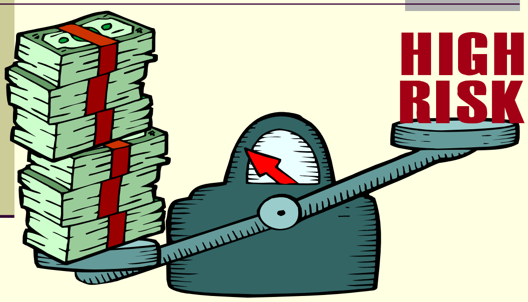
Enterprise Risk Management And Rating Process.

Risk Management and Financial Crisis.

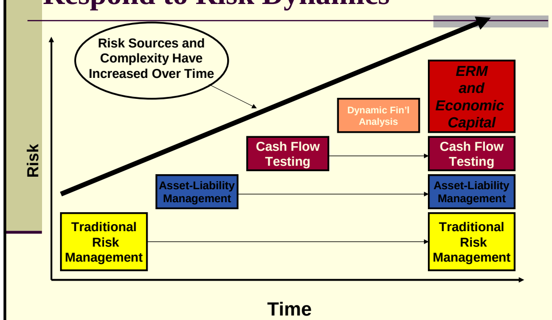
What worked and what did not.

Aftermath of the Crisis.

Higher the Risk Higher the Capital.



Insurance Industry Continues to Respond to Risk Dynamics



What is ERM

- ERM is a Process , not a one time occurrence
- ERM is ongoing and iterative
- ERM is way of doing business not a compliance issue
- ERM needs to be embedded in the corporate DNA
- ERM starts at the top
- ERM takes the commitment of senior management and board
- ERM is interactive, proactive and forward looking
- ERM is integrated and comprehensive
- ERM supplants Silo RM with Holistic RM

Risk Definitions

- Measurable Uncertainty
  - Frank Knight (1971) Risk Uncertainty and Profit
- Combination of the Probability of harm and the severity of that harm –ISO/IEC Guide 1999
- Combination of probability an event and it's consequence- ISO/IEC Guide 2002
- Chance of Something happening that will have an impact on objectives- AS/NZS 4360; 2004
- Effect of uncertainty on objectives- ISO 31000; 2009

Important points to consider in ERM

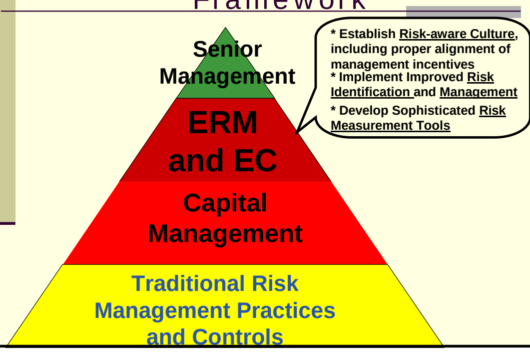
- Enterprise risk appetite, risk capacity and risk propensity
- Enterprise risks that are material, what are they?
- What are the metrics for these risks?
- How the enterprise risks are related to each other?
- Risk owners and risk response owners. Who are they?
- Non traditional non quantifiable risks and their measurement
- What are the roles and responsibilities with regards to risk management function?
- Company specific, systemic, structured

Important points to consider in ERM

- Decision making involves risk considerations?
- Enterprise risk return optimization strategies?
- How to identify and quantify emerging risks?
- ERM processes, policies and framework in place
- Transparency and reporting to Stakeholders
- ERM linked to performance? Risk based evaluations?
- How Independent is the risk function with in the Enterprise?
- Iterative and responsive to change

ERM framework

Enterprise Risk Management Framework



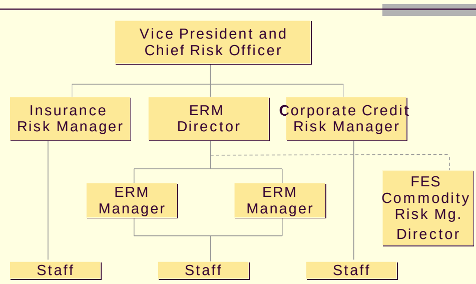
ERM dashboard should address the following for senior management

- Risk compliance and regulation
- Are risks aligned with Strategic, financial and operational objectives?
- Are there any risks that are escalated from below
- What are KRI and which requires immediate attention
- All risks are with in risk limits or Soft limits? Hard limits?
- How are risk functions performing?
  How are the risk target metrics. Are they with in boundaries
- Timing and frequency of dashboard reporting

Successful ERM

- Engaged senior management and board of directors
- Established policies, systems, and processes, supported by a strong risk culture
- Clearly defined risk appetite with respect to risk limits and business boundaries
- Robust risk analytics for intra- and inter-risk measurement, summarized in an "ERM dashboard"
- Risk-return management via integration of ERM into strategic planning, business processes, performance measurement, and incentive compensation
- Proactive and forward looking
- Portfolio view of risks

ERM Organization



Source: COSO

ERM…Embedding Risk Management into your "Corporate DNA"

- ERM and Economic Capital model must be an integral part of the management process and decision making culture of the institution.
- Embed your business in ERM and ECM frameworks and then embed your ERM and ECM into your Business
- Risk awareness is properly embedded in the daily operating procedures employed across the organization

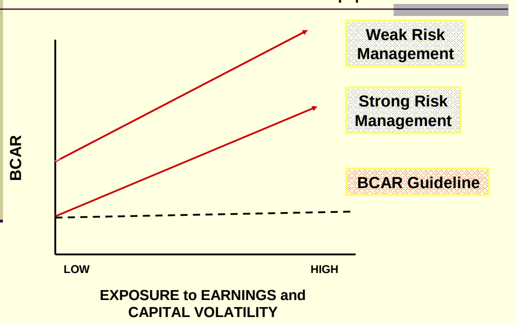
ERM for all companies ?

- Nature and scope of ERM will vary based on:
- Complexity of a company
  - Type of products offered
  - Number of products offered
  - Investments
  - Risk Profile of the company
- Volatility of Earnings/potential significant capital loss (Risk profile)
- Financial Flexibility
- Strength of its Traditional Risk management

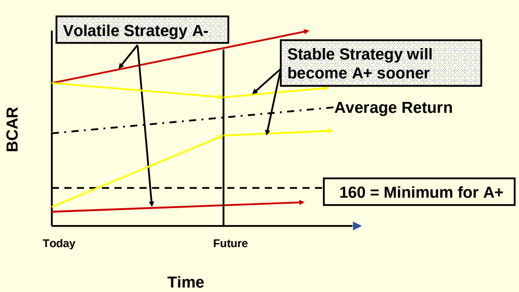
Best's Five Major Categories of Risk

Credit	Market	Underwriting	Operational	Strategic
Default	Equities	Underwriting process	Monetary controls	Competition
Downgrade	Other assets	Pricing	Financial reporting	Demographic/ social change
Disputes	Currency	Reserve development	Legal controls	Negative publicity
Sovereign	Concentration	Product design	Distribution	Rating downgrade
Concentration	Basis	Frequency	IT systems	Customer demands
Counter party	Reinvestment	Severity	Regulatory	Regulatory/ political capital
Spread	Liquidity	Lapse	Training	
	ALM	Longevity	Turnover	
	Interest rate sensitivity	Mortality and morbidity	Data capture	
	Basis	Policyholder optionality		
		Concentration		
		Economic environment		

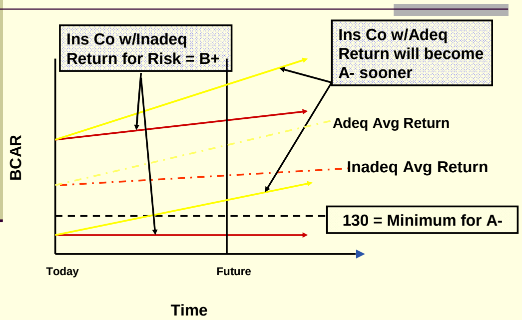
Risk Management and BCAR
Best's Traditional Approach

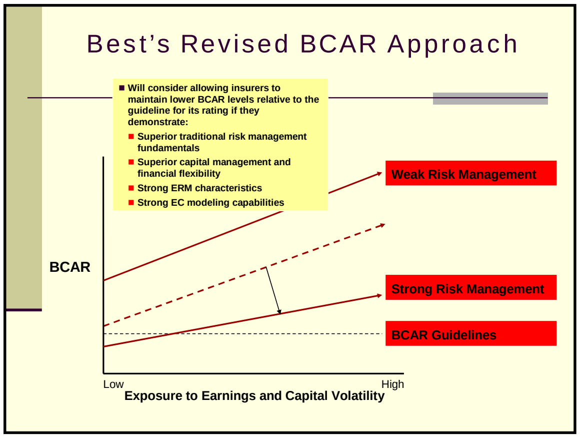


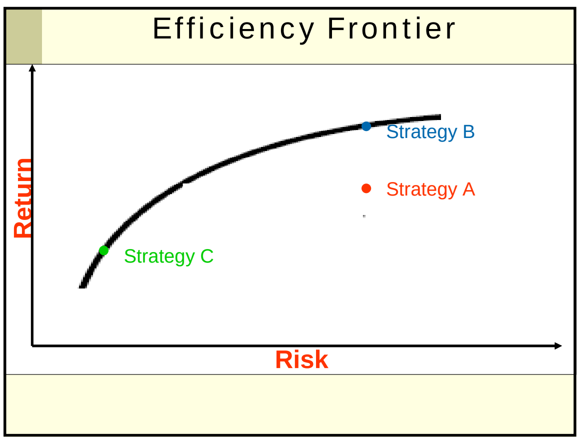
Impact of ERM - Example of Changing Business Strategy From Volatile to Stabile Lines

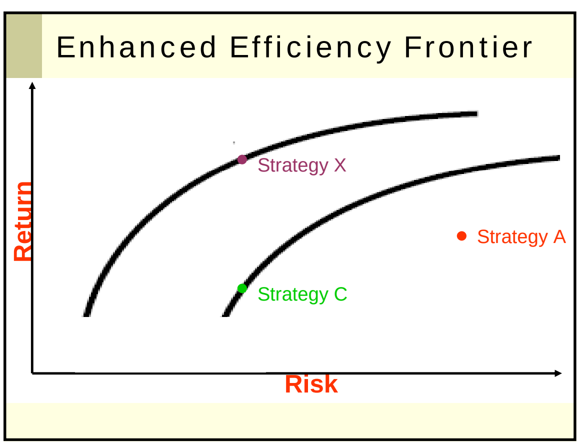


Impact of ERM on Ratings

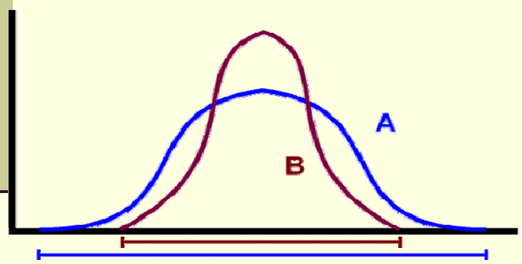



Best's Revised BCAR Approach
Will consider allowing insurers to maintain lower BCAR levels relative to the guideline for its rating if they demonstrate:
Superior traditional risk management fundamentals
Superior capital management and financial flexibility
Strong ERM characteristics
Strong EC modeling capabilities
Weak Risk Management
BCAR
Strong Risk Management
BCAR Guidelines
Low
High
Exposure to Earnings and Capital Volatility


Efficiency Frontier
Strategy B
Strategy A
Return
Strategy C
Risk


Enhanced Efficiency Frontier
Strategy X
Strategy A
Return
Strategy C
Risk

ERM and Reduced Volatility



A.M. Best's Rating Evaluation
Rating Considerations

	Secure A++ B+		Vulnerable B D
Balance Sheet Strength	Outstanding		Weak
Operating Performance	Very Stable/Strong		Volatile/Poor
Business Profile	Strong / Sustainable Advantages Well-Diversified		Questionable Viability Competitive Disadvantages Concentrated Risk

Enterprise Risk Management

ERM Framework and Culture

- Board & Senior Management Involvement
- Establishment and Communication of
  - Risk Management Objectives
  - Risk Tolerances
  - Key Risk Metrics
- Defined Roles/Responsibilities/Oversight
- Risk Management Objectives and Incentive Compensation

ERM is about the "E"

- ERM is the process through which insurers identify, quantify, and manage risk on an enterprise-wide, holistic basis
- ERM takes into consideration the individual risks at hand, as well as any correlations and interdependencies of risk across the entire organization
- Insurers that create a more structured, integrated risk framework and apply it prudently can
  - **Increase the value of the firm** and
    Provide financial security to the organization

While "one size does not fit all," Best expects all insurers to incorporate "selected" elements of ERM

Common Elements	Non-Complex Insurers	Complex Insurers
Foster risk-aware culture	✓	✓
Identify, monitor and manage risk on a quantitative basis	✓	✓
Consider the impact of risk correlations in business model	✓	✓
Identify and manage new emerging risks	✓	✓
Use internal economic capital (EC) models in decision making		✓

Role of BCAR

- BCAR lives on as a baseline for the assessment of risk-adjusted capital for all insurers
  - Many organizations do not have the scale or resources to support an Internal Capital Model
- Value of BCAR in rating process proven over time through our default statistics
- Next generation BCAR
  - NOT an "economic capital" model
  - Tie probability of default to the determination of required capital
  - Incorporate more stochastic elements in the development of risk factors

BCAR Requirements

Companies Without EC Output (Most of the U.S. Industry)

- BCAR requirements more closely linked to a company's relative ERM strength and earnings volatility
  - An insurer with "strong" ERM and "low" volatility can operate closer to the BCAR "guideline" for its rating level
  - An insurer with "weak" ERM and "high" volatility needs to maintain capital that is several notches above Best's minimum BCAR guidelines

Companies With EC Output

- Best is encouraging "leading edge" insurers to share their EC output
- Companies with strong ERM and EC modeling capabilities may have capital requirements that fall below Best's BCAR guidelines, provided the EC output is:
  - Used by management in strategic decision-making
  - Produced by an EC model that Best views as robust

Economic Capital Models

"A model, of necessity, is an abstraction from the full detail of the real world"

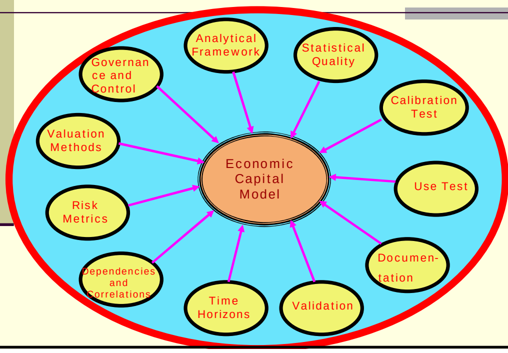
- Alan Greenspan, March 2008

(Abstraction - Generalization; ignoring or hiding details…….)

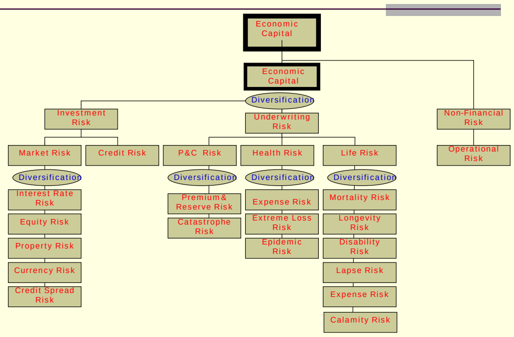
Quantitative Models

- "There is perhaps no beguilement more insidious and dangerous than an elaborate and elegant mathematical process built upon unfortified premises."
  - Thomas C. Chamberlain, 1899.
- "In theory there is no difference between theory and practice, In practice there is."
  - Yogi Berra

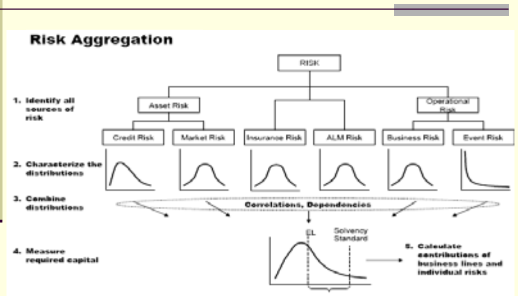
AMB - ECM Framework



Economic Capital Model Schematic



Capital Model Schematic



Source: CEIOPS

How will AMB gain comfort in the integrity of the ECM process and results?

- **Independent assessment of an insurer's ECM process and results**
  - Statistical quality test (including appropriateness of methodology and assumptions of model)
  - Calibration test (including extent to which stress and scenario testing is used to determine impact of tail events)

How will AMB gain comfort in the integrity of the ECM process and results?

- **Independent assessment of an insurer's ECM process and results**
  - Use test and governance (including evaluation of governance and internal controls in place related to ECM)
    - Performance measurement
    - Compensation
    - Pricing
    - Reserving
    - Capital allocation
    - Strategic decision making

How will AMB gain comfort in the integrity of the ECM process and results?

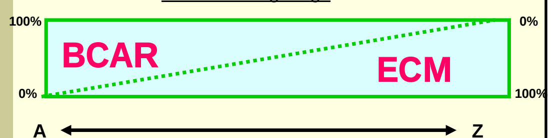
- **Objective is to better understand ECM vs. BCAR or other metrics**
  - Compare/contrast "gross" ECM results to BCAR, i.e. pre and post diversification benefit
    - In aggregate, by LOB, by major risk type
  - Compare/contrast "net" ECM results to BCAR, i.e. post-diversification benefit
    - In aggregate, by LOB, by major risk type
  - Reconcile results for current time period and understand trends

Internal Capital Models & Ratings

- Tier II – AMB discussion of key elements of ICM process and results
  - Analytical framework and granularity, flexibility, computability, tractability and auditability of the model
  - Assumptions and scenario testing
  - Timeliness and availability of data
  - Applicability and relevance of data
  - Sample length and relevance
  - Time horizons
  - Risk metrics used (VaR...TVaR/CTE)
  - Correlations and dependencies
  - Operational, Strategic and Emerging risks
  - ICM and management decision making
  - Disclosure (internal and external)
  - Parameter error / model error and model implementation error considerations
  - Internal and external "audit" findings
  - Next steps in ICM development

How will AMB integrate ECM results in the rating analysis?

Relative Weightings



Items for Discussion:

- Can the relative weighting reach 100% ECM?
- Can credit be given for "partial" models?
- What detail should AMB disclose about the analysis and weighting?

Model documentation

- Model development and structure
- Outline of Technical documentation
- Change documentation
- List and Frequency of Parameter calculations, updates, and model calibration
- Models Sub-Models and Versions if any
- Documentation understandable and accessible
- Public disclosure of the documentation

Model Validation

- Internal or external
- Procedures to check the calibration and appropriateness of the model
- Validation is iterative
- Qualitative validation
  - Departments, design teams, management teams, risk ownership at all levels, Model design, Data Quality, Use Test
- Quantitative
  - Model calibration, back testing, benchmarking, scenario testing Statistical tools and fitness testing, Calibration
- Model output volatilities across cycles, and across different time periods
- Cognizant of model risk, parameter risk, simulation errors and parameter errors
- Transparency

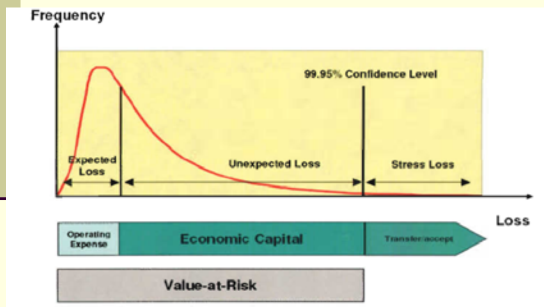
Use Test

- Degree to which risk management considers ECM results
- ECM is approved by the senior management
- ECM output is reported to Senior management and to be used in strategy setting
- ECM is used for Capital allocation, capital attribution, pricing, reserving, objective setting, product development, performance
- ECM is embedded, instilled and ingrained in enterprise DNA

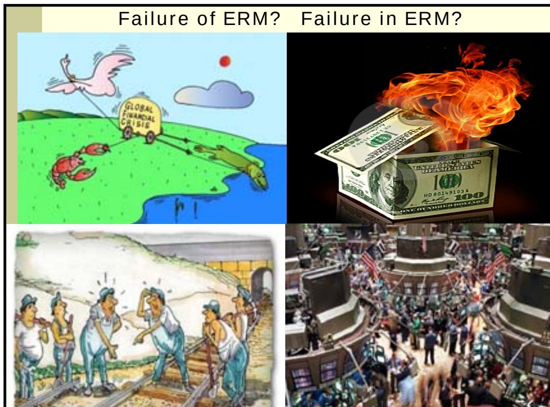
ECM - What have we seen so far?

- Re-insurers, large primaries
- Methodologies vary widely
  - Reserves – bootstrap, Mack, percent deviations
  - Aggregation – Correlation matrix, copulas, Stochastic modeling
  - Time horizon – 1yr/ult runoff, 5yr/10runoff, 4yr
  - Risk tolerance – VaRs - 99.9%, 99.5%, 99.95%, 99.97%
  - Risk Metrics – VaR, CTE/TVaR
  - Usage – Risk Capital, Product Pricing, capital allocation
  - Model/parameter updates – qtrly – annual
  - Validation – Internal validation
  - Documentation – Not satisfactory
  - Maintenance and Development of the Model - Nothing
- No explicit credit given so far.....

EL-UL-VaR-TVaR



Failure of ERM? Failure in ERM?

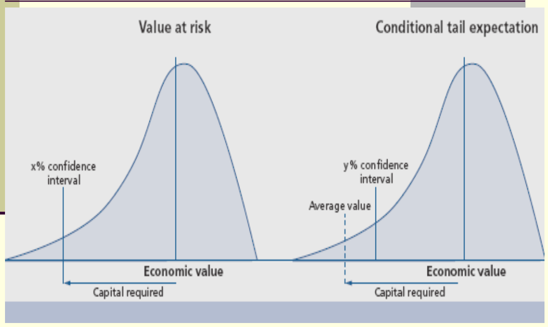


Failure of ERM? Failure in ERM?

Financial Crisis: What worked and what did not?

- Liquidity Risk
- Operational Risk
- Contagion Risk
- Capital Fungibility
- Correlations between risk factors
- Frequent scenario analysis
- Risk Governance
- Risk Metrics
- Risk Communication
- Risk Compensation
- Risk and reward/risk performance

Risk Metrics



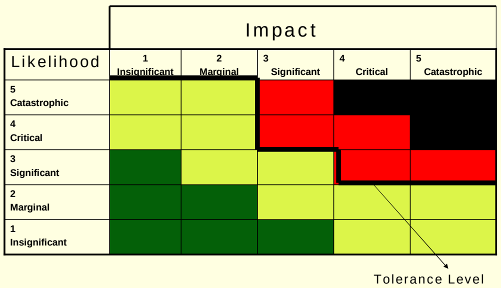
Risk Governance and Financial Crisis

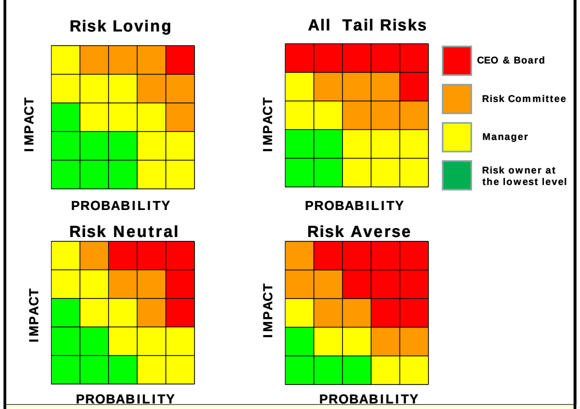
- Risk Management Culture
  - Risk Policy
  - Independence
  - Authority - empowerment
  - Risk Controls
  - Risk Compensation
  - Risk Ownership
  - Alignment of risk management and objectives
  - Risk awareness and underwriting
  - Risk articulation and Communication
  - Risk INFO feed back loops
  - Board and Senior management involvement
  - Integrated comprehensive and holistic

Risk Appetite and Financial Crisis

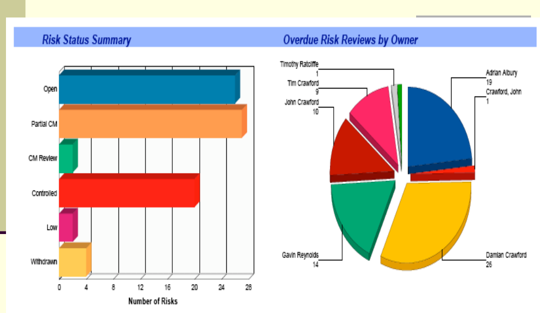
- Risk Appetite
- Risk Tolerance
- Risk Limits
- Risk targets
- Risk controls
- Embedding the risk limits in business
- Soft and/or hard limits on Risk
- Limit violations and trigger mechanisms
- Risk escalation procedures
- Implementation, effectiveness and changing of risk mitigation strategies

Impact of risks on your Business and Risk Rating.





Risk Status - Risk Reviews



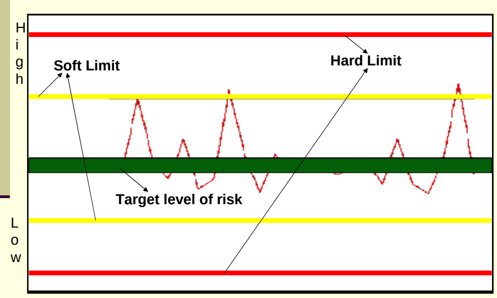
Enterprise Risk Profile

	London	New York	Toronto	Sydney
Bonds	Medium			
Equities			Medium	
Foreign Exchange			Medium	
Interest Rate		Medium		Medium
Precious Metals		High		

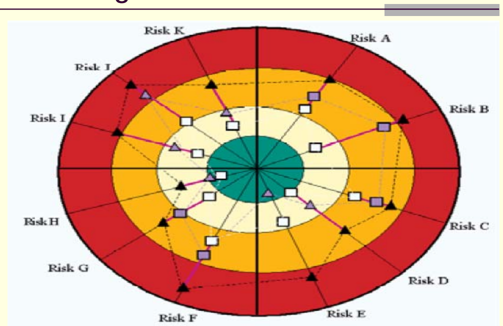
New York Precious Metals Operations:

	Traders	Middle Office	Back Office
Personnel			
Settlements			Medium
Reconciliations	High	Medium	High
Compliance			

Risk Limits: Soft and Hard



Risk Mitigation and Management/Residual Risks



Source: UK DOT

Risk Appetite and the Financial Crisis

- Stakeholder analysis
  - Shareholders
  - Employees
  - Rating agencies
  - Regulators
- Alignment with Strategic, financial and operational objectives
- Risk capacity and Risk Propensity
- Integrated, comprehensive and holistic view of risk
- Risk Culture

Risk Management Capacity

- Ability of an Enterprise to manage risk exposures with in the established tolerance limits consistent with risk profile and appetite of the Enterprise.
- Indicators of risk management capacity
  - Does the company understand it's risk profile
  - Does the company have proper processes and metrics to measure and assess risks
  - Does the company have people with appropriate skill sets to manage risks
  - Are the company risk management practices, policies and procedures are consistent, commensurate and with the risk profile of the company?
  - Can these risk management practices be verified for effectiveness?
  - Does the firm have a risk culture to support effective and efficient risk management.

Role of Board

- Set the risk appetite for the company and risk limits for the managers and business units
- Decide risk decisions the board should retain and identify risk owners at higher level
- Establish risk tolerances and escalation procedures
- The nature, type, frequency and rigor of risk reporting

Risk Communication and Financial Crisis

- Key risk indicators
- Risk dashboards
- Risk registers risk logs
- Oversight review of risk events
- Vision and provision for emerging risk
- Risk escalation procedures and triggers
- Frequency and timeliness of communications

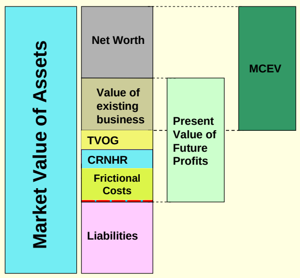
Risk Categories and Financial Crisis

- Operational Risks
- Reputational Risks
- Contagion Risks
- Emerging Risks
- Basis Risks
- Risk Responses

Liquidity Risk and Financial Crisis

- Funding liquidity
- Asset liquidity
- Liquidity and Capital
- Liquidity risk Management framework
- Scenario and stress tests
- Including in ECM
- Contingency funding and stress testing
- Conduits and off balance sheet activities
- Liquidity risk pricing

Market Consistent Embedded Value and Financial Crisis



Purpose

Valuation

Performance

Disclosure

Reporting

Pricing

Problem with MCEV

illiquid Markets

Market Volatility

No allowance for Credit and Liquidity risk

Source: CEIOPS

Risk Models and Financial Crisis

- Correlations between risk factors
- Capital Fungibility
- Frequent scenario and stress analysis
- Liquidity Risk
- Consideration of non quantifiable risks
- Model error
- Model validation
- Data quality
- Risk categories covered
- Flexibility of frameworks and assumptions to deal with contingencies
- Experience judgment

ERM and ECM

- Not mutually exclusive
- ECM a subset of ERM
- ECM not necessary for all companies
- ECM may be a must for some companies
- ECM a quantitative tool with in ERM
- Partial models are possible
- Risk profile dictates the relationship between ERM and ECM
- ECM for Pricing of risk

Model Error/Validity/applicability

" The essential problem is that our models – both risk and econometric models – as complex as they have become, are still too simple to capture the full array of governing variables that drive global economic reality."

.... *Alan Greenspan*, "We will never have a perfect model of risk", Financial Times, March 16, 2008

Questions and Comments

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