

# Swiss Solvency Test (SST) for Insurance Groups

Issues of Group Regulation, Modeling,  
Processes

Martin Jakob, SST - Insurance Risks

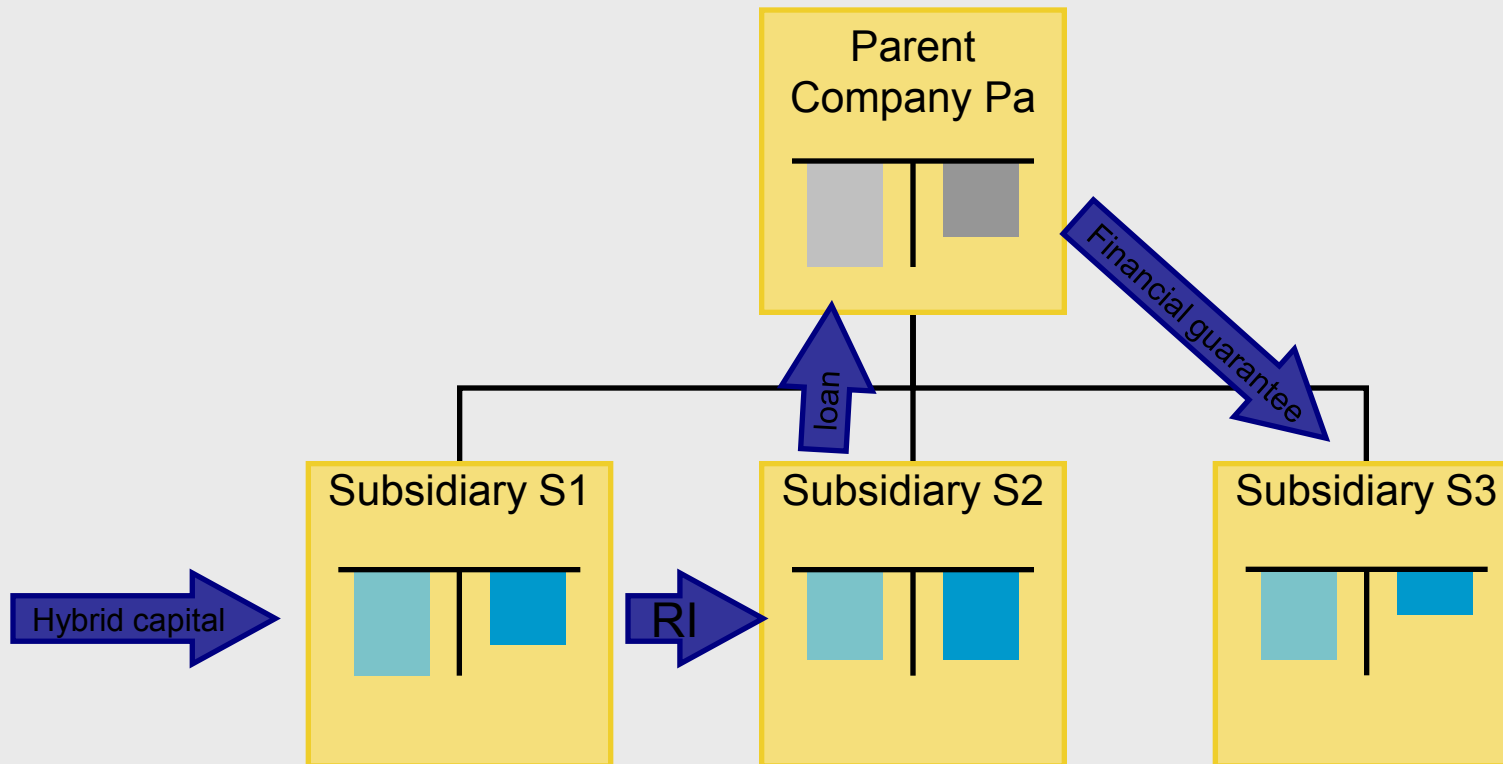
- Insurance Group: a Setup
- Consolidated Approach
- SST for Groups: a Legal Entity Approach
  - Intra Group Transactions
  - Group Support
  - Diversification
- Examples
- Conclusions

A **group** is a set of legal entities ( $\geq 2$ ) plus the information of

- who owns whom (**structure of ownership**);
- which type of capital has been transferred between group members (**capital transfer instruments: loans, hybrids etc**),

And

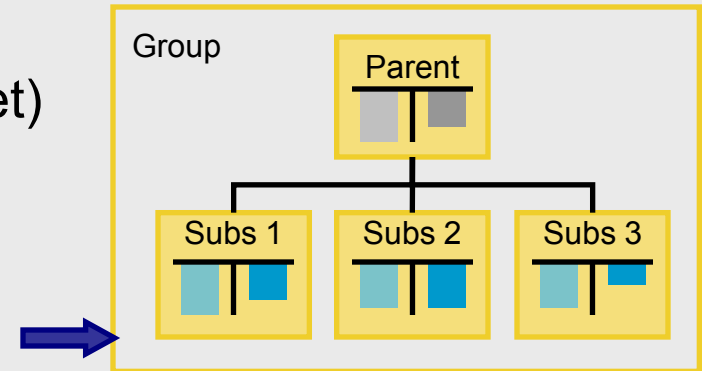
- which risks are transferred between which group members (**risk transfer instruments: guarantees, reinsurance contracts**).



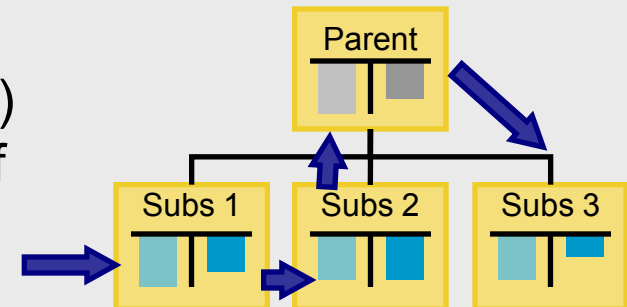
- A set of (at least two) legal entities bound by some type of ownership or control arrangement.
- At least one of the legal entities runs insurance operations.
- Intragroup interactions / transactions.

# Approaches to Group Solvency

1. Single Economic Entity Approach.  
(based on consolidated balance sheet)

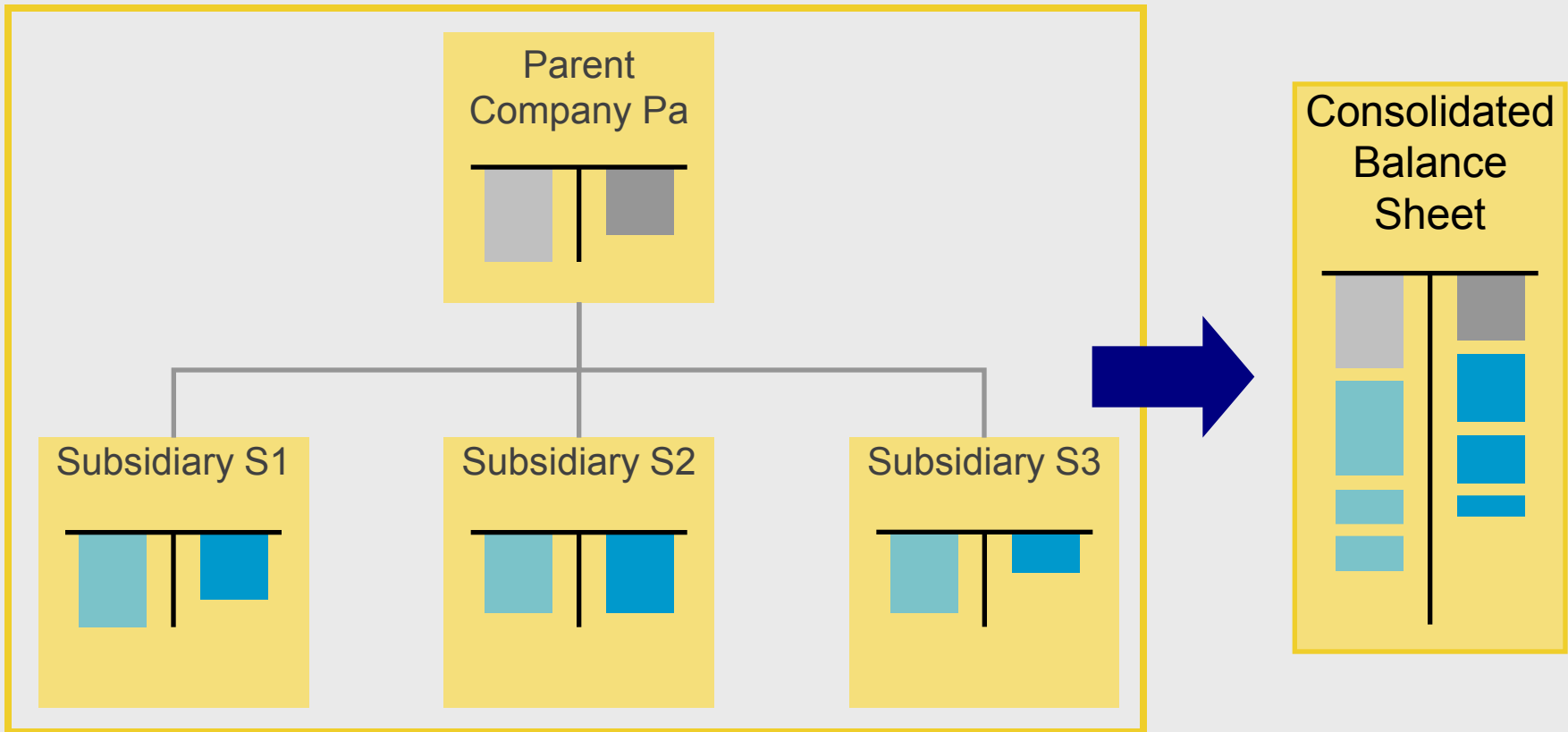


2. Legal Entity Approach.  
(≠ traditional solo approach, see below)  
Focus on legal entities in the context of the rest of the group.



3. Combinations of 1 and 2.

# Single Economic Entity / Consolidated Approach



- The consolidated balance sheet considers the group as one single economic entity.
- It is a list of all assets and liabilities ignoring where these positions are from.
- Intragroup transactions cancel out.

# Risk and Capital Measurement using a Pure Consolidated View

## Unlimited Fungibility and Transferability

- Assumes that any asset can legally be used to cover any loss.
- Assumes that top management is willing to use / spend any asset to cover any loss.
- Assumes that group acts as one single economic entity even in times of distress.

## Musketeer Approach

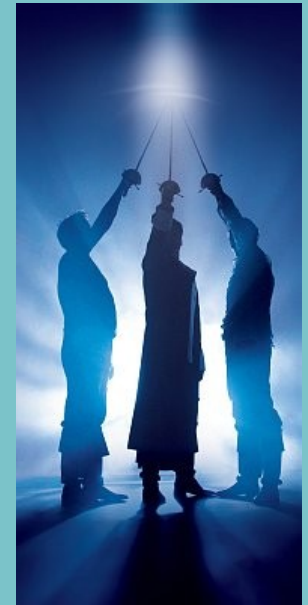
"One for all and all for one."

Assumes that either

- **all** legal entities or
- **no** legal entity

of the group are insolvent.

Typically, risk is measured and captured by *one single number* for the whole group.



In general, strong assumptions used by the consolidated view for risk management purposes are not met in practice:

- A group will support a subsidiary in distress only if this is preferable for the owners of the group.
- There are real life examples of failed groups and other near misses where some legal entities survived and others became bankrupt.
- External institutions such as rating agencies or regulators might prevent a group from injecting capital into an insolvent subsidiary.

Effects of intra group transactions on individual entities is not captured.

**Therefore: The fact that the “overall” capital of a group is larger than the “overall” risk does not mean that all legal entities and their policyholders are protected on the intended and required level.**

Reason for major discussions about group support.

- It is not the responsibility of an insurance group but of individual legal entities to pay for claims of policyholders.
- The legal entity approach focuses on the risks (solvency capital requirement) and resources to take these risks (available financial resources) of **legal entities**.
- The existence of the group has an impact on individual legal entities. Therefore, for a **comprehensive view**, they have to be considered as members of the group instead as standalone entities like in a traditional solo view.

# SST for Groups: a Legal Entity Approach

- In the SST a group is not considered as one single economic entity.
- The SST considers all group members (i.e. the legal entities) individually but fully allowing for their mutual interactions. Effects of the group on individual entities are part of the model.
- This is why a legal **entity approach** is a group model. It is fundamentally more than a collection of traditional solo supervisions.

# SST for Groups: Result is more than one Number!

The group model has to determine available capital as well as required capital for each legal entity. That means for the example from previous slides:

| Entity        | Available Capital | Required Capital: SCR | Required Capital: MCR (*) |
|---------------|-------------------|-----------------------|---------------------------|
| Parent        | $AC_p$            | $SCR_p$               | $MCR_p$                   |
| Subsidiary S1 | $AC_1$            | $SCR_1$               | $MCR_1$                   |
| Subsidiary S2 | $AC_2$            | $SCR_2$               | $MCR_2$                   |
| Subsidiary S3 | $AC_3$            | $SCR_3$               | $MCR_3$                   |

(\*) only for Swiss entities.

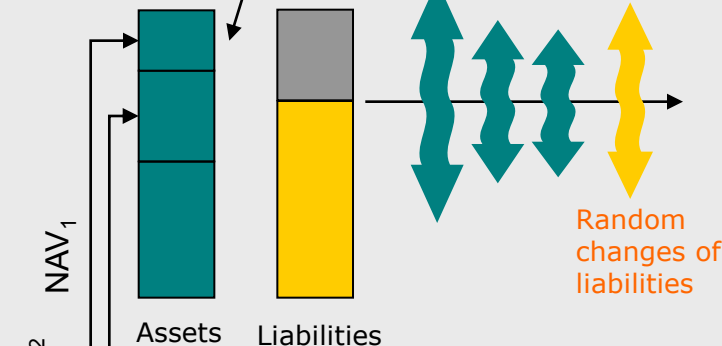
Since the group is not considered as one single entity, there is no need to determine an overall figure in the first place: there is no group SCR.

Nevertheless, under certain conditions groups can determine a group wide SCR or be asked for the calculation by FINMA.

# SST: Group Diversification

The subsidiary's *economic net asset value* is an asset to the parent company

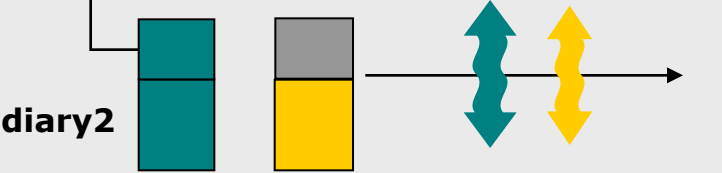
## Parent Company



## Subsidiary 1



## Subsidiary 2



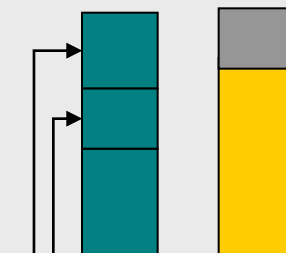
Economic balance sheet at t=0  
(deterministic)

Random changes of the economic value of assets and participations

Random changes of liabilities


The *parent company* benefits from diversification since the random change of its assets and liabilities is not fully correlated to the changes of the economic net asset value of its participations

Parent's diversification is effected via the ownership relation between the parent and its subsidiaries



Economic balance sheet at t=1  
(stochastic)

-  Assets
-  Available Capital of Subsidiary 1
-  Available Capital of Subsidiary 2
-  Liabilities

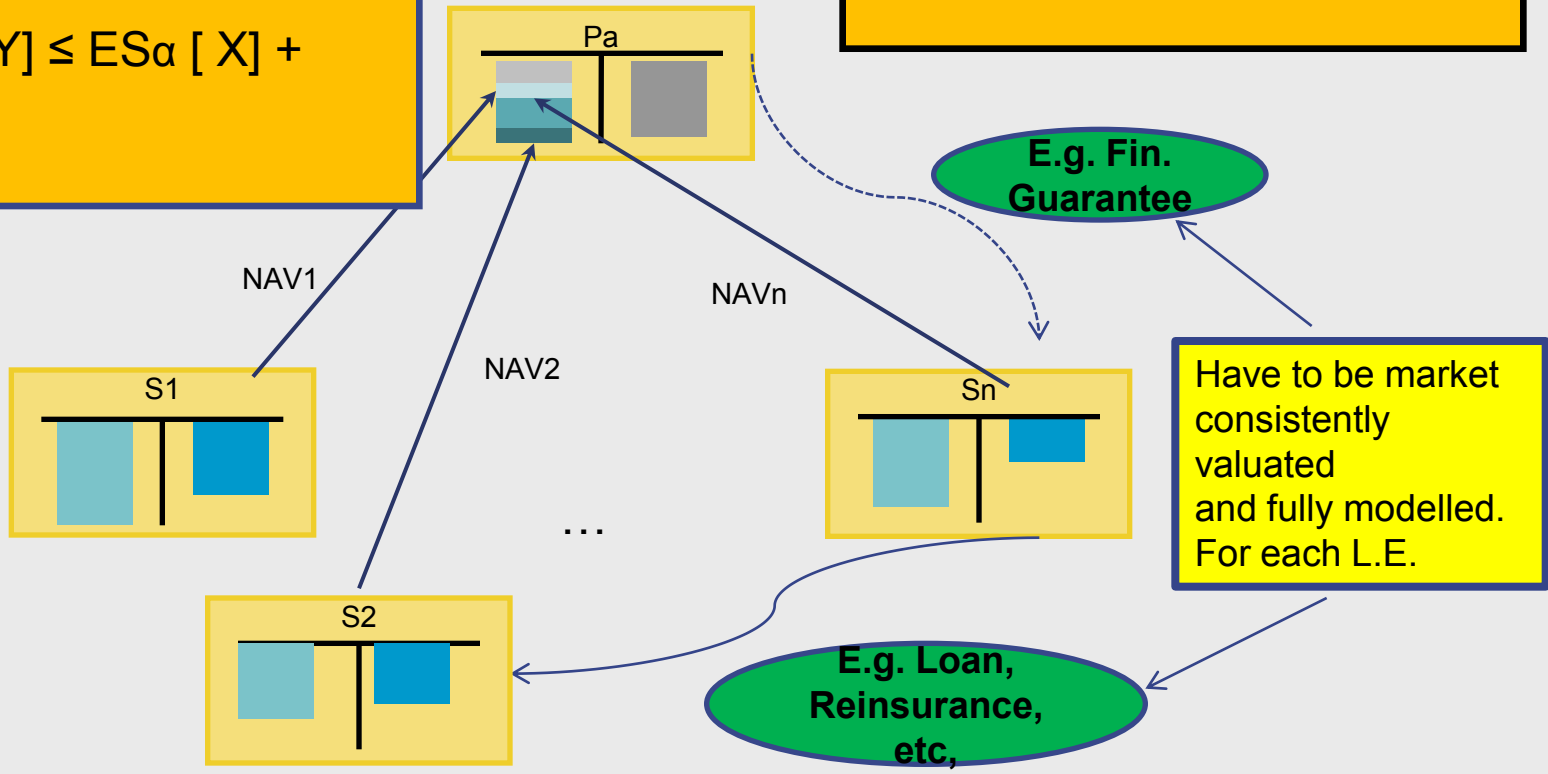
 Random changes of the economic value of assets and participations

 Random changes of liabilities

# SST for Groups: Group Effects

For **Parent**:  
 Diversification effects in that  $S_1, \dots, S_n$  do not typically move in parallel.  
 Further:  
 $ES_\alpha [X + Y] \leq ES_\alpha [X] + ES_\alpha [Y]$ .

On the other hand, group members profit from capital and risk transfer instruments.



**Capital and risk transfer instruments (CRTI)** in the SST are written and legally binding documents that define

- in which situation
- how much capital
- flows from whom to whom.

Examples of CRTI:

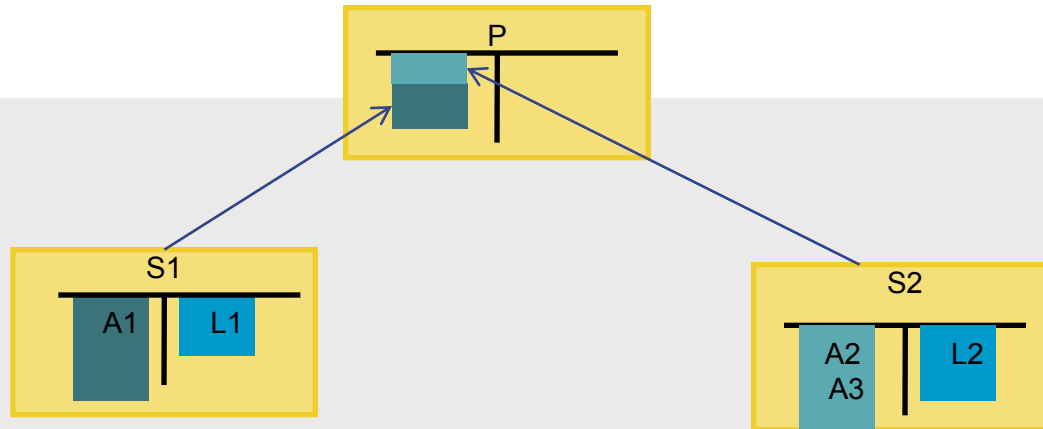
- Reinsurance agreements
- Financial guarantees
- Hybrid instruments
- Intragroup loans

The oral promise from a group CEO to support subsidiaries in distressed situations is not a CRTI.

- CRTI define the minimal possible support between group members. Depending on the precise situation the support may exceed that minimum.
- In the SST, group support is taken into account to the extent it is defined by accepted CRTI.
- Usually, **risk transfer instruments** impact much more on SCR than on available capital. They
  1. decrease the risk of one party (e.g. of a cedant or the receiver of a guarantee) and
  2. increase the risk of a second party (e.g. the “reinsurer” or the provider of a guarantee).

**Both sides (together with credit risk) have to be taken into account!**

# Examples



- P owns S1 and S2 as its assets, no liabilities
- Value assets of P =  $\text{Max} (\text{Assets S1} - \text{Liabilities S1}, 0) + \text{Max} (\text{Assets S2} - \text{Liabilities S2}, 0) \geq 0$ ,  
i.e. P is a **holding**.

Assets A1, A2, A3

modelled as i.i.d. r.v.  $N(1, 0.2)$

Liabilities L1, L2

|       |                | A1  | A2 | A3  | L1 | L2 | NAV |
|-------|----------------|-----|----|-----|----|----|-----|
| ex. 1 | S1             | 1.6 |    |     | 1  |    | 0.6 |
|       | S2             |     | 1  | 0.6 |    | 1  | 0.6 |
|       | Parent         |     |    |     |    |    | 1.2 |
| ex. 2 | S1             | 1.6 |    |     | 1  |    | 0.6 |
|       | S2             | 1   |    | 0.6 |    | 1  | 0.6 |
|       | Parent         |     |    |     |    |    | 1.2 |
| ex. 3 | S1 + guarantee | 1.6 |    |     | 1  |    | 0.6 |
|       | S2             |     | 1  | 0.6 |    | 1  | 0.6 |
|       | Parent         |     |    |     |    |    | 1.2 |

- Example 3 (“guarantee to S1”):

**P gives up** its limited liability to S1:

- If  $A1 - L1 < 0$  then P transfers as much as possible but at most  $L1 - A1$  to S1.

# Simulation results (2 Mio. events)



## S1 and S2 independent

| Entity | Expected value | Expected Shortfall |
|--------|----------------|--------------------|
| Parent | 1.21           | 0.11               |
| S1     | 0.60           | -0.41              |
| S2     | 0.60           | -0.22              |

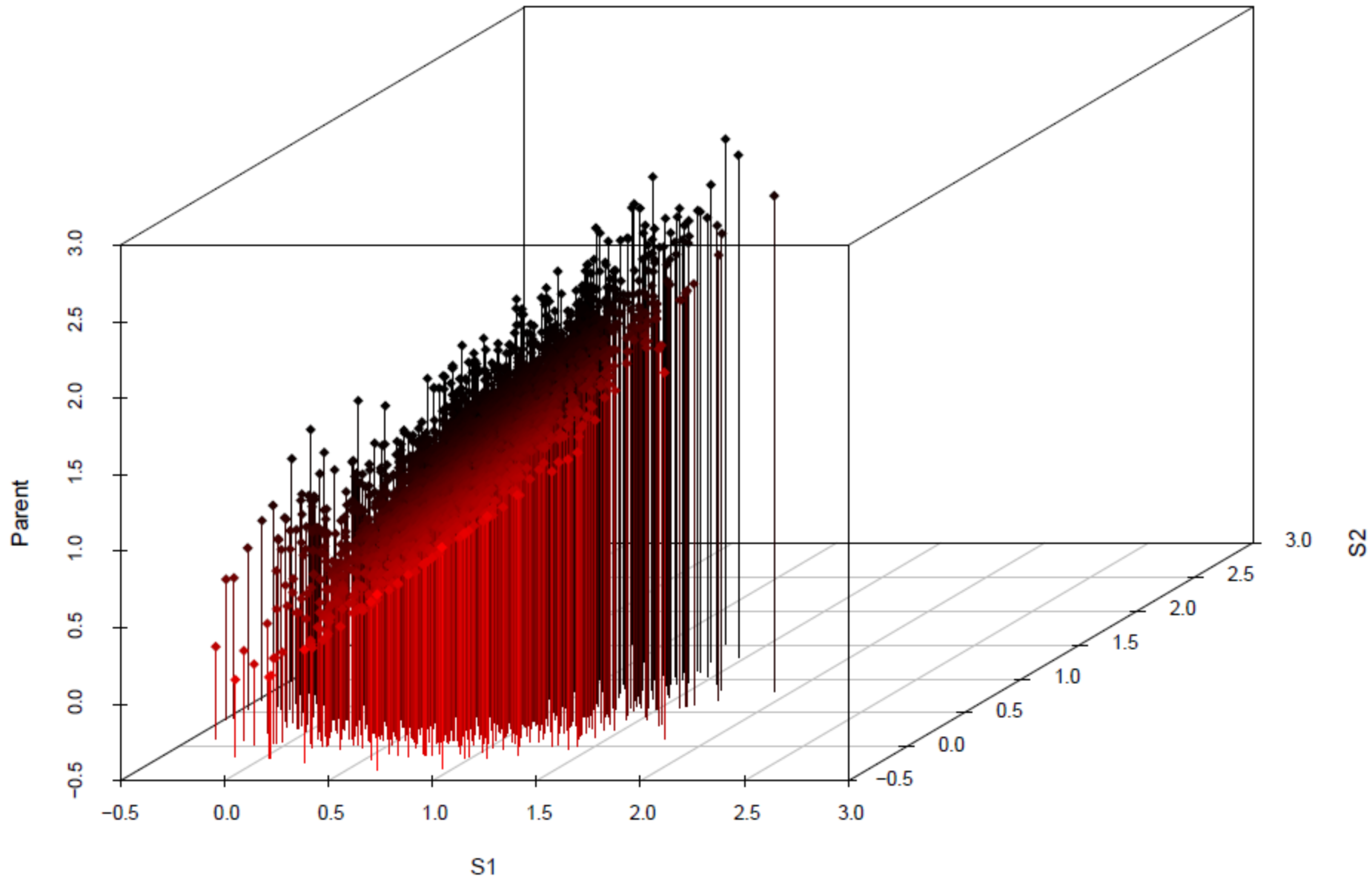
## S1 and S2 dependent

| Entity | Expected value | Expected Shortfall |
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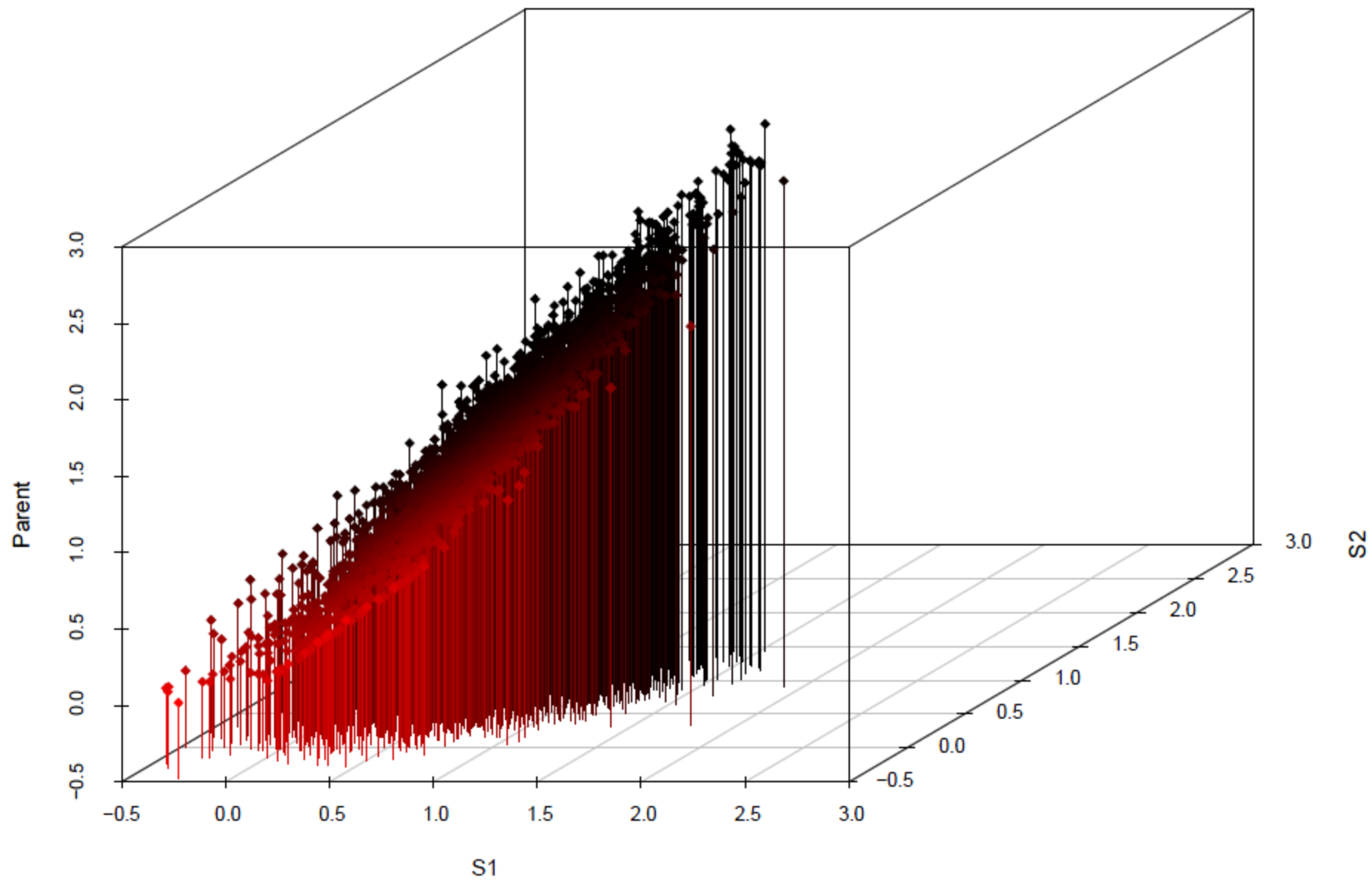
## Guarantee to S1

| Entity | Expected value | Expected Shortfall |
|--------|----------------|--------------------|
| Parent | 1.20           | -0.05              |
| S1     | 0.61           | -0.08              |
| S2     | 0.60           | -0.22              |

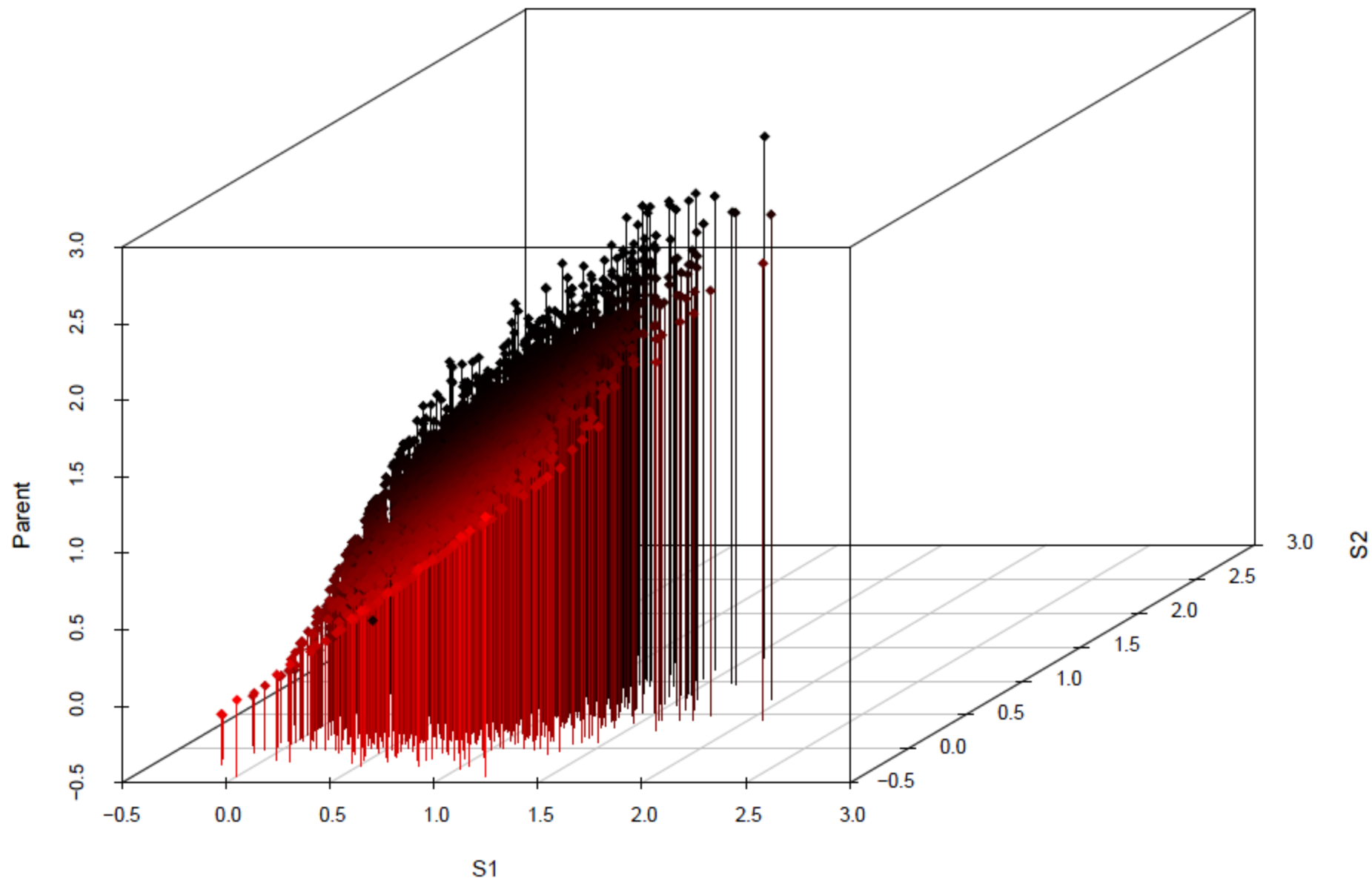
# Independency of S1 and S2



Dependency of S1 and S2



# Guarantee to S1

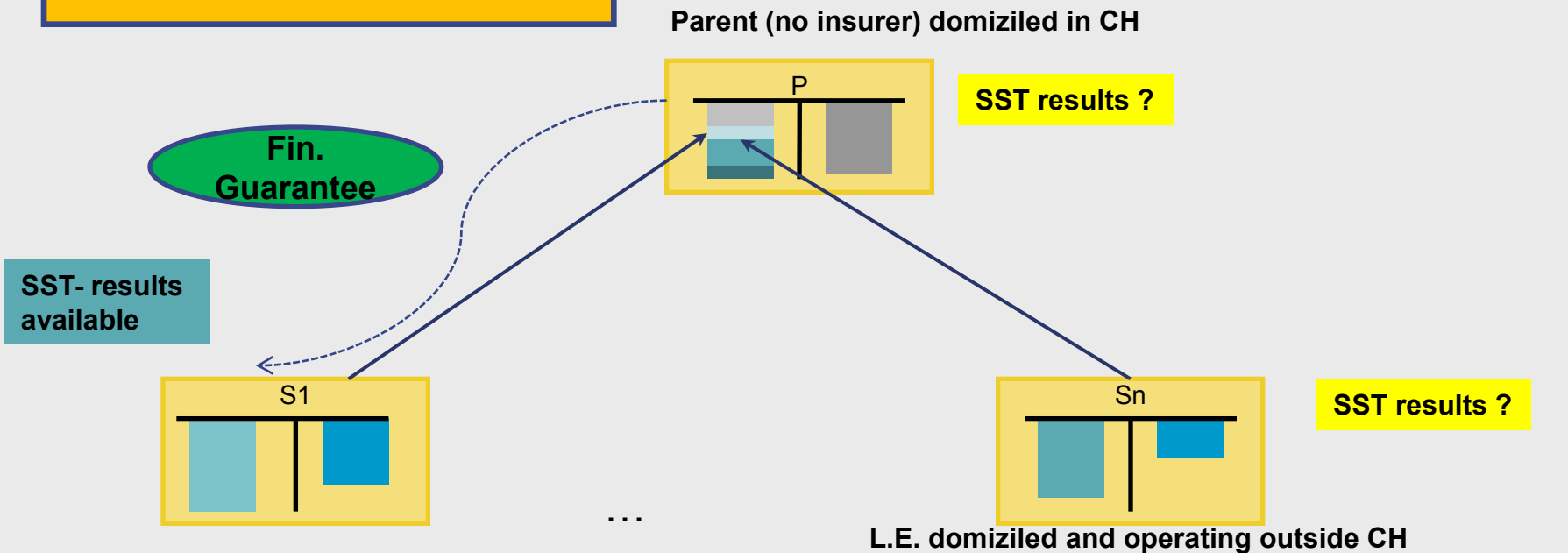


- The counter party risk of the guarantee to S1 originates from the risk to which S2 is exposed.
- => strong dependency of credit risk of S1 and the risks of S2 (in particular, market and insurance risks).

This is typically not visible when focusing to issuing parent. => Questions on credit rating of parent.

# Conclusion

A parent company providing guarantees to insurance subsidiaries should deliver SST-results, even if it is not itself an insurer under FINMA supervision (e.g. a holding).



Legal entity under  
FINMA supervision

Similarly, subsidiaries producing the wealth that could be transferred to subsidiaries under FINMA supervision should deliver SST-results, even if they reside abroad.

*For companies outside of Switzerland, Capital requirements from SST are not enforceable.*

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