

Swiss Solvency Test

Schweizer Solvenz Test
Test suisse de solvabilité
Proba di solvibilità svizzera
瑞士偿付能力测试

Philipp Keller, Federal Office of Private Insurance
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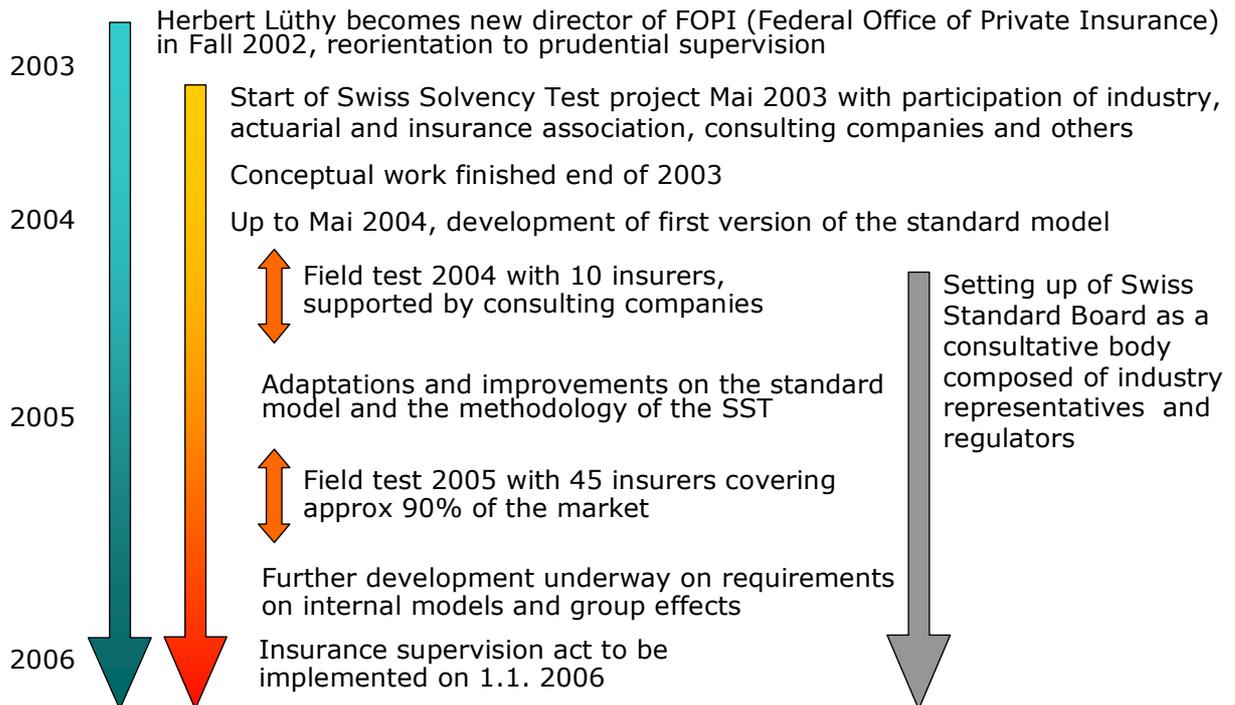
- Risk Based Supervision
- Concept of the Swiss Solvency Test
- Experiences from the Field Tests
- Internal Models



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Timeline of the SST Development



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

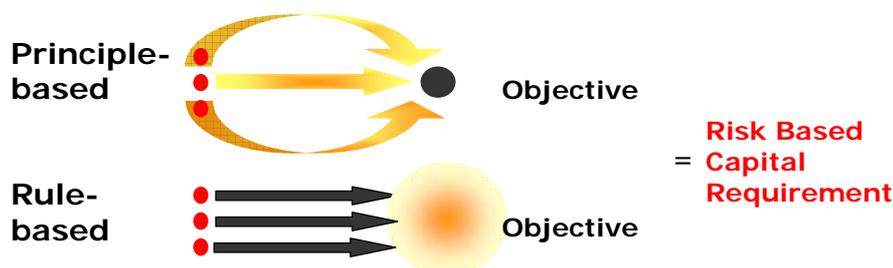


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Implications of Principles vs Rules

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



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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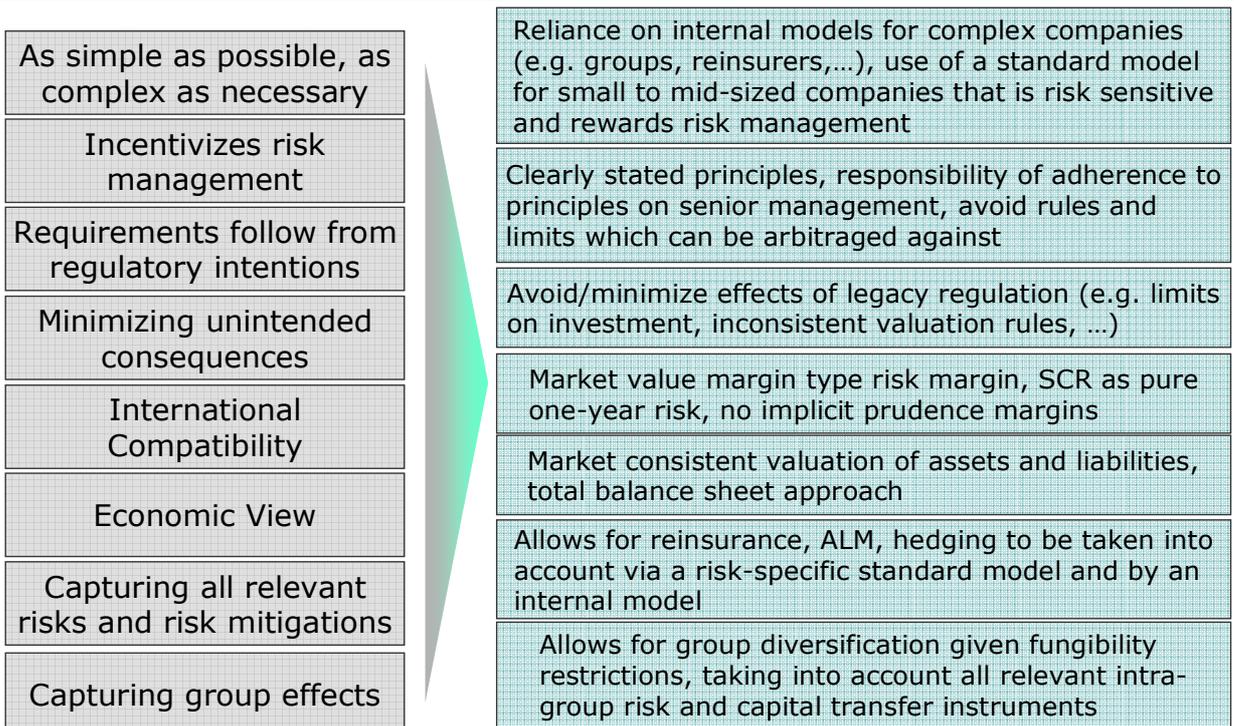
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- Risk Based Supervision
- Concept of the Swiss Solvency Test
 - Requirements
 - Principles
 - General Framework
 - Market Value Margin
- Experiences from the Field Tests
- Internal Models



Requirements of the SST



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

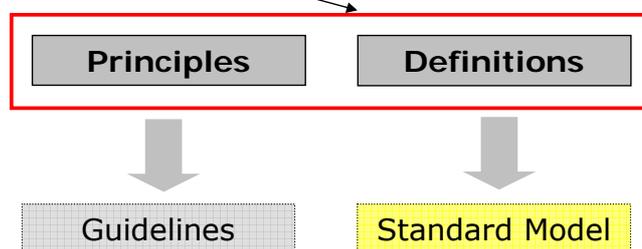
Public presentations, seminars, workshops,...



The SST Concept: Principle-Based

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

Core of the Solvency Test



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

- Defines Output**
 - 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
- Defines How-to**
 - 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
- Transparency**
 - 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
- Responsibility**
 - 13. Senior Management is responsible for adherence to principles



The SST Concept: General Framework

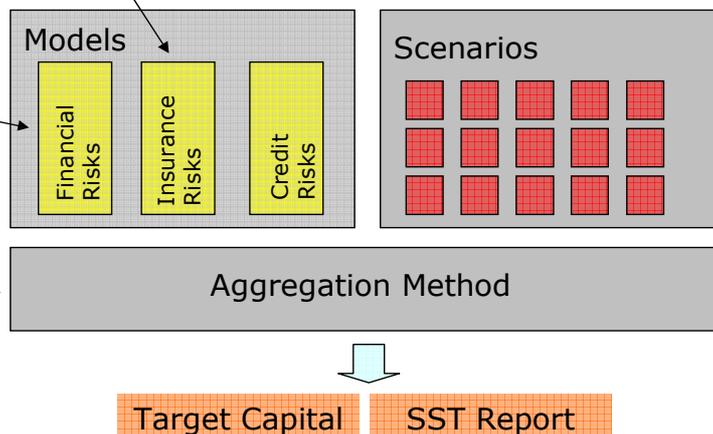
Standard Models for insurance risk:
 Nonlife: Split into small and large claims and catastrophes
 Life: biometric and policy holder behavior risk modeled using multivariate normal approach

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

Credit risk calculated using Basel II or portfolio model (e.g. credit metrics)

Asset-Liability Model using covariance approach

Aggregation by weighted average of different distribution functions (weight = probability of scenarios occurring)

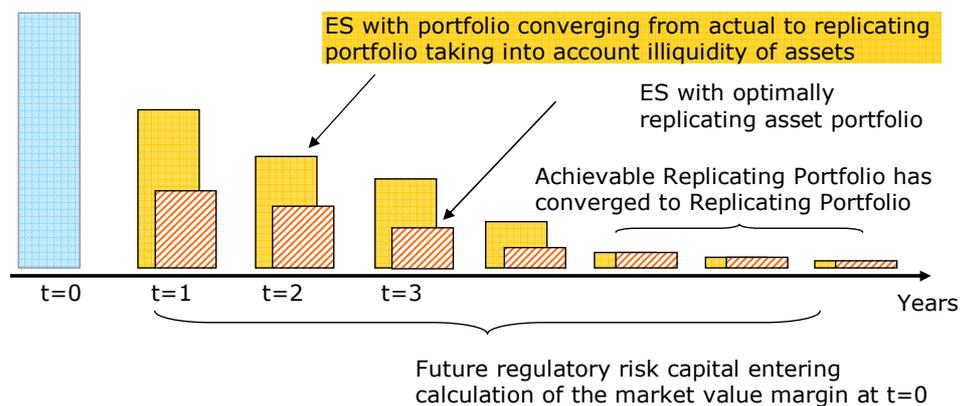


The SST Concept: Market Value Margin

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

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



Contents

- Why Risk Based Supervision
- Development of the Framework
- The Major Principles
- **First Results**
 - Impressions from the Industry
 - Principle-based Approach
 - Some Quantitative Results
- Future Challenges



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



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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



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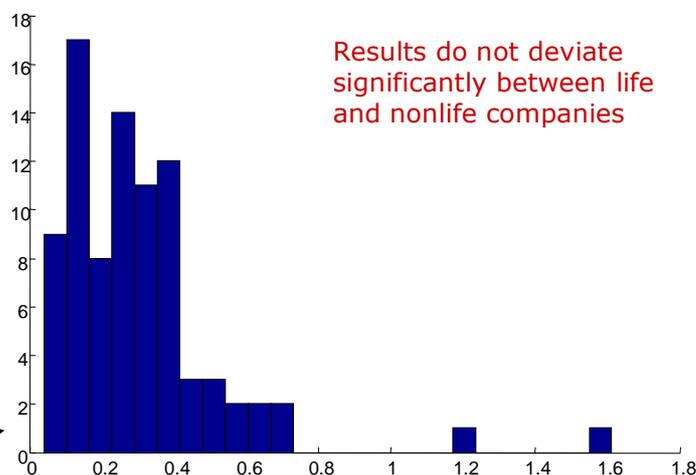
Results of the Field Tests: Volatility of SST

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%
- 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.
- 1/3 of the companies had at least one yearly change of Solvency 1 ration 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.

Histogram of the standard deviation of the change of solvency 1 ratios around the 5 year mean



Results do not deviate significantly between life and nonlife companies



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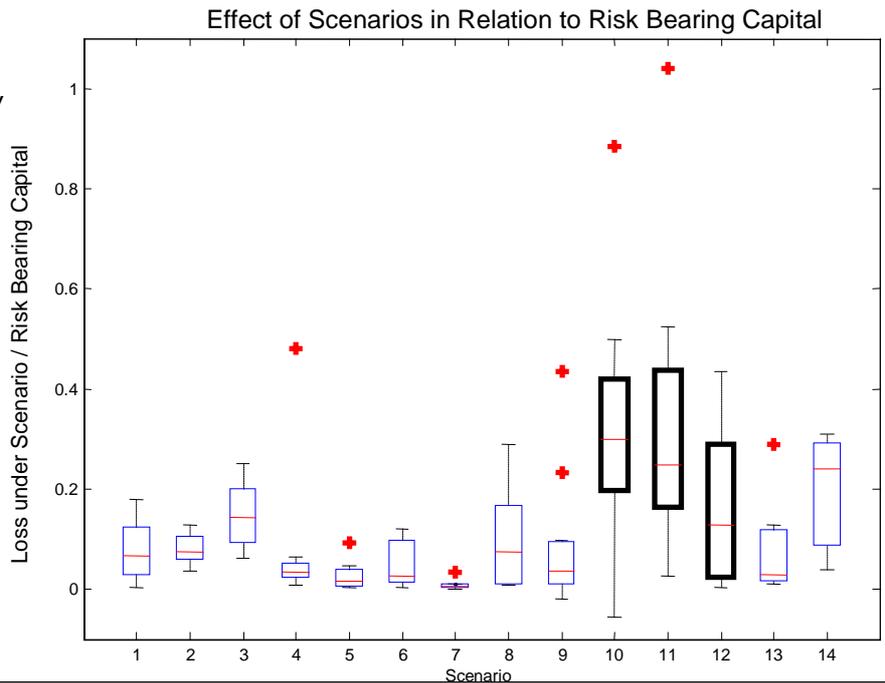
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Results of the Field Tests: Scenarios

Effect of Scenarios Expressed as Fraction of RBC

Scenarios evaluated by companies

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



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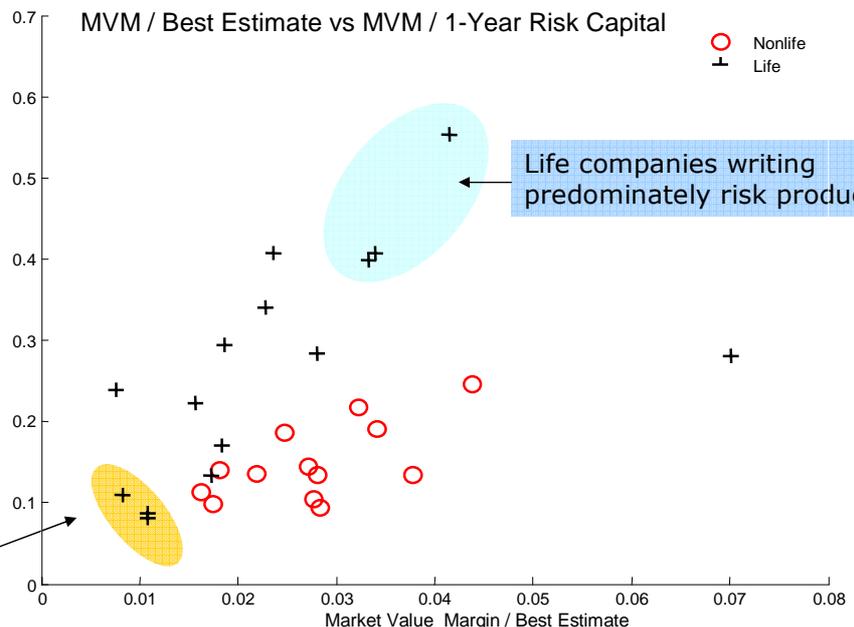
Market Value Margin

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)

Life companies writing predominately savings products



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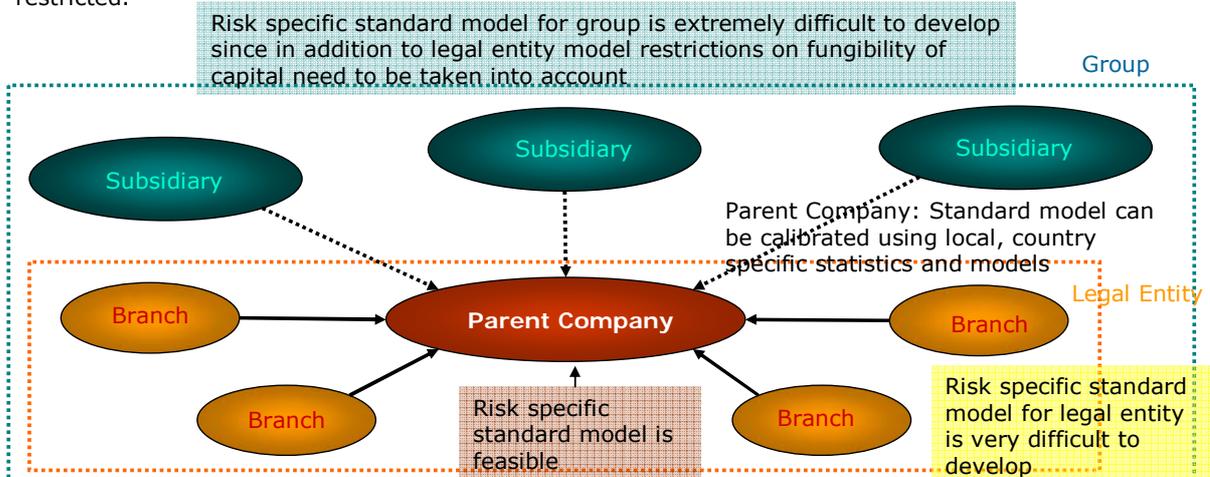


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Scope of Regulatory Models: Group

Subsidiaries: Can be in all parts of the world, home country regulator can not 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 can not 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

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.



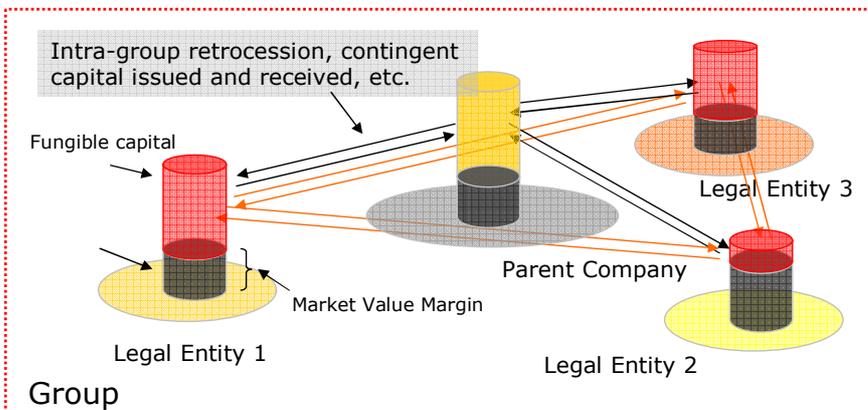
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Group Effects

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

Intra-Group Capital and Risk Transfer Instruments:

- Intra-group Retrocession
- Dividends
- Guarantees
- Loans
- Participations
- Issuance of surplus notes
- securitization of future cash flows / earnings
- sale / liquidation of a business



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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



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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

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

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.

The regulator is responsible for ascertaining that the review process is appropriate

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



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.

