

# Non-Life Insurance Technical Provisions

Towards the strengthening and modernisation of  
insurance and surety regulation

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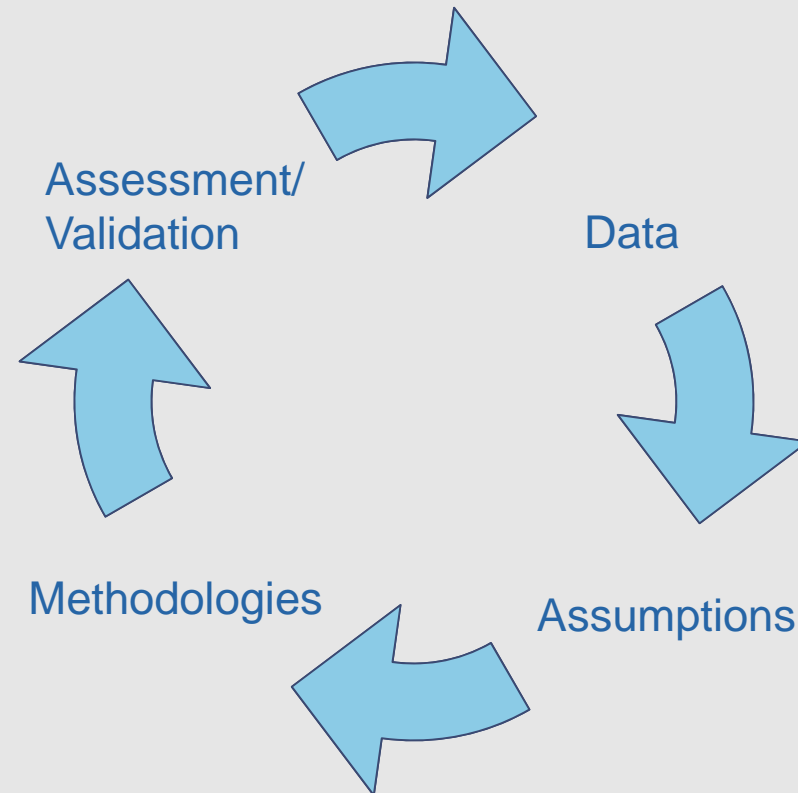
# Non-Life Insurance Technical Provisions

## Content

- Valuation of technical provisions more than a single number
- Specific valuation requirements for non-life insurance
- Calculation methods
- Internal and external data
- Validation and assessment
- Challenges

# Valuation process

Valuation of technical provisions is not just about a number, it is a **process** requiring **expert judgement**



# Valuation process

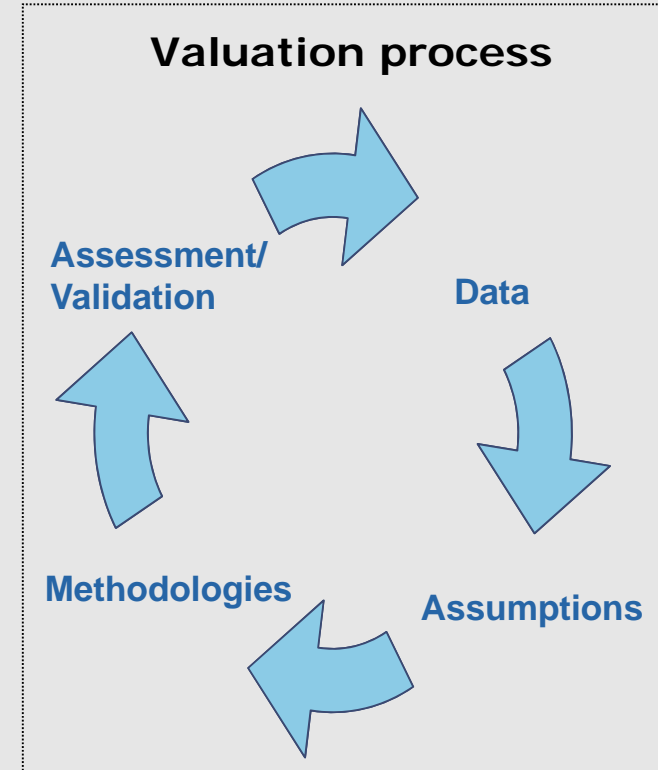
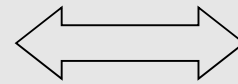
The valuation process has to be consistent with the **regulatory valuation requirements...**

## Valuation requirements

General provisions

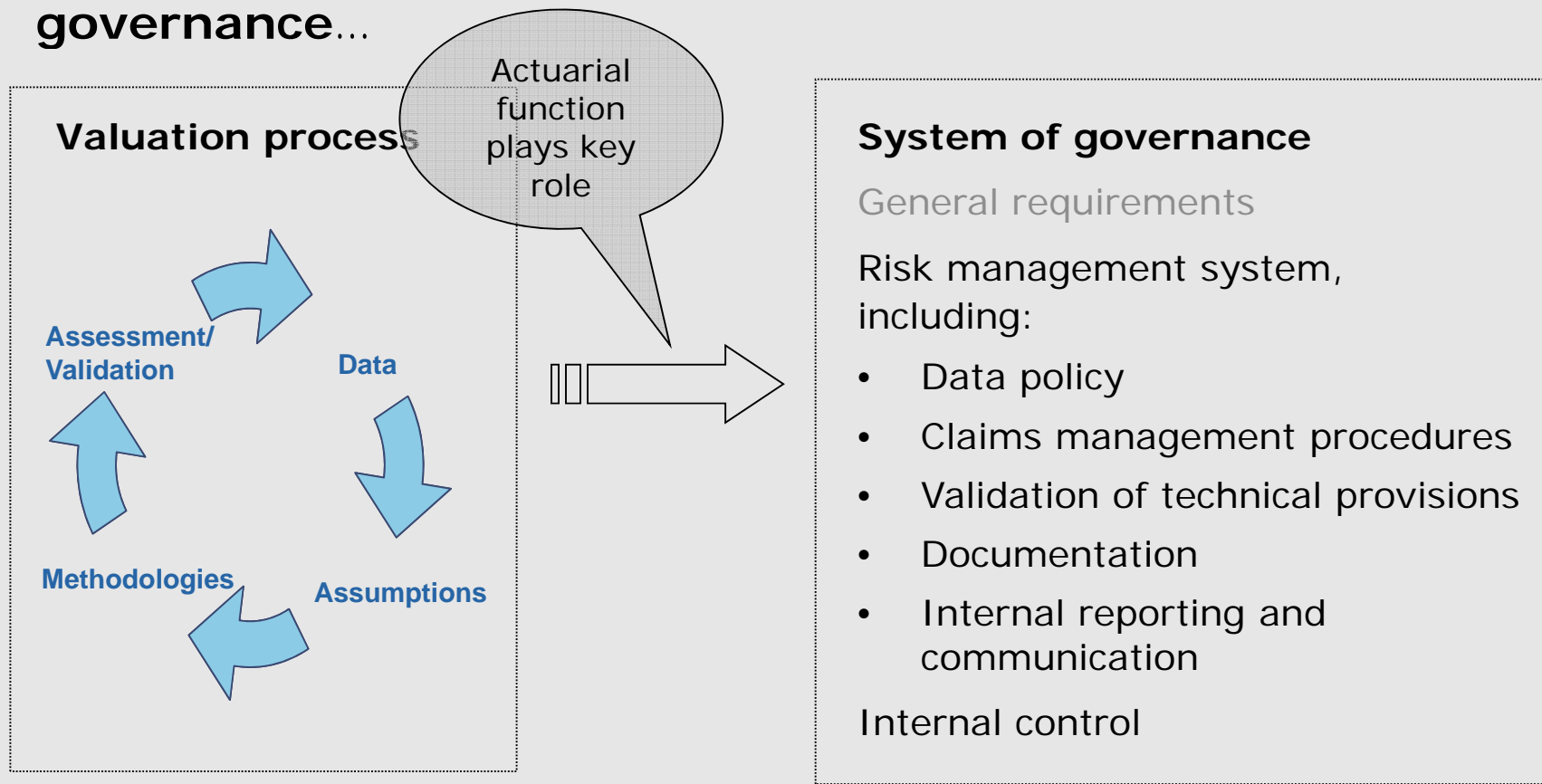
Specific provisions

- Non-Life insurance
  - Segmentation
  - Split in claims and premium provisions
- Life insurance



# Valuation process

And has to be embedded into the undertakings **system of governance**...



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## Specific valuation requirements in non-life

### Split into premium provisions and claims provisions

Best estimate in non-life to be calculated separately for:

- **Premium provisions:** Relate to *future claim events* covered by the *existing contracts*.
- **Outstanding claims provisions:** Relate to claim events that *have already occurred*, regardless of whether the claims arising from these events have been reported or not.
- Calculation of best estimate shall take into account all relevant cash flows relating to these events (benefits, expenses, receivables and premiums)
- Analogous to split into *pre-claims liability* and *claims liability* under IFRS

# Specific valuation requirements in non-life

## Split into premium provisions and claims provisions

|                       |    | Month of accident [insured loss occurring] |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|-----------------------|----|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                       |    | Claims incurred 2007                       |        |        |        |        |        |        |        |        |        |        |        | Claims incurred 2008 |        |        |        |        |        |        |        |        |        |        |        |        |
|                       |    | Month                                      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | 11     | 12                   | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | 11     | 12     |
| Policies written 2007 | 1  | Yellow                                     | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow               | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |        |
|                       | 2  | Yellow                                     | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow               | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |        |
|                       | 3  | Yellow                                     | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow               | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |        |
|                       | 4  | Yellow                                     | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow               | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |        |
|                       | 5  | Yellow                                     | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow               | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |        |
|                       | 6  | Yellow                                     | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow               | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |        |
|                       | 7  | Yellow                                     | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow               | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |        |
|                       | 8  | Yellow                                     | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow               | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |
|                       | 9  | Yellow                                     | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow               | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |
|                       | 10 | Yellow                                     | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow               | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |
|                       | 11 | Yellow                                     | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow               | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |
|                       | 12 | Yellow                                     | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow               | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |
| Policies written 2008 | 1  |  |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|                       | 2  |  |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|                       | 3  |  |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|                       | 4  |  |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|                       | 5  |  |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|                       | 6  |  |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|                       | 7  |  |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|                       | 8  |  |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|                       | 9  |  |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|                       | 10 |  |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|                       | 11 |  |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|                       | 12 |  |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |
|                       |    | Balance date 31.12.07                      |        |        |        |        |        |        |        |        |        |        |        |                      |        |        |        |        |        |        |        |        |        |        |        |        |

# Specific valuation requirements in non-life

## Segmentation – lines of business in Non-Life insurance

### Direct business and accepted proportional reinsurance

- Medical expenses
- Income protection
- Workers' compensation
- Motor vehicle liability
- Motor, other classes
- Marine, aviation and transport
- Fire and other damage
- General liability
- Credit and suretyship
- Legal expenses
- Assistance
- Miscellaneous non-life insurance

### Accepted non-prop. reinsurance

- Health
- Property
- Casualty (other than health)
- Marine, aviation and transport

Plus split by currency!

# Specific valuation requirements in non-life

## **Segmentation – homogeneous risk groups**

- Insurer needs to segment obligations into homogeneous risk groups – at least as fine as LOBs
- Affords an actuarial assessment
- Too coarse segmentation may lead to
  - Unreliable development patterns
  - Apparent but false claim development
  - Apparent but false trends and seasonality
- Too fine segmentation may lead to loss of substance in statistical data

# Specific valuation requirements in non-life

## A very fine segmentation – geographical diversification

Northern Europe  
Western Europe  
Eastern Europe  
Southern Europe  
Central and Western Asia  
Eastern Asia  
South and South-Eastern Asia  
Oceania  
Northern Africa  
Southern Africa  
Northern America excluding the United States of America  
Caribbean and Central America  
Eastern South America  
Northern, southern and western South America  
North-east United States of America  
South-east United States of America  
Mid-west United States of America  
Western United States of America

by

Medical expenses  
Income protection  
Workers' compensation  
Motor vehicle liability  
Motor, other classes  
Marine, aviation and transport  
Fire and other damage  
General liability  
Credit and suretyship  
Legal expenses  
Assistance  
Miscellaneous non-life insurance

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# Calculation methods

## Selection of method requires proportionality assessment

- Valuation of technical provisions is principle based
- Insurer has to select method which is proportionate to nature, scale and complexity of underlying risks
- Allows use of simplified methods in case risk profile is simple

**Step 1:  
Risk Assessment**

What are the risks?

- Nature
- Scale
- Complexity

+

**Step 2:  
Assess model error**

- Assess adequacy of method against risks
- Assess extent of error in results due to any deficiency in the method

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**Step 3:  
Select method**

Select method so that model error is not material

# Calculation methods

## Calculation methods for non-life technical provisions

- Broad distinction could be made between *deterministic* and *stochastic* methods
- **Deterministic methods** only make assumptions about expected value of future payments and provide *single point estimate*
- Examples: Chain Ladder, Loss Ratio method, Bornhuetter-Ferguson method
- **Stochastic methods** give additional *insight to uncertainty* of estimate by providing full or partial loss distributions
- Examples: Thomas Mack Model, Over-dispersed Poisson, Bootstrapping, Bayesian models, direct simulation

# Calculation methods

## Method selection – general considerations

- Underlying assumptions of method must be clear and explicit
- Data must be verifiable and sufficiently granular
- Assessment and communication of uncertainty and sensitivities in estimate is key
- Stress & scenario testing have important role to play
- Weight to be given to losses with low probability and high cost
- Stochastic methods are not a panacea – if deterministic methods fail then stochastic methods will normally also fail

Overall limitations of the valuation must be understood

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# Internal and external data

## Data used in the calculation of technical provisions

- Insurers need to implement internal processes and procedures to ensure *appropriateness*, *completeness* and *accuracy* of data used
- This includes:
  - Implementation of well-organised IT data system
  - Data policy
  - Compilation of a directory of data used
- Supervisory reporting requirements set minimum standard on granularity of data
- Data can be internal or external
- However insurer needs to be able to demonstrate adequacy of external data against own risk profile

# Internal and external data

## **Approximations in case of insufficient data**

- Sometimes lack of data of appropriate quality unavoidable e.g. when insurer writes new line of business
- Then appropriate approximations, including case-by-case approaches, may be used
- However these still have to be commensurate with economic valuation principles
- CEIOPS together with actuaries and insurance industry developed “proxies” for valuation in case of scarcity of data
- “Proxies” also developed for discounting and transition from gross to net
- Further exploration needed to underpin Solvency framework

# Internal and external data

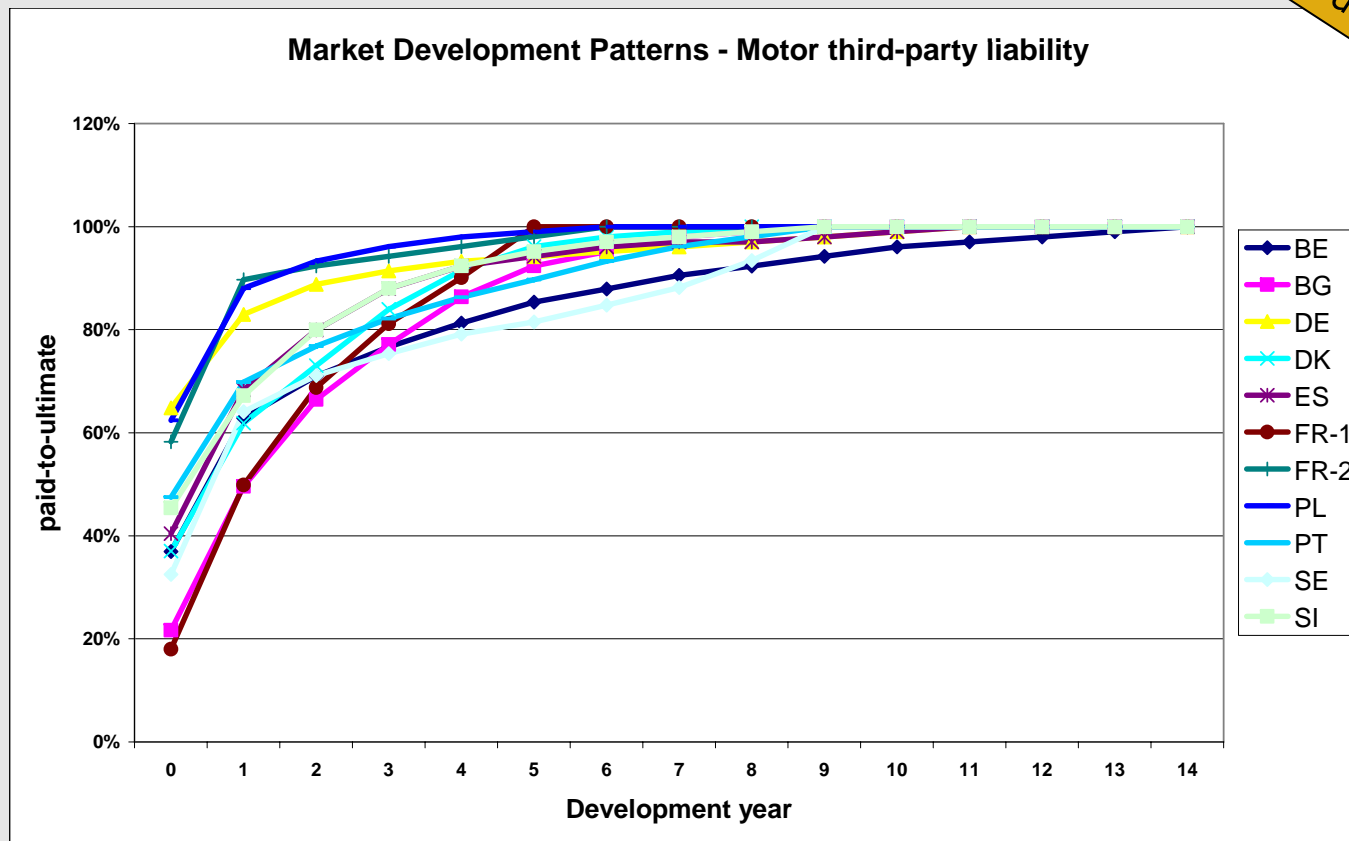
## **Use of external data for benchmarking**

- Insurance market data can provide “benchmark” information
- Useful for validation and assessment of valuation
- Can be represented as e.g.
  - development parameters/factors per line of business
  - aggregate summary statistics per line of business
- Insurance market data could be provided through supervisory authorities, industry or actuarial associations
- Report on the use of insurance market data in the valuation of technical provisions published by CEIOPS and Groupe Consultatif

# Internal and external data

## Example: Market development patterns

See CEIOPS' report on use of insurance market data



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# Validation and assessment

## **Role of validation and assessment**

- Simple “diagnostic” ratios may be helpful to reveal unreasonable best estimates, e.g.:
  - Implied ultimate claim cost per unit of exposure
  - Paid-to-ultimate ratios or incurred-to-ultimate ratios
- More broadly, validation of technical provisions key part in insurers risk management
- Has to cover all aspects (data, assumptions, methods)
- Includes comparison against past experience – aim is to assess uncertainty and reliability of valuation
- Validation and assessment also important for supervisory review

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# Non-Life Insurance Technical Provisions

## Challenges

- Data availability
- Availability of actuarial expertise in undertakings
- Compatibility with IFRS
- Application of certain aspects of regulatory framework, e.g.
  - Expenses
  - Contract boundaries
  - Reinsurance recoverables
- Supervisory review of actuarial valuation carried out by insurers

Thank you for your  
attention.

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