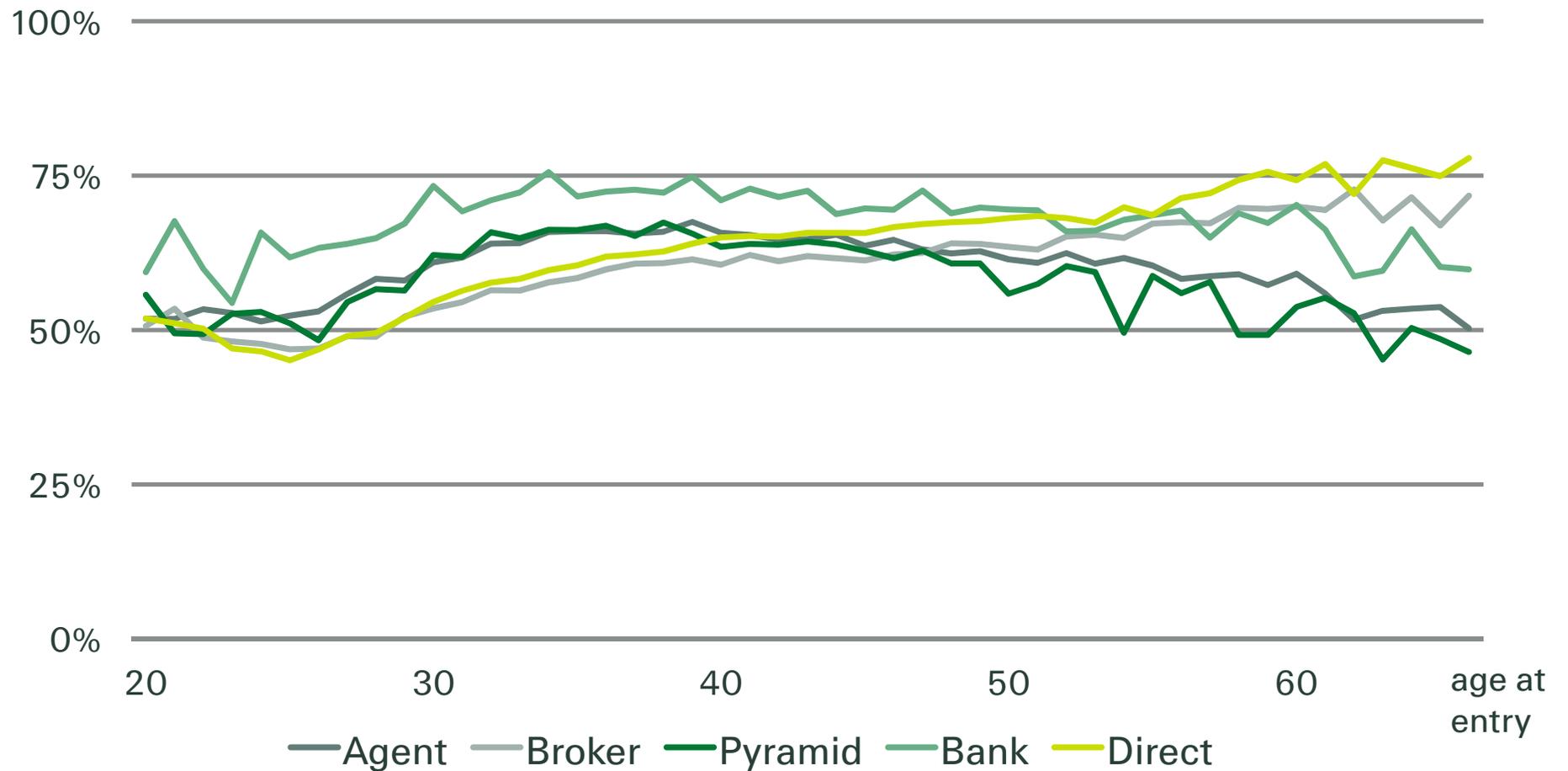
Influencing factor: region (postcode)

Term Life - male ratio, weighted by volume, new business (2005 – 2009),
by region

Legend:
- Leipzig, Dresden
- Berlin, Brandenburg
- Bremen, Hamburg
- Central Germany
- Very West
- Cologne
- Frankfurt, Main
- South West, Stuttgart
- Munich
- Franconia

age at entry

What does this tell us so far?

- Variability between companies is considerable

    - gender ratios have to be specifically determined for every company

    - there is no single ratio/solution which will work for all

- And most important of all, past buying behaviour may change significantly in face of major price changes

    - and how much it changes may also be different by all the same factors

    - e.g. sales channel: tied agent versus independent broker

- A "competitive advantage" afforded by past high female customer ratios, could turn out to be a cause of serious losses when more males start to buy at that price

Requirements for success

- Coordinate unisex pricing decision with marketing

  e.g. if assuming high percentage of females, need to advertise heavily to women

- Closely monitor new business, and also lapse rates

  need to be sure that what you assumed is really happening

- Monitor what your competitors are doing

  this will influence who buys your products

- Be ready to react fast

  ensure actuarial and other resource available

- Introduce new differentiated products early

  it helps prevent the mutually destructive price spiral which is otherwise a risk

Going back to the earlier slide

If you did assume 50/50, apart from losing a lot of money what happens?

75 €

100 €

50 €
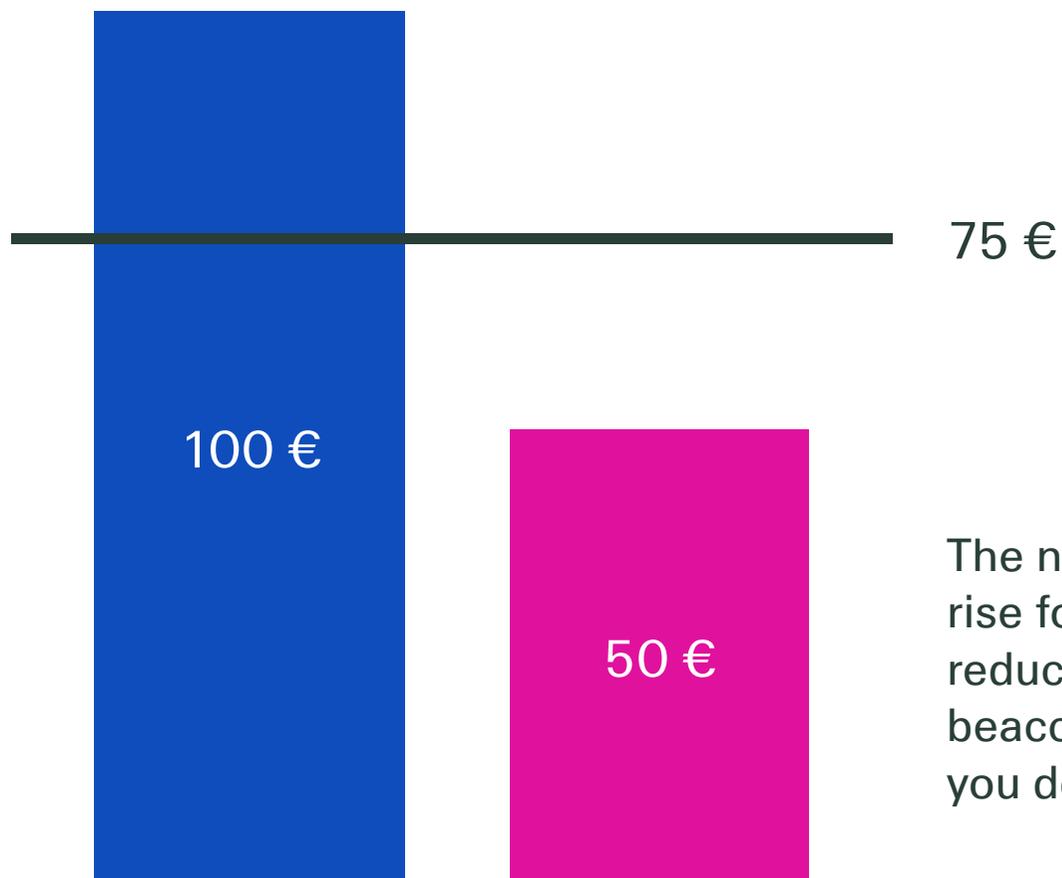
The newspapers report a 50% price rise for women and only a 25% reduction for men, i.e. you will beaccused of profiteering whatever you do

![Swiss Re]

Possible modelling of the gender mix

- "Play it safe" (e.g. annuities: female table for all)

  - calculation of premiums

  - calculation of actuarial reserves

- Market-wide unisex aggregate mortality table

- Company specific gender mix of:

  - current new business

  - current business in force

  - current new business with projection into the future (mortality and lapses)

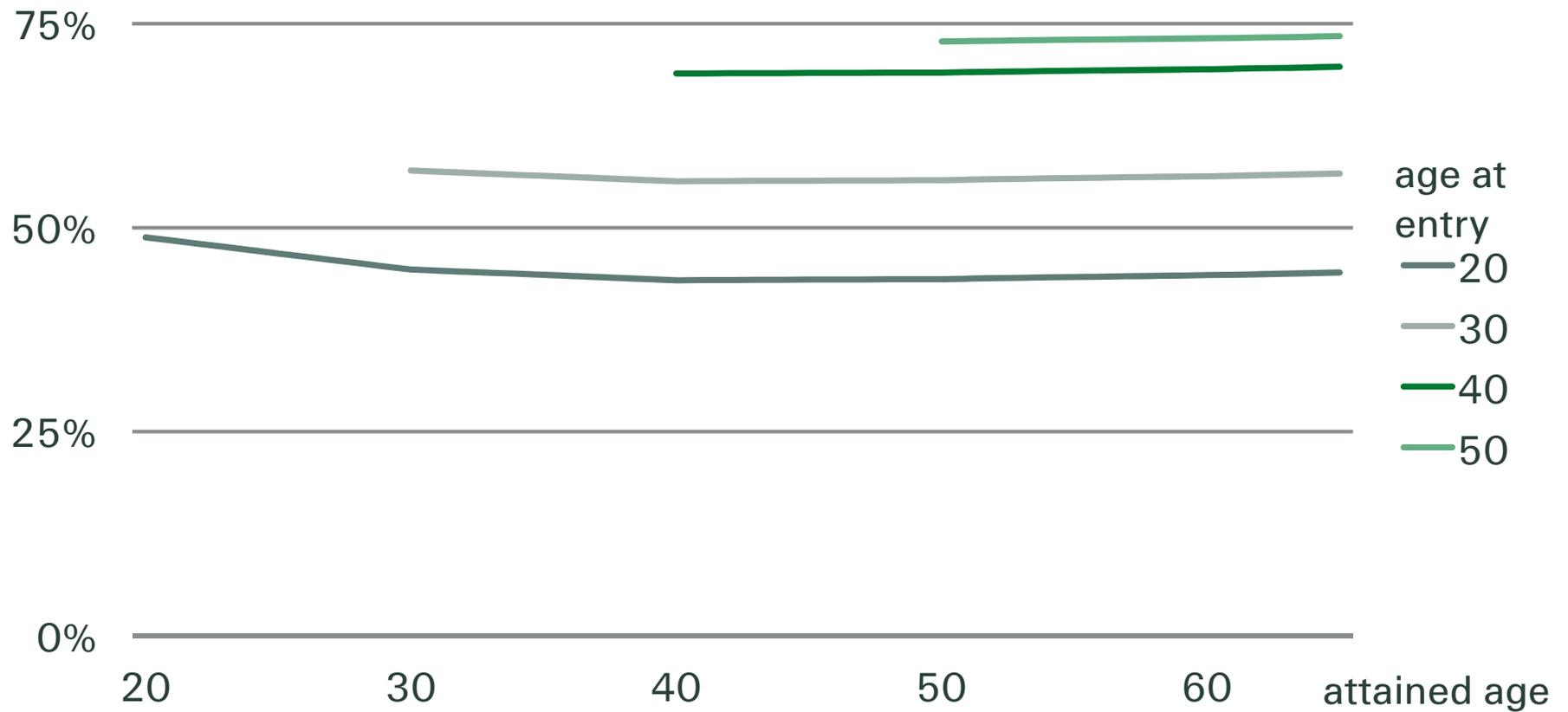 - projected business in force from current layers of new business

Lapse rates by gender

German pool data - $lapse_{female}$ /$lapse_{male}$
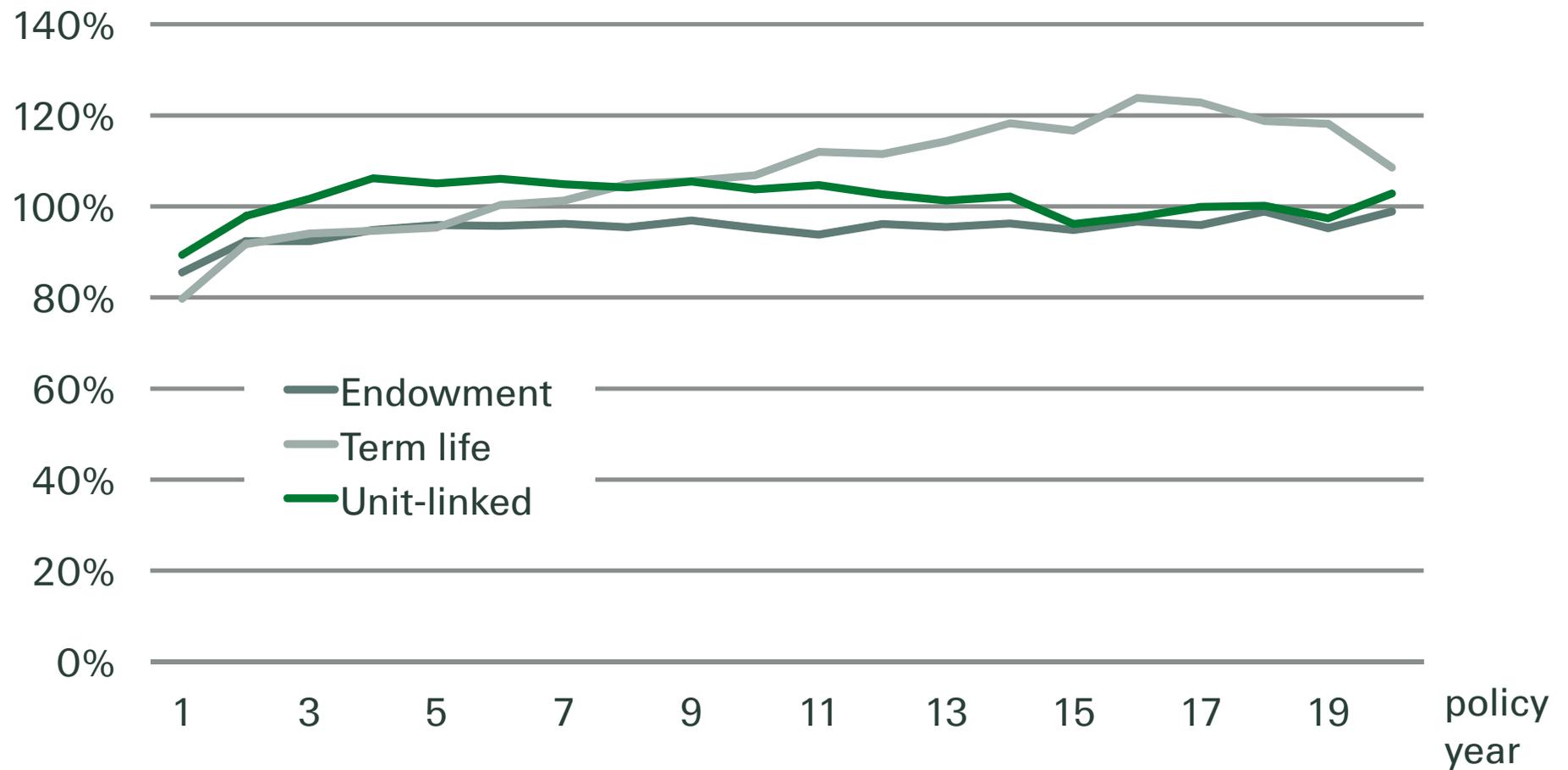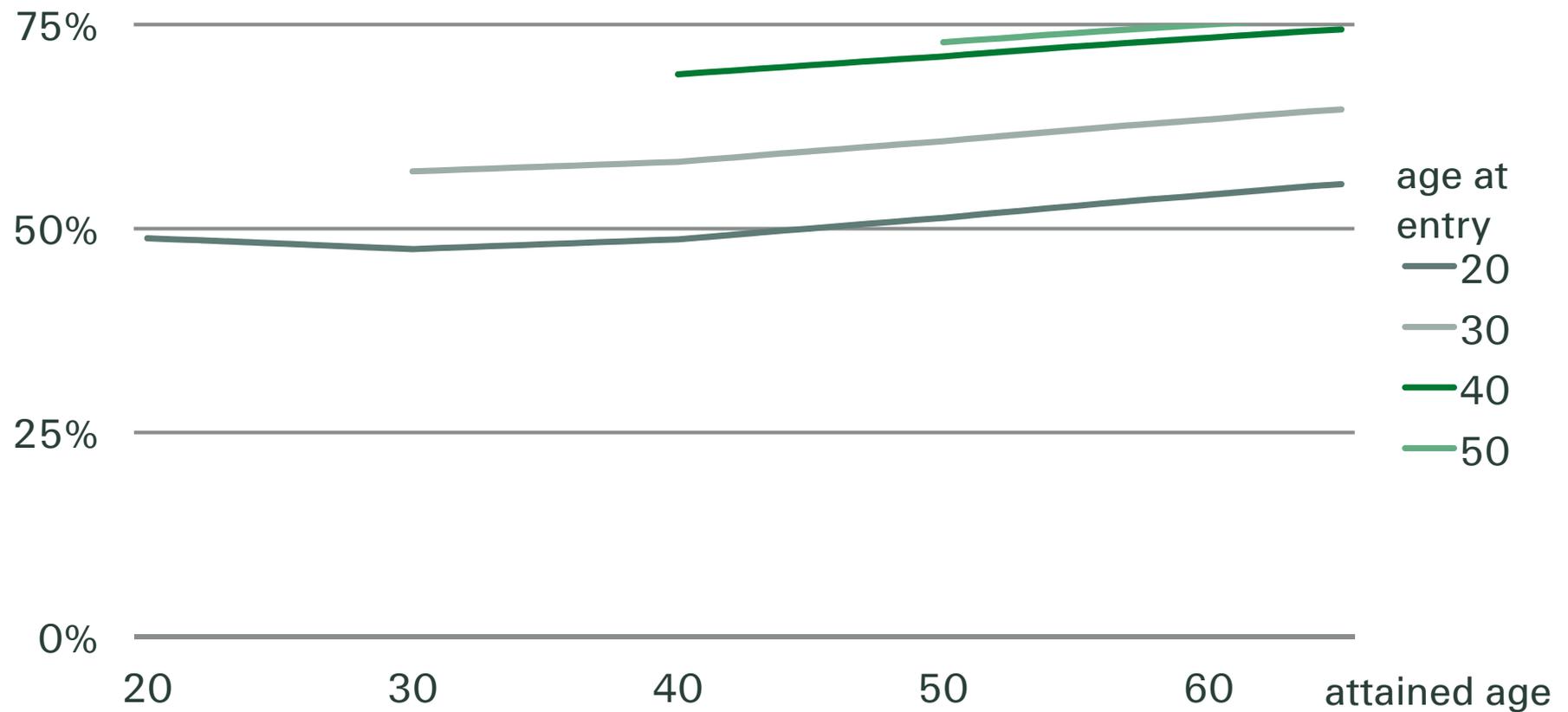
Projection of male ratio, term life
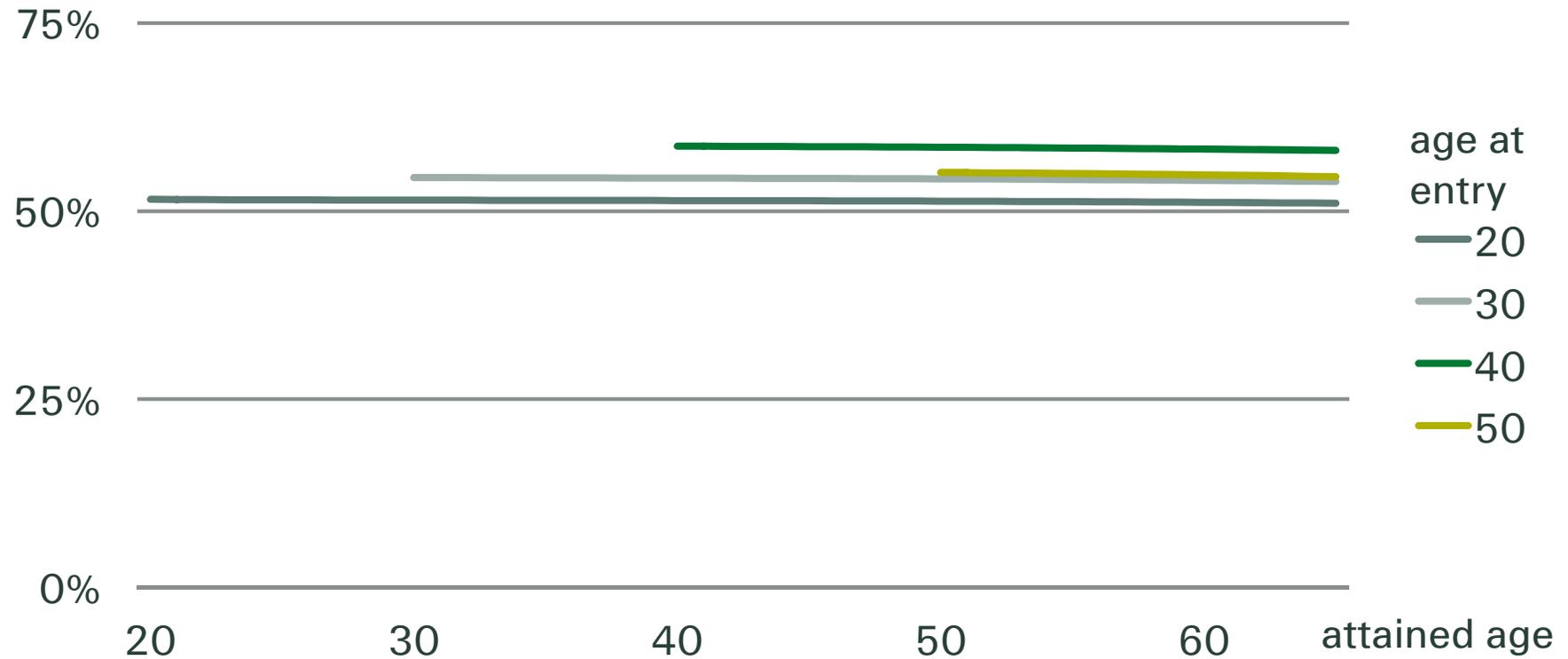
German best estimate mortality and lapse experience

Projection of male ratio, term life

German best estimate mortality and lapse experience
with 1%pt-increase for females
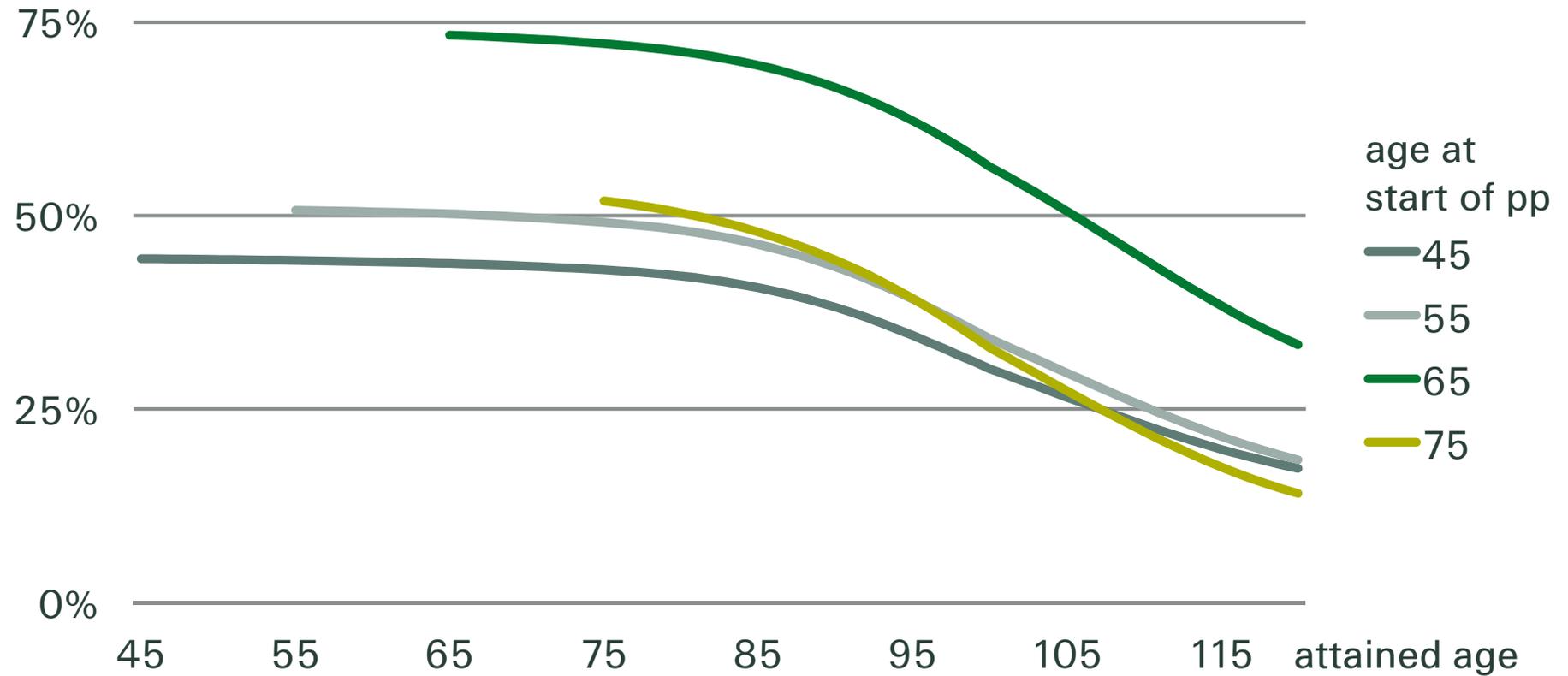
Projection of male ratio, annuity

German best estimate mortality and lapse experience accumulation period

Projection of male ratio, annuity

German best estimate mortality
payout period

age at
start of pp
45
55
65
75

attained age

Lump sum option

Conventional annuities / German pool data
percentage of policyholders exercising the lump sum option

Example scenarios: changes of behaviour regarding lump sum option

Initial business in force 10.000 deferred policies, male ratio 60%
currently: transition to annuity payment period: 20% of insured lives

males:	6.000*20% = 1.200	
females:	4.000*20% = 800	

male ratio of annuitants: 60%

scenario1:
10% of the males currently accepting annuity payments now opt for lump sum settlement
10% of the females currently deciding on lump sum settlement now go for annuity payments

males:	1.200 − 120 = 1.080
females:	800 + 3.200*10% = 800 + 320 = 1.120

male ratio of annuitants: 49%

scenario 2: **-20% males, +20% females:** male ratio of annuitants: 40%

scenario 3: **-50% males, +50% females:** male ratio of annuitants: 20%

Where does this leave us?

- Subject more complex than it first appears

- Multitude of factors have an impact on the gender mix

- There isn't one solution for <u>all</u> companies.

- Static modelling not sufficient

  ⇨ projection

- Strong recommendation:

  – implement a monitoring process for gender mix

  – closely monitor lapse rates, they can exert considerable influence on all products

- How many tables can be implemented?

Future product opportunities

- Sell more cost neutral benefits, e.g. joint life policies

- Make products more cost neutral, e.g. differentiate benefits in ways which compensate the lower risk gender

- Sell more to the lower risk group to reduce aggregate price

  - marketing messages directed more (or exclusively) at lower risk gender

  - direct marketing to existing insured lives of one gender only

  - additionally reward your agents based on male/female ratio

- Male/Female products

- Alternative segmentation, e.g. full preferred, or better use of known risk factors (occupation, smoking, education, income, etc)

- Alternative risk selection, e.g. predictive underwriting

What attributes should differentiating factors possess?

- No discrimination

- Easily and reliably captured in the application form

- Consistent over time

- Large number of people to meet the criterion

- High differential in the actuarial basis

- Good data

- Awareness of the interdependencies with other criteria (preferably no correlation)

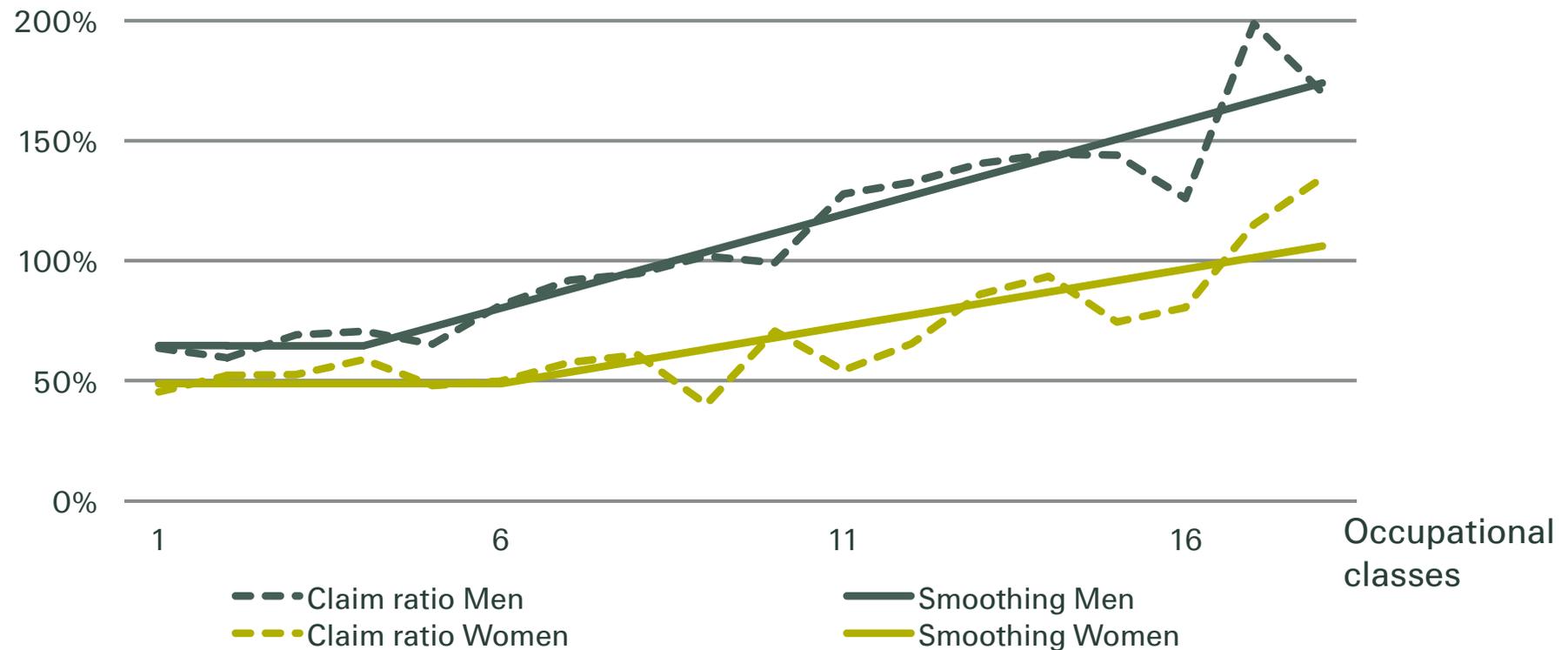Not all criteria will always be met simultaneously.

Smoker/non-smoker

Smoker extra mortality / Germany
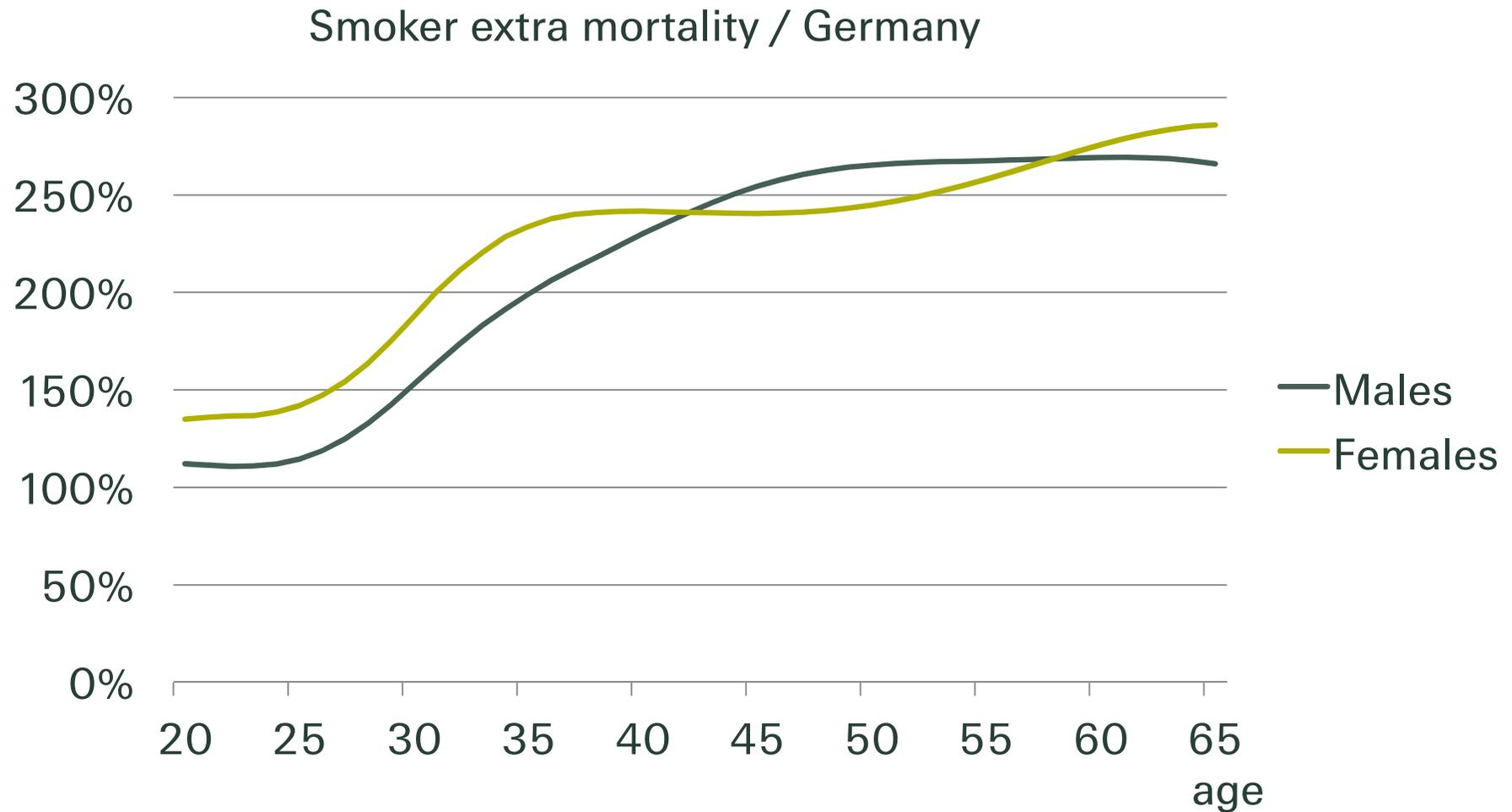
Source: German insurance table DAV 2008 T

Differentiation by occupational groups

Mortality level based on Swiss Re pool data for disability products

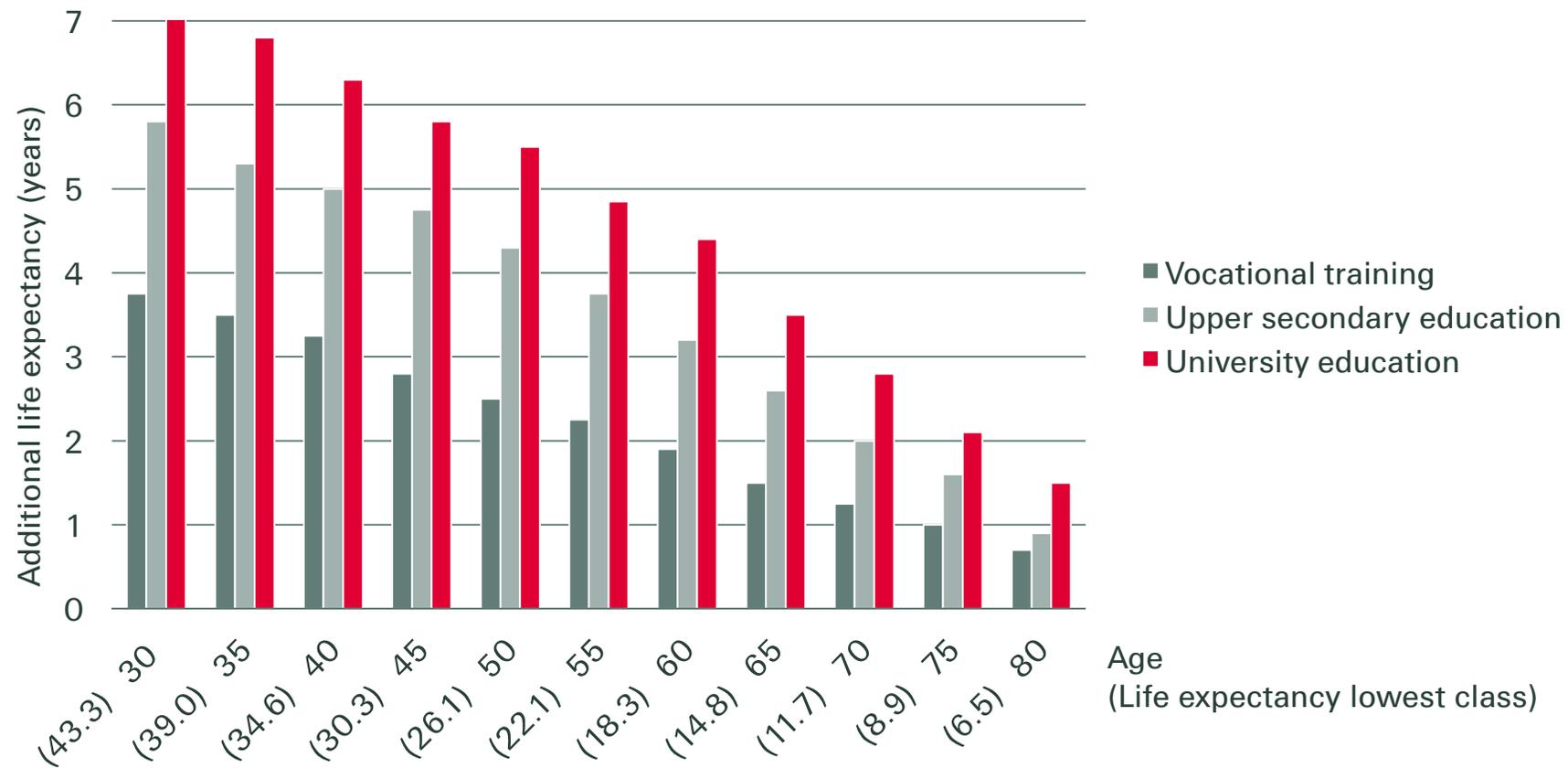

Occupation exerts considerable influence on mortality – not currently reflected in underwriting or price
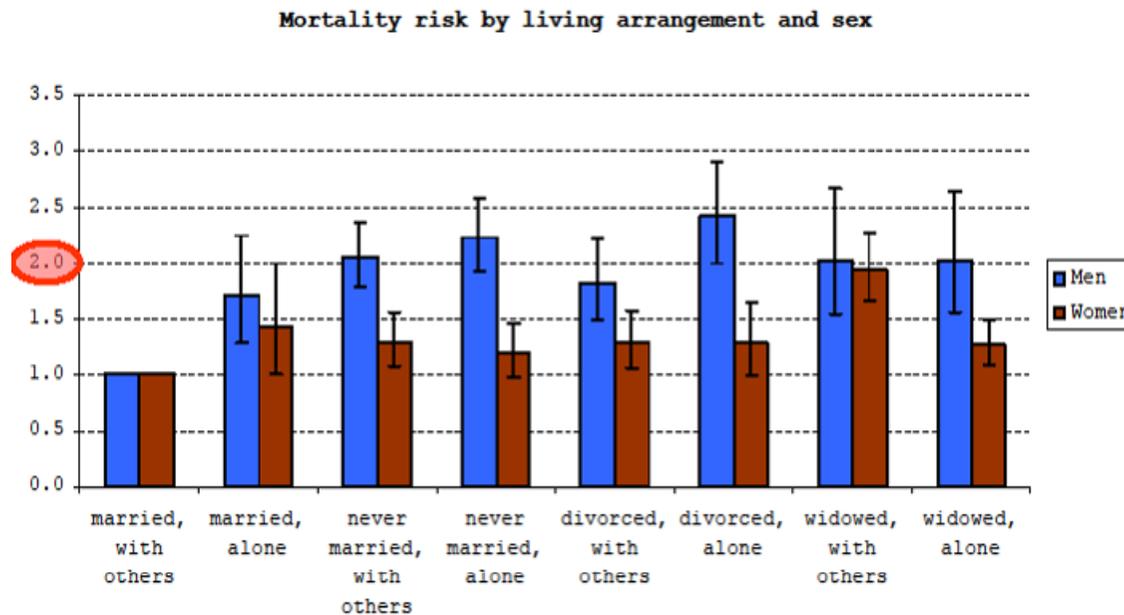
Differentiation by education

Life expectancy by education for Swiss Male: difference in years between lowest (compulsory schooling) and three higher categories
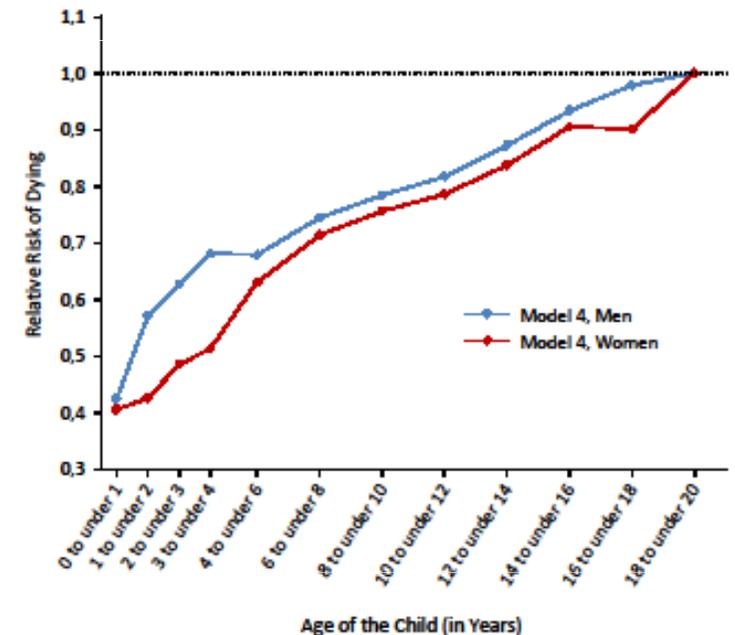
Source: Swiss Med Wkly 2006; 136: 145-148

Excess mortality according to family status

Longitudinal Studies Center - Scotland

Mortality risk by living arrangement and sex

Max Planck Institut Rostock

Use this knowledge in designing new products / product riders, e.g. free children's accident cover when you buy term assurance - the cost will be more than covered by the better mortality of the parent (especially if sell joint life)

Summary

- The ECJ ruling represents a real loss for the industry and its customers

- Expect a volatile period for pricing, there may not be a "right" answer

- We have a great opportunity to think afresh how we assess risks and design products
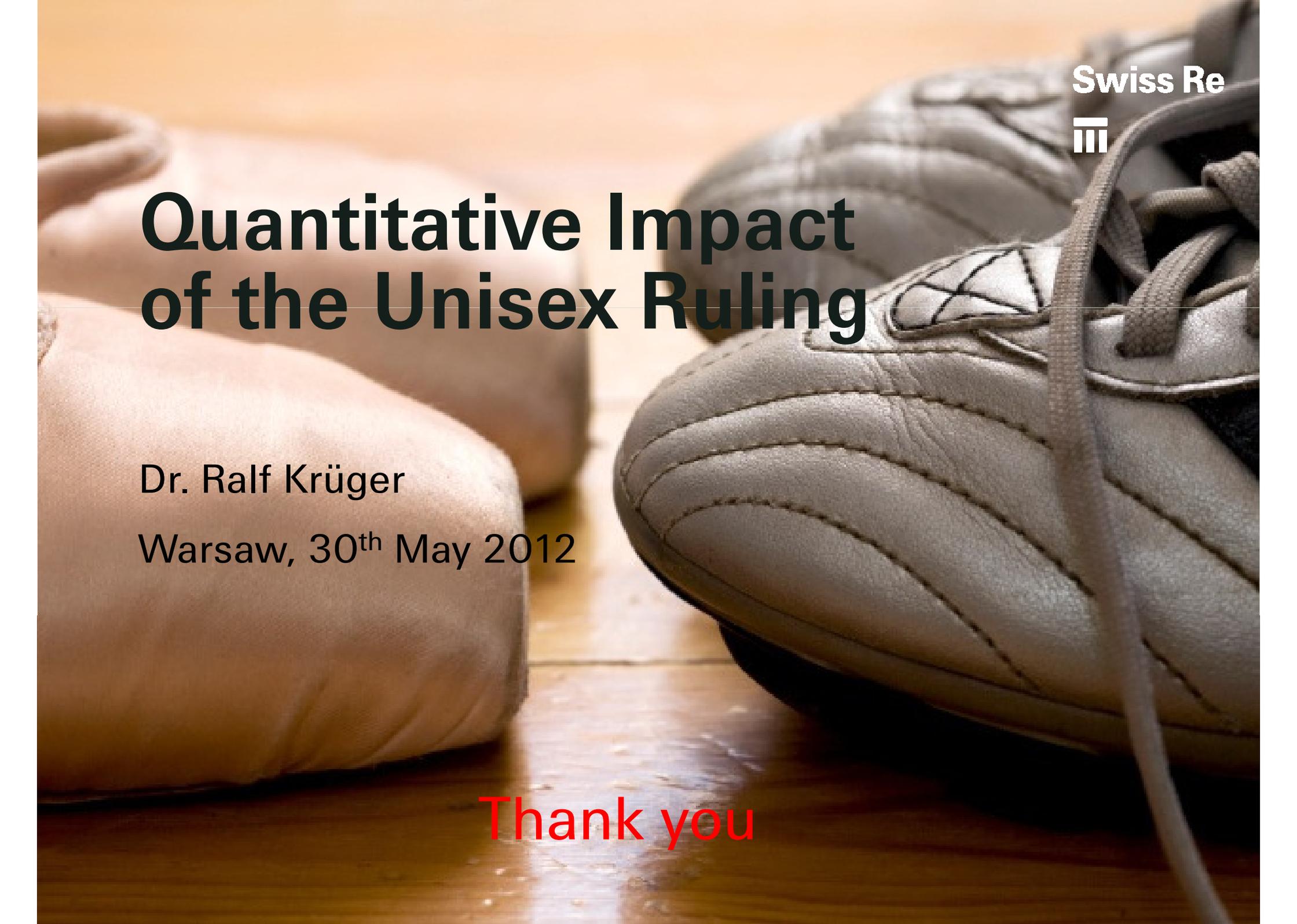
Swiss Re

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Warsaw, 30th May 2012

Thank you

Legal framework

Legal Framework

Directive 2004/113/EC of 13 December 2004

- Article 5(1): Member States shall ensure that in all new contracts concluded after 21 December 2007 at the latest, **the use of sex as a factor in the calculation of premiums and benefits** for the purposes of insurance and related financial services **shall not result in differences** in individuals' premiums and benefits.

- Article 5(2): Notwithstanding paragraph 1, Member States may decide before 21 December 2007 to permit proportionate differences in individuals' premiums and benefits where the use of sex is a determining factor in the assessment of risk based on relevant and accurate actuarial and statistical data.

European Court of Justice judgement 1 March 2011

"**Article 5(2)** of Council Directive 2004/113/EC of 13 December 2004 implementing the principle of equal treatment between men and women in the access to and supply of goods and services **is invalid with effect from 21 December 2012**."

Guidelines of the European Commission (22 December 2011)

- Ruling only affects contracts issued after 21 December 2012; contracts issued before this date remain unaffected
  - ☞ depending on national legislation

- Gender can be used as a variable for the calculation of actuarial reserves and for internal pricing to ensure the sustainability of the aggregate rate.
  - ☞ depending on national legislation

- Reinsurance rates can be calculated with gender specific actuarial assumptions if the rate offered to the consumer is independent of gender.

- Gender specific marketing and advertising is permitted.
  - ☞ no one must be refused access to a certain product purely because of their gender.

Guidelines of the European Commission (22 December 2011)

- Risk assessment of individual risks can still reflect the different risk factors (e.g. state of health or family history). The physiological differences between gender can be used in the process of individual risk assessment.

- Products or options tailored to facts concerning men or women exclusively are possible.

- Risk factors which might have a gender specific component are still possible as long as they are genuine and independent risk factors.

- Company pension schemes formally not affected by the decision
  ☞ but a lot of specific issues will presumably be affected by unisex all the same