Cape Town Afrique du Sud

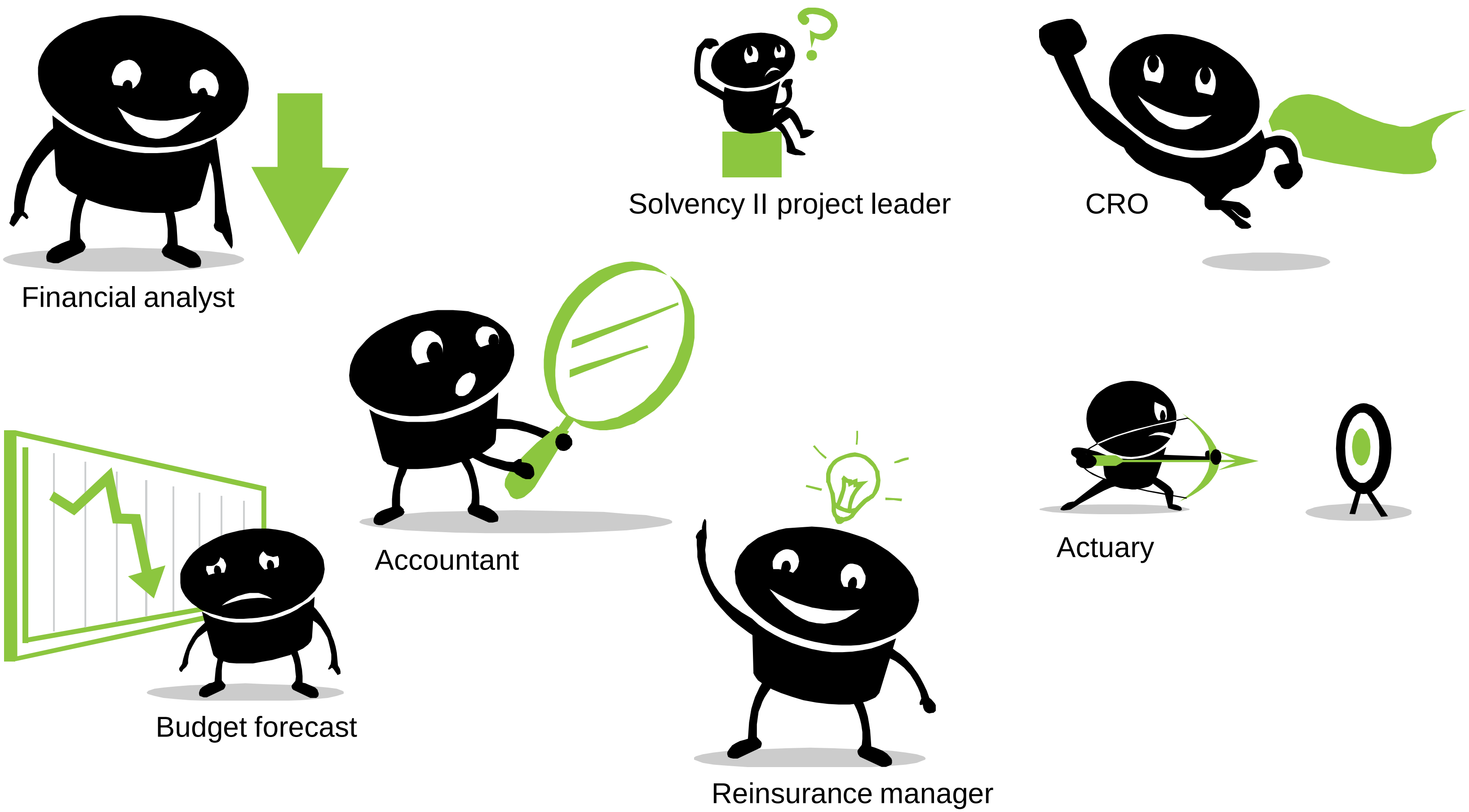
ICA 2010 CIA

Implementing and embedding a Solvency II model

Jurgen Wielandts

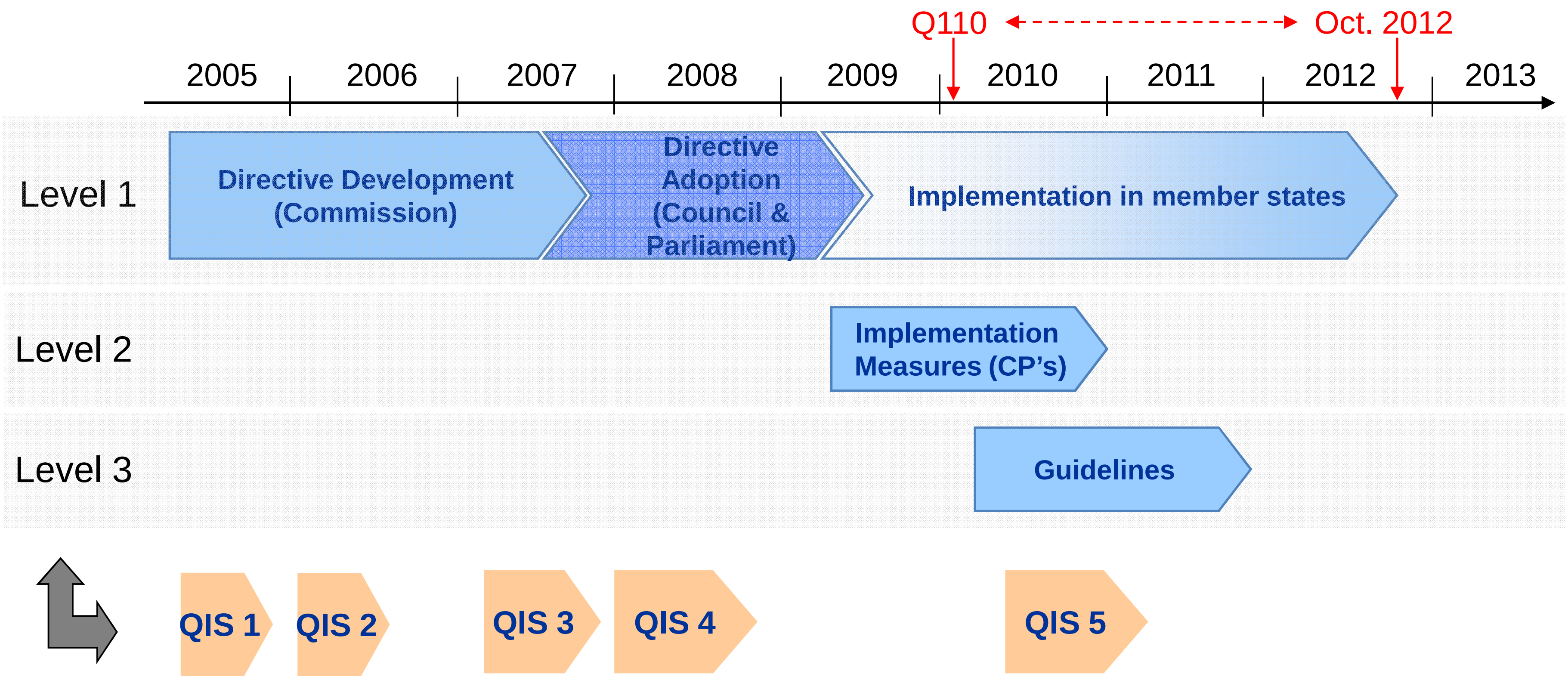
AON BENFIELD

ERM: So ?



Financial analyst
Solvency II project leader
CRO
Accountant
Budget forecast
Reinsurance manager
Actuary

Solvency II landscape



- Fair Value balance sheet defines available capital;
- Standard or internal model defines required capital;
- Tier structure used to grade the quality of available capital;

- Governance
- Reporting

Solvency II landscape

Q110 ← - - - → Oct. 2012

2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013

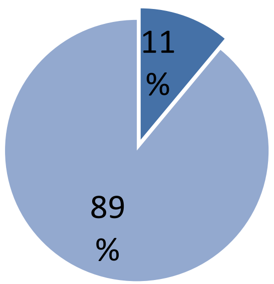
Market risk for corporata bonds
Market risk for equities
Revised correlation matrices
Non-Life premium and loss reserve
Non-Life exposure basis

SCR
+ 75% Life
+ 65% Non-Life

Level 2

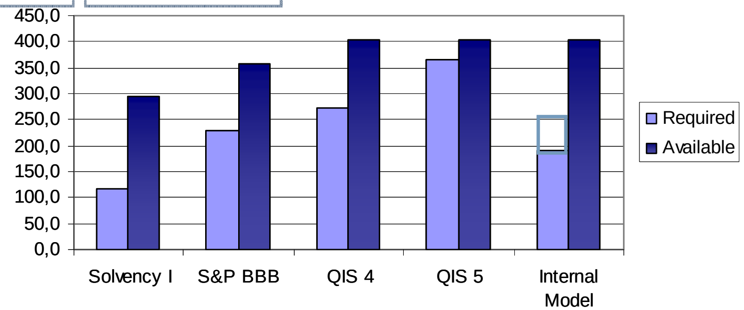
Implementation Measures (CP's)

SCR Breach QIS 4



CRO Forum results

Model	QIS 4 Available / Required		CP5 (CP's) Available / Required		CP5 (CP's) Available / Required	
Standard	207 / 100	207%	207 / 165	125%	186 / 165	113%
Internal	207 / 93	222%				



Geneva convention March 2009:

"If more capital is required, this should be done on the basis of a precise and objective assessment of risk. Excessive capital requirements are as dangerous and inefficient as insufficient capital requirements: They are giving insurers and reinsurers a wrong incentive to transfer risks to other less competent actors and may accordingly alter financial stability."

Solvency II landscape

SCR

Standard approach (eg QIS4) Market assumptions	Standard approach (eg QIS4) Company assumptions	Internal model Partial	Internal model Full

Conservatism

Business impact

Standardized — Move towards internal model (personalized)

Standard model
- Best Estimate process
- Fair Value balance sheet
- Consistency & Governance
- Reporting

Standard model with USP's
- Data quality
- Regulatory review
- Calibration

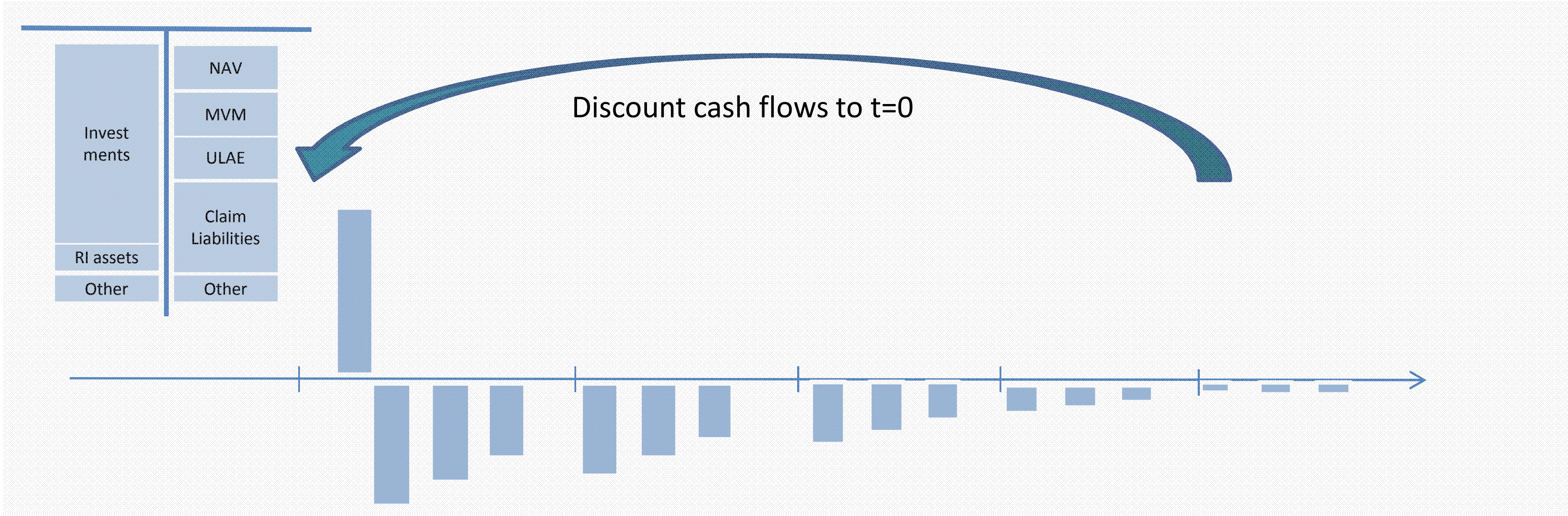
Partial Internal Model (Cat)
- Regulatory review
- Use test;
- Statistical quality standards
- Callibration standards
- P&L attribution
- Validation standards
- Documentation standards

(Partial) Internal Model
- Detailed regulatory review

1. Reinsurance
2. De-risk asset
3. Raise capital
4. Internal model
5. Change business mix

Internal model: Kernel

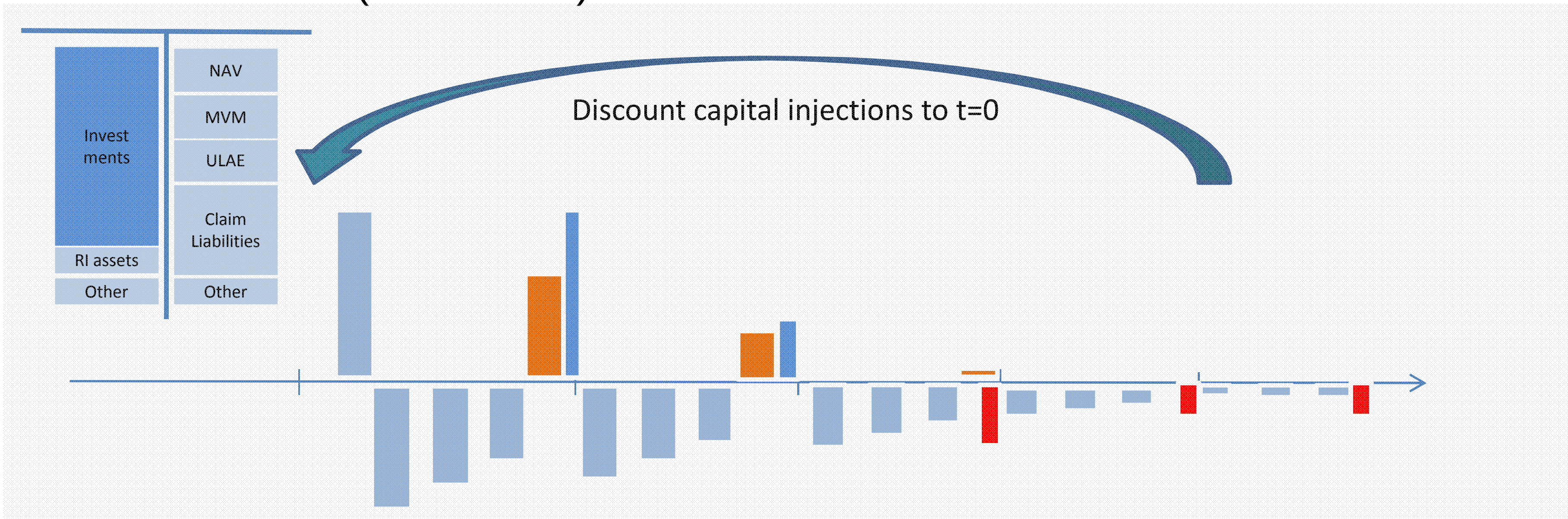
Discounted Cash Flow Method



- Cash flows are modeled to ultimate run-off;
- Spot rate used to discount all cash flows to t=0;
- No Valuation required;

Internal model: Kernel

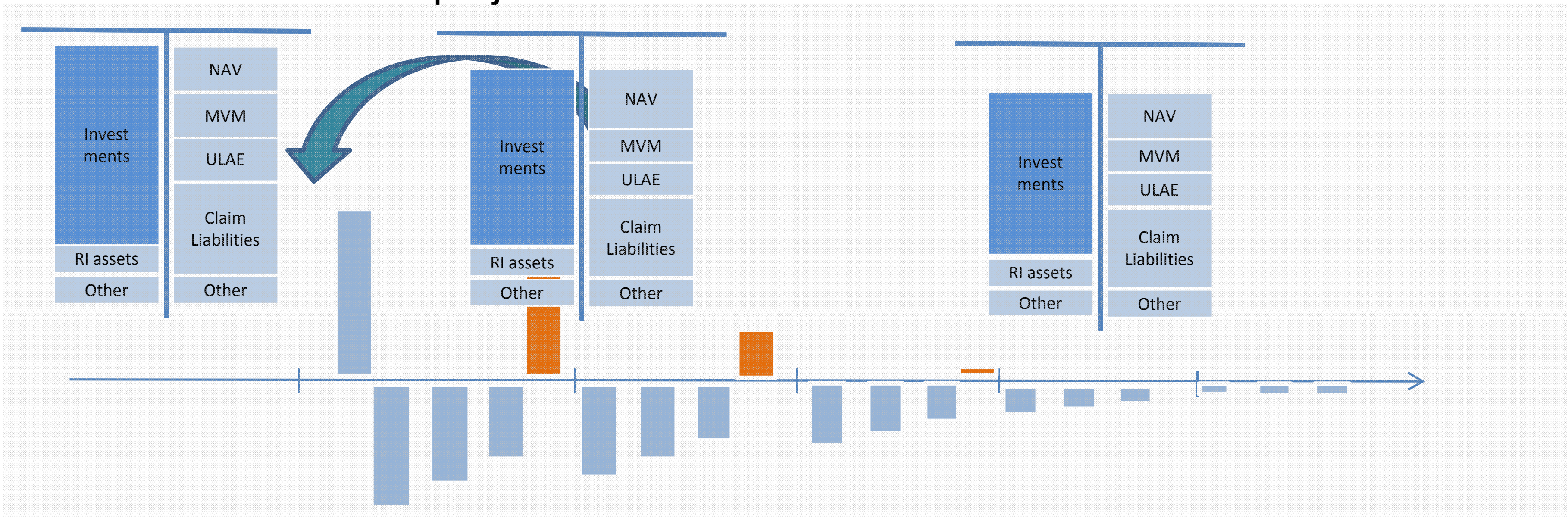
Cash Balance (Fitch Prism)



- Cash flows are modeled to ultimate run-off;
- Ability to include investment return (eg. Minimum risk portfolio).
- Spot rate used to discount all capital injections to t=0;
- No Valuation required;

Internal model: Kernel

Full balance sheet projection

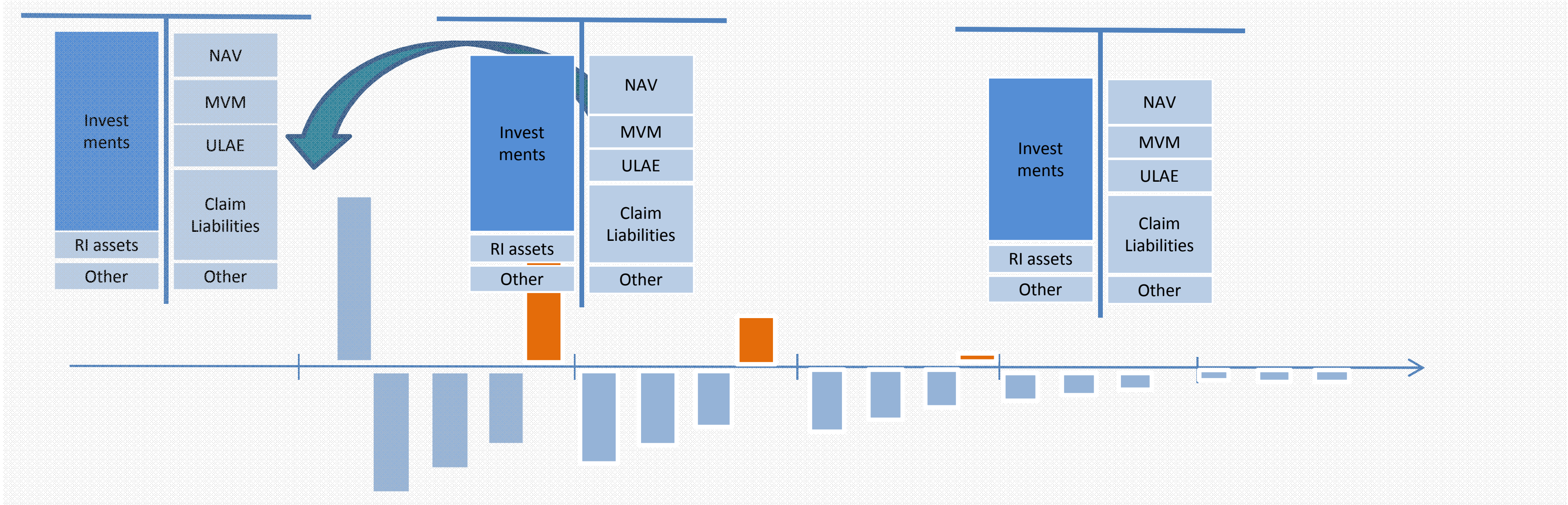


- Cash flows are modeled to ultimate run-off + EOY reserves are calculated;
  => Requires a valuation approach;
- Change in NAV is measured at t=0, t=1, t=…. } As required by Solvency II
- Various sub strategies possible:
  - Stochastic Assets | Deterministic Liabilities;
  - Stochastic Liabilities | Risk Free financial return;
  - Limited to Assets backing Liabilities;

Could cause SCR Calculation Consequences
(eg unavoidable market risk)

Internal model: Kernel

Full balance sheet projection

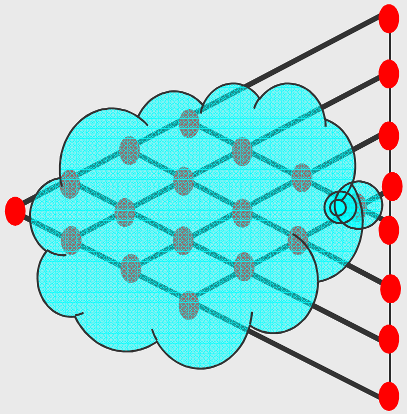


Solvency II capital calculations (SCR) require a valuation approach:

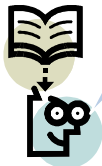
- Each balance sheet position should be valued at Fair Value;
    - Assets at Market Value;
    - Liabilities at best estimate discounted + MVM;
- Which cash flows should be considered when valuing an end of year position?

Reserve Risk Emergence

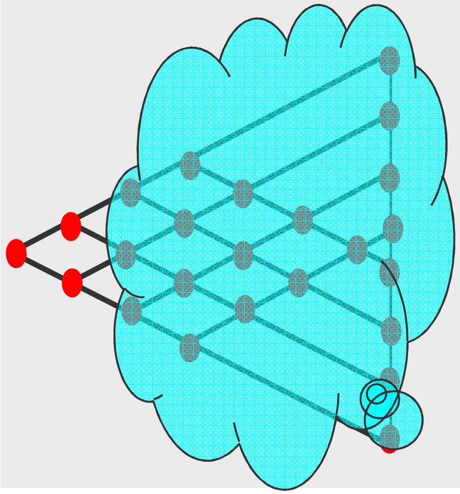
Movement to ultimate
(immediate emergence of loss)



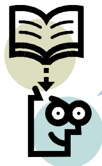
Pricing actuary: risks to ultimate



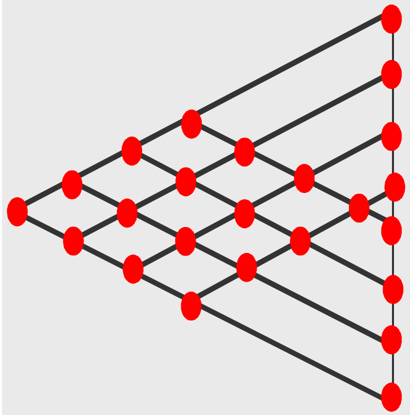
1 year movement



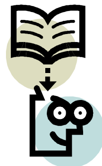
Regulatory Capital actuary: 12 months and then commute them.



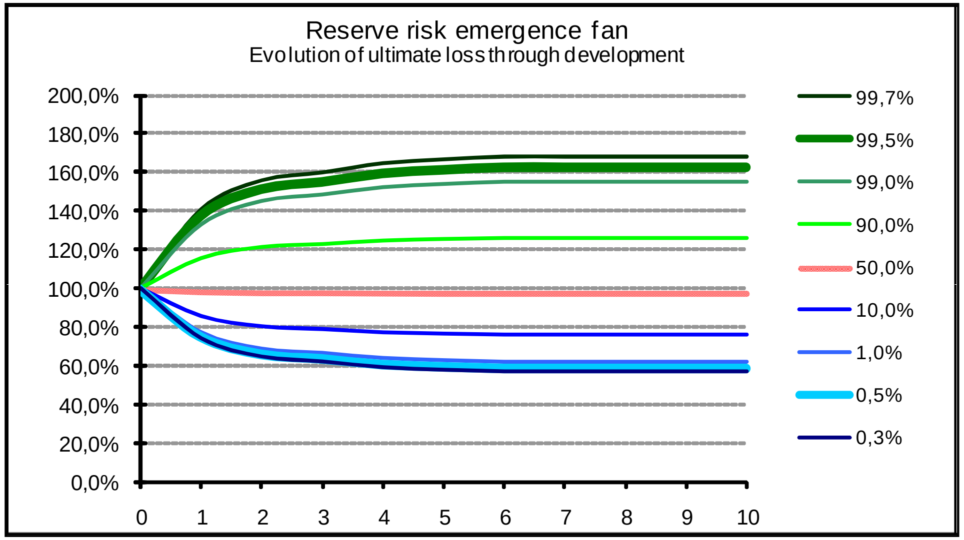
Movement to ultimate
multiple 1yr risk shocks

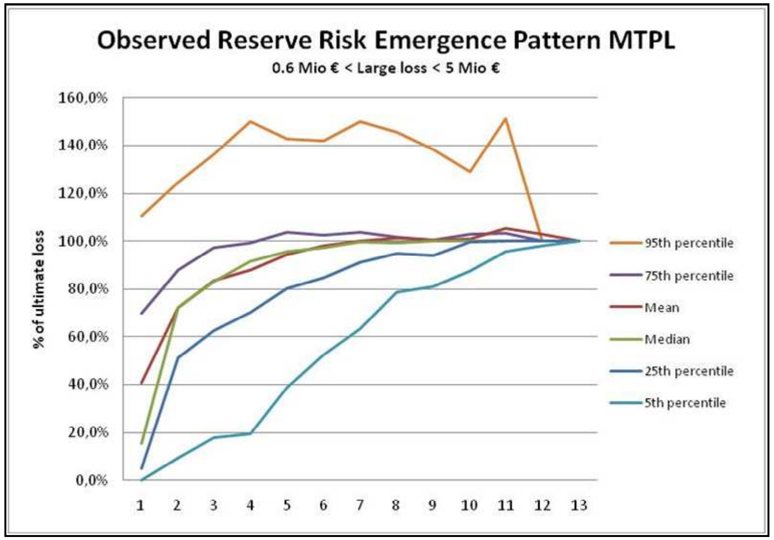


Smart actuary:
I can do both.



Reserve Risk Emergence

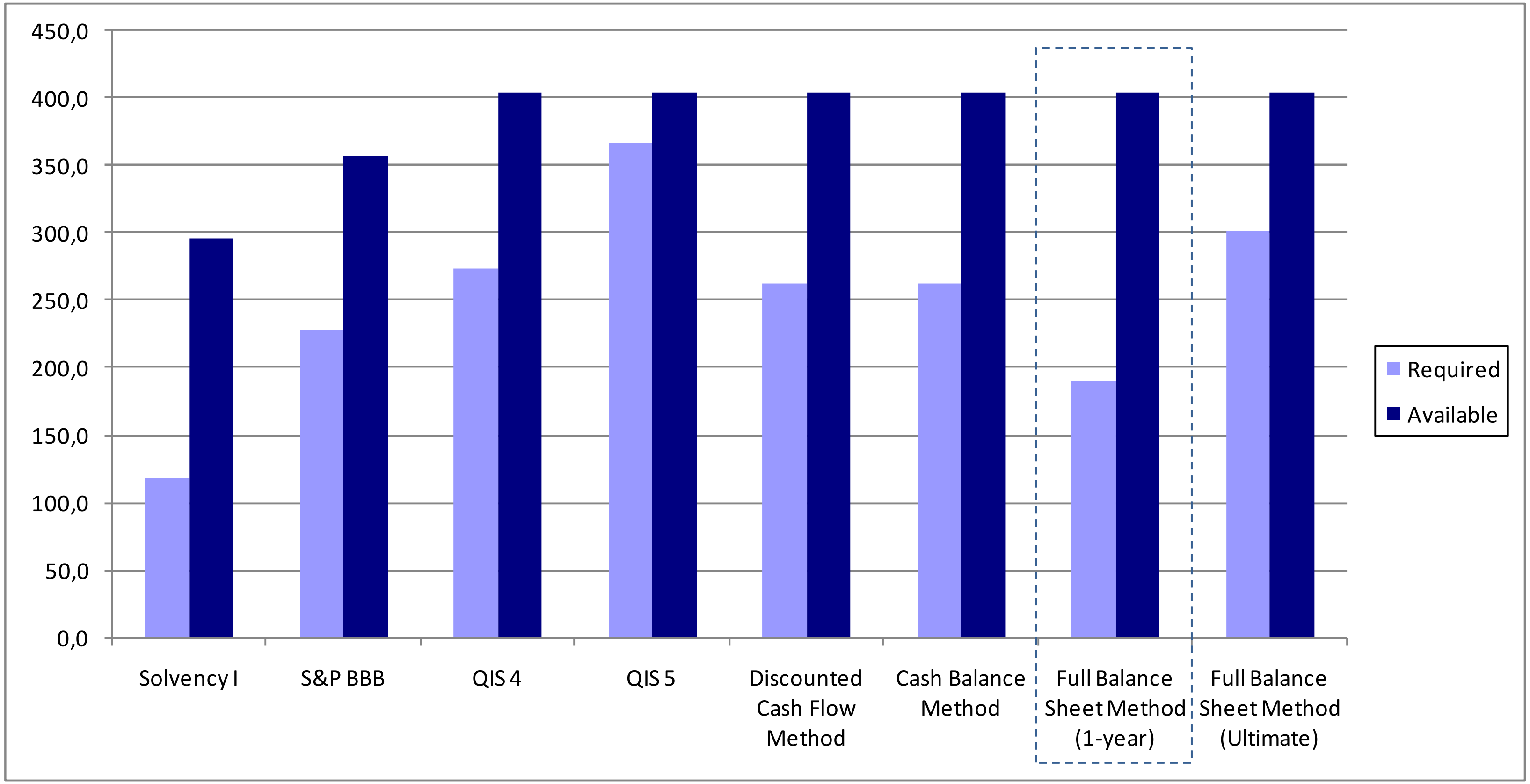




Modelled reserve risk emergence on prior year losses (Belgian MTPL)

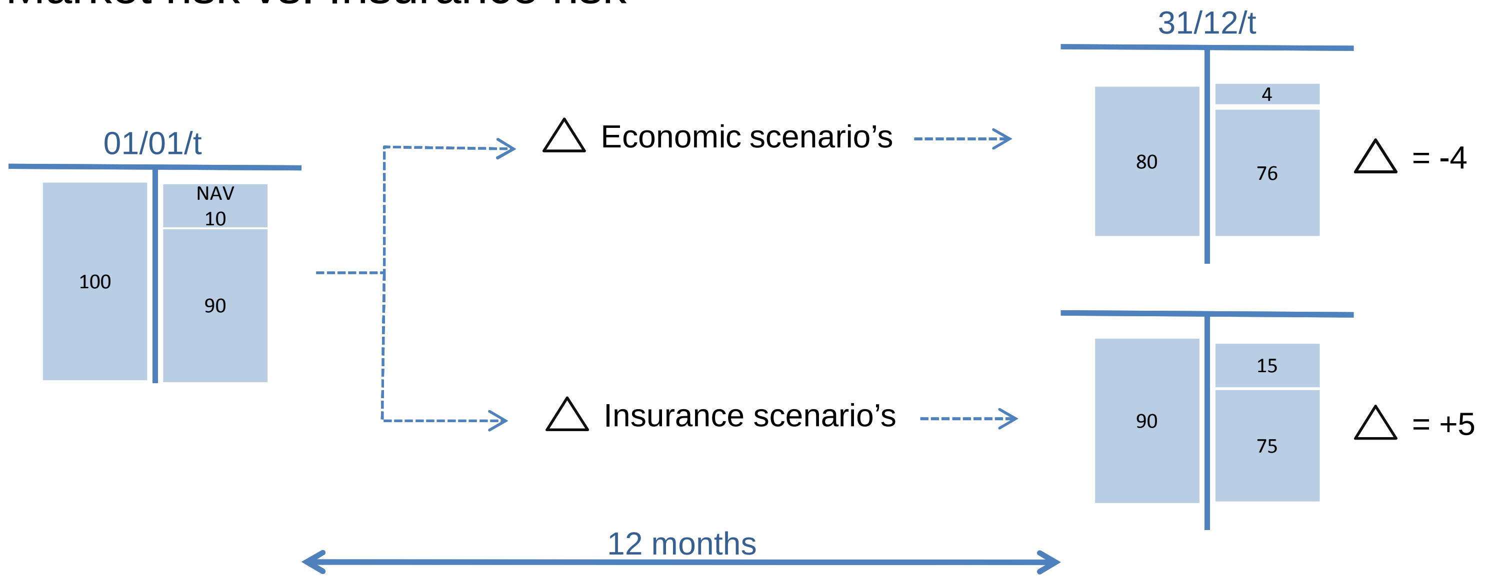
Observed reserve risk emergence on large losses (Belgian MTPL)

Comparing Model Kernels



Risk Limits & ALM

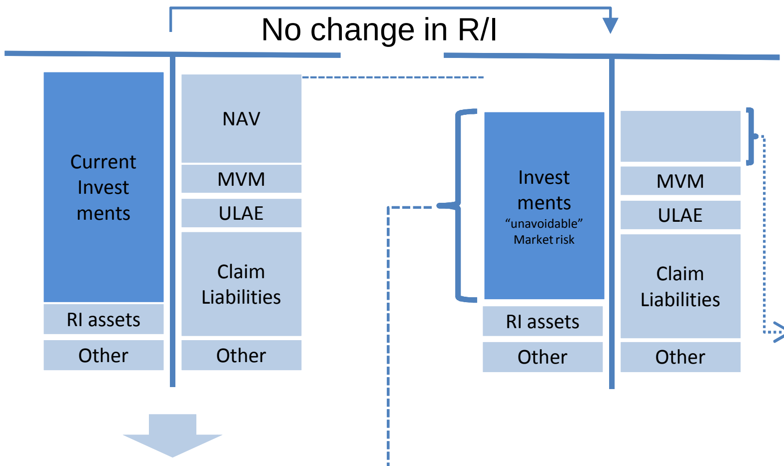
1. Market risk vs. Insurance risk



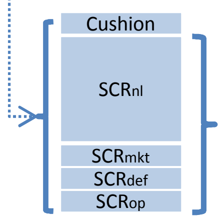
Market risk = △ in NAV due to changes in the economy
Insurance risk = △ in NAV due to changes in the insurance scenario's

Risk Limits & ALM

2. De-risk assets & define risk limits on insurance risk



Covers Management risk tolerance level on insurance risk (ORSA)
Eg. Target capital is SCR + Capital cushion (eg. MCR, rating target…).



Capital required for Company that would have invested in a portfolio that minimizes market risk.
= Unavoidable market risk (Residual)
! Will depend on reinsurance structure.

Fair Value defines available capital
(settle all liabilities and provide capital back to shareholders)

△ Structure: Portfolio (theoretical) invested in traded securities which "mirror" changes in value of the liabilities due to movement in Economic scenario's.
- Currency
- Duration
- Fixed/indexed link govies (no credit risk)

△ Size : Covers Liabilities + target capital.

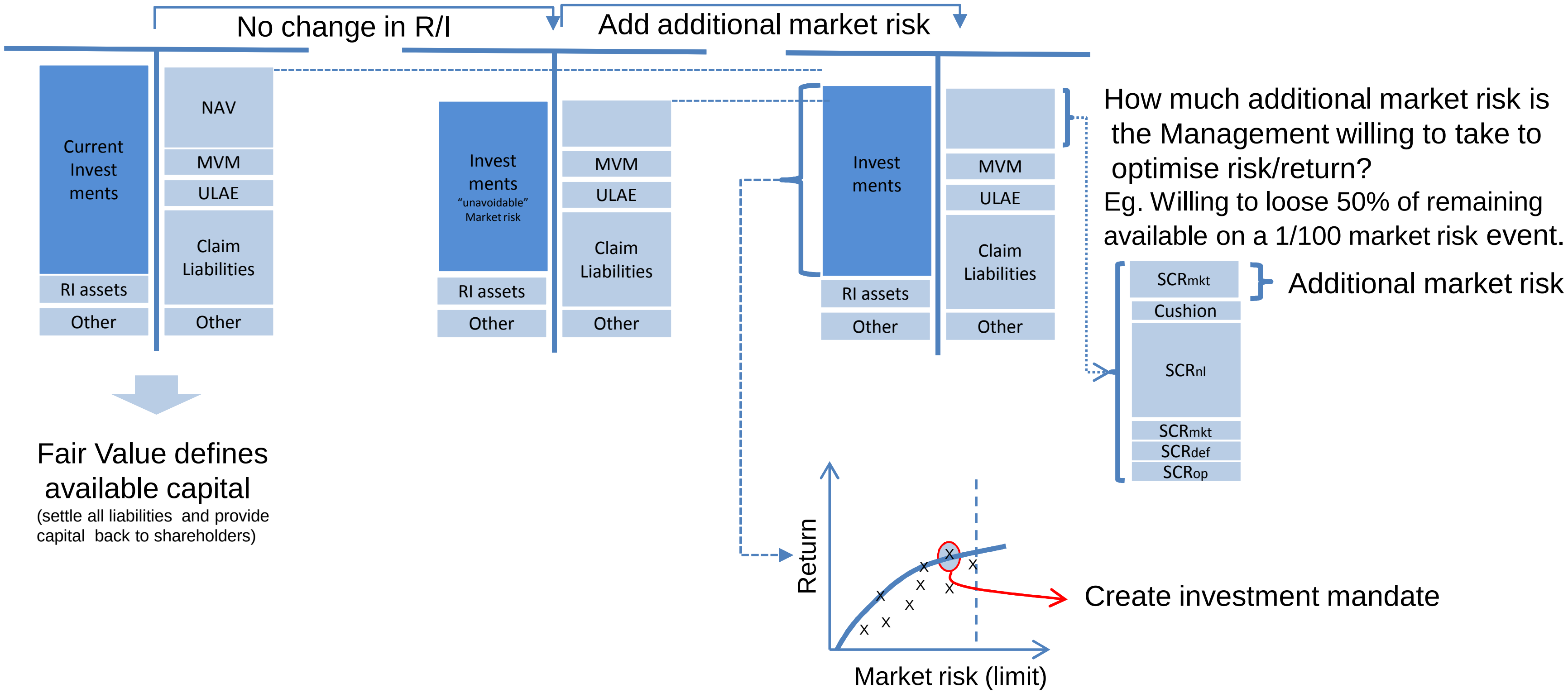
Asset & Liability structure generated that:
- True risk exposure on insurance risks;
- Reduces market risk to the minimum;
- Available capital covers management target risk tolerance level;

Investment return

Reinsurance analysis

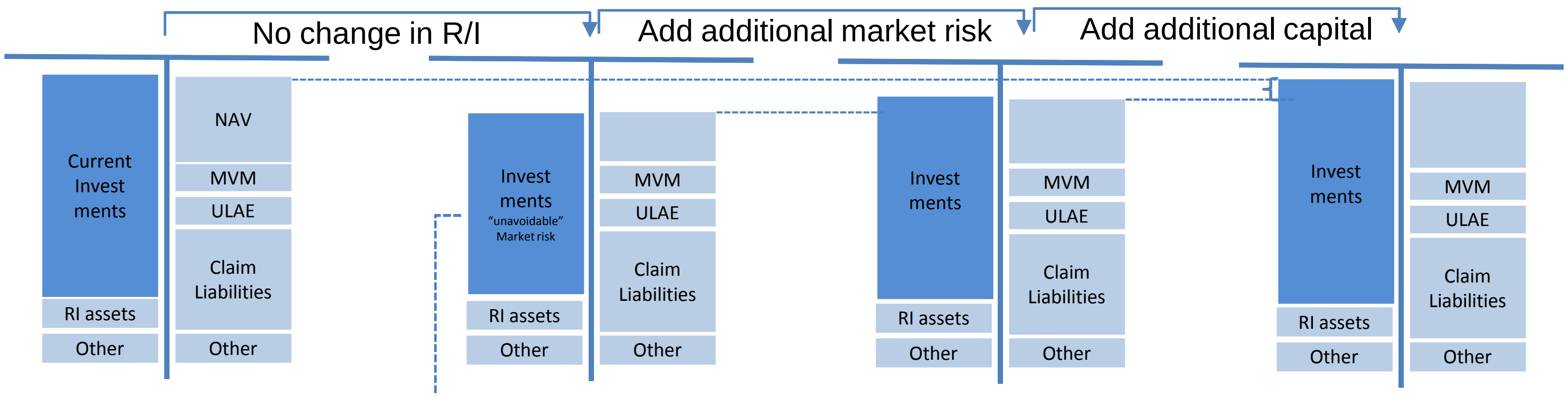
Risk Limits & ALM

3. Add additional market risk to optimize risk/return



Risk Limits & ALM

3. Add additional available capital (@no risk)



Fair Value defines available capital
(settle all liabilities and provide capital back to shareholders)

On an expected basis

+ Technical result
+ Financial return
= Insurance return

+ Additional financial return
+ Additional financial return on non-used capital
= Total return

Capital base

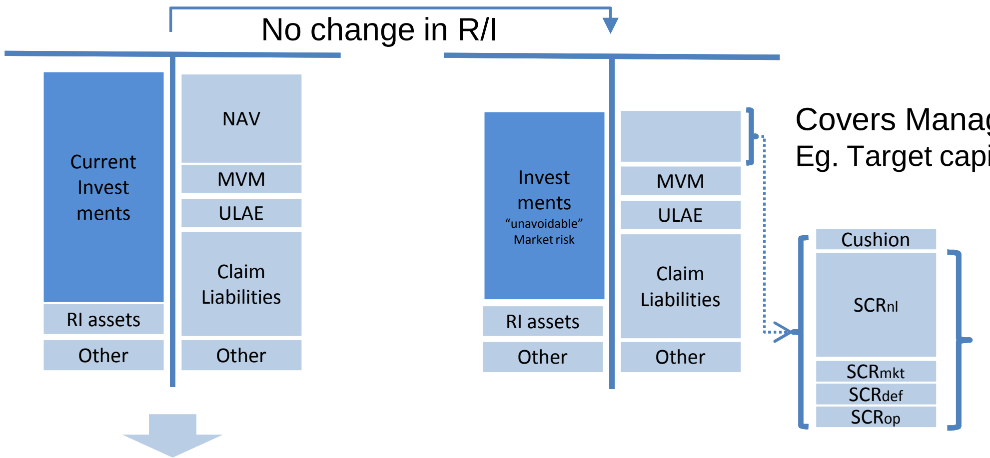
Locked capital for insurance risk (incl. unavoidable & cushion)

Additional capital for market risk

Total locked capital

Reinsurance analysis

1. Impact on Capital position



Fair Value defines available capital
(settle all liabilities and provide capital back to shareholders)

Covers Management risk tolerance level on insurance risk (ORSA)
Eg. Target capital is SCR + Capital cushion (eg. MCR, rating target…).

Within the risk tolerance level (=capital), which R/I program is the best ?

	R/I program A	R/I program B
Gross Capital	500,0	500,0
Net Capital	400,0	390,0
Capital saving	100,0	110,0
Reduction on Capital Cost CoC 12%	12,0	13,2
Expected Earnings impact		
R/I Premium	-46	-45
Recoverables	38	35
	-8	-10
Economic value added	4,0	3,2

Reinsurance can be used to reduce the risk within the risk limit framework..
=> Optimal reinsurance is the program that creates Economic added value….

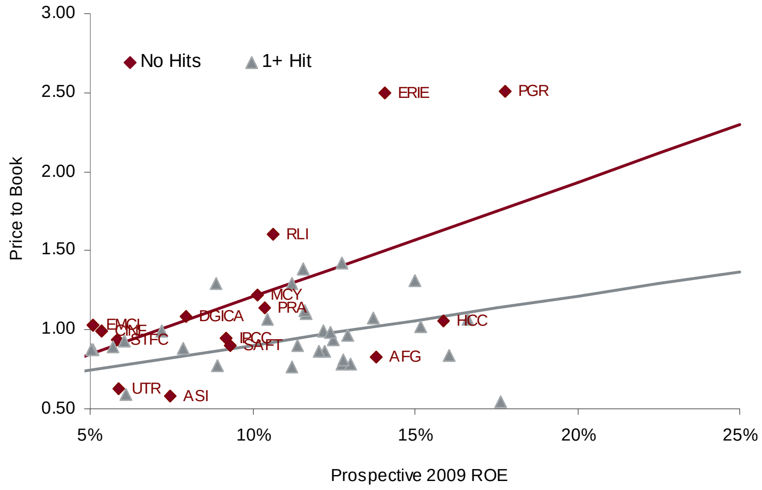
Reinsurance analysis

2. Impact on the variability of profit

"Insurance can be pretty volatile business. Fortunately the outside world doesn't see it that way since we can hide the volatility in the books."

November 2008

April 2009



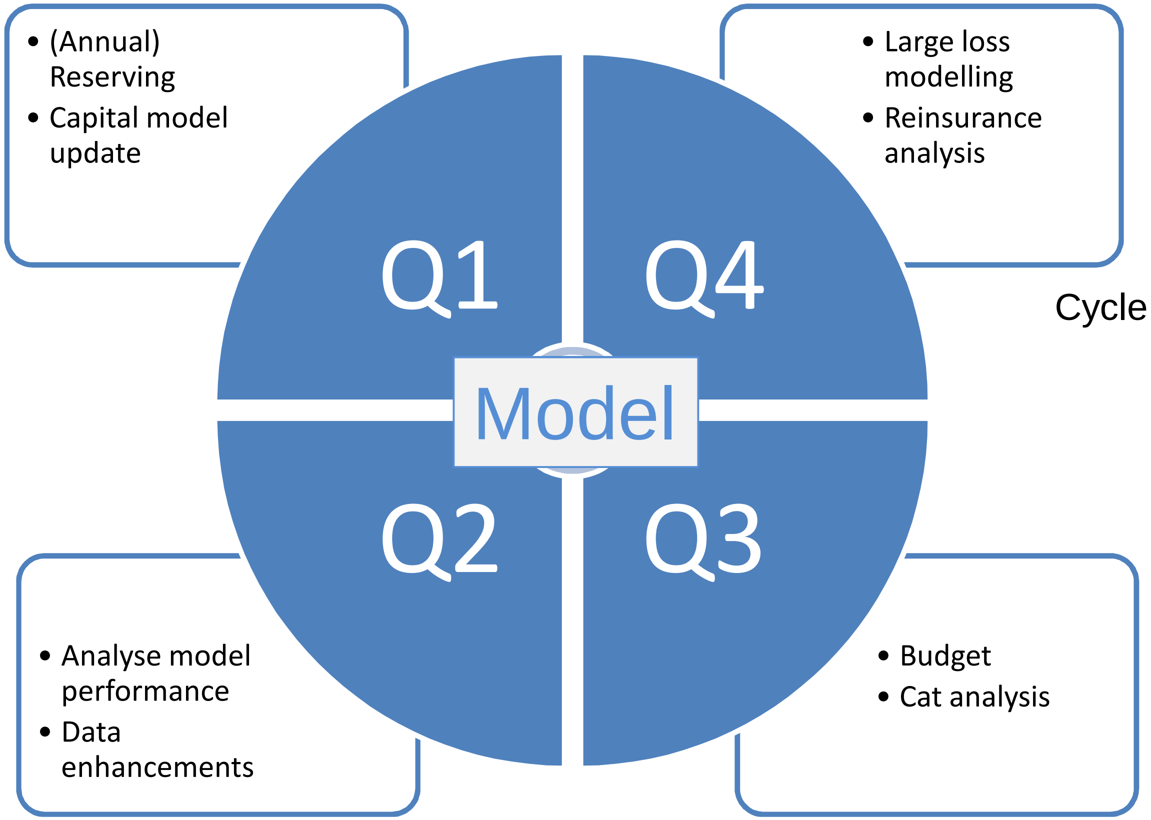
… but optimal reinsurance should also aim at reducing volatility in earnings.

Hit : loss of 150% or more of average quarterly profit.

Use test

- Risk limit setting
- ALM
- Reinsurance
- Reserving
- Capital allocation
- Cat model results vs cat pricing

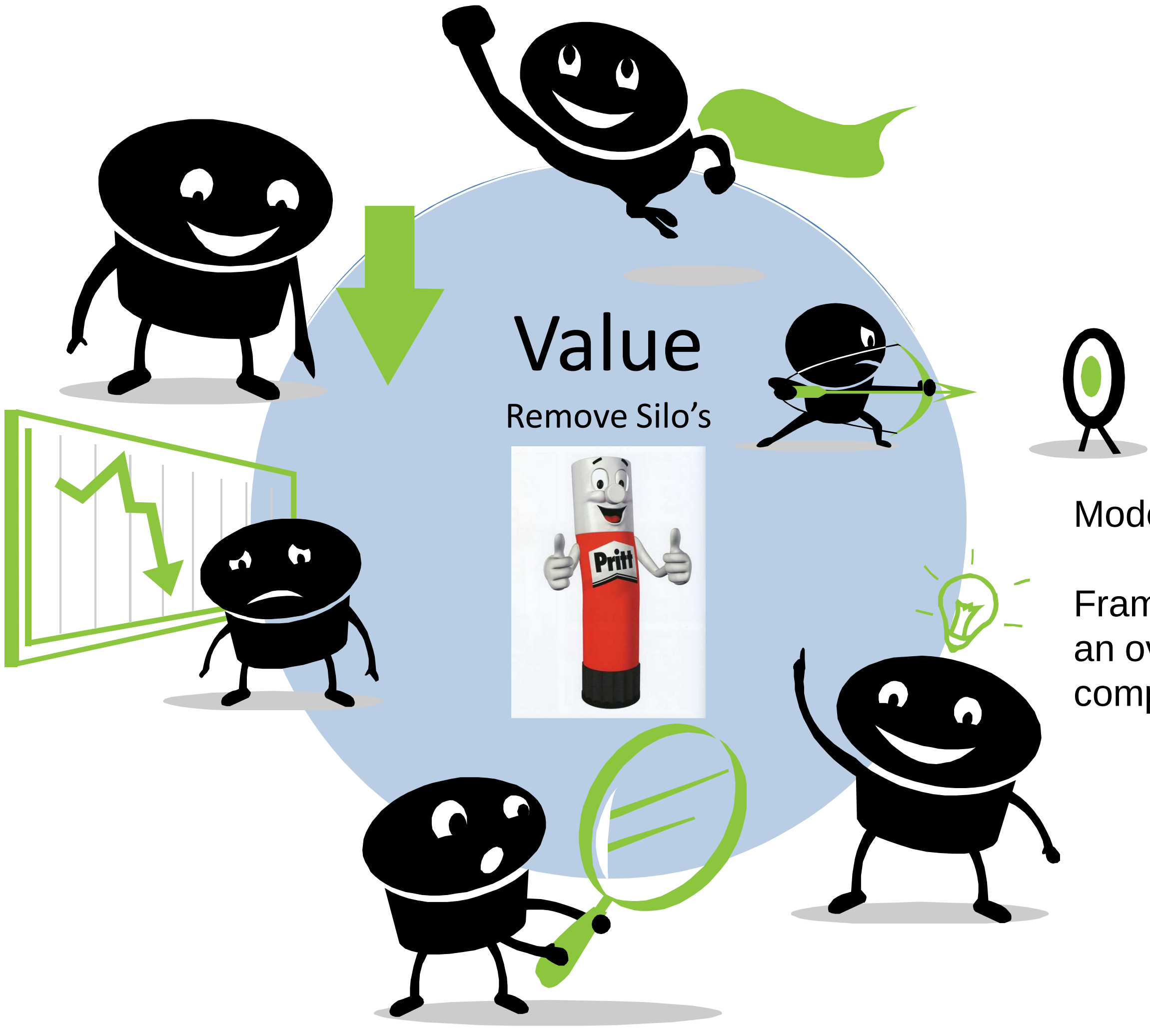
Identify the process



Cycle management will improve :

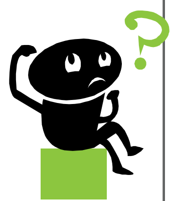
- Process
  - > become less key-person dependent
- Analyse performance of model
  - > projected P&L vs. observed?
- Identify weaknesses
- Communicate conclusions
  - > board should know model weaknesses
- Improve documentation

ERM: So ?



Model =

Framework to communicate and monitor an overall risk appetite expressed in company (=shareholders) €'s.



Lessons learned

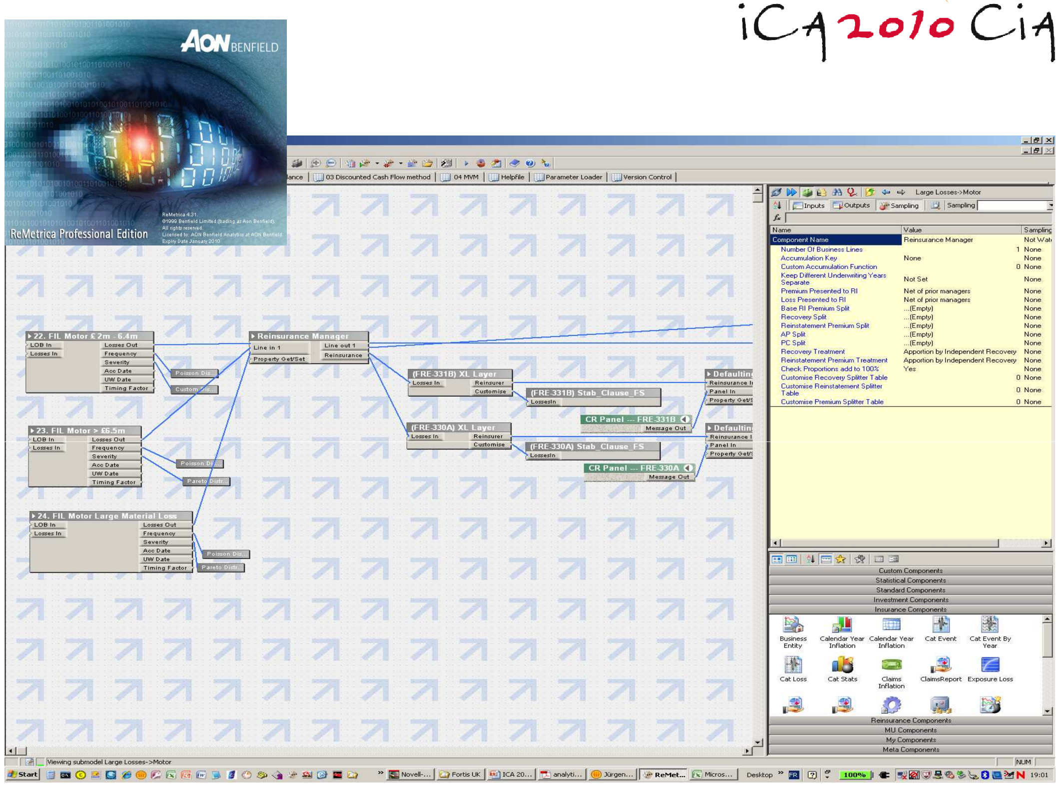
- In a fair value world:
  - Available capital will be volatile;
  - Required capital will be volatile;

  Communication is key !
- Introduce scenario's in stochastic model (e.g. historical large losses)
- Avoid over complex models;
- Data issues:
  - Granularity;
  - Consistency;
  - Do we have the full exposure ?
- Documentation: Too little (dead team) vs. too much (update);
- Testing;
- ORSA Art. 44 §5: if it takes 240 man days to do a re-run ??
- Sign-off system is crucial (calibration needs to be traceable).

Solvency II solutions

ReMetrica

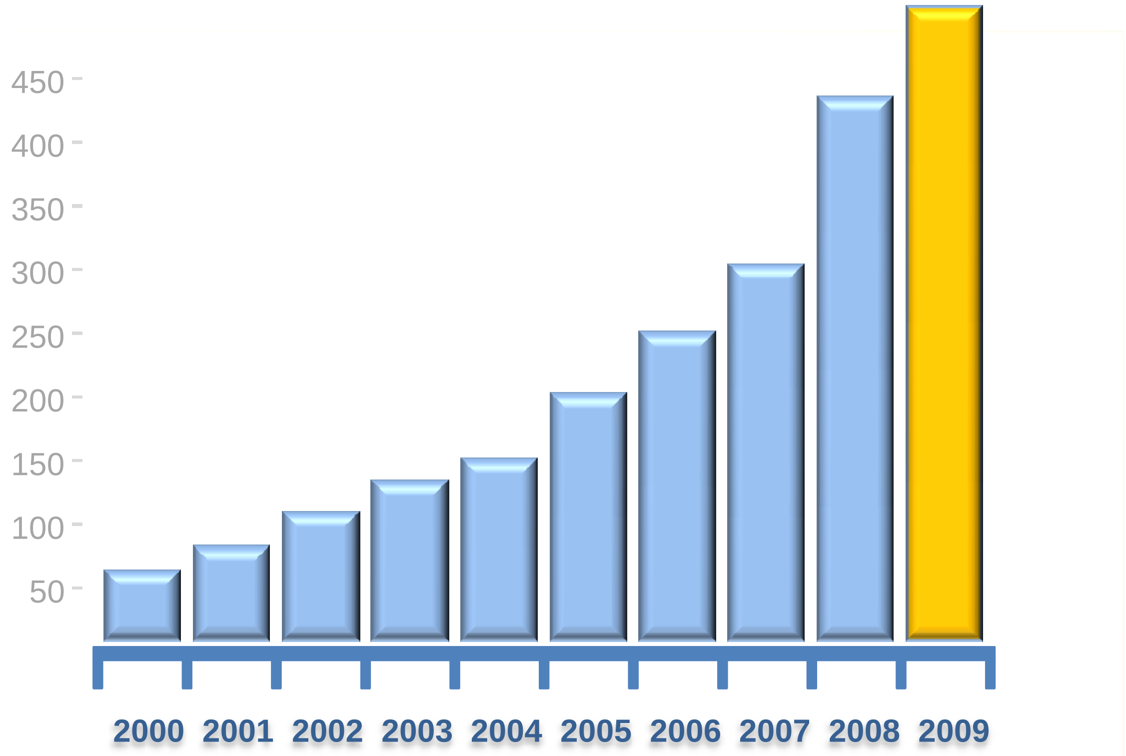
- Build in business logic gives ReMetrica flexibility to develop models quickly
- Complete statistical and coverage packages to model insurance risk
- Comprehensive reinsurance library
- Accounting: GAAP, US, IFRS
- Support for RMS, EQECat, AIR
- Support for all major asset classes
- Integrated economic scenario generator and support for external ESG’s
- Easy to check models
- Fast to run
- Integrated Excel for input and output & extensions
- Scriptable with custom components in VBA
- Unrivalled support and documentation
- Open market platform used by many reinsurers and consultants
- Integrates with reserving software, cat and ESG’s.
- Strong audit capability.
- Used in house AON Benfield.



Solvency II solutions

ReMetrica

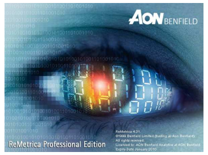
- Used by over 140 companies worldwide
- Over 500 Users outside Aon Benfield
- Aon Benfield is the biggest user



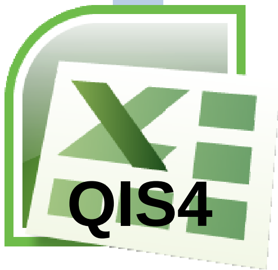
ReMetrica External User Base

Solvency II solutions

ReMetrica



Template Solvency II model is generated



- S2Metrica reads in the QIS4 spreadsheet and generates a Solvency II internal model (full balance sheet method)
- Simple user interface
- Includes built-in Economic Scenario Generator
- Reporting templates SCR standard QIS4 approach vs. internal model
- Stochastic Balance sheet and P&L reported (QIS4 Fair Value Base)
- Market risk is calculated, not allocated
- Detailed documentation describing the model kernel, assumptions and limitations of the model
- MVM calculation

- Gives the option to move to a full ReMetrica model for further customisation at a later stage.

Contact Details

Contact details:
Jurgen.Wielandts@aonbenfield.com (Benelux)
Briony.Shannon@aonbenfield.com (London)
Paul.Maitland@aonbenfield.com (London)
Marc.Beckers@aonbenfield.com (EMEA/London)
Emmanuel.Dubreuil@aonbenfield.com (France)
Stephan.Schuetzeck@aonbenfield.com (Germany)