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

Does financial supervision have to heat up?

ETH Risk Day, Sept. 2019

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Agenda

1. FINMA Mandate and Tools
2. Introduction to the Swiss Solvency Test
3. Risks related to climate change
4. Climate Risks within the Swiss insurance supervisory system

FINMA Mandate

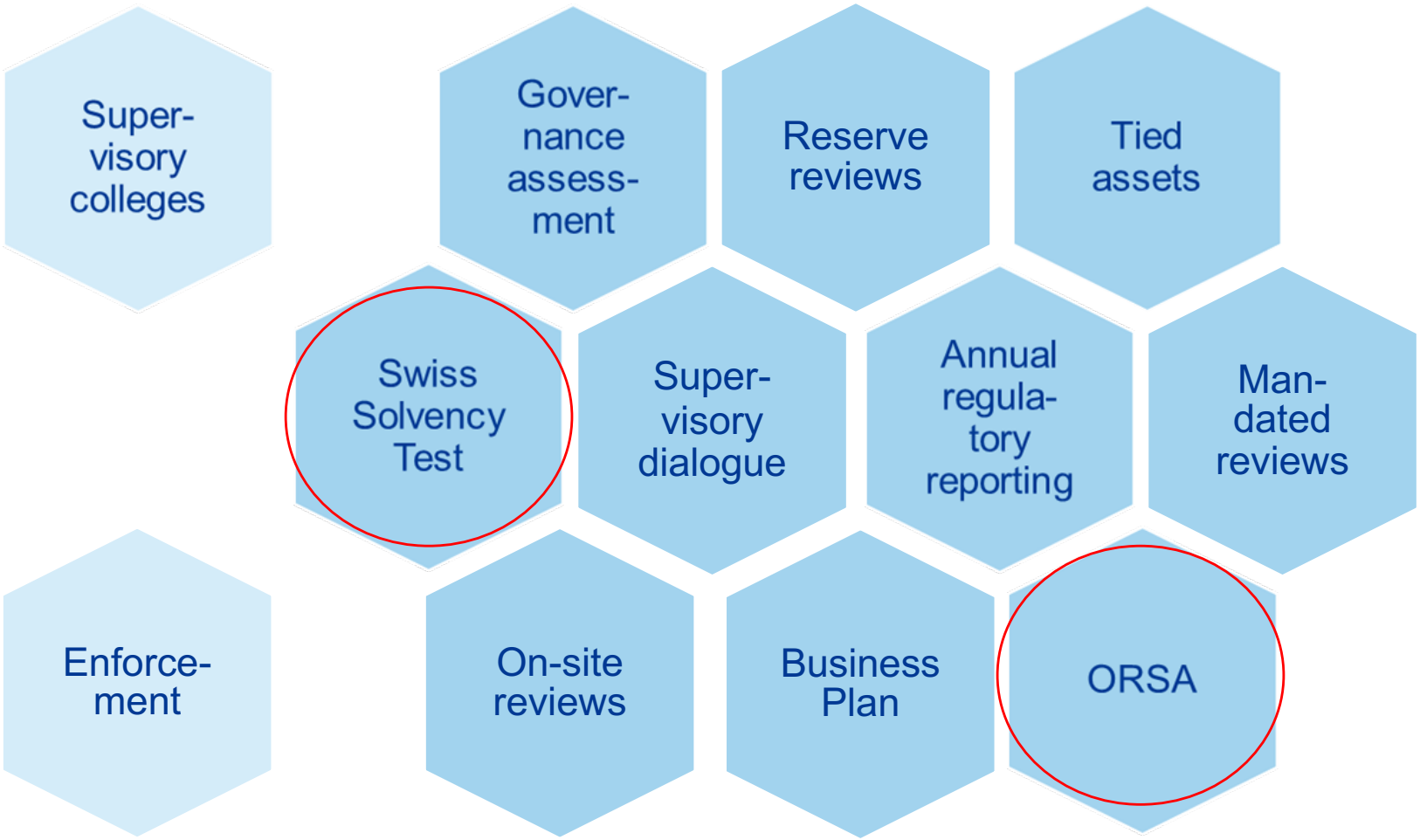
- FINMA is an institution under public law with its own legal personality

- It is responsible for implementing the Financial Market Supervision Act and financial market legislation

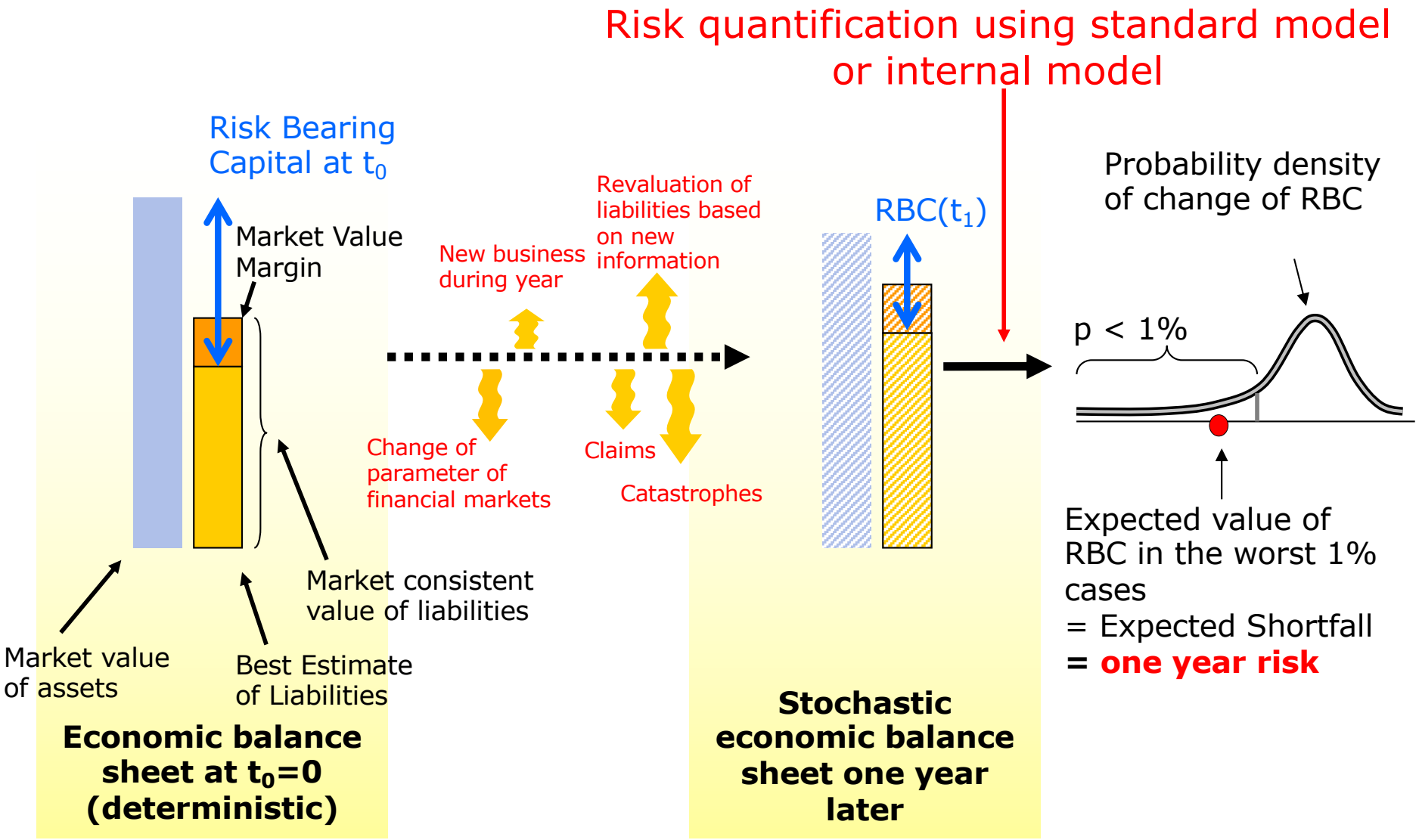
- As an independent supervisory authority, FINMA acts to **protect the interests of creditors, investors, and insured persons** and to **ensure the proper functioning of the financial markets** (Art. 4 FINMASA)

- **FINMA's Tasks are:**
  - **Licensing**: to individuals and legal entities that are active in the financial market
  - **Enforcement**: enables FINMA to ensure compliance with supervisory law, order corrective measures to be taken where necessary, or impose sanctions
  - **Supervision**: core task, guided by Art. 5 FINMASA
  - **Regulation**: Where expressly provided for in the legislation

FINMA's major insurance supervisory tools



Risk under the SST regime

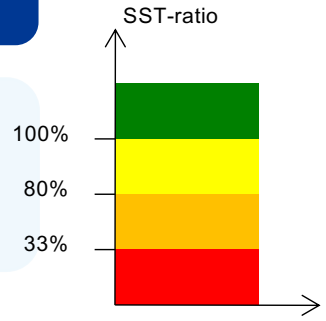


Solvency Regulation: Swiss Solvency Test (SST)

The SST is defined via a set of principles

SST capital requirement

- An insurance company meets the SST capital requirements if the risk-bearing capital (available capital) exceeds the target capital (required capital) -> SST Ratio >= 100%.
- FINMA has the right to intervene in case of an insufficient coverage ratio (intervention ladders)
- The SST measures the capital coverage for a run-off scenario



Mark-to-market (-to-model) for assets and liabilities

- All assets and liabilities are to be valued market-consistently. This means that valuation is based on reliable market values or – if no such values exist – on model outputs, calibrated using market data.
- As a consequence, the SST-ratio *is* interest rate sensitive

Risks to be quantified

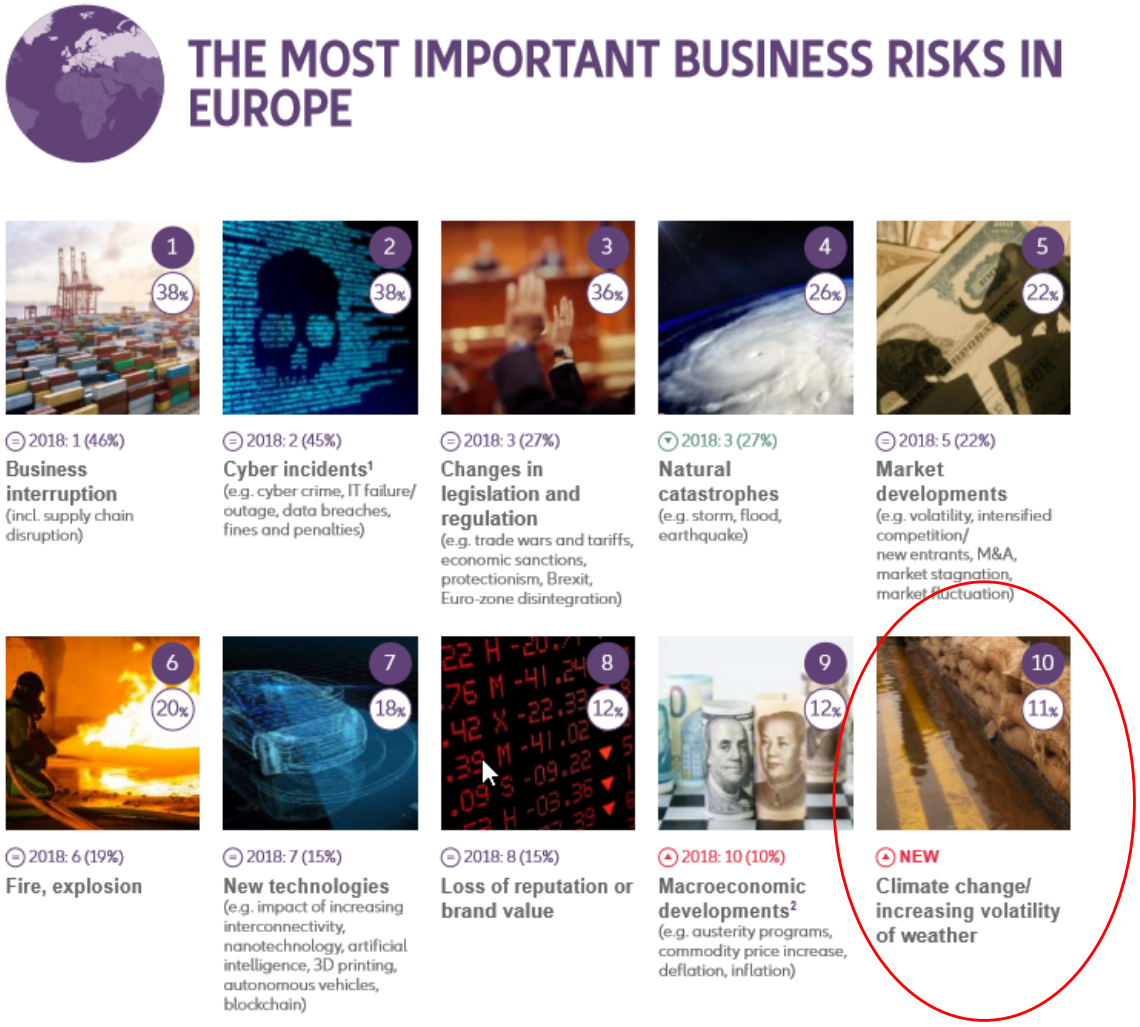
- The SST calculation covers all economically relevant balance sheet items (total balance sheet approach) and the risks resulting from them (in particular, market-, credit- and insurance risk).

Scenarios

- Scenarios prescribed by the regulator as well as company's own scenarios have to be evaluated and, if not already reflected by the model, aggregated to the target capital.

Risk Identification - Allianz Risk Barometer 2019

The annual Allianz Risk Barometer identifies the top corporate perils, and potential solutions, for 2019, based on the responses of 905 risk experts



International Paris Agreement 2015

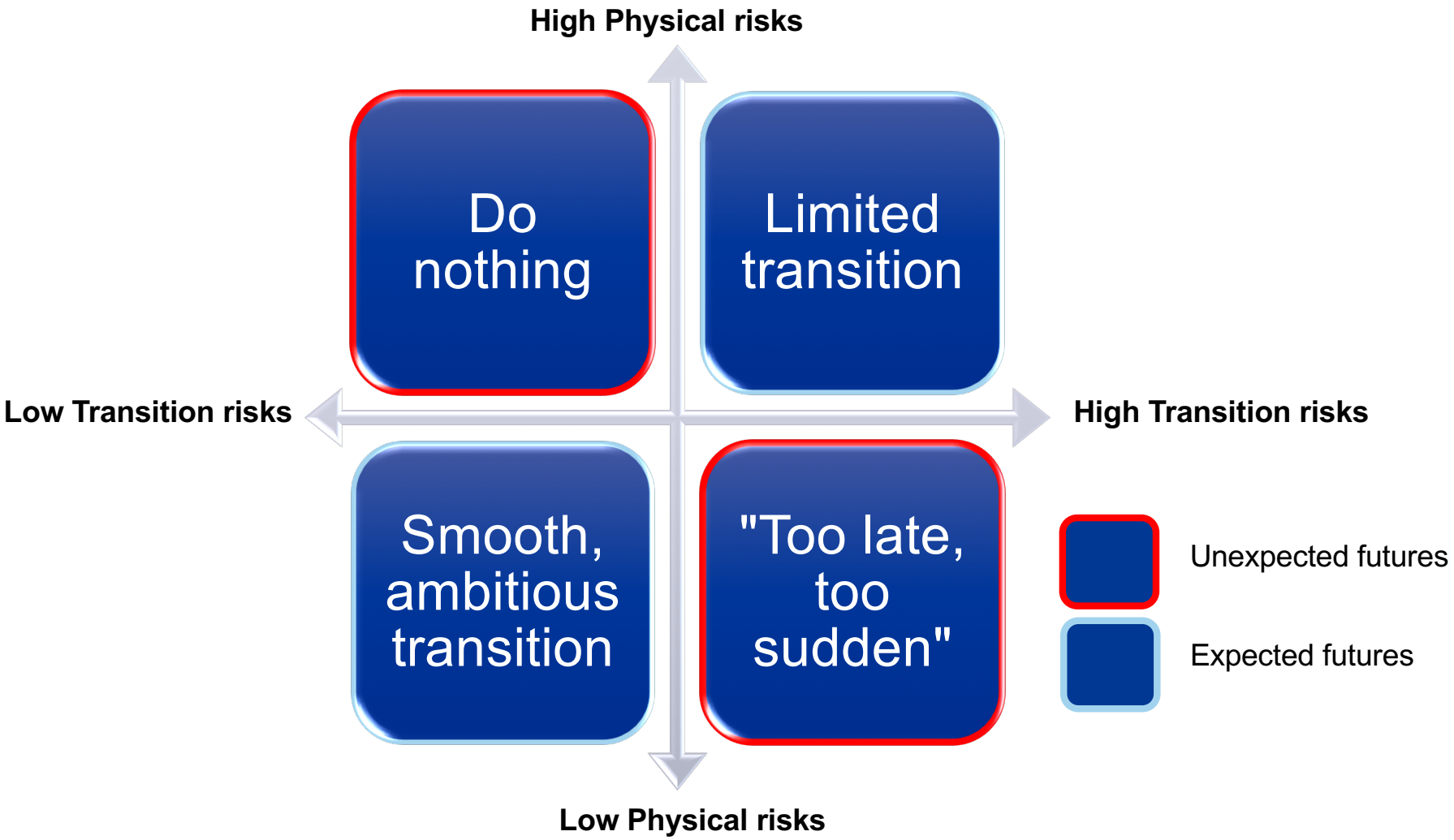
Objectives (Art 2.1.)

1. **Mitigation**: Limit temperature increase to well **below 2°C** (compared to pre- industrial values); 1.5°C to reduce risk significantly -> net-zero-emissions as of mid century (industry, transport, buildings, etc).

2. **Adaptation**: Increase ability to adapt to impacts and foster climate resilience.

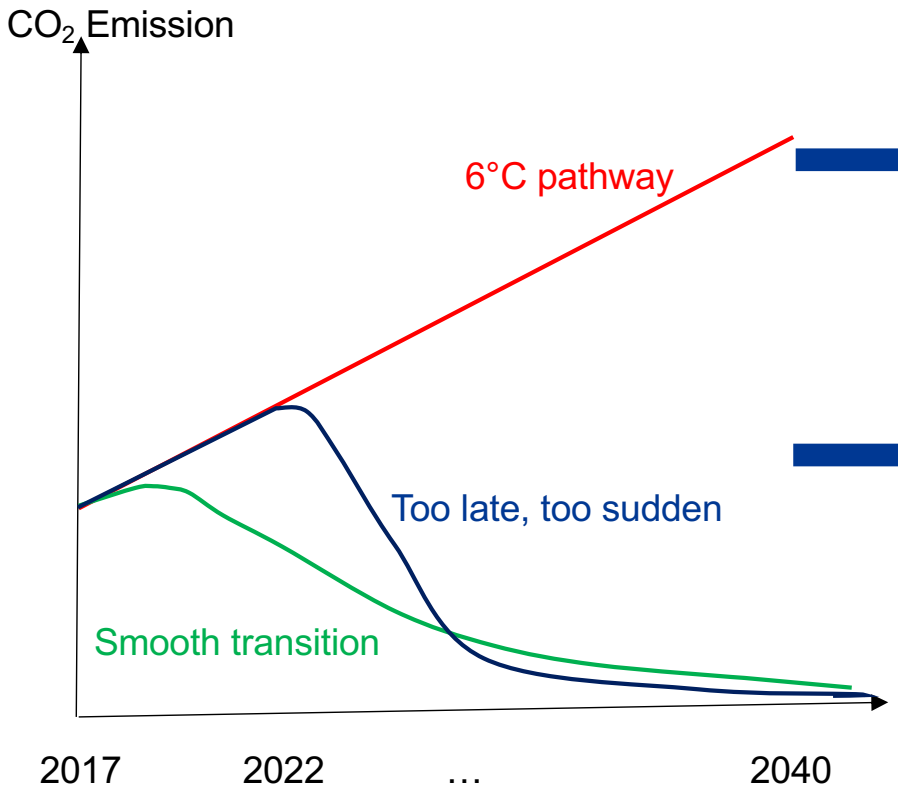
3. **Finance**: Make finance flows consistent with a low carbon and climate resilient pathways -> public and private sector.

Physical and Transition Risks



Quelle: 2° Investing Initiative, Discussion Paper April 2019

Risks for insurance (financial) markets



Source: European Systemic Risk Board

Climate Change Risks and capital charges

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Current reg. System

- At present, the Swiss regulatory system (and as well Solvency II) only indirectly addresses climate risks

EU possible action plan

- "Taxonomy": classification system of sustainable economic activities
- Financial disclosure on climate related financial risks
- *" The Commission will assess whether more appropriate capital requirements could be adopted to better reflect the risk of sustainable assets held by banks and insurance companies."*

FINMA opinion

- Climate risks can generally be translated into the classic risk categories such as credit, market, insurance or operational risks and should be covered by these; however, solvency systems represent usually a short-term time horizon. Climate risks have special characteristics, such as very long time horizons or potentially very far-reaching effects (across many economical sectors and geographies)

Climate risks within the existing solvency framework

- **Certain aspects of climate risks** can already be included in existing models and their parametrization, e.g. in existing NatCat models, especially in North Atlantic hurricane models or in US wildfire model (whereby certain aspects have already been challenged by FINMA in discussions with some companies).
- However, for several **other emerging scenarios** it is a priori less clear how to include them in the solvency calculation *if it should turn out that there is a corresponding risk-based need.*
- On first glance obvious potential approaches are close to "classical methods" we have already used in the SST: E.g.
    - **Aggregation of extreme scenarios** as we did it for other unexpected events like depression/ financial crises/ real estate.
    - **Calibration** of **distributions to** some **scenarios**.
- However, it turned out that a suitable aggregation of such scenarios can be challenging.

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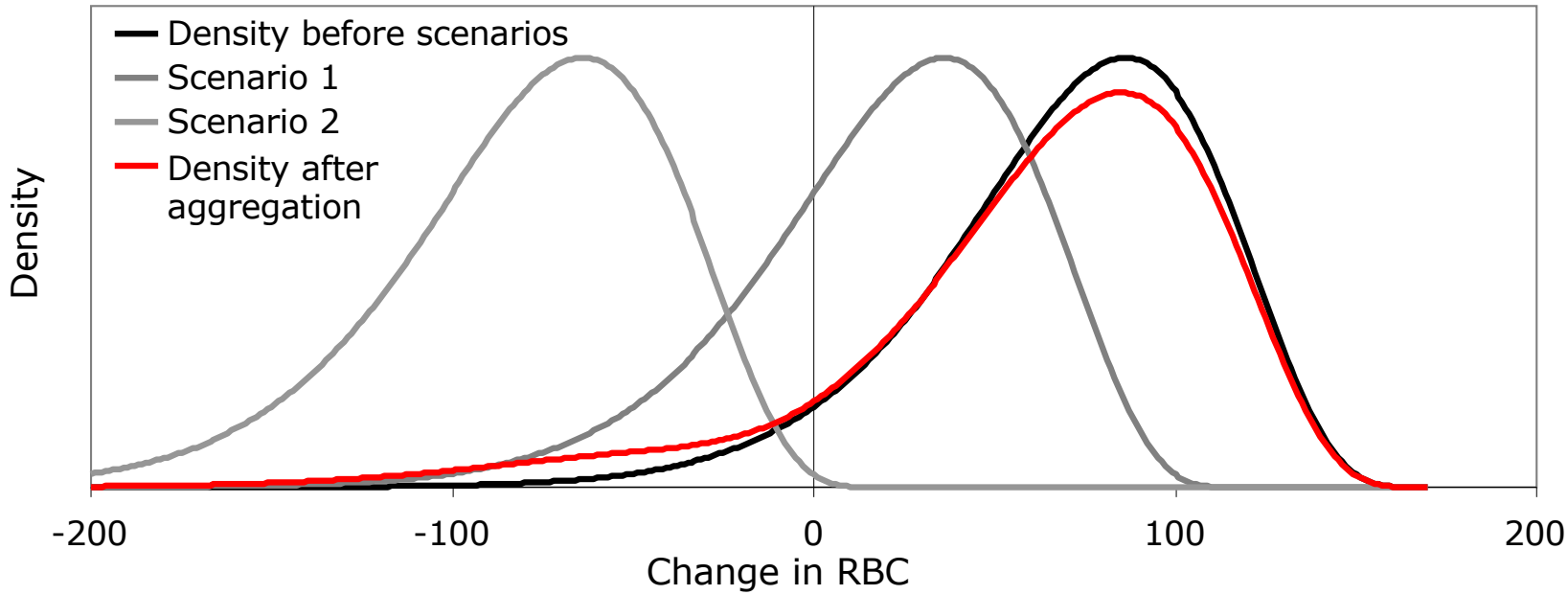
SST Scenario Aggregation



This aggregation method is pragmatic but has some drawbacks, e.g.

- aggregation creates confusion among stakeholders about "double-counting",
- it gives penalties for conservative modelling before scenario,
- same "dispersion" for the stressed and non-stressed distribution, etc.

(cf. e.g. Filipović & Cambou (2017), Haier & Pfeiffer (2012), where, in particular, also some alternatives have been discussed; often with some technical challenges for certain concrete implementations)

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Calibration of an analytic distribution via scenarios (I)

Obvious alternative: Consider e.g. (and similarly as e.g. used in StandRe) the following mutually independent random variables:

Loss severity, e.g. (for simplicity) $L_i \sim \text{Pareto}(x_m, \alpha)$ with $i = 1, 2, \ldots$
Number of losses during the year $N \sim Poisson(\lambda)$

The total loss X is a **compound-Poisson** random variable:

$$X = \sum_{i=0}^{N} L_i$$

A representative set $\mathcal{S}$ of n scenarios with frequency f_j and loss S_j is used to calibrate the model

$$\mathcal{S} = \{(S_j, f_j), \qquad j = 1, \ldots, n\},$$

where we assume for simplicity that $S_j > x_m$ for all j.

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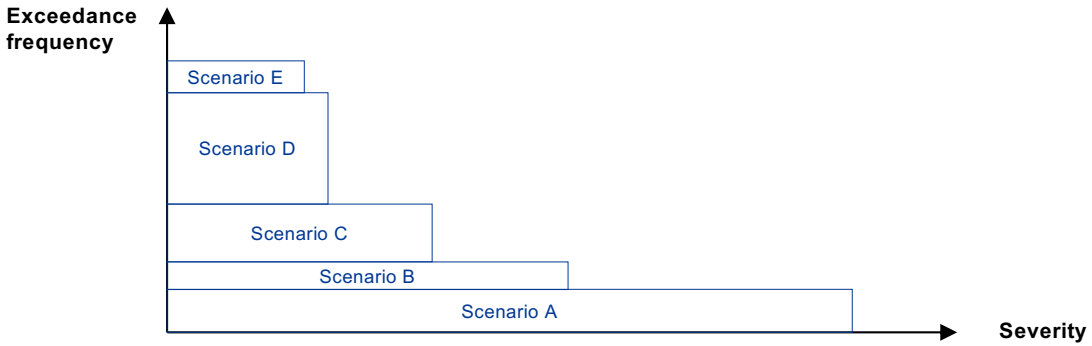
Calibration of an analytic distribution via scenarios (II)

The compound Poisson model can be fitted to the scenarios $\mathcal{S} = \{(S_j, f_j)\}$ using the (expected) exceedance frequency curves.

Exceedance frequency curve of the scenarios: "stack" the scenarios on top of each other, with the largest severity on the bottom and the smallest on top:



In a log-log plot, the exceedance frequency curve for the compound Poisson model is a straight line with negative slope equal to the Pareto-α.

For a good fit, the exceedance frequency curve of the scenarios should thus be close to a straight line in a log-log plot.

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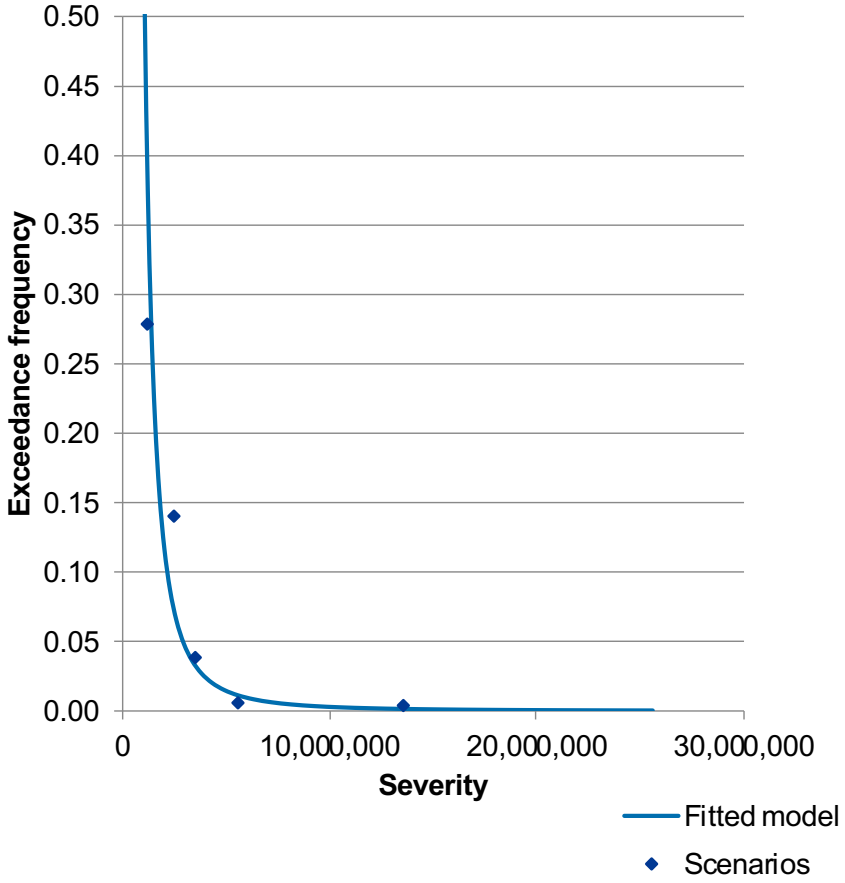
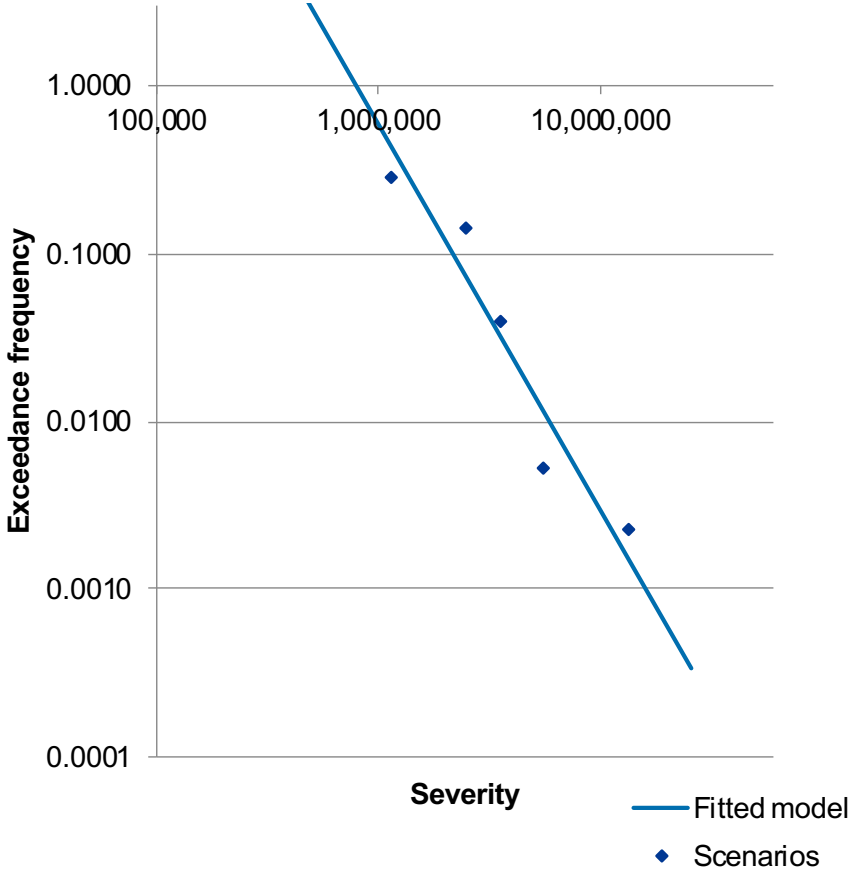
Calibration of an analytic distribution via scenarios (III)





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Calibration of a analytic distribution via scenarios (IV)

Also here some ***obvious challenges*** exist, as e.g.

- How to find reasonable scenarios for the one-year distribution?
- Handling of the limited number of scenarios for the fit.
- Outcomes from heterogeneous scenarios might not be suitable to the modeling assumptions => potential modification of the assumptions (and calibration procedure)
- Dependency (with other losses / risk factors) modelling?
- Potential next discussions about double counting with other model components.
- Etc.

Hence, many interesting questions exist, which could be *suitably answered specifically for climate risks*.

Questions