

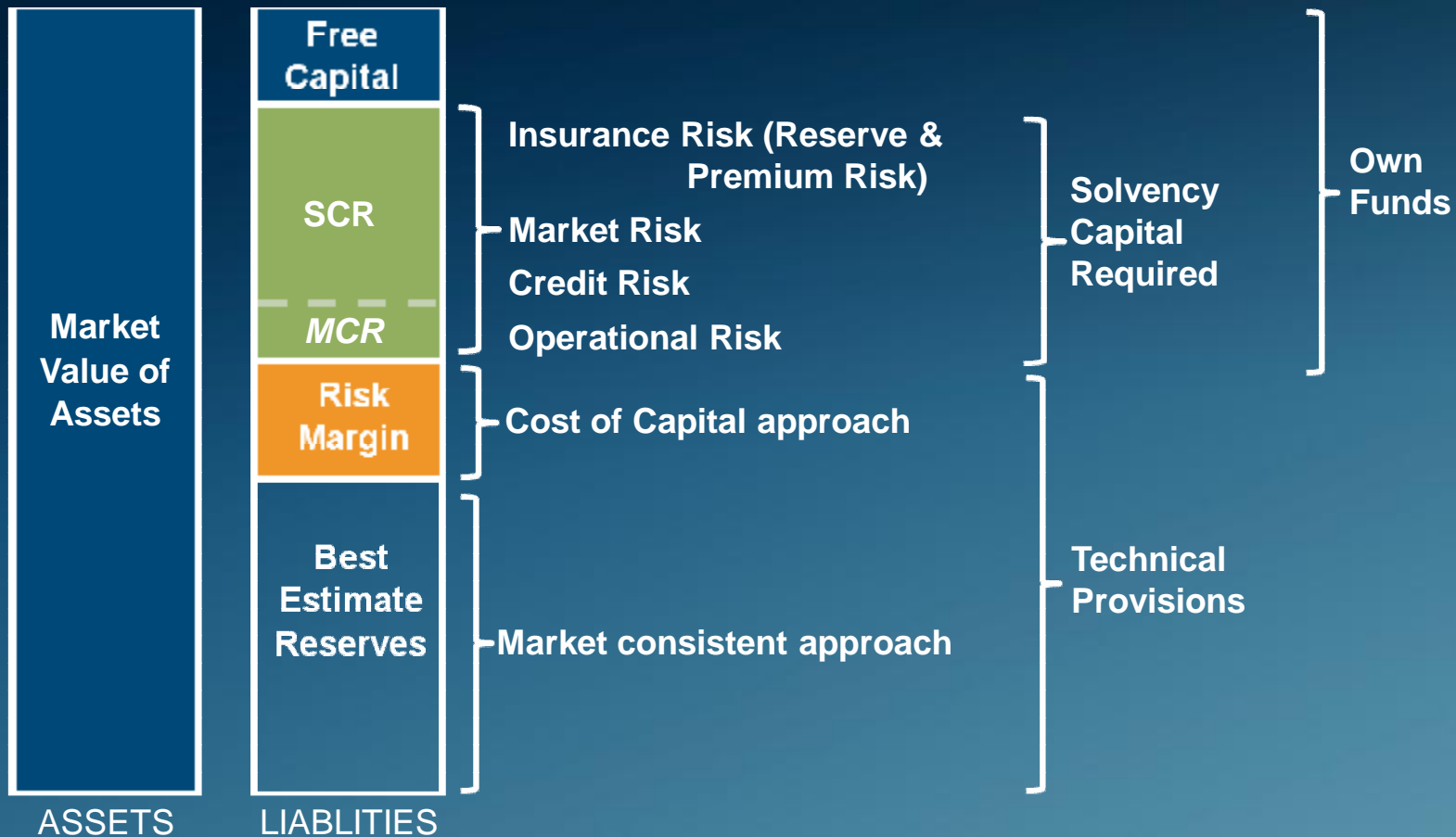
SOLVENCY II – UPDATE

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Risks to Quantify under Pillar 1

Consolidated Group or Solo Entity View



Standard Model or Internal Model (I)

§ A company has to decide if it will determine its SCR based on a

- Standard Model
- Internal Model
- Partial Internal Model

QIS4 results show that:

§ Many consider the SCR standard formula to be a good fit.

§ Key drivers for building an internal model and seeking approval:

- better risk management and governance
- better capital management
- more transparent decision making.

Standard Model or Internal Model (II)

§ Majority believe internal model will produce lower SCR

- Size dependent: the larger the undertaking, the greater the expectation of a 20%+ decrease
- 63% of the respondents plan to use at least a partial internal model, 13% have no plans, and 24% do not know yet.

§ Reasons provided for not using an internal model include

- too demanding
- standard SCR works well
- too large an administrative burden
- too expensive.

Current Second Wave

The current (2nd) wave covers the following topics.

Pillar I

- § **CP 39 – Technical Provisions – Best Estimate**
- § CP 40 – Technical Provisions – Risk Free Rate
- § CP 41 – Technical Provisions – Calculation as a whole
- § **CP 42 – Technical Provisions – Risk Margin**
- § CP 43 – Technical Provisions – Standards for data quality
- § CP 44 – Technical Provisions – Counterparty Default Adjustment
- § CP 45 – Technical Provisions – Simplifications
- § **CP 46 – Own Funds – Classification and eligibility**
- § CP 47 – SCR standard formula – Market Risk
- § CP 48 – SCR standard formula – Non Life underwriting Risk
- § CP 49 – SCR standard formula – Life underwriting Risk
- § CP 50 – SCR standard formula – Health underwriting Risk
- CP 51 – SCR standard formula – Counterparty Default Risk
- CP 52 – SCR standard formula – Reinsurance Mitigation
- CP 53 – SCR standard formula – Operational Risk
- CP 54 – SCR standard formula – Loss absorbing capacity of Technical Provisions
- CP 55 - SCR standard formula – MCR calculation

Pillar II

- § CP 37 – Additional advice on internal model approval
- § CP 56 – Advice on tests and standards for internal model approval
- § CP 57 – Advice on capital add-on
- § CP 59 – Advice on remuneration
- § **CP 60 – Advice on Group Solvency Assessment**
- § CP 61 – Advice on intra-group transactions and risk concentration
- § CP 62 – Advice on cooperation and colleges of supervisors

Pillar III

- § CP 58 – Advice on Supervisory Reporting and disclosure

Technical Provisions

Best Estimate Reserves

§ In the following slides we look in detail at the solvency capital required for non-life insurance risks denoted by SCR_{nl}

§ Risks to be considered:

- Premium risk
- Reserve risk
- Catastrophe risk

§ Risk measures to be applied:

- Confidence level of VaR(99.5%)
- Time horizon of one year
- Applied yield: risk free rate

§ The standard model is a factor model, not distribution based. But the underlying logic to the factors assumes distributions.

Technical Provisions

Best Estimate Reserves

§ It is expected that the technical provisions under IFRS should be the following sum

$$\text{Technical Provision} = \text{Best Estimate (gross)} + \text{Net Risk Margin (net)}$$

where

§ Best Estimate is the sum of:

- The present value of provisions for premium
- The present value of provision for claims outstanding

§ Risk Margin is the present value amount representing the cost of capital needed to run-off the portfolio.

Technical Provisions

Best Estimate Reserves

§ The formula used in the standard model, a factor model, to calculate SCR for the combined reserve and premium risk, SCR_{pr+res} , is:

$$\begin{aligned} SCR_{pr+res} &= \sum_{i \in \{\text{line of business}\}} (P_i + R_i) \cdot \frac{\exp\left(\Phi^{-1}(0.995) \cdot \sqrt{\log(\varphi^2 + 1)}\right)}{\sqrt{\varphi^2 + 1}} \\ &= \sum_{i \in \{\text{line of business}\}} (P_i + R_i) \cdot VAR_{0.995}^{mean}(\Psi) \end{aligned}$$

where:

Ψ = lognormal distributed random variable with $E[\Psi] = 1$ and $Var(\Psi) = \varphi^2$

$VAR_{0.995}^{mean}(\Psi)$ = 99.5% value at risk of $\Psi - E[\Psi]$

Φ = standard normal distribution

P_i, R_i = premium and reserves for line of business i

φ^2 = variance of premium and reserve risk for all lines of business*

*for detailed formulae see "The Insurance Risk in the SST and in Solvency II" by Alois Gisler

Technical Provisions

Best Estimate Reserves

§ The formula used in the standard model to calculate SCR for the catastrophe risk SCR_{cat} is:

$$SCR_{cat} = \sqrt{\sum_{k \in \{LoB \text{ with Cat Loss}\}} c_k^2}$$

where:

c_k = expected cat loss amount by LoB by company expressed as fixed percentage times corresponding premium

§ And the non- life SCR is:

$$SCR_{nl} = \sqrt{SCR_{pr+res}^2 + SCR_{cat}^2}$$

Technical Provisions

Best Estimate Reserves

- § The models behind the formula used in the standard model to calculate SCR_{pr+res} do take parameter risk into account but neglect random fluctuation risk (meaning: pure random fluctuations around an expected ultimate due to market factors like change in inflation rate, weather conditions, etc)
 - The annual weather conditions, for example, impact the market frequency of car accidents. Hence not taking a market weight into a standard model might not value risks fairly between small and large undertakings.
- § It can be concluded from the formulas that the correlation matrices applied for premium risk and reserve risk are equal
 - But, for example, weather conditions might have an impact on frequency and hence only impact premium risk and not reserve risk. As a consequence the standard model might not value risks fairly between companies with a high and low “reserve to premium” ratio.

Technical Provisions

Risk Margin Principles

- § The purpose of a risk margin is to reflect the ‘cost of risk bearing,’ a compensation for the transferee for the risk of taking on an obligation to pay uncertain cash flows. That is if the cash flows are not hedgeable.
- The less that is known about the current estimate; the higher the risk margins should be
 - Risks with low frequency and high severity will have higher risk margins
 - For similar risks, contracts that persist over a longer timeframe will have higher risk margins
 - Risks with a wider probability distribution will have higher risk margins
 - To the extent that emerging experience reduces uncertainty, risk margins will decrease

Technical Provisions

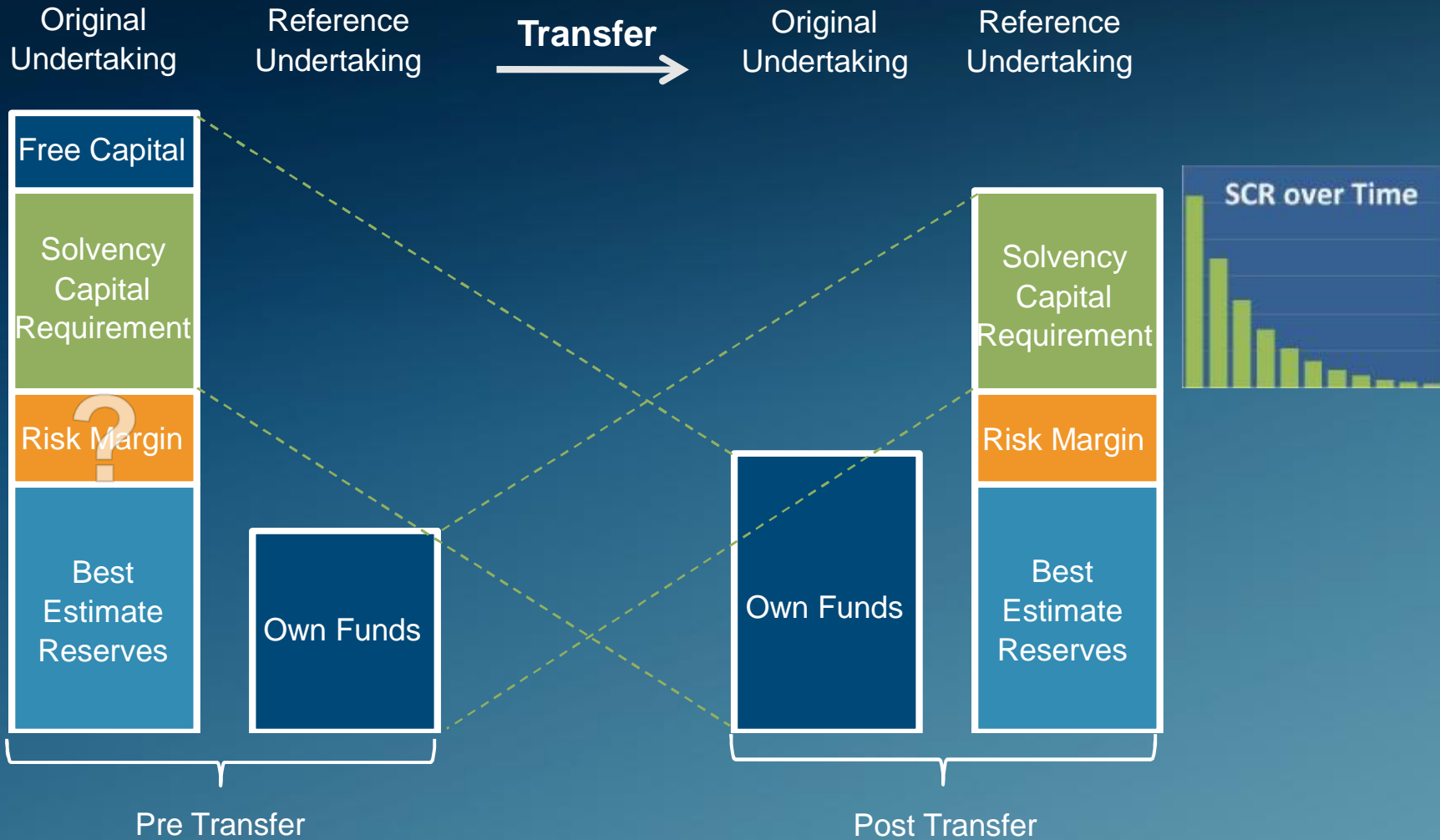
Risk Margin Calculation

§ Three main steps that need to be considered around the calculation of the risk margin:

- The reference undertaking
- The cost of capital rate (CoC)
- The calculation of the risk margin itself

Technical Provisions

Risk Margin Calculation



Technical Provisions

Risk Margin Calculation

The Reference Undertaking (RU)

- § The RU is an empty undertaking before the transfer
- § After the transfer the RU has eligible own funds corresponding exactly to the SCR relative to the transferred obligations
- § After transfer the RU contains assets to cover Best Estimate net of reinsurance and SPVs, the Risk Margin and the SCR
- § These assets are invested to minimize market risk.
- § SCR of the RU consists of
 - Underwriting risk with respect to the transferred obligations
 - Counterparty risk with respect to reinsurance and SPVs
 - Operational risk
 - Unavoidable market risk

Technical Provisions

Risk Margin Calculation

§ Cost of Capital Rate was 6% plus low risk rate in QIS4

- The Cost-of-Capital rate will likely be at least 6% above low risk rate when Solvency II is implemented
- Industry attempts to lobby for a lower Cost-of-Capital rate have thus far been dismissed

$$\text{Risk Margin} = \text{CoC} \cdot \sum_{i \in \{\text{LoBs}\}} \left(\sum_{0 \leq t} PV[SCR_{RU,i}(t)] \right)$$



Technical Provisions

Risk Margin Calculation

- § The SCR for reference undertaking, using standard formula by LoB, is:
- Basic SCR (U/W, C/P on R/I and SPV, unavoidable market risk)
 - Plus partial SCR representing operational risk for LoB
 - Basic SCR based on correlation assumptions from L1 text only for unavoidable market risk and C/P default risk on ceded R/I.
 - RU will capitalize itself to required level of eligible own funds at time = 0
 - Note the need to project forward the SCR for each LoB, diversification between LoBs is not recognized.
 - Present values use the risk-free curve

Own Funds

Classification of Eligibility

§ The current financial crisis shows that “Own Funds” need to be defined very carefully.

§ CEIOPS proposes to strengthen the current definitions of Tier 1, Tier 2 and Tier 3 eligible own funds.

Permanent Availability: Own Funds need to be available or to be called on demand to fully absorb losses on a going concern bases as well as in the case of winding-up.

§ To achieve Permanent Availability CEIOPS proposes

- a revised limit structure on Tier 1, 2 and 3 capital,
- minimal characteristics for own funds
- sufficient duration on Tier 1, 2 and 3 capital
- comprehensive definition of Tier 1, 2 and 3 own funds

Own Funds

Classification of Eligibility: Proposed Limit Structure

§ CEIOPS recommends the following general rule:

- In relation to compliance with SCR, eligible funds shall satisfy
 - “proportion of Tier 1” > “proportion of Tier 2”, and
 - “proportion of Tier 2” > “proportion of Tier 3”.
- In relation to compliance with MCR, eligible funds shall satisfy
 - “proportion of Tier 1” > “proportion of Tier 2”

§ concrete CEIOPS proposes

- for SCR:
 - Tier 1 \geq 50% of eligible own funds and
 - 25% \geq Tier 3 \geq 5% of eligible own funds, depending on the definition of Tier 3 eligible own fund
- for MCR:
 - Tier 1 \geq 80% of eligible own funds and
 - No Tier 3 own funds is an eligible own fund to cover MCR

Own Funds

Classification of Eligibility: Sufficient Duration

§ A stringent approach would be to define duration as the maturity of the longest dated insurance liability for Tier 1. For Tier 2, duration could be defined as the average weighted maturity of all insurance liabilities.

§ In addition capital instruments should have benchmark minimum maturities, CEIOPS recommends:

- 10 years for Tier 1,
- 5 years for Tier 2,
- 3 years for Tier 3.

Own Funds

Classification of Eligibility: Tier 1 Capital Requirements

§ Subordination:

- Most deeply subordinated in a winding-up.

§ Loss absorbency:

- Fully paid in,
- first instrument to absorb losses,
- must not hinder recapitalization.

§ Sufficient duration:

- In relation with insurance obligations and
- Legal maturity of item should not be less than 10 year at issue date

§ Free from requirements or incentives to redeem

- No incentive to redeem the item
- Redeemable only at the option of undertaking
- Any redemption should be subject of approval of supervisor

Own Funds

Classification of Eligibility: Tier 1 Capital Requirements

Requirements on Capital Instruments:

§ Free from mandatory fixed charges:

- Coupons/dividends at a minimum cancelled on a breach of the SCR
- Coupons/dividends should not be a fixed rate and no preference as to income or return of capital

§ Absence of encumbrances, examples of potential encumbrances are:

- rights of set off, restrictions, charges or guarantees.
- Where an investor subscribes for capital in an undertaking and at the same time that undertaking has provided financing to the investor, only the net financing provided by the investor is considered as eligible own funds.

Own Funds

Classification of Eligibility: Supervisory Approval

CEIPOS recommends:

- To avoid a mechanic approach
- Supervisor approval should take a principle-based approach

§ The insurer assesses the appropriate classification of own funds and is responsible to provide the related documentation.

§ The request for approval should include:

- amount to be used and legal form of the element to be included;
- counterparty (belonging to the same group or not);
- the capacity of the own funds item to absorb losses either on a going concern basis (Tier 1) or in a winding up (Tier 2 and 3);
- if the item is fully paid or called up;
- duration of the item;
- existence of requirements or incentives to redeem the instrument;
- existence of mandatory fixed charges;
- subordination in winding up;
- duration of insurance and reinsurance obligations.

Own Funds

Classification of Eligibility: Supervisory Approval

CEIPOS recommends:

§ three step process when granting supervisory approval of the own fund item not covered by the list.

Step 1. The supervisory authority, taking into account the legal enforceability and the characteristics of the item, assesses to what extent it possesses the characteristics of permanent availability and subordination. In addition, the supervisory authority assesses whether the duration of the item is compatible with the maturity of undertaking's insurance and reinsurance obligations. For undated items without a call this assessment is unnecessary.

Step 2. The supervisory authority assesses to what extent the item possesses the features of absence of incentive to redeem, mandatory servicing costs, and encumbrances.

Step 3. The supervisory authority assesses whether the inclusion of the item is compatible with the quantitative limits envisaged by implementing measures to cover Solvency Capital Requirement and the Minimum Capital Requirement.

§ That insurance undertakings use a similar process when seeking approval.

Group Capital Assessment

Summary of Basic Principles

1. Scope

This consultation paper gives guidance on how the available eligible own funds and SCR for insurance groups should be determined.

2. Purpose of group Solvency

There is a large number of insurance groups and financial groups active in Europe. Those groups have operations in various countries. Many risks companies are running, are not local but may likely impact the entire group. The supervisor wants to know the risks of the entire group and the available own funds.

3. Scope of group SCR calculation

Companies need to be considered in case there is significant influence by a parent undertaking (>20% participation or voting rights).

4. Group SCR calculation

The Group SCR shall be calculated via the 'accounting based consolidation method' or 'the deduction and aggregation method'. There is a preference to use the first method, which recognizes diversification effects between the different undertakings.

5. Available group own funds

The available group own funds (AGOF) to cover the group SCR is calculated by deducting from the regulatory own funds the sum of excess unavailable own funds. In order to make the AGOF eligible to cover the group SCR, the AGOF must comply with the tier limits (CP46)

6. Related companies outside the EEA

Related companies outside of the EEA are considered by default by calculating the solvency position based on the consolidated accounts including the accounts of the third country. The requirements will be developed further in 2010 including criteria for the determination of equivalence of non EU solvency regimes.

Group Capital Assessment

Scope of Consolidation: Example

Dominant influence: >50%

Holding has dominant influence in undertakings A, B and C

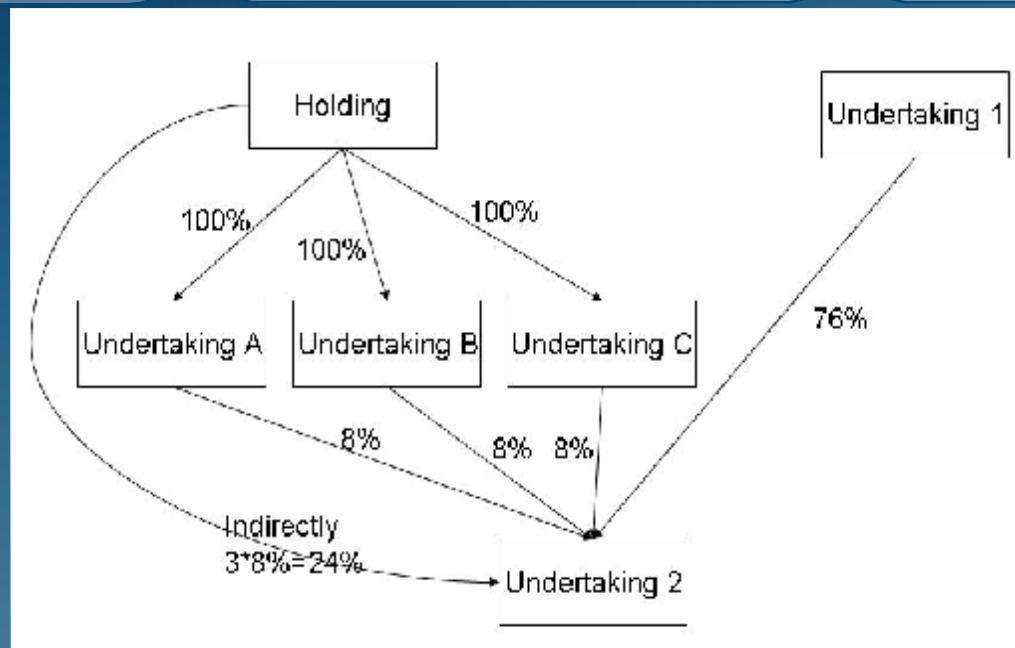
Undertaking 1 has dominant influence in undertaking 2.

Significant influence: $20\% \leq X \leq 50\%$

Holding has significant influence in Undertaking 2 (look-through principle).

No significant influence: <20%

Undertakings A, B and C have no significant influence in Undertaking 2.



Group Capital Assessment

Two Proposed Calculation Method for Group SCR

§ The **accounting consolidation-based method** is based on a set of consolidated accounts. The group solvency margin is:

- “Eligible group own funds” – “SCR at group level”, where
 - SCR at group level assumes the group to be a single economic unit and hence that any liability in the group can be met with any asset.

§ The **deduction and aggregation method** is based on solo entity accounts. The group solvency margin is:

- “Sum of solo entity own funds in the group” – “Sum of solo entity SCRs”
 - Diversification effects are already recognized in solo calculations, but the deduction and aggregation method does not allow for additional diversification effects at group level as the group SCR represents the sum of the solo SCRs.

The accounting consolidation-based method is the preferred method by the group supervisor but the supervisor may decide to apply the deduction and aggregation method or a combination of both methods.

Group Capital Assessment

Two Proposed Calculation Method for Group SCR

§ Example: Let's assume we have a Parent company and 2 Subsidiaries with own funds OF_P , OF_1 and OF_2 and SCR_P , SCR_1 and SCR_2 .

§ What's the relation between the group and solo entity solvency margin:

$$SM_{Group} = \frac{OF_{Group}}{SCR_{Group}} \quad ? \quad \frac{OF_P + OF_1 + OF_2}{SCR_P + SCR_1 + SCR_2} = SM_{SE}$$

- Internal Group Transactions (IGT) are non-existent in a consolidated account, hence don't impact SM_{Group} .
- If S_1 purchases a quota share from P at arms length pricing,
 - OF_P and OF_1 are expected to increase and decrease, respectively (profit transfer)
 - SCR_P and SCR_1 are expected to increase and decrease, respectively, but not by similar amounts and not proportional to the change in OF, as
 - OFs are measured at “expected level” of risk distribution
 - SCRs are measured at tail of risk distribution

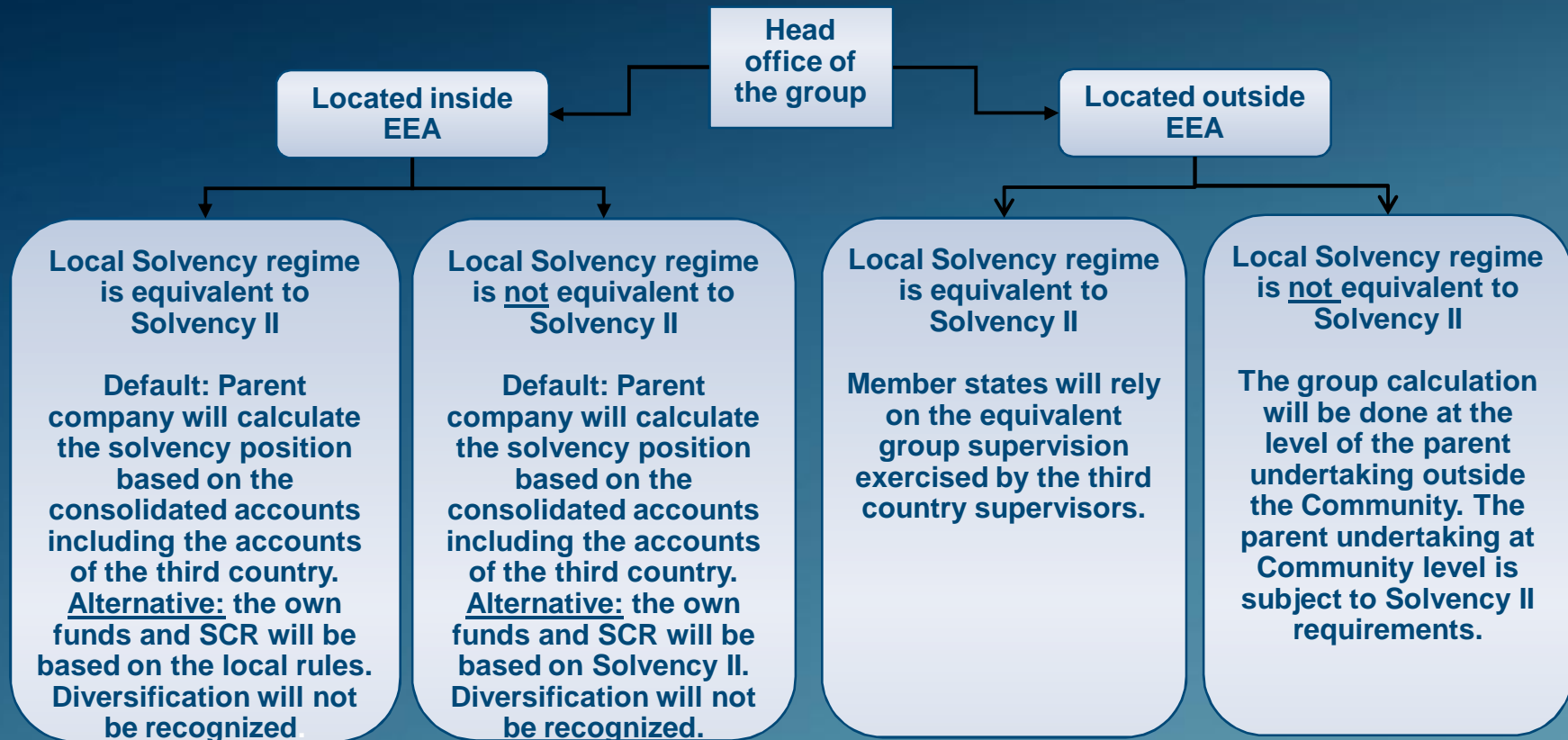
§ QUESTION: Is $SM_{Group} > SM_{Solo Entities}$ possible?

Group Capital Assessment

Group SCR and Third Country



§ Below summarized initial thoughts, by early 2010 CEIOPS will publish criteria for “equivalence of non EU solvency regimes”.



Summary

§ A standard formula for SCR on Best Estimate reserves must apply generalizations.

- Analyzing the underlying model assumptions might be helpful when considering the use of the standard or an internal model.

§ The Risk Margin (RM) is calculated by LoB, meaning:

- SCR by LoB, including related counterparty risk for RI and operational risk, no diversification between the LoBs is allowed when determining RM.
- RM is part of Technical Reserves, not of SCR

§ Own Funds are split into Tier 1, Tier 2 and Tier 3 Own Funds. Ratios between the Tiers and minimal duration by Tier need to be considered to determine Own Funds. Same holds for group consolidated accounts.

§ Group Capital Assessment guidelines contain today

- the definition and scope of a group for solvency purposes,
- considerations to eligible own funds for a group,
- two methods to determine group SCR and solvency margin.

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