



SOCIETY OF ACTUARIES

**ERM Symposium
April 2009**

**D5-Risk-Based Financial Management of
Insurance Companies**

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Risk Based Financial Management

2009 Enterprise Risk Management Symposium

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Agenda

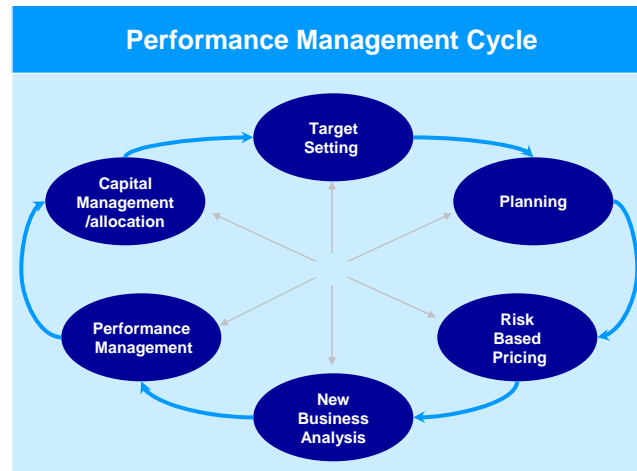
- Brief overview of Risk Based Financial Management
- Capital Management
- Risk Based Pricing – Risk Management at the Point of Sale

Take Aways

- RBFM cycle provides structure and context
- The Economic Balance Sheet
- Using MCEV or EC to link internal and external perspectives
- Risk based pricing addresses some of the shortcomings of traditional pricing methods related to risk

Introduction to Risk Based Financial Management

Risk Based Financial Management



Performance Management Cycle

■ Capital Management

- Capital required to run the business?
- Disciplined use of available capital
- Maintain/maximize capital flexibility

■ Performance Measurement

- How do we measure value creation consistently across the business?
- Develop a better understanding of sources of value creation within the business.
- E.g., What is the value of the current year's business?

Performance Management Cycle (continued)

- **Targeting (Goal setting)**

- External stakeholder expectations → What is required for the firm to create value?
- How can we internalize these expectations and utilize them throughout the organization?

- **Risk Based Pricing**

- How can we measure profitability uniformly across various products while recognizing their different risks?
- Can we differentiate between pricing and production costs to identify opportunities for pricing discretion?

Capital Management

Typical capital management questions

Required Capital

- How much capital is required to run the business?
- How much capital do we need for rating requirements?

Efficient deployment of risks and capital

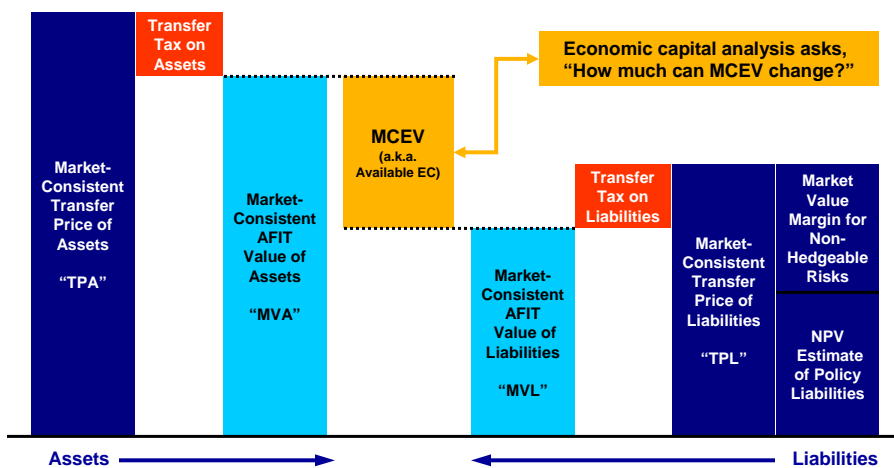
- How do we optimize the deployment of available capital?
- How can we be more disciplined about the use of available capital?

Managing available capital

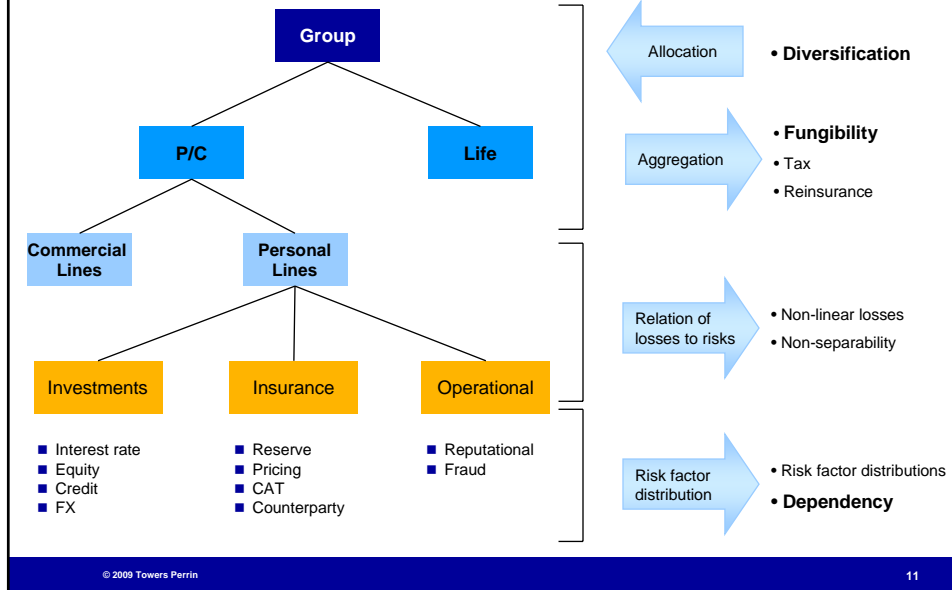
- How can we best increase available capital?
- How can we make available capital more flexible?

The Economic Balance Sheet

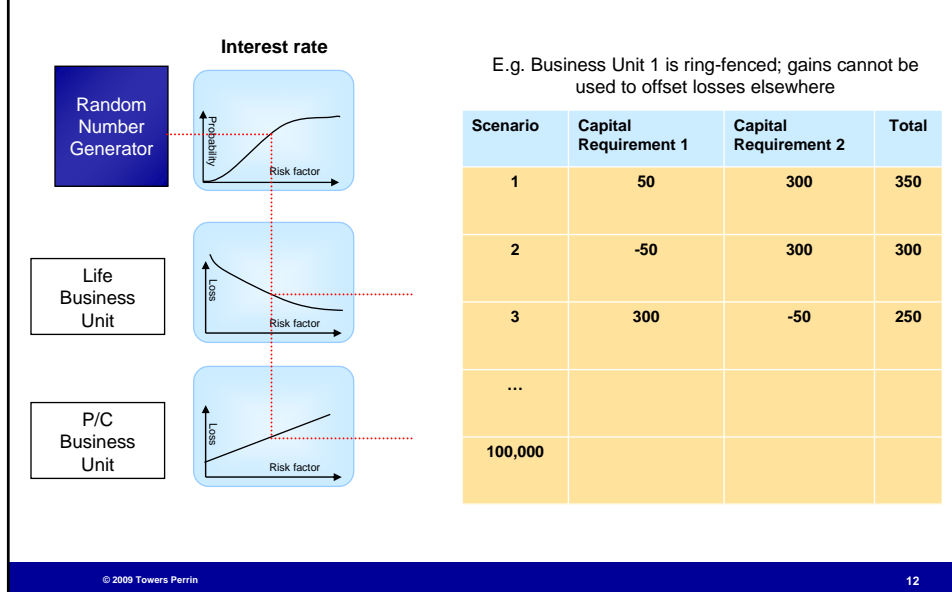
- Tangible assets and liabilities are marked to a market-consistent valuation basis
- Available Economic Capital = Market-Consistent Embedded (Tangible) Value



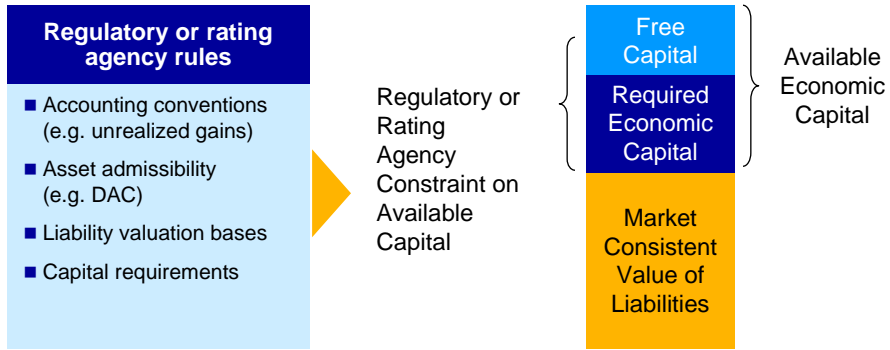
What are the implications of the business structure for Economic Capital?



Fungibility constraints



Regulatory and rating agency capital constraints can be translated onto the market consistent balance sheet



The regulatory or rating agency requirements act as a constraint on the Group's ability to take on risk to the extent that they often exceed the Required Economic Capital

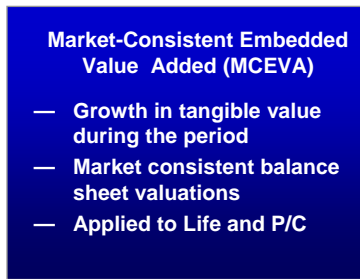
Many companies are seeking to link internal performance measures to shareholder value

Actual shareholder value



- Observable, but only at the overall enterprise level
- Volatile in the short run; not always reflective of management performance in the period
- Subject to market forces beyond management control

Proxy shareholder value



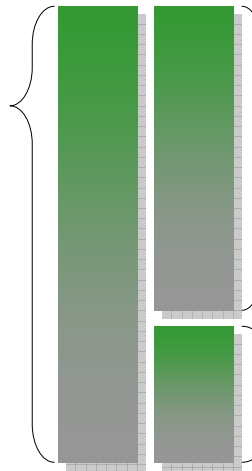
- Stable and directly reflective of management activity
- Can be used at business unit and/or product level, in addition to enterprise
- Can be used internally or disclosed to investors

Actual shareholder value and MCEV can be related

External Market View

Capitalized Market Value

- Observable in capital market
- Risk (β) estimable
- Reflects external perceptions
 - About company
 - About sector
 - About equity market



Internal Economic View

Tangible Value (MCEV)

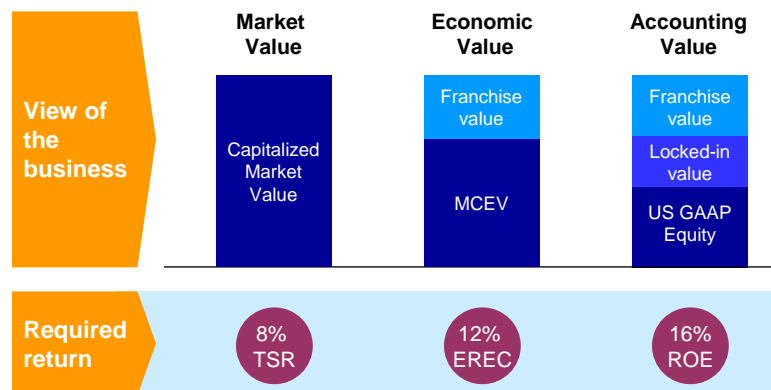
- Calculated using market-consistent valuation principles; values incorporate market price of risk
- Reflects tangible value of contracts written and assets held

Franchise Value

- Future customers and other intangibles
- Inferred, not observable

Internal and external return targets need to be consistent, but that is not the same as equating them

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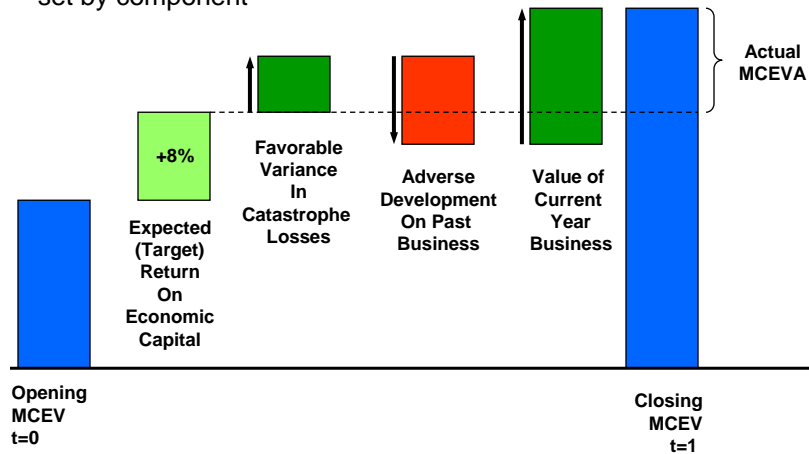


Different “returns” are required to support the same market value

An analysis of the contributors to MCEVA reveals the underlying sources of insurance value creation

- Target contribution to MCEVA can be set by component

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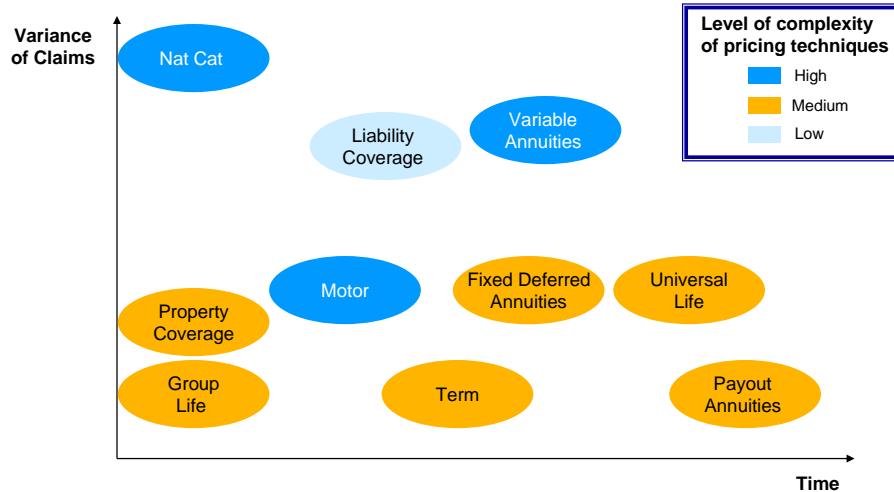


Key statements for Capital management and Capital allocation

- 1 Capital management needs to understand, reconcile and manage the capital requirements of different stakeholders
- 2 Capital allocation process needs to balance different product characteristics, in terms of amount and duration of capital commitment, and expected returns
- 3 Capital management needs to consider all activities of an insurance company, from decisions on underwriting activity, to investment strategy, to measures of increasing the capital efficiency, such as securitisations, reinsurance, etc.

Risk Based Pricing – Risk Management at the Point of Sale

The level of complexity of pricing techniques depends on the type of business



Shortcomings of traditional pricing methods

- Most common pricing measure is statutory internal rate of return ("IRR")
 - Pricing objective is based on achieving a rate of return in excess of the company's hurdle rate
 - Hurdle rate often based on company's overall cost of capital
 - Hurdle rate typically does not vary by product
 - But different products have different levels of risk
- A product with a higher pricing IRR does not necessarily create more shareholder value than a product with a lower pricing IRR
 - Depends on risks inherent in each product
- Products are priced under the implicit assumption that arbitrage opportunities exist
 - Asset risk premiums are capitalized during pricing
 - These risk premiums are passed to policyholders before insurers are released from risk
 - If insurers believe that these arbitrage opportunities exist, why not just borrow at the insurer's credit rating and invest in riskier assets rather than manufacture and distribute insurance products?

Consideration should be given to pricing products such that all risks undertaken are measured in an objective and consistent way

Traditional vs. Risk Based Pricing Approaches

Traditional

- Typically the discount rate used is the same for all products and is based on the cost of capital of the company
- Credit spreads and equity risk premiums are capitalized at issue
- The costs of options and guarantees are generally not valued in a manner that is consistent with how they are valued in the market

Risk Based

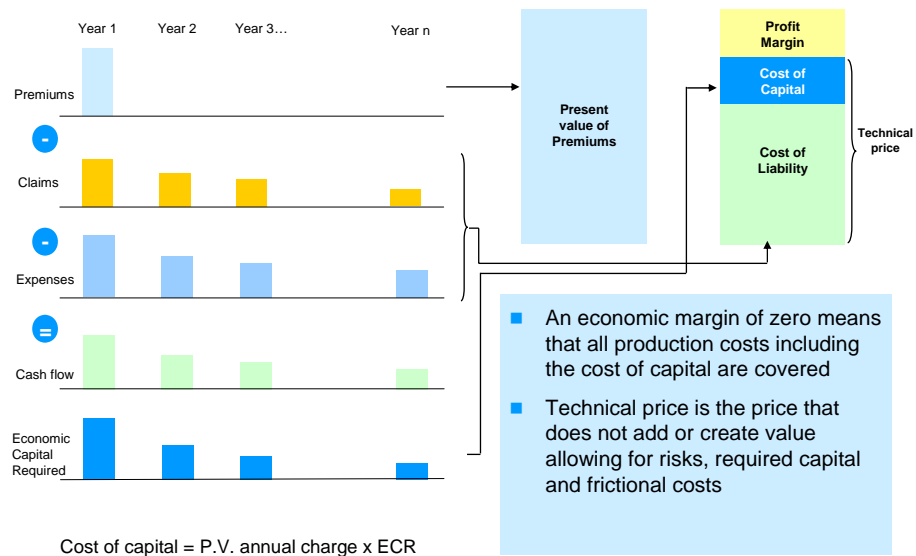
- The discount rate is set to reflect the risks inherent in each product
- Credit spreads and equity risk premiums are earned as insurer is released from risk
- The costs of options and guarantees are valued in a manner that is consistent with how they are valued in the market

Typically, for each product, a value of new business (VNB) is determined which reflects the value to shareholders created through the activity of writing new business

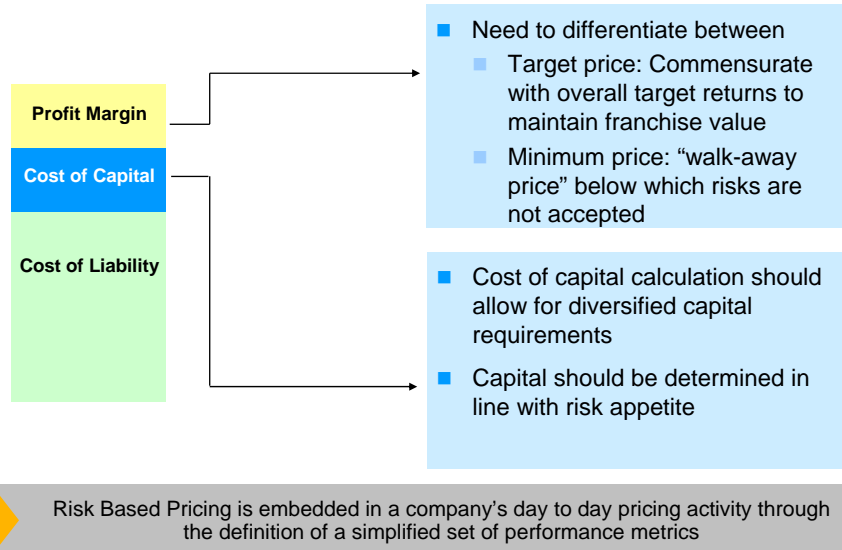
- VNB = Present value of future profits after tax
 - Time value of financial options and guarantees
 - Frictional costs of required capital
 - Cost of non hedgeable risks
- Common metric is the profit margin: VNB / present value of premiums
- Implied discount rate is the discount rate such that a traditional VNB will equal the risk based VNB
 - This is sometimes used to compare the relative level of risk between products

Risk based pricing provides a robust, transparent and objective economic perspective on new business profitability that is consistent across products. If the VNB is greater than zero, the return is greater than the market price of the risks undertaken. A VNB less than zero reduces shareholder value.

Risk Based Pricing Framework



Capital and profit margin calculation need careful consideration



Implications for North American products and companies are numerous

- Risk based pricing can have significantly different impacts by company depending on several factors including:
 - Product mix
 - Split of fixed vs. variable/segregated fund business
 - Level of guarantees
 - Amount of asset risk (e.g., credit quality of assets)
 - Treatment of future flexible policyholder credited rates
- Everything else being equal (e.g., assuming the same product charges), a product (Product A) with more guarantees, more asset risk and without management levers to mitigate adverse experience ought to be considered more risky than a similar product (Product B) with opposite characteristics
 - The pricing metric used should show a less favorable result for Product A relative to Product B
 - This is the case under a risk based pricing framework

Published information shows that Risk Based Pricing can have significantly different impacts on VNB margins by company

Comparison of Risk Based vs. Traditional European Embedded Value Profit Margins

Company	Year	Value of New Business Profit Margin		
		Traditional	Risk Based	Difference
Allianz US	2005	1.9%	2.5%	0.6%
Aviva US	2007 / 2008*	1.9% / 2.0%	0.9% / -0.2%	-1.0% / -2.2%
AXA US	2004	1.8%	1.3%	-0.5%
Old Mutual US	2007	2.3%	1.0%	-1.3%
Zurich/Farmers	2005	4.4%	6.6%	2.2%

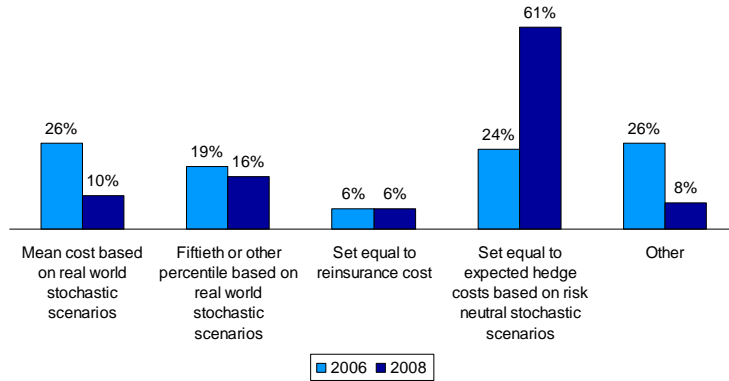
*June 30

Comparison of Risk Based vs. Traditional Profit Margins (positive figure indicates Risk Based greater than Traditional)

Product	Company A	Company B	Company C
Term Insurance	2.3%	1.4%	N/A
Universal Life/Variable UL	2.7%	-9.1% to +1.4%	N/A
Fixed Annuities	-4.1%	-3.6% to -0.5%	-1.0%
Payout Annuities	-4.9%	-7.6%	-6.1%
VAs/Segregated Funds	0.0%	N/A	-1.8%
Fixed Indexed Annuities	N/A	-5.3% to -3.9%	N/A
Critical Illness	1.0%	N/A	N/A
Group Life & Health/Employee Benefits	1.1%	N/A	1.9%

The approach used to set the cost of guarantees on variable annuity business has evolved over time

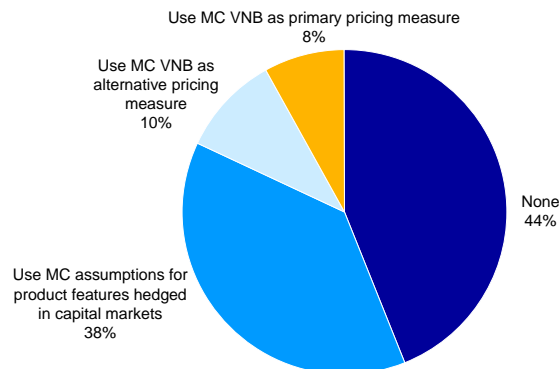
**Method Used to Determine Cost of Guarantees on VAs
(e.g., Guaranteed Minimum Death Benefits, Guaranteed Minimum Income Benefits) (Percent of Responses)**



Note: Companies selected multiple responses if they used different methods for different guarantees.
Source: 2006 and 2008 Tillinghast Pricing Methodology Surveys (i.e., methodology used to price products in 2005 and 2007)

Risk based pricing methodologies or assumptions are most often used in the US for product features that are hedged in the capital markets

**Use of Market Consistent ("MC") Pricing Methodologies or Assumptions
(Percent of Responses)**



Source: 2008 Tillinghast Pricing Methodology Survey (i.e., methodology used to price products in 2007)

While risk based pricing was not broadly used in 2007 for a wide range of products, this is gradually changing

- Market consistent techniques are making their way into a wide range of applications from financial reporting to economic capital to asset-liability management to insurance company transactions
 - US GAAP (FAS 157 and 159)
 - The European Insurance CFO Forum MCEV Principles
 - Published in June 2008, requires member companies to publish year-end 2009 embedded values and VNBs using market consistent techniques
 - Many companies, domestic and international, are using market consistent methodologies to determine economic capital (a la Solvency II)
 - More and more merger and acquisition and securitization transactions are being valued using both traditional and market consistent techniques
 - Some companies are embracing market consistent techniques because they believe these methods provide useful insights into asset-liability management
- The above developments have motivated many companies to look at the profitability of their products using risk based techniques
- Some of these companies have made or are in the process of making changes to their products and/or pricing
- Other companies have embraced risk based pricing for its own sake
- IFRS Phase II, which is based on a fair value approach, could become required in 2014 in the US and in 2013 in Canada
- Consequently, the use of risk based pricing should continue to increase in North America

Those that act early can gain a competitive advantage

- Risk based pricing could be used to develop strategic options
 - Companies could target products where current product charges are greater than prices required by the market
 - Companies moving first would gain leverage by targeting profitable products
 - Eventually inefficiencies will be corrected as competitors catch up
- Companies could also use risk based pricing analyses to better understand the relative risks of their products
 - Depending on a company's risk appetite, measures could then be taken to de-risk certain products by increasing product charges or making changes to the product design
 - Product design changes could include
 - decreasing interest rate guarantees
 - making variable annuity/segregated fund guarantees less rich
 - introducing market value adjustments upon surrender
 - changing premiums from a guaranteed basis to an adjustable basis
- Companies could use risk based pricing techniques to protect themselves against similar tactics used by competitors

Key statements for risk based pricing

- 1 Risk based pricing addresses some of the shortcomings of traditional pricing methods by providing a framework for understanding the tradeoffs between shareholder risks and rewards using a robust, transparent and objective economic methodology that is consistent across products
- 2 Pricing should differentiate between target price and production costs to appreciate competitive pressures in different markets and potential pricing discretion
- 3 The use of risk based pricing has recently extended beyond variable annuity guarantees to a wide range of life, health and annuity products
- 4 More and more companies are looking at the profitability of their business using risk based approaches motivated by FAS 157 and 159, MCEV Principles, economic capital calculations, mergers and acquisitions and securitization transactions, asset-liability management and IFRS Phase II
- 5 Companies that are among the first to take action may benefit

Thank You

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Risk-Conscious Everyday Management

Enterprise Risk Management Symposium
May 1, 2009
Chicago, IL
Jay Glacy

E_{nterprise}

$$\frac{R_{\text{return}}}{R_{\text{risk}}}$$

M_{anagement}



Guiding Wisdom from Sages

- "Business men play a mixed game of skill and chance, the average results of which ... are not known by those who take a hand. If human nature felt no temptation to take a chance, no satisfaction (profit apart) in constructing a factory, a railway, a mine or a farm, there might not be much investment merely as a result of cold calculation."

- John Maynard Keynes
"The General Theory"



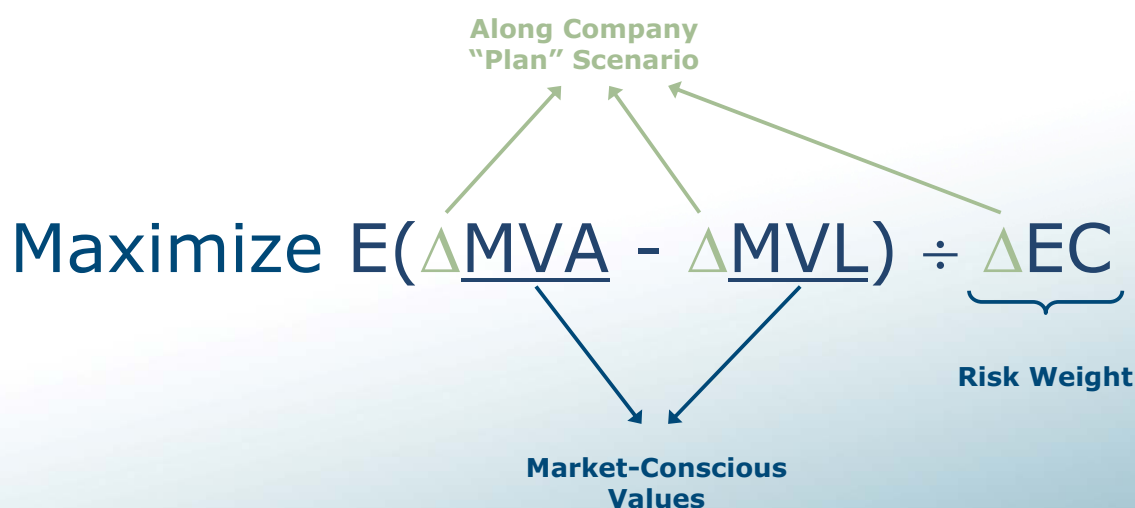
ERM Aims to Balance Risk and Return

- *What is ERM?* ERM is a distributed framework for the risk-conscious deployment of capital in localized decision-making.
- ERM cannot be administered from the top of the house.
- ERM is not just about risk but about organized ways to weigh risk-bearing profit opportunities.
- ERM has to be as concerned with value creation as it is with value preservation.
- *How does ERM work?* ERM systematically adjudicates multiple sources of risk emanating from many actual and potential risk-bearing projects, each consuming scarce risk capital, amid continually changing conditions.

3



EC Organizes a System of Risk Charges

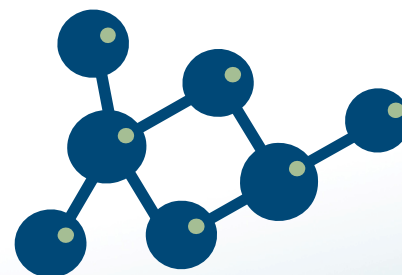


4



EC Contextualizes Risk and Return

- Maximize $E(\Delta MVA - \Delta MVL) / \Delta EC$, where Δ is company Plan scenario
- Connecting orthogonal parts of the enterprise in an EC model exploits potential diversification benefits by pairing up risk partners.
- EC helps answer fundamental ERM questions
 - “What is the incremental economic return on a prospective project in relation to its risk capital impact?”
 - EC intrinsically captures offsets between the project and the enterprise’s existing risk profile.
 - Permits consistent, coherent and comparable conclusions about a project’s advisability.



TailVar Is a Coherent EC Metric

- Capital determination via TailVaR automatically includes all sources of variation and covariation.
- Under normality, $EC_i = \phi(\text{VaR}) / (1 - \Phi(\text{VaR})) \cdot \sigma_i^2 (1 + \rho_{i,j} \cdot \sigma_j / \sigma_i)$
- Instead of consuming capital, some projects can generate capital. This phenomenon can only occur when the correlation coefficient is negative.
- Allocation dynamics are subtle and complex when multiple constituents share multiple risk factors.
- TailVaR can be successfully used in numerical situations with non-tractable distributions.

EC Helps Proportionalize Opportunities

- When sufficiently granulated, EC applies risk “price tags” to balance sheet components, permitting actual or prospective managerial actions to be contrasted.
- Since EC incorporates the operation of risk, computationally intensive stochastic processing can be reduced and managerial attention can be redirected toward business outcome improvements.
- Under TailVar, for example, the economic capital impact of any project is its contribution to the tail. So marginal capital consumptions can be estimated.
- The ability to attribute, in a coherent way, a constituent’s capital consumption is critical to informed decision-making.

How Risk Happens in the Real World

- Companies don’t have “risk appetites” but fragile, fleeting opportunities to sell products in uncertain volumes. “Risk” is often ancillary to the pursuit of nearby profit opportunities.
- Products are messy baskets of risk that don’t scale nicely.
- Line managers in insurance organizations balance risk and return every day, often in a vacuum.
- What line managers need to know is:
 - “Is the company constructive on this risk today?”
 - “Is there an orthogonal exposure elsewhere in the company?”
 - “Is this prospective consumption of EC return-maximizing?”
 - “Are there inertial forces that outweigh pure economics?”
 - Cosmetics, platform maintenance, *et al*
 - “How much of this should I buy/sell?”

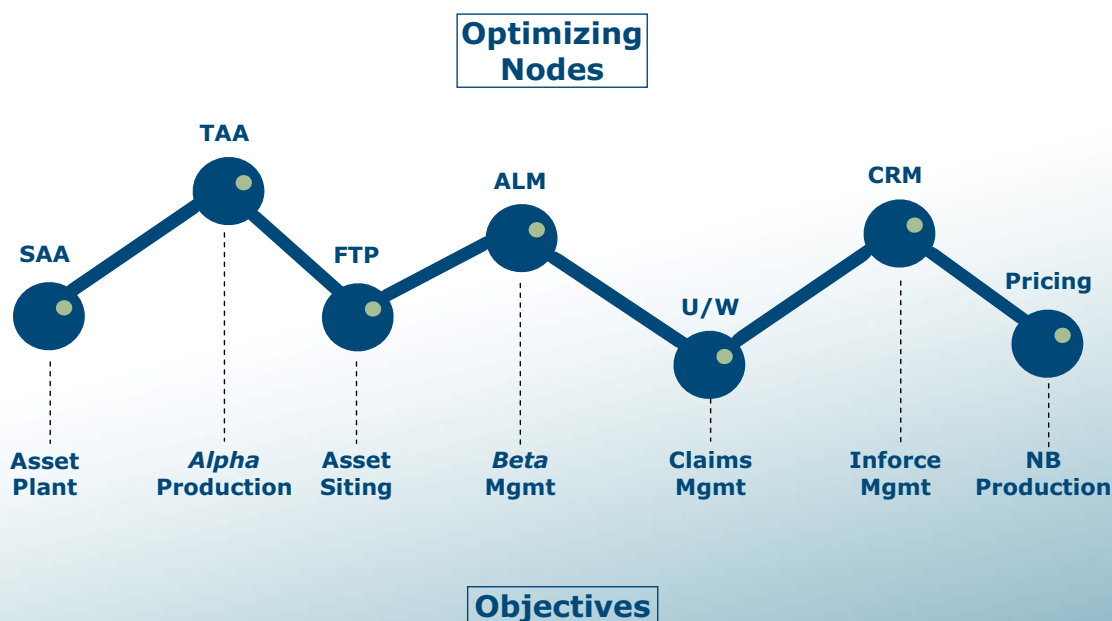
What is the Value Chain?

- The value chain is a framework for organizing the emergence of value at each point in the lifecycle of an insurance product.
- The “raw materials” involved in the creation of a life or annuity product are:
 - Bonds (for transferring value into the future)
 - Economic capital (for absorbing risk)
 - Know-how (for profitability)
- The value chain is really a levered wheel, with the policyholder’s premium financing the purchase of raw materials.

9



Value Chain Exposes Key Decision Points



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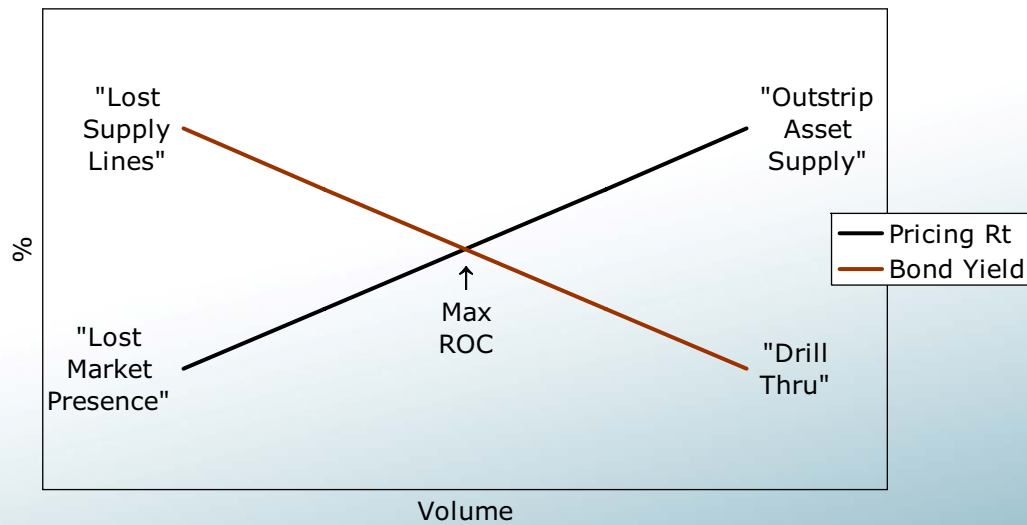
How Do We Optimize Nodes in the Chain?

- Strategic Asset Allocation
 - Identifies long-range asset mix that best fits liabilities
 - Tells which bond desks to build out
- Tactical Asset Allocation
 - Identifies asset mix that is return-maximizing right now
 - Based on relative-value determinations
- Funds Transfer Pricing
 - Sites assets where they receive friendliest treatment
 - Ports risk/return to natural liability host

How Do We Optimize Nodes in the Chain?

- Asset/Liability Management
 - Adjusts *beta* positions for economic and market conditions
 - Optimizes risk capital deployments
- Underwriting
 - Equilibrates risk to available risk capital
- Customer Relationship Management
 - The game-theory of policyholder psychology
 - Inforce management and disintermediation
- Product pricing and re-pricing
 - Adjudicates supply and demand economics
 - Manages platform costs

Case Study: Four Risks of Product Pricing




Feedback Loop Illustrates Elasticities



True Risk Appetites Can Be Adjudicated

Dynamic Balance Sheet Optimization

Scenario	Economic Capital				ROC
	Line A	Line B	Line C	Total	
Actual	\$1000	\$1000	\$1000	\$3000	11%
Unconstrained	\$0	\$1000	\$2000	\$3000	14%
Preserve Distribution	\$500	\$1000	\$1500	\$3000	13%
Min RBC = 240%	\$750	\$1000	\$1250	\$3000	12%
Incremental \$100	\$0	\$0	\$100	\$100	18%
Incremental \$1000	\$250	\$250	\$500	\$1000	15%



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