Obsah

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

- 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

![Graph showing profits over 20 years with present value at 9%](chart)

Present Value = +8
(at 9%)

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

![Graph showing profits and present value over years with annotations](image)

**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
- 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

**EV approach**

- Deterministic: Guarantee never bites

**EEV approach**

- High UCG: Dynamic management decisions on realisations and bonuses
- Low interest rates: Guarantees increase in value

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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

Frictional Costs
- Allowance for tax on investment return on required capital
- Typically, no allowance for investment expenses on required capital
- Relate to actual costs that a shareholder would incur due to investment via an insurance company
- Frictional costs include investment expenses and tax on investment return on “locked-in” shareholder funds

Agency costs/LLPO
- No allowance
- Some allowance for such items can be made in MCEV, but probably not appropriate for public disclosure purposes since may be perceived negatively by market

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
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
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](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 spočtěno pomocí komutačních čísel
- Technická úroková míra 4%
- Nákladové parametry
  - Alpha = 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 = zilmerovaná 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