AFIR LIFE MUNICH 2009

Optimisation of limit systems for investment risks in accordance with Solvency II

Section Finance de l'AAI
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DAV
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Agenda

- Introduction
- Solvency control
- Risk capital and coverage
  - Top-down limit setting
  - Dynamics in the risk limit process
- Risk indicators for investment risks
  - Defining key risk indicators
  - Model risk and limitations
  - Integration of ALM approaches
- Dynamic limit setting in the investment management process
- Summary

Introduction

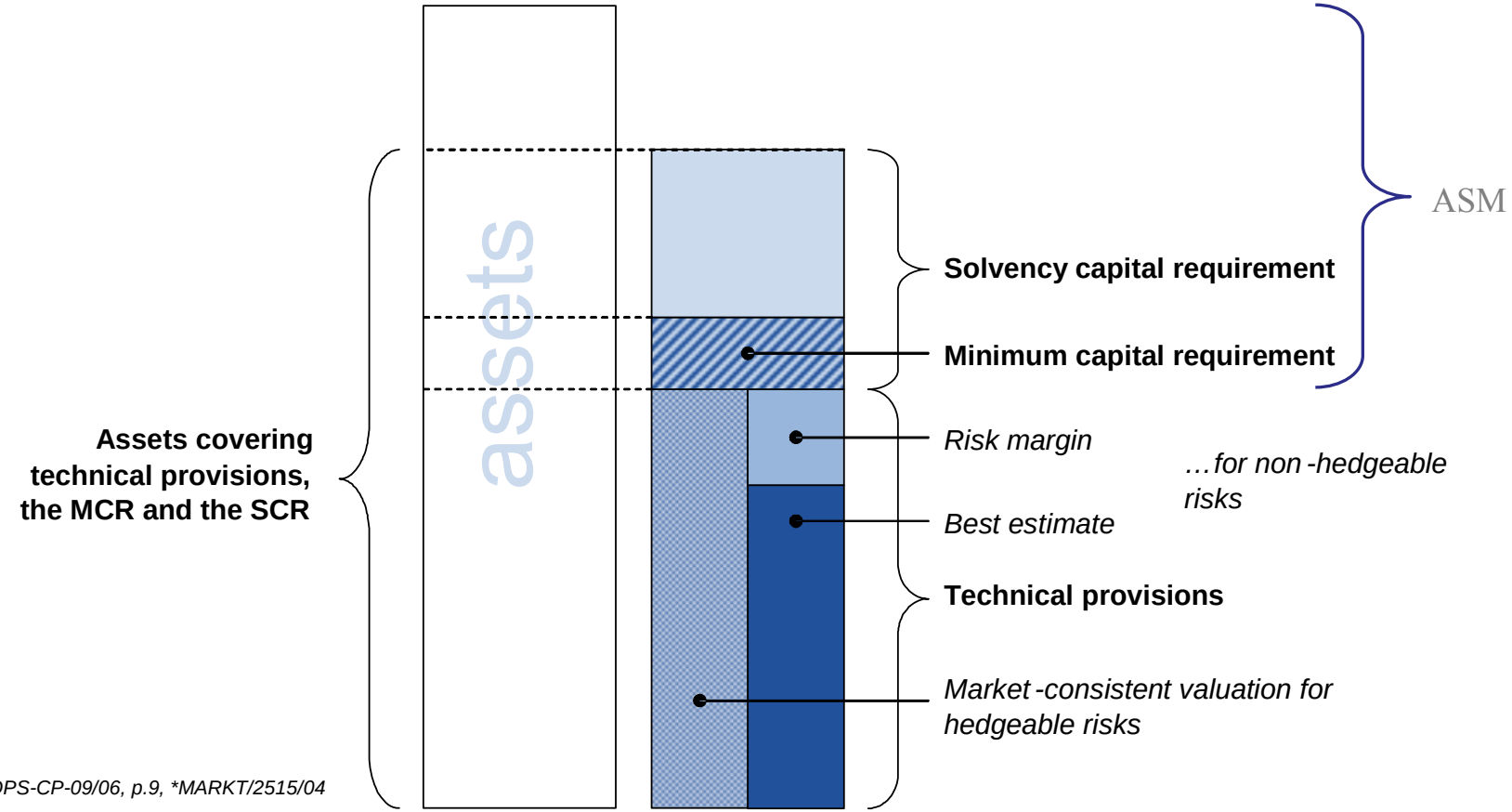
- Various types of limits
  - Limits for transactions (security trading), e.g.
    - Limits on the volume of transactions in a defined period
  - Limits for specific investments
  - Counterpart limits
  - Limits in the asset allocation process and portfolio limits, e.g.
    - Maximum exposure for specific countries and business segments
    - Duration based limits
  - Limits with focus on the relation between two different indicators, e.g.
    - Quota share of equity in the investment portfolio

Introduction

- Solvency analysis
  - Overall risk perspective
  - Adequateness of own-funds / “Available Solvency Margin” (“ASM”)
  - Top down risk assessment with focus on the whole financial position of the entity
  - Implementation of a risk limit *system* as major part of the overall risk controlling process
- Key assumptions
  - Economic valuation principles
  - Principles based approach
- Risk capital
  - Required capital to survive with a well-defined probability in the future
  - Controlling of “Solvency Capital Requirement” (“SCR”)
  - Analysis based on risk model approaches

Solvency control

- Available equity versus risk capital requirement

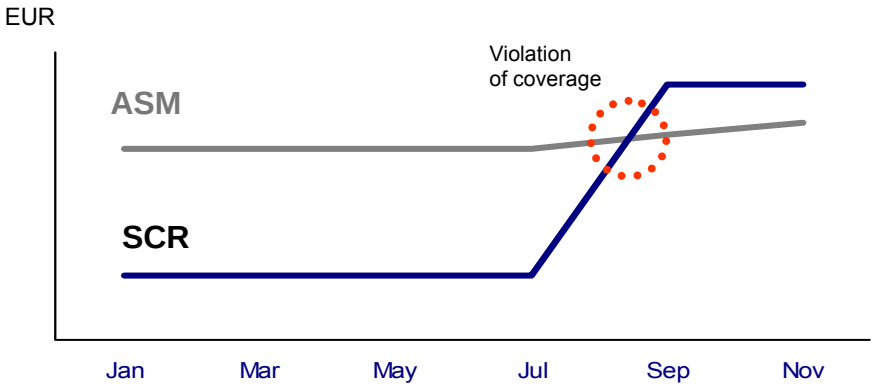


*Source: CEIOPS-CP-09/06, p.9, *MARKT/2515/04*

Solvency control

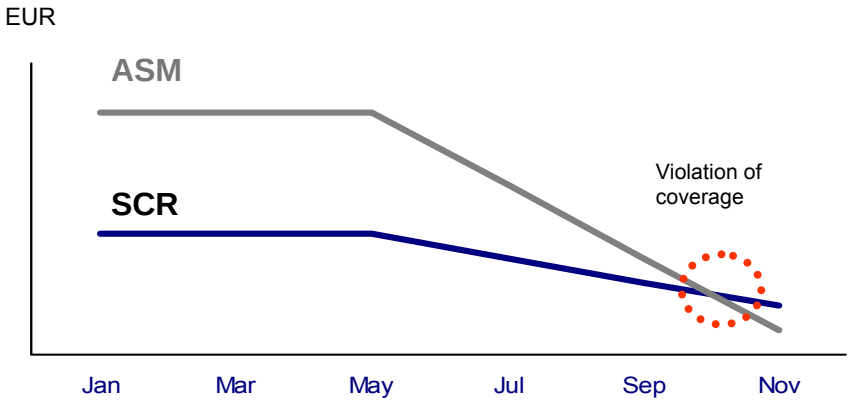
- Negative impact on the entity's solvency situation --- illustration ---

Raising the risk leads to exceeding the risk-capital requirement



e.g. changed investment strategy

Loss of equity leads to additional need for equity



e.g. decrease of market value of investments

Risk capital and coverage

- Dynamics of SCR and ASM

- Therefore: Limit setting for SCR
  - in relation to the current situation of available capital (ASM)
  - alt.: focus on the “Coverage Ratio” (CR)

$$Coverage - Ratio = \frac{ASM}{SCR}$$

Top-down limit setting

- Coverage ratio (CR) for investment risks ("IR")

$$Coverage - Ratio_{IR} = \frac{ASM_{IR}}{SCR_{IR}}$$

- $SCR_{IR} \rightarrow SCR$
  - Bottom-Up aggregation and diversification
- $ASM \rightarrow ASM_{IR}$
  - Top-Down allocation of equity

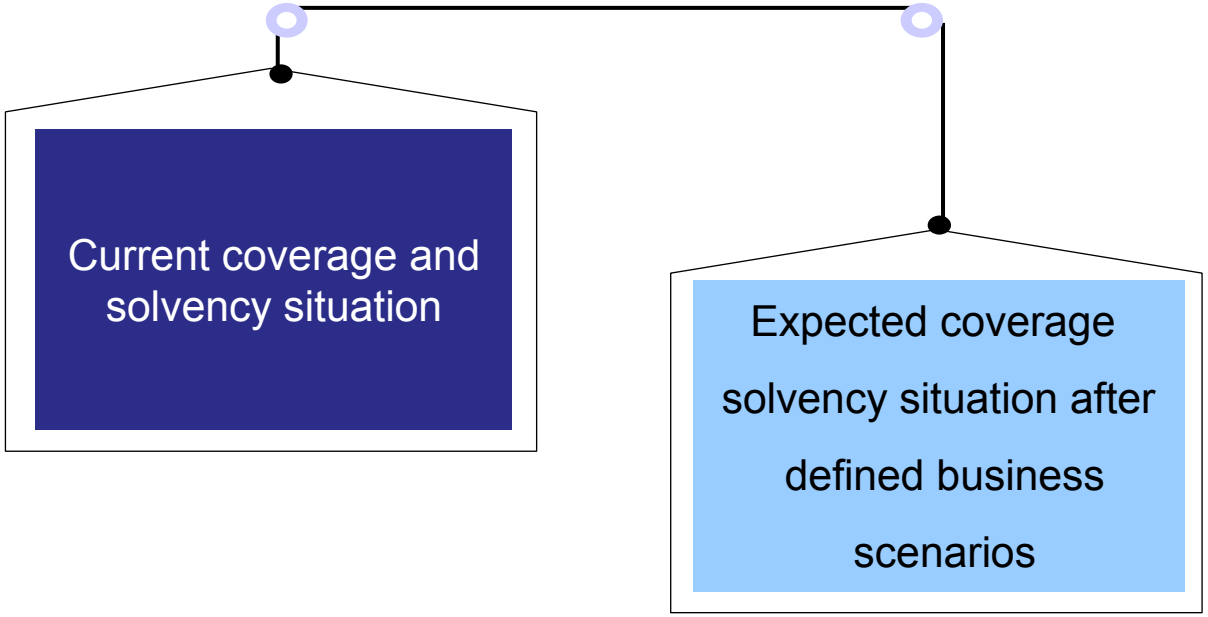
Assumptions on correlations between risks

→ Consistency ?

→ Dynamics ?

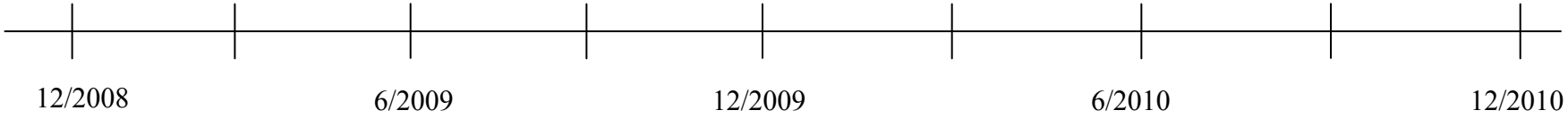
Dynamics in the risk limit process

How fast can the solvency situation change?



- Setting limits (and alert levels) based on the current situation and the entities business (investment) planning
- Critical issues: Financial market shocks, valuation risks and model risks

Dynamics in the risk limit process



„Roll-forward“ limit setting and controlling

Analysis of solvency based on 12/2008

Focus on default until 12/2009

Interim analysis needed

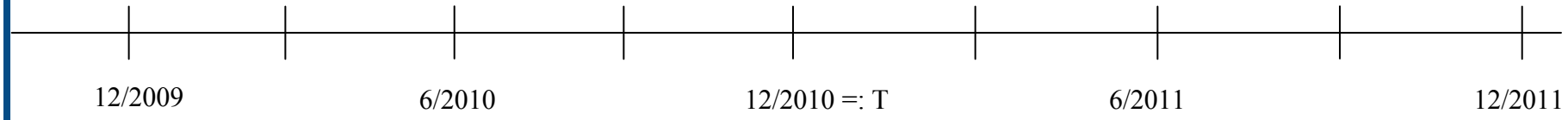
Interim analysis of solvency e.g. based on 6/2009

Focus on default until 6/2010

Analysis of solvency based on 12/2010

Focus on default until 12/2010

Dynamics in the risk limit process



Strategic planning and simultaneous projection of ASM and SCR

- Investment strategy & business planning
- Market value of assets and liabilities
- Projection of assumtions (volatilities, correlations, …)

Analysis of expected solvency in 12/2010

Focus on default until 12/2011

Follow-up analysis until t=T needed

$$E(CR_T \mid A_{t \le T}) = E\left(\frac{ASM_T}{SCR_T} \mid A_{t \le T}\right)$$

Stochastic dependencies between both processes!

Risk indicators for investment risks

- Relevant criteria for defining key risk indicators
  - Focus on
    - Risk structure and risk categories including correlations between these risks
    - Model risk and limitations (e.g. limiting cases, extreme values, path-dependency)
    - Requirements of the ALM and asset allocation process
  - Overall requirements
    - Understanding and transparency
    - Promptly reporting
    - Consistency and materiality

Defining key risk indicators

- Examples for risk indicators (--- illustration---)

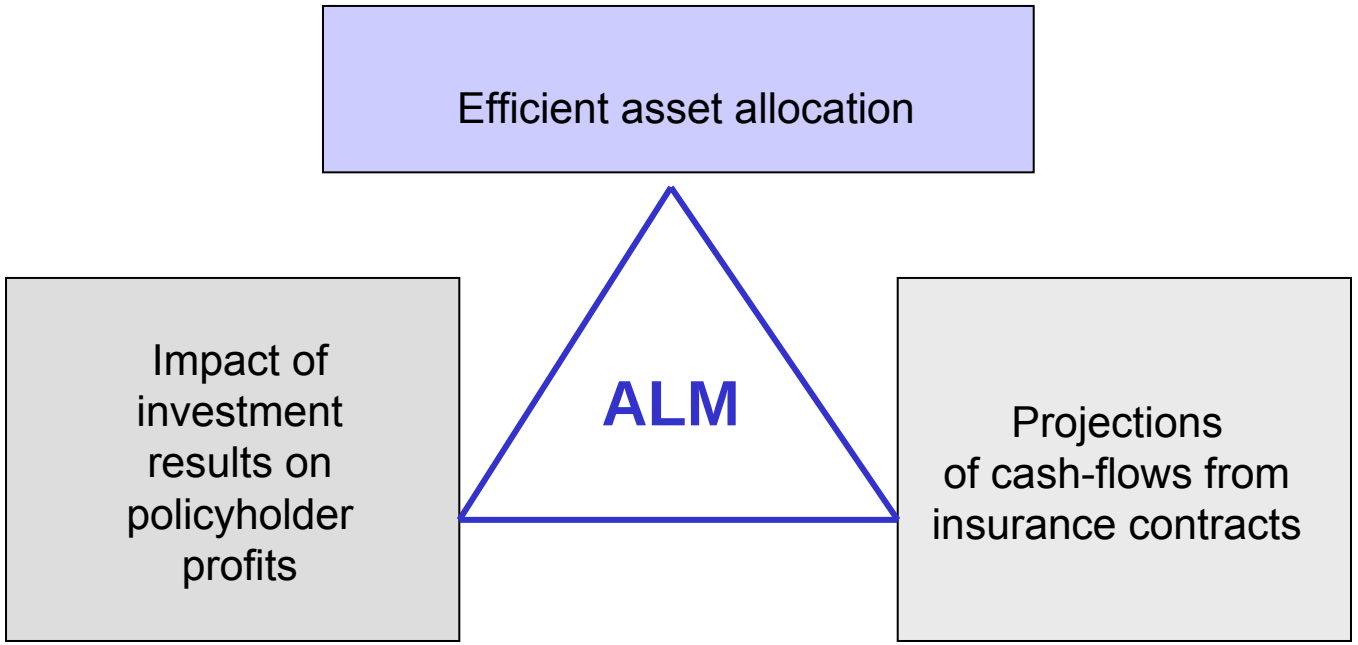
	Indicator						
	Market Value (Exposure of asset classes) Market and credit risk	Volatility of investment portfolios Market risk	Rating structure Credit risk	Credit Spread Market and credit risk	Duration ALM risk	Convexity ALM risk	Net interest income ALM risk (comparison to the guaranteed interest rate in the insurance contracts)
Overall	X	X	n/a	n/a	n/a	n/a	X
Equity	X	X	n/a	n/a	n/a	n/a	X
Fixed Income	X	X	X	X	X	X	X
Real Estate	X	X	n/a	n/a	n/a	n/a	X
Other	X	X	n/a	n/a	n/a	n/a	n/a

Model risk and limitations

- Characteristics of investment risk factors
  - Distinction between
    - Handling “everyday” risk factors
    - Protection against unusual extreme events
- VaR based risk model approaches
  - Appropriate for focus on ordinary market development
  - Issue: Limitations of volatility based VaR approaches
  - Alternatives? (e.g. expected shortfall / TVaR)
- Stress Test approaches
  - Excellent for handling unusual shocks
  - But subjective and depending critically on judgmental decisions
- Interactions between the key risk indicators and the overall solvency control?

Integration of ALM approaches

- Focus on the integrated asset liability management



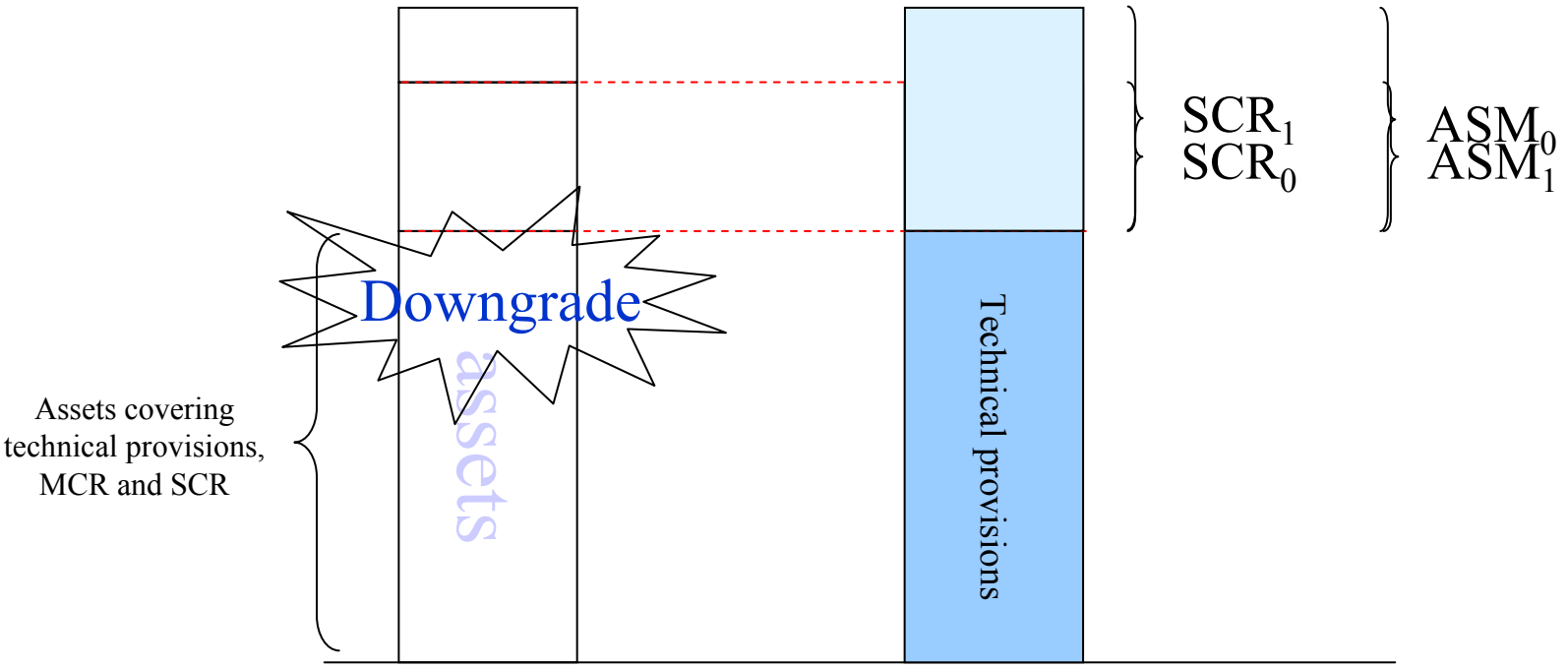
- Integration of advanced ALM methods into the Solvency control and limit system

Dynamic limit setting in the investment management process

- Model assumptions
  - Assets solely consisting of bonds
  - Focus downgrade/default risk
  - Technical provisions constant
  - Pre-defined impacts of downgrades on SCR / Fair Values

- Calculation steps
  - Estimation of transition probabilities for a quarterly timeline
  - Simulation of downgrades based on calculated probabilities
  - Re-calculation of portfolio fair value and SCR
  - Worst case scenario

Dynamic limit setting in the investment management process



Summary

- Solvency control
  - Simultaneous controlling of the impact of investment risks on SCR and ASM necessary
  - Top-down structuring of risk controlling approaches with focus on the company‘s overall financial constitution
  - Lessons learned from the financial crisis: Consideration of risk model limitations
- Risk limit system
  - So far no specific requirements regarding risk limit systems included into the Solvency II Framework Directive
  - But specific requirements in individual countries (German Minimum Requirements on Solvency Control)
- Challenges
  - Link between individual investment limits and overall solvency control
  - Consideration of investment risk dynamics
  - Integration of ALM requirements

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Breakout Session Topic 10:

Solvency, guarantees and risk capital

10 September 2009

Lunch Break