Insurance Business Optimization

Full Stochastic Approach

Spring Actuarial Get-together

28–29 May, 2015. Oáza hotel, Říčany u Prahy

Tomáš Kovář, Risk Management Department
Typical management’s objectives

- **P&L (Return, ROE, ROAC, …)** – both level and volatility
  - e.g. to attain P&L at the level of 2,000 mio CZK, with tolerance of 5% down and 10% up, respectively, and with the probability of 80% (4 in 5 years)

- **Capital adequacy**
  - e.g. to have the Solvency 1(2) ratio in the range of 150% to 180% with the probability of 90% (i.e. possible breach once in 10 years)

- **Value creation, economic profit**
These 3 objectives are usually expressed in the Risk Appetite Statement (RAS) of a company (along with other statements).

Other statements may be e.g. „Rating Statement“, „Operational Excellency Statement“, „Market Share Statement“, profiling (investment vs. technical part, innovators vs. clever followers, trend-setters…)
These 3 objectives (P&L, Capital, Value) are usually addressed in the Financial Plan of a company.

However, there are some drawbacks:
- Financial Plan is usually based on a (couple of) deterministic scenario(s)
- It does not capture the full volatility of the result caused by the uncertainty of economic scenarios (swap rates, spreads, FX rates, equity index, property index, inflation, …)
- It also does not capture volatility stemming from non-economic factors (CAT losses, big claims, operational losses, …)

Hence the Financial Plan cannot give a definite answer to:
- Uncertainty of the result and capital position
- What is the best business structure corresponding to the best assumptions about the future at disposal
**Concept of IBSOT**

- IBSOT = Insurance Business Structure Optimization Tool

- It projects a full histogram of P&L, Solvency 1 (ratio, capital), Solvency 2 (ratio, OF, SCR), technical P&L, investment P&L etc., etc. over a period of 1 calendar year.

- It originally started (in 2011) as a concept/tool addressing the before mentioned main RAS (P&L, Capital, Value).

- It is not a planning tool !!!
  - but it can be used for checking the appropriateness of the plan from the risk perspective (whether it is compliant with a given RA i.e. ORSA in planning process).
IBSOT – Core principles

- It works with the outer scenarios and business strategies

- It deploys a full stochastic (histograms are build using a real underlying stochastic, there are no simplifying assumptions on the type of distribution nor other simplifications – e.g. least square Monte Carlo)

- Works in real-time (in seconds, up to 1 minute)

- Under given set of stochastic scenarios (i.e. outer scenarios)
  - economic, CATs, big losses, operational losses, impairments, …

  - we propose the optimal business structure (i.e. business strategy)
    - products/LoBs composition, reinsurance policy, strategic asset allocation

  - to optimize the objective function
    - P&L or a mix of P&L and Value

  - while ensuring that the capital adequacy
    - S1, S2, S&P ICAM, internal CAM…

  - is met (according to a given RAS)
IBSOT – Core principles - cont.

- The underlying magic is a clever architecture and massive off-line processing.

- It uses an existing actuarial infrastructure (Life, Non-Life and Assets modules) - these external modules are not part of IBSOT and can be easily replaced by different modules (interface between IBSOT and these modules is predefined).

- Stochastic is taking place in external modules and is run off-line (heavy processing, in weeks of runtime, no simplifications used).

- Adding other stochastic factors (e.g. inflations) or implementing a dynamic ALM takes place in a particular off-line (external) module and has no impact on IBSOT runtime (but it obviously can have an impact on the off-line processing runtime).
IBSOT – Core principles - cont. 2

- IBSOT projections are as precise as precise is the underlying actuarial infrastructure

- The know-how is
  - the way the off-line and on-line parts are split to provide an instant on-line response times avoiding simplifications (e.g. linearity tradeoff) - for instance, Solvency 2 correlation structures are calculated on-line; the same goes for investment/reinvestments
  
- The mathematical and SW algorithms (developed, used, enhanced) – for instance, the efficient portfolio of liabilities
IBSOT – what it can be used for

- **Business steering**
  - Finding the optimal strategy under given constraints
  - Testing of various business strategies (e.g. MTPL growth, Corpo decline)
  - Portfolio optimization

- **Risk Appetite**
  - Checking whether the overall Risk Appetite (P&L and Capital statements) has been set adequately
  - Cascading the overall Risk Appetite (P&L and Capital statements) across the company

- **Financial plan**
  - Checking the attainability of the P/L and capital targets

- **Risk analytics**
  - If-then analysis
  - Testing of various outer scenarios (economic environment, CAT frequency)
  - Reinsurance program (efficiency) testing
  - Investment strategy testing
Thank you!