



## Validating Internal Models: the Swiss Experience

GIRO, 19 September 2012

### Models



#### Reserves

Different models depending on

- data availability / quality
- line of business / market
- processes / claims mgmt
- ...
- actuarial judgment

→ 1<sup>st</sup> moment of a distribution

🔧 standard reserving model

#### Capital

Different models depending on

- data availability / quality
- line of business / market
- processes / products
- ...
- actuarial judgment

→ n<sup>th</sup> moment of a distribution

💀 standard solvency model

## Agenda



- Internal Models: Back to the Basics
- Internal Models: Validation

3

## Differences Solvency II & SST



	Solvency II	SST
start	2014 - 2015	2006 - 2008
available capital	"RTC"	"RBC"
required capital	VaR(99.5%) → "SCR"	tVaR(99%) → "TC"
risk horizon	1 year	1 year
insurance risk	✓	✓
market risk	✓	✓
credit risk	✓	✓
operational risk	✓	✗
scenarios	✗	✓
internal models	☹	☺

4

## Fallacies

- 💡 There is a perfect model
- 💡 All details must be modeled
- 💡 Internal models must be complex
- 💡 Internal models are expensive
- 💡 The solvency ratio can be used to compare companies
- 💡 All parameters are equal
- 💡 Internal models are static
- 💡 Internal models are difficult to validate

## Fallacies

- 💡 There is a perfect model
  - one size does not fit all
  - there is no TOE
- 💡 All details must be modeled
  - eventually start modeling noise
  - 80% solution ⇒ keep the overview
- 💡 Internal models must be complex
  - complexity = opportunity to hide / tune / divert attention
- 💡 Internal models are expensive
  - can be run in Excel
  - can be developed within 3 months



## Fallacies

- 💡 The solvency ratio can be used to compare companies
  - can't summarize a company in one figure
  - generates beauty contest
- 💡 All parameters are equal
  - some are more sensitive than others
    - ⊖ identify them
    - ⊕ focus on them
  - some have a broad confidence interval
    - ⇒ account for systematic risk
  - some are irrelevant
    - if the underlying model is wrong

## Fallacies

- 💡 Internal models are static
  - must adapt to changes (internal, external, SoA)
  - must not solve everything at once
    1. basics
    2. refine progressively ⇒ robust
  - must give opportunity to experiment
- 💡 Internal models are difficult to validate
  - opportunity to better understand business
  - peer comparison
  - be flexible
  - focus on the forest, not the trees

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13

## The Swiss Model Validation Experience

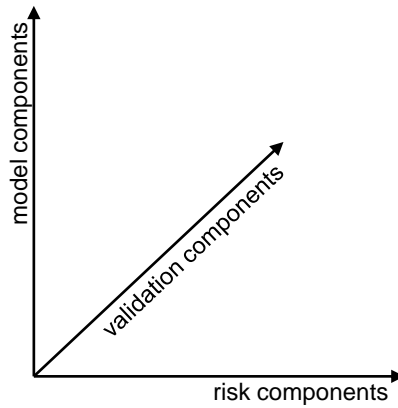


- 50% of the Swiss market players (~75) implement an internal model
- FINMA outsourced validation of specific components of the internal models
- FINMA asked very competent & sophisticated questions
- FINMA read every single line of the validation report
- Best to establish from the onset a close & transparent relationship with the regulator

14

## Validation Framework

- 3 dimensions



15

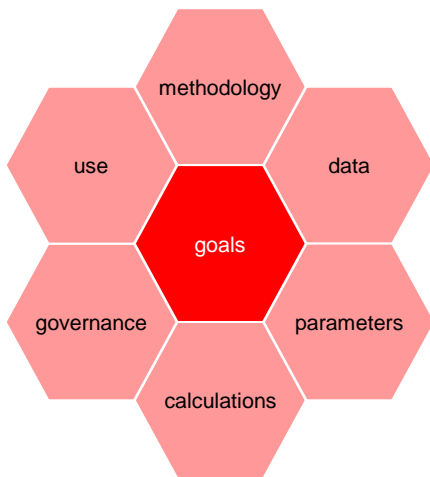
## Risk Components



- insurance
  - life
  - GI
- market
  - fixed / variable income
  - real estate / mortgages
  - FX
  - Interest rates / inflation
  - funky stuff
- credit
  - assets
  - reinsurance
- group
  - participations
  - intra-group reinsurance

16

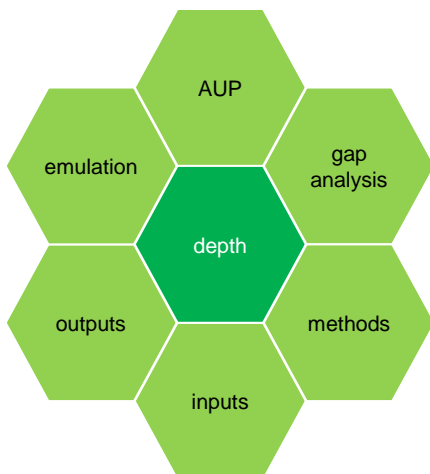
## Model Components



- parameters
  - reasonable
  - fitting
  - confidence interval
- calculations
  - convergence
  - reproducible
- governance
  - processes
  - responsibilities
- use
  - portfolio mgmt / R/I optimization / product development / M&A
  - ALM
  - CapAll / incentives & remuneration
  - pricing / UW limits

17

## Validation Components



- AUP ☹
- methods
  - appropriate
  - understood
  - well applied
  - benchmark with literature / peers
- input tests
  - processes & governance
  - reconcile
  - reasonable
  - sensitivity
- output tests
  - useful
  - in-line with expectations
  - robust

18

## Report



- scope
  - risk components
  - model components
  - validation components
- components
  - ...
  - tests
    - purpose
    - setup & method
    - expectations
    - results
    - findings
- summary of components
- findings
- recommendations
- peer comparison
- references

19

## Experience with FINMA



- 😊 load relief
- 😊 experience
- 😊 expertise
- 😊 mediation
- ! clear specs
- ! flexibility to redefine specs
- ! regular triangular meetings
- ! debriefing
- ! report = basis for regulatory decision
- ! concentrate on the essentials

20



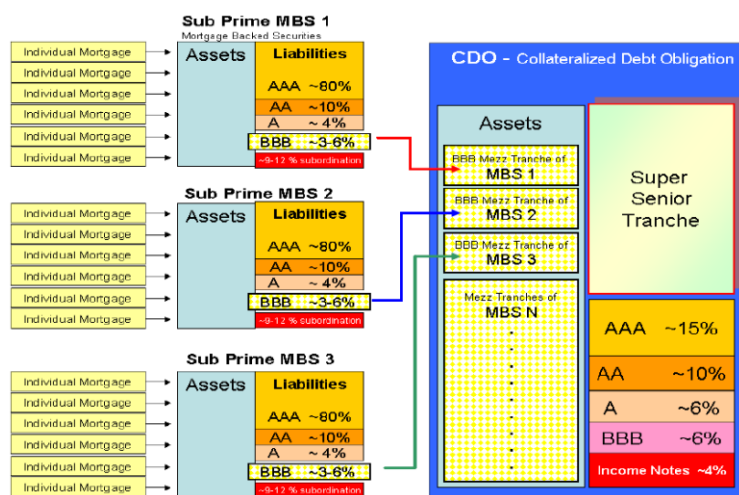
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21

## Models or trust?



22

## Conclusion



For **insurers** internal models are a unique opportunity to

- better understand their own business

For **regulators** internal models are a unique opportunity to

- better understand the regulated business
- diversify their own risk

23

## Contact



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24