European actuarial academy

an initiative of the 'Deutsche Aktuarvereinigung', the Dutch 'Actuarieel Genootschap', the 'Schweizerische Aktuarvereinigung' and the 'Aktuarvereinigung Österreichs'

Reserving in the Actuarial Control Cycle

Agenda

- Introduction reserving
- Types of reserves
- Methodologies of reserves

The environment around us

IFRS

Solvency II

External rating agencies

Local accounting

Prudent reserving

Competitive pricing

Group consolidation

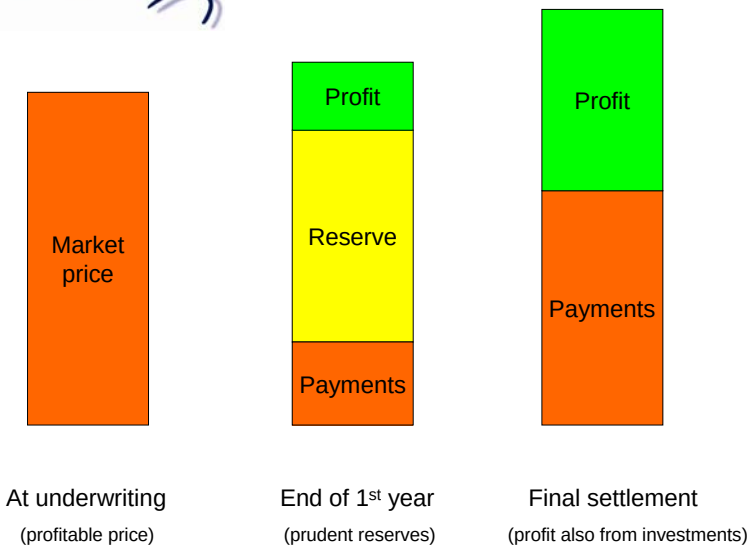
Transparent reporting

Fiscal regulation

US GAAP

How to get the overview?

Non-life reserving: The past



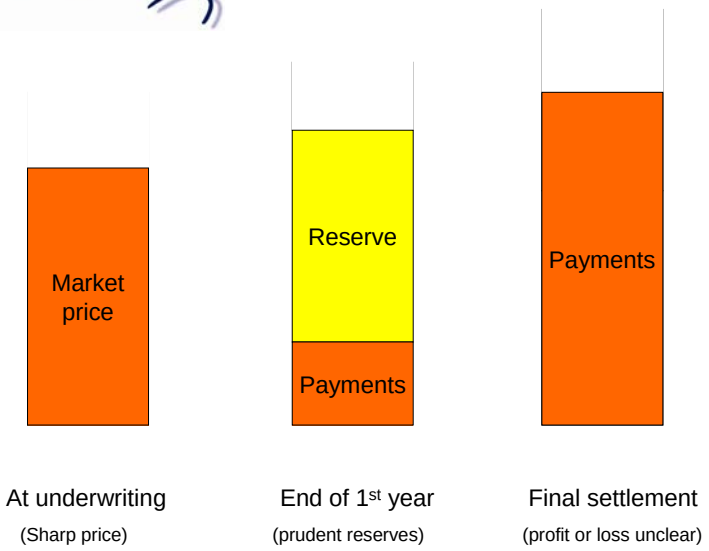
Non-life reserving: The past

- Stable price:
  Long history of benchmark information
- Investment income
  Prudent investments leading to extra profits

Leading to:

- Methodology, e.g.:
  - Reserve per known case plus x% of premium
  - Reserve per known case plus y% of reserve

Non-life reserving: Going forward



Non-life reserving: Going forward

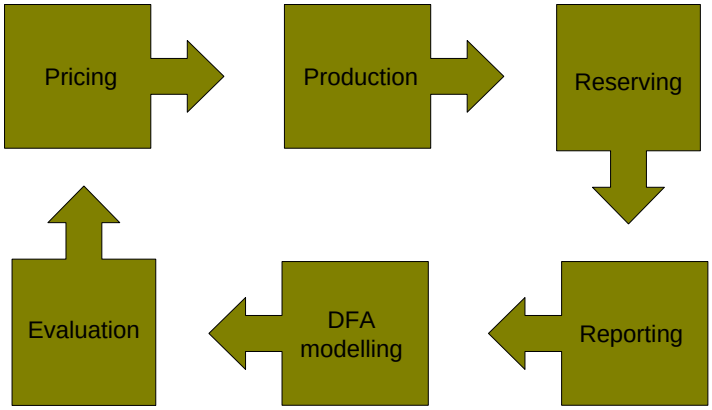
- More advanced pricing and more competition:
  - Reduction of profit margin
  - More uncertainty of profit upfront
- More advanced investments:
  - Less stable investment income
  - Potentially losses on investments
- Focus on one-sided information: claim handlers
- New risks arising from the portfolio
  - Asbestosis
  - Polution

Non-life reserving: Going into the future

- More focus on transparancy:
  - US Gaap:
    Best estimate reserving and no discounting
  - IFRS:
    Fair Value: Discounted best estimate plus market value margin
  - Solvency II:
    Best estimate plus risk margin (discounted?)

Non-life reserving: Back to the future

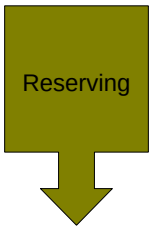
The Actuarial Control Cycle



Non-life reserving: Get the overview

The Actuarial Control Cycle

- Methodology
- Purpose
- Data
- Process and embedding
- Audability



The Actuarial Control Cycle

- Accounting standard
  - US Gaap
  - IFRS
  - Local
- Timing
- Periodicity

Reporting

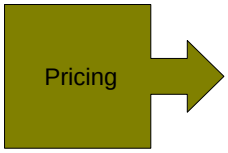
Non-life reserving: Get the overview

The Actuarial Control Cycle

- Different reserve input
  - Level
    (statutory as well as best estimate)
  - Volatility
  - Large claims / catastrophies
- Solvency II

DFA modelling

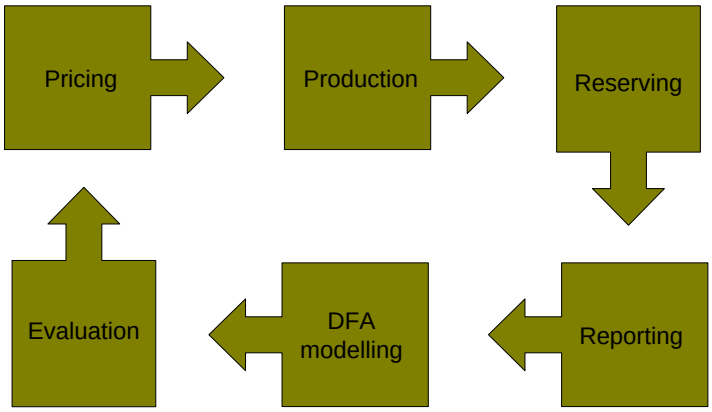
The Actuarial Control Cycle



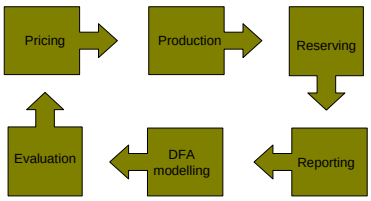
- Reserves needed for profit margin
- Reserves on best estimate with / without risk margins
- Cost of capital explicitly added?
- Explicit profit margins?

Non-life reserving: Get the overview

The Actuarial Control Cycle



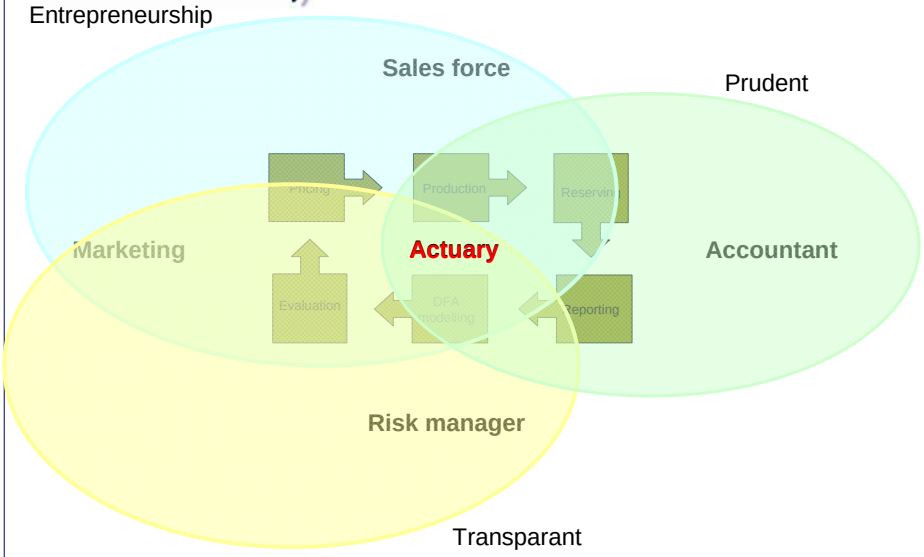
Non-life reserving: Get the overview



The actuarial control cycle:

- will bring the overview, but
- does not make complex things easy

Non-life reserving: Stakeholders



Agenda

- Introduction reserving
- Types of reserves
- Methodologies of reserves

Reserves for reporting: Balance Sheet

- Assets

- Capital
  - Free surplus
  - Solvency margin
- Technical reserves
- Non-technical reserves

Reserves for reporting: Balance Sheet

- Assets

- Capital
  - Free surplus
  - Solvency margin
    - Solvency I
    - Internal add-on
- Technical reserves
- Non-technical reserves

Reserves for reporting: Balance Sheet

- Assets

- Capital
  - Free surplus
  - Solvency margin
- Technical reserves
- Non-technical reserves
  - Payments due
  - Managerial provisions
  - Taxes
  - …

Reserves for reporting: Balance Sheet

- Assets

- Capital
  - Free surplus
  - Solvency margin
- Technical reserves
  - Premium reserves
  - Claims reserves
- Non-technical reserves

Reserves for reporting: Balance Sheet

- Assets

- Capital
  - Free surplus
  - Solvency margin
- Technical reserves
  - Premium reserves

    - Unearned premium reserves
    - Insufficient premium reserves
    - Expense reserves
  - Claims reserves
- Non-technical reserves

Reserves for reporting: Balance Sheet

- Assets

- Capital
  - Free surplus
  - Solvency margin
- Technical reserves
  - Premium reserves
  - Claims reserves
    - Case reserves
    - IBN(E)R reserves
    - Expense reserves
- Non-technical reserves

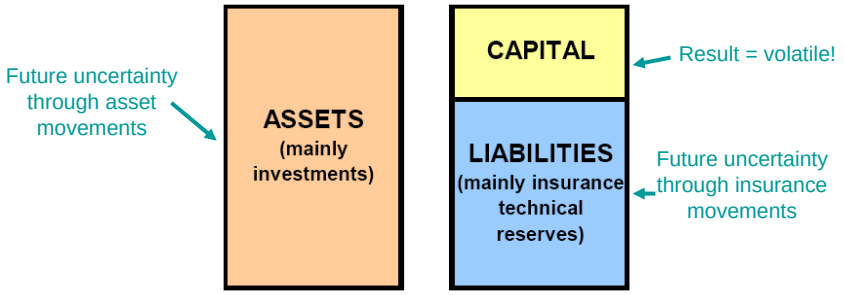
In this seminar focus on claims reserves

Reserves either net of reinsurance or reinsurance as asset

Reserves for pricing

- For repricing current business one needs:
  - Portfolio characteristics
  - Information about current profitability
- When repricing current business:
  - Wait until all claims are settled is impossible
  - Use incurred estimate in early stage (hardly any payments) is not advisable
  - Wait until a percentage is settled (say 60%?) and use a best estimate reserve for the rest
  - Think about explicit risk margins and profit margins

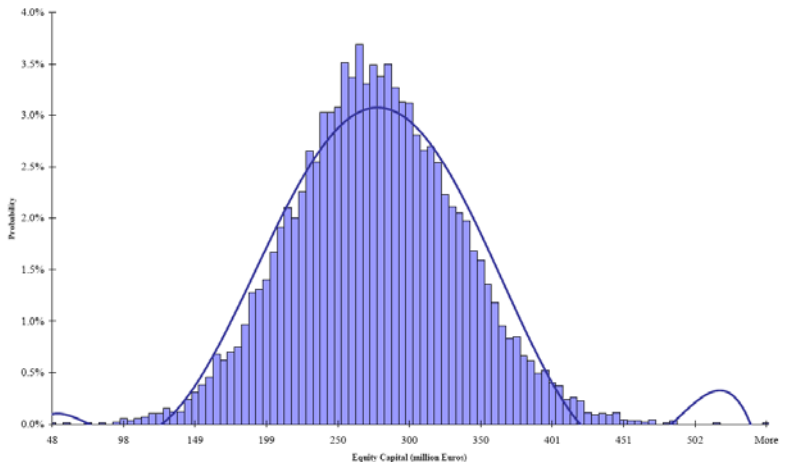
DFA modelling; the essence



Source: Borghino, 2005, master dissertation, DFA models as tool for solvency assessment

DFA modelling; the essence

Figure 3-9 – Empirical distribution of the one-year projection of the equity capital



Source: Borghino, 2005, master dissertation, DFA models as tool for solvency assessment

DFA modelling; the essence

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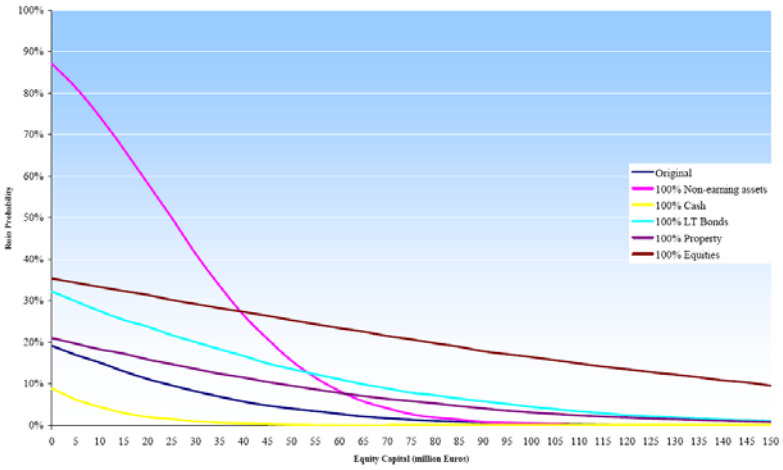
developing actuaries

Figure 3-13 – Ruin probability vs. starting Equity capital for different investment strategies



Source: Borghino, 2005, master dissertation, DFA models as tool for solvency assessment

DFA modelling; the essence

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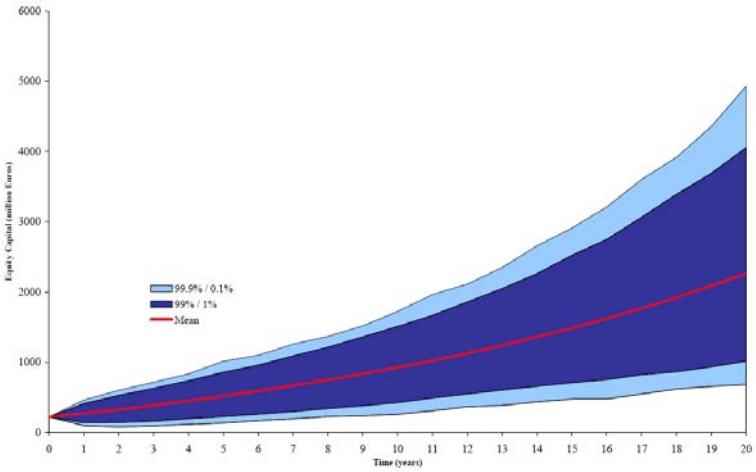
Figure 3-17 – Projected Equity Capital for a maximum of 20 years



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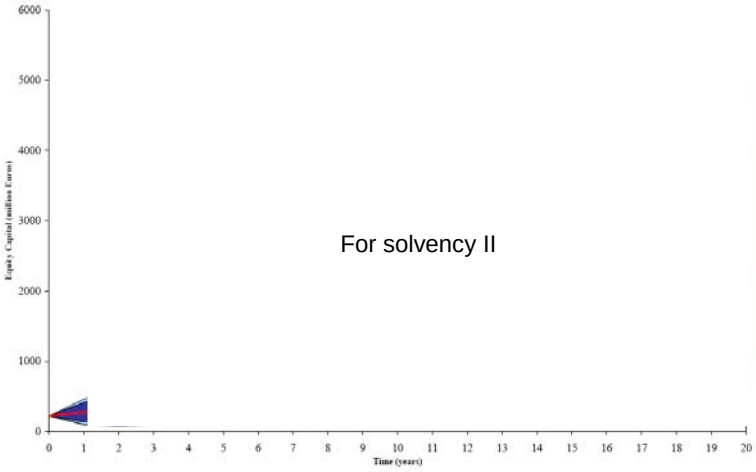
DFA modelling; the essence

Figure 3-17 – Projected Equity Capital for a maximum of 20 years



For solvency II

Source: Borghino, 2005, master dissertation, DFA models as tool for solvency assessment

Reserves for capital modelling

- Needed for capital modelling / DFA modelling:
  - Reserves at starting date
  - Payment patterns
  - Volatility of payment patterns
- What volatility is needed?
  - Incurred volatility (potential deviations in final incurred)?
  - Reserve volatility (potential deviations in reserves as of today)?
  - Next year's incurred volatility (potential deviations is payments and reserve run-off for one-year time horizon)?

Agenda

- Introduction reserving
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Different methodology

- Individual case reserves:
  With information from claim file

  – Expensive to set
  – Depends on “policy” and management
  – Depends on individuals
  – Difficult to audit
  – No explicit reserves for IBNR

Different methodology

- Statistical based case reserves:
  Average reserve per claim based on historic data

  – Will not work for large claims
  – Will not work for claims with large time until settlement
  – No explicit reserves for IBNR
  – Explicit assumptions for inflation needs to be set

Different methodology

- Percentage of premium / reserve

  – Simple and auditable
  – Self-fulfilling prophecy
  – Makes no use of recent (payment) information

Different methodology

- Claim triangle methods:
  Projections based on run-off triangles

  – Will not work well for large claims
  – Aggregates data, so loss of information
  – Will not work well on portfolios with little claims
  – Will not work well with volatile portfolios

Different methodology

- Simulation methods:
  Projections based simulated individual claims and/or claim run-off

  – Difficult to parameterize
  – Many calculations for large books of claims
  – Not always simple to audit

Break