

Reflection of Asset Liability Management in the Reserving for Long Term Liabilities

Convention A, Ulm Actuarial Session:
Innovative Product Design and Risk Management in Life Insurance and Pensions

■ 19 September 2022



Agenda

Motivation

Approaches for prudent reserving

Germany

Switzerland

Aspects of reserving for solvency purposes

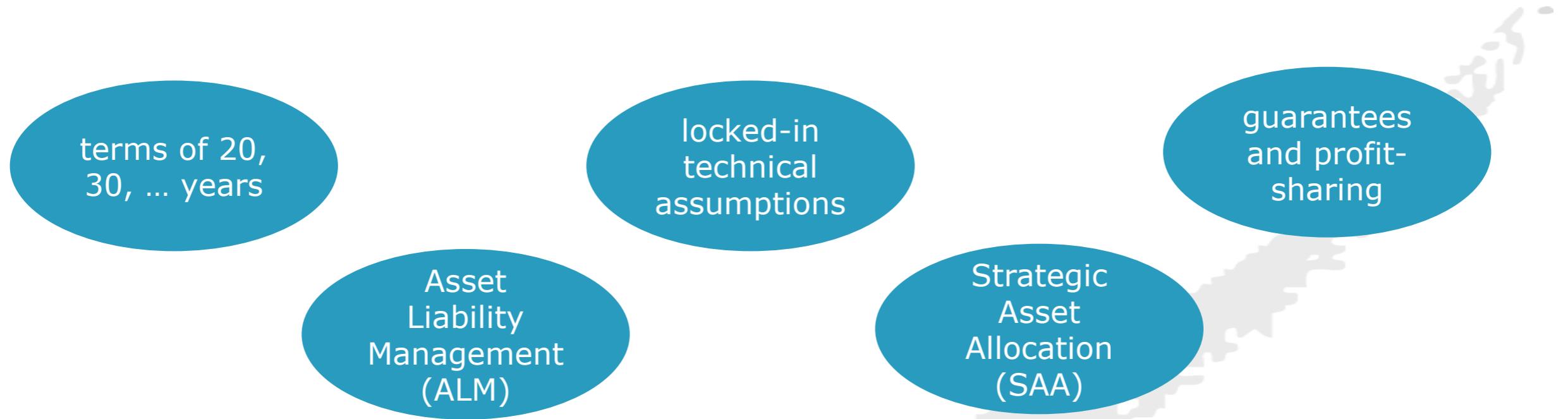
Europe

Bermuda

Conclusions

Motivation

Reserving for long term liabilities



Prudent reserving (local GAAP, statutory)

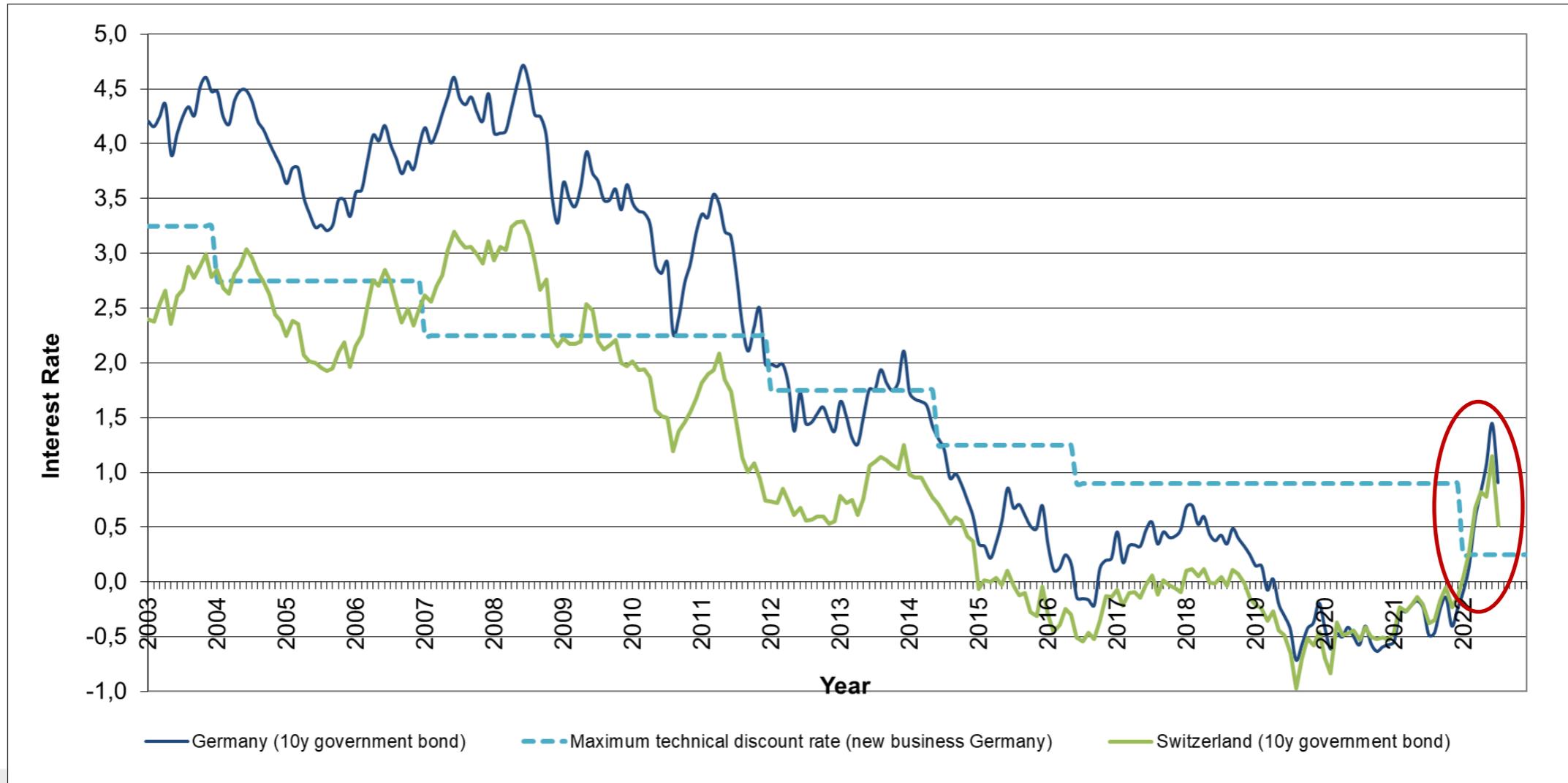
- Relevance: basis for coverage requirements, profit sharing, in some countries also basis for dividend distribution to shareholders
- Valuation needs to result in sufficiently **prudent** technical reserves

Reserving for solvency purposes

- Relevance: key component for determining economic own funds (numerator of the solvency ratio)
- Valuation based on **market consistent** discount rates and best estimate cashflows

Motivation

Reserving if risk-free interest rates deviate materially from technical rates underlying the premium calculation



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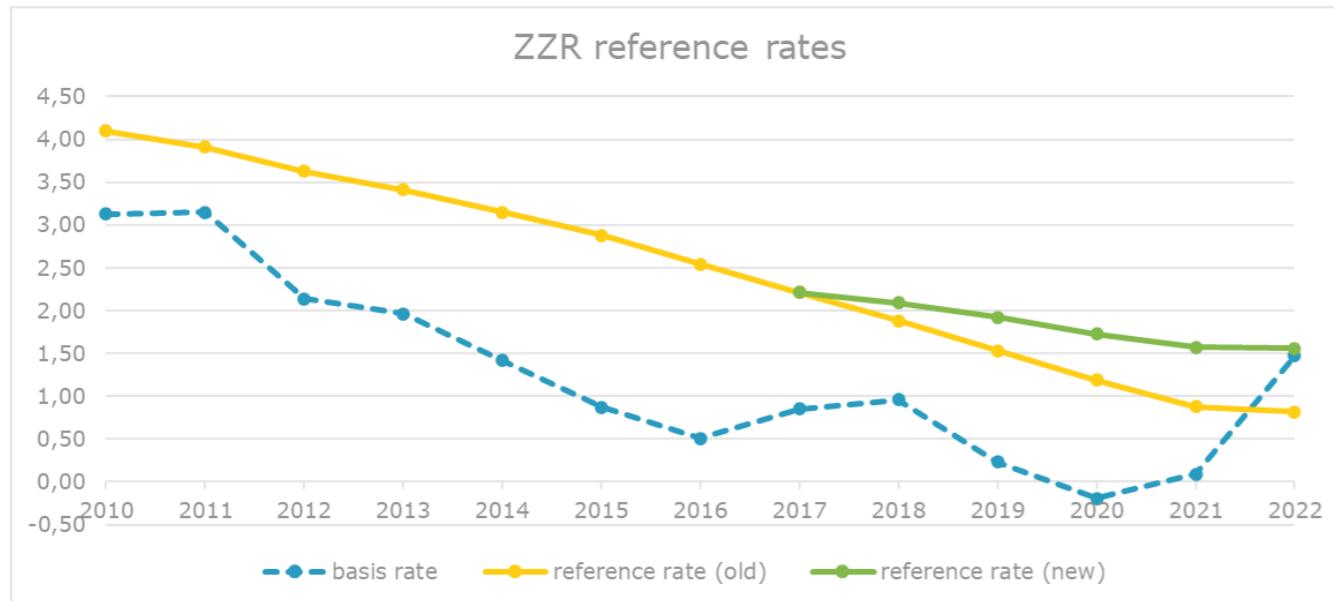
Approaches for prudent reserving

Different answers to similar challenges – Germany



Additional interest rate reserve (“Zinszusatzreserve”, ZZR) in Germany

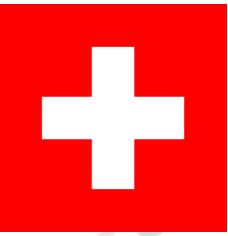
- Key aspect: **prescribed reference rate** to be used as discount rate
 - Reference rate is derived from 10-year EUR swap rates
 - Initially a simple average over 10 years
 - This was refined, in particular to address situations with increasing rates (so-called corridor method).



→ **The ZZR discount rate does not depend on the actual assets held, i.e., it does not reflect the insurer’s approach to ALM and the company specific SAA; no incentive to align assets and liabilities.**

Approaches for prudent reserving

Different answers to similar challenges – Switzerland



Strengthening reserves in Switzerland

- Key difference: **company specific discount rates** based on a yield vector
 - Yield vector represents future (book value based) investment yields (best estimate with safety margins).
 - Selected details:
 - Reflect current asset allocation as well as expected reinvestments in line with the SAA
 - Projected volumes are based on projected liability cash flows – the **materiality of reinvestments** clearly depends on the degree of cash flow matching (ALM).
 - Starting point: **best estimate investment return** by asset class
 - For bonds: book yield, but allowing for expected defaults and cost of fx hedging
 - Reinvestment yield based on **six months average risk-free rates**, with upper bounds and other restrictions
 - Deduction of **safety margins**
 - For equities and alternative investments: depending on the volatility of the asset class
 - For bonds: depending on the type of bond and the rating class
 - In addition: perform **liability adequacy test** (“Minimalanforderungstest”), based on combinations of technical assumptions
- **The discount rate for the strengthening reserve reflects the actual assets held as well as the insurer’s approach to SAA and ALM, including reinvestments.**

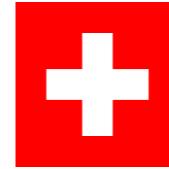
Approaches for prudent reserving

Different answers to similar challenges



Cash flows underlying the ZZR

- based on pricing assumptions but may be adjusted to account for expected margins and policyholder behavior
- Initially, other technical assumptions (e.g., mortality, charges) were taken from the premium calculation (i.e., were on prudent pricing basis).
- Deviations from pricing assumptions are now possible (but still need to be prudent).
 - Allowance for surrenders or exercise of lump sum option
 - Allowance for margins on biometric and cost assumptions (if available)
- The imparity principle needs to be observed.

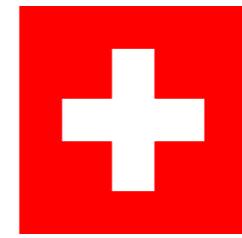


Cash flows underlying the strengthening reserve

- clearly linked to solvency regulation (SST), using best estimate assumptions as starting point and allowing for safety margins
- Starting point: best estimate assumptions (in line with solvency regulation under the Swiss Solvency Test (SST))
- As for the yield vector: allowance of safety margins
 - Parameters are derived based on volatilities (variation coefficients) underlying the calculation of the SST capital requirements.
 - The direction of safety margins may not be trivial, e.g., for the surrender option.

Approaches for prudent reserving

Summary



Switzerland vs. Germany:

- Different starting points for cashflows:
pricing assumptions vs. best estimate assumptions
 - But arrive at similar cashflows for reserving purposes (?)
- Different starting points for discount rates: (averaged)
capital market rates vs. company specific investment yields
 - Very unlikely to arrive a similar results
 - Different incentives for SAA and ALM and different
fluctuations over time
- Different degrees of alignment with reserving for solvency
purposes
- Different degrees of freedom and responsibility for the
Appointed Actuary

Common challenges:

- Need to strike a balance between reflection of current
capital market situation and fluctuations of reserves over
time
 - Adequate safety margins
 - Assumptions on reinvestment yields
 - Reflection of specific investment strategies
- Complexity of calculations
- Suitable methodologies for modern life insurance products
and their guarantees

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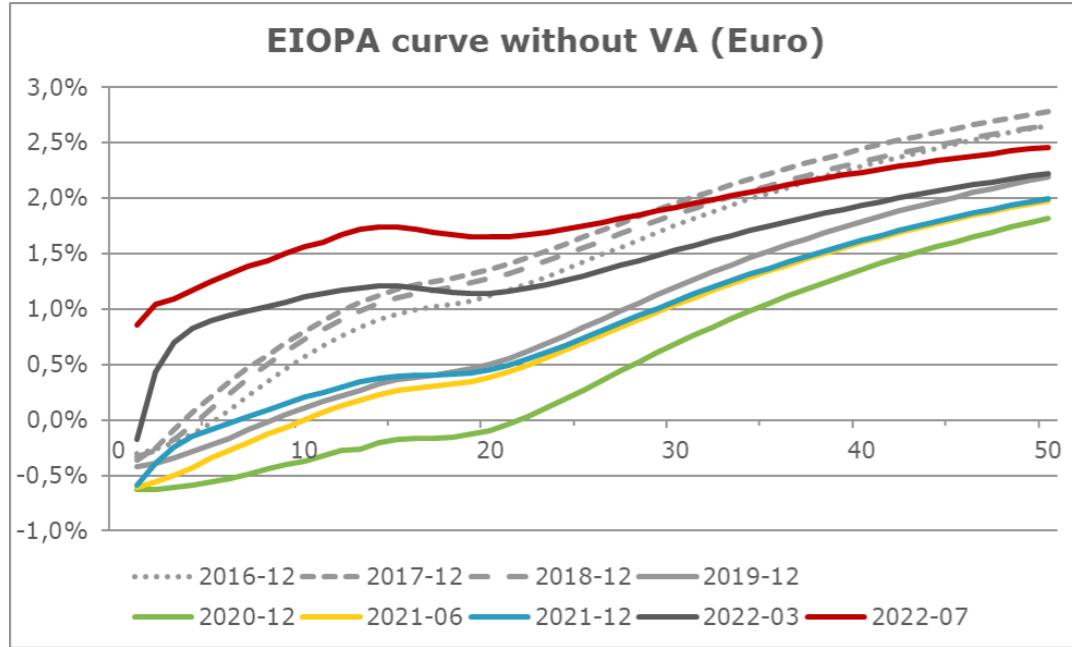
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Aspects of reserving for solvency purposes

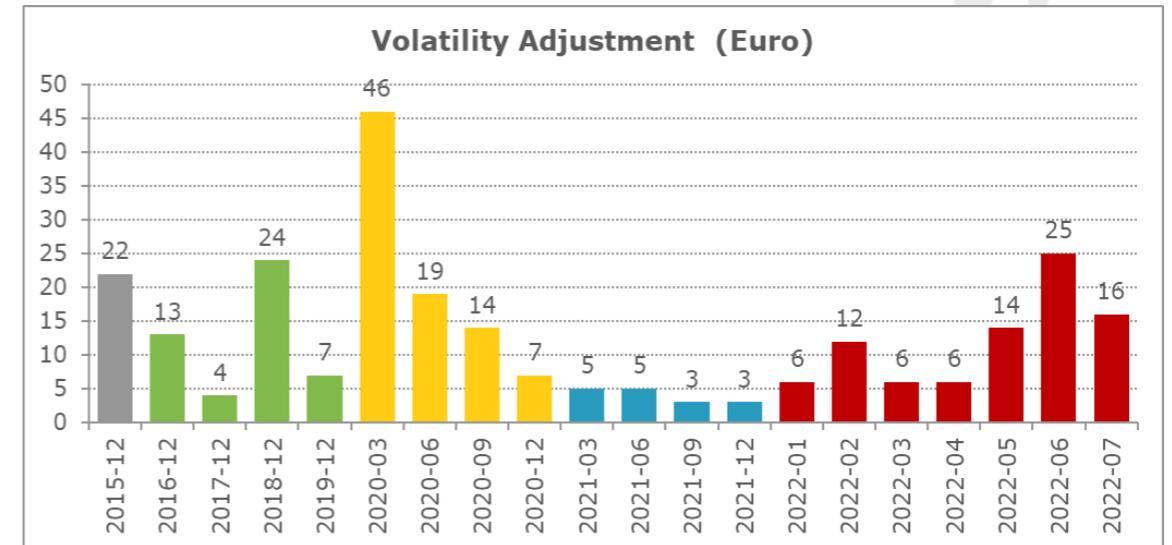
Europe



Solvency II in Europe



- Spreads expected to be earned may be reflected via the so-called **Volatility Adjustment (VA)**.



- Stochastic valuation implies that cash flow mismatches are reflected in the reserve (via the **time value of options and guarantees**).

- Note that the **VA** is based on a market average **SAA**.

Aspects of reserving for solvency purposes

Solvency regulation in Bermuda (Scenario-Based Approach) – “equivalent” to Solvency II



- Economic Balance Sheet (EBS) framework with similar setup as under Solvency II
 - BEL discount rate needs to reflect the time value of money and an **appropriate illiquidity adjustment**
 - Standard Approach: prescribed discount rates

- For long term business: **Scenario-Based Approach (SBA)** for deriving discount factors
 - Consider actual portfolio of assets assigned to a block of business
 - Including any projected reinvestments – based on the SAA
 - Determine future investment yields net of expected defaults
 - Amount of assets required to cover liability cash flows in the base scenario (best estimate)
 - Run a prescribed set of interest rate scenarios (stresses):
 - Calibrated to approximately one sigma stresses – intended to reflect interest rate risk and to adjust for any mismatch between asset and liability cash flows
 - Determine the amount of assets needed to cover the liability cash flows in each scenario
 - BEL is set to the maximum amount (corresponding to a shift of best estimate yields)

Aspects of reserving for solvency purposes

Solvency regulation in Bermuda (Scenario-Based Approach) – “equivalent” to Solvency II



■ Implications:

- The SBA approach rewards insurers that have well-matched asset and liability cash flows (lower BEL than under the Standard Approach).
 - It can be applied even if strict matching requirements are not satisfied.
 - Fluctuations of the BEL due to interest rate movements are largely offset by corresponding movements in the asset portfolio.
- The results clearly depend on the best estimate yields.
 - In particular: allowance for expected defaults, treatment of other asset classes such as real estate
- Proper interaction with capital requirements for interest rate risk needs to be ensured.

➔ **The discount rate under the SBA approach reflects the actual assets held and the spreads expected to be earned as well as the insurer’s approach to SAA and ALM, including reinvestments.**

■ Further aspects:

- Allowance for investment expenses
- Certain minimum level of matching required for SBA

Aspects of reserving for solvency purposes

Bermuda vs. Europe



- Liability cash flows are largely consistent.
 - Different allowance for investment expenses
 - The VA under Solvency II only partially reflects the insurer's approach to ALM and the company specific SAA, and thus the Solvency II discount rate is largely independent from the actual assets held.
 - The SBA approach under Bermuda EBS is fundamentally different from the approaches under Solvency II.
 - Clearly rewards close but imperfect matching of asset and liability cash flows
 - Acknowledges limited exposure to fluctuations of spreads in such portfolios
 - May lead to lower reserves (higher Own Funds) and less fluctuations of Own Funds over time
- **The resulting BEL may be significantly lower than the corresponding Solvency II BEL, although the Bermuda solvency regime is classified as equivalent to Solvency II.**

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Reserving for long term liabilities

- Even if the reserving purpose is almost the same, actuaries come across very **different reserving methodologies for long term liabilities** in different jurisdictions.
 - Surprisingly, “equivalent” solvency regimes seem to require materially differing levels of Technical Provisions in the Economic Balance Sheet for the same type of business.
- Since long term liabilities are typically closely linked to the assets backing the liabilities, it seems preferable to reflect the **company specific approach to ALM and SAA** in the methodology for the calculation of technical reserves.
 - However, current reserving approaches differ widely in this respect.
 - Different approaches are needed depending on the purpose (prudent reserving vs. reserving for solvency purposes), in particular regarding **safety margins**.
- Since reserving requirements are an important restriction for the management of long-term liabilities, particular attention should be attributed to the **implications of reserving requirements on the management of existing business and the attractiveness of new business**.



Actuaries should contribute to further refinements and alignments of reserving methods – this appears to be a **global actuarial task**.

Conclusions

References

■ Germany

- Dealing with Low Interest Rates in Life Insurance: An Analysis of Additional Reserves in the German Life Insurance Industry: <https://www.mdpi.com/1911-8074/12/3/119/htm>

■ Switzerland

- Guidelines on the assignment of adequate technical life reserves: <https://www.actuaries.ch/de/mitgliedschaft/richtlinien/richtlinien-schweiz>

■ EU

- Technical documentation: https://www.eiopa.europa.eu/sites/default/files/risk_free_interest_rate/eiopa-bos-21-384-technical-documentation.pdf
- Proposal Solvency II review: https://eur-lex.europa.eu/resource.html?uri=cellar:da66a00c-1c51-11ec-b4fe-01aa75ed71a1.0001.02/DOC_1&format=PDF

■ Bermuda

- Discount rates: <https://www.bma.bm/viewPDF/documents/2018-12-31-07-01-46-Determination-of-Discount-Rates-for-Economic-Balance-Sheet.pdf>
- Bermuda reporting requirements: https://www2.deloitte.com/content/dam/Deloitte/bm/Documents/about-deloitte/bm-AIS-library/Deloitte-BermudaReportingRequirements-LongTerm_May2021.pdf

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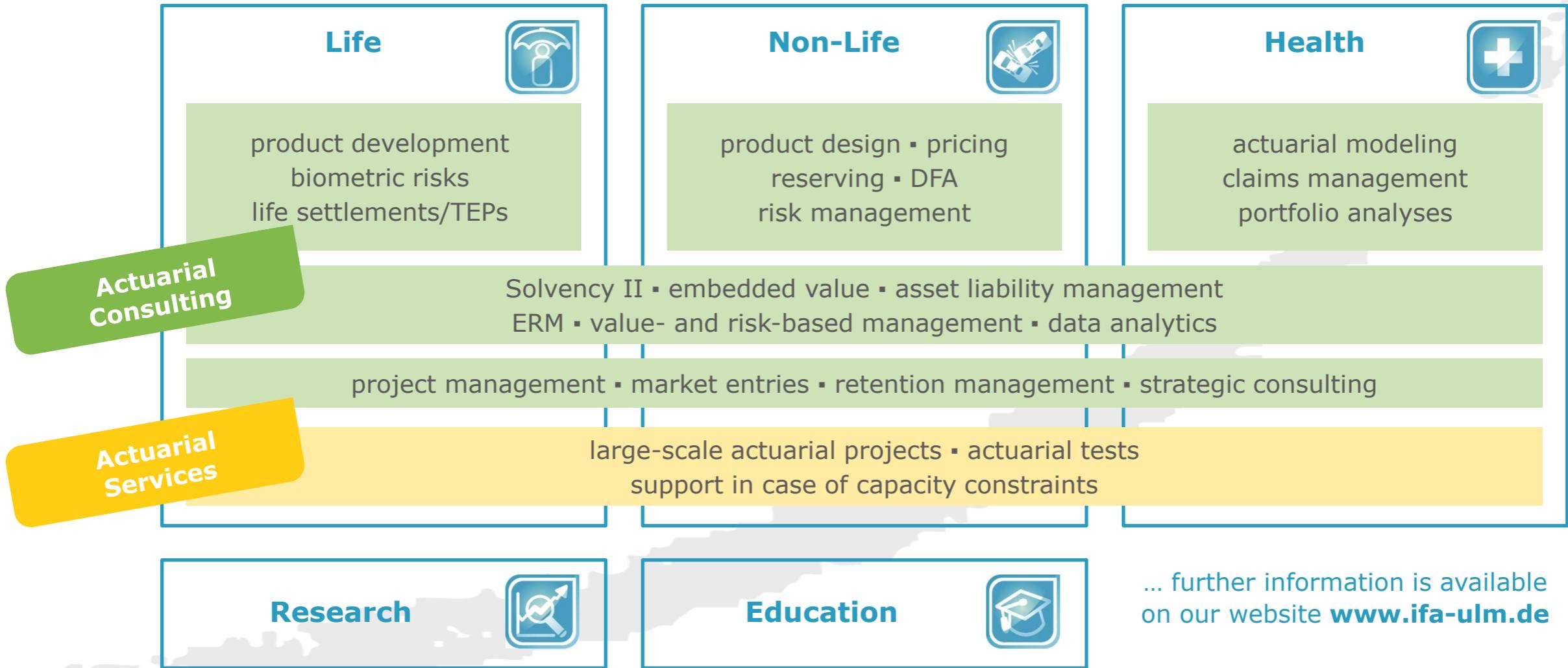
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