ANALYSTS' DINNER – UPDATE ON SOLVENCY II

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Solvency II – Fuelling a global trend towards risk-based supervision(?)

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Influence of Solvency II on other supervisory regimes

Multilateral framework aiming for worldwide coherence of supervision among global insurance companies

Harmonisation
No separate framework

Convergence
No additional supervision

Evidence of the trend

Various supervisory regimes aiming for recognition under Solvency II ("equivalence"), e.g. Bermuda and Switzerland

Adjustments of risk-based-capital-type models in USA and Canada

Planned adaptions of Solvency II, inter alia in Japan, Israel and Mexico

Convergence towards a common framework to be expected in the medium term

Munich Re well positioned to manage changes and capture opportunities arising from Solvency II

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Main implications of Solvency II

Convergence of enterprise risk management standards in the industry

Impact on product design and pricing

Strengthened market discipline through increased transparency requirements

Impact on Munich Re

- Harmonisation between internal steering and regulatory requirements
- Some convergence with financial reporting
- Approval of internal model to gain better recognition of diversified business structure
- Additional reinsurance business potential due to changed/increased capital requirements

Capitalising on already existing enterprise risk management framework

Impact on insurance industry

- Enhanced comparability between insurance companies across different business models and countries
- Shift towards less capital-intense products especially as regards participating features
- Changes in asset allocation due to link between ALM and Solvency II
- Increased interaction with supervisors

Increased focus on risk and capital management

Munich Re's enterprise risk management framework principles

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Pillars of Solvency II

1 Quantitative	2 Qualitative	3 Transparency
Solvency requirements Standard approach or internal model	**Supervisory process** Efficient risk management and control	**Market transparency** Disclosure requirements to strengthen market discipline
Market-consistent valuation using the cost of capital concept Standard model calibration: Value-at-Risk 99.5%	Use test requires capital models to be used for risk and capital management	Implementing measures for external and supervisory reporting are currently being discussed – perception of overburdening companies
Munich Re's internal model scaling standard model calibration with 175% reflecting AA-company security requirement	Munich Re has been using own capital model for steering purposes, capital management and performance measurement for several years now	Munich Re has already been reporting risk figures internally and externally, as well as disclosing methods, for several years now

Munich Re's risk model already fulfils many requirements of Solvency II today

Successful work in the remaining period provides good starting point for Solvency II

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Timetable for the remaining period based on the proposal of the European Parliament[1]

2012

- Adoption of the Level 1 Framework Directive (Omnibus II)
- Consideration of further Quantitative Impact Study (QIS6) at national level
- Publication of the Omnibus II Directive in the EU official journal
- Finalisation of Level 2 measures and draft binding technical standards (Level 3)
- Transposition into national law

2013 | **2014** | **2015** | **...**

- Solvency I (2013)
- Phasing-in of Solvency II (2013)
- Full application of Solvency II (2014–2015)
- Recovery period[2] of the MCR[3] (2013)
- Recovery period[2] in case of non-compliance with SCR[4] (2014–2015)
- First report (MCR[3], SCR[4], own funds, balance sheet, profit and loss account) (from 1.7.2013)

Adoption of Solvency II 1.7.

Soft-launch of Solvency II during the first year after transposition, and transitional measures, will give the insurers time to smoothly adapt the new regime

[1] Draft Report on Omnibus II by Burkhard Balz, 19.7.2011 and 23.9.2011.
[2] Recovery period means the period during which companies have to ensure coverage of the MCR or SCR.
[3] MCR: Minimum Capital Requirement. [4] SCR: Solvency Capital Requirement.

Insurance industry actively participates in shaping of the future supervisory regime

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Key industry issues regarding Solvency II ...

Valuation

- Expected profits included in future premiums (EPIFP) – Value in force (VIF)
- Contract boundaries
- Technical provisions (yield curve – counter-cyclical and matching premium)

SCR calculation

- Calibration (non-life underwriting and natural catastrophe risk)
- Complexity of standard formula
- Approval and standards of internal models

Processes and governance

- Proportionality
- Transitional measures (own funds, technical provisions)
- Own risk and solvency assessment (ORSA)

... and related concerns

Sustainability of traditional life business challenged

- EPIFP and thus a significant part of own funds put under regulatory scrutiny
- Valuation of technical provisions may depress net asset value

Non-life companies may suffer from calibration and complexity issues

- Underwriting risk dominant driver for non-life companies (> 50% in QIS5)
- Standard formula complexity may overburden small and medium-sized companies

- Mounting requirements for internal model certification after financial turmoil
- Principle of proportionality still to be fleshed out in practice
- Overburdening reporting requirements (Pillar 3)

Economic approach is a fundamental principle of Solvency II – majority of large European groups, as well as the industry as a whole, still support Solvency II

Munich Re's enterprise risk management (ERM) – already Solvency II compliant

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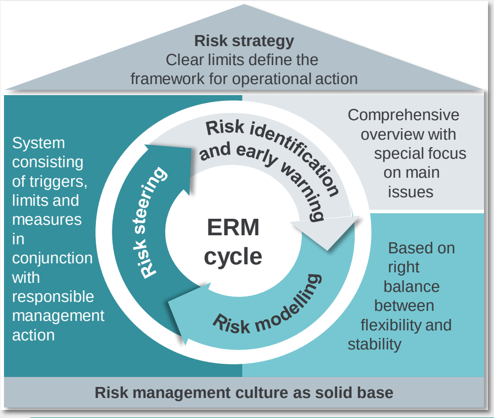
Components of Munich Re's ERM



Objectives

- Protect and generate sustainable shareholder value
- Ensure the highest degree of confidence in meeting policyholders' and cedants' claims
- Protect Munich Re's reputation

Business-embedding

- Risk steering
- Pricing/underwriting
- Liability-driven investment strategy
- Performance measurement
- Management compensation

Risk management is a key part of our corporate management – already in line with Solvency II

ORSA requires forward-looking perspective – Munich Re invests in new analytical tools

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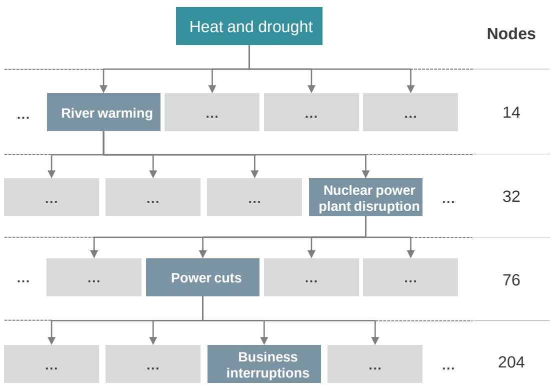
Increasing interdependencies may lead to loss cascades[1] …

Example: Potential consequences of a prolonged heat and drought period (selected nodes)



… and complex accumulations …

Example: Terrorism
Influence of and impact on political and social environment

Example: Contingent business interruption
Complex global supply chains

… addressed in Munich Re's ORSA[2]

- Ongoing project to build Complex Accumulation Risk Explorer (CARE) – analytical tool to assess risk of complex accumulations
- Emerging risks are part of regular risk reporting and included in the ORSA

[1] Munich Re analysis. Project CARE.
[2] ORSA: Own risk and solvency assessment.

Certification process of Munich Re capital model well on track

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Roadmap to certification

Roadmap for the pre-application phase of Munich Re's capital model

2009	Focus on market and credit risk
2010	Focus on property-casualty risks and aggregation
2011	Focus on life/health and operational risks; increased focus on solo models
2012	Stronger focus on solo models; preparation of the formal application for group and solo entities

Various on-site visits in Munich and Düsseldorf as well as supervisory college workshops from 2009 until 2011

Challenges and achievements

- Standard formula not adequately capturing Munich Re's risk profile
- "Moving target" of Level I – III requirements entails close monitoring of regulatory debate and participation in related consultations …
- … making adjustments to current model may be necessary depending on regulatory developments (e.g. EIOPA yield curve)
- Formal application remains a challenge due to strictly formalised requirements
- Certification of an internal model for subsidiary New Re in Switzerland under the Swiss Solvency Test

Munich Re on track in the pre-application phase for the certification of its internal model – Still some challenges but first goals have been achieved

Comparison of Munich Re's capital model with the Solvency II standard formula

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	Munich Re capital model	Draft implementing measures
Relevant risk-free interest rate term structure	Swap rates	Swap rates minus discount for credit risk plus either counter-cyclical or matching premium
Spread risks for European government bonds	Covered	Not covered
Volatility risks	Covered	Not covered in the SCR but reflected in the volatility of own funds
Diversification benefits between interest rate, currency and insurance risks	Covered	Ineffectively covered provides wrong incentive to hold entire surplus in reporting currency in cash
Insurance risk calibration	Specific for Munich Re's risk profile	Representing an average risk profile of a European insurer
Group risk margin	Diversification between legal entities taken into account	No diversification between legal entities taken into account

Munich Re capital model tailored to Munich Re's specific risk profile and built on economic principles of Solvency II

Volatility of own funds under Solvency II – something to get accustomed to

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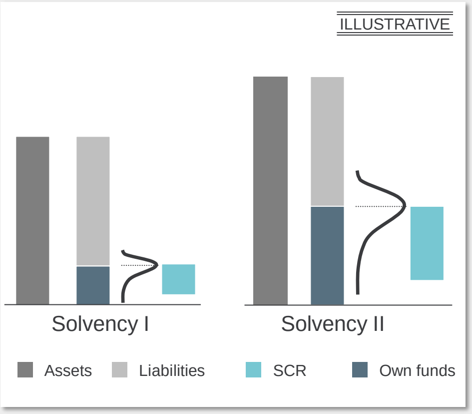
Solvency I vs. Solvency II



Examples of volatility drivers

- No risk-free investment available – deliberately taking investment risks
- Insufficient supply of investable assets for long maturities
- Sensitivity to changes in level and volatility of interest rates
- Risk margin reflects capital consumption over the business run-off

Indication of Solvency II volatility

Calibration of MCR implies a 15% risk of losing ~35%-points on solvency ratio over one year by reduction of own funds

Solvency II own funds will be more volatile than existing frameworks – Volatility will become a mark of the "new normal" regulation

Impact of the SCR on the volatility of solvency ratio under Solvency II

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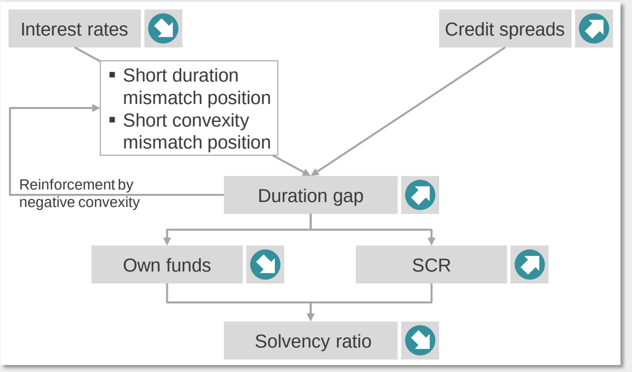
Impact of economic profits and losses on SCR and solvency ratio

SCR can dampen …

Reduction of risk exposure as a result of decreased market values and/or outright sales

As a result, the negative impact of decrease in own funds on the solvency ratio is partly compensated by a reduction of the SCR

… or amplify volatility of own funds



The volatility of the solvency ratio depends on the source of the change – SCR can dampen own funds volatility or amplify it

Significant change of market risk factors impacting solvency ratios to a large extent …

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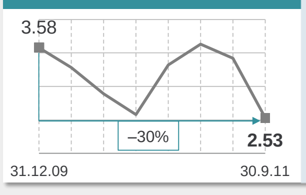
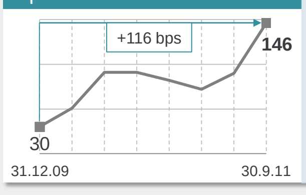
Interest rate risk[1]



Market
–30%

QIS5 shock
–31%

Spread risk[2]

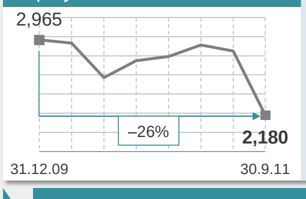


Market
+116 bps

QIS5 shock
+117 bps[3]

Spread risks for EU government bonds not covered by QIS5

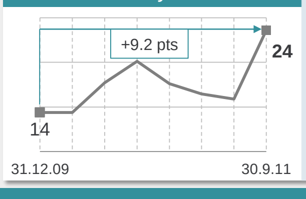
Equity risk[4]



Market
–26%

QIS5 shock
–30%

Interest volatility risk[5]



Market
+9.2 pts

QIS5 shock
No recognition of volatility risk

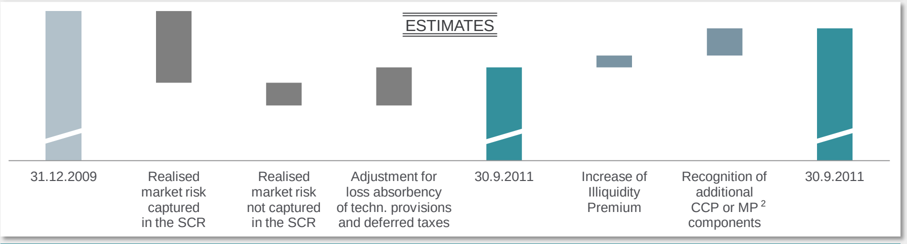
Draft QIS5 shock
+12 pts

The QIS5 shock for market risk realised over seven quarters since 31.12.2009

[1] 10 year EUR swap. [2] "ECB AAA and other European government bond rates" over swap.
[3] Expressed in bps for a AA-corporate bond with 10 years maturity. [4] EuroStoxx50.
[5] EUR swaption volatilities 10Y in 10Y in %. Source: Bloomberg.

… with substantial impact on average solvency ratios (VaR 99.5%) of European insurance companies

Estimated development of average own funds of European insurers since QIS5[1]



Non-quantified effects of the SCR on the solvency ratio

Increase of SCR
- Increase of insurance risk: Increased market value of insurance liabilities due to lower interest rates
- Increase of interest rate risk: Increased market value due to lower interest rates

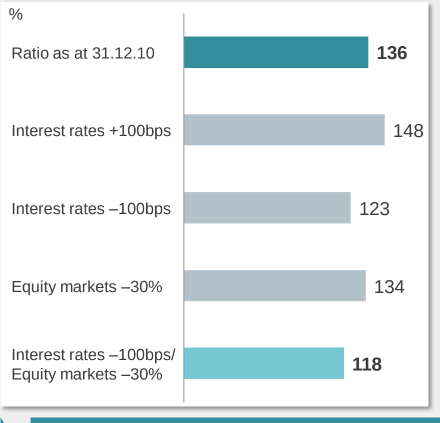
Decrease of SCR
Decrease of equity risk: Lower market value due to depreciation of equity markets

Market movements negatively impacted QIS5 solvency positions – Counter-cyclical measures are likely to compensate for a material amount

[1] Munich Re estimates based on reported results from EIOPA's QIS5 report. Incorporating only effects from financial markets development without taking possible management actions into account.
[2] CCP = Counter-Cyclical Premium; MP = Matching Premium.

Sensitivities of economic solvency ratios for Munich Re based on 175% of VaR 99.5%

ESRs[1] for MR Group as at 31.12.2010



Current situation

- Combined sensitivity to a 100 basis point fall in interest rates and a 30% drop in equity markets – about what we have seen so far in 2011, maybe slightly less
- But further factors to be considered
  - Significant credit spread widening
  - Substantial nat cat claims
- Nevertheless, economic solvency ratio is still well above 100% (i.e. above 175% under Solvency II calibration) – this is strong given the difficult environment
- Internal intervention level at 80% ESR

Munich Re able to withstand another extreme economic stress as experienced in Q1–3 2011 without breaching its internal(!) limit

[1] Economic solvency ratio defined as available financial resources over economic risk capital (based on 175% of Solvency II calibration target).

Aiming for higher target capitalisation – Management intervention much more granular than supervisory scheme

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Munich Re actions[1]

>140%
Excellent capitalisation

- Capital repatriation
- Increased risk-taking
- Holding excess capital to meet external constraints

100%–140%
Comfortable capitalisation

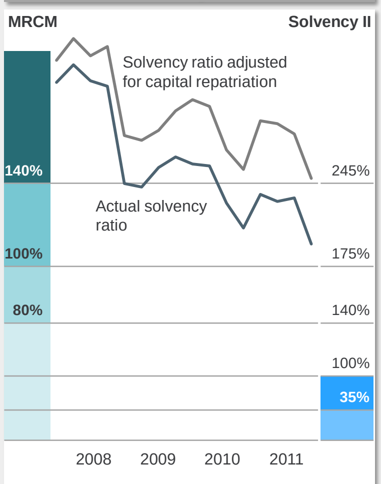
80%–100%
Adequate capitalisation

- Tolerate and monitor
- (Partial) suspension of capital repatriation

<80%
Below target capitalisation

- Risk transfer
- Scaling down of activities
- Raising of (hybrid) capital

Munich Re solvency ratio



Regulatory actions[2]

35–100%
Below target capitalisation

- Obligation to submit a comprehensive and realistic recovery plan
- Insurer to take necessary measures to achieve compliance with the SCR

<35%
Insufficient capitalisation

- Obligation to submit a short-term realistic finance scheme
- Regulator may restrict or prohibit the free disposal of insurer's assets
- Ultimate supervisory intervention: Withdrawal of authorisation

[1] Based on Munich Re capital model (MRCM): 175% of VaR 99.5%.
[2] Based on Solvency II calibration: VaR 99.5%.

Munich Re's risk strategy to safeguard target capitalisation through a comprehensive limit and trigger system …

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Core components of Munich Re's risk strategy

Objectives

- Maintaining Munich Re's financial strength
- Protecting and increasing shareholder value
- Protecting Munich Re's reputation

Implementation

Comprehensive limit and trigger system expressing MR's risk appetite and risk tolerance for various risks, e.g.

- Economic solvency ratio
- Government bond exposure
- AL mismatches
- Individual nat cat exposures
- Financial sector
- Pandemic exposure
- Counterparty credit risk
- Liquidity

Risk appetite	Risk tolerance/ limits	Budgets	Early warning triggers	Measurement & controlling
In broad terms: Risk types which are <u>generally acceptable</u>	<u>How much</u> of the risk is desirable at group/segment level, i.e. definition of risk criteria and limits	How much of the risk is acceptable in <u>specific terms</u> by business unit (operational budgets)	<u>Early warning indicators</u> to minimise the probability of breaching a limit	▪ Roles and responsibilities ▪ Processes ▪ Frequency of measurement ▪ Time to react

Effective risk management through operationalised risk strategy and streamlined governance

… continuously improving in an ongoing learning process

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Asset-side business integration

Achievements

"Duration hedge" between primary and reinsurance has worked

Substantial measures taken at early stage to address interest rate sensitivity in primary life

- Duration increase – enhance cash flow matching
- Purchase of receiver swaptions – reduce convexity risk

Outlook

- Further prolongation and convexity hedges planned
- Committed to optimising Munich Re Group's duration mismatch through active duration steering within the reinsurance segment

Liability-side business integration

Focus on own business portfolio

New product development focusing on guarantees that can be hedged more efficiently

Focus on clients

- Complex hedging capabilities already developed and established since 2007 …
- … leveraged to support clients' needs to develop and set up new products with an improved risk-return profile
- Solvency Consulting unit to support capturing of business opportunities within Solvency II

Enterprise risk management fully integrated into business strategy and daily business

Solvency II will change reinsurance demand

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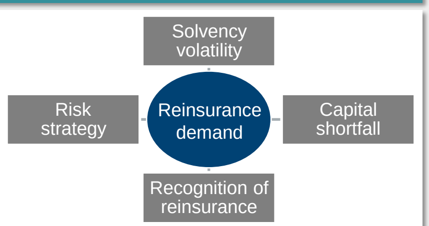
Traditional motives for reinsurance …	… not fully recognised yet
Stabilisation of earnings	Cap on cession (50%) compared to full economic effect
Peak-risk management – portfolio homogenisation	Use of historical reinsurance purchase compared to forward-looking perspective
Additional impact of price and capacity of reinsurance	Reliance on simple volume-based measures for reinsurance recognition

Better reflection of reinsurance under Solvency II – Driver of future reinsurance demand

- Reinsurance will be transformed into a powerful capital management tool
- (Partial) internal models allow for more complex products
- Internally set targets, e.g. for solvency or peak exposures, may also trigger increased reinsurance purchase



Capitalising on business opportunities

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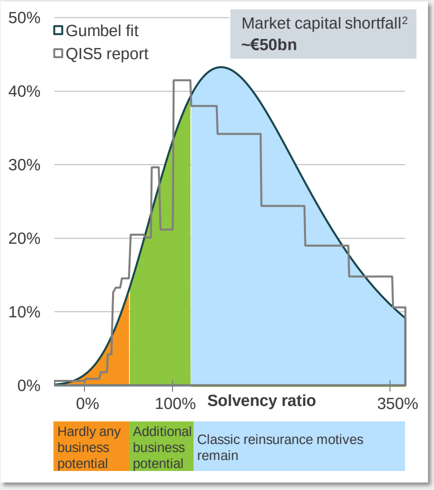
Distribution of solvency ratios[1]



Segmentation of business opportunities

- Companies in the left tail have the highest demand for solutions to improve solvency ratio but high default risk may discourage reinsurers
- Companies in the middle face new demand for reinsurance as a result of Solvency II
- Companies in the right tail are economically strong and remain the classic buyers of reinsurance cover

Prototypical non-life example

- Small company writing various business lines
- Solvency I ratio 130%, Solvency II ratio ~70%
- SCR reduction through quota share treaties in dominant business lines
- Immediate improvement of SII ratio to ~90%
- Future reserve risk reduction improves projected Solvency II ratio in 2014 to ~110%

[1] European insurance undertaking as at 31.12.2009 based on EIOPA's QIS5 report.
[2] Sum of all shortfalls below 120%.

Seizing business opportunities within Solvency II

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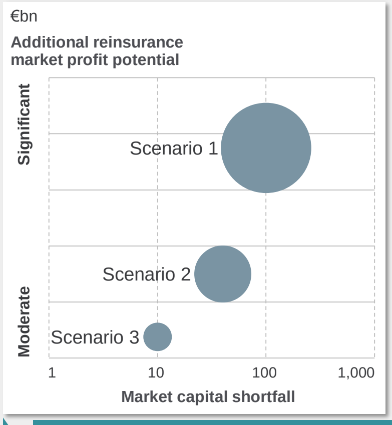
Profit potential[1] for Munich Re …



… dependent on final specifications

Scenario 1	Scenario 2	Scenario 3
High shortfall ▪ Negative market environment ▪ Large events depleting own funds ▪ Realistic economic assumptions	Realistic shortfall ▪ Improving market environment ▪ On average, realistic risk calibration ▪ Optimistic economic assumptions	Low shortfall ▪ Positive market environment ▪ Optimistic assumptions on valuation and (esp. insurance) risk calibration ▪ Enhanced use of risk dampeners
High incentive for reinsurance ▪ Insurance risks driver of SCR ▪ Insur. risks too conservatively calibrated	Adequate incentive for reinsurance ▪ Economic impact of reinsurance adequately reflected	Low incentive for reinsurance ▪ Insurance risks not driver of SCR ▪ Attractive alternative risk transfer solutions
Transitional period Short	Transitional period Appropriate	Transitional period Long

Positive business impact expected from Solvency II – Extent dependent on final specifications

[1] Bubble size reflects estimated additional profit for Munich Re.

Impact of Solvency II on clients and products

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Changes and challenges

- Challenges client-specific …
- … with regional differences and also having an impact outside Europe (e.g. Bermuda).

- Risk assessment for each segment …
- … increasing transparency as regards economic value contribution of different activities …
- … possibly triggering adjustments of clients' portfolios: Expansion into new lines of business vs. adaption and termination of certain lines of business

Solvency II – a catalyst for a trend which has been developing for some time: Enterprise risk management

"Winners" and "losers"

Company size

- Increased pressure on rather small, not well-diversified players
- Overall cost of compliance generally affects smaller players (increasing barriers to entry)
- Large, diversified groups potential winners …
- … as well as well-managed small companies
- Insurers with excellent enterprise risk management with competitive advantage

Products

Products with a high involvement of market risk ("asset-gathering business") may have to be redesigned or replaced

Level of diversification

Pillar 1 will punish (small) monoline insurers

There is no general rule for "winners" and "losers" – risk mitigation techniques like reinsurance offer solutions to reduce the competitive disadvantage

Advantages of reinsurance solutions

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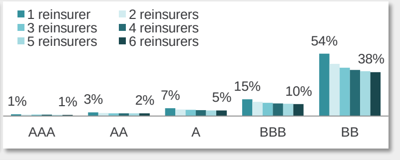
Criterion	Reasons
Capital strength and rating of reinsurer	▪ Rating and capital strength of reinsurers are differentiating criteria ▪ Explicit consideration of reinsurance credit risk through a deduction from capital relief (see chart[1])
Advantages of reinsurance solutions	▪ Effective and available independent of capital market access ▪ Faster and more flexible than capital market solutions ▪ Reinsurance available to all insurance segments and provides highest confidentiality
Capital management by reinsurance	▪ Capital management as an additional driver for reinsurance ▪ Comparison of internal cost of capital with the cost of reinsurance (cost of capital + administration cost + counterparty risk) will be possible and will influence decisions



Solvency II will lead to transparency in risk capital relief and will make the added value of reinsurance much more visible

[1] Chart based on QIS5 technical specifications.

Business opportunity segmentation

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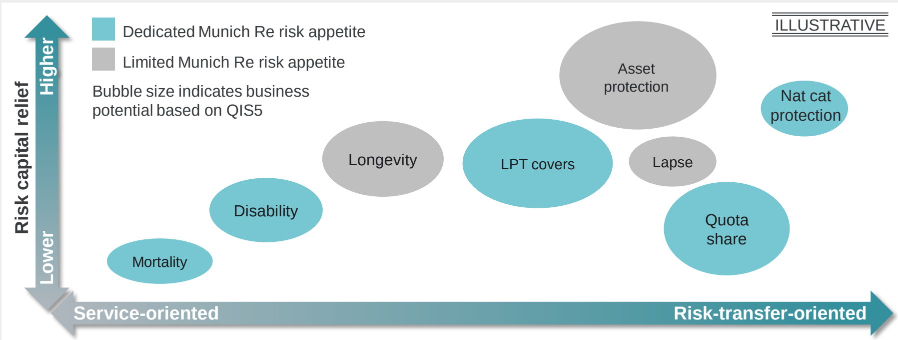

Life business

- Largest potential for products covering market risk
- Underwriting risks less important and generally written in connection with services

Non-life business

- Largest potential for nat cat, retrospective covers and quota share treaties depending on client risk profile
- Standard formula favours proportional treaties

Business opportunities will arise but careful selection will be required

Key takeaways

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We have already been steering our business in line with Solvency II principles for years – Management intervention kicks in much earlier and is more granular than supervisory scheme

Solvency II will foster less capital-intense products that allow for more efficient hedges

Solvency II will lead to selective additional business potential for reinsurance while classic motives for reinsurance still remain valid

Increased transparency requirements enhance comparability across Europe

Solvency II own funds will better reflect economics of insurance business

Solvency II will support analysts and investors in assessing the economic position of insurance undertakings

Appendix

Financial calendar

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FINANCIAL CALENDAR	
2 February 2012	Preliminary key figures 2011 and renewals
13 March 2012	Balance sheet press conference for 2011 financial statements
14 March 2012	Analysts' conference, London
26 April 2012	Annual General Meeting, Munich
8 May 2012	Interim report as at 31 March 2012

Appendix

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Appendix

Disclaimer

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