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

→ 1st moment of a distribution

andard reserving model

Capital
Different models depending on
- data availability / quality
- line of business / market
- processes / products
- ...
- actuarial judgment

→ nth moment of a distribution

andard solvency model
Internal Models: Back to the Basics

Internal Models: Validation

Differences Solvency II & SST

<table>
<thead>
<tr>
<th></th>
<th>Solvency II</th>
<th>SST</th>
</tr>
</thead>
<tbody>
<tr>
<td>available capital</td>
<td>“RTC”</td>
<td>“RBC”</td>
</tr>
<tr>
<td>required capital</td>
<td>VaR(99.5%) → “SCR”</td>
<td>tVaR(99%) → “TC”</td>
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<tr>
<td>risk horizon</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>insurance risk</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>market risk</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>credit risk</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>operational risk</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>scenarios</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>internal models</td>
<td>❓</td>
<td>😊</td>
</tr>
</tbody>
</table>
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

- 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
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

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
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
Validation Framework

- 3 dimensions

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
Model Components

- **methodology**
  - 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

- **data**
  - 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
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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
Report

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

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
Agenda

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

Models or trust?

- Sub Prime MBS 1
- Assets: Liabilities
  - AAA ~50%
  - AA ~10%
  - A ~4%
  - BBB ~3.9%

- Sub Prime MBS 2
- Assets: Liabilities
  - AAA ~60%
  - AA ~10%
  - A ~4%
  - BBB ~3.9%

- Sub Prime MBS 3
- Assets: Liabilities
  - AAA ~60%
  - AA ~10%
  - A ~4%
  - BBB ~3.9%

- CDO - Collateralized Debt Obligation
  - Assets
  - Super Senior Tranche
    - AAA ~15%
    - AA ~10%
    - A ~6%
    - BBB ~6%
  - Income Notes ~4%
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

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