



Edgenössische Finanzmarktaufsicht FINMA
Autorité fédérale de surveillance des marchés financiers FINMA
Autorità federale di vigilanza sui mercati finanziari FINMA
Swiss Financial Market Supervisory Authority FINMA

Towards Risk Based Supervision

Swiss Solvency Test: The Swiss Experience

Market & Credit Risk Measurement

XXI CNSF'S INTERNATIONAL SEMINAR ON INSURANCE AND SURETY

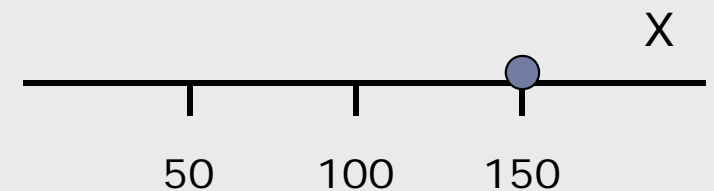
November 19, 2010

Preamble: How to deal with Uncertainty?

Question: What is the value of liability X?

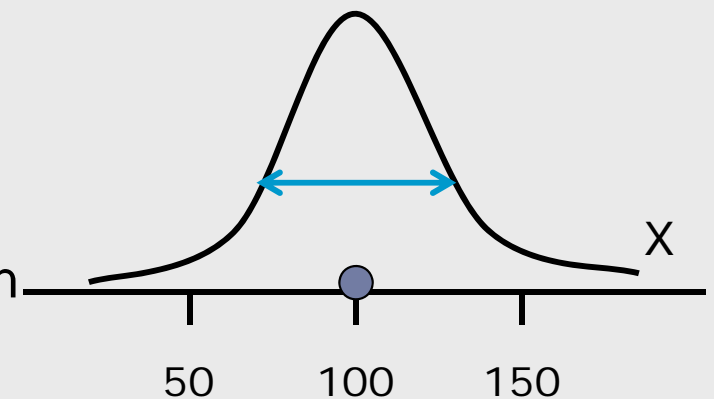
Answer A:

“We do not know exactly.
We will have to pay most probably less than 150. Let's be prudent, so we value it at 150.”



Answer B:

“We do not know exactly. We have calculated an estimation of the expected value which is neither optimistic nor conservative: 100. That is the value we use. But we keep in mind that there is uncertainty. The standard deviation is 30.”



(A) Usually, regulatory solvency regimes compare:

Risk taken by an insurer

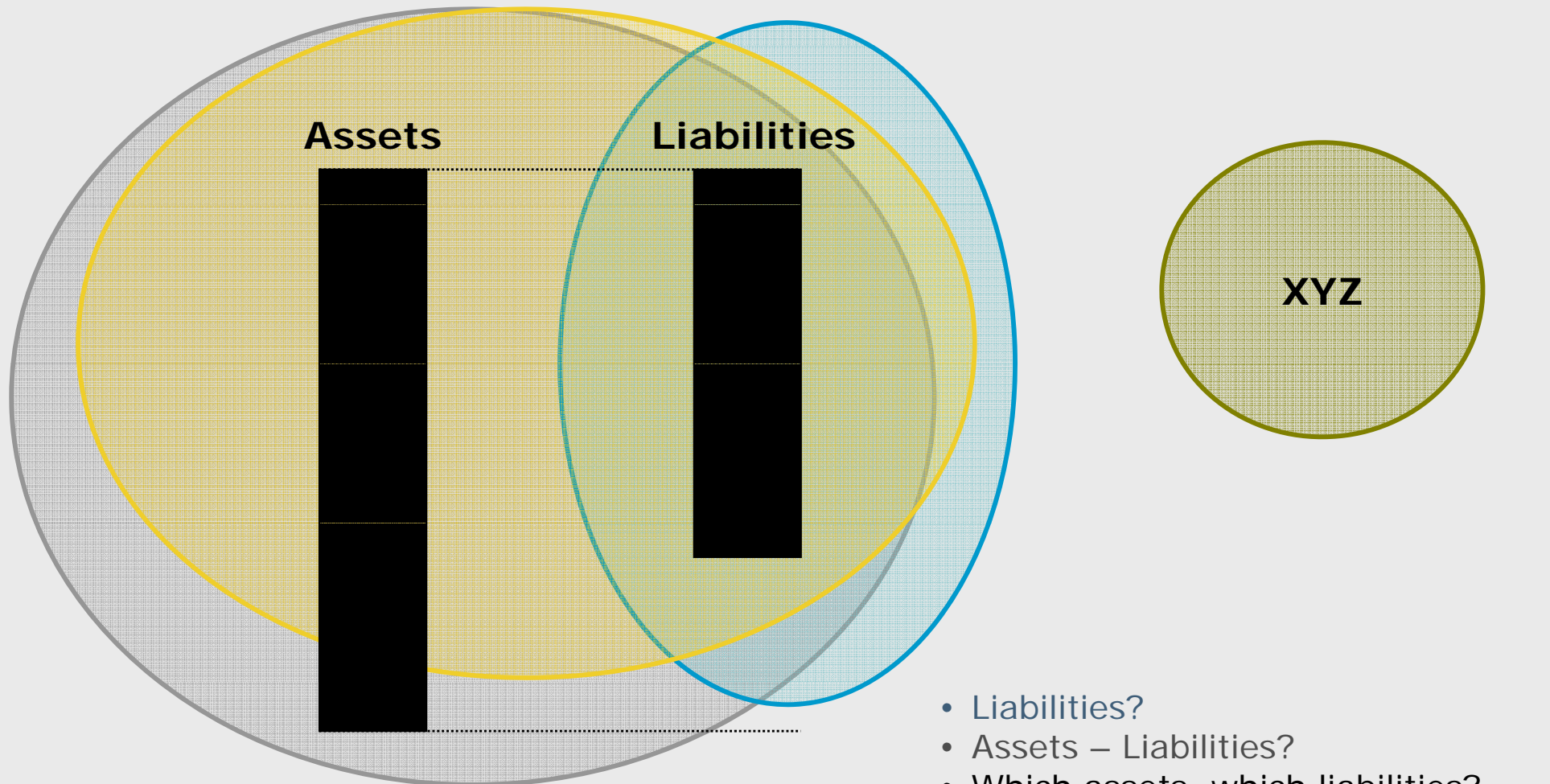
- Quantified by a number
- *Risk Measurement*
- *Risk Models*
- "Required capital"
- "SCR"
- "PCR"
- "Target Capital"

Insurer's ability to take risk

- Quantified by a number
- *Valuation*
- *Valuation Models*
- "Available capital"
- "Capital resources"
- "Risk capacity"
- "Risk Bearing Capital"

(B) Alternative: regulate premiums and insurance products.

Object under Consideration for Regulatory Solvency Purposes



- Liabilities?
- Assets – Liabilities?
- Which assets, which liabilities?
E.g. only those from the statutory balance sheet?
- Something completely different?

Principles versus Rules as a Basis of Regulation

1000+ Questions

e.g.: Is a grocery store an eligible asset to cover liabilities?
What about an old people's home? What about a football stadium?
What is the value of the discount rate for my insurance liabilities?

1000+ rules

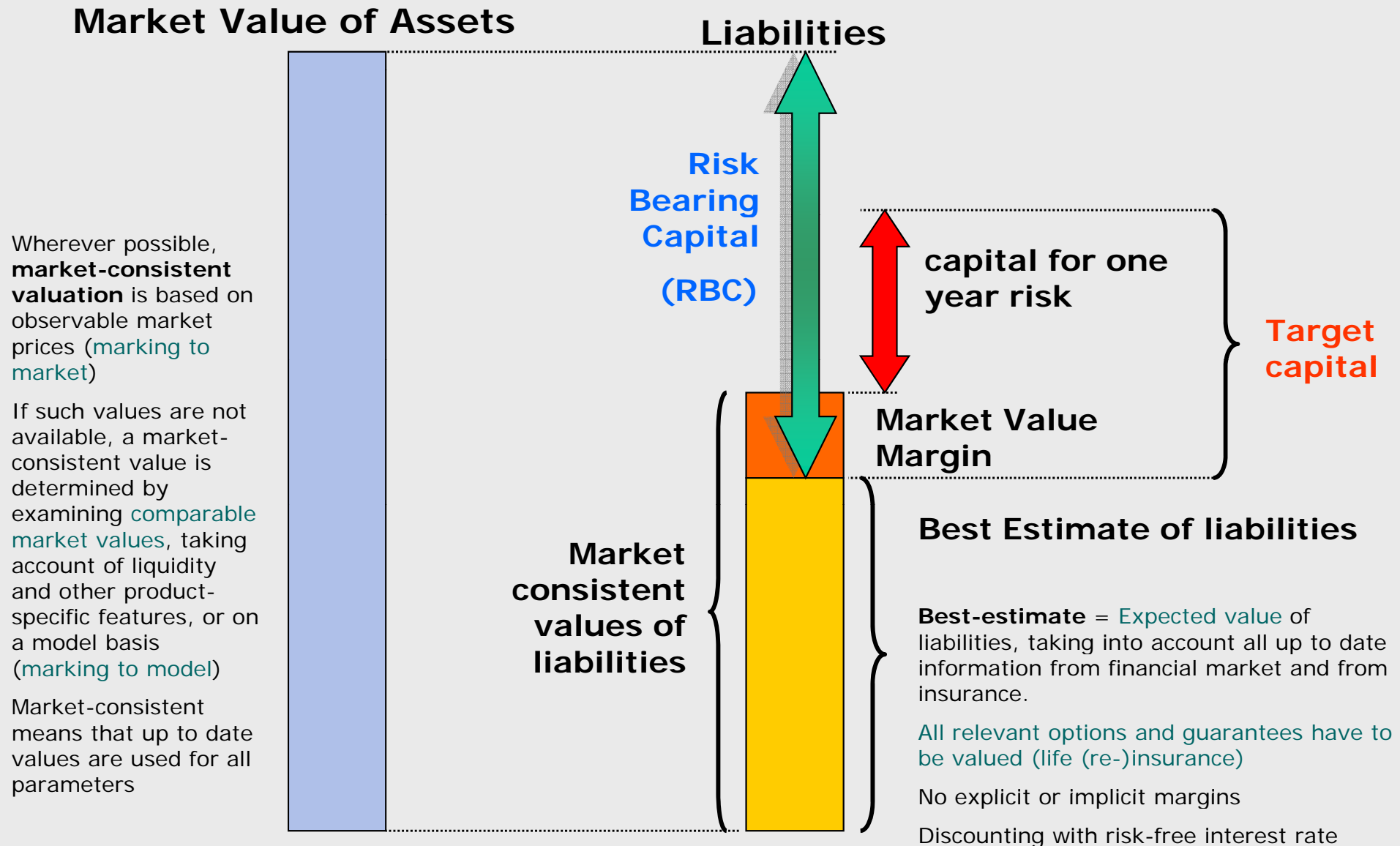
small number of principles

Rules regulate the detail.

Principles must be powerful and general.

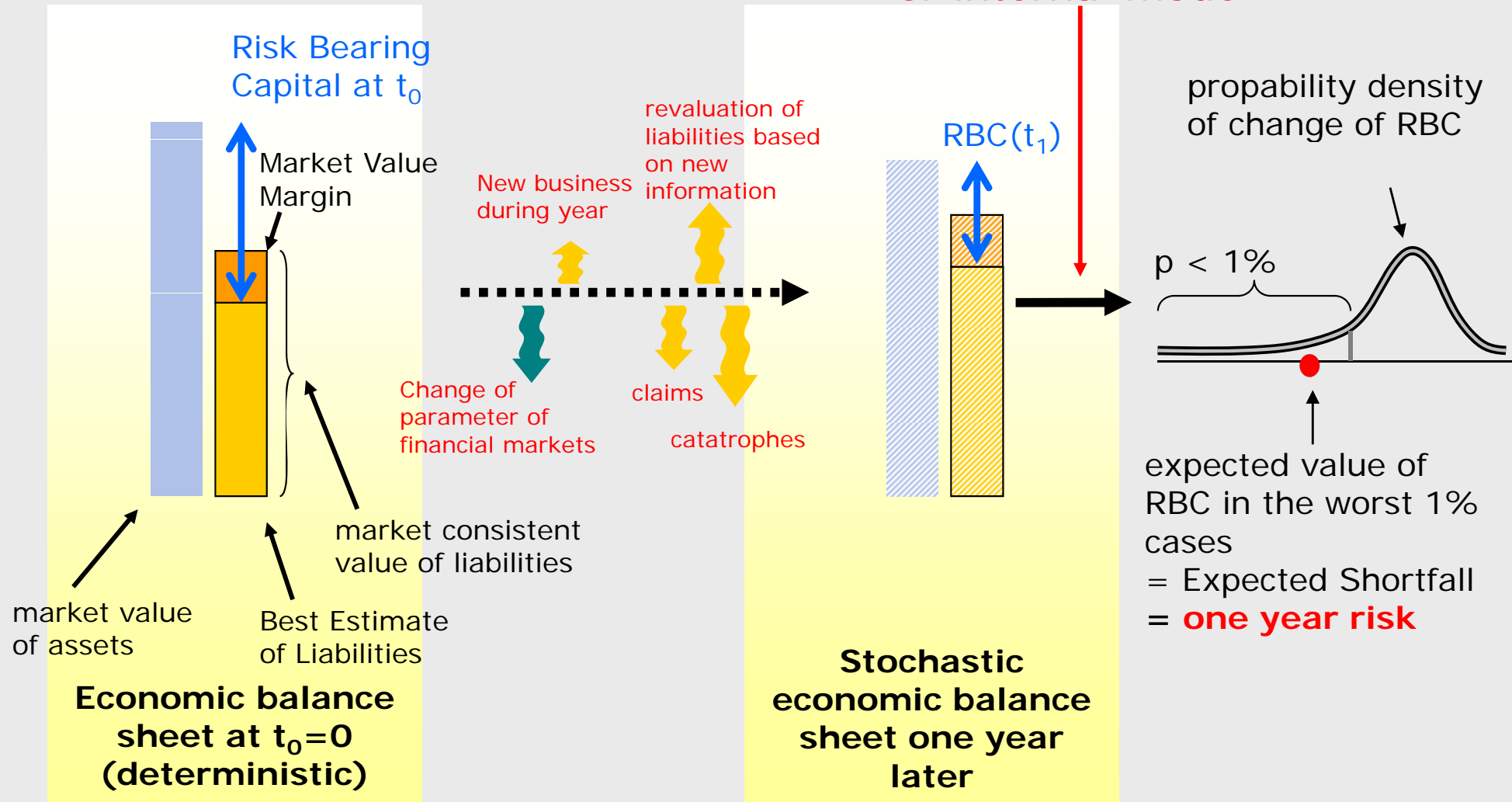
Answers

Swiss Solvency Test (SST): Economic Balance Sheet



Risk under the SST-regime

Risk quantification using standard model or internal model

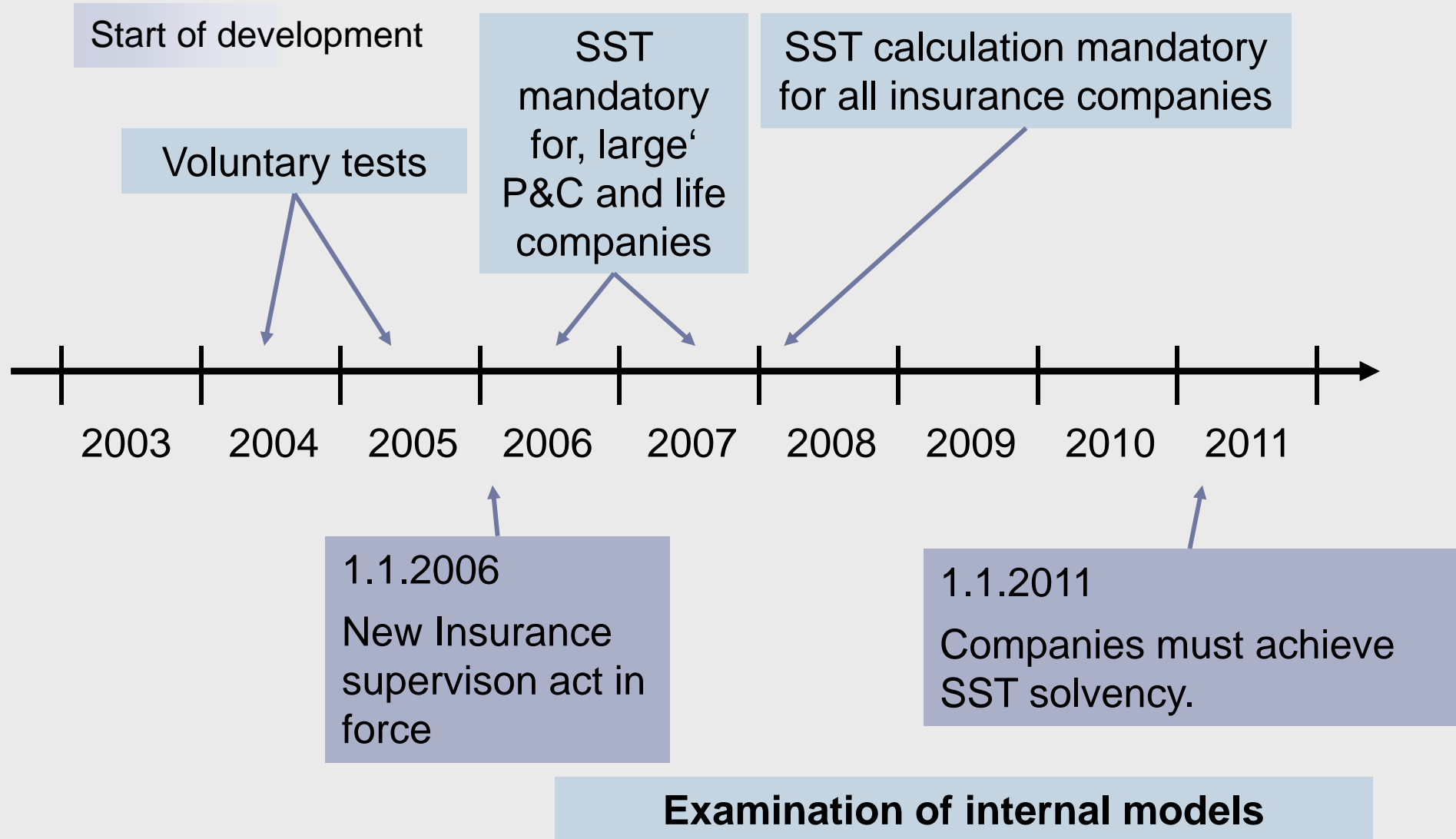


IAIS Requirements on Insurer's Risk Management for *Solvency Purposes*



- The insurer should have a *risk policy*, how to deal with all relevant types of risk. This can take many forms: to *bear risk*, *mitigate* risk, set up a limit system, ...
- Insurer should specify the *maximum of risk* he is willing to take (*risk tolerance statement*).
- Insurer should *quantify its risks*.
- Insurer should perform its *own risk and solvency assessment* (ORSA).
- Senior Management should be responsible for the whole *Risk Management Process*.
- *Risk Management* should be integrated into the company.
- Insurer should have an *asset liability management* (ALM).
- Insurer should evaluate *scenarios and stress tests*.

Swiss Solvency Test: Timeline



- SST team consists almost of 20 quantitative specialists from economics, *mathematics*, and natural sciences with background in *mathematical* finance, life, nonlife, health, and reinsurance.
- Each company is assigned a team out of these 20 people.
- Each internal model is assigned a team out of these 20 specialists.
- Special attention is needed for keeping decisions on models and calculations consistent over companies and over time.
- Need for defining a proper collaboration between SST specialist and general supervisors.
- Approving annual SST reports and internal models is a field of potential conflicts with insurers!

- SST team evaluates approximately 130 **annual SST reports**
Produces written feedback to insurers regarding:
 - Solvency ratio (SST ratio)
 - Quality of calculations
 - Quality of documentation
- SST team evaluates approximately **80 (partial) internal models**
 - Complex and time-consuming task
 - Some insurers try to make intensive use of powerpoint presentations in lieu of self contained documentation
 - Written documentation is often insufficient for a proper review.
- **Process database** for housekeeping and following progress

SST 2008 and 2009

Some results



SST 2008

- Valuation: portfolio at January 1, 2008
- Risk measurement: portfolio in 2008
- First official calculation, had to be performed by all insurers

SST 2009

- Valuation: portfolio at January 1, 2009
- Risk measurement: portfolio in 2009
- Mandatory for all insurers for the second time

Overview: SST results 2009 and 2008

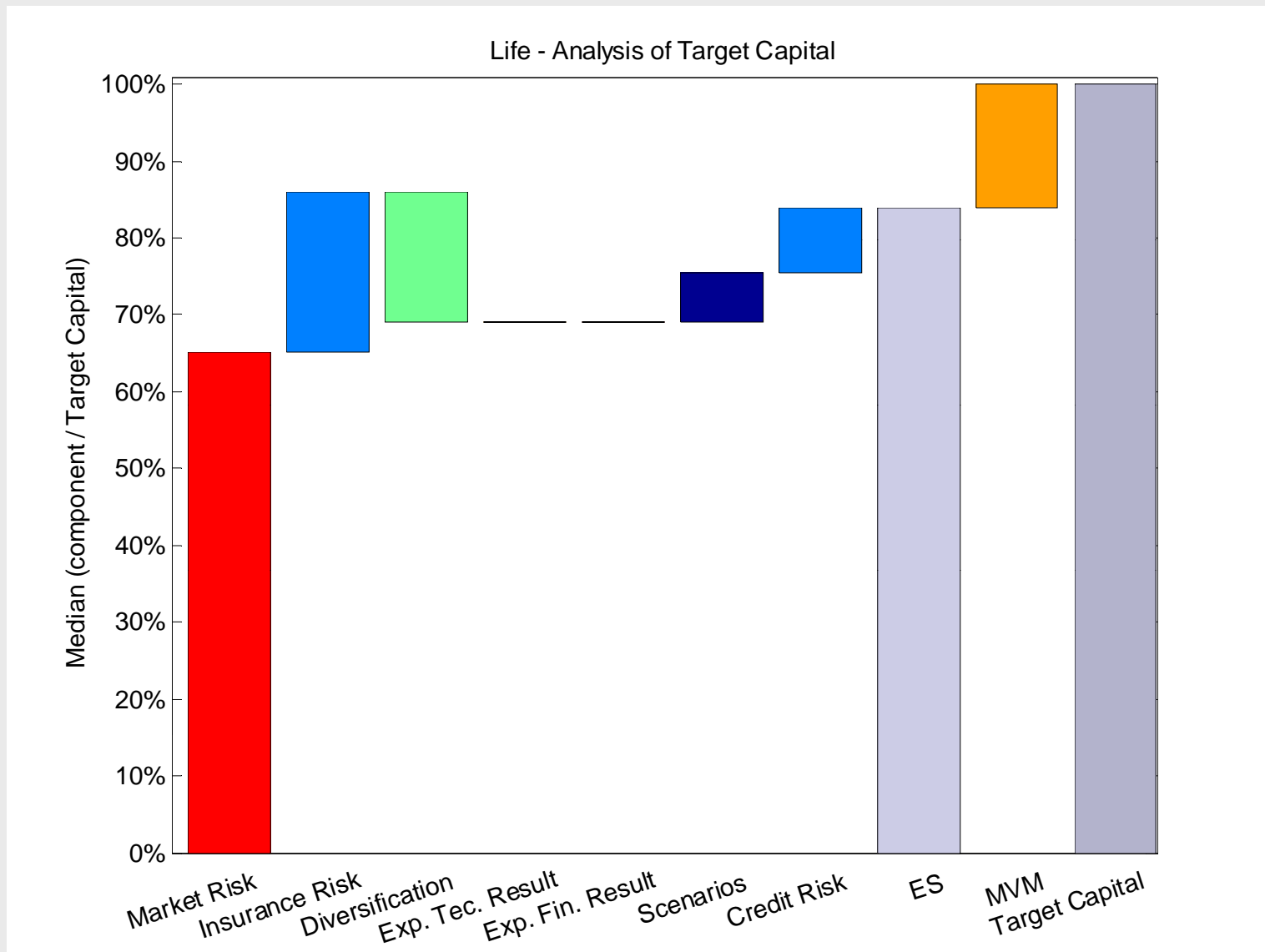


	2009		2008	
	Number of SST Reports	Number with SST-Ratio <100%	Number of SST Reports	Number with SST-Ratio <100%
Life	21	9	21	1
Nonlife	58	4	57	5
Health	19	0	18	0
Reinsurers	30	2	29	2
Total	128	15	125	8

Components of Target Capital (SCR)



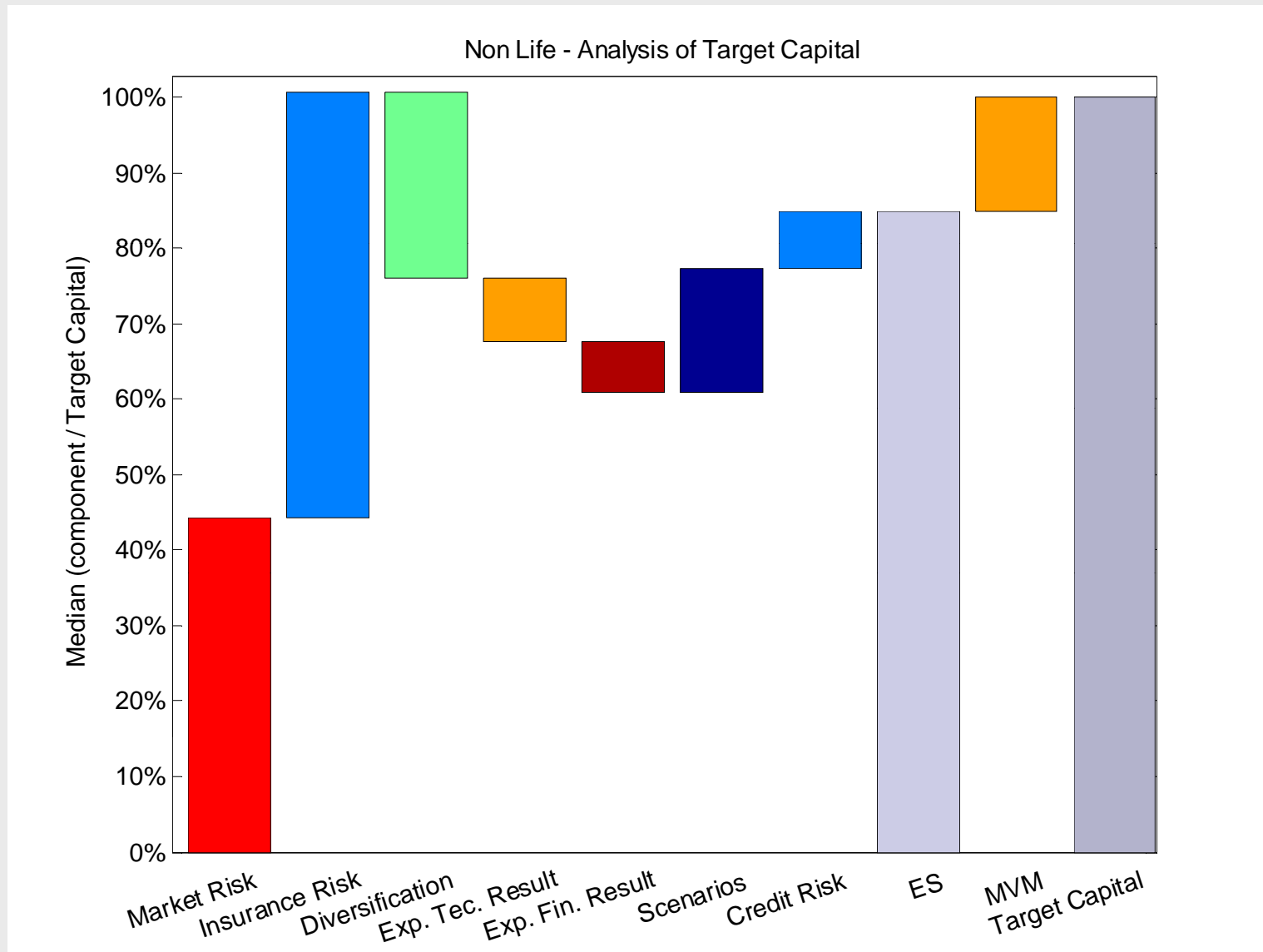
Life companies, 2009



Components of Target Capital (SCR)



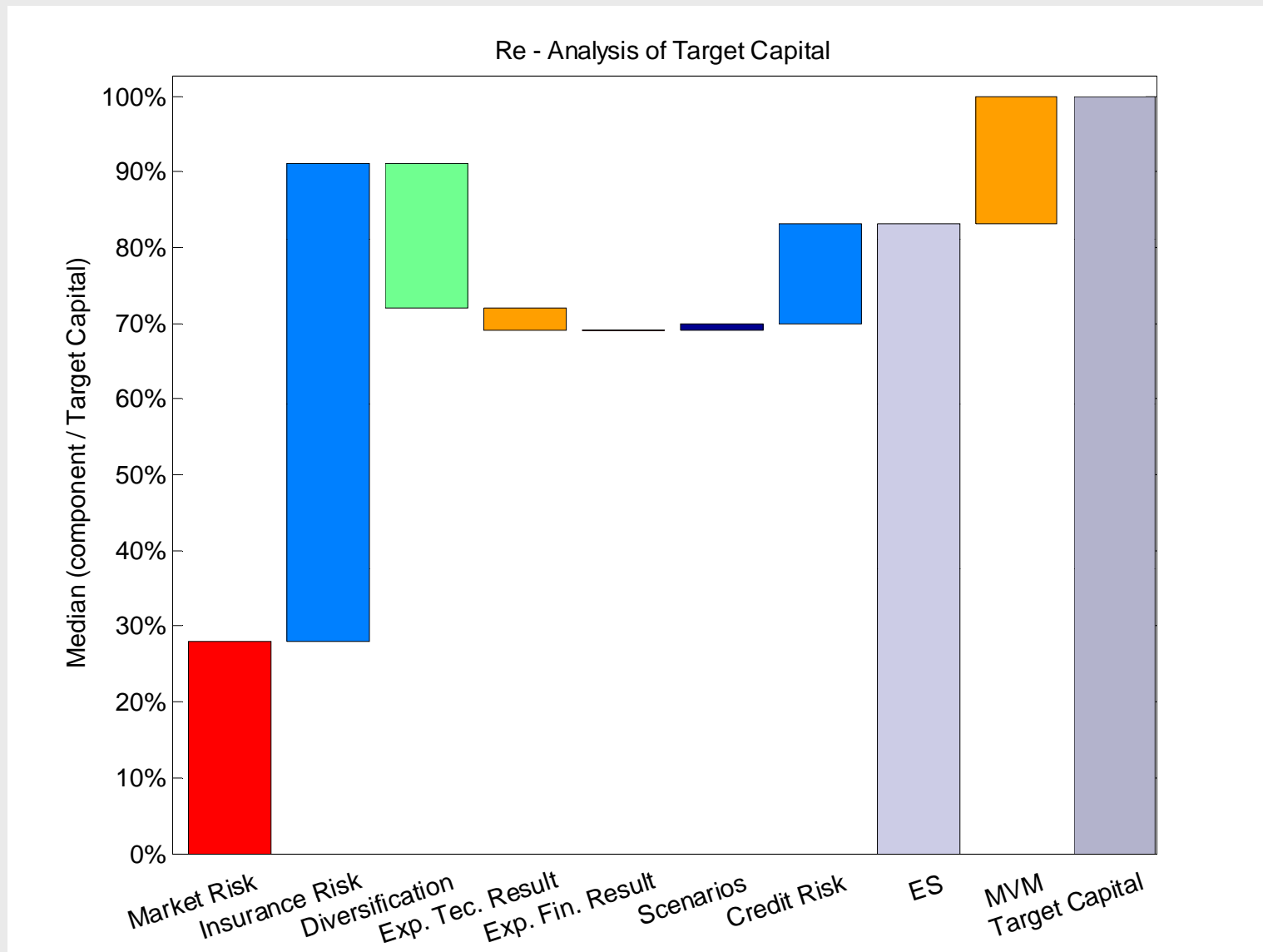
Non life companies, 2009



Components of Target Capital (SCR)



Reinsurers, 2009



Solvency II and SST

Preamble



Solvency II covers pillars I, II and III



SST focuses on pillar I aspects including elements of pillar II.

A full comparison of both supervisory regimes would consist in a comparison of Solvency II with the Swiss Insurance Supervision Act.

For the following slides we focus on pillar I aspects of supervision and compare the SST with the pillar I aspects of Solvency II.

Solvency II and SST

Defining principles



Total balance sheet approach

Total balance sheet approach

Market-consistent valuation

Market-consistent valuation

Risk based capital requirements

- Insurance risks
- *Market risks*
- *Credit risks*
- Operational risks

Risk based capital requirements

- Insurance risks
- *Market risks*
- *Credit risks*
- Operational risks not modeled;
capital add-ons considered.

Solvency II and SST Calibration



Value at risk of the change in available capital at 99.5% confidence level.

Expected shortfall of the change in available capital at 99% confidence level.

Time horizon: one year

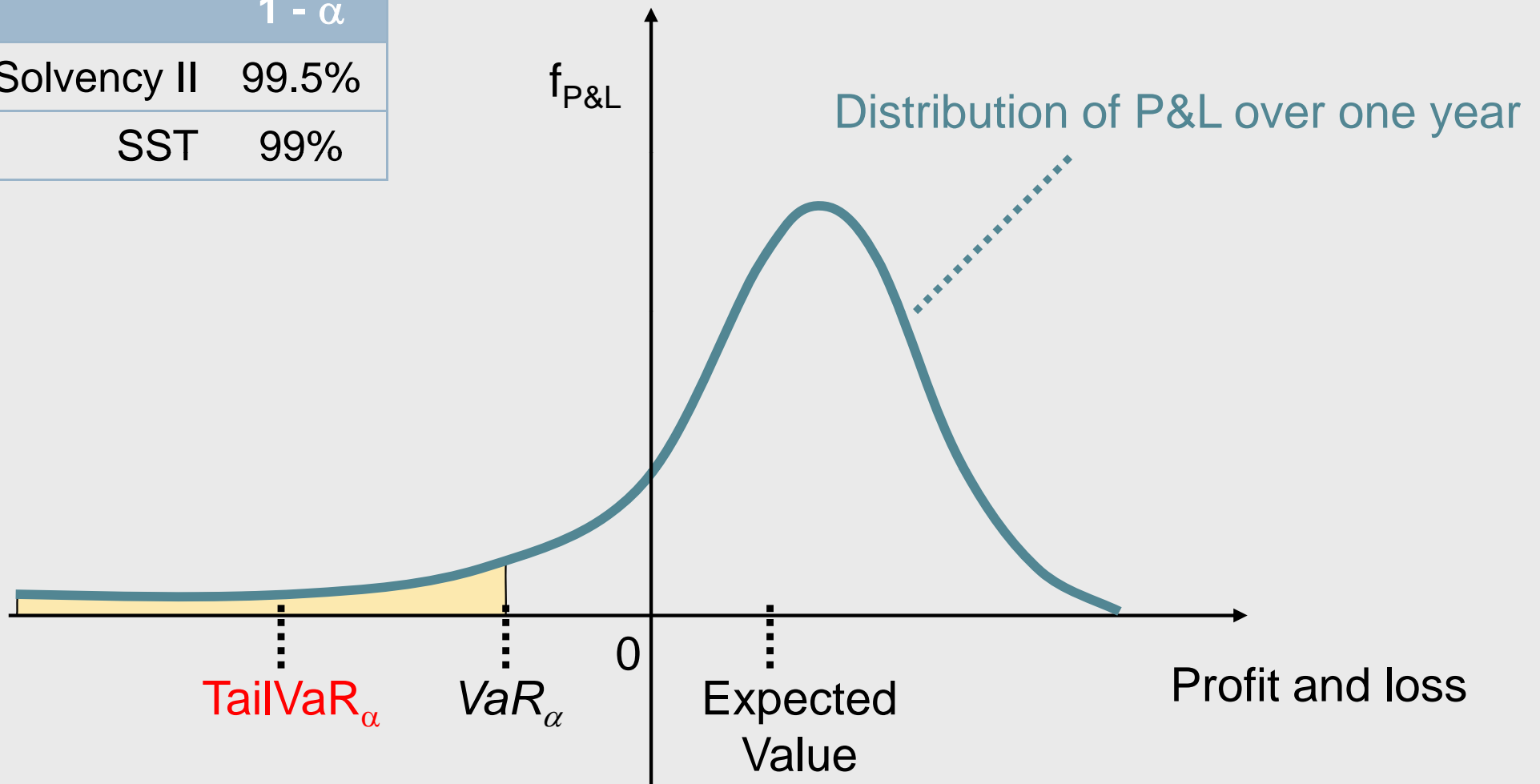
Time horizon: one year

Yield curve based on swap rates and a liquidity premium depending on nature of liability.



Yield curve based on government bonds.

Calibration: VaR and TailVaR

	$1 - \alpha$
Solvency II	99.5%
SST	99%



Solvency II and SST Risk Model

	
Standard model: formula.	Standard model: stochastic model.
Standard model is default choice.	SST emphasizes principles and encourages the use of internal models.
All companies may use the standard model.	Internal models are mandatory for certain companies and groups.
Similar requirements on internal models.	Similar requirements on internal models.
	SST makes extensive use of <i>scenarios</i> (to reflect tail risk, tail dependencies, concentration risk, etc.).

The SST standard model is a stochastic model for each of the risk types:

- *Market risk: Risk Metrics, a covariance model*
- *Credit risk: Basel II standard approach, a factor model*
- Insurance risk:
 - Life: a covariance model
 - P&C: a dedicated stochastic risk model
 - Health: a simplified version of the P&C model

Internal Models for *Market Risk*

Limitations of standard market risk model:

- Linearity assumption between risk factors and capital of insurer.
- Multivariate normal assumption

Types of internal models:

- Slight modifications of standard model: different risk factors, different estimators for volatilities and correlations
- Different model for dependency between available capital and risk factors
 - Use of grids
 - Delta-Gamma models
 - Full revaluation

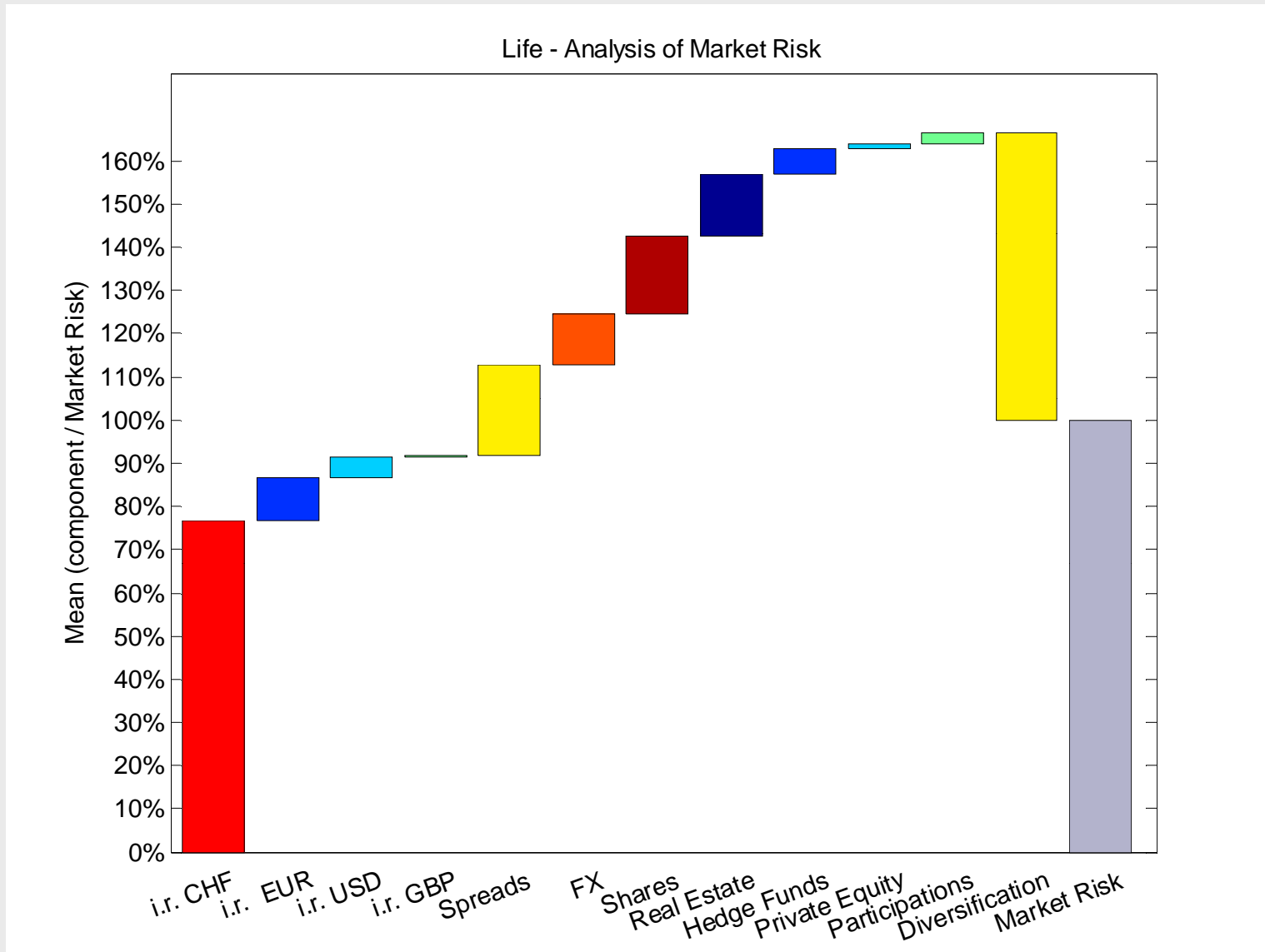
Internal Models for *Market Risk*

Types of internal models (continued):

- Different probability distribution functions for risk factors
 - Different marginal distributions (increased tail risk)
 - Different copulas (increased tail dependencies)
- Different model architecture
 - Historic simulation
 - Economic scenario generators (ESG)
 - For risk modeling purposes: physical probabilities
 - For risk modeling and valuation purposes: nested simulations
 - In practice combination of ESG (risk modeling) with replicating portfolios (valuation)
- No convincing attempt for dealing with dynamic hedging / dynamic portfolio management.

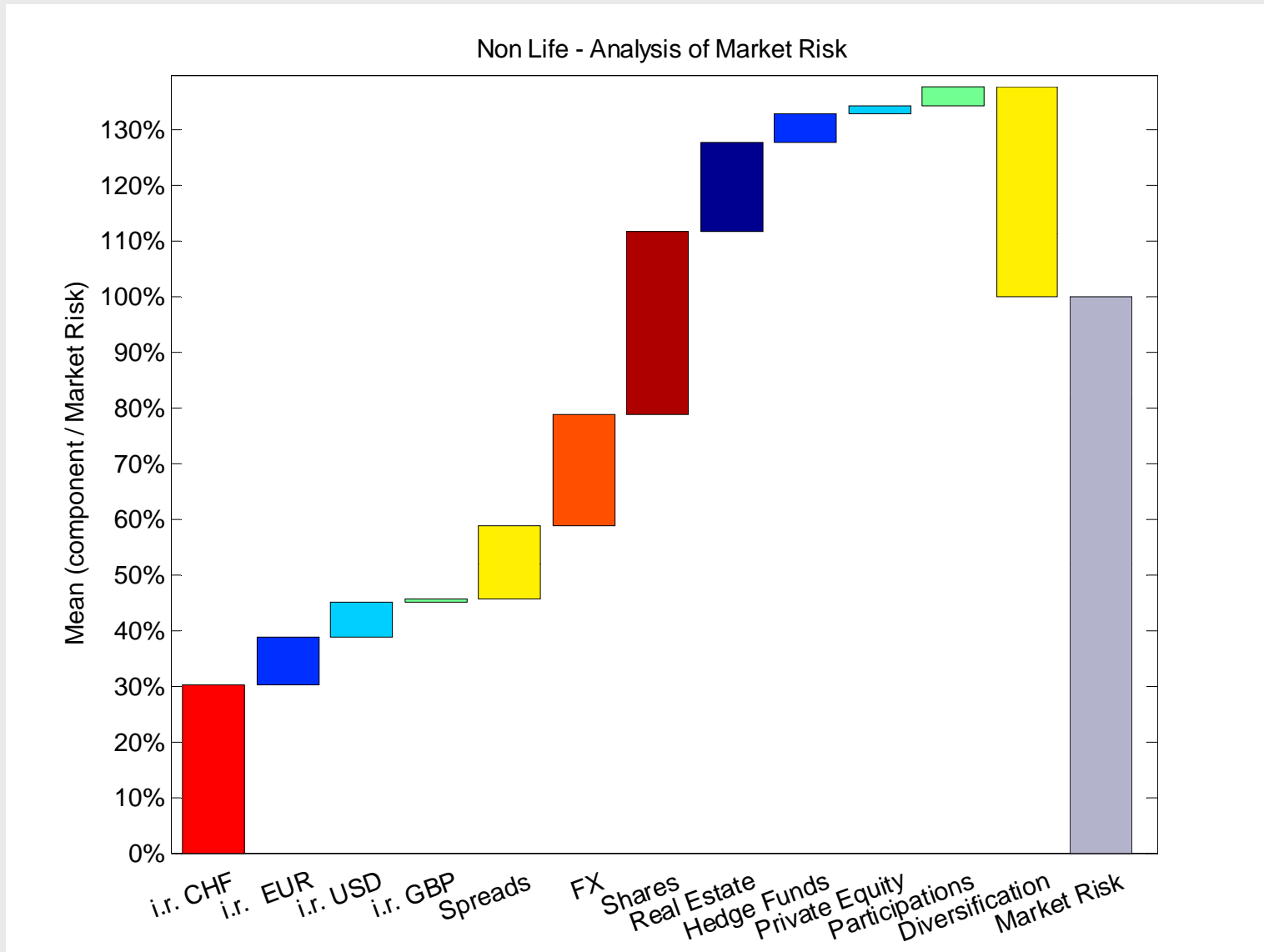
Market risks

Life companies, 2009



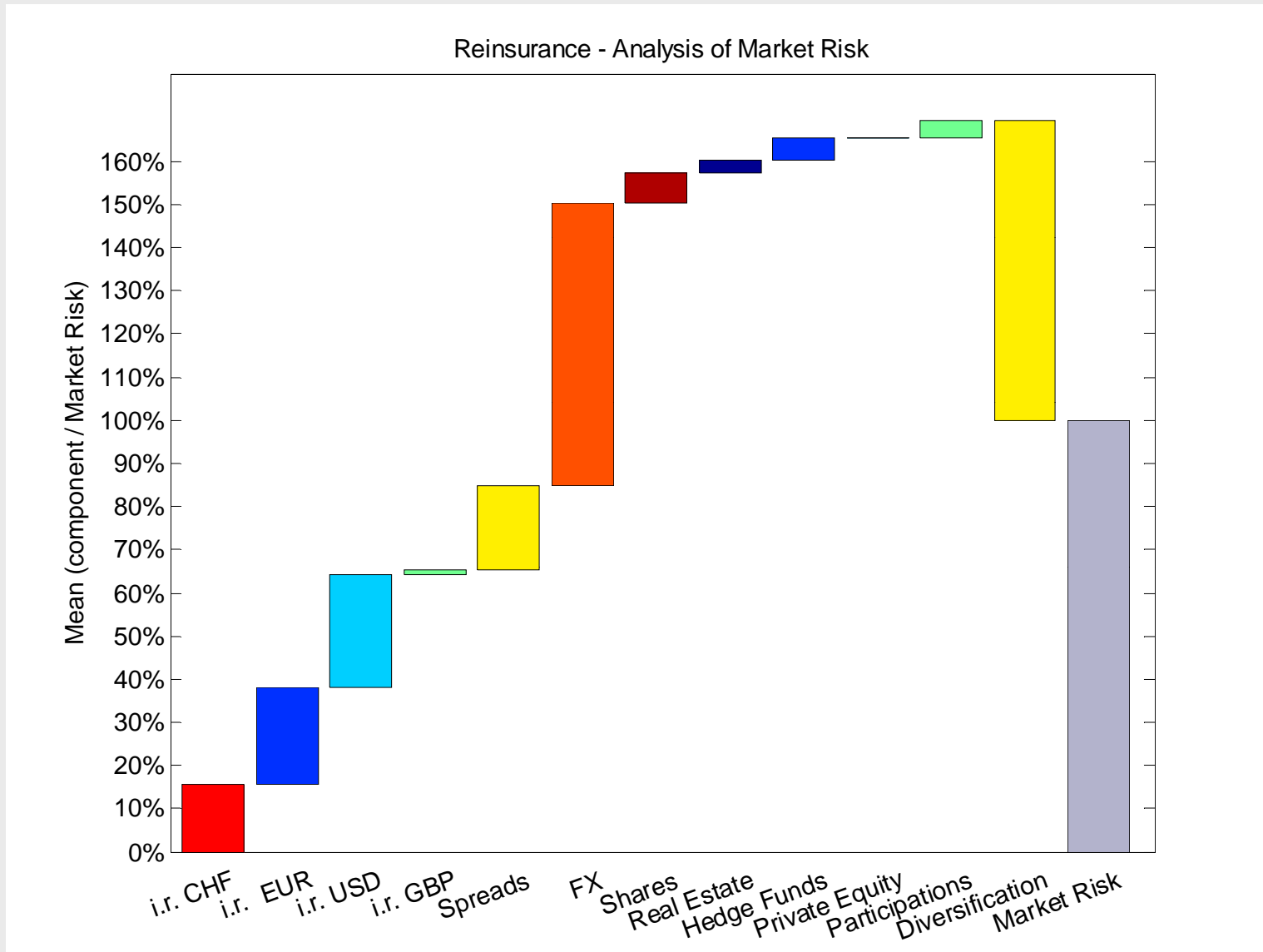
Market risks

Non life companies, 2009



Market risks

Reinsurers, 2009



Internal Models for *Credit Risk*

Limitations of the standard credit risk model (Basel II)

- Rely on ratings from credit rating agencies.
- Do not properly take diversification into account.

Internal models

- Partial internal models to assess the EDF (expected default frequency) and LGD (loss given default) of certain names.
- Comprehensive models:
 - KMV
 - CreditMetrics
 - CreditRisk+

Internal Models for *Credit Risk*

Comprehensive models

- Enable a more realistic modeling of the stochastic dependency between counterparties
 - Diversification effects taken into account, however economic cycle, sector and country effects also reflected in the model
- Enable a realistic modeling of the **stochastic dependency between credit and market risk.**
- FINMA requires that companies model both **default and migration risk.**
- Credit Spread Risks are allocated under Market risk

Use of scenarios

- Generic and specific scenarios must be evaluated and in certain cases taken into account in the required capital
 - To compensate for model weaknesses
 - Underestimation of tail risk (financial market risk scenarios)
 - To take into account tail dependency (e.g. pandemic scenario)
 - To take into account company specific risks, e.g. concentration risk

Impact of SST-Scenarios are aggregated via mix of df

Industrial



Pandemic



Accident:
works outing

Health: anti selection

Hail



disability; longevity,
lapses

Daily allowance

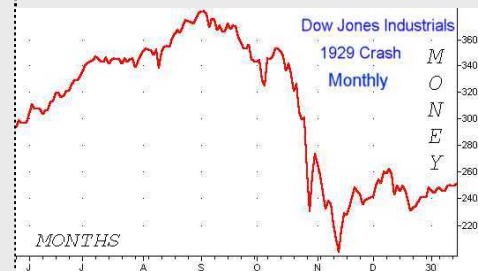


Claims provisions:
+10%

Failure of
reinsurance

Financial Distress

Financial Market



Terror

Any Questions??



You can buy it for only 50 CHF in every Swiss shop...

(advertising)

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