

# Insurance without sex

## Actuarial Challenge

## Trends and chances for the Product World

EU Gender Directive,  
Warsaw 30 May 2012,  
Jens Sonnenschein,  
Actuary DAV  
Head of Northern Eastern Europe/Middle East  
Departmental Director

# Welcome to the unisex world

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1	Introduction – General thoughts
2	Actuarial challenges
3	Business implications / Consequences / Opportunities
4	Pricing based on other risk factors
5	Monitoring und Reserving
6	Reinsurance
7	Conclusion

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## Need of risk based pricing

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Economic efficiency can be lost if insurers do not differentiate between different groups of individuals with different risk levels. If insurance companies offer a unisex rate they risk

- ❑ Adverse selection
  - Deter low-risk group from buying
  - Attract more high-risk individuals
- ❑ Moral hazard
  - Change of risk behaviour of the clients

Figure 2.1 A ban on the use of gender



Source: Oxera.

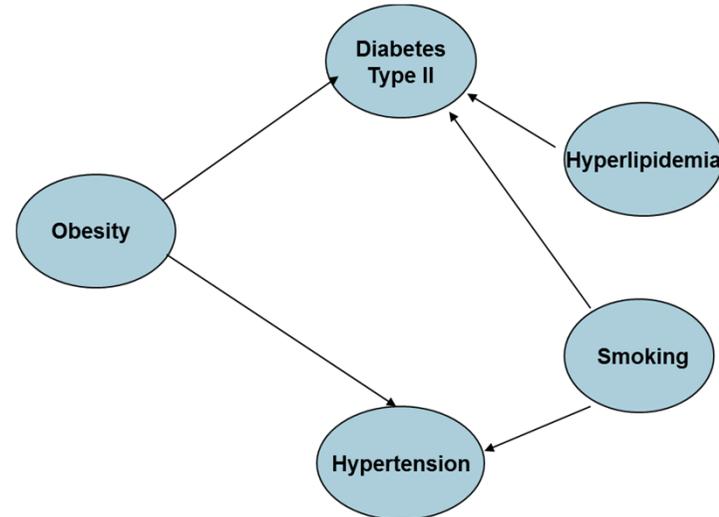
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Source: Oxera study

## Is gender a risk factor?

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- ❑ There are studies which include gender
  - Cloister study by Dr. Marc Luy
  - The impact of health behaviours and health lifestyles on sex differentials in mortality by Luy, M. und P. Di Giulio
  
- ❑ Another study concentrates on risk factors without taking too much emphasis on gender
  - Procam study by the Assman foundation



## Is gender a risk factor?

### *The cloister study („Klosterstudie“)*



- ❑ „Klosterstudie“
- ❑ Author: Dr. Marc Luy
- ❑ Comparison of life expectancy (LE) of convent and general population
- ❑ Elimination of socio-economic and behavioural differences
- ❑ Almost identical way of life of nuns and monks
- ❑ Basis: 11.980 order members, from which 6.199 are nuns and 5.781 monks
- ❑ In later examinations observation of the cause of death
- ❑ Extension of the study in 2012

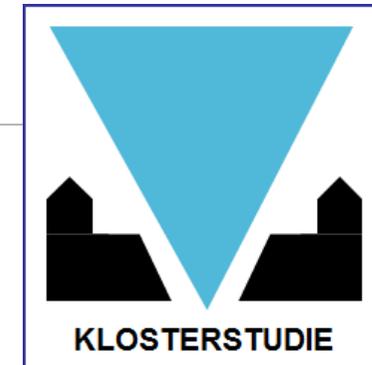
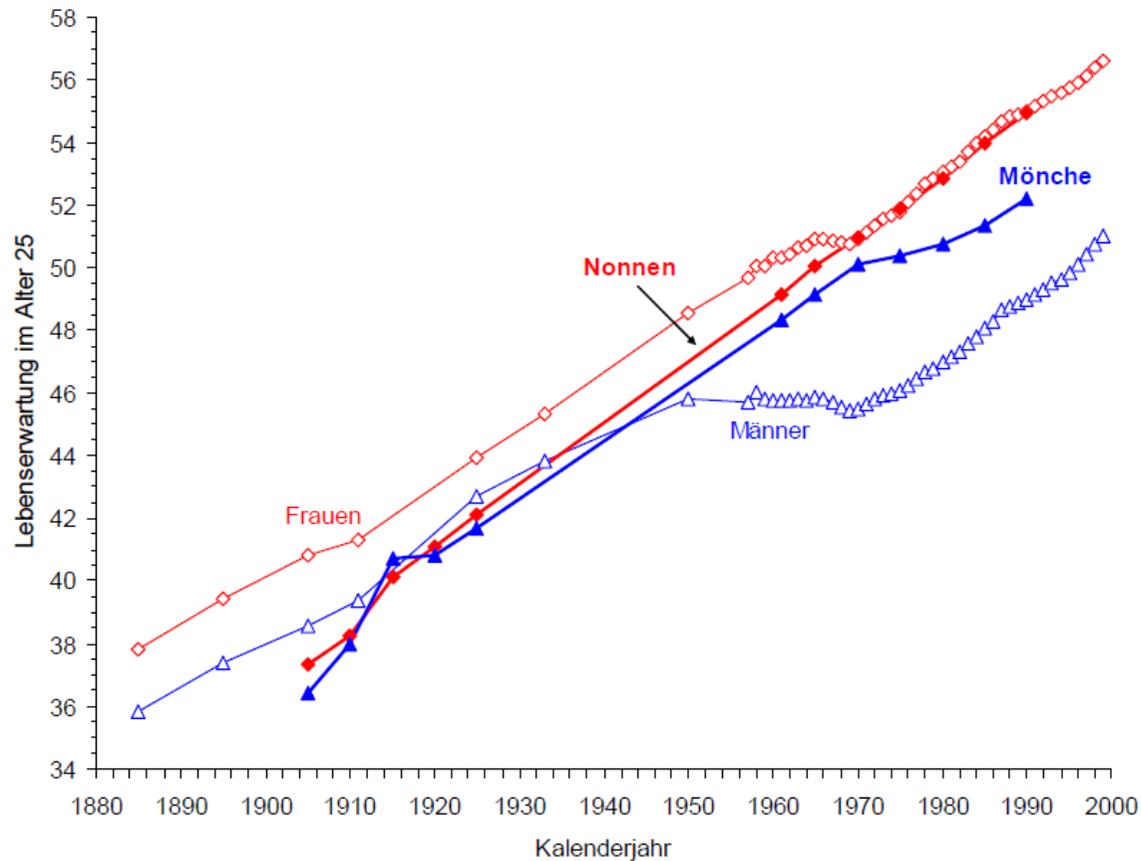
#### Results:

- ❑ LE of women and nuns nearly equal
- ❑ Difference in the LE only one year (in favor of the nuns), in the general population approx. 6 years
- ❑ Increase of the LE of monks and nuns corresponds with the increase of women, men stay behind
- ❑ Since 1970 more tolerant nicotine consumption of monks enlarges the difference of the convent population in recent years

#### Conclusions:

- ❑ Changes of the LE-difference within the general population as men stay behind
- ❑ Biological factors for different LE not detectable

## Is gender a risk factor?



*Image 1: Life expectancy at age 25 for German women and men as well as for nuns and monks, represented in the middle year of the evaluation periods*

## Does the move to unisex force to act?

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### *4 basic options for action*

1. **Change of the existing tariff to unisex**
2. **Introduction of new rating factors**
3. **Immunization strategy**
4. **Extension of benefits**

# Does the move to unisex force to act?

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## *Basic options for action*

### 1. Change of the existing tariff to unisex

- Keep existing tariff system while abandoning the gender criterion
- Derive new calculation bases
  
- Pros:
  - Small effort
  - Future gender mix is relatively easy to assess (Attention: market movements)
- Cons:
  - Probably missing the opportunity to innovate
  - If the market continues to differentiate further: risk of adverse selection
- Recommendable option:
  - In a less differentiated market environment
  - With low price sensitivity
  
- Example:
  - Disability rider with low annuity amounts

# Does the move to unisex force to act?

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## *Basic options for action*

### 2. Introduction of new rating factors

- ❑ Idea: “Omitting a rating factor requires the introduction of new rating factors”
- ❑ Ideally, these replace the criterion gender.
- ❑ Pros:
  - Innovation
  - Mean of better targeting
  - Lower safety margins necessary for unknown gender mix
- ❑ Cons:
  - Risk of indirect discrimination
  - Focusing on a customer group at the expense of other customers
  - Cost of introducing and monitoring new rating factors
  - Change of factors within lifetime
  
- ❑ Recommendable option:
  - If the market pressure is high
  - In case of existing differentiation
  
- ❑ Example:
  - Term life

## Does the move to unisex force to act?

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### *Basic options for action*

#### 2. Introduction of new rating factors

*Luy, M. und P. Di Giulio:*  
The impact of health behaviours and health lifestyles  
on sex differentials in mortality

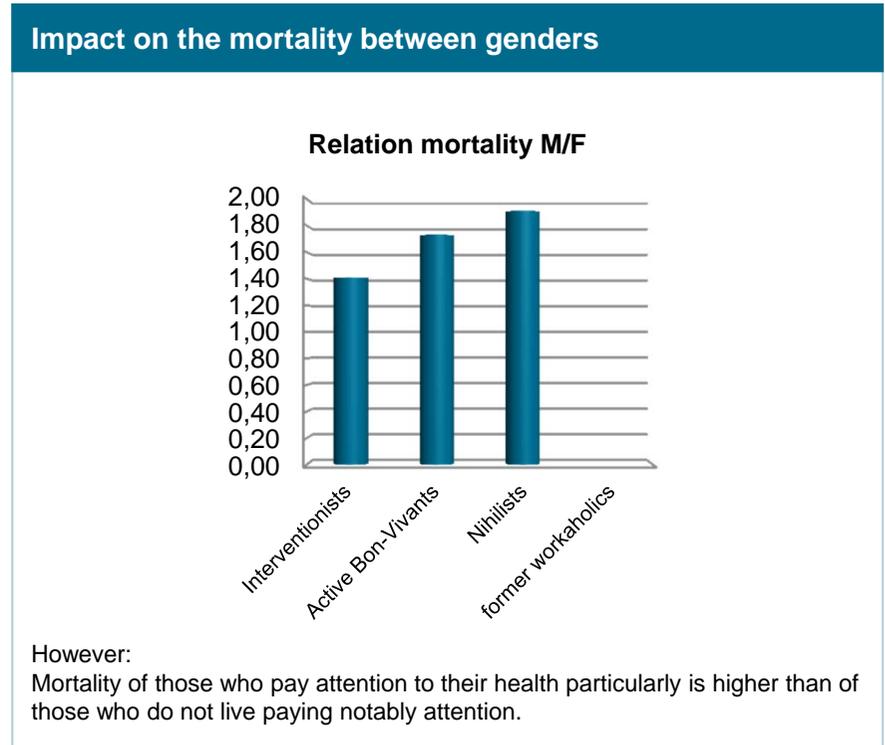
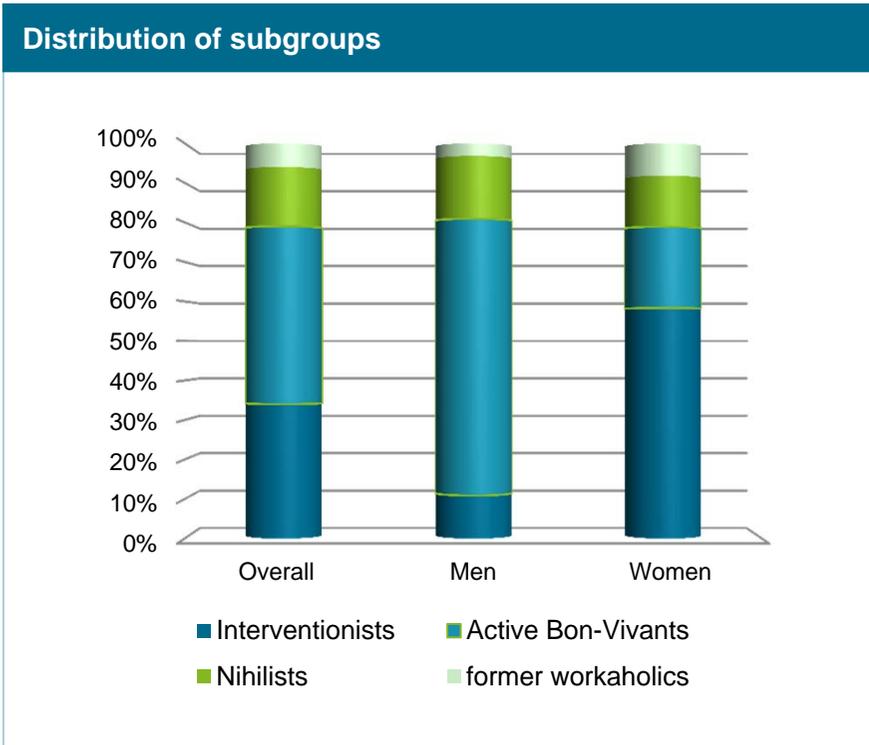
- ❑ Question: is there a possibility to define groups of risk without explicitly using gender as a risk factor?
- ❑ Idea: based on several items, e.g. smoking habits, body-mass-index, health and working habits, but as well performance, competitiveness, lack of time,... four lifestyle groups were generated
- ❑ Investigation: influence of health habits, lifestyles and living arrangements on the difference in life expectancy
- ❑ Data: age groups of 55-80, n=1,353
- ❑ The 4 groups:
  - Active bon-vivants
  - Interventionists
  - Nihilists
  - Former workaholics

# Does the move to unisex force to act?

## Basic options for action

### 2. Introduction of new rating factors

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# Does the move to unisex force to act?

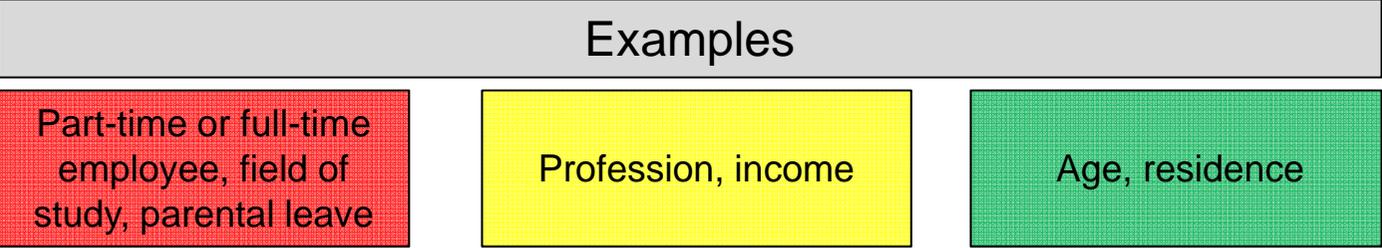
## Basic options for action

### 2. Introduction of new rating factors

#### Challenge: indirect discrimination

- ❑ The concept of indirect discrimination covers given facts that are present not exclusively but mainly and typically, respectively, at this one group of people.
- ❑ Objective justification shall be verified, i.e. there should be an actual risk factor
- ❑ Shall not circumvent the male/female differentiation

**Gender Directive 2004/113/EC**  
Indirect discrimination shall be taken to occur where an apparently neutral provision, criterion or practice would put persons at a particular disadvantage compared with other persons on any of the grounds referred to under Section 1, unless that provision, criterion or practice is objectively justified by a legitimate aim and the means of achieving that aim are appropriate and necessary.



## Does the move to unisex force to act?

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### *Basic options for action*

#### 3. Immunization strategy

- ❑ Bundling or reducing the benefits in a way that the impact of gender on calculation bases is reduced.
  
- ❑ Pros:
  - Lower safety margins necessary for unknown gender mix
- ❑ Cons:
  - Additional benefits are often expensive
  - The final product must be attractive to the customer
  
- ❑ Recommendable option:
  - Always, if possible and marketable
  
- ❑ Example:
  - Endowment or unit linked with reduced death benefit
  - Death benefit in long term care insurance
  - Term plus disability rider
  - Joint life

## Does the move to unisex force to act?

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### *Basic options for action*

#### 4. Extension of benefits

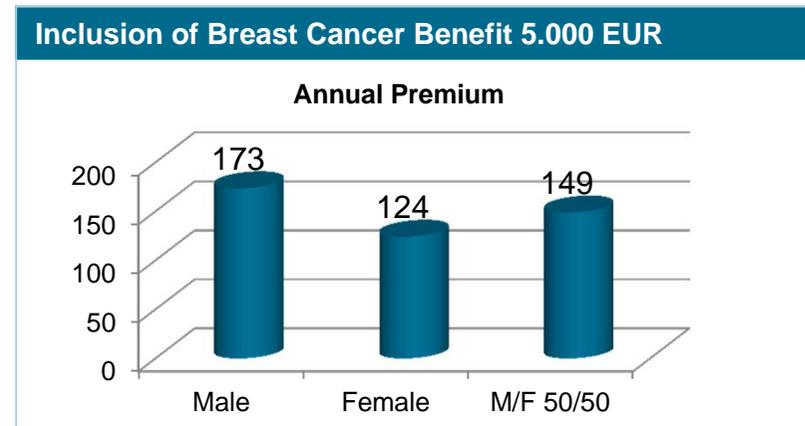
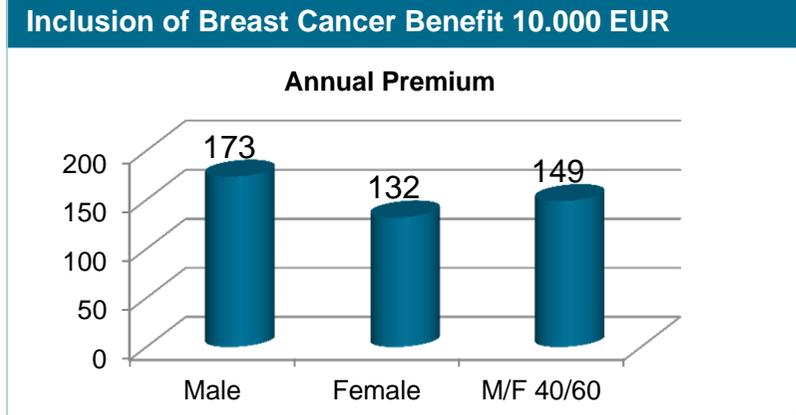
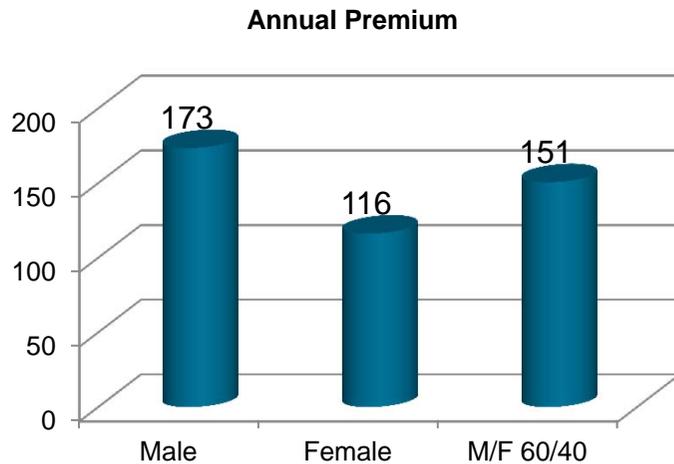
- ❑ Extension of benefits for the “cheaper” gender to control or stabilize the gender mix.
- ❑ Ideally, the additional benefits are as expensive as the savings of the better gender mix or the low safety margin
  
- ❑ Pros:
  - Low safety margins necessary for unknown ender mix
- ❑ Cons:
  - Cost of additional benefits
  - The final product must be attractive to the customer
  
- ❑ Recommendable option:
  - Always, if possible and marketable
  
- ❑ Example:
  - Low breast cancer benefit within term life.

# Does the move to unisex force to act?

## Basic options for action

### Example for extension of benefits

- ❑ Term life assurance with a sum insured of 100.000 EUR
- ❑ German mortality table, net non-smoker 2<sup>nd</sup> order premiums
- ❑ Age-Duration 35/25



If extra benefit leads to better M/F-split in portfolio, it may come at no extra cost!

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## Actuarial challenges

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1. Managing the gender mix
2. Could the switch to unisex be achieved at no cost?
3. Pricing impact term life

## Managing the gender mix with policy duration

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- ❑ Reviewable policies enable the insurer to make pricing adjustments if the experience is worse than expected
- ❑ Insurers may also consider offering shorter term products with renewability options
- ❑ However:
  - Consumers often prefer guarantees
  - Premium hikes increase the risk of anti-selective lapsing

## Gender mix

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- ❑ Proportion of each gender has to be considered
  - Term life: in the E.U. generally 60% to 80% of the insured amounts are purchased by males
  - Annuities: around 50% bought by females
- ❑ Term life: expected premium increase for females higher than the potential decrease for males
- ❑ Men (ages 65) expect a reduction in annuities at around 5%
- ❑ Women (aged 40) see an increase in life insurance premiums by 30%
- ❑ Young women (aged 20) might see an increase in motor insurance premiums by 11%

Source: Oxera study on gender use in insurance

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## Could the switch to unisex be achieved at no cost?

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- ❑ Direct compliance costs (one-off): re-pricing, systems, marketing, distribution...
- ❑ Additional risk margin (mid-term lasting): uncertainty on new gender mix, more economic capital
- ❑ Adverse selection: even increased proportion of high-risk individuals via lapses and renouncing to buy (e.g. opt for lump sum payments instead of annuity benefits, investing in assets rather than pension)
- ❑ Competition distortions by insurers, focusing on niches to attract the preferred genders

## Additional costs and impacts on consumers

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### □ Direct costs

- One-off compliance costs
- System changes
- Re-pricing
- Reprinting of documents
- Marketing
- Distribution

### □ Portfolio mix effect

- Pricing risk
- Unintended adverse consequences
- Uncertainty of gender mix as a new element of risk
- Additional economic capital

## Pricing impact term life

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- ❑ Post Dec 2012 a female policy must be more profitable than a male at given rate
- ❑ But ... do you (or can you) compete to attract more female business?
  - Supply & demand theory suggest it is difficult!
    - E.g. Co A successful in attracting females – Co B left with unattractive males
    - Co B must surely mimic Co A to survive? Unless its female strategy is hard to copy?
  - Fixed costs...
    - Female lives are only about 40% of the total current market – danger of half empty u/w shop?

## What are the short term pricing implications?

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- ❑ Pre-2012 pricing
  - Gender directive will lead to changes in behaviour, e.g. lower lapses going forward for female term lives = cheaper prices already now?
  
- ❑ Post-2012 pricing
  - The time to think about impact of gender directive on your pricing tools is fast approaching.
  - Obviously key to consider maths of moving to gender neutral rates competitively, but also if/how market dynamics will change.
  - Key areas to think about are joint life, business mix and ratings.
  - IT development time might be needed, so need to act now

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## Business implications / Consequences / Opportunities

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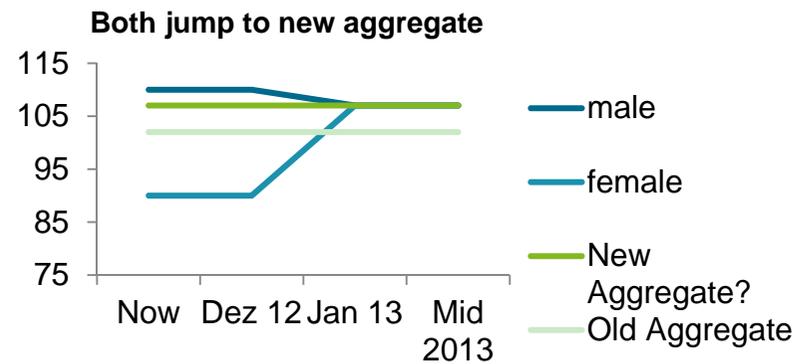
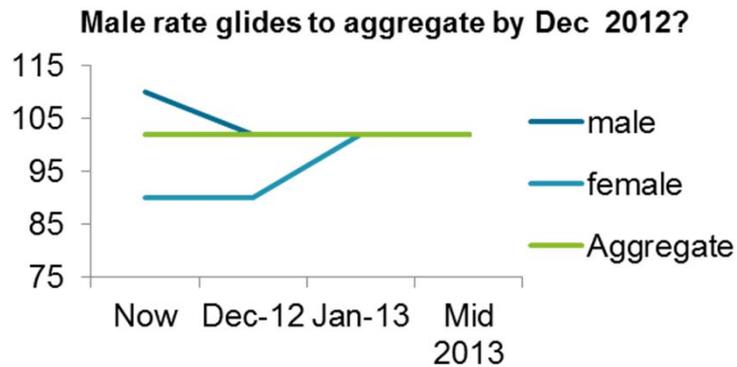
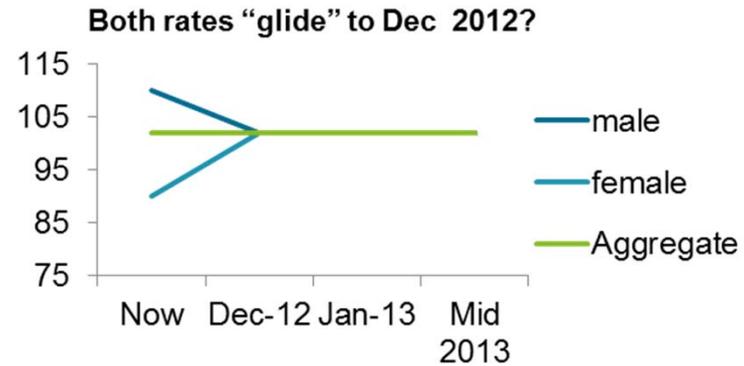
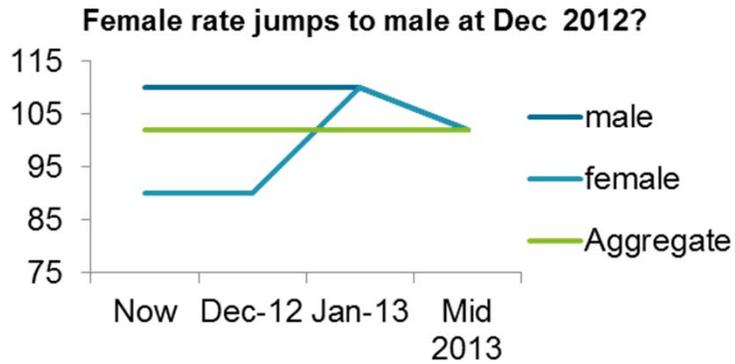
1. Challenges on selected markets
2. Business implications
  - Various scenarios
  - Persistency
  - Short term
  - Long term
3. Commercial opportunities

## Challenges on selected markets

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- ❑ United Kingdom
  - Life and C.I. market sensitive markets
  - Alternative risk factors considered
  - Fast re-pricing possible
  - Open market option for annuities
- ❑ Germany
  - Term life low price sensitivity and profit participation
  - In which universe shall long term annuities be annuitized?
- ❑ France
  - Credit life and LTC are already essentially unisex
  - Term life mostly capitalization and with high profit participation
  - Mainly an issue for health and annuities
- ❑ Poland
  - Term life
  - Price increases are an issue in view of economic situation and reputational risk

# Business implications – various scenarios



## Business implications – persistency

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- ❑ Active persistency strategy
  - How to manage lapse and re-entry risk
  - Also anti-selective lapses
  - Persistency strategies
    - Greater focus on female lives
    - Approach for own book (protect from churn elsewhere)
  
- ❑ Commission structure
  - Earnings period lengthened for business written now?
  - Differential earnings period by gender?
  
- ❑ Differentiate commission by gender? Is this allowed?
  - Males policies pay less, females more
    - Encourage brokers to place more female and less male business

## What are the short term implications?

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### ❑ Pipeline

- With up to 3 month delays (and over) getting medical evidence as well as changes in documentation to let policyholders know what will happen if does not complete in time
- Approach to this at your company needs to be agreed sooner than later and importantly communicated to your distributors.

### ❑ Helping your distributors

- Really important to communicate changes to your distributors so that they can provide best advice and get their clients on risk with minimum hassle.
- As well as helping with pipeline management, need to provide help on likely price impacts.
  - Unlikely to distort current protection advice process as generally lives need to go on risk ASAP (and generally prices will go up)

## What are the long term implications (the world in 2013 and beyond)?

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- ❑ Product design / marketing
  - In protection world feels like there is limited scope for differentiated products (e.g. pink / blue product).
  - Limited appetite for differentiated products out there.
  - No sustainable early mover benefit
  - On marketing front, may see some more female friendly targeting, but expect this to be in more alternative / niche distributions (if at all).
  
- ❑ Indirect discrimination / alternative rating factors
  - Be careful, but this is possible and could help a company differentiate itself.

## Findings of Oxera study

**Table 4.1** Redistribution effects for the monthly pension from a pension annuity

Country	Gender-based		Unisex	% change in pension	
	Men	Women		Men	Women
Germany	867	783	825	-5	+5
Netherlands	1,144	990	1,067	-7	+8
<b>Average</b>	<b>913</b>	<b>818</b>	<b>866</b>	<b>-5</b>	<b>+6</b>

Note: Average of countries calculated using country population weights.  
Source: See Appendix.

**Table 4.2** Redistribution effects for life insurance premiums

Country	Gender-based		Unisex	% change in premiums	
	Men	Women		Men	Women
Spain	30.8	19.3	26.8	-13	+39
Germany	30.1	20.7	26.8	-11	+30
Netherlands	23.8	20.9	22.8	-4	+9
Czech Republic	44.5	23.0	37.0	-17	+61
Poland	37.1	23.0	32.1	-13	+40
<b>Average</b>	<b>31.9</b>	<b>20.9</b>	<b>28.0</b>	<b>-12</b>	<b>+34</b>

Note: Differences in policies mean that values should not be compared across countries. All figures are in euros, with assumed exchange rates versus the euro of 25 for the Czech koruna and 4.4 for the Polish zloty. The overall average of countries is calculated using country population weights.  
Source: See Appendix.

## Commercial opportunities

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### *2012 gives us a commercial opportunity to sell more protection!*

- ❑ Prices are likely going up, any other industry would take advantage.
- ❑ Challenge is how to get the message out there.
  - Will individual companies take up the mantle?
  - Help your distributors get more informed about the opportunity and support them through it.
  - If selling through website, ensure this gets on the marketing program.
    - E.g. bancassurers can have this message pop-up when person logs on their internet banking
  - Direct marketing campaigns
- ❑ Concern that prices do not actually go up and potential bad publicity.
  - Keep prices the same and say you would 'pay the difference for us'?

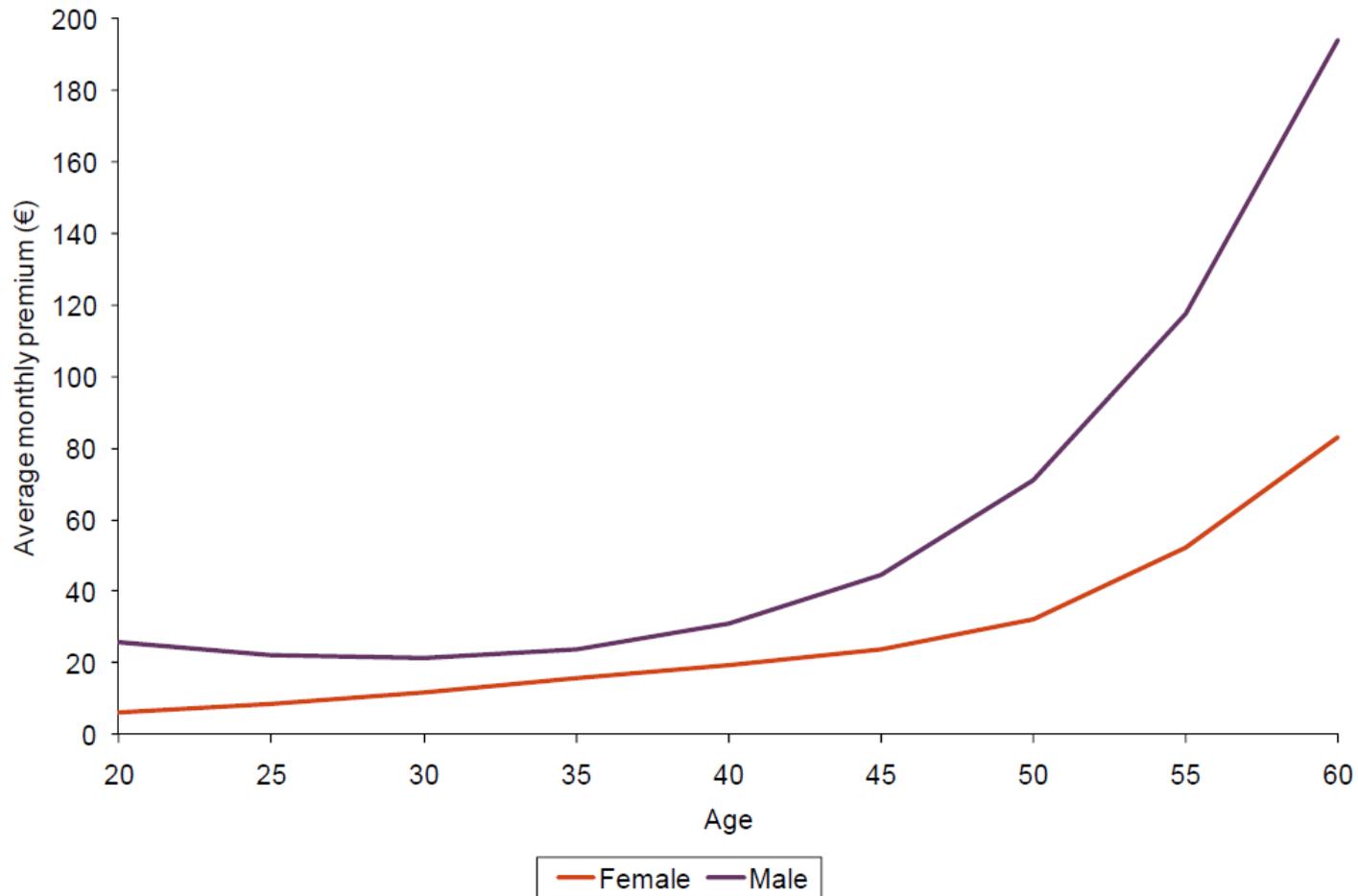
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## Example of term life pricing: Spain

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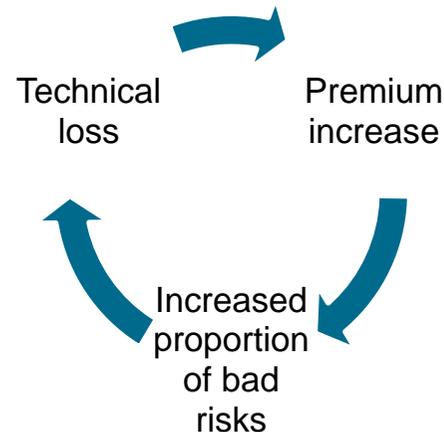
10 years term life insurance monthly premium according to the age at underwriting

Source: Oxera study on gender use in insurance, from price comparison website <http://www.rastreator.com>

## Adverse selection

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- ❑ If gender cannot be used for pricing, the low-risk and high-risk individuals are charged an average premium. Thus, premium rise for the low-risk and fall for the high-risk. This leads to adverse selection which has the following consequences:
  - Low-risk individuals pay a higher price than their risk suggests and subsidize the high-risks.
  - This cross subsidy may deter the low-risks to adhere as they perceive the cover as too expensive for their risk
  - As they leave, the average risk increased and forces the insurer to increase premium
  - More low-risks leave, and prices rise further...



- ❑ A problem on markets where individuals can decide not to buy the product (or to buy it elsewhere)
- ❑ Most insurers will likely wait until the last minute to change to the unisex world

## Differentiation criteria

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### *New preferred lives tariffs based on*

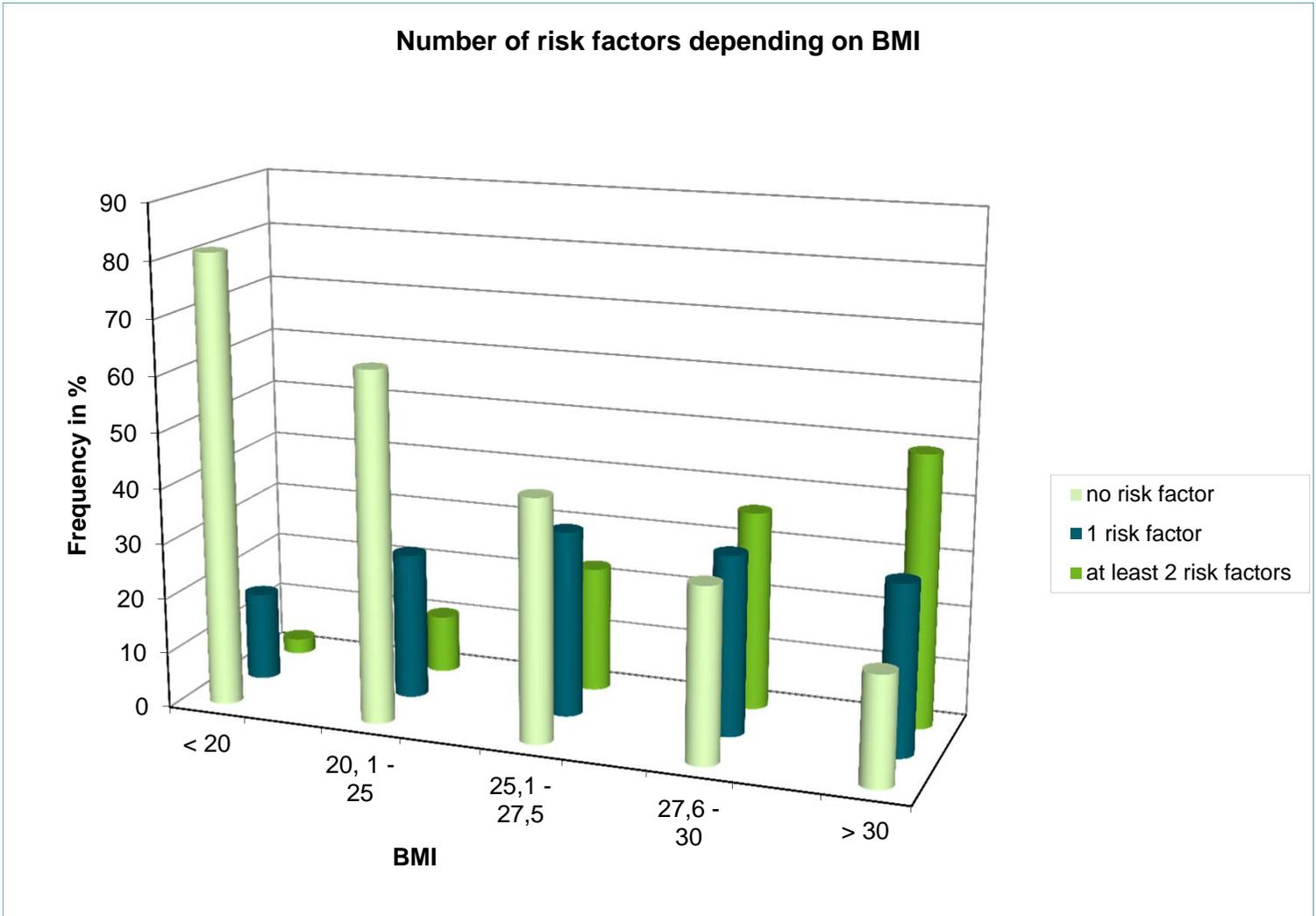
#### **Medical criteria**

- Smoker / non-smoker
- Blood pressure, cholesterol, diabetes, ...
- BMI (partly or with surcharge)

#### **Socioeconomic and lifestyle**

- Marital status
- Number of children
- Occupation or education
- Real estate property
- Residence

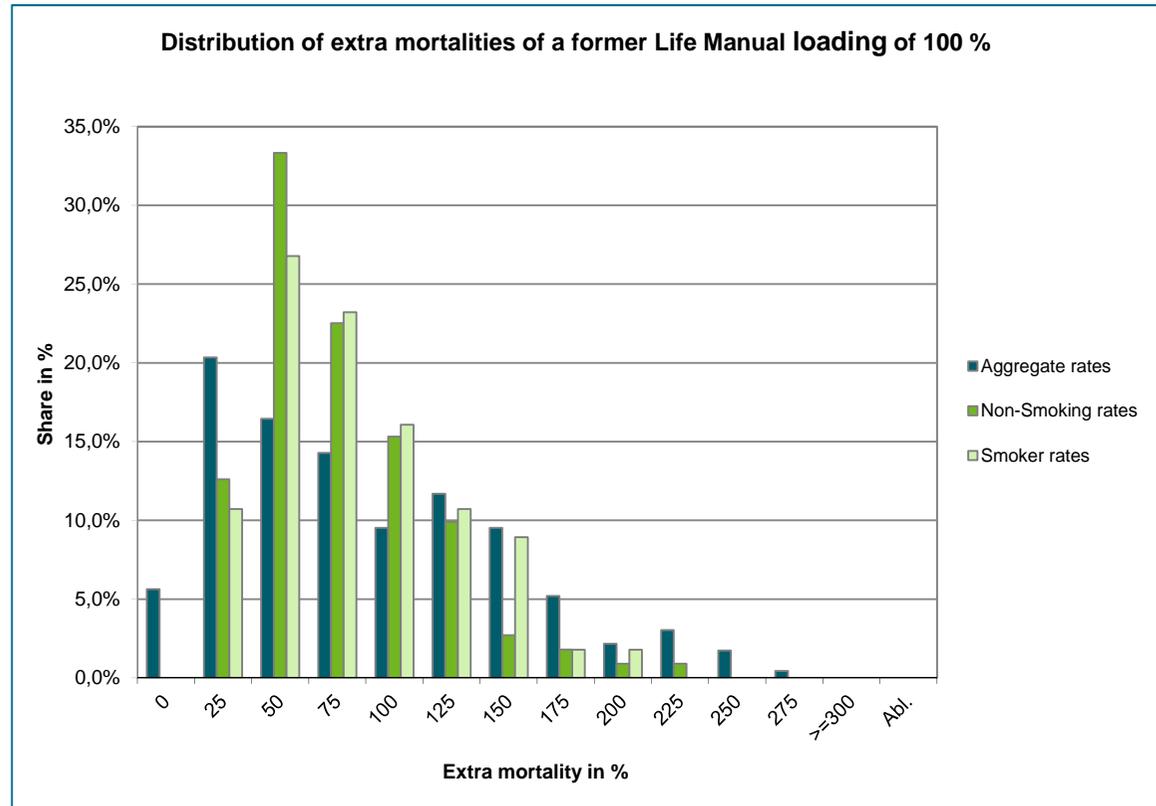
# Interactions between risk factors (PROCAM)



## New distribution of extra-mortalities

### Example: former Life Manual loading of 100%

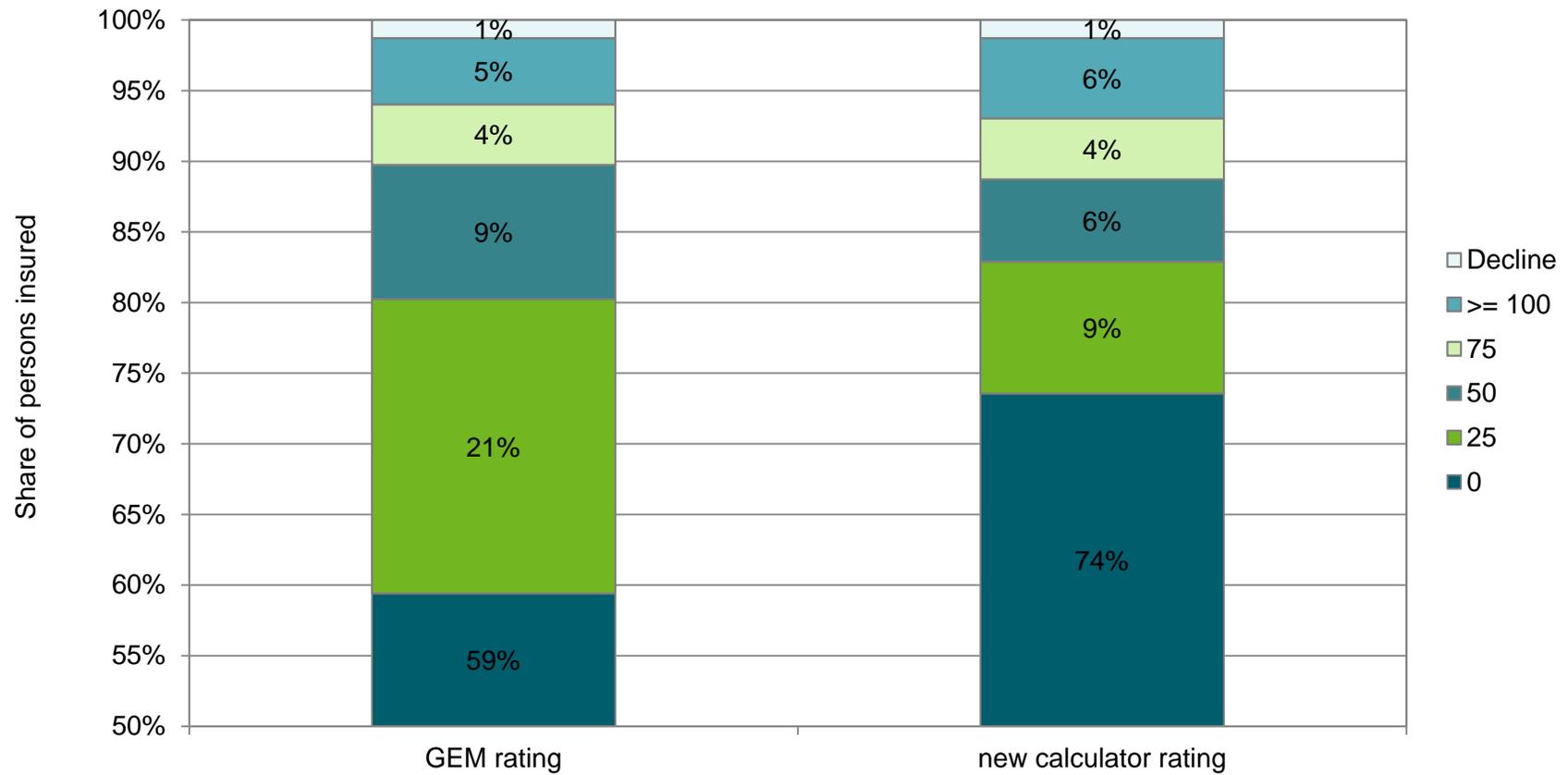
- ❑ Basis: exemplary new business
- ❑ Aggregate and Smoker/non-smoker
- ❑ Identify participants with former Life Manual loading of 100%
- ❑ Calculate loadings based on new calculator



# Impact on new business

## Distribution of loadings – number of policies

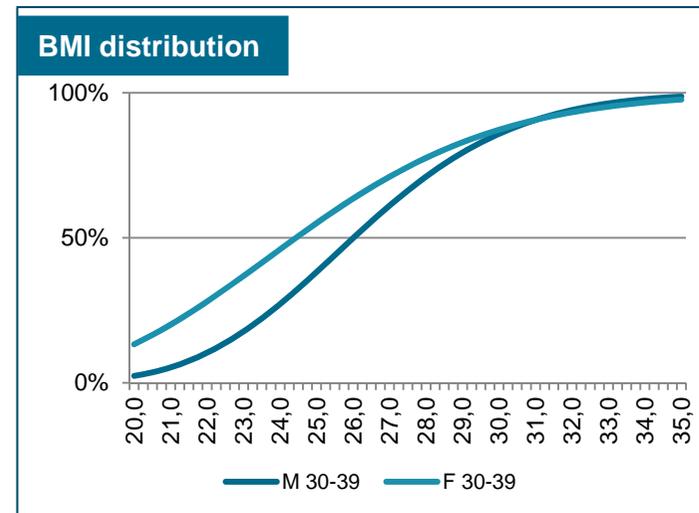
Distribution of extra mortalities - New business (aggregate rates)



## BMI as a rating factor

### Pros and Cons:

- BMI-distribution advantage to females
- Stable in our analyses
- Different limits for different ages?
- Risk of non-disclosure
- Do not overestimate the influence

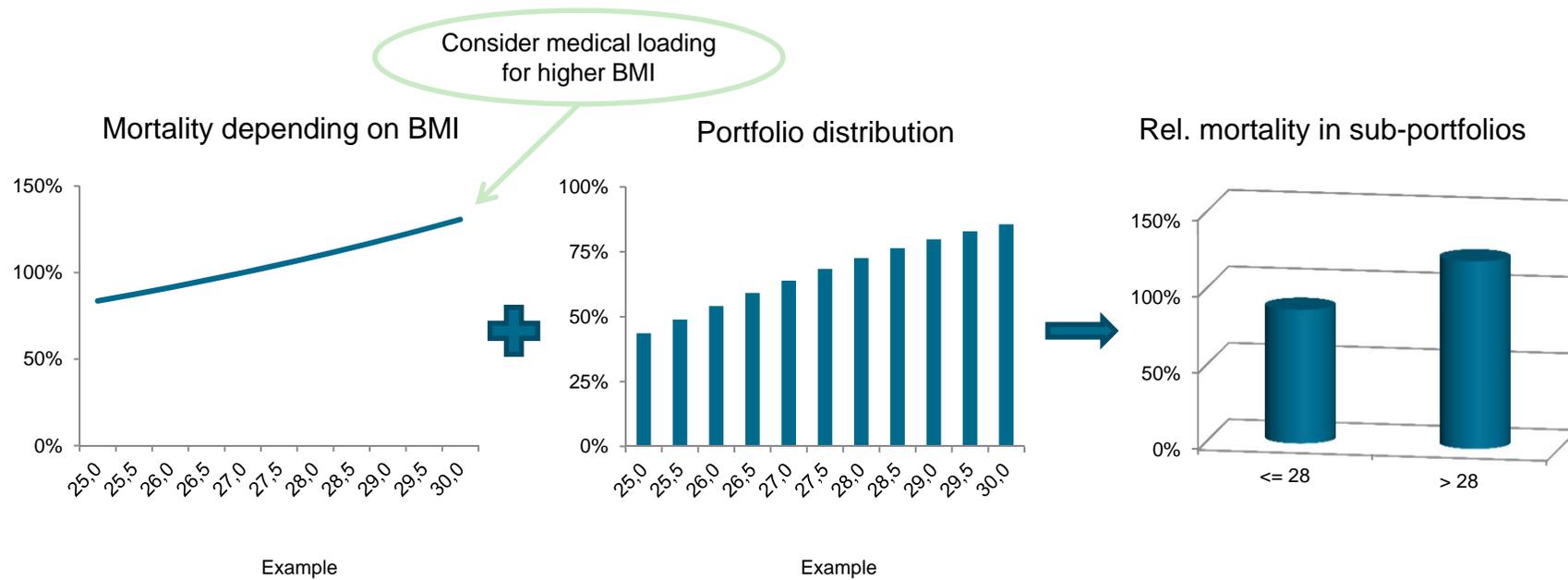


### Pay attention

- BMI-effects for smokers and non-smokers are different
- BMI-distribution is different for smokers and non-smokers
- When using BMI as a rating factor you have to adjust your medical underwriting

# BMI as a rating factor

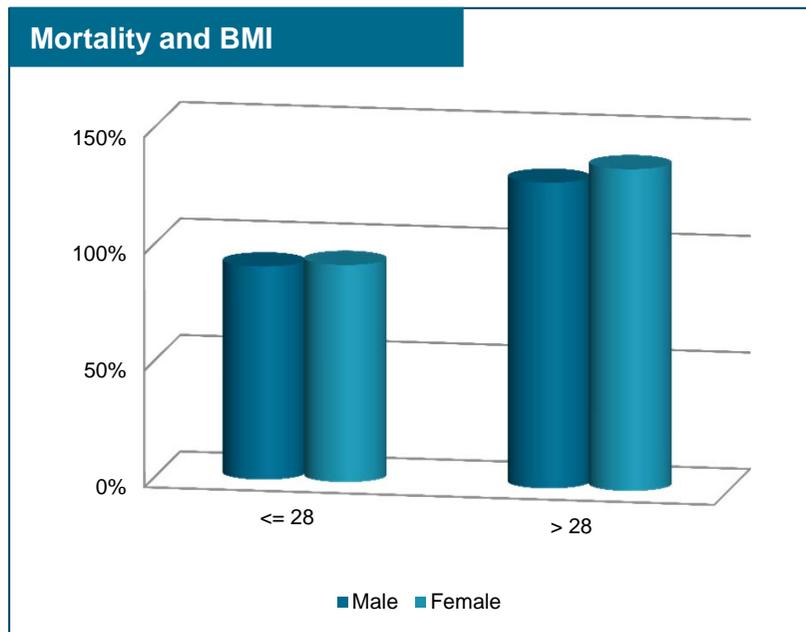
## Approach:



## BMI as a rating factor

### Example:

- ❑ Non-smoker, age at entry 35, BMI  $\leq 28$
- ❑ Starting point is a portfolio with a 50% share of males
- ❑ gender-specific calculation leads to higher resp. lower mortality



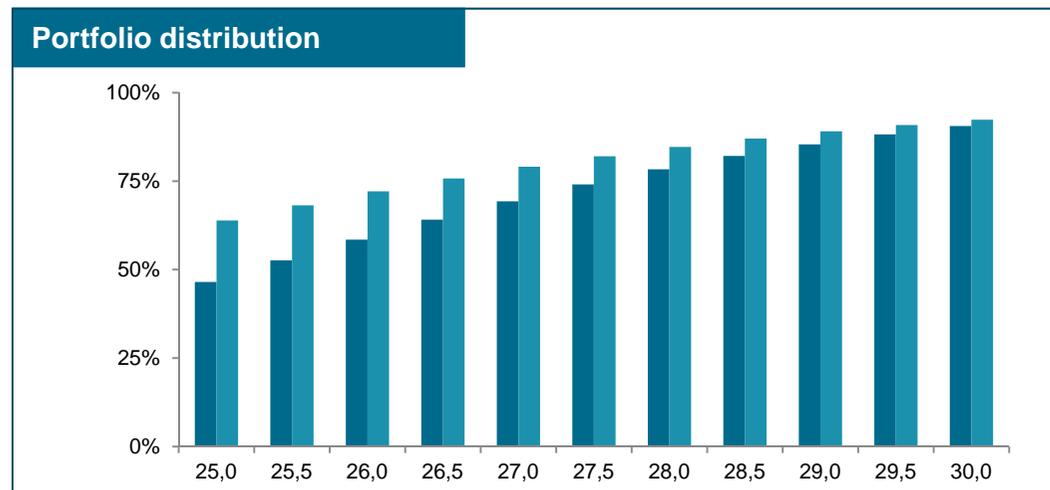
**Price reduction**  
males: 9% for 80% of new business  
females: 7% for 85% of new business

## BMI as a rating factor

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### Example:

- ❑ The unisex calculation induces approx. 9% price reduction
- ❑ Reason: The share of females with BMI  $\leq 28$  is higher as for males:



- BMI-evaluation has an impact on the price, as well as ...
- ... a positive effect on the gender mix

## Marital status as a rating factor

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### Pros und Cons:

- Objective and certifiable
- Young ages
- Durability
- Marketing

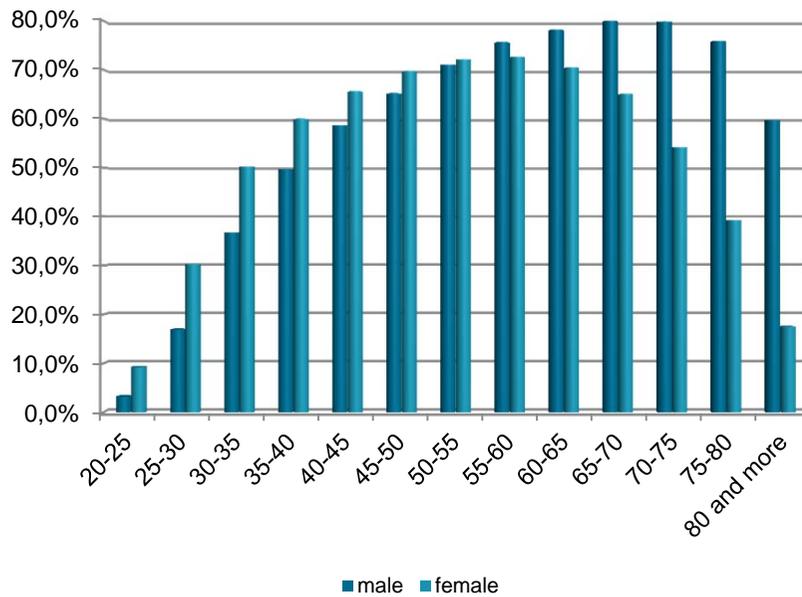
### Attention:

- Change at divorce

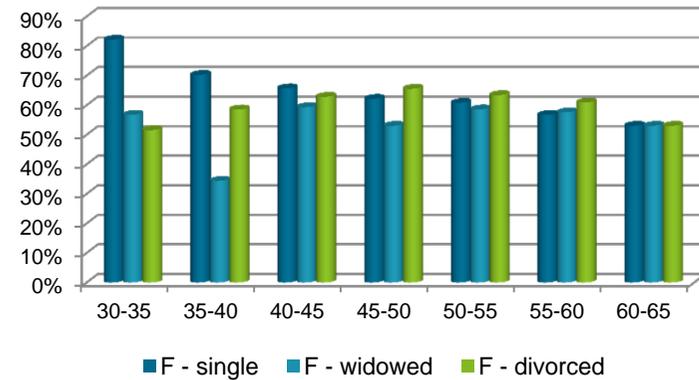
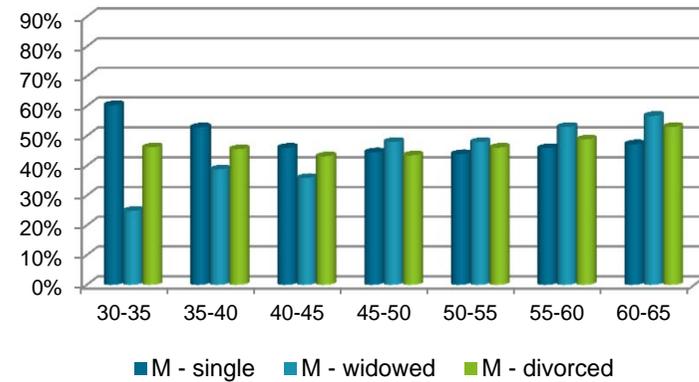
# Marital status as a rating factor

## Mortality is highly dependent on marital status

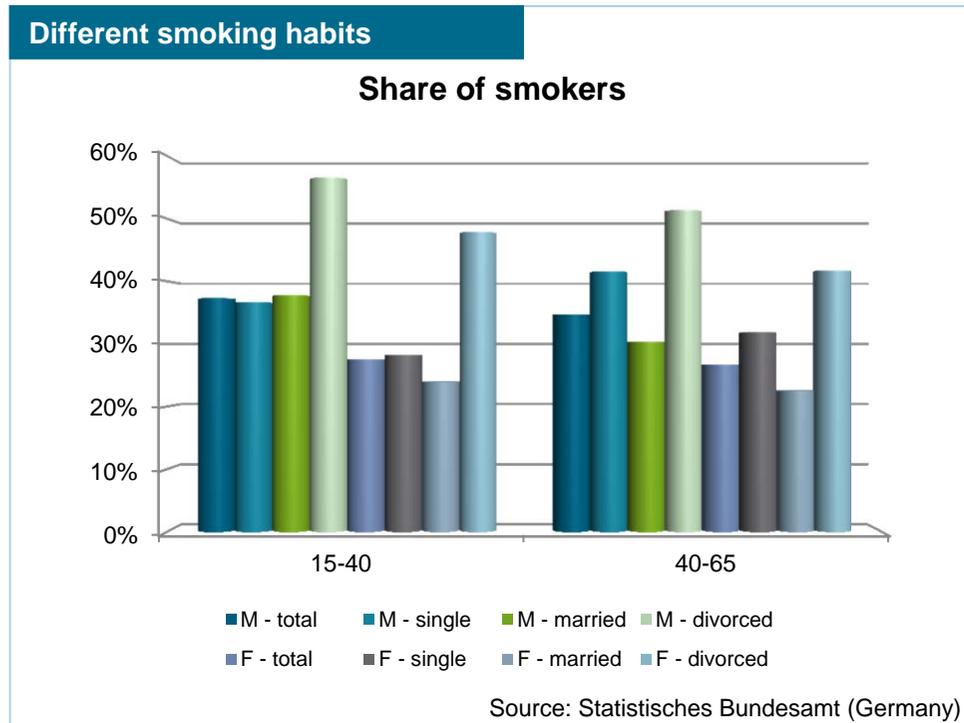
### Distribution of marital status – share of married people



### Mortality of single / widowed / divorced in % of mortality married



## Marital status as a rating factor



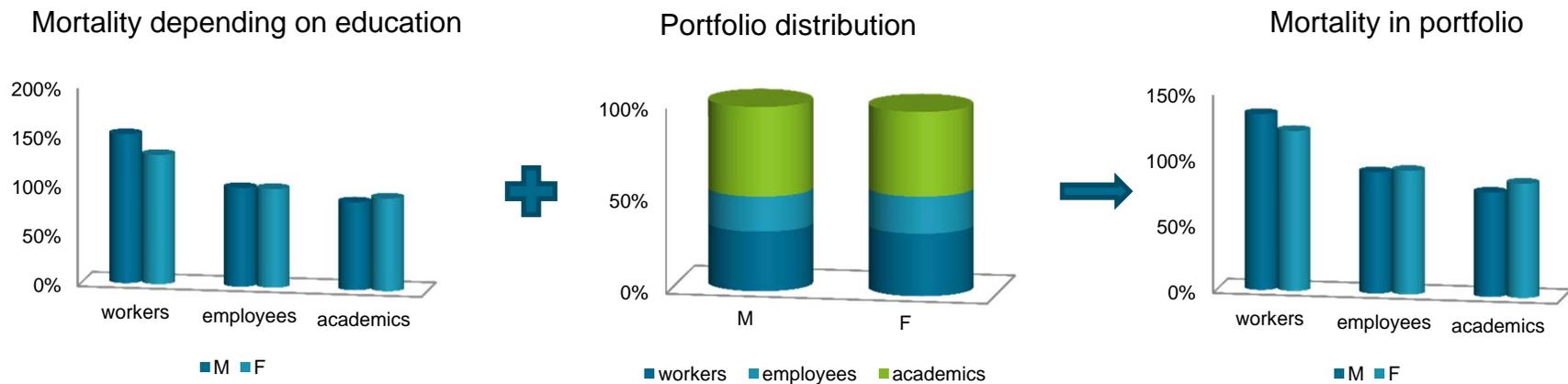
- ☐ Above-average mortality of singles and divorcees is already explained partly by their smoking habits, especially in higher ages
- ☐ In an exemplary unisex portfolio, married people receive a price reduction of up to 10% compared with non-differentiated tariffs

### Marital status

- impacts the price
- stabilizes the gender mix
- causes stronger alignment of male and female mortality

# Education as a rating factor

## Example: non-smoker, workers – employees – academics



- In our model portfolio, education has the highest price influence with approx. 15% reduction for academics (slight reduction employees, increase workers)
- However, this new business has to be monitored due to high sensitivity!
- Due to similar distribution in male or female population, not a particular unisex advantage.

## Other potential optimisation

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### *Possible inclusions of extra benefits*

#### **Child-bonus or childcare waiver of premium**

Especially in connection with  
family bonus

Interesting with regard to unisex

#### **Terminal illness benefit**

Easy to communicate to sales  
force

Less impact on unisex

#### **(Breast) cancer benefit**

Interesting with regard to unisex

#### **Severe Long Term Care benefit**

Interesting with regard to unisex

## Summary

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- ❑ Beside the smoker status there are further differentiation characteristics, which are
  - easy to communicate
  - significant
  - accepted by sales force
  
- ❑ Ideally they have a positive impact on the gender mix
  
- ❑ But also extensions of benefits can have a positive impact on the gender mix

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4	Pricing based on other risk factors
5	Monitoring und Reserving
6	Reinsurance
7	Conclusion

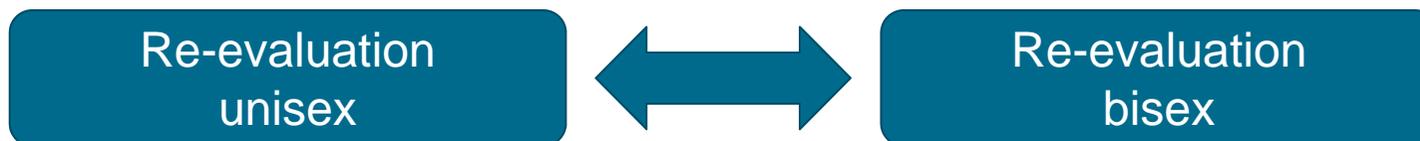
# Monitoring und Reserving

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## Monitoring

- ❑ More frequent checking
- ❑ More frequent re-pricing
- ❑ Special effects in 2012 and 2013
- ❑ Watch full portfolio for shifting activities

## Reserving



## Monitoring und Reserving

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- ❑ Gender can still be asked for and used for reserving purposes
- ❑ If pricing on unisex terms and reserving bi-sex then
  - On an overall level effects cancel out
  - But negative reserves are forbidden in some countries e.g. French GAAP
- ❑ Where however benefits like surrender values are so far linked to reserves, it will be more of a question of practicable feasibility in e.g. the IT systems to administrate to different values on an individual level:
  - gender differentiated reserve
  - unisex surrender value/ basis for profit participation/ etc.
- ❑ In some cases products are already sold unisex by regulation e.g. German Riester Rente where pricing and surrender values are unisex) therefore reserved on the same basis

# Welcome to the unisex world

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1	Introduction – General thoughts
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## Reinsurance

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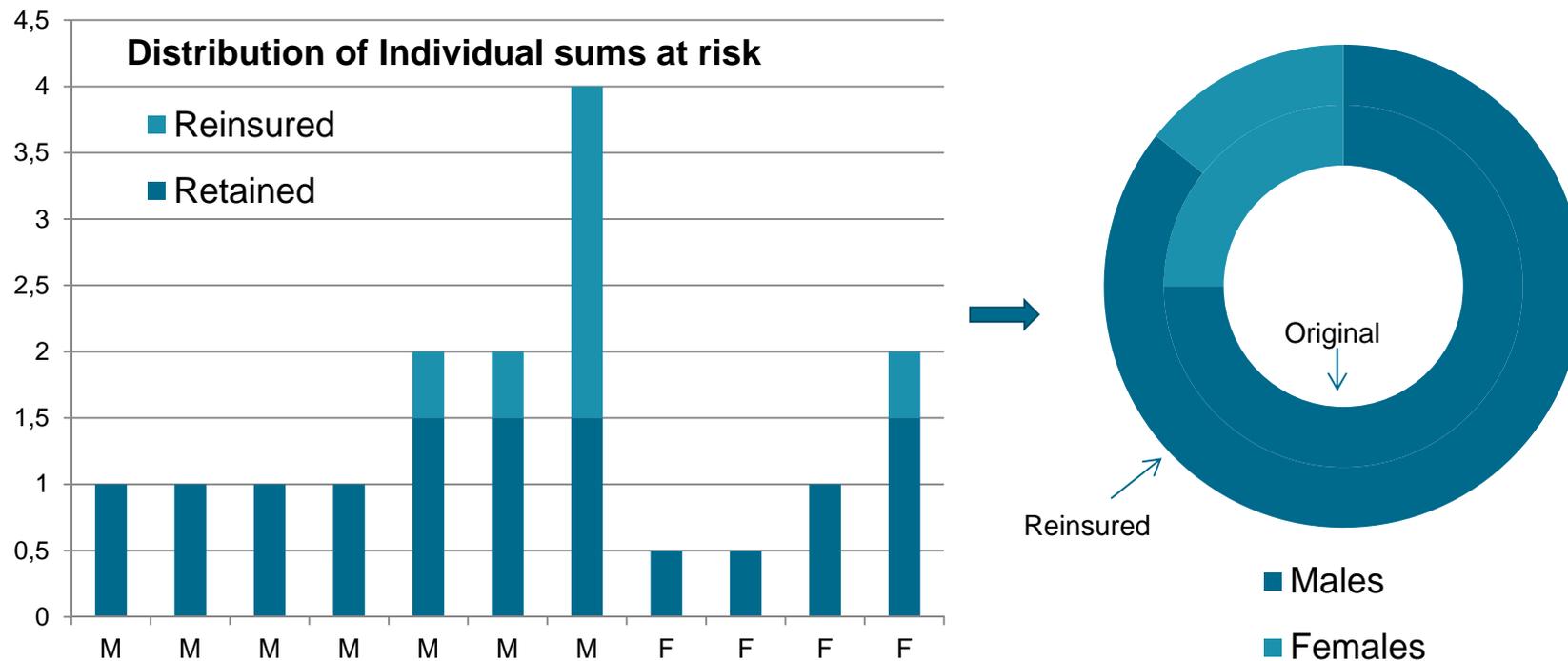
Guidelines on the application of Council Directive 2004/113/EC to insurance, in the light of the judgment of the Court of Justice of the European Union in Case C-236/09 (TestAchats):

“reinsurance contracts are contracts between an insurer and a reinsurer. It remains possible to use gender in the pricing of these products, as long as they do not lead to gender differentiation at individual level”

- ❑ In general, no need to change reinsurance pricing practice
- ❑ New risks for the insurer from uncertainty on current own and market gender mix, and it's future development
- ❑ For each underwriting year, however, this is a systematic short-term and quite stable risk that could be controlled by insurer through influence on distribution channels
- ❑ Specific reinsurance of this new risk will therefore remain exception

## Reinsurance

- ❑ Unisex reinsurance will still become more common where insurers want to align their reinsurance conditions with original terms in Quota Share agreements
- ❑ For Surplus agreements, however, differences in sums insured between men and women lead to differing gender mix in reinsurance, adding to the uncertainty of "net" gender mix



# Welcome to the unisex world

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## Conclusion

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- ❑ Different studies show different effects of gender in respect of mortality and morbidity
- ❑ There are statistically based other risk / rating factors which can be used
- ❑ Introduction of new rating factors depend on market acceptance
- ❑ New tariffs depend on possibility to fast re-price
- ❑ Every challenge can be an opportunity as well
- ❑ Avoid indirect discrimination
- ❑ Try to build flexible tariffs
- ❑ Make sure that the internal processes are ready and streamline
- ❑ Check your IT system

## Disclaimer

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