



## Applying ERM Concepts from ASOP 46 & 47

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### Desired Outcomes

- Understand many of the definitions in ASOPs 46 & 47
- Develop new mental frameworks for ERM using the concepts in the ASOPs
- Better understand quantitative challenges in ERM



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### Sample Company

- All numerical examples focused on one year time horizon
- Sample Company is in three lines of business
  - Health
  - Residential Property & Casualty
  - Commercial Property & Casualty
- All Policies sold on January 1
- Expenses included in loss distributions
- No Taxes or investment income



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# Sample Company

Each distribution was sampled 10,000 times

	Health	Residential	Commercial
Distribution	Normal	Beta	Beta
Parameter 1	1,000	3	2
Parameter 2	150	9	12
Scalar	1	4,800	10,500
Mean	1,000	1,200	1,500
Premiums	1,250	1,600	2,250

Company Capital	\$2,400
Total Financial Resources	\$7,500



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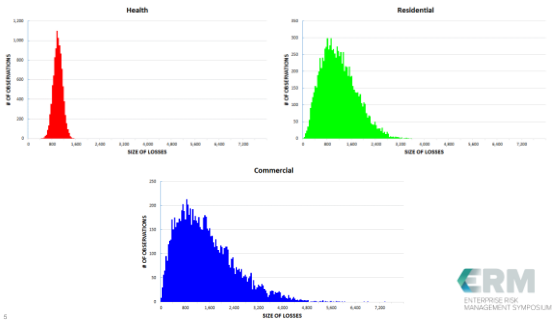
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# Graphical Illustration of Simulations



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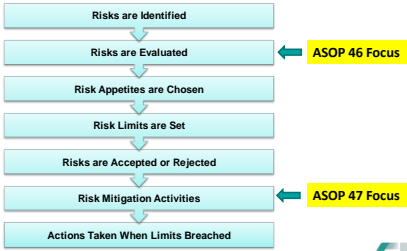
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# ERM Process



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## Risk: Definition

Definition

Observations

- The potential of future losses or shortfalls from expectations due to deviation of actual results from expected results.
- Focused on one side of distribution
  - Positive results less than expected are a Risk

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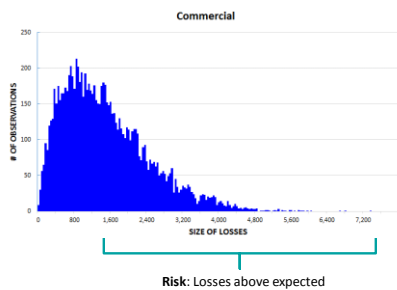
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## Risk: Definition



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## One Risk or Multiple Risks

Concept	Number of Risks
Risk	One or More
Risk Metric	One or More
Risk Profile	Multiple
Risk Tolerance	Multiple
Economic Capital	Multiple
Risk Appetite	One or More
Risk Limit	One
Emerging Risk	One
Risk Mitigation	One or More



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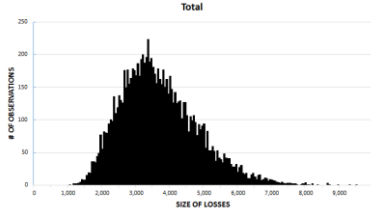
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## Risk Profile: Definition

- The risks to which an organization is exposed over a specified period of time.



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## Considerations: Risk Profile

Consideration	Sample Company
Nature, scale and complexity of risks	We greatly oversimplified risk modeling
Differences between current and long term risk profiles	Risks could certainly change – do our products limit repricing
Comparison to competitor risk profiles	Likely to have competitors with different risk profiles



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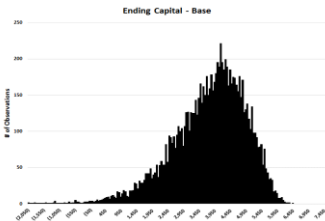
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## Risk Profile: Ending Capital

- Another way to look at your profile is ending capital



	99.5% VaR
Health	1,388
Residential	2,868
Commercial	4,685
Diversification	(1,694)
Total Company	7,247



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## Considerations: Financial Strength

Consideration	Sample Company
Financial Flexibility	Very Liquid, no indication of segregation of assets
Fungibility of Capital	High Fungibility – One Company

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## Risk Metric: Definition

- A measure of risk. Examples include value at risk, expected policyholders deficit, and conditional tail expectation

	Total Company
99.5% VaR	7,247
99.5% CTE	7,850

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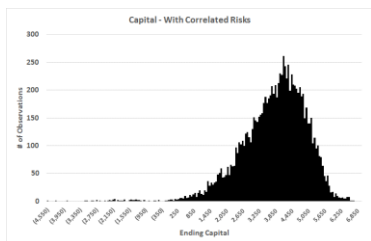
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## Considerations: Correlations



	No Correlations	Correlate 100 Events
99.5% VaR	7,247	8,326
99.5% CTE	7,850	9,456

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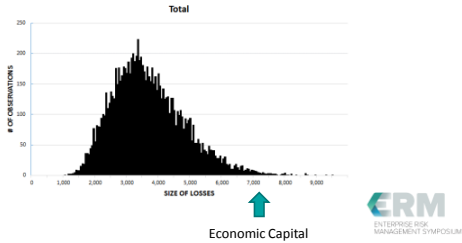
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## Economic Capital: Definition

- The amount of capital an organization requires to survive or to meet a business objective for a specified period of time and risk metric, given its risk profile.




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## Economic Capital: Considerations

Considerations	Sample Company
Time Frame	• One Year
Basis for Measuring loss / Accounting Framework	• All cash losses
Risk metric and how it is used in decision making	• We will discuss later
Degree to which Model reflects significant risks	• Includes risks, but may not be sufficiently tested
Degree to which Model reflects Interdependencies of those risks in a consistent and comprehensive manner	• Clearly the results are sensitive to correlation assumption




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## Risk Tolerance, Appetite & Limit

Term	Definition
Risk Tolerance	The aggregate risk-taking capacity of an organization.
Risk Appetite	The level of aggregate risk that an organization chooses to take in pursuit of its objectives.
Risk Limit	A threshold used to monitor the actual risk exposure of a specific unit or units of the organization to ensure that the level of aggregate risk remains within the risk tolerance.




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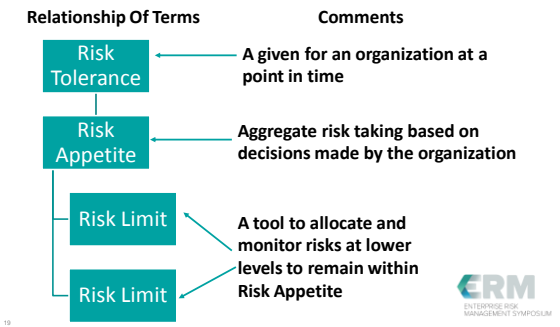
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## Risk Tolerance, Appetite & Limit




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## Risk Tolerance, Appetite & Limit

	Risk Metric	Threshold	Actual Result
Risk Tolerance	Expected Policyholder Deficit	0.10% of Premiums	0.04% of Premiums
Risk Appetite	VaR	99.5% VaR < Premiums + Capital	99.6%
Risk Limit: Risk 1	Loss Ratio	Losses < Premiums 80% of time	94.7%
Risk Limit: Risk 2	Loss Ratio	Losses < Premiums 80% of time	76.5%
Risk Limit: Risk 3	Loss Ratio	Losses < Premiums 80% of time	80.0%




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## Considerations: Risk Environment

Consideration	Sample Company
Regulatory and Rating Agency criteria for risk levels	Above Regulatory requirement, but maybe not by much
The organization's strategic goals	Not clear based on what we know
The interests, including risk/return expectations of relevant stakeholders	Also not clear

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## Risk Management System

Board of Directors Risk Report		
Companywide Metrics		
Measure	Required	Actual
Regulatory Capital	0.10% of Premiums	0.04%
Risk Limit	99.5% VaR < Premiums + Capital	99.6%
By Risk Metrics		
Risk 1	Losses < Premiums 80% of times	94.7%
Risk 2	Losses < Premiums 80% of times	76.5%
Risk 3	Losses < Premiums 80% of times	80.0%

What to consider

Components of ERM Control Cycle

Knowledge and experience of management and Board of Directors regarding ERM

Execution of ERM control cycle and reaction to unexpected events



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## Risk Mitigation

Definition

- An action that reduces the frequency or severity of a risk

Dealing with Risk 2 Risk Limit

- Pure stop loss insurance does not work effectively
- Purpose built reinsurance



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## Risk Mitigation: Specific Solution

- For Risk 2
  - Pays nothing if annual claims < 1,550 or claims > 1,700
  - Otherwise pays all claims over 1,550
  - Essentially moves enough claims into risk limit
  - Is this in Sample Company's best interests?



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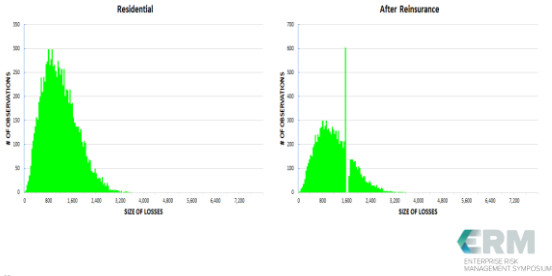
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## Risk Mitigation: Specific Solution

- Shifted enough scenarios to the left



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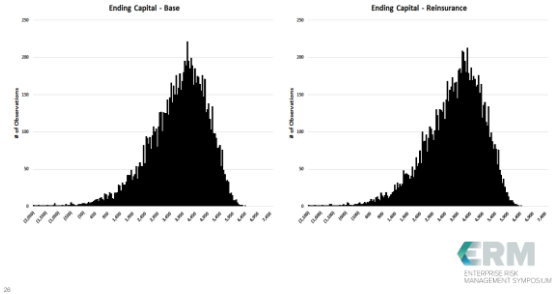
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## Risk Mitigation: Specific Solution

- Did not materially change firm's risk profile



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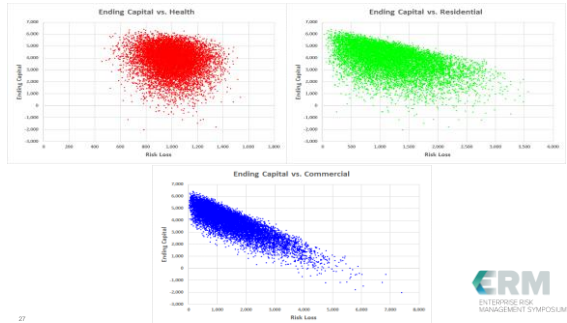
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## What is really driving results?



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## Contact Information

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