

The Swiss Solvency Test (SST)

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

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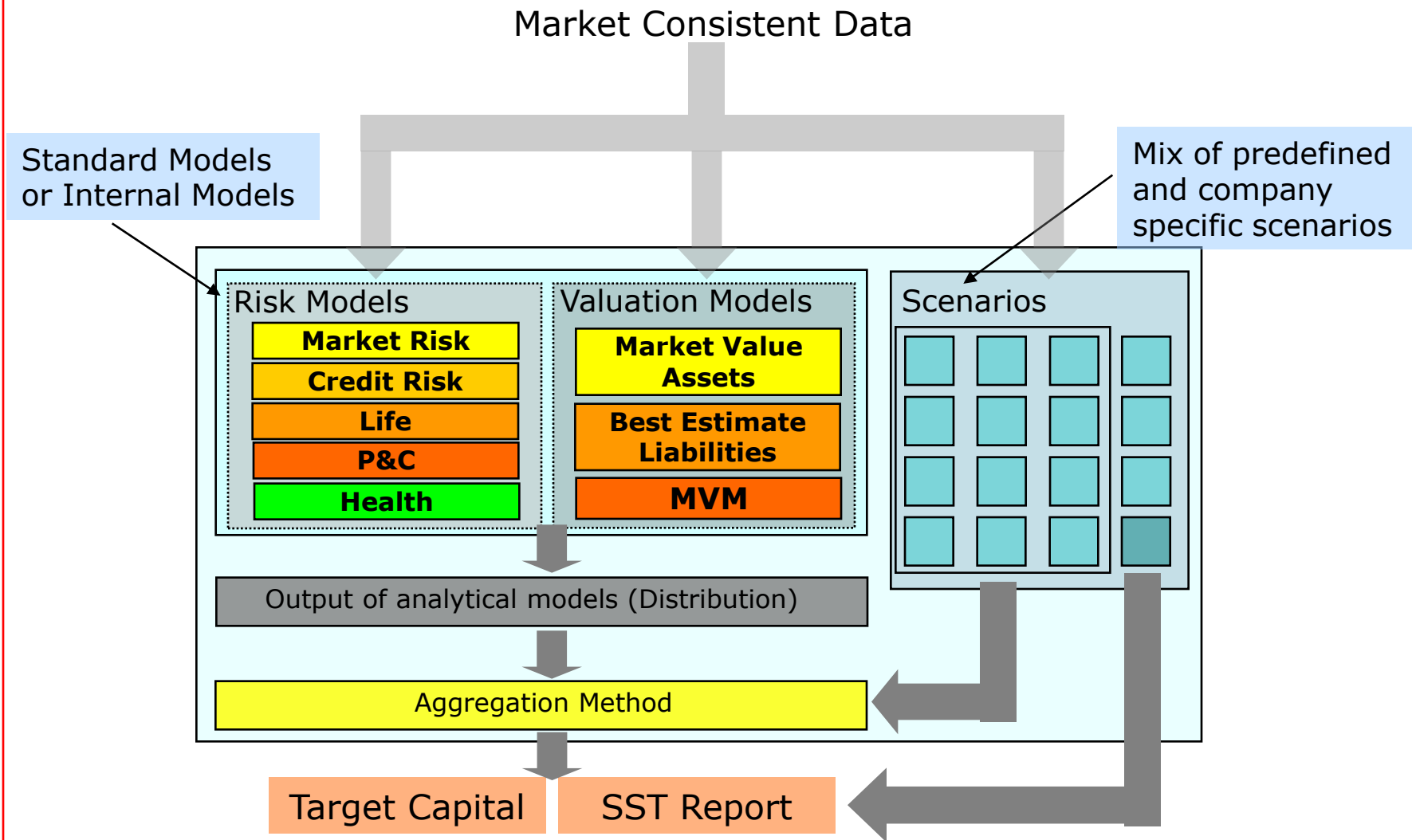


The Swiss Solvency Test

- Developed during 2003-2005
- Field-tested in 2004 and 2005
- In force since 1 January 2006
- As of 2006, all large life and P&C companies do the SST
- As of 2008, all companies (direct insurers, reinsurers and insurance groups) will have to do the SST
- The SST has to be done both on a **legal-entity level** and on a **group-level**
- Insurance groups, reinsurers and all companies for which the standard model is not applicable have to use internal capital models for the SST → approx. 80 companies will use (partial) internal models
- The SST is **risk-** and **principles-based**
- The SST is based on an **economic and realistic valuation framework**

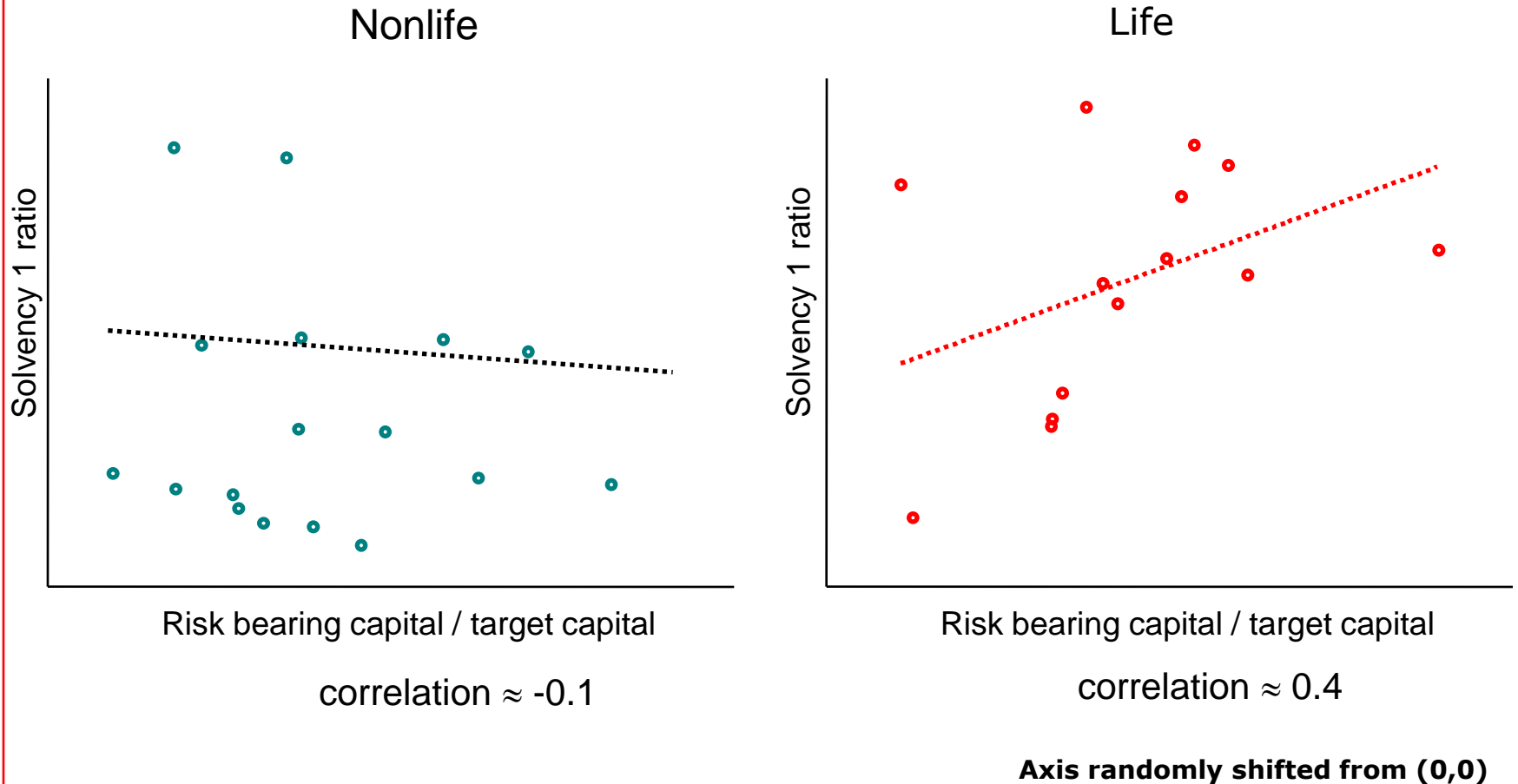


The Swiss Solvency Test: Standard Models



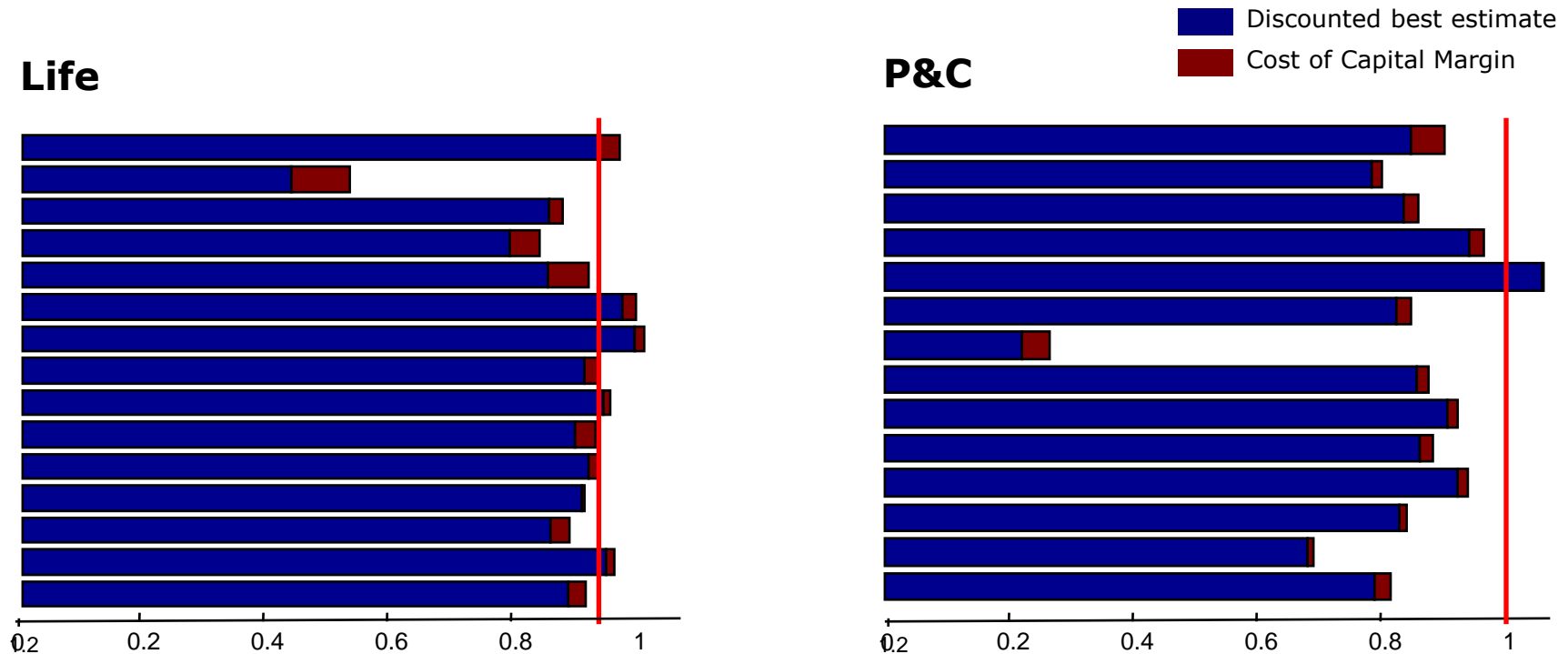
Correlations between Solvency 1 and SST

The correlation between the Solvency 1 ratio and the SST solvency ratio is 0 for nonlife and approx. 0.4 for life (based on provisional data from field test 2006)



Statutory vs Market Consistent Valuation

The following graph shows the relationship between statutory and market consistent technical provisions for a (randomized) sample of Life and P&C companies participating in the field tests 2005 and 2006. If the bars exceed 1, then the statutory values are lower than the market consistent values.

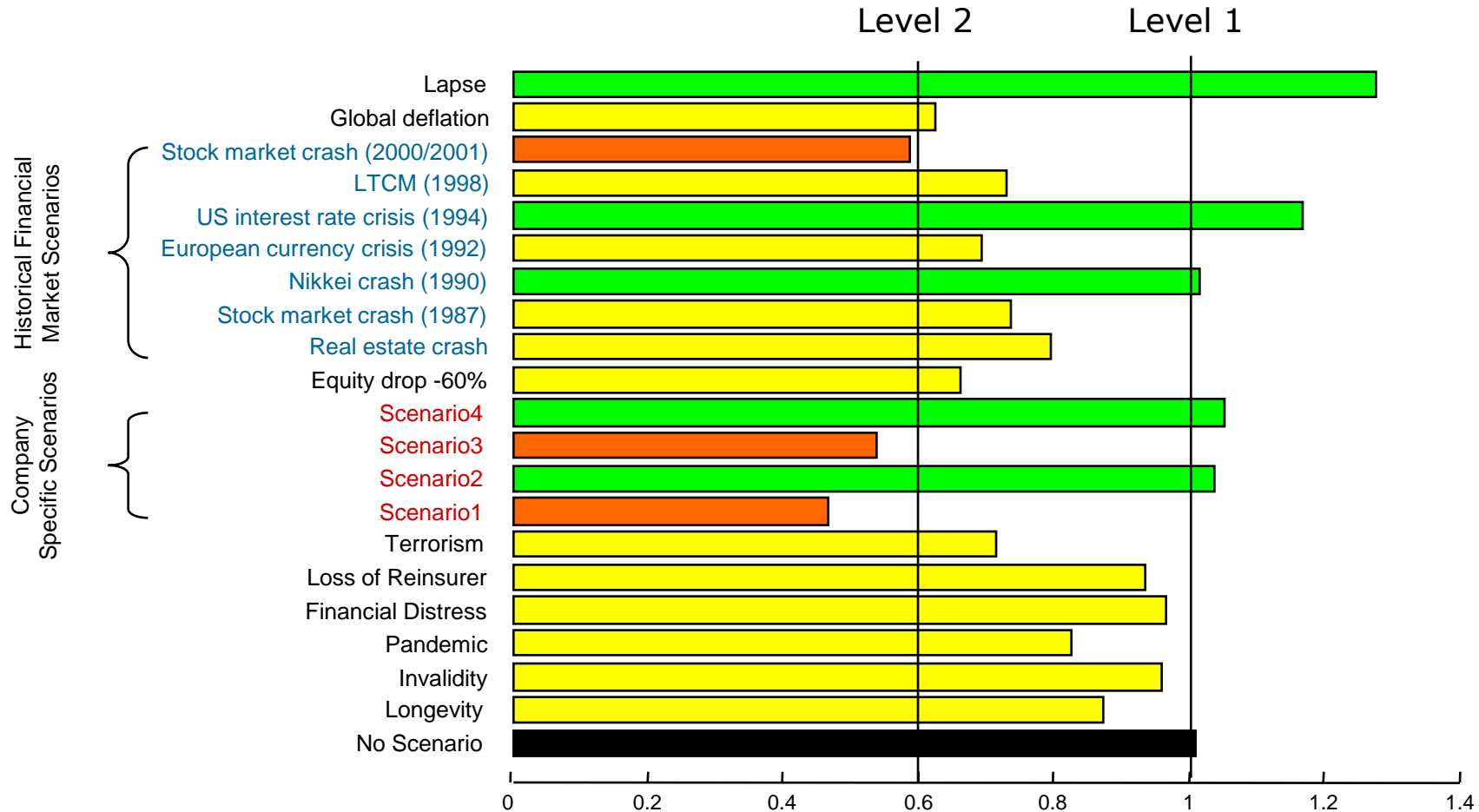


Over the whole life insurance market, the total value of statutory and market consistent technical provisions are approx. equal. For the P&C market, statutory provisions exceed market consistent provisions by ~ 15%



Impact of Scenarios

Total Impact of Scenarios on the Life Market



Risk-based Solvency Frameworks

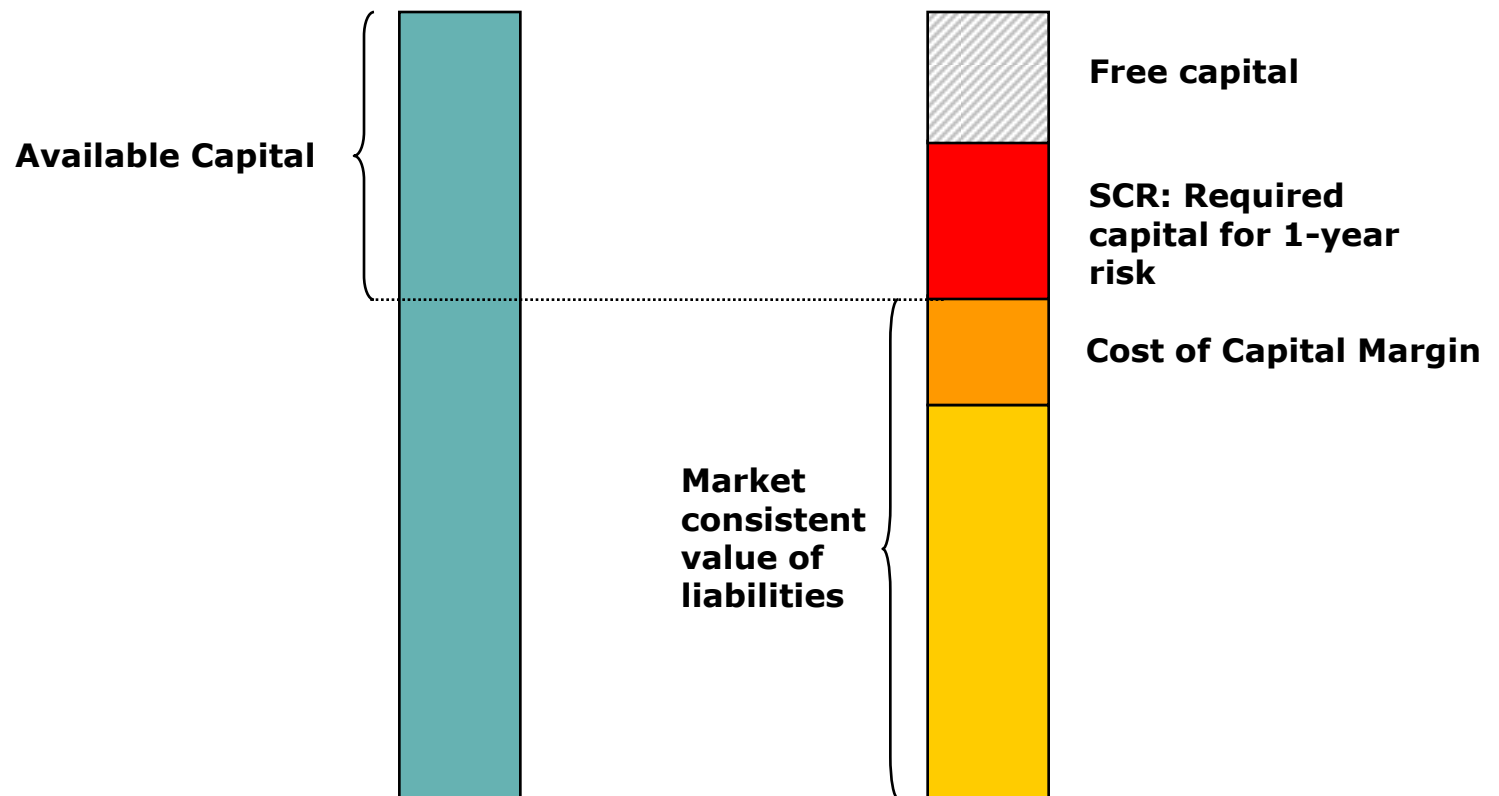
Key factors for a successful risk-based solvency framework:

- the importance of a sound, consistent methodology
- the importance of a solvency system to promote transparency rather than self-delusion
- the importance of tackling group aspects



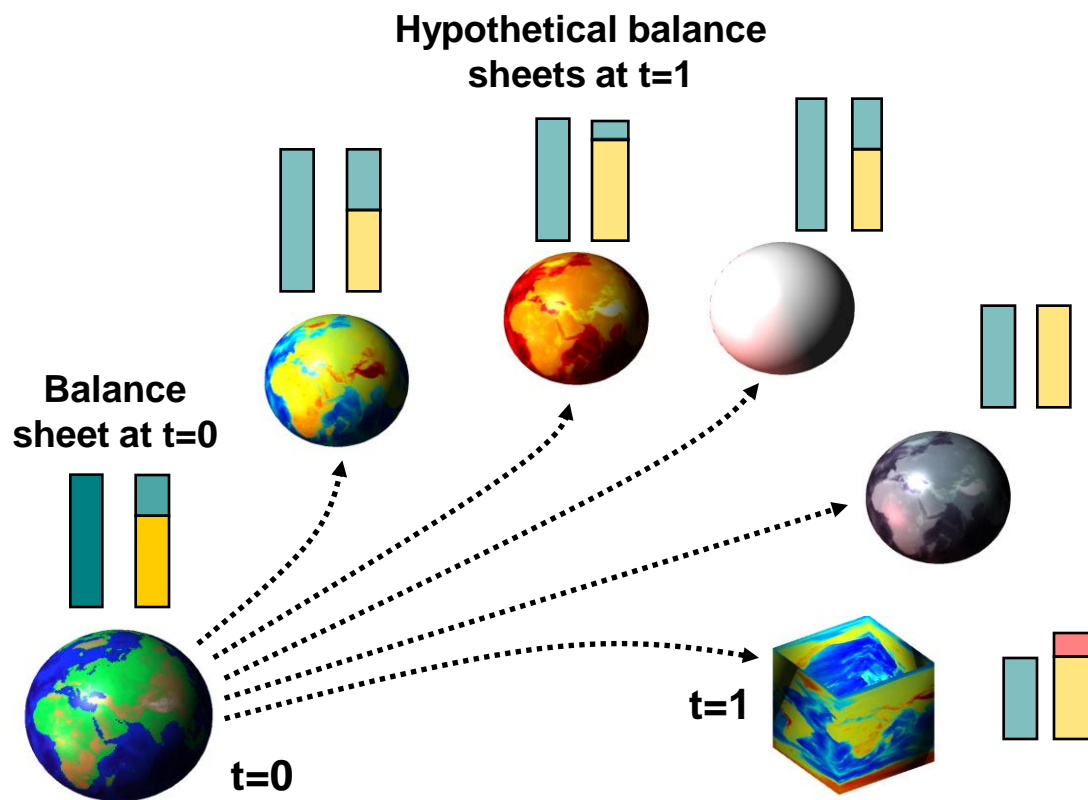
The Economic Balance Sheet

The economic balance sheet gives a realistic picture of a company's financial position now



Risk as Change of Available Capital

The Solvency Capital Requirement (SCR) captures the risk that the economic balance sheet of the company at $t=1$ differs from the economic balance sheet at $t=0$



The economic balance sheet at $t=1$ differs from the one at $t=0$ due to:

- Changes in the financial markets (interest rates, real estate prices, ...)
- Losses and catastrophes
- New information leading to a revaluation of the liabilities (e.g. asbestos)
- Capital received from or transferred to the group, reinsurers, ...
- Hybrid instruments switching from a liabilities to equity
- Dividends paid, profit participation for policyholders
- ...

The Economic Balance Sheet and SCR

The economic balance sheet gives a realistic picture of the economic position of the company now

The Solvency Capital Requirement (SCR) is a function of the risks emanating during a 1 year time horizon

The economic balance sheet should not be abused to take account of risks by

- requiring haircuts on certain assets; or
- not allowing certain forms of capital

The risk that assets might lose their value over a 1 year time horizon or that certain forms of capital (e.g. guarantees) are not available anymore in a year's time should be captured within the SCR and Pillar 2

Such inconsistencies between valuation and risk assessment are a throwback to old-style regulation where lack of adequate risk quantification had to be compensated with implicit and explicit prudence in the statutory balance sheet



The Economic Balance Sheet and SCR

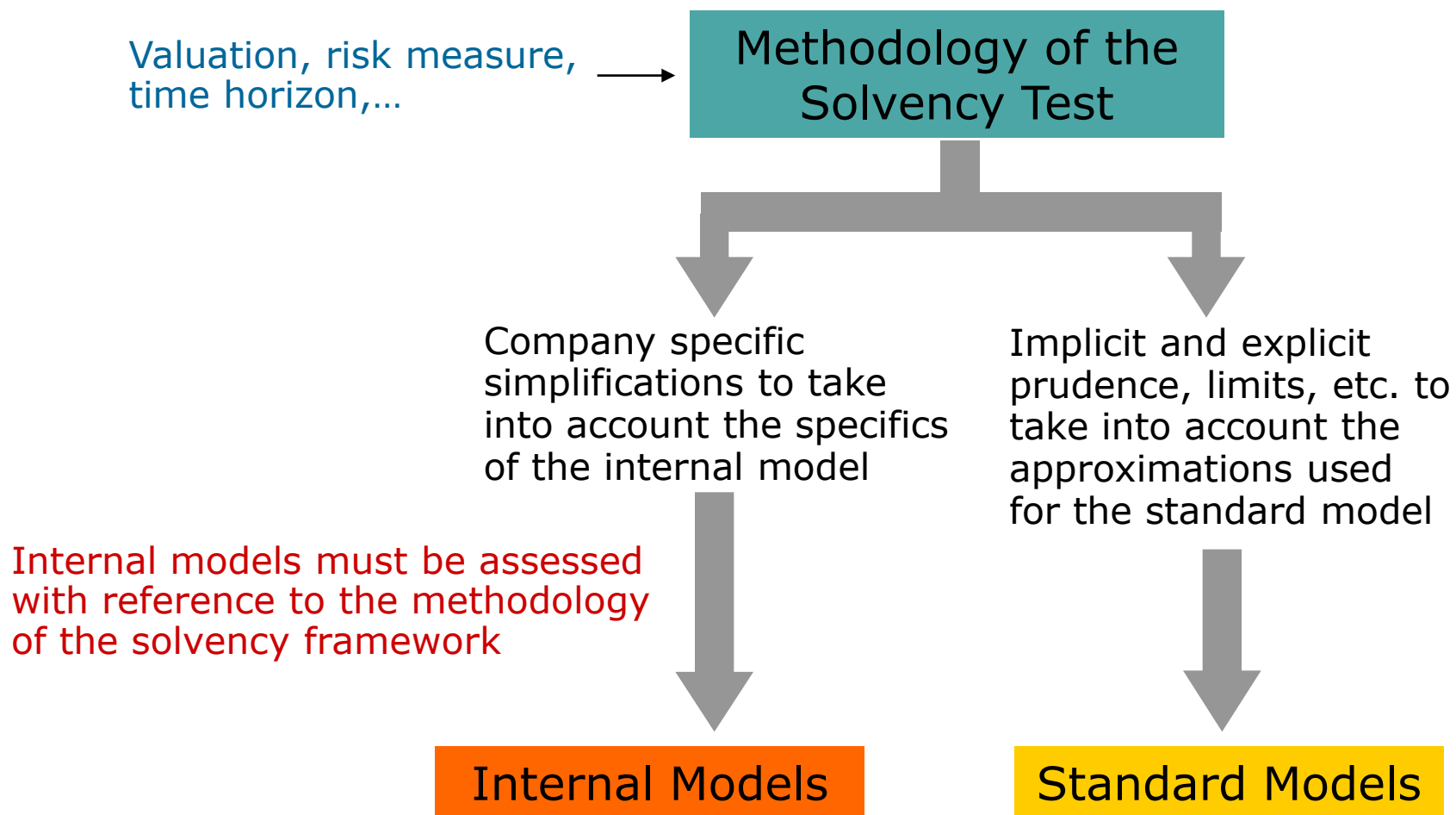
Eligible Forms of Capital

- In general, fixed limits on certain forms of capital are not compatible with a risk- and principles-based approach to supervision
- This implies that a tiering approach to eligibility of capital with limits and restrictions is in principle not compatible
- The assessment of the eligibility of a capital instrument should be based on its substance rather than on its form
- FOPI assesses capital instruments according to their ability to buffer risks and their availability in case of need (as and when needed, taking into account fungibility restrictions, permanence, etc.)
- Non-permanent forms of capital (e.g. guarantees, contingent capital) can be acceptable if quantitative and qualitative requirements are satisfied
 - Clear wording, legally binding, embedded within the risk and capital management processes of companies,...
 - Adequate and consistent modeling by both by the receiver of the instrument by the guarantor
 - Modeling implies valuation of the capital instrument and quantification of the impact on the SCR



Risk-Based Solvency Frameworks

The core of a solvency framework are the underlying methodology and principles, not the standard models



Risk-Based Solvency Frameworks

A little light dispels a lot of darkness.
Rabbi Schneur Zalman

The main purpose of risk-based solvency (and of risk management) is to achieve transparency on the insurers' exposure to risk

Control and mitigation of risk are secondary objectives which are better achieved via transparency

Incorporating implicit prudence via valuation, undue restrictions on eligibility of capital, investments and risk transfers will make the system less transparent and will lead to the transfer of insurers' risk management and responsibility to the supervisor. The rigidity of such a system can even cause insolvencies

Using aggressive parameters or neglecting major risks (e.g. equity risk) in order to perpetuate a given business model or to achieve political aims will also make the system intransparent and will ultimately lead to a loss of confidence in the solvency system and the insurance industry



Risk-Based Solvency Frameworks

Nothing is easier than self-deceit. For what each man wishes, that he also believes to be true. Demosthenes

Once a methodology is fixed, certain parameters are also fixed by consistency requirements

Example: If the SCR should cover risks during a 1-year time horizon (e.g. Solvency 2, SST), then share price volatility has to be calibrated to a 1-year time horizon

If share prices are – contrary to all accepted financial theory - assumed to be mean-reverting, this would be taken into account only in the valuation of liabilities (if benefits were linked to stock returns) or by extending the time horizon of the solvency framework (e.g. to 5 years)

If the time horizon is extended and insolvencies during the longer time horizon were permitted, the solvency framework becomes similar to many countries' pension regulation framework and policyholder protection compromised

If the assumptions on share price volatility are artificially reduced while keeping the one year time horizon, the government gives the industry a free option on its portfolio strategy

Since there is no free lunch, the cost of this option has to be borne either by the tax payers, policyholders or investors



Rules vs. Principles

Liberty means responsibility. That is why most men dread it.
George Bernard Shaw

To give incentive for risk and capital management and to put responsibility to senior management and the board of directors, it is essential that the approach to supervision is principles-based

- However, principles-based supervision is more challenging both for the supervised and for the supervisors
- There is pressure by some (among senior management, appointed actuaries, supervisors, etc.) that regulation becomes more prescriptive and rules-based
- It is essential that both the supervisors and senior management accept that the price of freedom is responsibility
- If we are dragged back to a rules-based approach, the consequences will be far reaching:
 - restrictions and limits will give no incentives for risk management
 - non-innovative companies will have a comparative advantage
 - the mid- and long-term competitiveness of the industry is at stake
 - systemic risks are increased



Group Solvency Test

The purpose of risk based solvency requirements for groups:

- **Assessment of the economic state of a group**
 - The group is defined by its legal entities and the web of ownership relations and capital and risk transfer instruments between the group's legal entities
 - One number is not enough to assess a group's risk: it is also necessary to analyze the solvency of the legal entities of the group
- **For the assessment, the group supervisor needs to**
 - Ensure the consistency of the risk quantification of the different legal entities
 - Review the web of capital and risk transfer instruments (CRTI) and ensure that quantitative and qualitative requirements on the CRTI are satisfied
- **In case of a group's financial distress**
 - The group supervisor should ensure that capital mobility is given and that capital flows according to the CRTI and in such a way that all the group's policyholders are protected optimally



Group Solvency Test: CRTI Approach

- The CRTI approach is based on and is compatible with the legal-entity level SST
- Within the CRTI approach, all (material) legal entity have to be modeled, taking into account the web of CRTI
- A group's SCR is identical to the SCR of the parent company, taking into account all relevant CRTI and the modeling of all material subsidiaries based on a economic, realistic framework
- Valuation and risk quantification are based on an economic framework
- The value of a subsidiary for the parent company is its economic value (independent of regulatory or accounting conventions the subsidiary is domiciled in)
- The parent company is assumed to be able to unlock economic value of a subsidiary by selling it for its economic value
- The one-year risk of a subsidiary for the parent is defined as the potential change of the economic value of the subsidiary within a year



Group Solvency Test: Diversification

The CRTI approach allows a consistent treatment and allocation of diversification within a group

- **Group Level Diversification:** A parent company benefits from group-level diversification since the random change of its assets and liabilities is not fully correlated to the changes of the economic value of its participations
 - Restrictions on capital mobility have to be taken into account
 - Group level diversification is effected via ownership relation
- **'Down-streaming' of Diversification:** A parent can down-stream group diversification to its subsidiaries using CRTI, e.g. via parental guarantees
 - The CRTI need to be legally binding
 - Restrictions on capital mobility have to be taken into account
 - A parental guarantee lowers the SCR of the subsidiary but increases the SCR of the guarantor



Outlook

I believe we are on an irreversible trend toward more freedom and democracy - but that could change

Dan Quayle

Whether a pervasive risk culture can develop and lead to an innovative, thriving insurance market depends not only on the re/insurance market, but also on how future regulation will be implemented

Main issues:

- **Consistency in Valuation of Assets and Liabilities:** Will valuation and regulatory capital requirements be based on an economic and realistic assessment or will there be an intransparent mix of implicit prudence and haircuts on equity risk?
- **Legacy Regulation:** Will implicit prudence margins, limits on investment, eligibility of assets be replaced with an economic view of risk and transparency or will the old prudence driven approach with supervision coexist with the risk-based solvency framework?
- **Group Diversification:** Will group level diversification and CRTI be recognized or do local supervisors insist on full (physical) capitalization of all legal entities in their territory?
- **Internal Models:** Will supervisors accept that company-specific risk-based solvency will entail to a certain degree the subjective assessment of re/insurers of their risk exposure or will supervisors prefer to achieve comparability of calculation steps via standard-models rather than comparability of results via internal models?



Appendix: The SST Principles

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. 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 the 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

Defines How-to

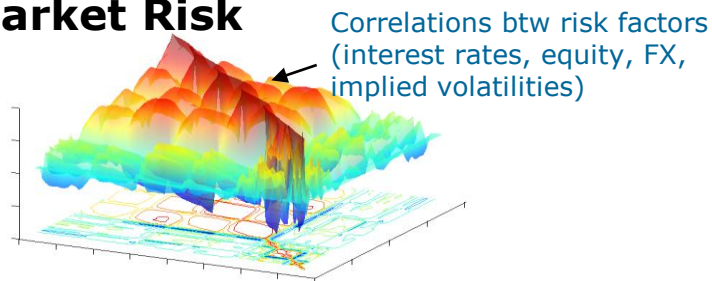
Transparency

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
12. SST Report to supervisor such that a knowledgeable 3rd party can understand the results
13. Public disclosure of methodology of internal model such that a knowledgeable 3rd party can get a reasonably good impression on methodology and design decisions
14. Senior Management is responsible for the adherence to principles



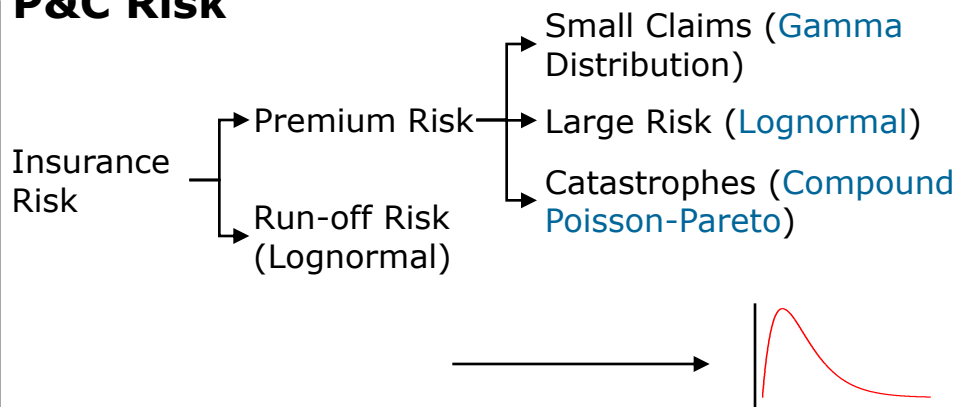
Appendix: The SST Standard Models

Market Risk



RiskMetrics type approach with ~80 risk factors. Sensitivities w.r.t. risk factors of both assets and liabilities have to be determined

P&C Risk



Life Risk

Covariance approach for 8 risk factors (mortality, morbidity,...)

Internal models have to be used if substantial embedded options and nonlinearities are in the books → e.g. replicating portfolios, market consistent scenarios,...

Credit Risk

Basel II (standard, advanced or IRB); recalibration to 99% TVaR. Spread risk treated within the market risk model.

Internal Models (CR+, KMV type,...)

Credit risk of default of reinsurers is treated via a scenario

Scenarios

Historical financial market risk scenarios (Crash of 2001/2002, Russia crisis,...)

Predefined scenarios (pandemic, industrial accident, default of reinsurers,...)

Company specific scenarios (at least three, e.g. nuclear meltdown, earthquake in Tokyo,...).

Scenarios have to describe impact of events on all relevant risk factors (e.g. Pandemic leads not only to excess mortality but also to downturn of financial markets).



Appendix: The CRTI Approach

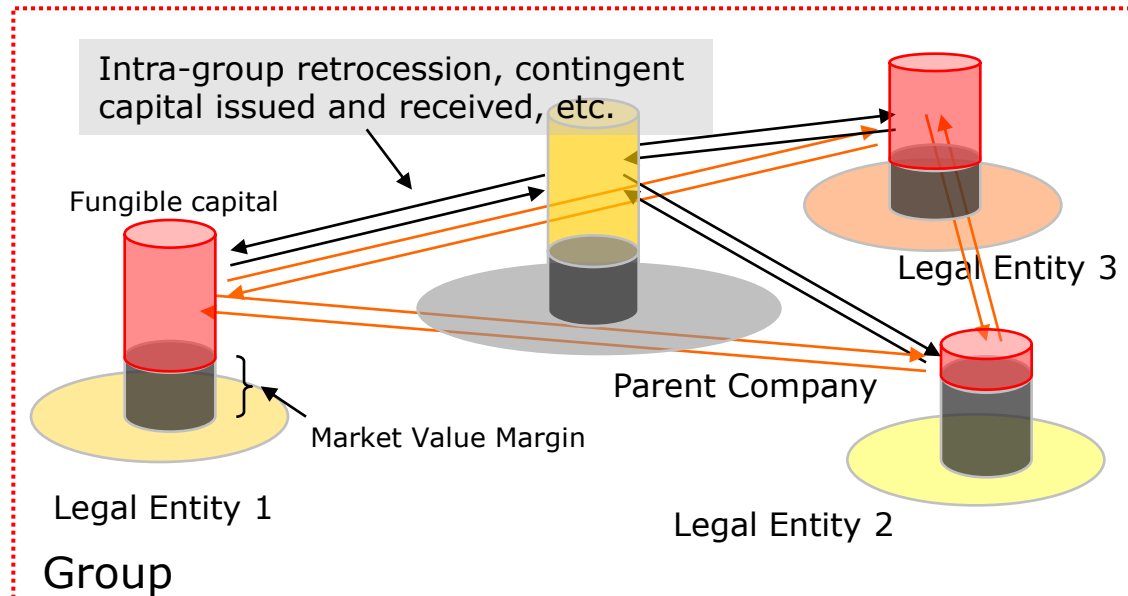
A group is defined not only by its legal structure but also by its web of intra-group capital and risk transfer instruments

CRTI: Capital and Risk Transfer Instruments

CRTI Approach: Explicit modeling of all relevant CRTIs and taking into account the legally limited liability structure

Intra-Group Capital and Risk Transfer Instruments:

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



Intra Group Capital and Risk Transfer Instruments can only be considered if they are legally binding and accepted by the regulators involved



Appendix: Diversification

Group Level Diversification: A parent company benefits endogenously from group level diversification by taking into account the dependency structure between the risks of its subsidiaries and the risks of the parent company. Group-level diversification exists due to the spreading of risk over different legal entities (geographical and legal diversification)

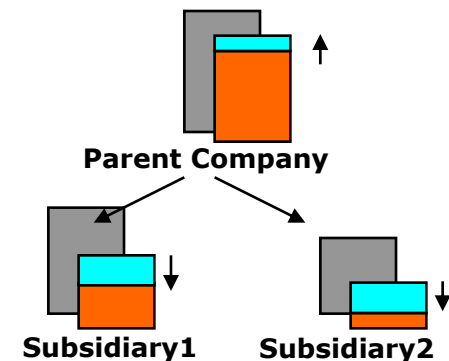
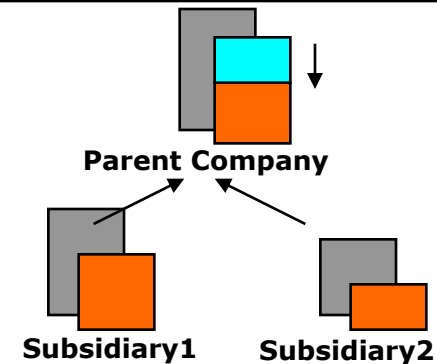
Group-Level diversification is transported to the parent company via the ownership relation between the parent and its subsidiaries





'Down-streaming' of Diversification: A parent company can down-stream group-level diversification via CRTI (e.g. intra-group retrocession, guarantees, etc.) to its subsidiaries.

A guarantee from the parent to a subsidiary allows a subsidiary to reduce its SCR but increases the parent's SCR

If there is no formal instrument from the parent to the subsidiary which ensures that the parent will support the subsidiary, then the subsidiary cannot benefit from being part of a group within the SST

Diversification is down-streamed to legal entities via CRTI



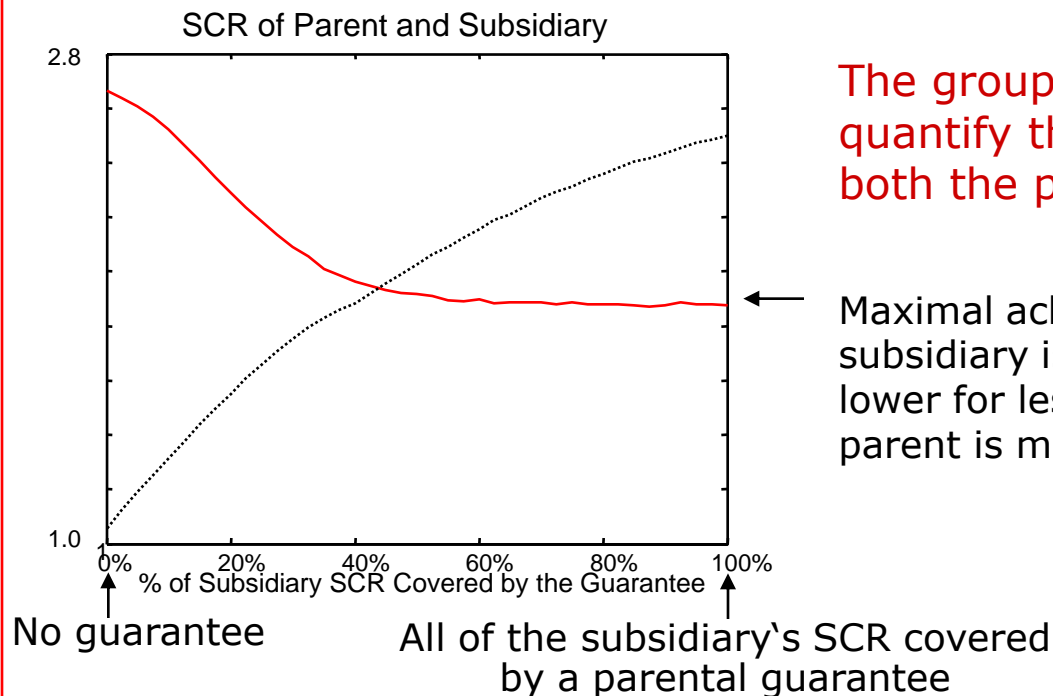
-  Assets exceeding technical provisions and debt
-  SCR
-  Effect of Diversification
-  } SCR without taking into account diversification



Appendix: Diversification

The down-streaming of diversification (e.g. via parental guarantees) is no free lunch. While the SCR of the subsidiary is reduced, the SCR of the parent is increased

The figure shows an illustrative example on the effect on the SCR of both the issuer (the parent) and the receive (the subsidiary) of a guarantee. The effect of a guarantee is strongly dependent on the relative size of parent and subsidiary and the solvency ratio of the parent



The group model needs to be able to quantify the effects the guarantee for both the parent and the subsidiary

Maximal achievable capital relief for the subsidiary is ~30%. The possible relief is lower for less solvent parents, higher if the parent is more solvent

