

# A Critical View on the New Solvency Regulations: comparison between Solvency II and SST

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## Agenda

1	New context for the industry and Solvency II
2	The Swiss Solvency Test (SST)
3	Comparison between Solvency II and SST
4	Adapting the solvency regulation to time of crisis
5	Conclusion: Challenges for Academic Research

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## A Changing Environment

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- ▶ Environment of the insurance industry in the European Union has undergone fundamental changes in the past few years.
- ▶ Deregulation in the 90ies gave the insurance companies more freedom and independence:
  - New opportunities
  - New challenges and increased self-responsibility
- ▶ Insurance companies and regulatory authorities are equally affected by the changes.
- ▶ In-force European regulations was only partly successful (insolvency of Mannheimer!, difficulties of life insurances in the UK).
- ▶ Under the name “Solvency II”, a new supervisory framework has been approved by the European parliament last year.

## Why new solvency regulations?

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- ▶ In-force solvability rules had a number of *deficiencies*. Examples:
  - Premium-based methods hardly reflect the true risk.
  - Factor-based methods are unable to adequately take into account complex forms of risk transfer.
  - Investment risks are not included in the required solvency.
  - Dependencies between assets and liabilities or between lines of business are not taken into account.
- ▶ As a result, there was an *unrealistic or wrong estimation* of capital levels. On the other hand, insurers already have technically mature methods for risk analysis and capital allocation.
- ▶ Moreover: Because of different regulations, there are opportunities for *regulatory arbitrage* between banking and insurance industry (e.g. credit insurance).
- ▶ Financial crises (1998, 2001, 2008) emphasize the need for *holistic risk management*.

## Solvency II – A new European Regulation

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- ▶ Overall goal: *Consumer protection*.
- ▶ Creation of a *harmonized supervisory system* throughout Europe based on an evaluation of the actual risk situation of each insurance company.
- ▶ Extending the existing quantitative supervisory system through the development of companies' own internal risk model and risk management processes.
- ▶ Adding a qualitative aspect to the supervisory system through internal risk management system requirements.
- ▶ The level 1: approval of the directive taken in April 2009. Implementation (level 2) still on-going discussion, but first proposal published in March 2010.

## Changes compared to Solvency I

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- ▶ Solvency II is *principle-based* in contrast to the *rule-based* system of Solvency I.
- ▶ Economic and *market-consistent valuation* of all material risks.
- ▶ Reinsurance and other risk mitigation instruments fully applicable under Solvency II (no more 50% cap on non-life reinsurance).
- ▶ Consideration of diversification effects.
- ▶ Investment risks are comprehensively taken into account, together with credit risk for both the investments and the liabilities (for instance, credit risk of reinsurers).

# The three pillars of Solvency II

## 1. Quantitative

Solvency Requirements

Standard approach or internal model to Solvency Capital Requirements (SCR)

## 2. Qualitative

Supervisory Process

Own Risk and Solvency Assessment (ORSA)

## 3. Transparency

Market Transparency

Disclosure requirements to enforce market discipline

Enterprise Risk Management (ERM) should replace the traditional accounting-based focus, which will facilitate a stringent economic and holistic approach for managing risk.



Success will have to be measured on return on risk capital and not on combined ratio and investment income.

## Solvency II: Pillar 1

### Quantitative requirements

- ▶ Solvency capital shall be derived from the actual **total risk** and shall essentially correspond to the economic risk capital.
- ▶ Market-based valuation approach (‘mark-to-market’).
- ▶ Distinction between **minimum** and **target solvency capital**.
- ▶ Minimum capital determined by a simple standard model (this was the initial idea; CEIOPS has slowly changed it to make the standard model more demanding in terms of capital).
- ▶ Target capital can be determined by **internal risk models**. Supervisory system shall favour the use of such models (this is the spirit of Solvency II, not agreed by all regulators).
- ▶ Interplay of assets **and** liabilities shall be taken into account (ALM).

## Solvency II: Pillar 2

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### Supervisory process and internal risk management

- ▶ Insurance companies shall be made responsible for implementing risk management processes (ORSA). Examples:
  - Actuarial principles regarding reserving practice
  - Asset Liability Management (ALM)
- ▶ Supervisory processes are guided by capital requirements and the actual capital margin (capital, which counts towards meeting requirements).
  - Supervisory process shall be more guided by the individual risk profile of a single company.
  - Intervention zone between minimal and target solvency capital, within which the supervisory authority can intervene before the company falls short of the minimum solvability capital.

## Solvency II: Pillar 3

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### Market transparency and discipline

- ▶ Aimed at increasing transparency in the insurance industry.
- ▶ The goal of the disclosure of the actual risk and return situation is an increase of the market transparency that shall lead to an increased market discipline.
- ▶ Strongly follows Basel II and future IFRS 4 guidelines.
- ▶ Remark: The EU Commission seems to be aware of the dangers that increased disclosure requirements can have (e.g. capital drain in the case of a deterioration of the risk situation of an insurance company).
- ▶ But, the pro-cyclicality of regulation is not really addressed yet.
- ▶ Still a moving target (implementation measures not yet published).

## Context of Solvency II

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- ▶ Solvency II is part of a changing regulatory environment:
  - Basel II (regulatory framework for banks),
  - IFRS 4 (International Financial Reporting Standard, currently under development).
  
- ▶ Solvency II is a European project:
  - Solvency II is initiated and driven by the EU Commission. Solvency II is developed in close cooperation with national supervisors and international professional bodies (e.g. actuaries).
  
- ▶ Solvency II comes in the middle of a financial crisis, where a lot of the models are put into question.
  
- ▶ Solvency II is an ambitious project:
  - Aims at a risk-based determination of adequate capital levels.
  - Solvency II is still under development (level 2). In force by 2012 only.

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## The SST Concept: Principle-Based (1/2)

### Definition of 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. *The market value margin* is approximated by the cost of the present value of future required regulatory capital for the run-off of the portfolio of assets and liabilities
6. Under the SST, an insurer's *capital adequacy* is defined, if its target capital is less than its risk bearing capital
7. The *scope of SST* is legal entity and group / conglomerate level domiciled in Switzerland
8. *Scenarios* defined by the regulator as well as company specific scenarios have to be evaluated and, if relevant, aggregated within the target capital calculation



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## The SST Concept: Principle-Based (2/2)

### Definition of use of internal model

9. All relevant probabilistic states have to be modeled probabilistically
10. Partial and full internal models can and should be used. If the SST standard model is not applicable, then a partial or full internal model has to be used
11. The internal model has to be integrated into the core processes within the company

### Transparency

12. SST Report to supervisor such that a knowledgeable 3rd party can understand the results
13. Disclosure of methodology of internal model such that a knowledgeable 3rd party can get a reasonably good impression on methodology and design decisions

### Responsibility

14. *Senior Management is responsible* for adherence to principles

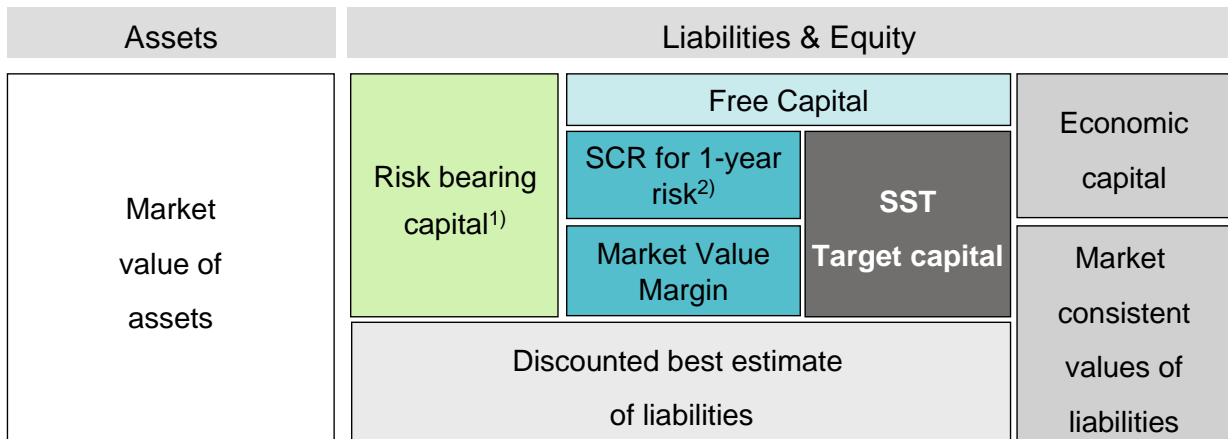


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# SST model - Terminology

What is ultimately calculated for SST?



1) Risk bearing capital is the economic capital and is exposed to risk. In contrast, Risk adjusted capital (RAC) is commonly used to denote the capital necessary to sustain a given risk exposure (as defined in ALM model).

2) Finma's Solvency Capital Requirement (SCR) defines the capital necessary to sustain the risk exposure of the risk bearing capital over 1 calendar year. The RAC, though conceptually related to the SCR, differs from the SCR in at least two ways: The 1-year RAC takes into account the ultimate risk rather than accepting a 1-year horizon and considers in addition the MVM. Second, the RAC values certain classes of liabilities nominally and not economically.

## Group Issues

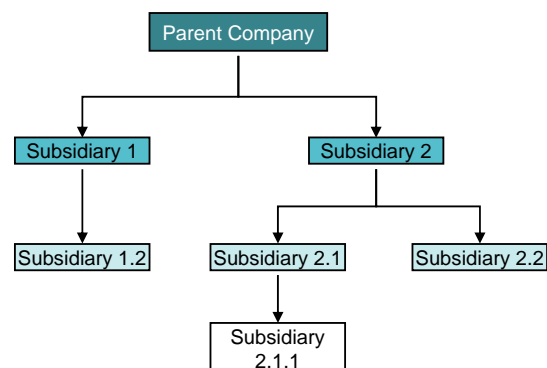
How to model the economic capital of a group?

A group is more than just a collection of legal entities: It is defined by the structure of the group, the ownership relationships and the web of implicit and explicit obligations and expectations between the different legal entities

A legal entity in the group is exposed to group risk:

- The risk that due to a financial distress within the group, the group will draw out capital from the subsidiaries
- The risk (in a positive sense) that in case of financial distress of the legal entity, it will receive group support

Example: a group consisting of 7 legal entities





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## Solvency II and SST: Common methodology

Both use the same underlying mathematical methodology:

- ▶ SCR should buffer risks emanating during a *1-year time horizon*.
- ▶ Risk is defined by *change of available capital* over a 1-year time horizon.
- ▶ Available capital is defined with reference to an economic, *market consistent valuation* framework.
- ▶ The market consistent value of insurance liabilities is defined to be the *best estimate plus a risk margin*.
- ▶ The risk margin covers the *cost of the capital* necessary to buffer non-hedgeable risks during the entire run-off of the liabilities.

# Solvency II and SST: Fundamental Differences

The main differences between Solvency II and the SST are due to their specific implementation and *simplification*:

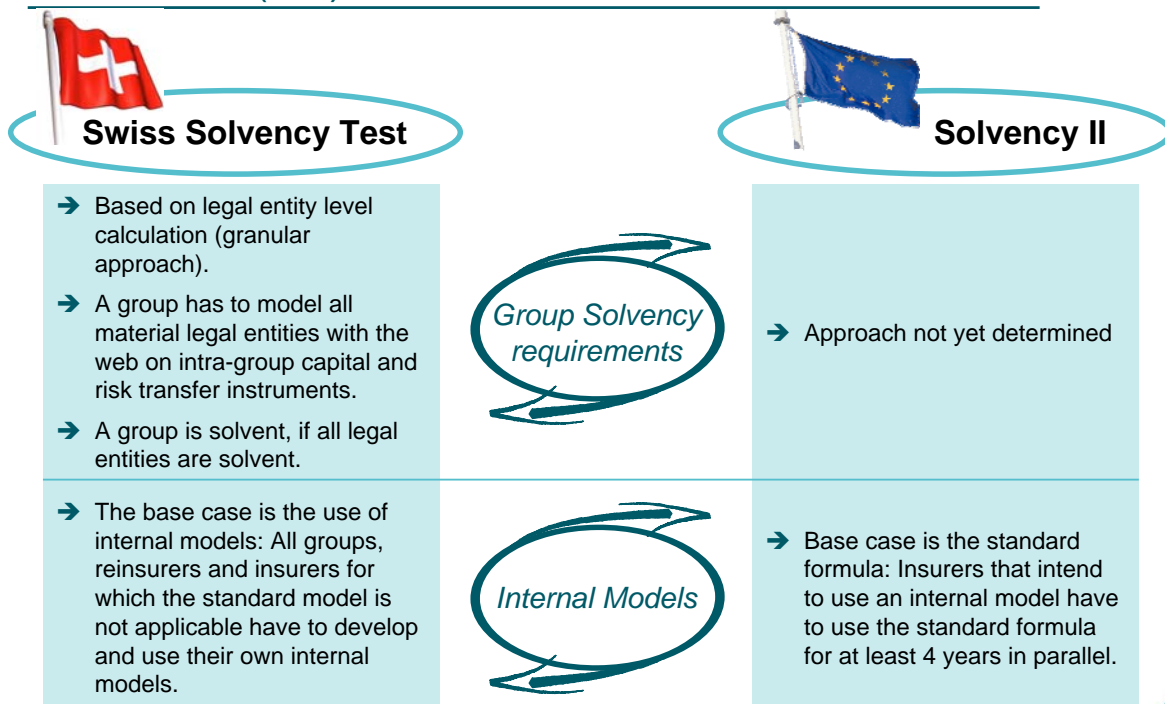
- ▶ Treatment of hybrid elements of the balance sheet
- ▶ Standard formula versus standard model

as well as some *philosophical ones*:







- ▶ The use of internal models: normal case (SST) or exceptional (Solvency II)
- ▶ How much to expect from companies: simple standard formula or standard models
- ▶ Which risks are considered quantifiable and which are not (SST considers the operational risk not to be quantifiable)

The biggest conceptual difference is currently the *treatment of group solvency*







## Solvency II and SST: Details of the fundamental differences (1/2)





## Solvency II and SST: Details of the fundamental differences (2/2)

 <b>Swiss Solvency Test</b>		 <b>Solvency II</b>
<ul style="list-style-type: none"> <li>→ Scenarios are an integral part of the SST, both in Pillar 1 and Pillar 2</li> </ul>		<ul style="list-style-type: none"> <li>→ Scenarios are not used</li> </ul>
<ul style="list-style-type: none"> <li>→ Risk margin on legal entity level</li> </ul>		<ul style="list-style-type: none"> <li>→ Risk margin on Line of Business level (no diversification benefit) changing with the new proposal</li> </ul>
<ul style="list-style-type: none"> <li>→ Duration 0, SCR depends on one-year market risk</li> </ul>		<ul style="list-style-type: none"> <li>→ Duration approach, equity risk treated as bond-like</li> </ul>
<ul style="list-style-type: none"> <li>→ Risk-based remuneration requirements proposed, based on economic P&amp;L of at least three-years, claw-back in case of losses, all employees globally in scope</li> </ul>		<ul style="list-style-type: none"> <li>→ Nothing is planned for the moment</li> </ul>



## Solvency II and SST: Details of the technical differences (1/3)

 <b>Swiss Solvency Test</b>		 <b>Solvency II</b>
<ul style="list-style-type: none"> <li>→ Only Pillar 2 requirement</li> </ul>		<ul style="list-style-type: none"> <li>→ Pillar 1 and 2 requirement</li> </ul>
<ul style="list-style-type: none"> <li>→ Pillar 2 requirement (market liquidity risk in theory also captured by the risk margin)</li> </ul>		<ul style="list-style-type: none"> <li>→ Pillar 1 and 2 requirement. Change in the discounting rate</li> </ul>
<ul style="list-style-type: none"> <li>→ Part of group solvency capital calculation</li> </ul>		<ul style="list-style-type: none"> <li>→ Not yet explicitly considered, CEIOPS propose not to give group benefits</li> </ul>
<ul style="list-style-type: none"> <li>→ Based on Tier one and two approach. Company using internal model can use principle-based approach if modeled appropriately</li> </ul>		<ul style="list-style-type: none"> <li>→ Based on the three Tiers approach, but proposal from CEIOPS to consider only Tier one (relaxed by the commission).</li> </ul>

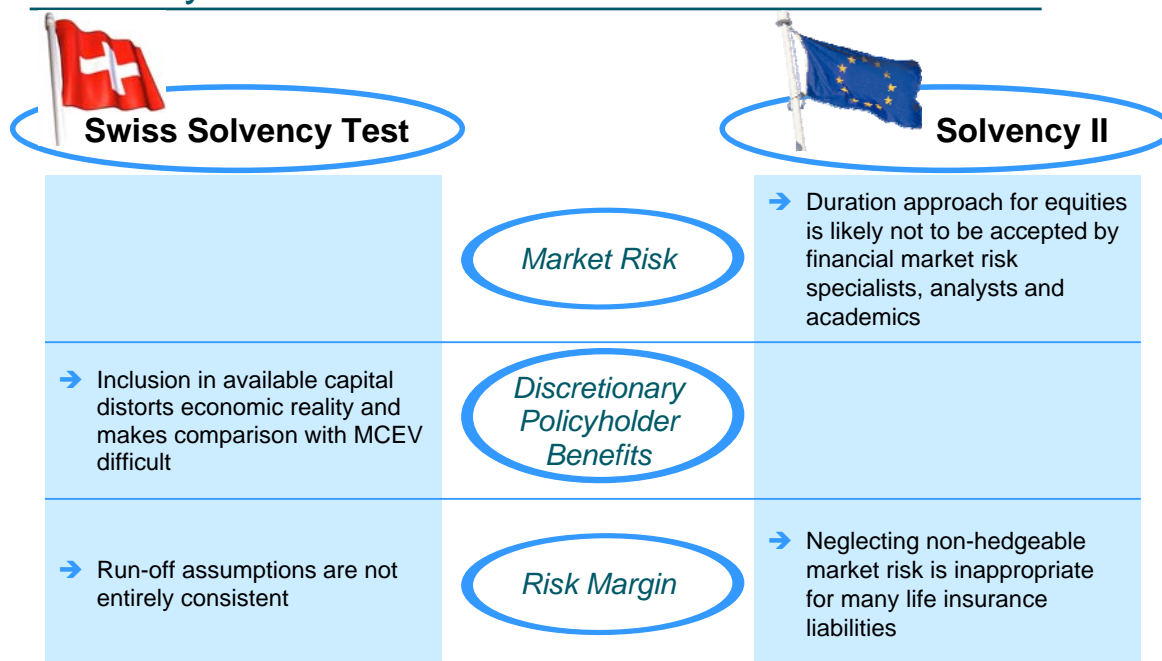
## Solvency II and SST: Details of the technical differences (2/3)

 <b>Swiss Solvency Test</b>		 <b>Solvency II</b>
→ Based on run-off, i.e. no diversification with new business, but diversification within the reserves	<i>Risk Margin</i>	→ Current implementation mixes run-off and going concerns limited diversification benefit
→ Part of risk bearing capital / own funds	<i>Discretionary Policyholder Benefits</i>	→ Part of liabilities
→ Part of risk bearing capital / own funds	<i>Deferred Tax Liabilities</i>	→ Part of own funds, but possible to model within an internal model
→ <b>99% Tail Value at Risk / Expected shortfall</b>	<i>Risk Measure</i>	→ <b>99.5% VaR</b>

## Solvency II and SST: Details of the technical differences (3/3)

 <b>Swiss Solvency Test</b>		 <b>Solvency II</b>
→ Risk factor based: Modeling of underlying risk factors based on distributions	<i>Model Approach</i>	→ Risk type based: Separate models for different risk types
→ Modeled on the level of underlying risk drivers	<i>Dependencies</i>	→ Correlations between risk types (insurance, market, credit, operational risk)
→ Most common form of reinsurance (QS, XL, SL) can be taken into account within the standard formula	<i>External Reinsurance</i>	→ XL, SL difficult or impossible to take into account within standard formula

## Solvency II and SST: Errors



## Future Developments

- ▶ Solvency II and the SST should more clearly distinguish between the underlying concepts and the chosen simplifications.
- ▶ As internal models will be used, they should not be assessed with respect to standard formula or models but with respect to their own foundations.
- ▶ Otherwise, the use of more sophisticated approaches and models will be inhibited from achieving the spirit of the new regulations.
- ▶ The current inconsistencies in the implementation will lead to inconsistencies in the calculation of available and required capital: between Solvency II and the SST, between companies doing both and between jurisdictions within the EU.

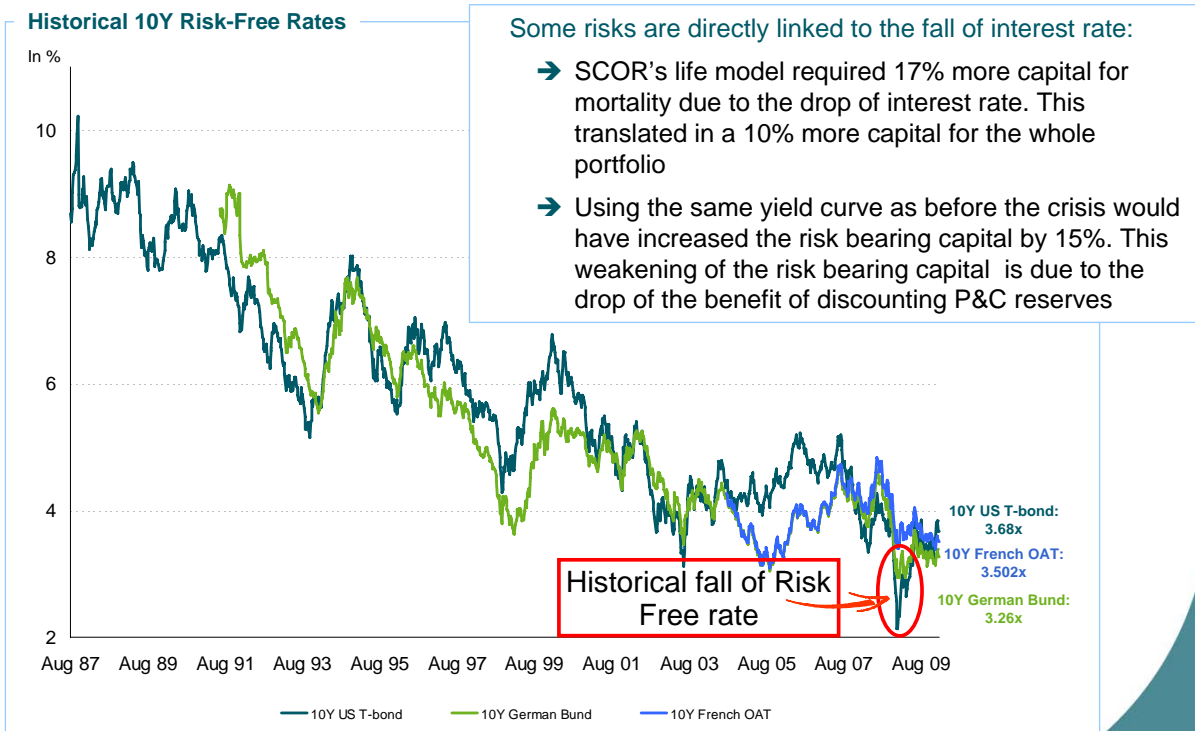
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## An efficient regulation in time of crisis

- In time of crisis, it is *too late to correct* the errors of the system. One should analyse them in order to learn from them
- It is important to adapt the solvency rules to the new situation and restore confidence in the system
- Good risk models would show an increased risk of the situation and thus come up with higher risk adjusted capital than in quieter times
- Requiring companies to keep the same level of security than before the crisis would require a *significant increase in capital*
- Such an increase will in turn *accentuate the lack of liquidity*, which is the main characteristic of financial crisis

## Examples of increased risk: Risk Free rate development



Source: Reuters as of 22 Jan 10

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## Examples of increased risks: Volatility of financial markets

- Some risks are linked to the *increased volatility of financial markets* and increased credit risk:
  - During the crisis the volatility of stock return more than doubled
  - Credit spread sky rocketed for reinsurance to 2000 basis points
- Those cumulated effects *reduce significantly the solvency ratio* of companies. In the Swiss Solvency Test (SST), we experienced a significant drop of more than 20% in our solvency ratio even though there was no significant changes in our portfolio of liabilities and our asset portfolio was significantly de-risked

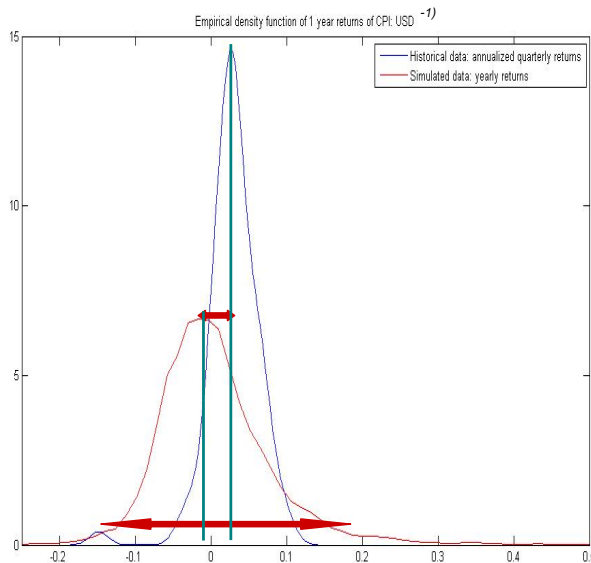
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## Examples of increased risks: Inflation



The empirical distribution of the simulated inflation is:

- **Out of phase**
  - because the current interest rates are lower,
- **Wider**
  - because the current volatility is bigger (GARCH effect)

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(1- Data: Number of historical data: 83 (relatively small). Number of simulations: 60'000

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## Consequences of not changing the rules

- Insisting on the same level of security even if the economic situation is rapidly deteriorating could force companies to declare insolvency for claims they would have to pay far in the future
- It would also require uniformly higher capital from insurances and reinsurances forcing them to de-leverage their balance sheet and thus fueling the crisis
- At the same time this would immobilize huge amount of supplementary capital, which in turn would pointlessly increase the cost of the protections provided by insurers and reinsurers
- Moreover, it would dry out the capital available for the rest of the economy weakening further non-financial companies, which would, therefore, reduce the quality of the asset portfolio of insurers and reinsurers, reinforcing the vicious circle

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## Regulators and companies come up with ad hoc changes in the rules

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- Several proposals were put forward to come out of the dilemma of procyclicality
- Use of the swap rate for discounting instead of the risk free rate. The argument being that this allows to account for liquidity risks
- How liquid are 30 years swap rates ? Why would swap rates be more liquid than government bonds ? We have seen the interbank money market collapse
- Some propose to give companies negative capital add-on, but nobody knows how such add-on would work in practice other than arbitrarily
- Some propose to suspend all together the solvency rules based on risk models and leave it up to the regulators to let company surviving

## Recognizing the riskiness of the situation

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- The CEIOPS answer to the crisis is to put forward an indiscriminate increase of the target capital for insurance companies
- Such requirements, if they go through, would have severe social consequences by drying even more up the liquidity of the markets and increasing the price of insurances
- What is required in such situations is simply the recognition that the situation is riskier and that company have to adapt to survive it
- One cannot ask a ship not to pitch when sailing through rough sea due to a storm
- Contrary to CEIOPS, we think regulators should relax the rules in time of crisis and make them more stringent during good times

## Efficient regulation should be contingent to the economic situation

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- Capital requirements should be adaptive and change according to the economic situation
- Studies<sup>(1)</sup> have shown that value-at-risk (VaR) are actually reduced during the crisis because the probability of rebounds increase
- Currently, the risk measure adopted by Solvency II is the VaR at a threshold of 99.5%
- This threshold is arbitrarily chosen in the tail of the distribution. There is no convincing argument why it should be 99.5% instead of 99.4% or 99%
- Why not then changing it according to the economic situation?

## Changing the risk measure threshold

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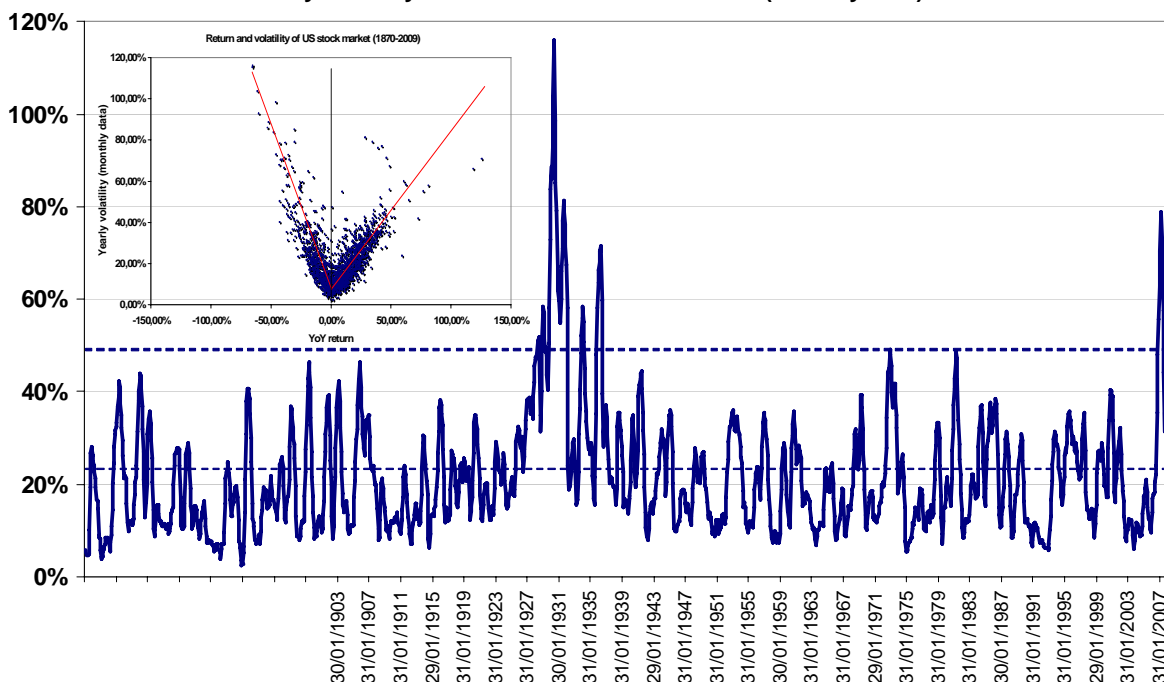
- Moving from 99.5% to 99% is a simple and transparent way to recognize the reality of the economic situation: nobody can be so safe anymore when the whole world is in a turmoil
- Moreover, this change of threshold will mainly compensate in terms of capital the increase due to the recognition by the model of the higher risks
- In SCOR's model, it would represent a decrease of roughly 10% of the required capital compensating the increase due to the higher market volatility and lower interest rates
- It is important that the law sets a threshold sufficiently remote to inspire confidence in the system by all stakeholders
- But, it would be logical to allow the supervisory authorities to change this, within predefined range, when times are difficult

## A clear and transparent trigger

- A rule allowing the regulators to change the threshold of the risk measure should be simple and based on an objective assessment of the crisis situation
- It is always hard to set a trigger for when a mere financial turmoil turns into a crisis
- We suggest to use one of the elements in the internal model that produces higher risks: market volatility
- Market volatility will affect the risks generated by the economic scenario generator (ESG) and thus end up requiring higher capital from the model
- It is a measurable quantity that is highly affected by the state of financial markets
- We propose to use twice the average yearly volatility of a chosen stock market index

## Market volatility has reached such values only twice in the past 140 years

Yearly volatility of US stock market since 1870 (monthly data)



## A simple rule

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- ➔ Regulators will declare that companies would be allowed to use a VaR at 99% for the next year if the stock index yearly volatility reaches twice its historical average measured on a very long period
- ➔ A year later, if the volatility is below this index, the regulators would then reestablish the 99.5% threshold and ask companies to refurbish their capital to comply with it
- ➔ Such a rule would allow insurance and reinsurance to use part of their capital to face up the bad economic situation without risking to become insolvent for liabilities they would have to pay in a distant future
- ➔ Given this flexibility to the system combines three advantages:
  1. It works against the famous pro-cyclicality
  2. It reduces the need to lock up useless extra capital
  3. It is transparent by recognizing an objective situation

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## Conclusion (1/2)

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- ▶ Principle based regulation is a good move for the insurance industry and will force it to improve its risk management practices
- ▶ Adapting to those new rules requires efforts not only from the industry but also from the regulators and the academic community
- ▶ Solvency II and SST are under pressure to take on more of the rules and regulations of Basel I and II
- ▶ However, it might well be that the underlying philosophy of Basel I and II have actually contributed to the crisis rather than mitigated the effect
- ▶ It is essential to adapt the solvency regulation to the occurrence of crises and to make them dynamic

## Conclusion (2/2)

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- ▶ For the system to remain credible, it is important to put forward simple adaptive rules that everybody understands
- ▶ Recognizing the situation and adapting the threshold of the risk measure to it, is a simple way of fighting against the rigidity of rules that could destabilize the industry even further, without any real justification
- ▶ Using an independent indicator like the extreme volatility of financial markets, avoids the blaming of any stakeholders for the decision and puts forward the objective situation
- ▶ Good regulation and supervision are expensive and at times painful, but the costs of bad or inappropriate regulation are potentially much higher

# Challenges for Academic Research

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- ▶ There are three important axis of development for research in terms of modeling for risk management:
  1. Develop the stochastic models to truly *multi-period models* where time plays a key role.
  2. Apply *financial valuation methods* to risks: this will accelerate the transfer of risks to financial markets and thus open up new investment opportunities.
  3. Fully integrate the concepts of *fat-tails and non-linear dependence* in the pricing of risks to obtain more realistic models.
  
- ▶ Another important challenge is to develop good *quantitative indicators of crises* in order to be able to build warning systems