IAA AFIR Colloquium 2009

September 10th–11th, 2009
Breakout Session Topic 9: Asset / liability management
Market Consistent Embedded Value in Non-Life Insurance: How to measure it and why

AFIR Colloquium 2009
September 11th 2009
Topic 9

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1. What is a Market Consistent Embedded Value (MCEV)?

2. Why should we measure a MCEV in Non-Life Insurance?

3. How can we measure a MCEV in Non-Life Insurance?

Outline

(1) Introduction
(2) Life Versus Non-Life
(3) Modeling MCEV in Non-life
(4) Application
(5) Conclusion
(1) Introduction

Embedded Value Methodologies

Valuation technique for Life Insurance business

- Net Asset Value
- PV of In-Force Business
+ PV of Profits from Future Sales

= Appraisal Value

Chief Financial Officers (CFO) Forum
- EEV Principles (May 2004)
- MCEV Principles (June 2008)

- Trend to market consistent valuation
- Improve consistency
**Market Consistent Embedded Value**

Present value of shareholders’ interests in the **earnings distributable** from assets allocated to the **covered business** after sufficient allowance for the aggregate risk in the covered business.

\[
\text{Free Surplus} + \text{Required Capital} + \text{Value of In-Force Business} = \text{MCEV}
\]

- **Earnings Distributable**: Profit arising under the local statutory basis
- **Covered Business**: Short and long-term life-insurance business

<table>
<thead>
<tr>
<th>Insurance Group</th>
<th>Life Insurance</th>
<th>Non-Life Insurance</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Group MCEV</th>
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<tbody>
<tr>
<td>Covered Business</td>
</tr>
<tr>
<td>MCEV methodology</td>
</tr>
<tr>
<td>Non-Covered Business</td>
</tr>
<tr>
<td>IFRS net asset value-</td>
</tr>
</tbody>
</table>
(2) Life Versus Non-Life

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Life Insurance</th>
<th>Non-Life Insurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract Duration</td>
<td>many years</td>
<td>usually one year, but renewals</td>
</tr>
<tr>
<td>Main Type of Services</td>
<td>intermediation</td>
<td>risk pooling</td>
</tr>
<tr>
<td>Structure of Assets</td>
<td>long-term oriented portfolio</td>
<td>short-term oriented portfolio</td>
</tr>
<tr>
<td>Structure of Liabilities</td>
<td>limited degree of uncertainty</td>
<td>high degree of uncertainty</td>
</tr>
<tr>
<td>Options&amp;Guarantees</td>
<td>essential part</td>
<td>no essential part</td>
</tr>
</tbody>
</table>

Main Drivers for Modeling MCEV

**Life Insurance**
- Capital Market Conditions
- Options&Guarantees
- Biometric Risks

**Non-Life Insurance**
- Claim Number and Severity
- Modeling of Catastrophes
- Renewal Process
(3) Modeling MCEV in Non-Life

Starting Point:

- Statutory balance sheet (German local GAAP)
- Projection horizon of T years
- Payment patterns
- Certainty Equivalent Approach

- Cash flows vary linearly with market movement
- Deterministic framework
- Use risk free yield curve (spot rates)
Modeling Steps:
(1) Present Value of Future Profits
(2) Required Capital
(3) Frictional Costs of Required Capital
(4) Cost of Residual Non-Hedgeable Risks
(5) Free Surplus

(1) Present Value of Future Profits

\[ PVFP = \sum_{t=1}^{T} NI_t \cdot dr_t \quad \Rightarrow \quad EBT_t = T_t + I_t \]

(a) Technical Result

\[ \text{Technical Result} = \text{Gross Premiums Earned} - \text{Claims Payments} - \text{Changes in Claims Reserves} - \text{Changes in Equalization Reserves} - \text{Costs} \]
Existing Business
- Unwinding of the existing business
- No future gross premiums earned
- Payment pattern for claims payments

Renewal Business
- Assumptions about development of the existing insurance portfolio
- Future gross premiums earned
- Payment pattern for claims payments

(b) Investment Result
- Investment return comes from forward rates
- Consider investment costs
- Unrealized gains and losses (UGL) remain constant
(2) Required Capital
   – Assets backing shareholders’ equity (distribution to shareholder is restricted)
   – European Union Regulatory Rules (Solvency Capital Requirements)

(3) Frictional Costs of Required Capital
   – Due to the fact that capital has to be held within the company (RC)
   – Investment Costs and Taxation
   – Released Capital over the projection horizon

(4) Cost of Residual Non-Hedgeable Risks
   – Allowance for non-hedgeable risks
   – Cost of Capital Approach
   – Similar to Risk Margin under Solvency II

(5) Free Surplus
   – Assets backing shareholders’ equity not restricted
(4) Application

(a) Determination of MCEV

Starting Point:

- Statutory balance sheet
- Payment patterns
- Risk free yield curve

<table>
<thead>
<tr>
<th>Assets backing Liabilities</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shareholders' Equity</td>
<td>€ 48'236</td>
</tr>
<tr>
<td>Equalization Reserves</td>
<td>€ 33'932</td>
</tr>
<tr>
<td>Claims Reserves</td>
<td>€ 153'951</td>
</tr>
<tr>
<td>Total</td>
<td>€ 236'119</td>
</tr>
</tbody>
</table>

Scenario:

- Unwinding of the existing business
- Additional allowance for renewal business
- Cancelation Rate of 13%
- Future gross premiums earned
### Economic Balance Sheet

#### Assets
- MV of Assets backing shareholders’ equity: €49'201
- MV of Assets backing liabilities: €191'641
- Present Value of Future Premium Income: €392'651

#### Liabilities
- Free Surplus: €18'913
- Required Capital: €30'288
- VIF: €88'001
- CRNHR: €7'489
- FCRC: €2'835
- Present Value of Taxes: €46'271
- Present Value of Costs: €79'988
- Present Value of Claims Payments: €359'708

### Renewals
- A
- Aspects
- VIF: €88'001
- CRNHR: €7'489
- FCRC: €2'835

### Scenario
- Free Surplus: €18'913
- Required Capital: €30'288
- VIF: €88'001
- Market Consistent Embedded Value: €137'202

### Shareholders
- MV of Assets backing shareholders’ equity: €49'201

### Staffs/Tax Office
- CRNHR: €7'489
- FCRC: €2'835

### Tax Office
- FCRC: €2'835

### Miscellaneous
- Present Value of Claims Payments: €359'708

### Policyholder
- Present Value of Taxes: €46'271
- Present Value of Costs: €79'988
(b) Sensitivity Analysis
(5) Conclusion

(1) Summary

- What is a Market Consistent Embedded Value? ✓
- Why should we measure a MCEV in Non-Life Insurance? ✓
- How can we measure a MCEV in Non-Life Insurance? ✓

(2) Contribution

- New and relevant information for stakeholders of Non-Life Insurance companies
- The model provides information comparable to MCEV in Life Insurance

(2) Future Research

- Extend the model in various directions
- Combine concepts of Life and Non-Life for a Group MCEV
- Use the Concept for **Value-Based Management** on a Group Level
Thank you very much for your attention!

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Coffee Break