A Survey of Advanced Risk Management Techniques

Orlando Chapter RIMS

November 19, 2009

Agenda

Goal: Learn about the latest advances in risk management as well as innovative strategies in risk finance, risk analytics and enterprise risk management. With both internal and external stakeholders asking more and more risk-related questions, it's critically important to utilize the latest techniques that enable you to identify, quantify, and manage the insurable and non-insurable risks of your organization.

I. Current Landscape

II. Leveraging Analytics

III. Advanced Risk Financing

IV. Enterprise Risk Management

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I. **Current Landscape**

II. Leveraging Analytics

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Risks are Changing - Top 10 Risks Around the World*

Top 10 Risks	Change from 2007 Survey
1. Economic slowdown	(+7)
2. Regulatory/legislative changes	(+4)
3. Business interruption	(-1)
4. Increasing competition	New entry
5. Commodity price risk	New entry
6. Damage to reputation	(-5)
7. Cash flow/liquidity risk	New entry
8. Distribution or supply chain failure	(-4)
9. Third party liability	(-6)
10. Failure to attract or retain top talent	(-3)

Top 10 Risks

**Taken from Aon's Global Risk Management Survey 2009*

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Aon's 2009 Global Risk Management Survey

Available for free on Aon's website:

- **Go to www.aon.com**
- **Type "Global Risk Management Survey" into the search tool in the upper right hand corner**
- **Click on 2009 Global Risk Management Survey**
- **You will be asked to register, and then you can download a PDF copy. Note that you will need the current version of Adobe Acrobat.**

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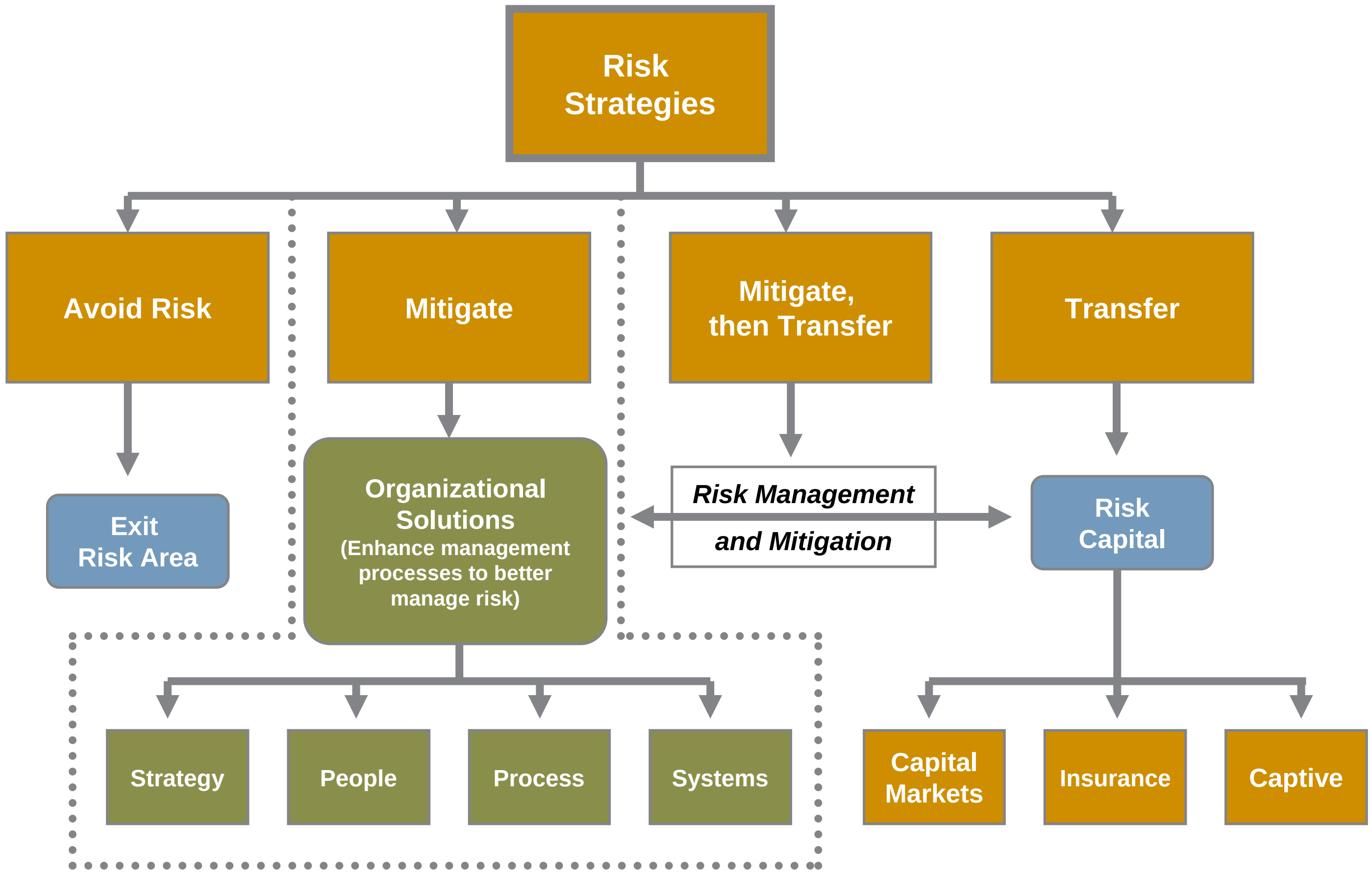
Risk Strategies to Manage the Changing Risk Environment



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Role of the Actuary

- **Where there is a need to quantify risk, there is an opportunity for an actuary**
- **Products & services provided by the actuary can be utilized by all industries/market segments:**
  - Retail
  - Construction
  - Manufacturing
  - Healthcare
  - Hotel and Leisure
  - Financial Institutions
  - Pharmaceutical/Chemical
  - Aviation
  - Energy
  - Technology

- **With appropriate risk analytics in place, an actuary can help:**
  - Quantify & improve predictability of key risks, thereby improving the decision making process
  - Understand balance sheet risks and help properly analyze risk transfer and retention possibilities, thereby increasing operational efficiency and minimizing the Total Cost of Risk

Risk Management Concerns

Risk Analytics can …

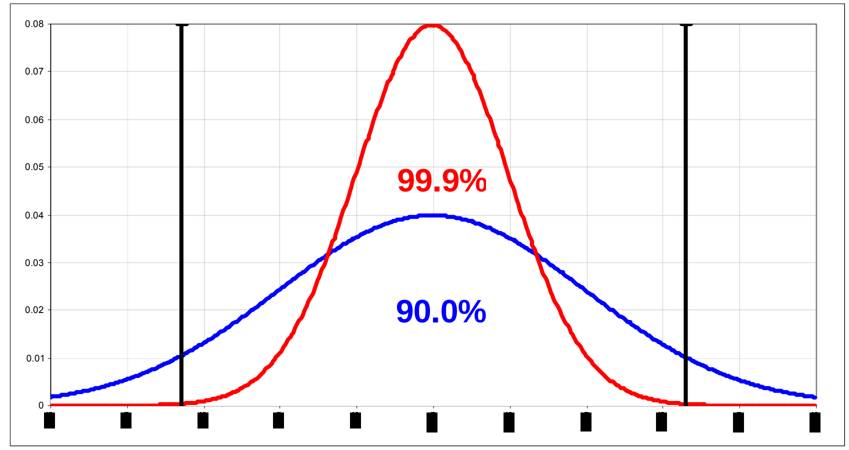
- Help establish reserve levels and show auditors these amounts are appropriate
- Quantify self-insurance or insurance costs for the upcoming year
- Lower collateral and letters of credit held by insurance carriers
- Assess volatility of self-insurance or insurance costs for the upcoming year
- Determine cost savings associated by assuming different retentions or deductibles

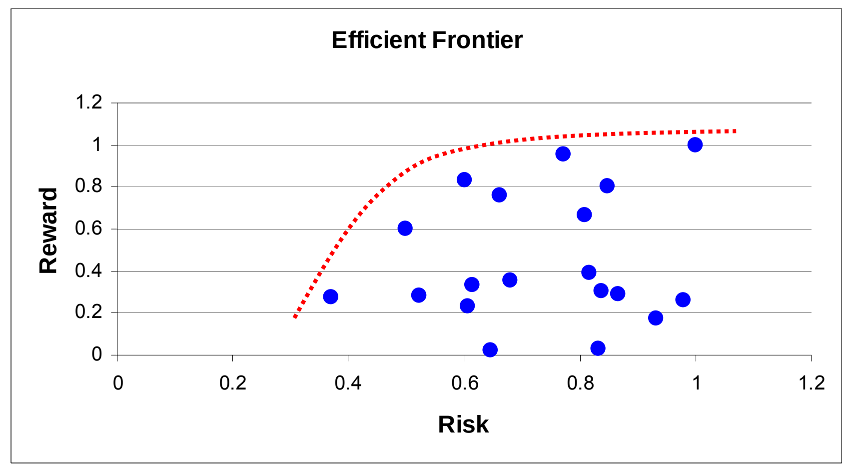
Specific Analyses

Standard Actuarial Services	Advanced Techniques
▪ Loss forecasting ▪ Loss reserve accruals ▪ Self-insurance certifications ▪ Risk variability and retention analyses ▪ Collateral / Letter of Credit analysis & negotiation assistance ▪ Ratemaking and Pricing ▪ Benchmarking	▪ Risk bearing capacity analysis ▪ Program comparison ▪ Loss Portfolio Transfers/Reserve Buyouts ▪ Risk Financing Decision Platform ▪ Cost of Risk allocation ▪ M&A Due Diligence ▪ Benchmarking ▪ Self-insurance/Captive Feasibility Studies ▪ Enterprise risk analyses

Understanding Variability in Models

- Expected Value
  - Mean, Average
  - Most financial forecasts convey the expected value
  - Point estimate to represent all potential outcome
  - Does not convey idea of risk
- Variance
  - Alternative is Standard Deviation
  - Describes how far events deviate from the expected value
- Mean and Variance
  - Completely describes risk for symmetric distribution
  - Sufficient for comparing options





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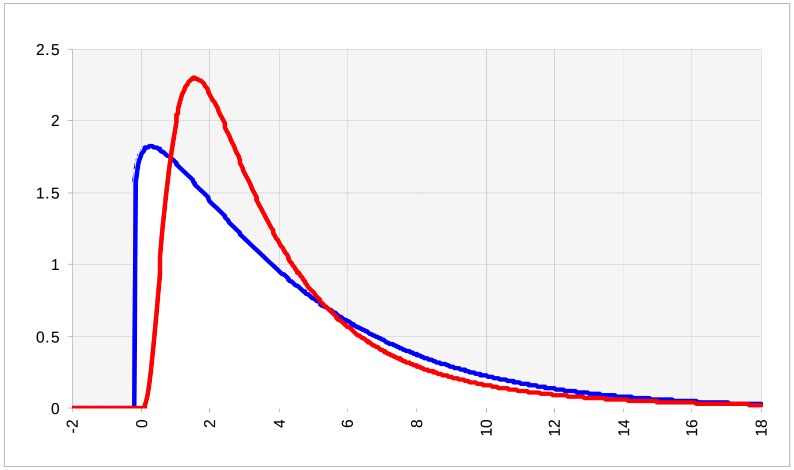
Understanding Variability

- Risks and opportunities often not symmetric
  - Losses bounded below by zero
  - Total cost of risk insured risk bounded below by transfer costs
  - Rewards bounded below by investment amounts (theoretically unbounded below if additional dollars are continually pumped into a losing investment)
- Skewed distributions
  - Not symmetric
  - “Fat tails”
  - The average is no longer at the median (i.e. 50%ile)
  - Same mean and variance can produce different results



	Blue Distribtion	Red Distribution	Difference
Mean	4,125	4,125	-
Std Deviation	4,000	4,000	-
Skewness	1.748	4.719	
90% Perc	9,389	8,382	(1,007)
95% Perc	11,998	11,241	(757)
97.5% Perc	14,557	14,499	(58)
99% Perc	17,867	19,496	1,629
99.5% Perc	20,337	23,805	3,468
99.9% Perc	25,996	35,941	9,945

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Type of Modeling

- A multitude of possibilities from the simplistic to the highly complicated
  - Gut/Instinct
  - Back of the envelope
  - Financial forecasts based on management view of the future
  - Non-financial based modeling (e.g. CAD, structural and spatial models)
  - Regression/predictive
  - Actuarial forecasts
  - Monte Carlo simulation models
  - Any decision based on the examination of the current and past environment as well as thoughts on future conditions

Examples of Modeling Tools

- Actuarial forecasting and reserving
- IBNR Monitoring reports
- Natural Catastrophe Modeling (such as RiskLink)
- Risk Financing Decision Platform
- ERM; Quantitative Modeling and Risk Assessments

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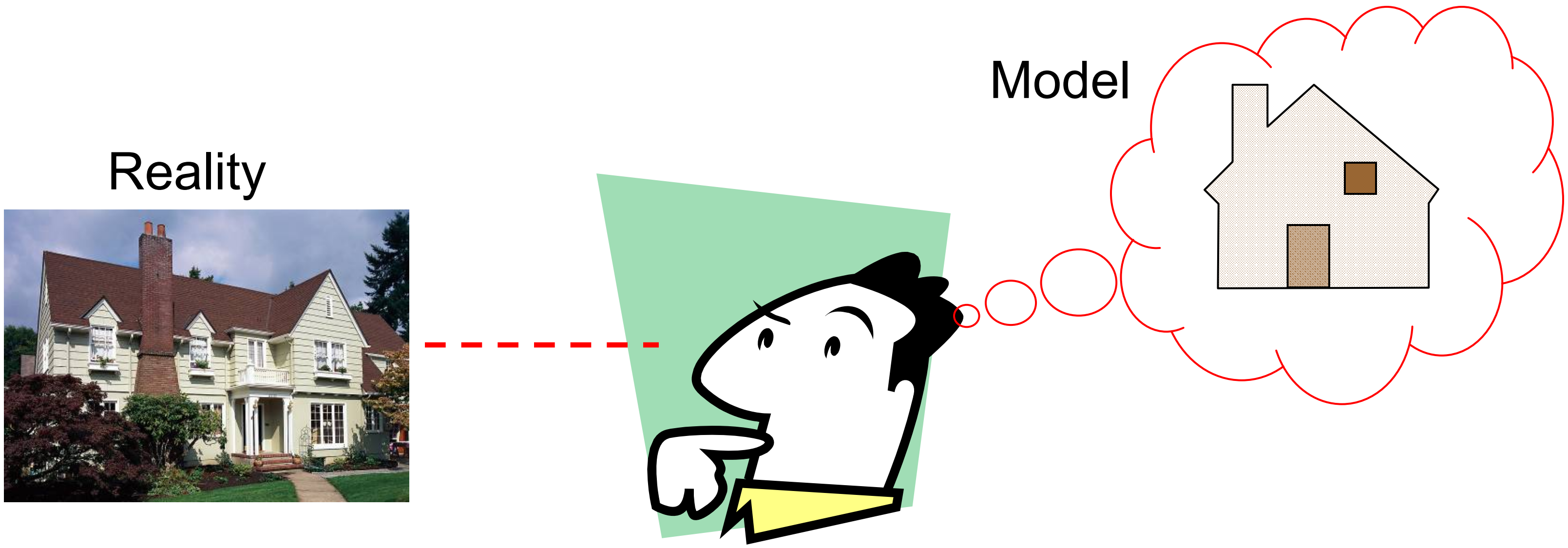
Models: A Refresher



- Attempt to estimate an unknown to make a better decision
- <u>Simplification</u> of reality to help us understand characteristics of a system
- Useful when it is prohibitive or impossible to observe/test directly
- Important characteristics: Accuracy, Clarity, Flexibility, Efficiency
- Models are tools…all models are wrong, some are useful

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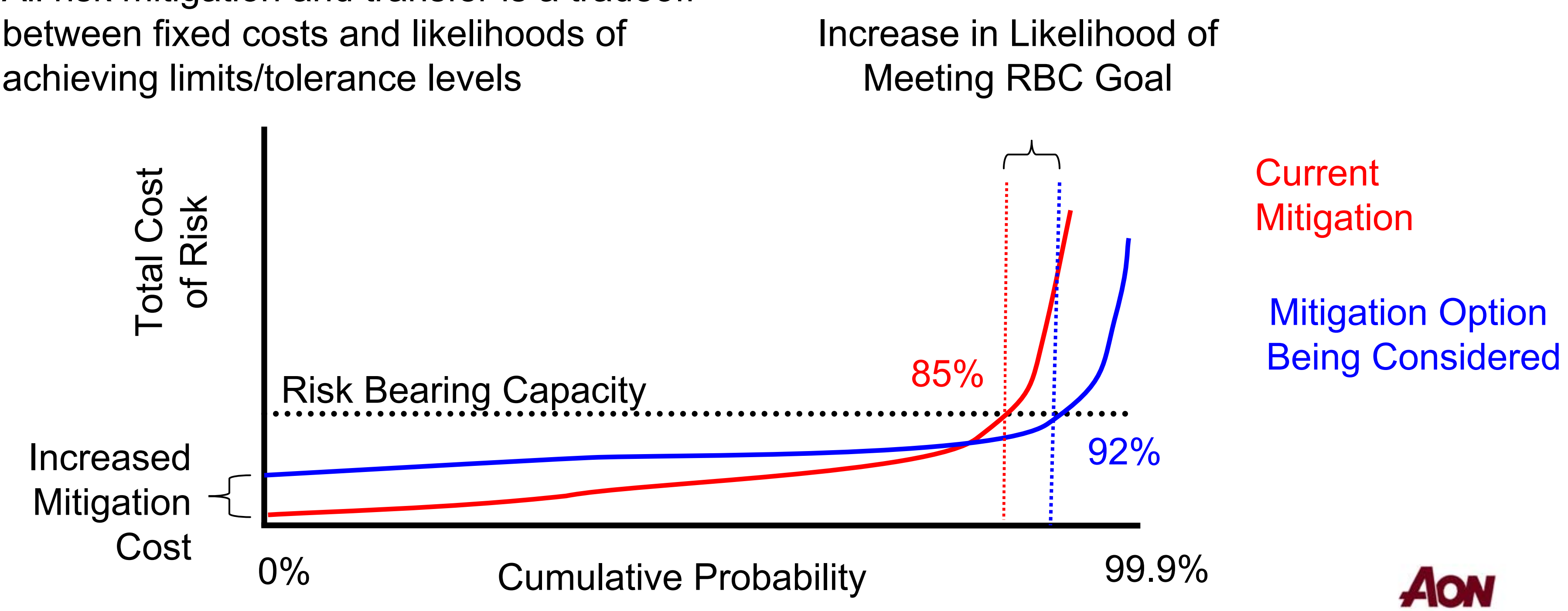
Leveraging Models

- ...some models are useful
  - Leverage the models to assist in determining how to deploy risk capital
  - Combine risks and opportunities
  - Consider a portfolio view, tie models to financial forecasts

All risk mitigation and transfer is a tradeoff between fixed costs and likelihoods of achieving limits/tolerance levels



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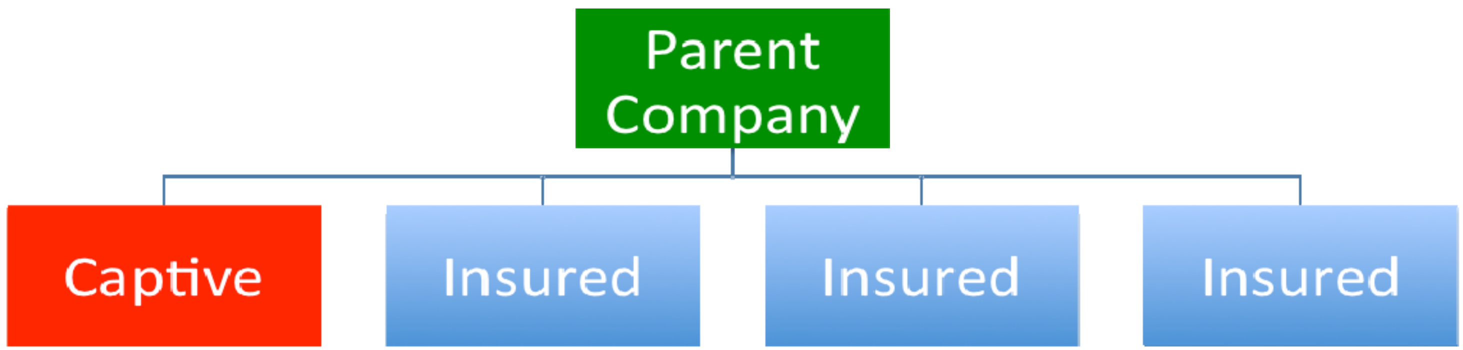
What Is A Captive?

- An insurance company owned and run for the benefit of a non-insurance owner or group of owners
- A captive by its very essence is a tool to retain risk
- It may or may not enjoy tax advantages offered to insurance companies

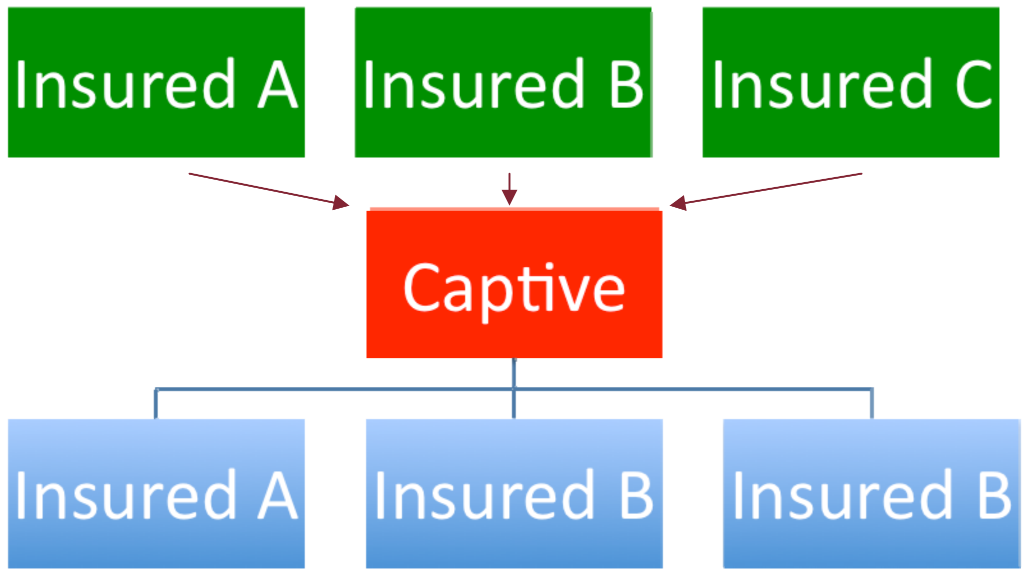
Types of Captives

- **Single Parent** Owned by a single company
- **Association or Group Captive** Owned by a number of companies that may have common interests. An RRG is a type of group captive with regulatory advantages
- **Rent-A-Captive / Protected Cell Captive** Owned by investors to provide clients with some benefits of a captive without actually forming a company

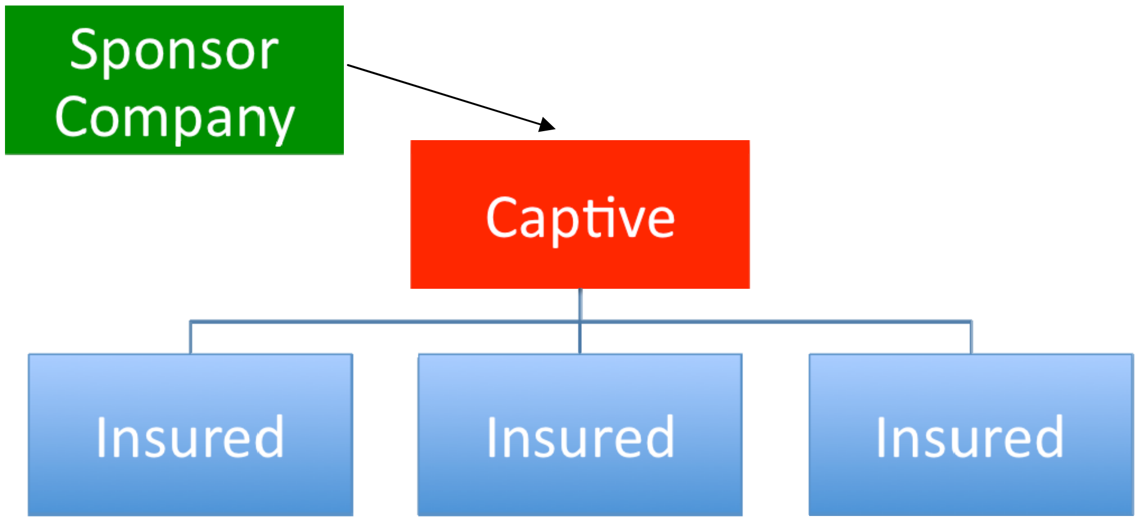
Single Parent Captive



Association-Owned Captive



Cell or Rent-A-Captive Structure



1. Each cell is accounted for separately
2. The sponsor provides core capital and owns the captive
3. Clients enjoy *some* of benefits of captive without dealing with the need to create a new corporate entity
4. In practice single parent captives are often costs competitive with rent-a-captive facilities

Value that Captives Deliver

- Cost Premiums charged by commercial insurers include profit margin and overhead charges. Captives can recapture this lost profit.
- Flexibility When markets harden, the captive is able to retain a larger proportion of its risks, and can maintain cover for its parent even when commercial insurance is unavailable or expensive.
- Conduit to Reinsurance Since captives are insurance companies, they can access the reinsurance market at favorable terms.
- Coordination of Global Programs A captive can play a central role in creating a single insurance platform for risk anywhere in the world.
- Tax A properly structured insurance program can provide Federal and State as well as Global tax efficiencies.
- Terrorism Captives are not prohibited from participating in the Terrorism Risk Insurance Program Reauthorization Act of 2007 (TRIPRA). A captive provides a way for companies to directly access capacity.

Advanced Risk Financing
Entrepreneurial Captives

- Situation
  - A real estate group owing 15,000 condos requires each renter to obtain Renters Insurance. Currently offered by open market. CFO asks if they can do it themselves and create a new income stream from related business.
- Solution
  - Client partners with a fronting carrier to provide Renters Insurance at attractive rates
  - Forms a dedicated captive reinsurance captive
  - All risk reinsured from the front into the reinsurance captive
  - Annual loss ratio around 45%
  - Expense ratio around 15%
  - Reinsurance captive captures the 40% profit which was otherwise lost to the open market.

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Advanced Risk Financing
Diversifying Retained Risk

- Situation
  - A large transportation company seeks to diversify their captive insurers underwriting portfolio.
- Solution
  - Client enters a risk swap with an insurer. The captive cedes $20,000,000 and assumes $20,000,000 in risks from the insurer.
  - This has the effect of diversifying a significant percentage of the captive exposures.
  - May have beneficial tax effects, since one of the distinguishing features of an insurer in tax law is significant diversification in underwriting.

Advanced Risk Financing
Dealing With Legacy Liabilities

- Situation:
  - A petrochemical company seeks to create a way to protect earnings from changes in legacy liabilities including pollution and asbestos related liabilities. Insurance is not available in sufficient size to provide meaningful help.
- Solution
  - A program to transfer assets and liabilities to a special purpose entity (SPE) is created.
  - The SPE is deconsolidated from the group, insulating the parent from the liabilities.

Advanced Risk Financing
Earning Impact of Accumulation of Risk

- Situation
  – A diversified Fortune 50 manufacturer has used their captive for nearly 25 years, and they are concerned about the accumulation of risk throughout that period.
- Solution
  – A multi-year, multi-line retroactive reinsurance contract is implemented to protect the captive.

Advanced Risk Financing
Insuring the Uninsurable

- Situation:
  - A company has an exposure to product recall event that could seriously challenge the company's financial resources. The company is financial healthy and profitable.
- Solution
  - A structured insurance solution is put in place.
  - While not "insurance" in either the tax or accounting definition, it creates a way for the company to spread the cash effect of the potential loss over several years.

Advanced Risk Financing
Accessing Risk Bearing Capacity

- Situation:
  - A group of companies have an exposure to catastrophic windstorm, and the insurance market provides limited capacity at high cost.
- Solution
  - The group of companies will create an association captive to issue Insurance Linked Securities (ILS) - also called Cat Bonds.
  - ILS are a form of indebtedness that is forgiven if a specified event occurs.
  - This structure provides a pool of funds to pay for losses in the event of a claim.

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There are many factors—internal and external—driving expectations and requirements for better risk management

Internal Drivers

- Board requests better risk information and details on existing risk management activities and strategies
- Administration's need to better understand the causes of volatility in the business and thereby improve decision making
- Administration's duty to provide assurance to the Board and external stakeholders that key risks are managed
- Desire for improved communications regarding risks to strategy and objectives
- Concerns regarding the organization's positioning and strategy given the current uncertain economic environment

External Drivers

- Regulatory requirements for controls and financial risk management frameworks
- Rating agency scrutiny of existing practices for identifying and managing risks (Recent S&P Changes)
- Published standards for risk management (COSO, AS/NZS)
- Investors seeking information on potential causes of volatility in project financials
- Stakeholders demanding assurance for on-going viability of organization
- Analyst evaluations of overall management and governance
- Current market and economic conditions force an inward look at and assessment of existing risk management practices

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Key stakeholders are raising critical risk and risk management questions and organizations need an effective framework to respond

Key Organizational Stakeholders

External Stakeholders

- Investors
- Rating agencies
- Lenders, Creditors
- Customers

Internal Stakeholders

- Board of Directors
- Audit Committee
- Management
- Employees

Sample Risk and Risk Management Questions

Risk Awareness

- What are the top risks?
- What is the potential impact of the top risks?
- Which business line brings the most risk to the organization's overall profile?
- Has the organization quantified any of its key risks? If so, which?
- How is risk information communicated to the Board and other key parties?
- How is the organization's risk profile changing?

Risk Improvement

- What activities are in place to manage the organization's key risks?
- Does the organization have the capabilities to execute this risk response strategy?
- What key metrics does the organization use to monitor current risk exposure levels?
- Who is responsible for monitoring the completion of action plans?
- Did the mitigation activity yield the appropriate level of benefit for the cost?

Risk Governance

- What is the organization's risk appetite?
- Is there a senior level or Board committee on risk?
- Do employees understand their risk management roles?
- Where is the risk management department located in the organization?
- How does the administration incorporate risk into its strategy development?
- Is the organization taking an appropriate amount of risk?

Enterprise Risk Management (ERM) offers a framework to address risks and challenges while improving overall corporate governance and decisioning

ERM Model

- Demonstrate **proactive understanding and management of risk**
  - Advance Management and Board-level understanding of *existing business risks and results*
  - Advance Management and Board-level understanding of *emerging risks and future prospects*
- **Improve organizational health**
  - Enhance corporate governance
  - Streamline existing risk processes
  - Improve business decision-making through better risk information delivered to the right people in an appropriate and timely manner
  - Support financial reporting through better understanding of risks and planned responses
- **Gain competitive advantage**
  - Anticipate and effectively respond to risk
  - Improve the risk / reward ratio
  - Better allocate resources

S&P, recognizing the benefits of ERM, announced that it will incorporate ERM reviews in ratings and evaluations of non-financial institutions…

- S&P is using the ERM framework to enhance their review of management, which they currently view as a "highly qualitative exercise"

- S&P will focus its analysis on two elements of any ERM program
  - Risk Management Culture
  - Strategic Risk Management

- S&P hopes to achieve:
  - enhanced analytical process and focus
  - better insights into management
  - enhanced communication regarding S&P's opinions of management
  - more forward-looking ratings
  - better ability to differentiate quality

…but the timeline for completing these reviews and incorporating ERM ratings has been extended to late 2009/early 2010

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S&P released a list of sample discussion questions it will use to evaluate a non-financial institution’s ERM program

- What are the company's top 5 risks, how big are they, and how often are they likely to occur? How often is the list of top risks updated?
- What is management doing about top risks?
- What size quarterly operating or cash loss has management and the board agreed is tolerable?
- Describe staff responsible for risk management and their place in the organization. How do you measure success of risk management activities?
- How would a loss from a key risk impact incentive compensation of top management and on planning/budgeting?
- Tell us about discussions about risk management that have taken place at the board level or among top management when making strategic decisions.
- How has your company responded to a recent “surprise” and describe whether the surprise affected your company and others differently.

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Even with risk management standards and the expectations/requirements of stakeholders, there are challenges to developing an ERM framework

Issue	Specific challenges
Perception of ERM	▪ Administration and employees may view ERM as a "bolt-on" process that requires extra time and effort ▪ Key employees may think the institution "already manages risk" ▪ It may not be clear who would own the ERM effort ▪ The administration may not see direct value in the ERM effort ▪ Organization may not have a clear "champion" for the ERM effort
Organizational resources	▪ Funding may be limited ▪ Current market and economic uncertainty may force companies to fund only critical operations and to preserve as much cash as possible ▪ Risk management or finance department may not have employees with the time, willingness or skill set to lead or participate in the effort
Leadership priorities	▪ Senior leadership's' (especially CFO) attention may be focused on more immediate issues (e.g. credit availability, etc)

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A phased, step-by-step implementation approach will develop an ERM program in a structured and practical manner

Step I: Understand ERM Capabilities

Assess existing risk management activities and develop a plan to achieve an ERM program tailored to the organization's needs and requirements

Step II: Pilot ERM Process

Develop (or update) the organization's risk profile by piloting the steps of the ERM process (e.g. identification, prioritization, response, etc)

Step III: Advance ERM Techniques

Conduct advanced risk analytics and implement governance structures and/or technology solutions to sustain ERM program

ERM Model

Case Study
Midstream Gas Company Seeks to Evaluate Capabilities, Develop Strategy

Situation

- A rapidly growing gas processor wanted to evaluate its existing risk management capabilities and develop a strategy to implement a sustainable ERM approach that leveraged the organization's strengths and closed identified gaps

Process

- Reviewed various operating, strategic and financial documents and interviewed 20 management representatives to assess existing risk management activities and decision processes
- Assessed existing risk management practices against certain risk management standards (e.g. COSO, Standard & Poor's) and ERM best practices using Aon's ERM Evaluation Scorecards
  - Applied a rating to each Aon Evaluation scorecard component: Governance/Infrastructure, Process, Integration and Communication & Sustainability
- Identified strengths in existing risk management practices and opportunities for improvement
- Detailed 7 key recommendations to be implemented in 2009 and 2010, which would close identified gaps and move the organization toward its desired ERM rating ("Strong-Excellent ERM" by S&P)

Results

- Evaluation scorecards and explanations for each ERM Evaluation Scorecard component
- Multi-year ERM implementation strategy that leverages organizational strengths, closes gaps and supports a sustainable ERM program

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Case Study
International Hotel Company Wants to Build Risk Profile, Pilot ERM Process

Situation

- A rapidly growing global hotel group needed assistance restructuring its ERM process and updating its existing risk identification, assessment and management data. ERM responsibilities had recently been re-assigned to a newly-created ERM team

Process

- Worked closely with the global ERM team in three corporate centers (US, UK and Asia) to design the ERM process in alignment with existing business processes
- Designed custom ERM tools and templates to support the new process
- Facilitated executive and management workshops to launch the new process and refresh the business unit, functional and corporate risk profiles

Results

- An efficient and effective process that achieved stated objectives on time and in budget
- Executive and management team understanding of the new ERM process and results
- Thorough and aligned series of risk profiles at business unit, functional and corporate levels
- Baseline ERM process and approach that can be further developed as needed

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Case Study
Global Oil Company Seeks Enterprise Risk Perspective

Situation

- An energy company with significant exposure to commodity price fluctuations, Gulf of Mexico windstorms, and political risks was seeking assistance in building a foundation to quantitatively assess overall risk and opportunity in the company's operations portfolio

Process

- Aon investigated the impact of oil and natural gas price volatility and basis risk on company performance in relation to critical rating agency metrics
- Aon quantified the company's political risk exposure in a country of concentrated operations, which included regulatory, economic policy, business environment, trade, and security risks
- Aon measured the company's Gulf of Mexico exposure to significant windstorm events

Results

- A baseline for investigating future hedging strategies was constructed and recent decisions were validated
- A framework for political risk and production interruption assessment was established, which validated past decisions and supported future considerations of alternative strategies for protecting against CAT risk

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