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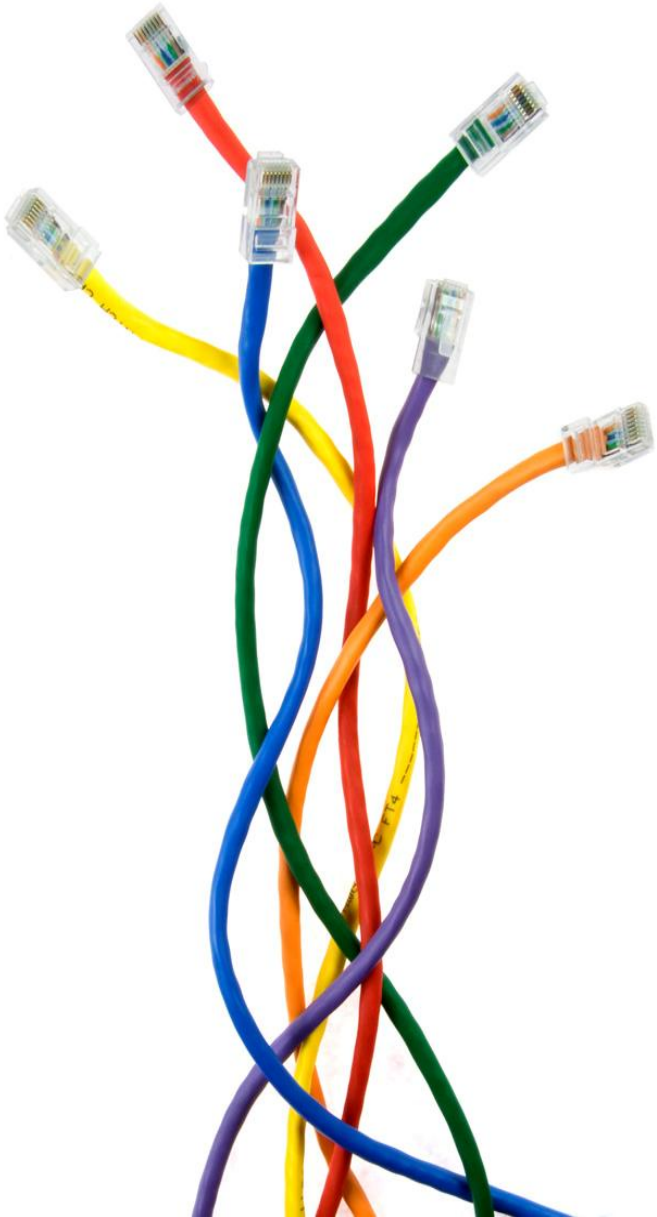

Solvency, Accounting and the Evaluation of Life Insurance Business

Norbert Heinen, B&W Deloitte GmbH

Munich, 8 September 2009

Agenda

Introduction

Evaluation of Life Insurance Business

Modelling Participating Business

Market Consistency and Illiquid or Non-Existing Markets

To be, or not to be… Market Consistent

Conclusions

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Introduction

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Different Principles In Different Applications

European Commission and CEIOPS	• Solvency II Framework Directive • Solvency II advisory documents prepared by CEIOPS for the EC • QIS Technical Specifications
CFO Forum **CRO Forum**	• EEV and MCEV Principles • CFO Forum Proposition for IASB: IFRS Phase II Insurance Model • Discussion of Solvency II treatment of insurance liabilities • "Market Value of Liabilities for Insurance Firms (Implementing elements for Solvency II)" – 2008 publication of CRO Forum
IASB / FASB	• Insurance IFRS and related projects – Phase I: IFRS 4 Insurance Contracts – Phase II: Insurance IFRS • Discussion Paper, May 2007, Exposure Draft, late 2009 (planned) • Standard, 2011 (planned)
IAA	• Measurement of Liabilities for Insurance Contracts: Current Estimates and Risk Margins, April 2009

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Significant Differences In The Proposed Approaches I

Best Estimate	• The latest proposition of **SII** (QIS 4) suggested using swap rates as discount factors. Credit risk is evaluated separately. • This may differ from **PII** results (no precise indication of discounting), if the risk of default is considered in Phase II as an adjustment of the discount rate rather than directly reflected in the probability distribution of the cash flows. • The issue of consistency with IAS 19 has recently been addressed.
Risk Margin for Uncertainty	• Under **SII** a risk premium of 6% should be applied to future SCRs to determine the cost of capital. • **PII** does not specify a single method to derive the risk margin. The margin should be determined on a market consistent basis to reward the bearing of unexpired insurance risk uncertainty. • **CFO Forum** suggests that the allowance for inherent risk and uncertainty should be determined by management.
Market Consistent Expenses Estimate	• **SII** requires use of company specific factors in the valuation of non-hedgeable risks. • **PII** requires all cash flows to be market consistent. In particular, any entity specific efficiencies or inefficiencies should be excluded from the estimate because they would not be consistent with market participants‘ view. • **CFO Forum** opts for fully entity-specific non-economic assumptions.

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Significant Differences In The Proposed Approaches II

Service Margin	• **SII** recognizes *the entity specific* service margins, they are indirectly included in the calculation of the best estimate of cash flows. • Under **PII** *market consistent* service margins for future services should be directly evaluated and recognized. This proposition may be reconsidered in view of the criticism after the publication of the discussion paper in 2007.
Premium Recognition	• The **SII** liability includes all cash flows expected under the legal terms and conditions of the contracts in force, even if the contract can be cancelled at any time. • **PII** proposes to consider all premiums if the insurer can enforce their payment in return to retain the guaranteed insurability (the IASB's general concept of the revenue accounting).
Credit Standing	• **PII** requires to reflect the insurer's credit standing in the value of the liabilities. As a result, improvement of the credit standing will increase the insurer's liabilities (recognition of the limited liability put option of the insurer). • **SII** (and also CFO Forum) explicitly prohibits any such adjustments.
Market Value of Assets	• Counterparty limits in Solvency II are not foreseen in PII discussion paper and the MCEV Principles.

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Hurdles Met By The Current Methodologies

Market Efficiency	• Lack of liquidity through sudden flight to quality
Availability of Market Prices	• Long term investment assets • Assets to hedge demographic risk, behavioural risk
Policyholder‘s Behaviour and Management Decisions	• Empirical basis for the assessment of dynamic lapses and annuity take-ups • Management discretion in participating business • Expected behaviour of regulators
Specifics of Local Regulations	• Asset and liability valuation rules • Minimum profit sharing requirements • Accounting and economic recognition of unallocated surplus funds

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Evaluation of Life Insurance Business

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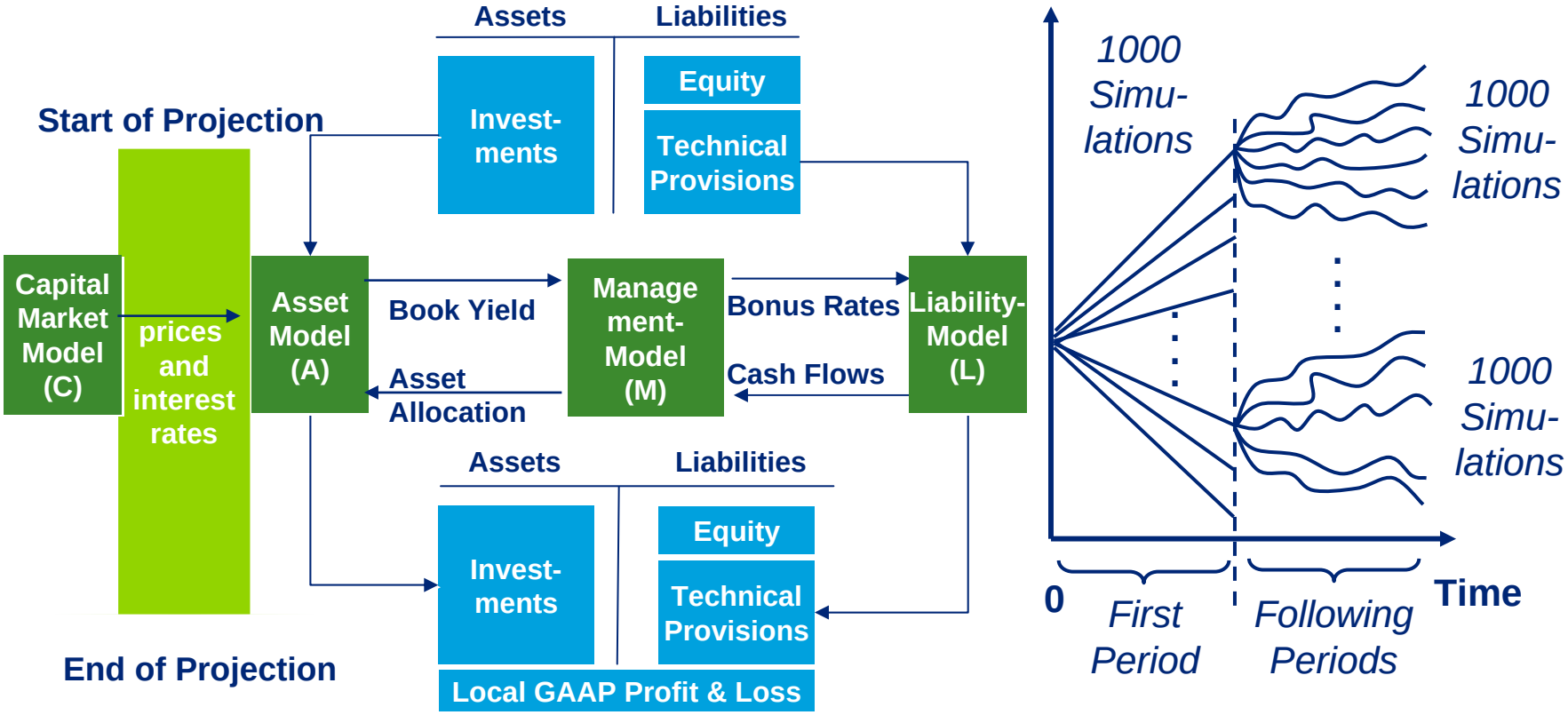
Long-term Projections of the Local GAAP Balance Sheet



The result of this calculation is **one** economic balance sheet based on stochastic evaluations of the technical provisions and shareholder funds at the valuation date. To project the economic balance sheet, such evaluation has to be repeated year by year for each projection period under each economic scenario.

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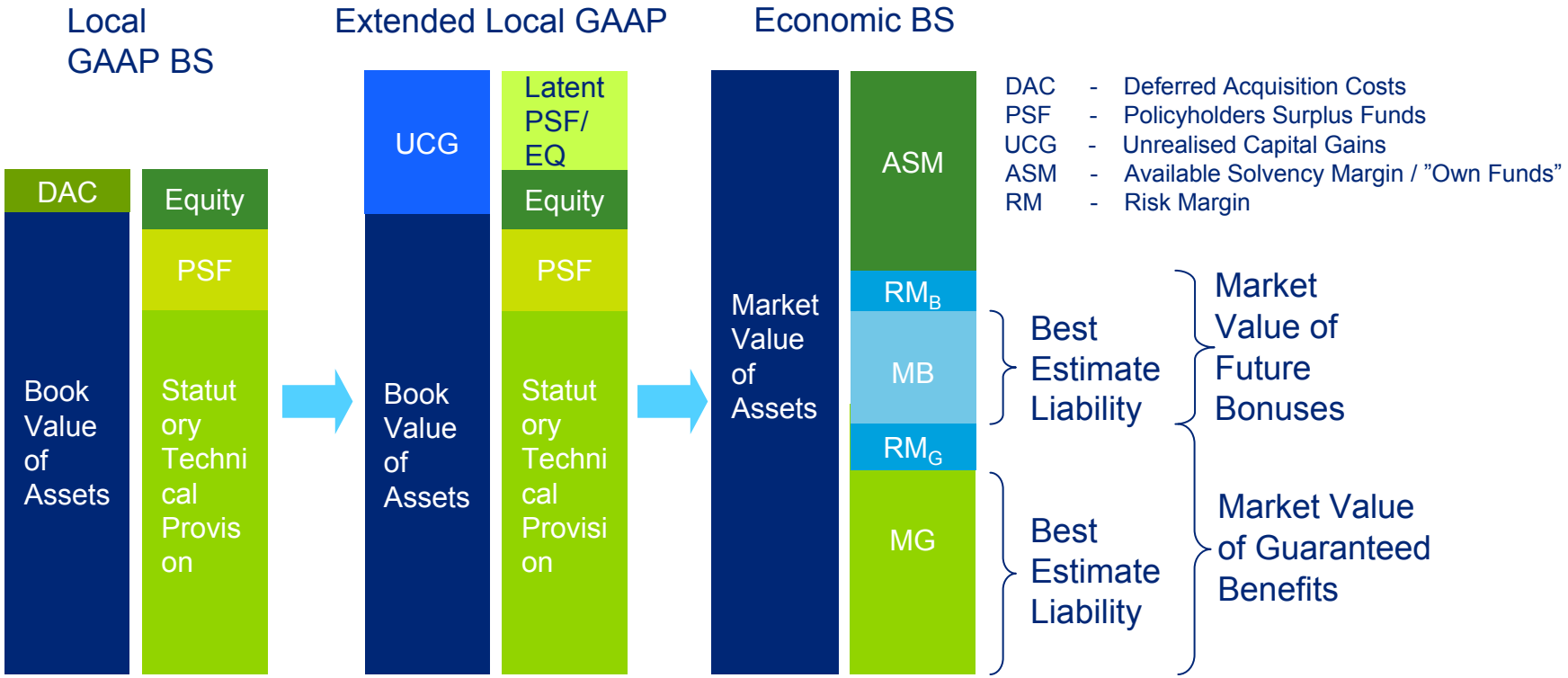
Transition to the Economic Balance Sheet for SII



In Solvency II the local GAAP balance sheet is converted into an economic balance sheet using market consistent evaluation techniques:

- Internal model approach – evaluation of probability distribution of the economic balance sheet
- Standard approach – use of sensitivity on various stresses

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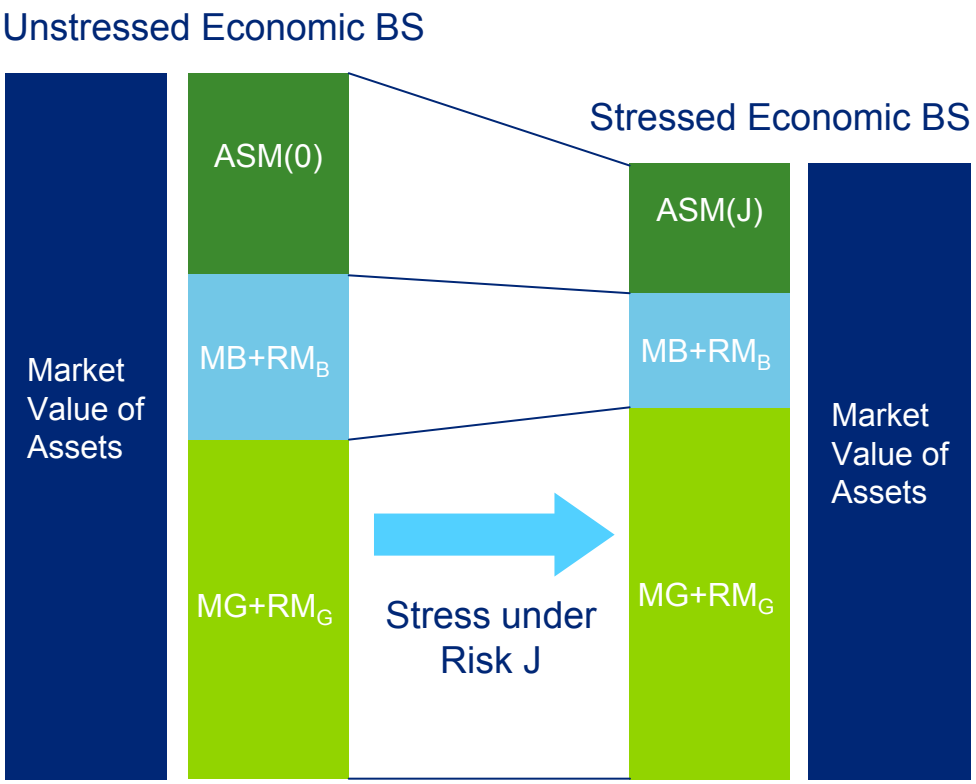
Stressing The Economic Balance Sheet



The Solvency Capital Requirement SCR (J) for risk J is defined as the reduction of the Available Solvency Margin ASM if risk J materializes.

Internal Model Approach
The stresses are realized through stochastic simulations. In practice most of internal models rely on deterministic stresses for non-economic risks.

Standard Approach
Only a certain number of pre-defined stresses for all cate-gories of risk are evaluated.

Aggregation Step
The results of these stress tests are then aggregated through correlation matrices to obtain the overall level of the capital requirement.

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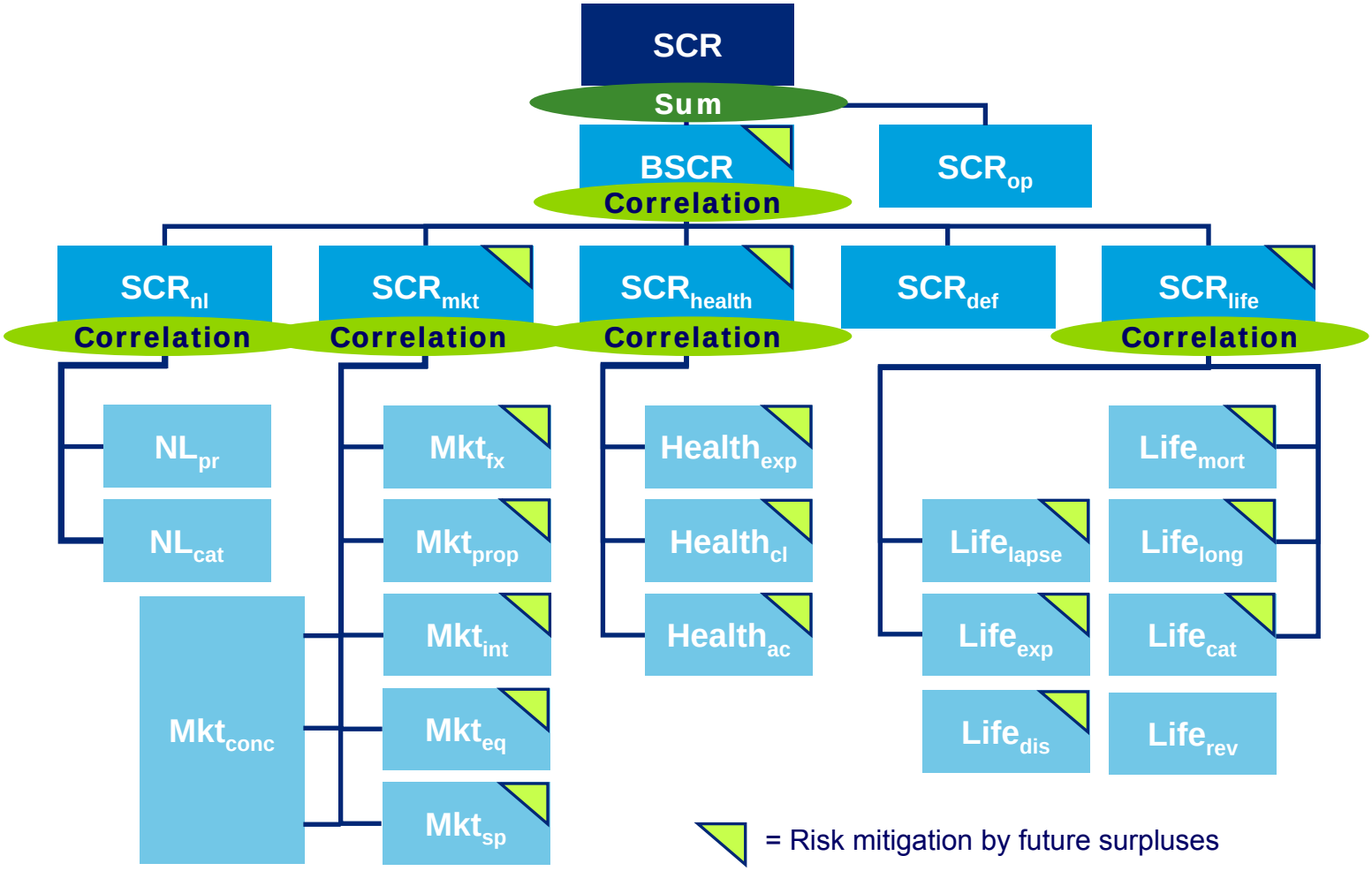
Solvency II Risk Aggregation Methodology As Suggested For The Standard Model



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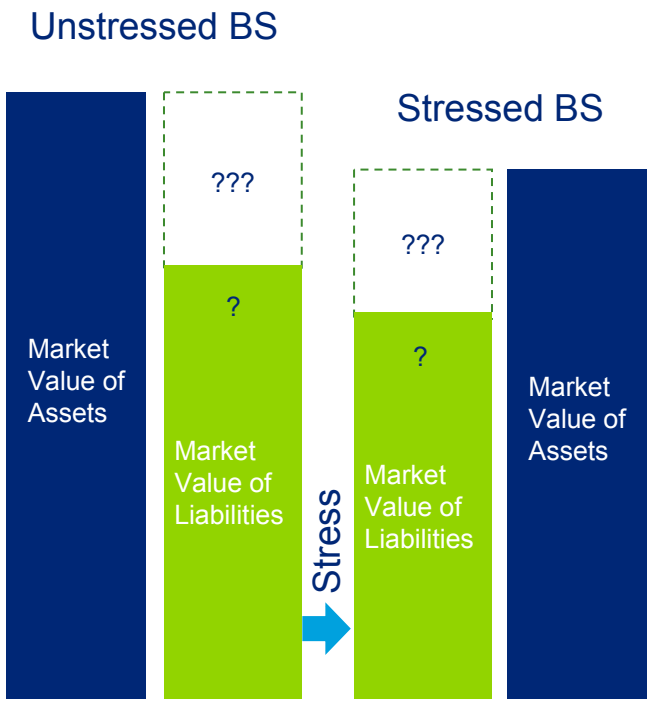
Liabilities Are Crucial for the Solvency Assessment



- No major conceptual discussion about market consistent valuation of assets.
- Different methodologies to evaluate liabilities may result in significant differences in their market value.
- Uncertainty in calculation of SCR is magnified through the uncertainty in calculation of liabilities.

The differences between the reserving methodologies have the highest impact on the solvency position of the life insurance companies in different European markets.

Treatment of participating business is of particular importance.

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CEIOPS Reserving Principles under Solvency II

- Going-Concern approach
- Full recognition of all contractual obligations including future bonus participation, options and guarantees
- Calculation of Technical Provisions usually based on stochastic market consistent models
- Realistic assumptions of future management decisions and policyholders' behaviour have to be made
- Where market values are not available, use of Mark-to-Model approaches
  - If Mark-to-Model approaches are used, a Risk Margin has to be added to the Best Estimate Liability as part of the Technical Provision
  - Risk Margins have to reflect the price required for a potential transfer of the insurance portfolio (CEIOPS prefers the Cost-of-Capital-Approach)

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Modelling Participating Business

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Key Issues – Policyholder Surplus Fund I

- Premiums calculated under prudent biometric and expense assumptions
- Minimum profit sharing requirements („Mindestzuführungsverordnung“)
  - 90 % of investment returns (book yield) minus technical interest rate
  - 75 % of risk surplus (from biometric assumptions)
  - 50 % of residual surplus (from expense assumptions, re-insurance, tax, etc.)

  Must be allocated to the Policyholders‘ Surplus Fund (PSF)

- Cross subsidies and financing through PSF only under „exceptional circumstances“

- Negative results to be carried by shareholders in „normal circumstances“

- VVG Reform (Insurance Contract Legislation) since 2008: policyholders receive 50 % of valuation reserves at termination of their policy

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Key Issues – Policyholder Surplus Fund II

- The PSF is subdivided into three tiers
  - Bonuses for the next business year (regarded as part of the guaranteed benefits)
  - The Terminal Bonus Fund revocably allocated to individual policies
  - The ‚free‘ PSF is limited by corporate tax legislation and regulatory practice
- The PSF can only be used for bonus payments except in emergencies such as
  - Unexpected adverse development of capital markets
  - Adverse and generally unforeseen biometrical trends requiring the strengthening of statutory reserves
  - Thus under Solvency I the PSF is regarded as part of the Available Solvency Margin

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Key Issues – Policyholder Surplus Fund III

Two controversial choices to treat unallocated policyholders‘ surplus are being discussed in Europe

Policyholder Equity Approach	Reduced SCR Approach
• Unallocated surplus is a special form of equity. • Provisions have to be set in respect of guaranteed benefits only. • SCR applies to participating business as for other business.	• Provide for expected bonus payments in the valuation scenario. • Reduce SCR to reflect loss absorbency of bonuses.

For QIS 4, technical specifications treat unallocated surplus meeting Article 90 as policyholder equity, while requiring provision in respect of bonuses from other sources.

For the full diversity of participating business in Europe neither approach is fully appropriate and entirely satisfactory.

The German business model for participating business is probably best reflected by a combination of both approaches

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Key Issues – Realistic Dynamic Lapse Models I

- In Germany surrender values had to be guaranteed for regulated business written before 1994.
- Between 1994 and 2007 policy conditions could provide for market-adjustments of surrender values.
- This option was used by some major players whereas the majority of companies stayed with guaranteed surrender values.
- Since 2008 there is a de facto guarantee of surrender values imposed by insurance contract legislation.

Now compare two companies:

- Company A for which only 1/3 of the contracts have surrender value guarantees, but which has almost no unrealised capital gains on assets.
- Peer company B, which has surrender guarantees on 100 % of the portfolio, but also unrealised gains of 12% of book values of assets

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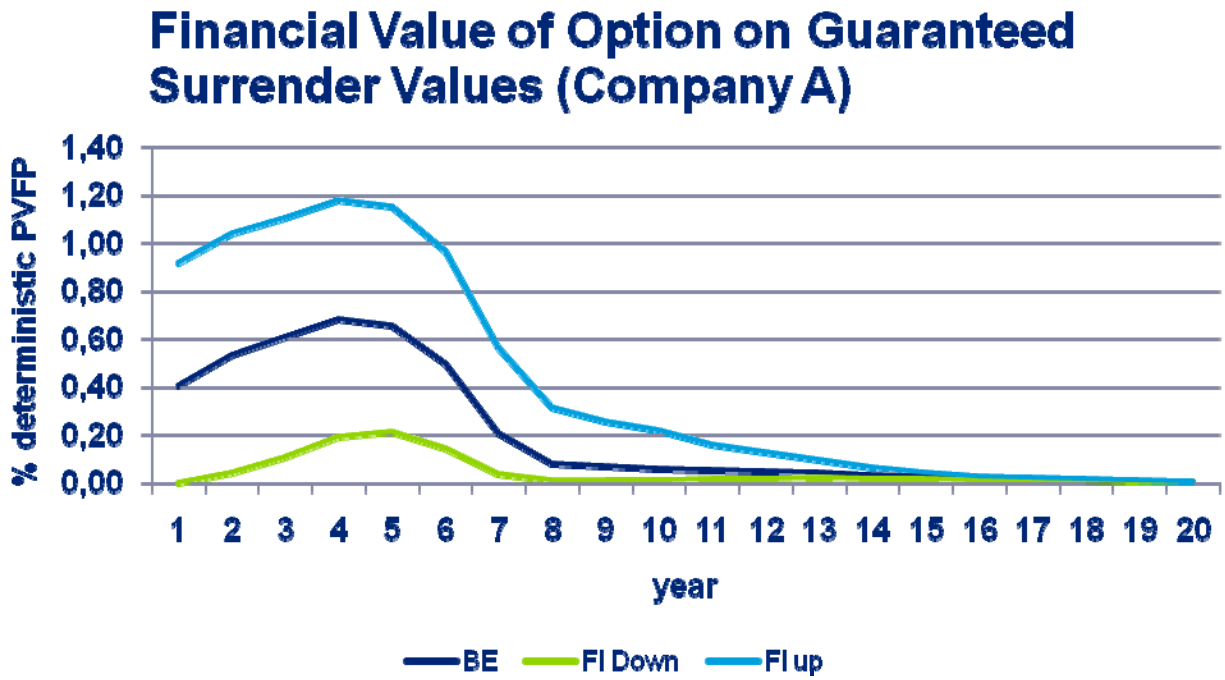
Key Issues – Realistic Dynamic Lapse Models II

- If policyholders behave rationally increased lapse rates should mainly be expected for a limited time after an upside interest rate shock.
- The financial value of the surrender guarantee option is expected to depend on current interest rate levels compared to average coupons of the asset portfolio
- The graph shows the significant financial value of guaranteed surrender values company A from a policyholder perspective



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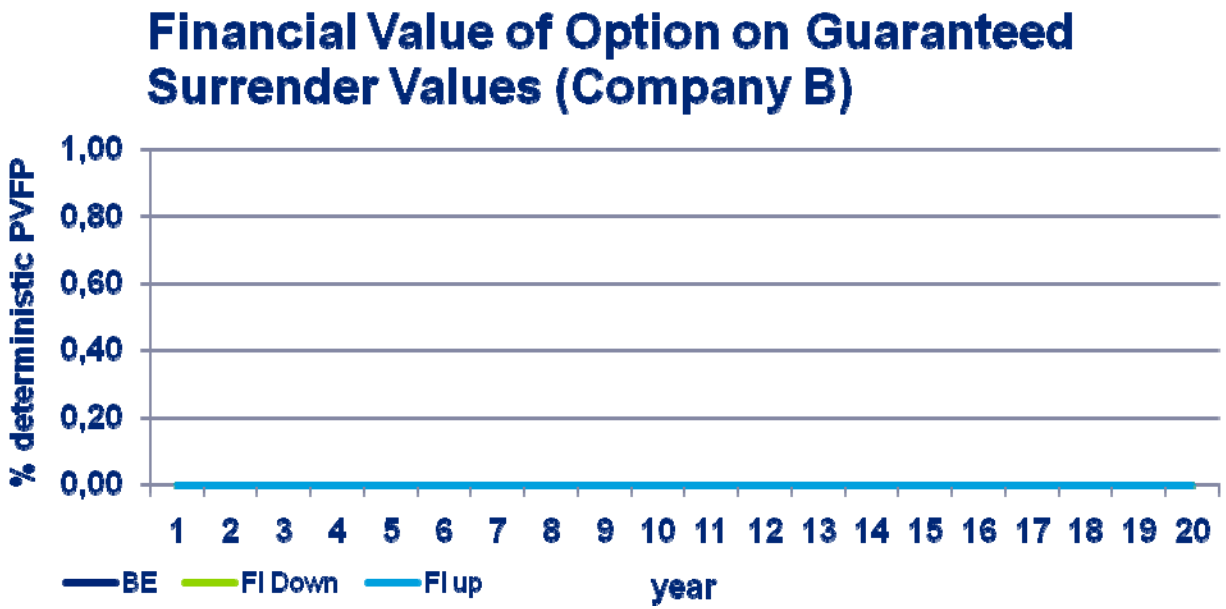
Key Issues – Realistic Dynamic Lapse Models III



- The graph above is not a mistake!
- For peer company B, which has surrender guarantees on 100 % of the portfolio, but also unrealised gains of 12% of book values of assets the financial value of the option from the policyholder perspective is zero.
- So, from a client perspective the financial value of the surrender guarantee depends more on the financial strength of the insurer than on market interest rate levels.

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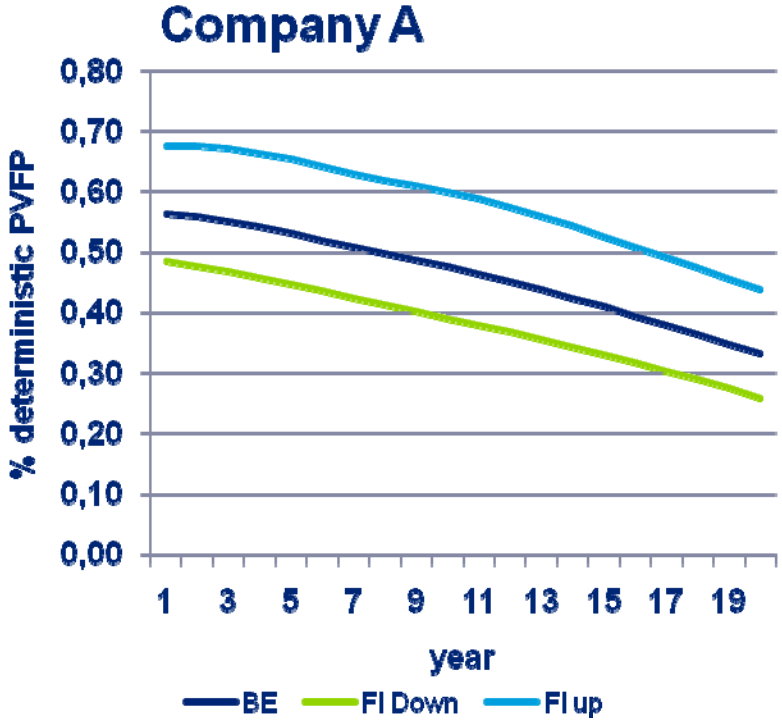
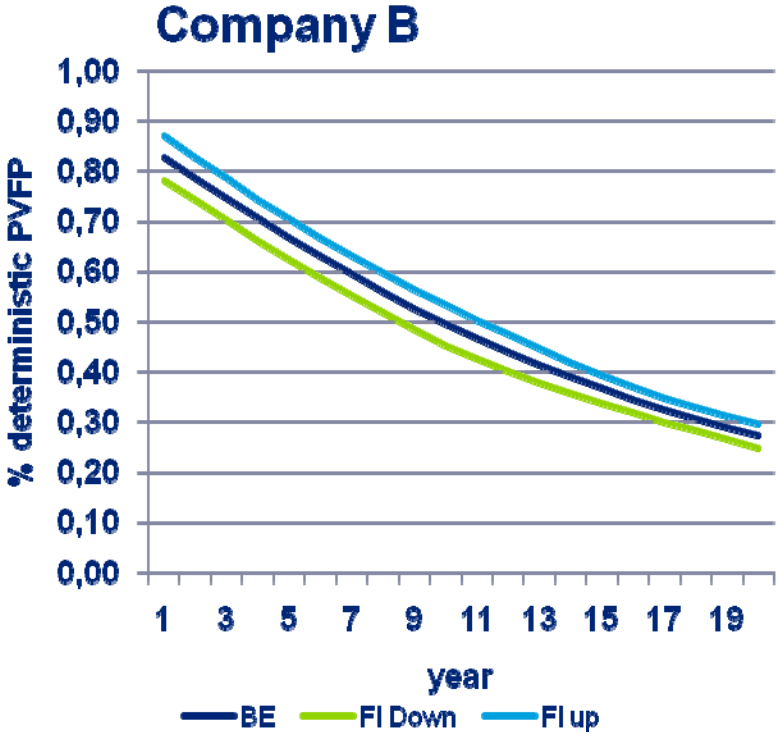
Key Issues – Realistic Dynamic Lapse Models IV

Reduction of PVFP in Case of Portfolio Lapse Event





- Though in case of company B the surrender option has a value of zero from a policyholder perspective, an increased level of lapses has a significant negative impact on shareholders equity in the economic balance sheet.
- That is because lapsed policies do not contribute any longer to future local GAAP profits.

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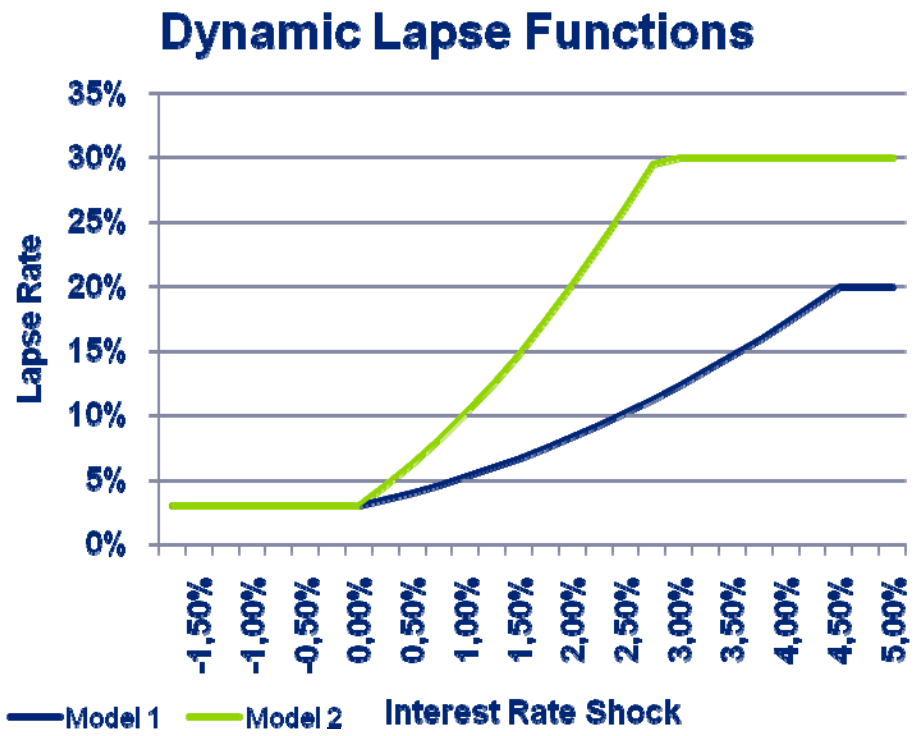
Key Issues – Realistic Dynamic Lapse Models V

Two different examples of a dynamic lapse model

Lapse behaviour can be heavily influenced by external factors:

- Interest rate movements
- Policyholder‘s liquidity demand

Financially strong companies could be hit by lapse rate increases in such cases.



Overall, realistic assumptions in respect of policyholders‘ lapse behaviour seem to be at least as important as more sophisticated valuation approaches of the surrender guarantee as a financial option.

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Key Issues – Realistic Dynamic Lapse Models VI

Example valuation results – PVFP and SCR

Different lapse scenarios can produce significantly different Solvency Coverage Ratios – In which one would you believe if you were a manager of company A?

In both scenarios it is assumed that following an interest shock lapse rates linearly return to original levels over a period of 5 years.

Lapse function	Value of the surrender guarantee option under upside interest rate shock (% of deterministic PFVP)		Solvency Coverage Ratio (QIS 4 Standard Model)	
	Company A	Company B	Company A	Company B
Model 1	**32 %**	**11,4 %**	**223 %**	**428 %**
Model 2	**101,6 %**	**16,7 %**	**112 %**	**426 %**

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Key Issues – Management Decisions I

The Impact of Management Discretion on Stress Severity

- The solvency coverage ratio depends on future bonus policies in a variety of scenarios
- The Solvency II framework requires enterprise-specific assumptions on key drivers of Solvency for participating life business, particularly
  - Rules for shareholder participation in investment returns and technical results
  - Management rules for bonus allocations to policyholder accounts
  - Behavioural factors like lapse rates, lump-sum conversion rates etc.
- These assumptions must not only be made for the initial best estimate balance sheet, but also for a variety of stress situations for which little empirical evidence is available.
- There is a clear trade-off between a strong solvency position and attractive policyholders‘ participation assumptions. The solvency position depends on how aggressively management is willing to cut bonuses in adverse situations.

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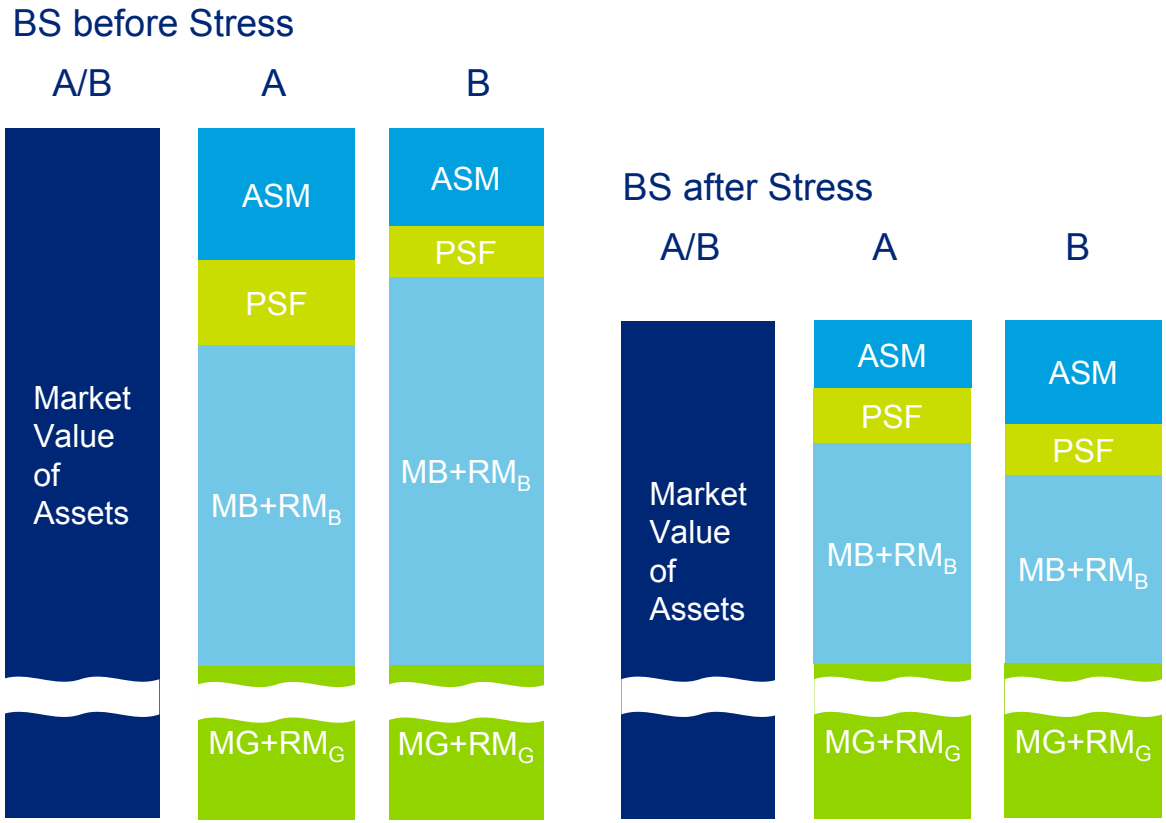
Key Issues – Management Decisions II

The Impact of Management Discretion on Stress Severity – Example

Inconsistent or diverging sets of assumptions for participating business can lead to severe misinterpretations of formal Solvency Coverage



- Company B has a smaller ASM than Company A because PH bonus expectations are higher.
- However, management of B assumes to cut bonuses more aggressively than A in a stress scenario, leading to a smaller SCR and possibly a higher Solvency coverage ratios for B compared to A.
- Importance of disclosures regarding bonus policies

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Key Issues – Management Decisions III

The Impact of Management Discretion on Stress Severity

Is a fully entity-specific participation model appropriate?

- CEIOPS technical specifications for QIS 4 require an enterprise-specific assessment of „legal and contractual obligations“ from bonus participation.
- Some participants of the German domestic discussions suggest testing partially standardized parameterisation of the model. The standard profit sharing assumption should correspond to minimum requirements as defined in the „Mindestzuführungsverordnung“ for both the initial best estimate balance sheet and the stressed balance sheet.

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Market Consistency and Illiquid or Non-Existing Markets

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Non-Existing Capital Markets I

Proposition of the Swedish Insurance Federation

Position paper on Level Two Rules for the Directive on Solvency II – a Method Based on Macroeconomic Principles for the Valuation of Technical Reserves when no True Market Price Exists, 5th June 2009

- Why do we observe a tendency of yield curves to fall down for long durations in stressed markets?
  - Stress scenario – available capital approaches SCR – risk must be reduced
  - Strategic asset allocation – sell risky assets and buy risk free investments
  - Increasing duration matching of pension liabilities beyond 20 years
  - Instruments with longer maturities are usually less liquid
  - Sudden demand in illiquid markets of long term bonds increases prices of the and decreases their expected return
  - Falling interest rates dynamics cause better capitalized insurers to follow the same strategy: a vicious circle
  - Unrecognized liquidity spreads – the reversed yield curve does not reflect expected long term forward rates and seems inappropriate for the valuation of liabilities.

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Non-Existing Capital Markets II

Proposition of the Swedish Insurance Federation

The Normal Interest Rate Method.

- Objective: reduce the volatility in the long end of the interest rate curve compared to the volatility of forwards extrapolated from short term market rates
  - Liquidity cut-off area (from T_1 to ∞) – Interval of maturities where no liquid market exists
  - Determine the cut-off as the maximum maturity, for which the volume of liability duration equals the supply of duration in interest rate instruments
  - Determine the long term equilibrium level interest rate (r_∞) and the time period, when it can be defined (T_2)
  - r_∞ is based on sound macroeconomic assumptions, creating a reasonable discount rate for instruments with very long maturities
  - It is assumed to be equal to the short term real interest rate in an economy, calibrated from market data, and the future expected inflation
  - A term premium is added for holding long maturities, calibrated through market prices of instruments from the cut-off area
  - The rates between T1 and T2 are determined by linear interpolation

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Non-Existing Capital Markets III

Proposition of Barrie+Hibbert

How to set long-term interest rates in the absence of market prices

- Similar approach as in the Normal Interest Rate Method
- Basic principles to derive the long-term nominal forward interest rate:
  - Stability – the estimate should not be affected materially by short term economic changes
  - Consistency – the forward rate is expected to be broadly the same around the world
  - Simplicity – the aim to use a simple approach that is easily understood
- Definition of the rate: real return + inflation + term premium + convexity effect
- The term premium reflects the relation between long-term return and short-term returns. It may be positive, which means investors seek incremental return for higher long-term volatilities, or negative, when investors are ready to pay for long-term immunization through long-term bonds.
- Real interest rates are estimated as exponentially weighted real cash return from the time period of 1930-2007 in highly developed world economies.

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Non-Existing Capital Markets IV

Proposition of Smith and Wilson

Fitting Yield Curves with Long Term Constraints, August 2000

- Class of calibration methods where
  - the long forward rate is a fixed input parameter
  - the short term rates are derived through calibration of a discount function *P*(*t*) to the observable market data, given the fixed input constraint
- The resulting interest rate structure is consistent with observable market prices and includes economically reasonable long-term interest rate pattern
- The asymptotic behavior of bond prices P(t) is fixed, which is achieved through fixing the form of the bond function that asymptotically does not depend on observable bond prices. Commonly used form is for example:

$$P(t) \sim X_0 \exp[-f_\infty t] + X_1 \exp\exp[-(f_\infty + \alpha)t] + \ldots$$

- X_0 and X_1 vary by the valuation date.
- On the other hand, f_∞ (the long-term forward rate) and α (mean reversion) are constant properties of the economy.

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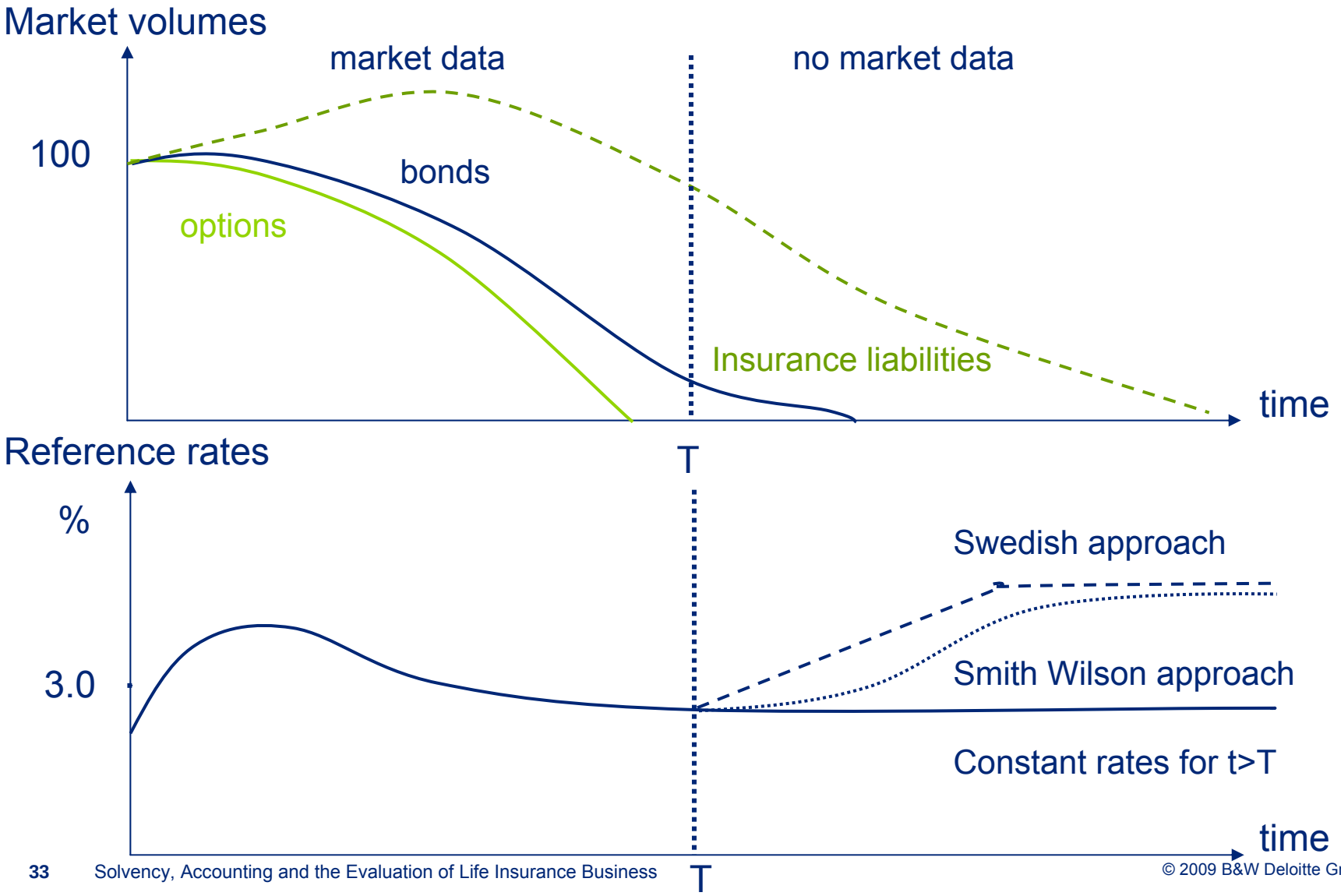
Non-Existing Capital Markets V

Whatever you do at the long end – it is a guess with high impact on liabilities!



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To Be, or Not to Be… Market Consistent

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Market Turmoil In 2008

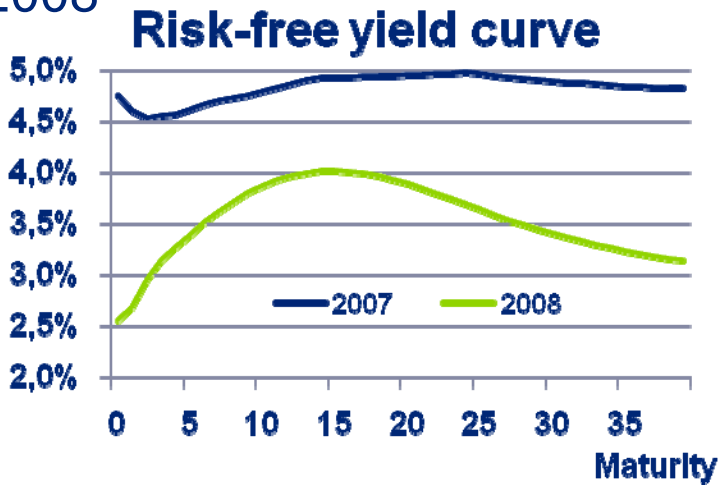
Market dislocation and its impact on MCEV 2008

- Interest rates and long-term equity returns
  ➔Low returns and low discount rates

- Volatility
  ➔greater TVOGs through increased volatility

- Level of credit spreads
  ➔higher credit event losses

Fall in MCEV results across all markets



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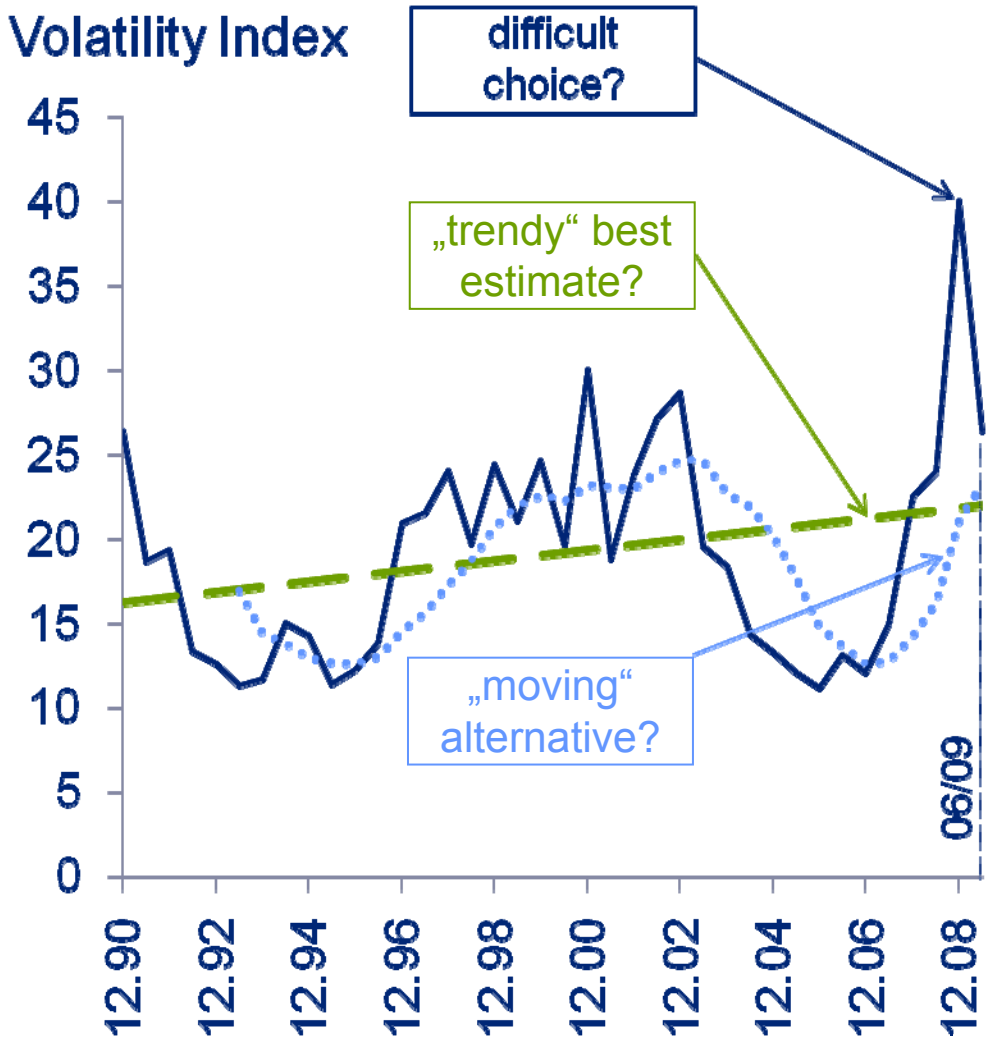
History of Volatility

Volatility assumptions in life insurance evaluation



Actuarial-business-as-usual-type of questions:

- Which assumption for our 31/12/2008 market consistent valuation is:
  - Market consistent?
  - Our realistic best estimate?
  - Reasonable?!
  - **Right?!**
- Do we have a similar dilemma on 30/06/2009?
- Are we consistently market consistent?

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Responses of the Industry to the Dislocated Markets I

Common approach to MCEV Reporting:

- 04/06/08: MCEV Principles

Financial turmoil and an immediate response of the CFO Forum…

- 05/12/08: Agreement to review impact of market conditions on MCEV Principles

  "[…] CFO Forum members are working collaboratively to develop guidance in relation to the application of the MCEV Principles to address the notion of market consistency under current conditions […]"

Ad-hoc practical approaches developed in the market:

- Liquidity premium and historical volatility adjustments

Response of the CFO Forum

- 22/05/09: Update on progress made in developing the MCEV Principles

  "The current financial crisis has revealed significant challenges for MCEV, such as adjustments for liquidity premia, which have ultimately harmed comparability. The CFO Forum has agreed to do further work to seek to improve the consistency in the adjustments made for liquidity premium and volatilities […] In light of these developments, which may result in significant amendments to MCEV, we believe it is sensible to defer the mandatory MCEV reporting for all member firms until 2011."

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Published MCEV Results 2007 and 2008 I

EEV / MCEV 2008 compared with 2007

Company	2008	2007	Change (%)
Generali	5.90	5.88	0%
Hannover Re	1.65	1.72	-4%
Munich Re	6.12	6.66	-8%
ING	23.08	26.99	-14%
VIG	4.16	4.88	-15%
Aegon	17.19	20.17	-15%
Zurich ($)	12.82	15.94	-20%
L&G (£)	6.52	8.13	-20%
Swiss Life (CHF)	6.32	8.76	-28%
AXA	27.21	38.49	-29%
Aviva (£)	14.10	21.19	-33%
ERGO	3.51	5.41	-35%
Allianz	12.55	21.93	-43%

Questions:

- **Do MCEV results impact investors' view on insurer's value?**
- **Are MCEV results consistent with the market changes?**
- **Where are the main value drivers?**

… and why is this picture not complete?

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Published MCEV Results 2007 and 2008 II

EEV / MCEV 2008 compared with 2007 (rearranged)

Company	2008	2007	Change (%)	Liquidity Spreads
Hannover Re	1.65	1.72	-4%	None
Munich Re	6.12	6.66	-8%	None
Zurich ($)	12.82	15.94	-20%	None
ERGO	3.51	5.41	-35%	None
Allianz	12.55	21.93	-43%	None
This is supposed to be a THICK RED LINE (currently not in stock @ Deloitte)				
Generali	5.90	5.88	0%	50 bps
ING	23.08	26.99	-14%	0-190 bps
VIG	4.16	4.88	-15%	50 bps
Aegon	17.19	20.17	-15%	100-600 bps
L&G (£)	6.52	8.13	-20%	Top-down EEV
Swiss Life	6.32	8.76	-28%	0-65 bps
AXA	27.21	38.49	-29%	50-100 bps
Aviva (£)	14.10	21.19	-33%	150-250 bps

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Changes in EV Results vs Share Prices in 2008

EEV / MCEV vs Share Price

Company	EEV / MCEV	Share Price
Hannover Re	-4%	-29%
Munich Re	-8%	-18%
Zurich	-20%	-27%
ERGO	-35%	-35%
Allianz	-43%	-49%
The THICK RED LINE		
Generali	0%	-30%
ING	-14%	-74%
VIG	-15%	-55%
Aegon	-15%	-64%
L&G	-20%	-63%
Swiss Life	-28%	-72%
AXA	-29%	-37%
Aviva	-33%	-55%

Change in share price end of 2008 vs 2007

84%	Unadjusted results are strongly correlated with the market

Adjusting the MCEV destroys their comparability with share prices…

27%	Adjusted results are not fully consistent with the market

…and weakens the informative role of the MCEV reports: The unadjusted results are at least as good an indicator for an investor as usual indicators (such as E/P), but are much more informative.

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Changes in EV Results vs Share Prices in 2008

EEV / MCEV vs Share Price

Company	EEV / MCEV	Share Price
Hannover Re	-4%	-23%
Munich Re	-8%	-21%
Zurich	-20%	-41%
ERGO	-35%	-37%
Allianz	-43%	-51%
The THICK RED LINE		
Generali	0%	-47%
ING	-14%	-79%
VIG	-15%	-54%
Aegon	-15%	-69%
L&G	-20%	-70%
Swiss Life	-28%	-71%
AXA	-29%	-58%
Aviva	-33%	-61%

Change in avg share price in the MCEV reporting periods (3-5/09 vs 3-5/08)

89% Unadjusted results are strongly correlated with the market

Adjusting the MCEV destroys their comparability with share prices…

27% Adjusted results are not fully consistent with the market

…and weakens the informative role of the MCEV reports: The unadjusted results are at least as good an indicator for an investor as usual indicators (such as E/P), but are much more informative.

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Changes in EV Results vs Share Prices in 2008

EEV / MCEV vs Share Price

Company	EEV / MCEV	Share Price
Hannover Re	-4%	14%
Munich Re	-8%	7%
Zurich	-20%	2%
ERGO	-35%	4%
Allianz	-43%	13%
The THICK RED LINE		
Generali	0%	20%
ING	-14%	11%
VIG	-15%	-12%
Aegon	-15%	5%
L&G	-20%	0%
Swiss Life	-28%	22%
AXA	-29%	8%
Aviva	-33%	-1%

Change in share price in the MCEV reporting period 2008 (1/3-1/5/09)

~0%*	No significant correlation

**Statistically not significant*

~0%*	No significant correlation

**Statistically not significant*

Information in MCEV reports does not seem to significantly impact the prices in volatile markets.

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Conclusions

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Conclusions I

Overwhelming complexity and variety of the approaches…

- The evaluation of life insurance becomes increasingly complex. The regulatory and financial reporting framework challenges traditionally used actuarial approaches and requires from insurers to invest resources in their valuation processes. Discrepancies between the propositions from various industry bodies increase this complexity and impair the transparency of insurance reporting.
- Ongoing discussions on entity-specific vs market consistent assumptions
  - Neither CEIOPS nor IASB seem to be internally consistent in this topic within their methodological propositions
  - CFO Forum clearly opts for the maximum flexibility of the management in setting assumptions
- Entity-specific assumptions are hard to validate by even a well-informed investor, especially in extreme market situations. This creates some hazardous area for manipulation of results and arbitrage opportunities. A minimum degree of reasonable standardization seems to be necessary for transparent external reporting.

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Conclusions II

Is market consistent valuation what we look for in financial reporting?

- Life insurance evaluation in dislocated markets seemed to challenge even the latest methodological achievements, such as the MCEV Principles of the CFO Forum. However, the strict application of these principles seems to reflect the investors‘ own assessment of the insurers‘ value. Share prices were strongly correlated with the latest MCEV results of the firms who fully applied the MCEV Principles.
- Publication of embedded value reports does not seem to impact the share prices significantly. Markets are dominated by large investors who are more than well acquainted with the business specifics.
- Under these circumstances, the MCEV’s informative role seems to be focused on assuring that investors understand particular value relationships and sources of changes in the value. It does not seem to play a role of a “buy-and-hold” or “sell-and-forget” type of information. These messages clearly seem to have been sent well before the MCEV reporting deadlines.
- If the MCEV role is to explain why the market valuation changed in a way it did, any kind of adjustments, such as liquidity spreads or historical volatilities, impair the reports ability to provide such explanation.

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Conclusions III

Over-market consistent valuation?

- Non-existence of efficient and liquid financial markets creates a serious hurdle in the market consistent evaluation. Typical annuity liability have duration s significantly exceeding duration sof available liquid investment assets.
- However, the approach to disregard the relevant liability cash flows may massively misstate the expected value of these cash flows.
- Current propositions to develop a long term interest rate, which does not depend on the short-term market dislocation, seem to be a good compromise between:
  - Non-existing long term market consistent assumptions, and
  - The approach to disregard potentially material part of the liabilities.
- As the derivation of the long-term rates is based on macroeconomic models, calibrated to historical data, standardized approaches should be applied across the market. Industry bodies, such as the CFO Forum, should play a significant role in providing appropriate guidelines.

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Thank you for your attention!

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