Swiss Solvency Test

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- Risk Based Supervision
- Concept of the Swiss Solvency Test
- Experiences from the Field Tests
- Internal Models
Timeline of the SST Development

2003
- Herbert Lüthy becomes new director of FOPI (Federal Office of Private Insurance) in Fall 2002, reorientation to prudential supervision
- Start of Swiss Solvency Test project Mai 2003 with participation of industry, actuarial and insurance association, consulting companies and others
- Conceptual work finished end of 2003
- Up to Mai 2004, development of first version of the standard model
- Field test 2004 with 10 insurers, supported by consulting companies
- Adaptations and improvements on the standard model and the methodology of the SST
- Field test 2005 with 45 insurers covering approx 90% of the market
- Further development underway on requirements on internal models and group effects
- Insurance supervision act to be implemented on 1.1. 2006

2004
- Setting up of Swiss Standard Board as a consultative body composed of industry representatives and regulators

2005
- Field test 2004 with 10 insurers, supported by consulting companies
- Setting up of Swiss Standard Board as a consultative body composed of industry representatives and regulators

Purpose of Insurance Regulation

Policy holder protection by ensuring that
- promises to policy holders will be fulfilled with a high probability
- consumer protection
- a choice of products are available by promoting a thriving and innovative insurance market

Foster trust in insurance market by ensuring that
- promises are kept
- stakeholder get a realistic picture of the companies

Having a level playing field by
- treating companies equally in the sense that all – small or large - have to fulfill regulatory requirements
- requiring similar capital requirements from companies having similar risks
Risk Management

Wir müssen wissen. Wir werden wissen
David Hilbert

Risk management is responsible for identifying, assessing, analyzing, quantifying and then transferring, mitigating or accepting of risk

Risk management has to be embedded within the culture of the company

For risk management to be effective, there needs to be a risk culture such that senior management wants to know and risk management is able to tell the “truth” about the risks

Senior management and the board have to ensure that there is a honest dialog and transparency regarding risks within the company

Risk management is not solely about control but about confronting issues and uncomfortable truths openly and honestly

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Implications of Principles vs Rules

**Principle-based standards describe the objective sought in general terms and require interpretation according to the circumstance.**

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<tr>
<th>Principle-based standards</th>
<th>Rule-based standards</th>
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<td>Risk Based = Capital Requirement</td>
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<td>Objective</td>
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Principles will have to be interpreted according to their intention, not legalistically by senior management and by the supervisor

Any rule based framework, by taking away responsibility from companies, tends to be arbitrated again and an “arms race” between the rule-makers and the arbitrageurs will lead to a proliferation of rules to fill loop-holes

If principles will be interpreted legalistically by companies, regulation will deteriorate rapidly to a rule-based, compliance driven framework with high compliance and legal costs for all

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Requirements of the SST

<table>
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<th>As simple as possible, as complex as necessary</th>
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<td>Incentivizes risk management</td>
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<td>Requirements follow from regulatory intentions</td>
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<td>Economic View</td>
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<td>Capturing all relevant risks and risk mitigations</td>
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<td>Capturing group effects</td>
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Reliance on internal models for complex companies (e.g. groups, reinsurers,...), use of a standard model for small to mid-sized companies that is risk sensitive and rewards risk management

Clearly stated principles, responsibility of adherence to principles on senior management, avoid rules and limits which can be arbitraged against

Avoid/minimize effects of legacy regulation (e.g. limits on investment, inconsistent valuation rules, ...)

Market value margin type risk margin, SCR as pure one-year risk, no implicit prudence margins

Market consistent valuation of assets and liabilities, total balance sheet approach

Allows for reinsurance, ALM, hedging to be taken into account via a risk-specific standard model and by an internal model

Allows for group diversification given fungibility restrictions, taking into account all relevant intra-group risk and capital transfer instruments
Development Process

Ideally, insurers and regulators should develop solvency framework together. Involve all stakeholders as far as possible: accountants, actuaries, CEOs, CROs, investors, risk managers,...

A prerequisite of this approach is the willingness of all to:

- enter into a dialogue and learn from each other;
- fight out controversial points openly and being able to compromise;
- accept differing points of views (e.g. shareholder view vs. policy holder protection).

FOPI opened several channels:

- Swiss Standard Board: A panel consisting of industry representatives, consultants and regulators to discuss open problems
- Several working groups composed of industry representatives and regulators to formulate guidelines for SST
- Increased involvement of FOPI in work by Swiss Actuarial Association
- Public presentations, seminars, workshops,...

The SST Concept: Principle-Based

The more laws and order are made prominent, the more thieves and robbers there will be, Lao-tzu

The SST is defined not by the Standard Model but by underlying principles:

- Principles define concisely the objectives
- Definition of terms and concepts so that meaning and possible interpretation of principles become clear
- Guidelines help in interpretation
- Standard Model allows use of Solvency Test also by small companies
The SST Concept: Principle-Based

1. All assets and liabilities are valued market consistently
2. Risks considered are market, credit and insurance risks
3. Risk-bearing capital is defined as the difference of the market consistent value of assets less the market consistent value of liabilities, plus the market value margin
4. Target capital is defined as the sum of the Expected Shortfall of change of risk-bearing capital within one year at the 99% confidence level plus the market value margin
5. Under the SST, an insurer’s capital adequacy is defined if its target capital is less than its risk bearing capital
6. The scope of SST is legal entity and group / conglomerate level domiciled in Switzerland
7. Scenarios defined by the regulator as well as company specific scenarios have to be evaluated and, if relevant, aggregated within the target capital calculation
8. All relevant probabilistic states have to be modeled probabilistically
9. Partial and full internal models can and should be used
10. The internal model has to be integrated into the core processes within the company
11. SST Report to supervisor such that a knowledgeable 3rd party can understand the results
12. Disclosure of methodology of internal model such that a knowledgeable 3rd party can get a reasonably good impression on methodology and design decisions
13. Senior Management is responsible for adherence to principles

The SST Concept: General Framework

Standard Models for insurance risk:
Nonlife: Split into small and large claims and catastrophes
Life: biometric and policy holder behavior risk modeled using multivariate normal approach
Credit risk calculated using Basel II or portfolio model (e.g. credit metrics)
Asset-Liability Model using covariance approach

Mix of predefined and company specific scenarios
Scenarios add approx. 15% (median) to capital requirement.
Credit risk of reinsurers’ default modeled using a scenario (adding btw.) 0.01% and 7% to capital requirement
The SST Concept: Market Value Margin

**Definition:** The market value margin is the smallest amount of capital which is necessary in addition to the best-estimate of the liabilities, so that a buyer would be willing to take over the portfolio of assets and liabilities.

**Market Value Margin = cost of the present value of future regulatory risk capital associated with the portfolio of assets and liabilities**

\[
MVM = CoC \cdot \sum_{t=2}^{\infty} ES[\Delta RBC(t)]
\]

Future regulatory risk capital entering calculation of the market value margin at \( t=0 \)

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- Development of the Framework
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Impressions from the Industry

Some have a somewhat reluctant attitude:

- SST will favour large companies that have already sophisticated risk-based management systems in place …’
- ‘Small companies without internal model will be punished by the Standard Approach of SST…’
- ‘SST may call for a complete overhaul of risk management …’
- ‘Technical implementation can become a problem …’
- ‘… transparency and fair values will further increase the volatility of earnings …’
- ‘… complexity of internal models will allow companies to game the system …’
- ‘SST leads to complexity where simplicity is required …’
- ‘SST will increase the minimum Solvency level …’

We would like to thank Andreas Kull (Ernst&Young) for the permission to use this slide

Impressions from the Industry

Some see it in a positive light:

- ‘…facilitates more efficient use of risk capital …’
- ‘Facilitates company wide risk culture and dialogue…’
- ‘… will reward companies that have a comprehensive risk management in place…’
- ‘… internal models are an excellent management tool and can be a competitive advantage…’
- ‘Rating dependent premiums will gain acceptance.’
- ‘Increased transparency in the insurance sector may reduce cost of capital for the sector as a whole…’
- ‘… will lead to increased transparency in an insurer's financial strength/weakness…’
- ‘… is an effective regulatory instrument to prevent insolvencies…’

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Results of the Field Tests: Principles vs Rules

**Principles work:**

Example: The requirement for the SST report was to send to the supervisor a report detailing the assumptions, calculations, simplifications etc. such that a knowledgeable 3rd person can understand the result.

Result: The overwhelming majority of reports were of excellent quality.

Requiring adherence to principles often leads to better quality and better company specific results than fixed rules which tend to foster a climate where execution mainly deals with pure compliance.

Results of the Field Tests: Volatility of SST

**Is economic solvency more volatile than Solvency 1?**

Sample: Solvency 1 ratios of approx. 100 life and nonlife companies over the last 5 years:

- The average standard deviation of the change of the Solvency 1 ratio over the 5 year mean is approx 30%.
- 1/3 of the companies had at least one yearly change of Solvency 1 ratio in excess of 50% during the last 4 years.
- 10% of the companies had at least two years, where the Solvency 1 ratio changed by more than 50% during the last 4 years.
- For approx half of the companies is the minimal Solvency 1 ratio during the last 5 year less than half of the maximal Solvency 1 ratio.

For 10% of the companies is the minimal solvency 1 ratio during the last 5 year less than 25% of the maximal solvency 1 ratio.

Results do not deviate significantly between life and nonlife companies.
Results of the Field Tests: Scenarios

**Effect of Scenarios Expressed as Fraction of RBC**

Scenarios evaluated by companies:
1. Longevity
2. Morbidity
3. Daily Allowance
4. Bus Accident
5. Stadium Cat
6. Hail
7. Barrage Cat
8. Industrial Accident
9. Pandemic
10. Financial Distress
11. Reinsurance
12. Terrorism
13-14. Own Scenarios

**Market Value Margin**

**Market Value Margin / Best Estimate vs Market Value Margin / ES[RBC], based on provisional data of Field Test 2005**

X-axis: MVM divided by best estimate of liabilities

Y-axis: MVM divided by 1-year risk capital (SCR)
Scope of Regulatory Models: Group

Subsidiaries: Can be in all parts of the world, home country regulator cannot calibrate easily (if at all) a standard model to different risk profiles. Mix of legal entity risk to risks emanating from subsidiaries is widely varying from group to group. Capital flow between subsidiaries and parent is restricted.

Branches: Can be in all parts of the world, home country regulator cannot calibrate easily (if at all) a standard model to different risk profile. Mix of parent country risk to risks emanating from branches is widely varying from company to company.

Risk specific standard model for group is extremely difficult to develop since in addition to legal entity model restrictions on fungibility of capital need to be taken into account.

Risk specific standard model for legal entity is very difficult to develop.

Parent Company: Standard model can be calibrated using local, country specific statistics and models.

Risk specific standard model for legal entity is very difficult to develop.

Capital can flow (nearly) freely between branches and parent company and legal entity can be considered to be one risk-entity. Diversification between parent and branches.
Group Effects

Group effects have to be captured consistently: for group capital requirements and for subsidiaries which are part of a group

-> take into account all formal, legally binding capital and risk transfer instruments

A group can set up web of risk and capital transfer instruments such that regulatory capital requirements for the group and for its legal entities is optimized

Internal Models: Regulatory Challenges

When allowing internal models for target capital calculation, the problems a regulator faces are:

- How to ensure that the results are comparable between different companies
- How to ensure, that a company is not punished if it models risks more conscientiously than its peers
- How to be able to distinguish between acceptable and not acceptable models
- Finding the criteria that show that a model is deeply embedded within a company
Internal Models

**Even worse than having a bad model is having any kind of model – good or bad – and not understanding it**

If internal models are used for regulatory purposes, it will be unacceptable if the model is not understood within the company.

Senior management is responsible for internal models and the review process. The review of internal models will be based on 4 pillars:

- Internal Review;
- External Review;
- Review by the Supervisor;
- Public Transparency.

There needs to be:

- deep and detailed knowledge by the persons tasked with the upkeep and improvement of the model;
- Knowledge on the underlying assumptions, methodology and limitations by the CRO, appointed actuary etc.
- Sufficient knowledge to be able to interpret the results and awareness of the limitations by senior management and the board.

Companies using internal models have to disclose publicly the methodology, valuation framework, embedding in the risk management processes etc.

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**Internal Models: Public Transparency**

The public disclosure requirements on internal models should be principles based. The amount of information to be disclosed should be based on the principle that a knowledgeable person can get a reasonably good impression on the basic methodology of the internal models as well as on the major design decisions. In particular a description of the following main features should be provided:

- valuation methods (for assets and liabilities);
- risk measure;
- criteria for the choice of parameters and distribution functions;
- major scenarios and risk factors and the assumptions on their dependencies;
- aggregation methods;
- embedding into the company's risk management processes;
- scope of the model and which relevant risks are not quantified.