

Session 3A: Value Creation Through ERM

Moderator:

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Enterprise
Risk Management
Symposium

Value Creation Through ERM

John DiMeo (Moderator)
Christopher (Kip) Bohn
Hui Shan





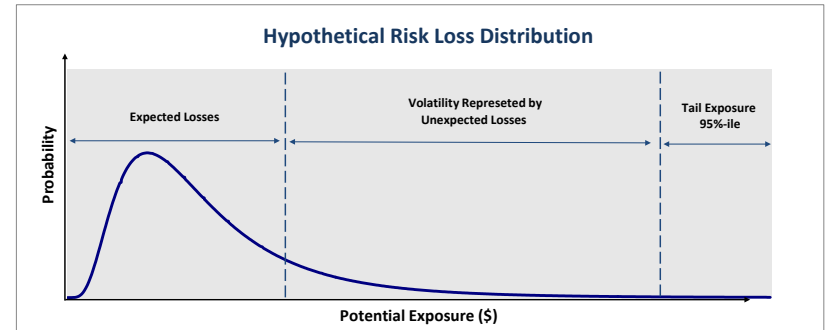
Value Creation through ERM

- Economic Capital

Christopher (Kip) Bohn, FCAS, ASA, CERA, MAAA

Economic Capital Models

- Statutory – Regulators
- GAAP – SEC
- Economic Capital (EC)
 - Measure of risk expressed in terms of capital
 - Amount required to remain solvent at a particular confidence level
 - Supports business decisions
- Available EC is the excess of assets over liabilities
- Required EC is the amount needed to provide a reasonable amount of security to policyholders



Economic Capital Models

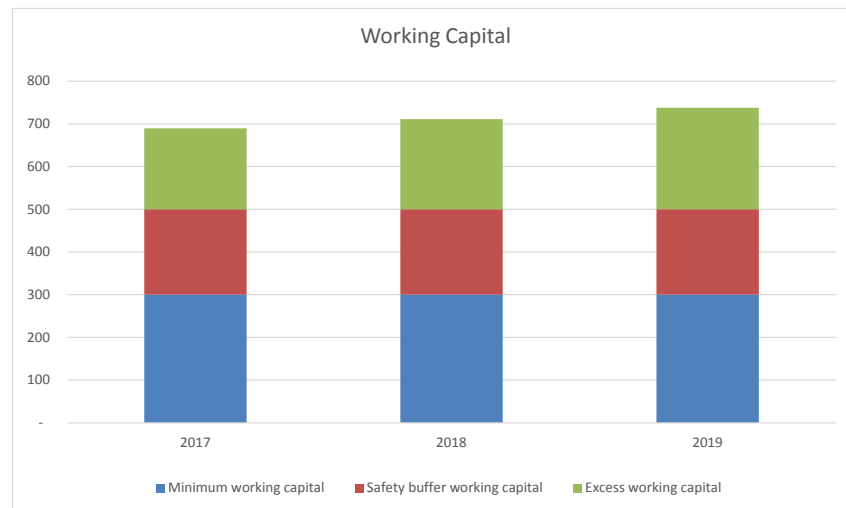
- All models can have varying degrees of maturity/complexity
 - Complexity/size of the organizations
 - Industry
- EC models capture the combined impacts of multiple risks
- Regulators and rating agencies are adopting EC models
- Some insurers may utilize multiple models
 - Need to ensure that parameter assumptions are consistent across models
- Risks typically included
 - Reserves
 - Pricing
 - Market
 - Interest rates
 - Returns

Economic Capital Models

- Insurance companies generally do well modeling these financial risks
- Models are stress tested under various scenarios (and/or Monte Carlo simulation)
 - Stress assets
 - Stress liabilities
 - Determine stressed EC
 - Set risk appetite
 - Determine the point of insolvency
 - Determine capital buffer or safety zone

Economic Capital Models

- Questions the EC model can help answer
 - Do I have adequate capital to support the business
 - Of the risks identified in the EC model, which ones have the greatest impact on capital adequacy
 - How much EC are the various operating divisions using – are the divisions generating appropriate returns
 - Can assist in product pricing
 - Can assist in allocation analyses
 - How should reinsurance be structured and is the available coverage priced appropriately
 - What are the impacts of an acquisition or divestiture
 - VaR, TVaR



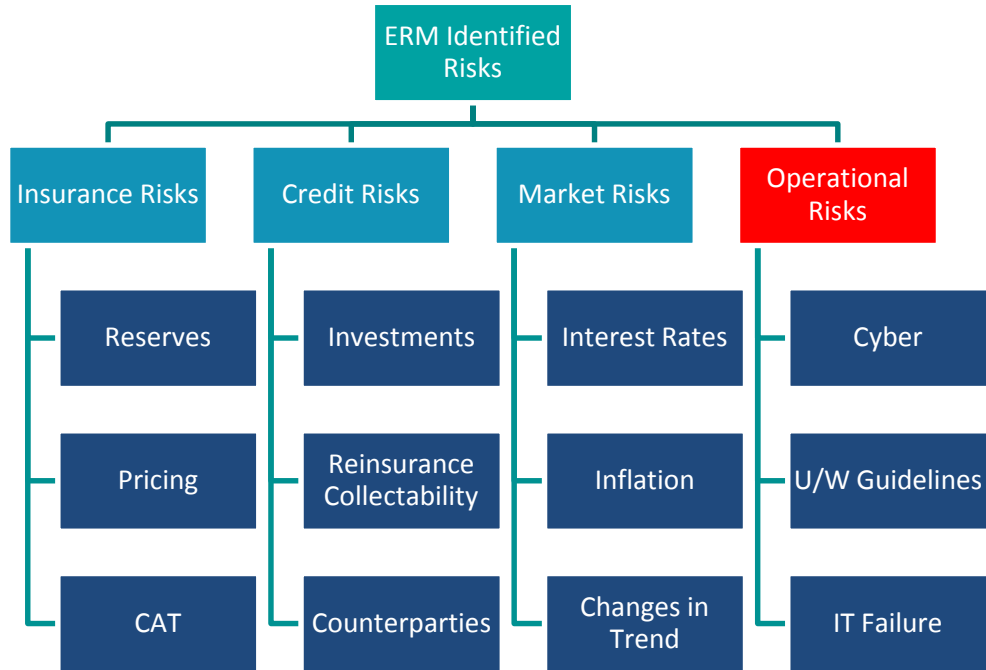
Economic Capital Models

- From an Enterprise Risk Management (ERM) standpoint
 - Suitable assessment processes are defined
 - Various levels of maturity which again is often determined by the complexity of the organization
 - Risks other than those listed above are identified
 - Often, operational and strategic risks are ***not*** considered in the EC Model
- To obtain value from the ERM process explicitly integrate the identified and quantified key risks
- Examples could include
 - Cyber
 - U/W controls
 - Unplanned operational expense
 - IT failures
 - Improper business practices

Economic Capital Models

- Items to consider
 - Financial forecast
 - Risk time horizon
 - Risk appetite
 - Which risks to include/exclude
 - Aggregation and correlation of risk
 - A methodology for quantification

Economic Capital Models



Economic Capital Models

- Having both financial and operational risks incorporated into the EC model will add value
 - Better financial decisions
 - Incorporating operational risks will make the ERM process more “real”
 - Explicitly consider correlations between risks
 - Support mitigation decisions
 - Ability to model over a specified time horizon

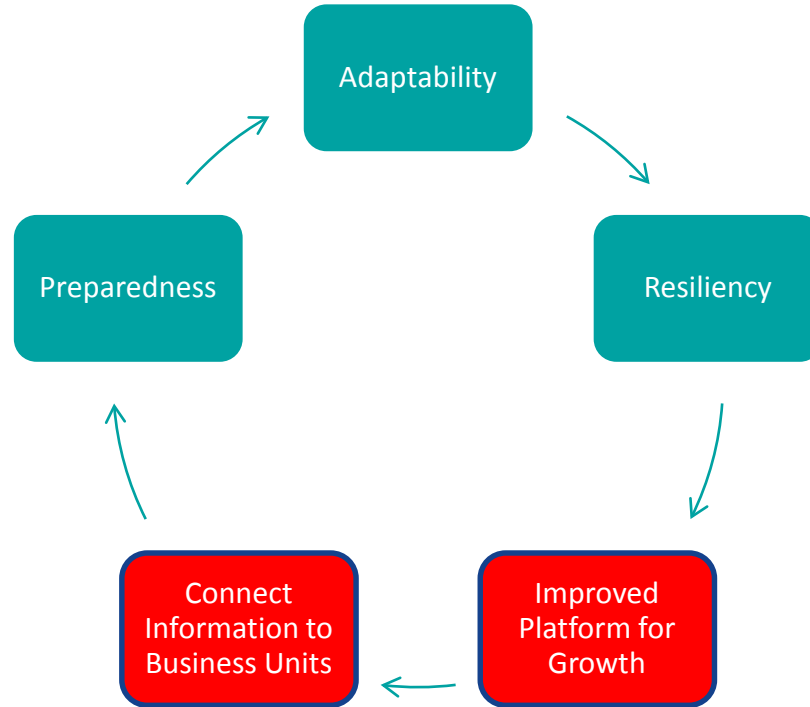
Economic Capital Models

- The process can satisfy Own Risk and Solvency Assessment (ORSA) requirements
 - A component of the overall ERM process
 - Better documentation for regulators, departments of insurance
- ORSA Objectives
 - Assess the risk your organization faces
 - Assess capital requirements to protect against identified risks
 - Document the risk assessment and EC requirements
 - A fundamental part of the overall risk management process

ERM Value Proposition

- Performance – understand variation with sensitivity
- Capital efficiency
- Regulator or rating agency compliance
- Stakeholder management can include
 - Board
 - Shareholders
 - Major clients
 - Major suppliers
 - Employees
- Operational Excellence

ERM Value Proposition



ERM to ECM Reconciliation

Risk Factor	Risk Source		Model Approach			
ECM Risk Factor	ERM Program Identified Risks in ECM	ECM Specific Key Risk Drivers	Detailed Structural Stochastic Model in ECM	Simple Stochastic Model in ECM Based on Input from Business	Risk Distribution Derived from ERM Risk Assessment	Reflected via Residual Standard Deviation
<i>Compliance</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Planning & Execution - Affordability / Cost Reduction</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Planning & Execution</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>All Other</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Star Rating</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Market Response to Competivenss</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Systemic Trend</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Value Creation through ERM

- Use of Embedded Value

Hui Shan, FSA, CERA, MAAA, Ph.D.

Risk and Return

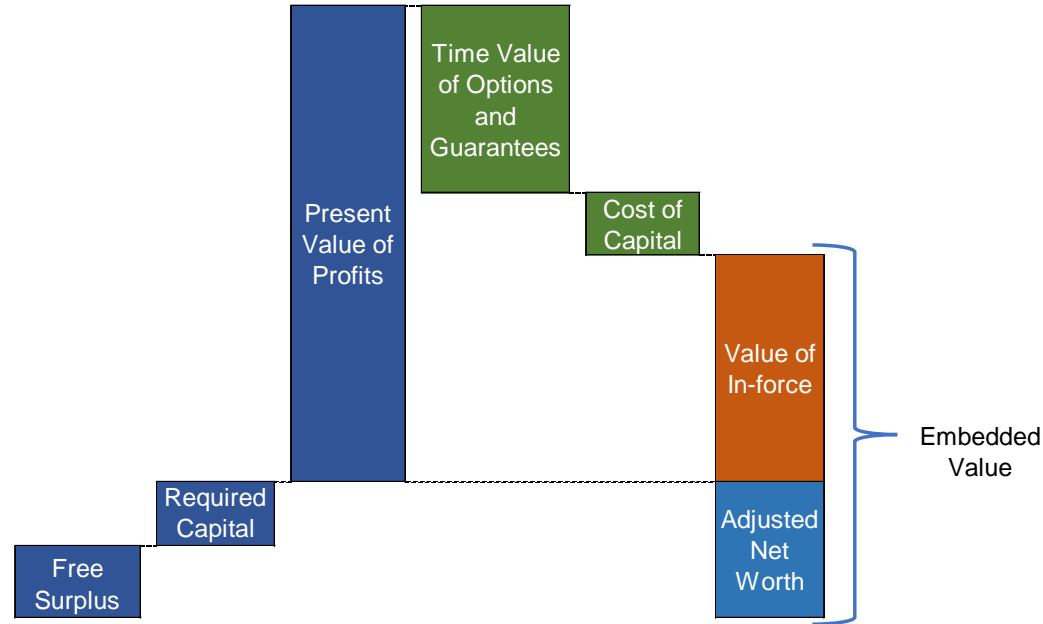
- Enterprise Risk Management –
 - Assessment and quantification of risks
 - Risk avoidance, transfer, and hedging
 - Adequacy of risk capital
- Value Creation –
 - Through issuing insurance contracts
 - Through beating the benchmark return on a risk-adjusted basis
 - Through other means such as reinsurance, buyout etc.
- CRO and CFO working together in tying value creation to a risk program

What is Embedded Value (EV)

- The concept of EV has evolved and there are different sets of principles issued by the CFO Forum
- Embedded value is generally defined as Value of In-force (VIF) plus Adjusted Net Worth (ANW)
- EV is not an appraisal value, neither an economic value
- EV does not set rules on valuation of liabilities, or capital
- EV recognizes the profits that can be distributed under the local statutory basis

Components of EV

- VIF is the present value of future distributable earnings (PVFP), representing the maximum amount that can be distributed under local statutory rules, adjusted for cost of capital (CoC) and time value of options and guarantees (TVOG)
- ANW is the market value of statutory surplus, which can be viewed as the sum of Required Capital (RC) and Free Surplus (FS)
- Under the MCEV framework, there are other components such as CoNHR.



Components of EV - for illustration purpose only

Calculation of EV

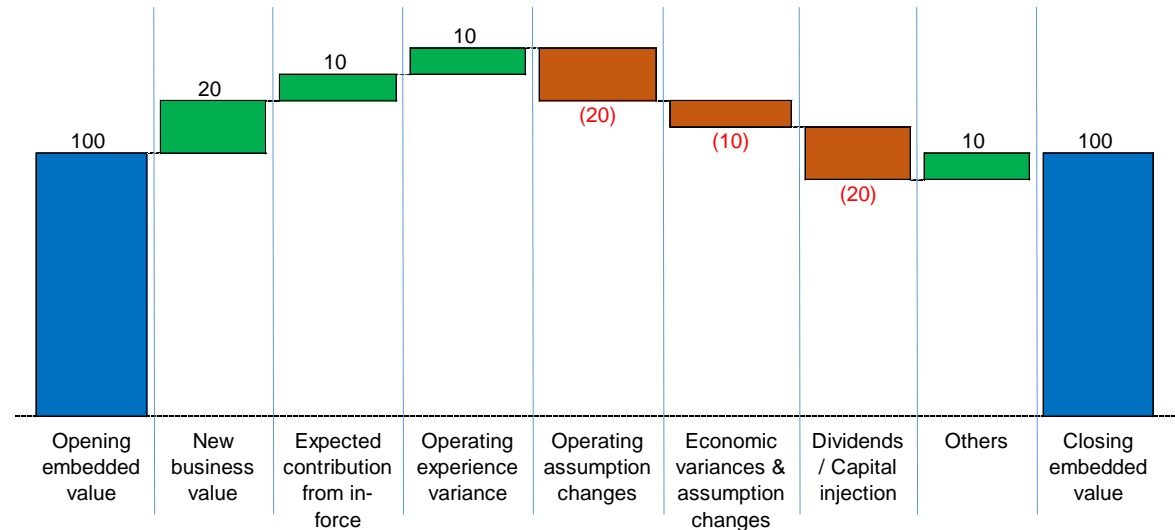
- Before adjusting for RC, the after-tax distributable earnings are calculated as:
 - product cash flows, *plus*
 - investment income, *minus*
 - other allocated expenses, *minus*
 - increase in statutory reserve, *minus*
 - taxes
- TVOG is a cost to insurers and calculated as the difference between the average of the stochastic PVFPs, and the deterministic PVFP

Where capital comes into play

- RC is taken into account in the distributable earnings (i.e. CoC)
 - Increase in required capital is a cost
 - Earnings on the capital is an income
 - Or it could be simply viewed as *Sum of PV of (capital at time t * cost of capital rate)*
- RC is generally defined as the greater of regulatory capital or internal capital
- RC needs to be allocated to LOBs or products in order to evaluate EV metrics at those levels
- RC is important in calculating risk-adjusted metrics and comparison among products

EV in Decision Making – AoC

- Analysis of Change
 - “Income statement”
 - Value of new business
 - a “point of sale” concept
 - Capital allocated to NB
 - Risk budgeting



Analysis of Change - for illustration purpose only

EV in Decision Making – RAROC

- RAROC
 - Many different variations to the name and calculation of this measure
 - Equals to (after-tax risk-adjusted net income) / (allocated capital)
 - It allows for a consistent comparison across different types of products and risks
- Example: an analysis of RAROC, supplemented by breakeven year
 - Depending on whether there is initial capital constraint or limitation on length of capital investment, different product could be chosen for further investment.

	Product A	Product B
Initial RC	100	50
PV(RC)	300	200
CoC Rate	6%	6%
CoC	18	12
<u>PVFP</u>	<u>30</u>	<u>20</u>
VNB	12	8
RAROC	12%	16%
Breakeven Year	4	6

EV in Decision Making – other metrics

- Other metrics
 - IRR
 - Changes of signs in cash flows could distort the result
 - Compared to the hurdle rate
 - VNB / PV of NB premiums
 - Breakeven year
 - First year in which accumulated profits turn positive and remain positive thereafter

Considerations

- Each measure has its merits and shortcomings
- Reflection of a borrowing rate
- Reflection of TVOG in profit measures
- Income earned on assets backing reserves vs. assets backing capital

Implementation of EV

- Leverage existing ALM models
- Leverage best estimate assumptions developed for GAAP valuation or loss recognition testing (or statutory CFT with margin removed)
- Calculation of TVOG may create additional complexity
- Reflection of hedging and taxes
- Comparison across lines of business or products

Other Uses of EV

- In-force management
- Goodwill analysis
- Securitization
- M&A
- Performance management

Moderator and Presenters

Moderator / Presenters

Background



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- John has 20 years of experience in the life insurance and reinsurance industry. In his role as Appointed Actuary for HLR America, John is responsible for all valuation related duties for HLR America, its subsidiaries and reinsurance captives including the support of such duties for various Hannover affiliates. John has oversight responsibilities relating to financial reporting on a statutory, IFRS and Solvency II basis. Prior to Solvency II reporting, John oversaw the MCEV reporting for HLR America. John is responsible for reporting IVC, or Intrinsic Value Created, a key internal metric which measures value creation above the cost of capital as determined by the Hannover internal model.
- John is active in various industry committees. He currently chairs the ACLI Reinsurance PBR working group, is Vice Chair for the Society of Actuaries Advanced Finance / ERM exam, is a board member of the Chief Actuaries Forum and is a member of the SOA Employer's Council. John has published research in the area of mortality and home equity conversion plans and has presented at various Society of Actuaries meetings.



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- Kip has over 20 years of management consulting experience across multiple industries. He has been an ERM practitioner for close to 15 of those years. His primary responsibilities include delivering client requirements for enterprise risk management, risk management modeling, capital expenditure modeling and economic capital modeling. He is also the temporary chair of the Casualty Actuarial Society's Cyber Risk Committee.
- Other areas of expertise include: Developing and maintaining stochastic models, actuarial pricing and reserving analyses for various self-insurance programs and captive insurance companies, developing stochastic Monte Carlo simulation models to aid clients to better understand their financial, strategic and operations risks, and captives. He has build numerous specialized operational model for risks that include: supply chain modeling (from manufacturing to service organizations), cyber risk modeling, and M&A. Industries he has worked in include insurance, healthcare, life sciences, financial services, construction, energy and retail



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- Hui is a member of the Deloitte Consulting Actuarial, Rewards & Analytics practice. Hui has been with Deloitte for about twelve years during which he has been actively involved in assisting major US insurance companies with reviewing and developing financial reporting valuation models for life insurance and annuity products. He specializes in the delivery of risk management and financial reporting solutions, including embedded value analysis, risk adjusted performance measurement and variable annuity risk analytics. Hui's experience also includes property & casualty reserve modeling and stochastic simulation.
- He has extensive experience in the risk management area such as development of economic capital models, review of risk analytics, and optimization of performance measurement and value creation. In addition, Hui has recently been involved in assisting major insurance companies in evaluating Solvency II technical provisions, implementing and validating Embedded Value and IFRS reporting.