Financial Stability in the Insurance Sector

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Introduction: Why solvency?

- A changed situation on the capital markets
Low interest rates (e.g., CH, Germany)
Financial Stability in the Insurance Sector

• A changed policyholder's value proposition
  - Lower loyalty to present insurer
  - Increased price sensitivity
  - Better informed customers
  - Intensified competition with stronger consumer advertising
  - New distribution channels (internet platform, other financial service providers, etc.)
Financial crises and Insurance
Financial Stability in the Insurance Sector

- Dow Jones 30 index and main events of the financial crisis
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• Estimates by IMF

- Losses from current market turmoil estimated to around 1'405 Billion USD

- Depreciations in the banking sector of worldwide 700 Billion USD

- Necessary capital for the banking system in the next years: 675 Billion USD

- Worldwide losses of insurance companies are estimated to 150 Billion USD (realized and non-realized losses)
• Reasons

- Propensity to consume and global financing policy of the U.S.?

- Intransparent cross-linked capital markets?

- Incentive structures in corporations led by managers?

- Stochastic models and their interpretation?
  ....

- Search for "culprit"
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- Model risk

  - Stochastic models are all about probabilities
  
  - Typically only the pure randomness is modeled
  
  - Stochastic phenomena stay stochastic (with or without risk modeling)
  
  - Using similar models (IFRS, Solvency II etc.) forces systemic risk within the market

"All models are wrong, some models are useful"

George E. Box, born 1919
“It’s time we face reality, my friends. ...
We’re not exactly rocket scientists.”
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- Crises in the insurance industry
  - AIG

  September 16th 2008: Liquidity crisis with a downgrade of its credit rating

  Share price had fallen over 95% to 1.25 USD on September 16th 2008

  Federal Reserve Bank: First rescue package of 85 Billion USD (up to now: 182 Billion USD)

  Largest government bailout of a private company in U.S. history
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- Crises in the insurance industry

  - AIG

  Report of nearly 62 Billion USD loss in the fourth quarter of 2008 (largest quarterly loss in corporate history)

  Corporate loss in 2008: almost 100 Billion USD

  March 2009: AIG announced pay outs of 165 Million USD in executive bonuses (bonuses for the entire company could reach more than 1 Billion USD)
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- Crises in the insurance industry
  - Mannheimer Lebensversicherung

  Highly stock oriented

  DAX merely accounted 2‘200 points in 2003 (now: 5‘000)

  Hidden liabilities

  At the end: Absorption of the company by the Protektor-AG
  (safety institution financed by German life insurers)
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- Crises in the insurance industry (continued):
  - Equitable Life

  England’s oldest life insurer (founded 1762)

  Too high annuity guarantees had been promised to policyholders

  In addition: Guarantees have been insufficiently hedged

  In December 2002, the business line was closed ("run-off")
Solvency regulation has a special importance in the insurance sector:

Insolvency of an insurance company can lead to "ruin" of the policyholder.

Safety level of the insurance company directly influences the product quality.

Willingness to pay reacts extremely sensitive to variations of the safety level of the insurance company.
Why solvency regulations?

"Risk incentive problem"

- Starting point: Current EU and CH regulations (update is called "Solvency I") unsatisfactory for deriving minimum equity capital requirement

Example Solvency I (P/L Insurer)

Minimum Capital Requirements (MCR): 23% / 26% * Net-Claims ("loss index")

MCR < current equity capital (based on balance sheet)
Solvency – An overview

<table>
<thead>
<tr>
<th>Model Typology</th>
<th>Model Name</th>
<th>Introduced by</th>
<th>in</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Solvency I</td>
<td>EU</td>
<td>2004</td>
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<tr>
<td></td>
<td>Insurance Reform Act</td>
<td>Australia</td>
<td>1973</td>
</tr>
<tr>
<td>Static Factor Models</td>
<td>General Insurance Reform Act</td>
<td>Australia</td>
<td>2001</td>
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<tr>
<td>Risk-Based</td>
<td>Risk-Based Capital Standards</td>
<td>USA</td>
<td>1994</td>
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<td></td>
<td>Solvency Margin Standard</td>
<td>Japan</td>
<td>1996</td>
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<td></td>
<td>Financial Analysis Solvency Tools</td>
<td>(Proposal of NAIC)</td>
<td>1994</td>
</tr>
<tr>
<td></td>
<td>Capital Adequacy Ratio</td>
<td>(Proposal of AM Best)</td>
<td>1994</td>
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<td></td>
<td>German Insurance Assoc.-Model</td>
<td>(Proposal of German Insurance Assoc)</td>
<td>2005</td>
</tr>
<tr>
<td>Dynamic Cash-Flow-Based Models</td>
<td>Stress Testing</td>
<td>Germany (BaFin)</td>
<td>2002</td>
</tr>
<tr>
<td>Scenario Based</td>
<td>Financial Assessment Framework</td>
<td>Netherlands</td>
<td>2008</td>
</tr>
<tr>
<td>Principles Based</td>
<td>Cash-Flow Model</td>
<td>(Proposal of Cummins, Grace, and Phillips)</td>
<td>1999</td>
</tr>
<tr>
<td></td>
<td>Cash-Flow Model</td>
<td>(Proposal of Schmeiser)</td>
<td>2004</td>
</tr>
<tr>
<td>Combination of Static Factor Models</td>
<td>Enhanced Capital Requirement; Individual Capita Assessment</td>
<td>UK</td>
<td>2004</td>
</tr>
<tr>
<td>and Dynamic, Cash-Flow-Based Models</td>
<td>Swiss Solvency Test</td>
<td>Switzerland (BV)</td>
<td>2006</td>
</tr>
</tbody>
</table>

**Table 1: Overview of Solvency Systems**

Source: Eling, Schmeiser, Schmit, RMIR 2007
Solvency II – Objectives and current development status

- Objectives of Solvency II

<table>
<thead>
<tr>
<th>Development of solvency standards which are applicable in all countries under EU law; aim: fair competition within the insurance market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk-oriented determination of the minimum equity capital requirement</td>
</tr>
<tr>
<td>Improvement of risk management in insurance companies</td>
</tr>
<tr>
<td>Inclusion of qualitative aspects in the supervision process</td>
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<tr>
<td>Creation of incentives to develop internal risk models</td>
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</tbody>
</table>
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- **Solvency II time table**

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>End of &quot;discussion stage&quot;</td>
</tr>
<tr>
<td>2004-2011</td>
<td>Development of a detailed supervisory system influencing:</td>
</tr>
<tr>
<td></td>
<td>- Equity capital requirements</td>
</tr>
<tr>
<td></td>
<td>- Capital investment policy</td>
</tr>
<tr>
<td></td>
<td>- Product policy</td>
</tr>
<tr>
<td></td>
<td>- Reinsurance policy</td>
</tr>
<tr>
<td></td>
<td>- Underwriting policy of the insurer</td>
</tr>
<tr>
<td>2012 (?)</td>
<td>Completion of the legislative procedure</td>
</tr>
</tbody>
</table>
Following Basel II: "three-pillar structure"

- **First pillar:** equity capital requirement, capital investment, assessment of claim reserves

- **"Two level approach":**

  1. Definition of an absolute [minimum capital](#) (based on "Solvency I")

  2. Definition of a [target capital](#) by means of a standard approach or by means of an internal risk model
• Standard approach

- The standard approach is meant to adequately display the risk situation of the majority of insurance companies

- The approach must be applicable independent of company size or legal structure

- In the meantime, various design options for a standard model have been tested:

  Practicability of calculations
  Assessment of possible effects on balance sheet
  Evaluation of the applicability of the different models discussed so far by the participants of the field test
• Internal solvency models

- Standard approach can be substituted by internal models

- Alternative of a partial substitution is presently discussed

- Accreditation by supervisory authority necessary

- Sustainable internal risk model fulfills many wishes for insurance companies:
  
  External solvency verification
  Internal risk and profit control
  Corporate governance regulation in Switzerland
  …
• Supposed capital requirements depending on the modeling approach

Graduated intervention by the supervision

Solvency Capital Requirement SCR

Minimum Capital Requirement MCR

Internal risk model

Standard approach

Amount of equity capital
• Summary

1st pillar
Two-level approach
• Minimum Capital
• Solvency capital
- Internal models: Lower requirements?
- Impulses for the risk management of the insurance company?

2nd pillar
Control by the supervision
• Accreditation
• Review process
- Organizational consequences?
- Reregulation?

3rd pillar
Market discipline
• Market transparency
• Disclosure
- In principle: product rating
- Problematic incentive effects?
Workshop (4 groups, 10 minutes)

- Financial Stability and Insurance
  - What are the main reasons leading to the current financial crisis?
  - What are lessons to be learned from the financial crisis?
  - In which way can or should (solvency) regulation help to increase the stability and credibility of the insurance business?
  - Why are insurance companies on average less effected by the current financial crisis compared to the banking industry?
Swiss Solvency Test (SST)

- **Time table:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>2003</td>
<td>Start of the SST project</td>
</tr>
<tr>
<td>2004</td>
<td>Field test with 10 insurance companies</td>
</tr>
<tr>
<td>2005</td>
<td>Field test with 45 insurance companies</td>
</tr>
<tr>
<td>2006</td>
<td>Commencement of the new supervisory provision (Solvency I persists)</td>
</tr>
<tr>
<td>2006</td>
<td>Mandatory field test (Exceptions: SME)</td>
</tr>
<tr>
<td>2008</td>
<td>Application of the SST in all insurance companies</td>
</tr>
<tr>
<td>2011</td>
<td>Capital requirements have to be met</td>
</tr>
</tbody>
</table>
Application area of the SST

Insurance companies based in Switzerland in case they are under the control of the FINMA (CH regulator)

To apply to life / non-life / reinsurance

Time horizon: 1 year

Models differ for life / non-life / health insurance

Deduction of SCR plus SST report

MCR is provided by the Solvency I rules, whereas SCR > MCR
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• Principle-based supervision

  - 14 principles describe the objectives of the supervision and give basic definitions

  - Regulatory authority provides standard models

  - Companies shall (or must) employ individually customized internal models to determine the particular Solvency Capital Requirement SCR

  - Reinsurers have to utilize internal risk models
• Basis

- Combination of factor model and scenario model

- Basic quantities:

  \[ RBC_0 \text{("risk-bearing capital", actual size } t = 0) \text{ and SCR} \]

- Requirement: \( RBC_0 > \text{SCR} \)

- SCR results from the modeling of the RBC (in one year) as a distribution function and by specification of a risk measure (Tail-Value-at-Risk)
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Market Consistent Data

Standard Models or Internal Models

Mix of predefined and company specific scenarios

Risk Models
- Market Risk
- Credit Risk
- Nonlife
- Life
- Health

Valuation Models
- Market Value Assets
- Best Estimate Liabilities
- MVM

Scenarios

Output of analytical models (Distribution)

Aggregation Method

RBC, SCR and SST Report

Source: FINMA
• 1st step: From the commercial balance sheet to the market value balance sheet

- The risk-bearing capital (RBC₀) is defined as the difference between the market value of the assets and the best-estimate value (present value) of the liabilities.
2nd step: From the presence view to the future based on expected values

Transformation to a future view

Market value balance sheet today

Market value balance sheet in one year (deterministic)
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- 3rd step: From the deterministic to the stochastic future view

Market value balance sheet in one year (stochastic)

Aggregated variation of RBC
• 4th step: Comparison of RBC with SCR

\[
\text{TVAR} = \text{Risk measure "Tail-Value-at-Risk" based on distribution of the RBC in } t = 1 \ (1\% \text{ level})
\]
\[
\text{MB} = \text{Minimum amount (run-off costs in case of an insolvency)}
\]
\[
\text{SCR} = \text{TVAR} + \text{MB}
\]

\[
\text{RBC}_0 > \text{SCR} \quad \text{Requirement}
\]
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\[ X_1 = \frac{1}{1+r} \left[ RBC_1^F - RBC_0^F \right] \]

\[ RBC_1 = A_1^F - L_1^F \]

\[ TVAR_{\alpha=1\%} = -E \left( X_1 \left| X_1 \leq VaR_\alpha \right. \right) \]

\[ F^{-1}(\alpha) = \inf \left\{ x : F(x) \geq \alpha = 1\% \right\} \]

\[ SCR = TVAR_{\alpha=1\%} + MB \]

\[ RBC_0^F = A_0^F - L_0^F > SCR \]

For formula lovers: The SST at a glance

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Theory

Expected value

\( f(x) \)

\( VaR_{1\%} \)

\( TVAR \)

Institute of Insurance Economics

University of St. Gallen
Insurance and the credit crisis: Ten Consequences for Risk Management and Supervision

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<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1)</td>
<td>We need to strengthen risk management and supervision</td>
</tr>
<tr>
<td>2)</td>
<td>We need to take care of model risk and non-linearities</td>
</tr>
<tr>
<td>3)</td>
<td>We need easy to use and understandable risk management</td>
</tr>
<tr>
<td>4)</td>
<td>Right incentives are needed</td>
</tr>
<tr>
<td>5)</td>
<td>Take care of the lessons from portfolio theory – Risk, return, and diversification</td>
</tr>
</tbody>
</table>
6) Principles instead of rules – Solvency II and SST are the right steps

7) A concept for a controlled run-off in the insurance industry is needed

8) Financial conglomerates need to be supervised at the group level

9) No regulatory arbitrage in financial services markets

10) Transparency, market discipline, and accountability is needed
Enterprise Risk Management ERM

1st Line of Defense
- Risk Management
  - Executive Management
  - Business Units

2nd Line of Defense
- Risk Oversight
  - Board of Directors
  - Risk Committee
  - Chief Risk Officer

3rd Line of Defense
- Risk Assurance
  - Audit Committee
  - Internal Audit
  - External Audit

Source: University of St. Gallen Integrationsseminar Mai 2009
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1st Line of Defense
- Risk Management
  - Promote risk culture and risk-reward thinking
  - Promote a culture of adhering to limits and managing risk exposure
  - Monitoring of risk positions
  - Identify and evaluate business risks
  - Implement adequate risk controls

2nd Line of Defense
- Risk Oversight
  - Watchdog and trusted advisor
  - Understands business and actively challenges initiatives
  - Enterprise wide risk view across all risks
  - Leads the development, implementation and maintenance of ERM
  - Communication with first Line of Defense, but independent risk viewpoint

3rd Line of Defense
- Risk Assurance
  - Independent oversight function with enforcement ability
  - Ability to link business and risk with IT and process know-how
  - Assurance for effectiveness of internal control systems

Source: University of St. Gallen
Integrationsseminar Mai 2009
• Complex system within the ERM

- Capital risk transfer instruments (CRTIs) between parent companies and subsidiaries (AIG had 4,000 subsidiaries!)

- New rules for group supervision in the EU (Solvency II) and CH (Group SST)
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• Consequence: Growing relevance of enterprise risk management, in particular in insurance groups
  - Prevention of a mere "silo risk management"
  - Recording and valuation of group-internal finance and risk transfer
  - Establishment of transparency, particularly in complex risk structures
Conclusion

• Solvency situation of the insurer represents significant quality characteristic for the product “insurance”

• In the future, financial situation will become more transparent and thus an important competitive factor

• Current credit crisis demands a review of traditional risk management tools

Thank you very much for your attention
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...Lemme get this straight—
I give you one cigarette and
next week you guarantee me ten?!!!

...It’s that simple...

Madoff behind bars... day one
• Kontakt

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