



SOCIETY OF ACTUARIES

**Global Best Practices in ERM for
Insurers and Reinsurers Webcast
December 10 & 11, 2008**

**Session # 2A: Does ERM Need an
Economic Capital Model**

**Sim Segal
Max Rudolph
Timothy J. Pratt**

**Moderator
Kevin Dickson**

Does ERM Need an Economic Capital Model?

Kevin Dickson - moderator
Sim Segal
Tim Pratt
Max Rudolph



Informal session title -- the role of modeling in an ERM program





Integrating Economic Capital and Enterprise Risk Management

Sim Segal, FSA, CERA, MAAA
US Leader of ERM Services
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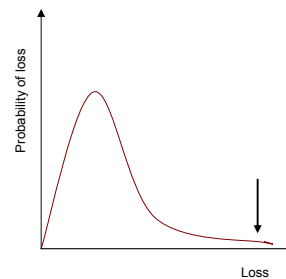


*Global Best Practices in ERM Webcast
December 10, 2008*

Definition of economic capital

Management-defined target for required capital:

Amount of [select financial reporting basis] capital needed to maintain solvency defined as [select definition] in at least [select percentage] of modeled scenarios over a [select number of years] time horizon

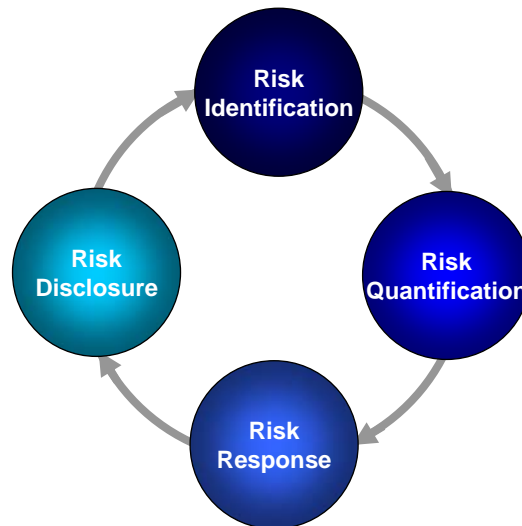


Definition of ERM

ERM is the **process** by which companies identify, **measure, manage,** and **disclose all key risks** to increase **value** to **stakeholders**.

process:	Not just a one-time task but continuous process cycle
measure:	Not just silo, but integrated
manage:	Not just reporting, but decision-making (including upside)
disclose:	Not standard disclosures, but robust risk information
all:	Not just financial risks, but strategic and operational risks
key risks:	Not hundreds of risks, but top risks to the company
Value:	Not just short-term indicators, but holistic value metrics
Stakeholders:	Not just constraints-focused, but driven by maximizing primary stakeholder (e.g., shareholder) value

ERM process cycle



Traditional approach under-utilizes EC

Traditional Approach

Provides a business case for decision-making?

- **No:** Just risk info, due to gap between EC and value models

Useful for decisions on all risks?

- **No:** Not as rigorous for non-financial risks

Ability to adapt and respond to the business?

- **No:** Overly-complex

EC models are rarely used for a full range of decision-making

Solution: Value-driven approach to EC

Three elements to the value-driven approach:

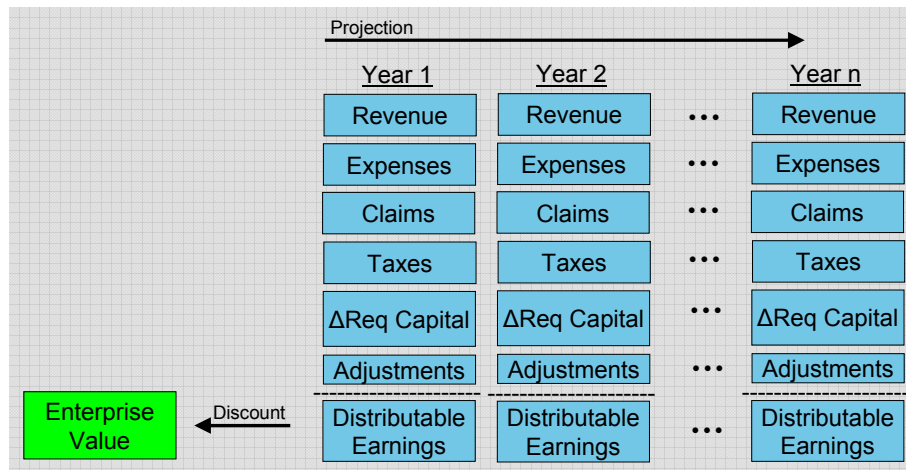
- 1) Expand EC model into value-driven ERM model
- 2) Comprehensive quantification of risks
- 3) Limit model complexity

Value-driven approach resolves difficulties

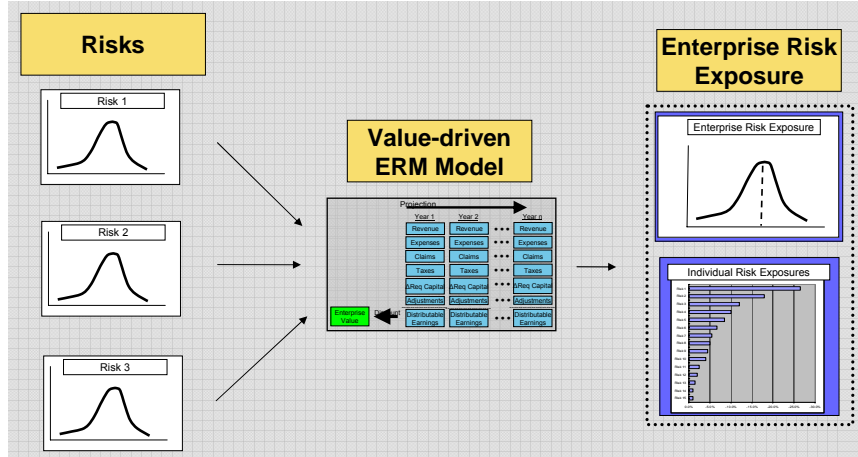
	Traditional Approach	Value-driven Approach
Provides a business case for decision-making?	<ul style="list-style-type: none"> No: Just risk info, due to gap between EC and value models 	<ul style="list-style-type: none"> Yes: Risk and value info integrated into a single, unified model
Useful for decisions on all risks?	<ul style="list-style-type: none"> No: Not as rigorous for non-financial risks 	<ul style="list-style-type: none"> Yes: Fully captures impacts of all risks
Ability to adapt and respond to the business?	<ul style="list-style-type: none"> No: Overly-complex 	<ul style="list-style-type: none"> Yes: Practical level of complexity

1) Expand EC into value-driven ERM model

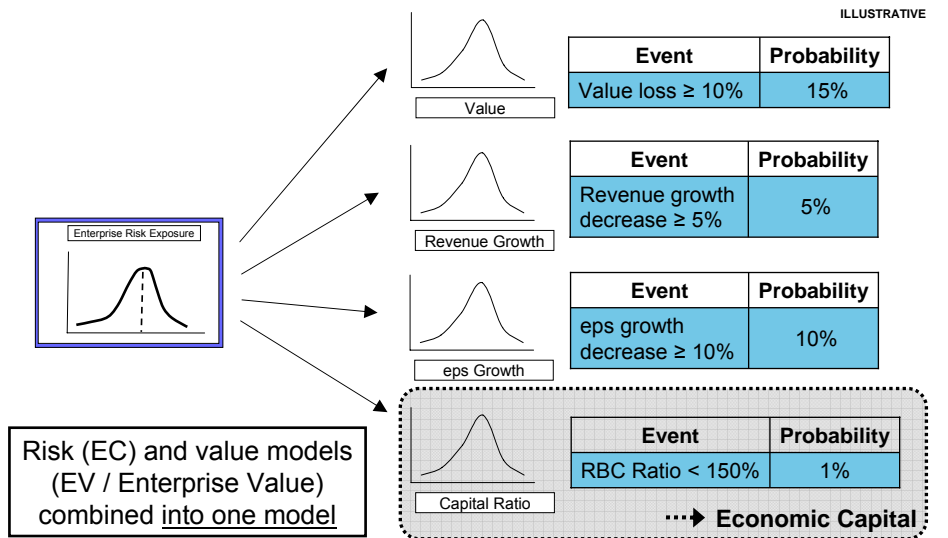
Project all future new business and required capital



Express exposure as volatility of value...



...and other metrics, including linkage to EC



Modified case study: Enterprise risk exposure by key metrics

MODIFIED CASE STUDY

Event	Probability
Enterprise value decrease \geq 10%	15.1%
Enterprise value decrease \geq 15%	4.9%
BCAR ratio < 155%	2.7%
BCAR ratio < 140%	0.5%
Revenue CAGR decrease \geq 5%	4.6%
EPS CAGR decrease \geq 10%	9.5%

} $\cdots \rightarrow$ **Economic Capital**

BCAR is A.M. Best's Capital Adequacy Ratio

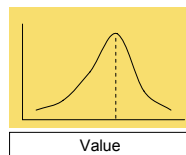


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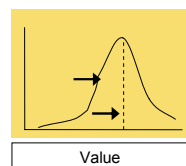
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Provides a business case for decision-making

ILLUSTRATIVE



CURRENT STATE	
Δ Baseline Value	---
Event	Probability
Value decrease \geq 10%	15.1%
Value decrease \geq 15%	4.9%



POST-DECISION	
Δ Baseline Value	+0.5%
Event	Probability
Value decrease \geq 10%	14.5%
Value decrease \geq 15%	4.5%

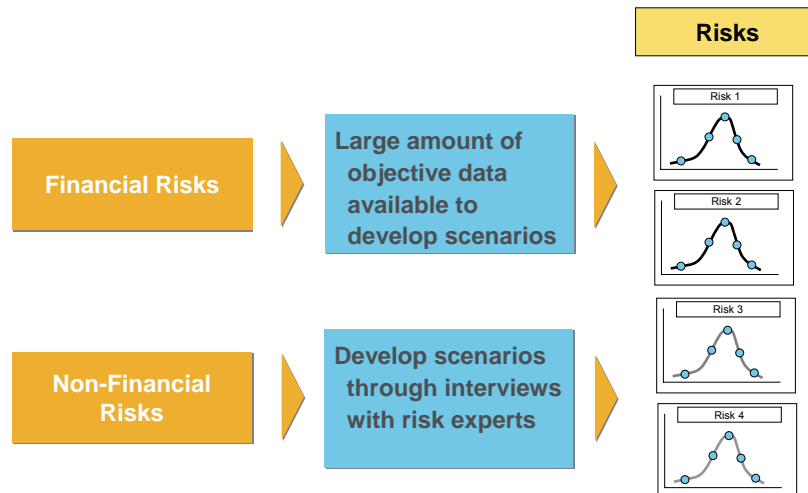
**Provides most rigorous business case for decision-making:
Change in value and change in volatility of value**



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2) Comprehensive quantification of risks



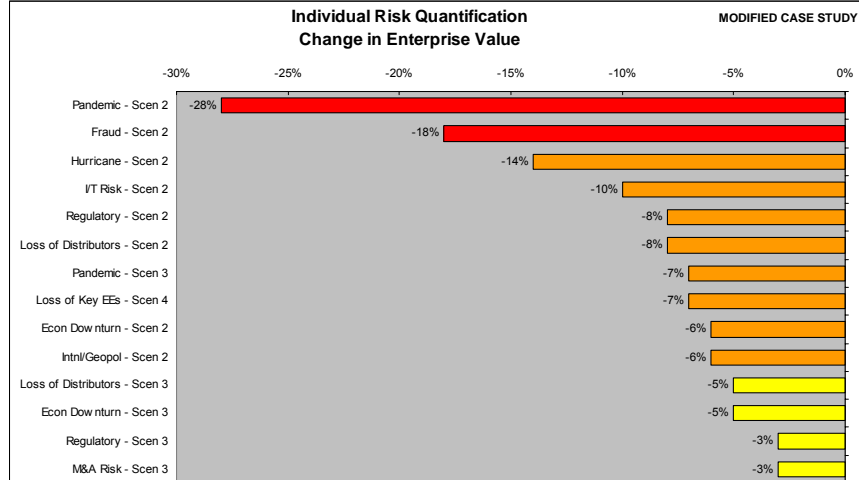
Case studies: Quantifying non-financial risks

Value-driven ERM model fully quantifies non-financial risks, which impact future revenues and expenses:

Case studies:

- IT: Destruction of systems and theft of customer data
- Fraud: Anti-money laundering violation
- Disaster: Loss of key sales managers/agents
- Disaster: Severe global pandemic
- Supply chain: Loss of sole-source supplier

Modified case study: Ranking key risks by enterprise value impact



3) Limit model complexity

	Traditional Approach	Value-driven Approach
Complexity?	<ul style="list-style-type: none"> Overly-complex Hard to understand/explain High level of model risk 	<ul style="list-style-type: none"> Practical level of robustness Easier to understand/explain Lower level of model risk
Maintenance?	<ul style="list-style-type: none"> Large volume of inputs 	<ul style="list-style-type: none"> Manageable amount of inputs
Run time?	<ul style="list-style-type: none"> Slow 	<ul style="list-style-type: none"> Keeps pace with business
Credibility?	<ul style="list-style-type: none"> False sense of precision 	<ul style="list-style-type: none"> Credible level of precision

ERM is more than risk management

ERM is *not*
the next step in evolution of *risk management*...

ERM *is*
the next step in evolution of *business management*.

For more information, contact:

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Global Best Practices in ERM for Insurers and Reinsurers

Does ERM Need an Economic Capital Model?

Timothy J Pratt
Deloitte Consulting LLP

December 10, 2008

Does ERM Need an EC Model?

Short Answer: No

- We've been doing risk management for years without an EC model
- How will an EC model help you assess something like Risk Controls?

Medium Answer: Maybe

- Risks in insurance are inter-related
- Liability risks can be transferred, but that introduces credit risks
- Is a solvency / probability of ruin risk measure the right measure

Long Answer: Yes

- Fully integrated ERM needs many risk measures
- A model that provides EC can provide alternate risk measures



Does ERM Need an Economic Capital Model?

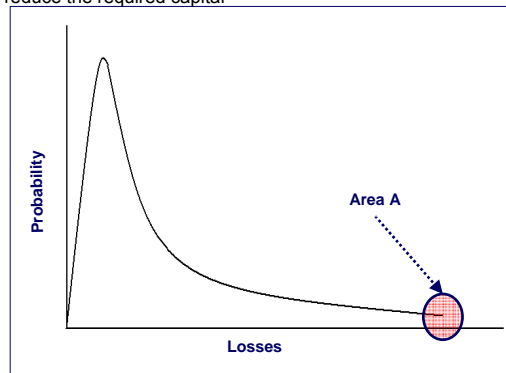
My Answer: Yes but No

- I don't think that ERM needs Economic Capital – this is the '**No**' part
- However, I do think that ERM does need a fully integrated model captures the range of risks that an insurance company faces ... a by-product of such a model (lets call it a holistic risk model) is that it can be used to generate an Economic Capital number
- Finally, the holistic risk model should be used to generate various risk measures depending on requirements – this is the '**Yes**' part

What is Economic Capital?

Simple Answer

- Economic Capital measures the amount of capital required to protect against insolvency [over a pre-selected time period, at a given level of confidence]
- Managing Economic Capital concentrates on actions that a company can take to reduce this insolvency risk / reduce the required capital amounts
- It exclusive focuses on the tail (Area A)



When is Economic Capital a Poor Measure of Risk?

Consider this Product

- Property & Casualty Auto (Motor) property damage only product
- Risk Characteristics:
 - Fairly stable frequency
 - Severity limited
 - Portfolio geographically spread
- Result: Risk profile is fairly stable (say, expected 5% of premium), narrow range of loss outcomes under vast majority of situations
- Economic Capital is probably very low (reflecting very little chance of insolvency)

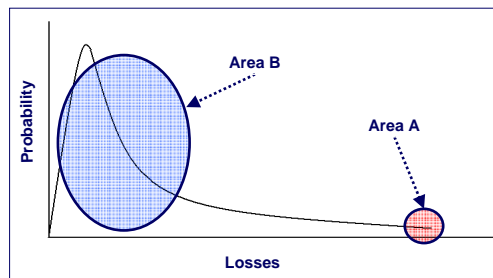
Consider this Scenario

- Company decides to drop prices by 10%
- Result:
 - Product generates losses each year but enough to place solvency of company in jeopardy
- No impact on EC so EC risk measure is unchanged

Risk Measures

Alternate Answers

- Holistic risk models can be used generate a variety of risk measures
- The probability of ...
 - meeting plan
 - covering fixed expenses
 - increasing policyholder benefits
 - increasing shareholder value
 - etc
- Concentrate on Area B without taking your eye of Area A
- Reduce the sensitivity to key assumptions



Deloitte.

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Session 2A: Does ERM Need an Economic Capital Model?

Global Best Practices in ERM
Max J. Rudolph, FSA CFA CERA
Rudolph Financial Consulting, LLC
December 10, 2008



Economic Capital – A Good Idea?

Maybe	Yes
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- | | |
|--|---|
| <ul style="list-style-type: none">• Why?<ul style="list-style-type: none">– External stakeholders• Metrics<ul style="list-style-type: none">– 99.987654321%• Aggregation<ul style="list-style-type: none">– Correlation matrix• Culture<ul style="list-style-type: none">– Talk the talk• Communication<ul style="list-style-type: none">– Single number | <ul style="list-style-type: none">• Why?<ul style="list-style-type: none">– Manage the business• Metrics<ul style="list-style-type: none">– Multiple measures• Aggregation<ul style="list-style-type: none">– Copulas– Variance Reduction• Culture<ul style="list-style-type: none">– Walk the walk• Communication<ul style="list-style-type: none">– Tell a story |
|--|---|

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Insert C  ent

EC and Enterprise Risk Management

- ...Leverage existing models
- ...Iterative improvements
- ...Use stochastic results (sort/graph)
 - Choose conservatism
 - Metrics like Conditional Tail Expectation (CTE) or Value at Risk (VaR)
- ...Are built off cash flows

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Insert C  ent

Knowledge Gained from Modeling

- Shortcomings if company isolates knowledge
- Positives when done correctly
 - Competitive advantage
 - Accept risk (sometimes exploit)
 - Not a competitive advantage
 - Mitigate (e.g., hedging, reinsurance)
 - Avoid

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Insert C  ent

Model Risk

- Economic capital
 - Sensitivity of assumptions
 - Limited significant digits
- Key is how you use the tools, not how sophisticated they are
 - Arbitrage free scenarios
 - Number of PhDs might be contrary measure
- Quantification is less important than culture

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Insert C  ent

Risk Culture

- Starts at the top and builds momentum
- Encourages honest discussions
- Necessary but not sufficient
 - Enron, LTCM, VA GMDB, Defined Pensions, Sub-prime
- Positives when done correctly
 - Alignment
 - Integrity – senior management walks the walk
 - Transparent/Proactive
 - Everyone is a risk manager
- Easier to get right at small companies

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Insert C  ent

Emerging Risks

- Unknown unknowns
 - Never happened before
 - How do you incorporate in your model?
- Scenario Planning – deterministic scenarios
 - Worried about specific event
 - Modeling constraint
 - Time constraint
 - Ignored in most Economic Capital models

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Insert C  ent

What to look for

- Consistency
- Risk constraints
- Leverages internal programs
 - balanced scorecard
 - incentive compensation

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Insert C  ent

Making Economic Capital Work

- Cost – must prioritize projects
- ERM/EC project should provide actionable information
- Don't accept cookie cutter solutions
- Who is your CSO?
 - Chief Skeptical Officer
 - Common Sense Officer

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Insert C  ent

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- Companies that understand the risk/return economics of a business can take more of the profitable risks that make sense for the company and less of the ones that don't. You need to know which are which.

Insert C  ent

Thank you!

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