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Market Consistent Embedded Value

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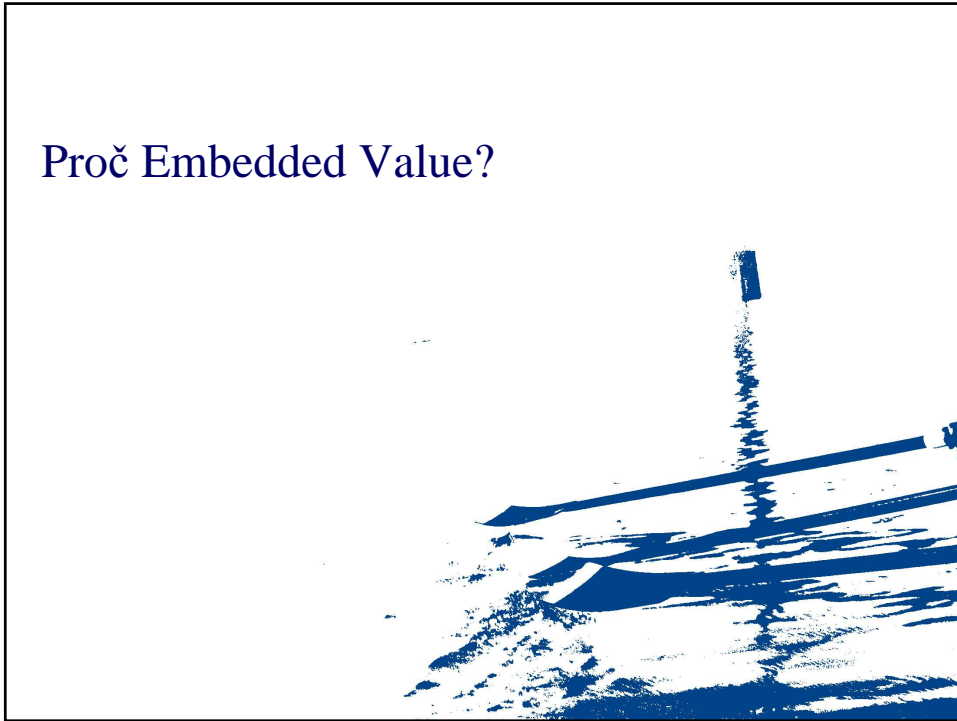
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Audit . Tax . Consulting . Financial Advisory .

Obsah

- Proč Embedded Value?
- Co je Embedded Value?
- Market Consistent Embedded Value
- Vývoj EV
- Příklady

Proč Embedded Value?

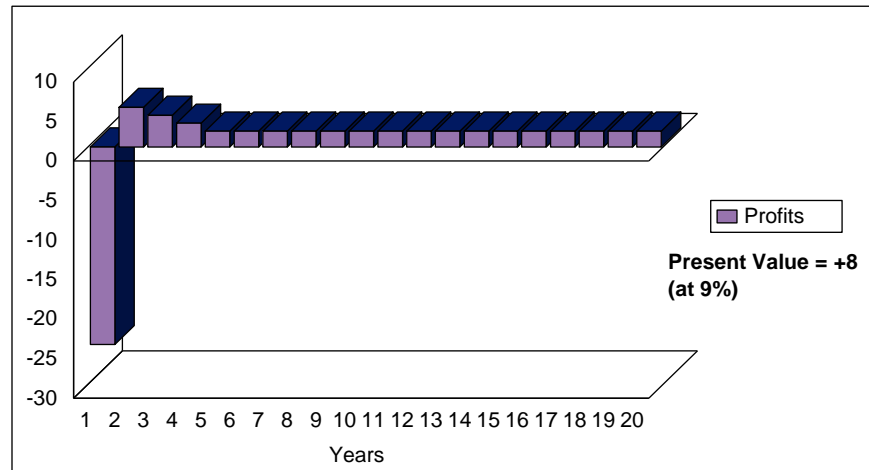


Proč Embedded Values?

- Method based on “realistic” assumptions
- Focus on distributable cash flows
- Consistent treatment of all types of business
- No artificial amortisation patterns
- Use of risk discount rates

Statutory profits

20-year life insurance policy



Statutory accounting

Statutory profit = Premiums + Investment income/gains – Claims – Expenses – Tax – Increase in statutory reserves

A typical pattern is an initial loss ...

- caused by sales costs,
- ... initial administration expenses,
- ... and possibly the need to set up valuation reserves

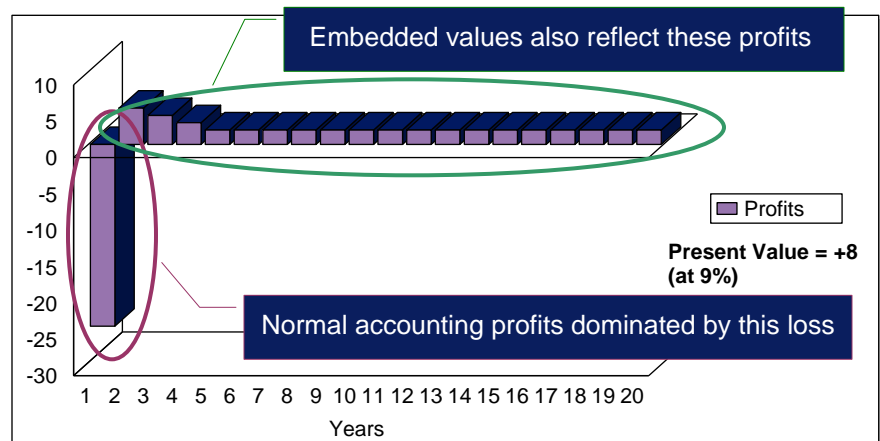
... followed by a stream of profits

- as company recovers its initial losses,
- ... margins emerge from prudent reserves,
- ... and (hopefully) experience is more favourable than the pricing basis

Overall the company expects to make a profit on the business

Statutory accounting vs Embedded Values

Statutory profits for a typical 20-year life insurance policy



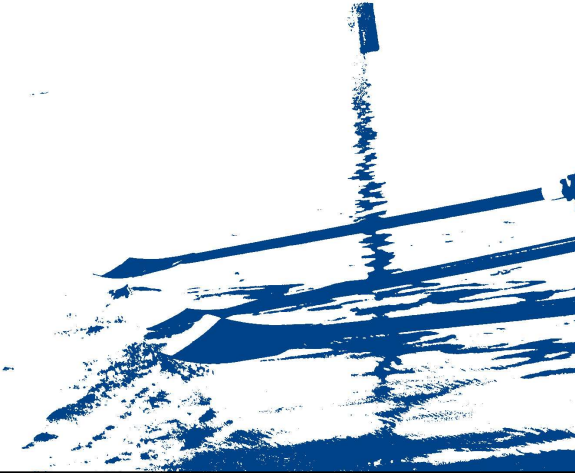
Principles

Embedded Values aim to reflect the true value to the company of all the business in-force:

- Initial losses from this year's sales
plus ...
- Subsequent profits from this year's sales and previous years' business reflecting ...
- Best estimates of experience, without margins for prudence but including ...
- Allowance for risks

Embedded values recognise future statutory profits – they do not change the amount of profits which can be distributed

Co je Embedded Value?



Structure

Embedded Value =

- Net Asset Value (NAV)
(excess of assets over liabilities)

PLUS

- Value of in-force business (VIF)
(discounted value of future statutory profits)

It is also usual to allow for:

- The cost of locking-in regulatory capital (solvency margin)

An Embedded Value does not include any value for future sales

Assumptions

- Economic
 - Investment returns
 - Inflation
 - Demographic
 - Mortality
 - Morbidity (sickness)
 - Lapses
 - Business
 - Expenses
 - Profit-sharing
 - Risk Discount Rate (RDR)
 - This is the rate used to discount future cashflows and profits
 - **The RDR includes an allowance for risks**
- Best estimate assumptions, based on appropriate investigations of the company's own experience, market data, expectations of the future, ...

Risk Discount Rate

- Allows for the economic value of future cashflows ...
 - Often yield on risk-free government bonds, net of tax
 - Plus additional yield expected on equities
- ... and includes allowance for **risks** of investing in this business:
 - Best-estimate assumptions of future experience will not be achieved
 - Impact of guarantees
 - Unforeseen developments (eg AIDS, increasing longevity)
- The choice = subjective
 - A lower RDR -> higher EV x slower increase
 - A higher RDR -> lower EV x faster increase (discounting of future profits "unwinds")
- Influences on the choice of RDR include:
 - The use that will be made of the EV (eg publication)
 - External users of EV information (eg analysts)

The RDR is the overall rate of return the shareholder will be seeking to provide a return on his/her investment and compensate for the risks incurred

Calculation

Net Asset Value

- derived from accounts

Value of In-force Business

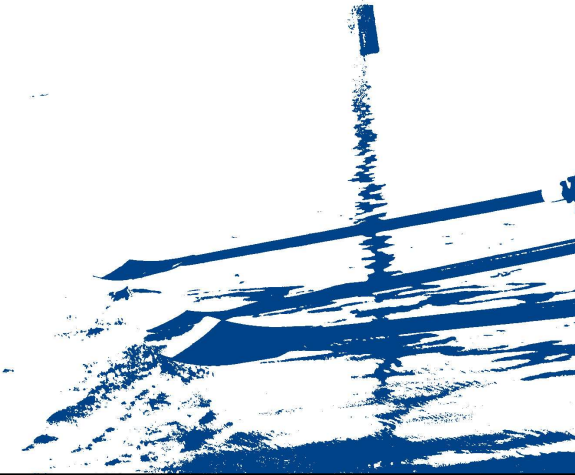
- calculated by projecting a detailed model of the business
- Model allows for features of all significant products ...
- ... and the characteristics of the portfolio of policies inforce

Calculation (2)

Locking in Cost

- the “opportunity cost” of the capital locked in
- Amount of regulatory capital (EU solvency margin requirement, local capital adequacy requirements, internal requirements)
- Difference between investment return net of tax on capital while locked in, and the RDR which it could have earned elsewhere

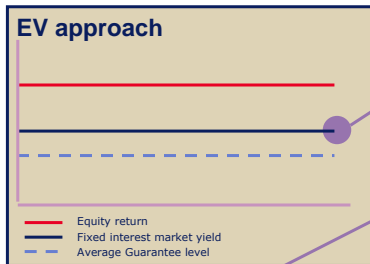
MCEV a EEV



Why is EEV being introduced?

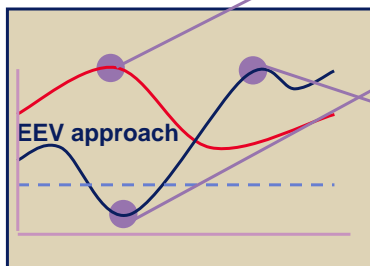
- Cost of options and guarantees not fully recognised in TEV
- Determination of the Risk Discount Rate is subjective
- Lack of consistency across companies – comparability difficult
 - Level of locked-in capital varies between companies
 - Varying levels of disclosure, no minimum standard
 - Assumptions used
 - Allowance for risk
- Analysts make their own adjustments to TEV to allow for some of the differences identified above

The world is dynamic ... and EV should be too



- **Deterministic:**
Guarantee never bites

- **High UCG:**
Dynamic management decisions on realisations and bonuses



- **Low interest rates:**
Guarantees increase in value

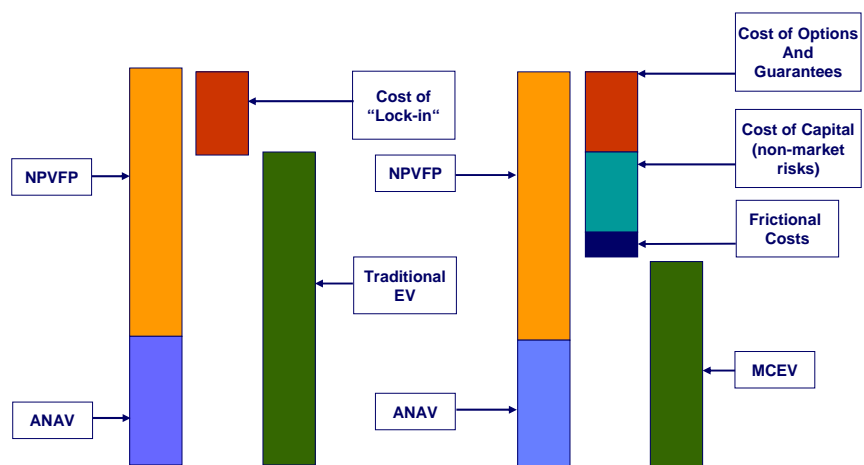
What is EEV?

- Launch of EEV principles on 5 May 2004 in attempt to improve
 - allowance for the time value of options and guarantees (“TVOG”)
 - and consistency and transparency of life insurance reporting
- EEV principles developed by CFO Forum
- CFO Forum has agreed to adopt the Principles from end of 2005
- 12 Principles and 65 related areas of Guidance
- CFO Forum’s goals in producing EEV principles were:
 - Guidance on preparation of supplementary financial information on an EV basis for European insurance groups
 - Address criticisms of TEV reporting, by providing guidance:
 - credible, robust and can be applied consistently
 - inclusion of cost of guarantees and options
 - minimum level of disclosure, including sensitivity analysis

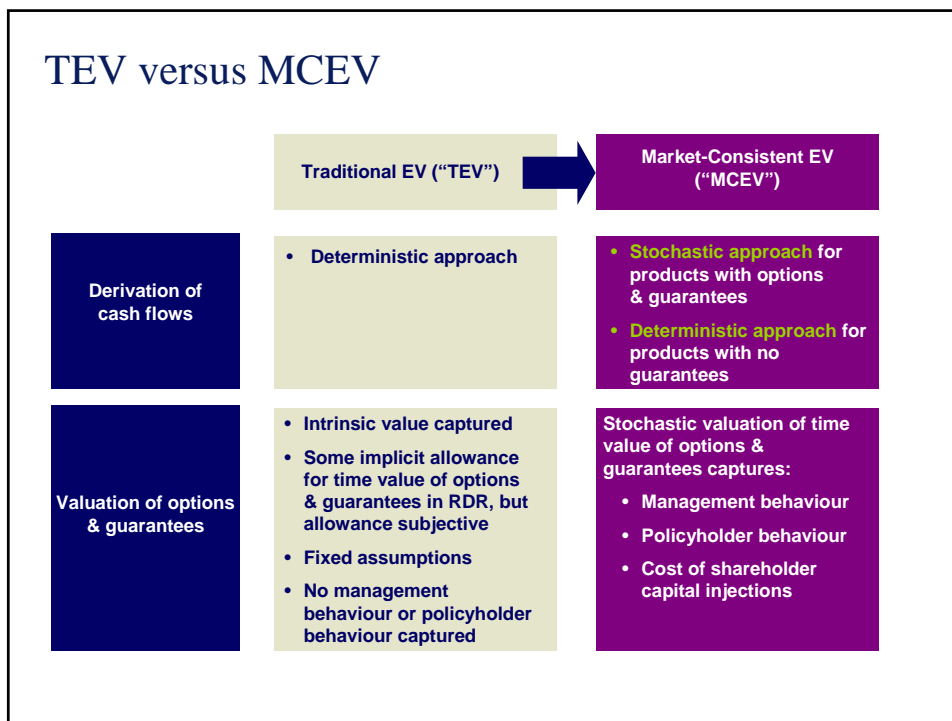
What is EEV?

- Principles are compulsory
- Guidance is optional, but companies have to explain why they have not complied with guidance
- Still room for plenty of flexibility, therefore, analysts may still want to make their own adjustments

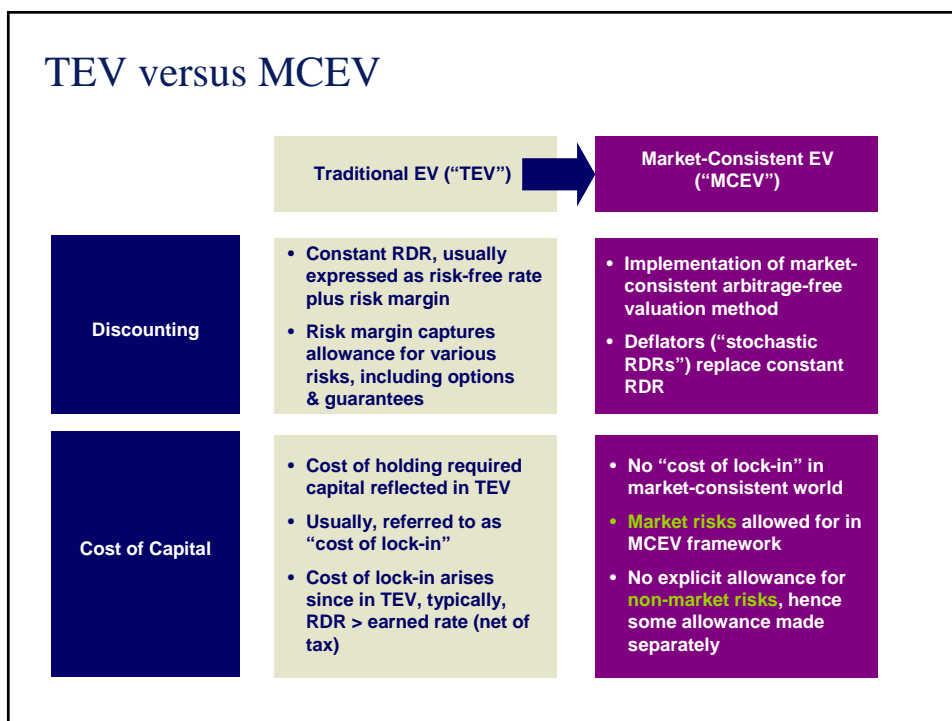
Comparison of TEV with EEV/MCEV



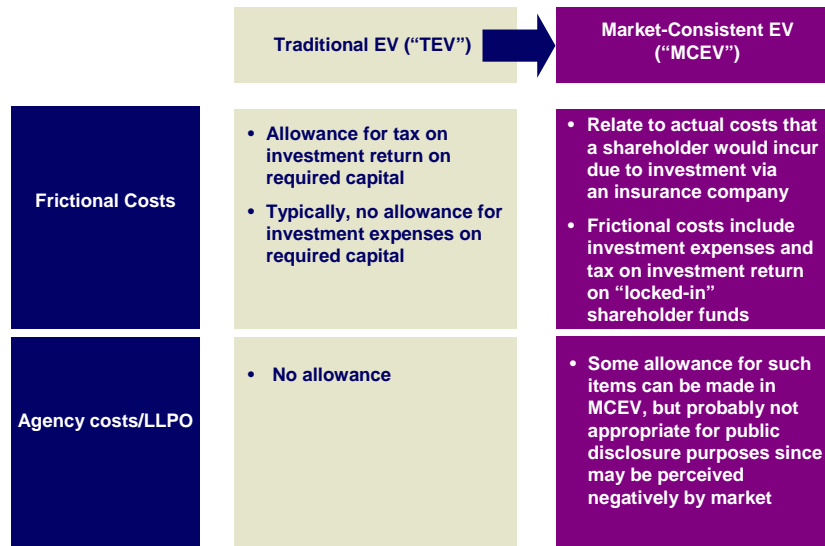
TEV versus MCEV



TEV versus MCEV



TEV versus MCEV



Features of Monte Carlo simulation

- Works for all options and guarantees.
- Need a large number of simulations to reduce sampling error.
- Can make explicit allowance for dynamic management/policyholder actions - can have a significant impact on cost:
- Management rules
 - Strategic asset allocation
 - Target return
 - Bonus rate declaration
 - Surplus splitting
- Policyholder behaviour
 - Dynamic lapse rates
 - Annuity option take-up rates

Two distinct approaches to EEV

Single RDR

- **WACC EEV = EV – TVGO**
- “Top-down” approach
- Starts with traditional EV
- Sticks with one deterministic RDR
- Applies stochastic modelling to calculations of TVGO.
- Choice of assumptions subjective (e.g. Beta)
- Not consistent with finance theory and market prices

MCEV

MC EEV = Stochastic EV – Non market risk

- “Bottom-up” approach
- Dispenses with traditional EV
- Holistic approach to profits and TVGO
- Benefit: RDR is consistent with finance theory and pricing in the market.
- Each scenario discounted at an appropriate (different) RDR.

MC EEV

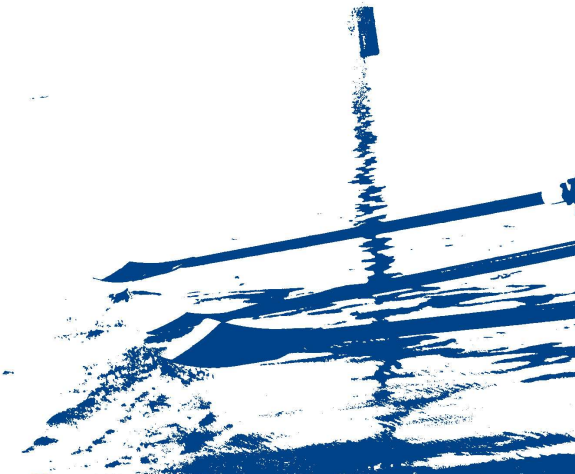
Adopting market consistent approach eliminates:

- The subjectivity surrounding a “top-down” approach
- The need to determine an appropriate Beta
 - since looks to the market to provide an appropriate RDR for each individual cash flow
- Reduces the subjectivity in relation to adjustments to the WACC determined RDR to reflect other aggregate risks captured elsewhere

Two distinct approaches MC EEV

- MCEV includes riskiness directly in the model
- Two approaches
 - Risk neutral world
 - Cash flows are projected and discounted at the risk-free rate
 - All asset classes have expected risk-free rate return
 - Real world
 - Discounting individual cash flows at different risk discount rates.
 - The discount rates allow for risk premia in the economic assumptions - i.e. Equities expected to return > risk-free rates
- Use of real world (not risk neutral) scenarios
 - Risk premiums on risky assets
 - Simulations dependent risk discount rates (i.e. deflators)
 - Market risks (interest, equity, credit ...) modelled directly
....on average discounted at the risk free rates

Embedded Value - vývoj



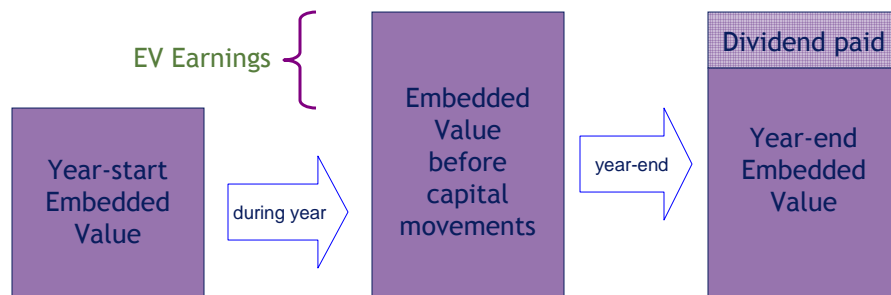
EEV in 2006

- EEV reporting
 - A step forward for the life insurance industry
 - Proper allowance for TVGO through MC principles = one of the success stories
 - Even though the definition of market consistency remains heavily dependent on calibration issues and the choice of volatility assumptions.
- Allowance for non-market risk - the problem remains
- EEV disclosures
 - The level of detail - still vary greatly from company to company
 - Analysts remain unhappy at the level of granularity, particularly with respect to persistency.
- Credibility of new business - a theme running through many 2006 results presentations
 - Negative operating variances and assumption changes are driving down value.
- More attention needs to be given to managing the back book.
- 2006 - a good year for economic variances, particularly in continental Europe.

Embedded Value Earnings (EVE)

EVE =

- Change in Embedded Value
- Before any capital movements (capital injections, dividend payments)



2006 EEV results

- Distorting Factors in the Change in EEV
 - acquisitions and disposals
 - net capital outflow – dividends less capital injections
 - currency movements
- >can distort the picture and hide genuine value adding operational activity

Embedded Value Earnings - Analysis

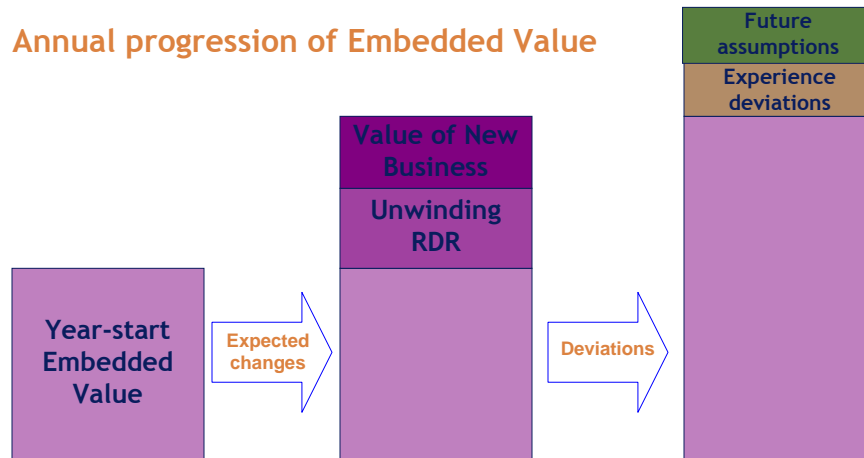
**This is the most valuable aspect of the whole exercise
-> an invaluable insight into the progression of the company**

Analysis of the change in Embedded Value into components:

- Expected movement in Embedded Value of the inforce business if experience had exactly followed all the assumptions = unwinding of RDR
- Value of New Business written during the year
- EV differences arising from experience during the year which was different to expectations (assumptions)
 - eg investment returns, expenses
- EV differences because it has become necessary to change the assumptions used for the future
 - eg tax, persistency

Embedded Value Earnings - Analysis (continued)

Annual progression of Embedded Value



Embedded Value Earnings - Analysis (continued)

It is useful to divide the components of EV earnings into two categories:

- Factors which are under the control of management
 - eg new business sales,
 - ... expenses,
 - ... persistency,
 - ... investment allocation between classes (eg bonds, equities),

The change in EV arising from these factors sometimes called EV Operating Profit.
- Factors which are not under the control of management
 - eg investment returns on asset classes,
 - ... legislation

Přestávka



Market consistency check

- Model pro tržní aktiva reprodukuje tržní ceny
- V modelu není arbitráž (model je “arbitrage free”)
 - Tzv. test $1 = 1$
- Scénáře
 - Průměr diskontovaných hodnot přes všechny scénáře je roven počáteční hodnotě
 - Musí platit pro všechny toky v modelu

Generátor scénářů Timbuk1

- http://www.deloitte.com/dtt/section_node/0,1042,sid%253D90733,00.html
- Autoři
 - Andrew D Smith
 - Frances E Southell
- Model předpokládá logaritmicko-normální rozdělení
- Model kalibrován na UK, červen 2001

Generátor scénářů

- Vlastnosti modelu
 - Arbitrage free
 - Úroky jsou vždy kladné
 - Umožňuje kalibraci na mnoho stavů ekonomiky
 - Tvar výnosové křivky
 - Rizikovost aktiv
 - Tzv. realword přístup
 - Pro určité výnosové křivky nejednoznačná kalibrace
- Excel používá lineární interpolaci => zjednodušení

Příklad – pojištění pro případ smrti nebo dožití

- Roční model
- Modelujeme 1 modelpoint
- Uvažujeme 1 000 scénářů výnosů / deflátorů

Příklad – pojištění pro případ smrti nebo dožití

- Muž
- 35 let
- Zbývající doba trvání smlouvy 20 let
- Smlouva již trvá 10 let
 - Ve 25 letech smlouva na 30 let
- Pojistná částka 1 mil. Kč
- Pojistné placeno po celou dobu trvání smlouvy
- 100 smluv

Příklad – pojištění pro případ smrti nebo dožití

- Pojistné spočteno pomocí komutačních čísel
- Technická úroková míra 4%
- Nákladové parametry
 - Alfa = 3,5% pojistné částky
 - Beta = 1% pojistné částky
 - Gama = 2% hrubého pojistného
- Rezervování: zillmerované rezervy

Příklad – pojištění pro případ smrti nebo dožití

- Náklady
 - Příklad 1: kalkulované (cca 10 600 Kč / rok)
 - Příklad 2: 800 Kč na smlouvu ročně
- Úmrtnost
 - Příklad 1: kalkulovaná
 - Příklad 2: 75% kalkulované

Příklad – pojištění pro případ smrti nebo dožití

- Podíly na zisku
 - Žádný
 - 90:10
 - 90:10 a marže 100 bp pro pojišťovnu

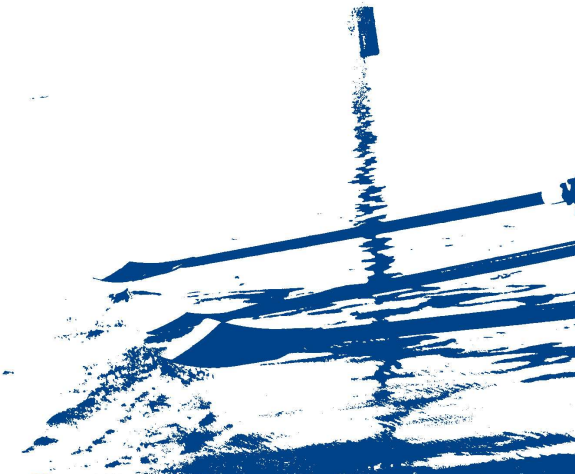
Příklad – pojištění pro případ smrti nebo dožití

- Odbytné = zillmerovaná rezerva
- Základní storna
 - Příklad 1: žádná
 - Příklad 2: 5% ročně
- Dynamická storna
 - Pokud výnos menší než RFR pak 100%
 - Jinak základní

Příklady dynamického chování

- Podíly na výnosech
 - Výše
 - Způsob výpočtu
- Investiční strategie
 - “Assetmix“ – struktura aktiv
 - Nerealizované zisky/ztráty
 - “Cross subsidy”
- Reakce na aktuální tržní situaci

Děkujeme za pozornost



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