ENTERPRISE RISK MANAGEMENT

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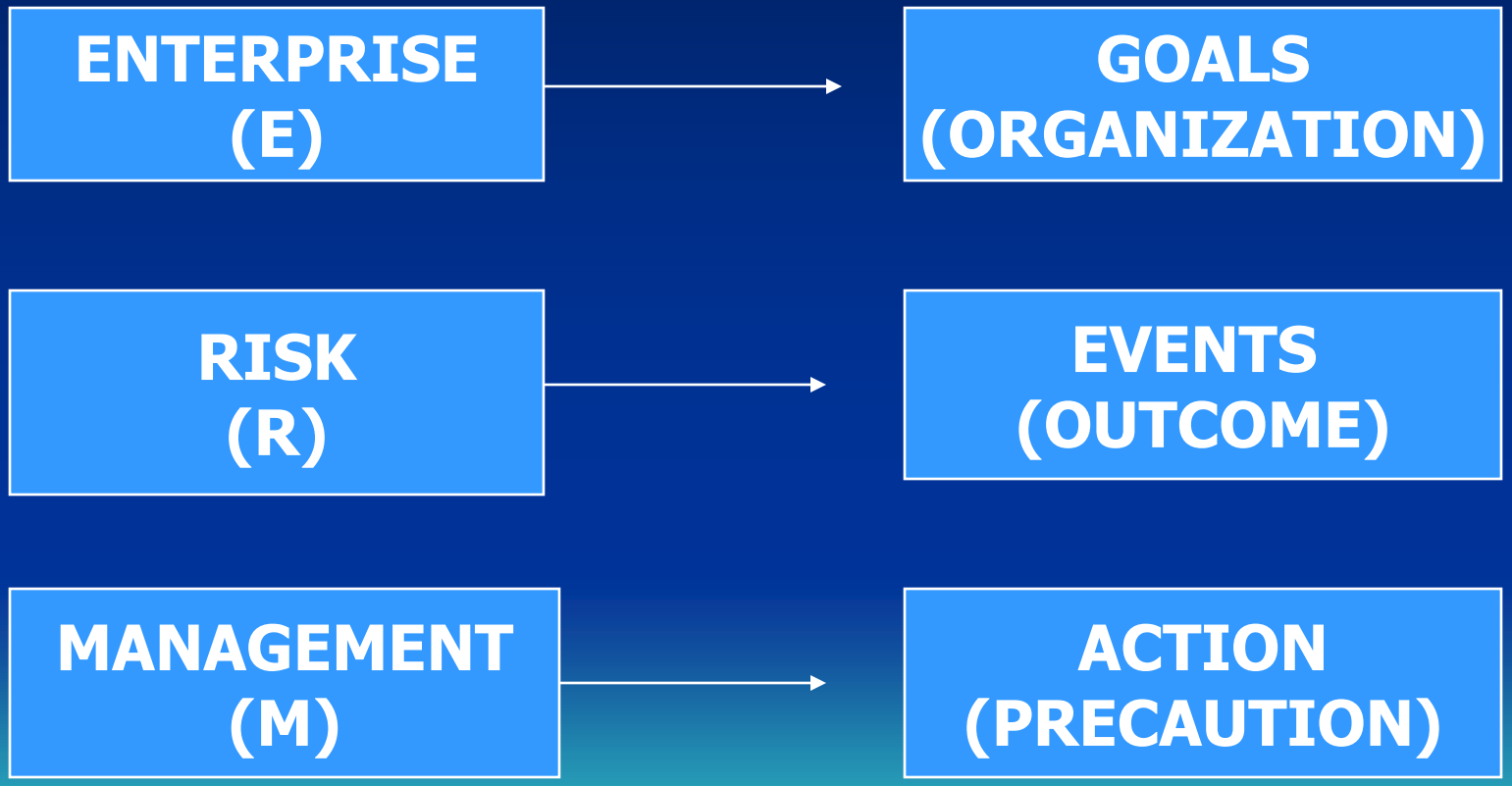
What is ERM?


ENTERPRISE (E)
GOALS (ORGANIZATION)
RISK (R)
EVENTS (OUTCOME)
MANAGEMENT (M)
ACTION (PRECAUTION)

ERM

- Enterprise – “ Organization”, “Company”, “Institution”, “Business Set Up”
- Risk – “Danger”, “Loss”, “Obstacle”
- Management – “Handling”, “Getting what you want”, “Practical solution to the given circumstance”, “Avoiding a collapse”

RISK

Risk, in traditional terms, is viewed as a ‘negative’.

Webster’s dictionary, for instance, defines risk as “exposing to danger or hazard”.

The Chinese give a much better description of risk

- The first is the symbol for “danger”, while
- the second is the symbol for “opportunity”, making risk a mix of danger and opportunity.

RISK MANAGEMENT

Risk management is an attempt

- to identify,
- to measure,
- to monitor and
- to manage uncertainty.

Risk management…

- Risk management is present in all aspects of life
- It is about the everyday trade-off between an expected reward and a potential danger
- It is universal, in the sense - it refers to human behavior in the decision making process

No Risk …

No Gain!

Benefits of risk management

Definition of ERM

"Enterprise risk management is a

- ***process**,*
- ***effected** by an entity's board of directors,_management and other personnel,*
- ***applied** in strategy setting and across the enterprise,*
- ***designed***
- ***to identify** potential events that may affect the entity, and*
- ***manage risk** to be within its risk appetite,*
- *to provide reasonable **assurance***
- *regarding the achievement of **entity objectives**."*

COSO (Committee of Sponsoring Organizations of the Treadway Commission) defines ERM

ERM

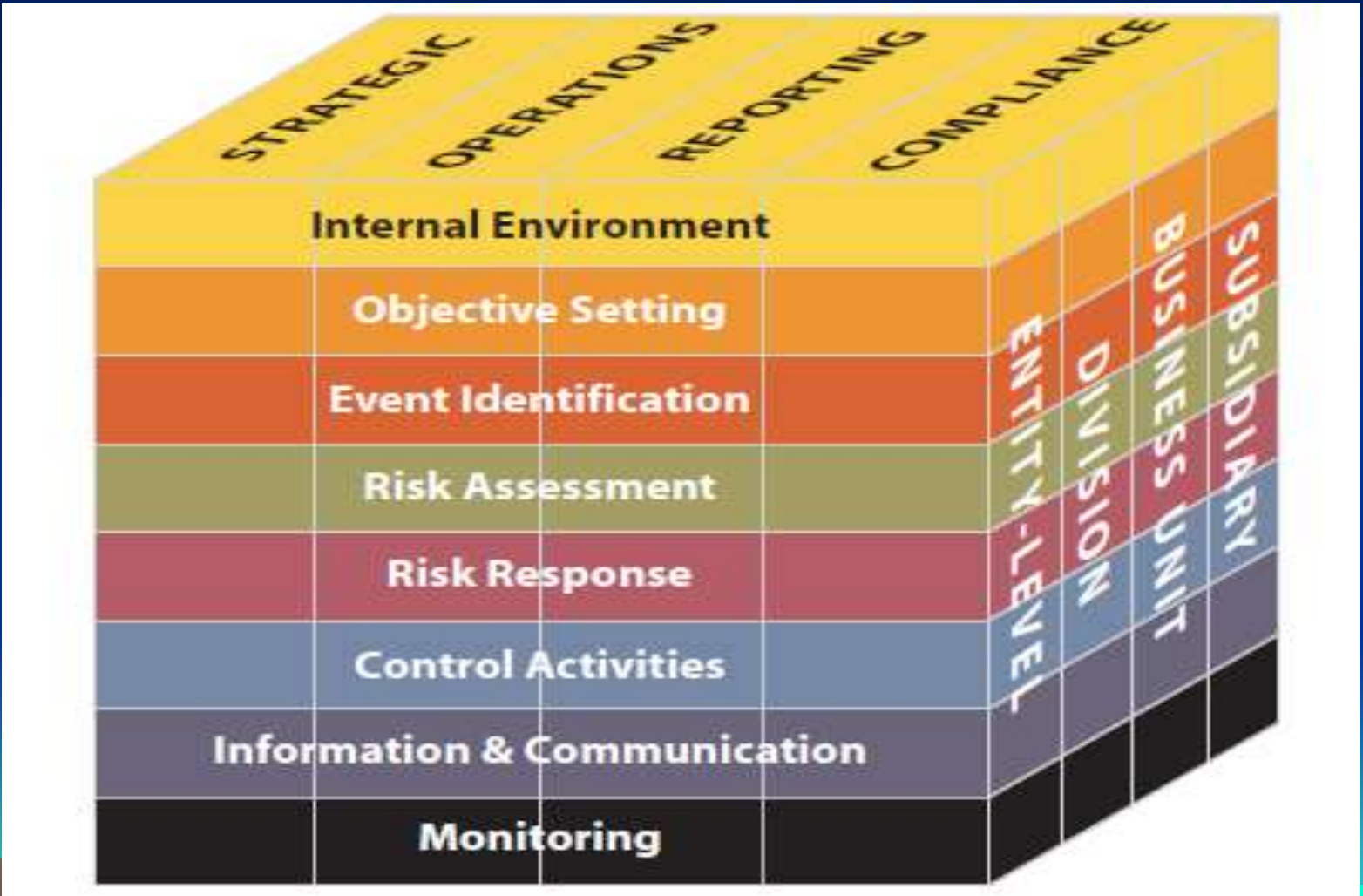
- ERM is an ongoing process
- ERM is an Integral part of how an organization operates
- ERM applies to all organizations, not just financial organizations.
- Risk applies broadly to all things threatening the achievement of organizational objectives
- Risk is not limited to threats, but also refers to opportunities.
- The goal of an organization is not “risk minimization”, but seeking an appropriate “risk-return position”.

Enterprise – Entity's Objective

Entity's Objectives - 4 categories

- **Strategic** – high-level goals, aligned with and supporting its mission
- **Operations** – effective and efficient use of its resources
- **Reporting** – reliability of reportin
- **Compliance** – compliance with applicable laws and regulations

8 Components of ERM



8 Components of ERM

1. Internal Environment
2. Objective Setting
3. Event Identification
4. Risk Assessment
5. Risk Response
6. Control Activities
7. Information and Communication
8. Monitoring

Internal Environment

- Establishes a philosophy regarding risk management. It recognizes that unexpected as well as expected events may occur.
- Establishes the entity's risk culture.
- Considers all other aspects of how the organization's actions may affect its risk culture.

Objective Setting

- Is applied when management considers risks strategy in the setting of objectives.
- Forms the risk appetite of the entity — a high-level view of how much risk management and the board are willing to accept.
- Risk tolerance, the acceptable level of variation around objectives, is aligned with risk appetite.

Event Identification

- Differentiates risks and opportunities.
- Events that may have a negative impact represent risks.
- Events that may have a positive impact represent natural offsets (opportunities), which management channels back to strategy setting.

Event Identification

- Involves identifying those incidents, occurring internally or externally, that could affect strategy and achievement of objectives.
- Addresses how internal and external factors combine and interact to influence the risk profile.

Risk Assessment

- Allows an entity to understand the extent to which potential events might impact objectives.

- Assesses risks from two perspectives:
  - Likelihood
  - Impact

- Is used to assess risks and is normally also used to measure the related objectives.

Risk Assessment

- Employs a combination of both qualitative and quantitative risk assessment methodologies.
- Relates time horizons to objective horizons.
- Assesses risk on both an inherent and a residual basis.

Risk Response

- Identifies and evaluates possible responses to risk.
- Evaluates options in relation to entity's risk appetite, cost vs. benefit of potential risk responses, and degree to which a response will reduce impact and/or likelihood.
- Selects and executes response based on evaluation of the portfolio of risks and responses.

Control Activities

- Policies and procedures that help ensure that the risk responses, as well as other entity directives, are carried out.
- Occur throughout the organization, at all levels and in all functions.
- Include application and general information technology controls.

Information & Communication

- Management identifies, captures, and communicates pertinent information in a form and timeframe that enables people to carry out their responsibilities.

- Communication occurs in a broader sense, flowing down, across, and up the organization.

Monitoring

Effectiveness of the other ERM components is monitored through:

- Ongoing monitoring activities.
- Separate evaluations.
- A combination of the two.

Scope of ERM

- Aligning risk appetite and strategy
- Enhancing risk response decisions
- Reducing operational surprises and losses
- Managing multiple and cross enterprise risks
- Grabbing opportunities
- Improving deployment of capital

Objectives of ERM

- Improve risk-based decision making
- More effective use of capital
- Comply with regulatory changes
- Improve shareholder value
- Anticipating problems before they become a threat
- Co-coordinating various risk management activities

ERM- History…..

1974- Basel Committee on Banking Supervision

1988 - Basel Capital Accord setting forth a new framework for minimum risk based Capital requirements

1985 - COSO formed an independent commission to undertake a private sector study of factors that caused fraudulent financial reporting

1992- Following a series of high profile corporate frauds and accounting scandals, the London Stock Exchange introduced new regulations covering various aspects of Corporate governance

1995- Development of national standards on Risk Management began with Aus/NZ Risk

Similar standards in Canada (Dey Report 1997) and Japan, and in the UK (2000)

1996- NAIC (National Association of Insurance Commissioners in United States) introduced risk based capital requirement for insurance companies.

2002 - A string of corporate accounting scandals has profound implications in the US and worldwide and led to the passage of Sarbanes-Oxley Act

2004 – COSO Enterprise Risk Management Integrated Framework

2009 – ISO 31000 Risk Management Standard

2010 –COSO Strengthening Enterprise Risk Management for Strategic Advantage

ISO : 31000

- ISO 31000 was published in 2009 as an internationally agreed standard for the implementation of risk management principles
- ISO also produced Guide 73 ‘Risk management – Vocabulary – Guidelines for use in standards’.
- The definition set out in ISO Guide 73 is that risk is the “effect of uncertainty on objectives”.

ISO : 31000

- Guide 73 also states that an effect may be positive, negative or a deviation from the expected, and that risk is often described by an event, a change in circumstances or a consequence.
- Risk management is a central part of the Strategic Management of any a organization
- Risk Architecture , Strategy and Protocols

Risk architecture

- Risk architecture specifies the roles, responsibilities, communication and risk reporting structure

Risk strategy

- Risk strategy, appetite, attitudes and philosophy are defined in the Risk Management Policy

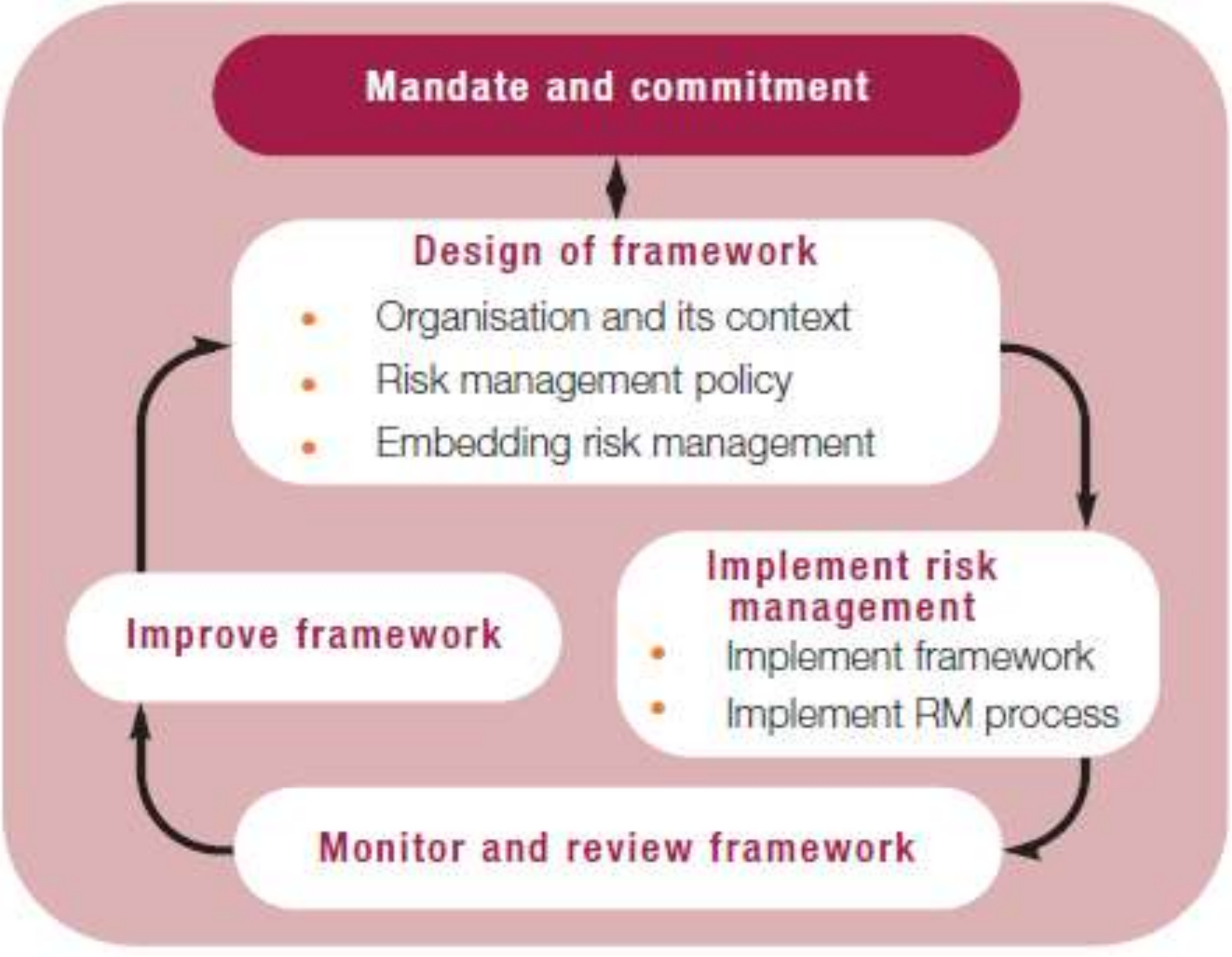
Risk management process

Risk protocols

- Risk protocols are presented in the form of the risk guidelines for the organisation and include the rules and procedures, as well as specifying the risk management methodologies, tools and techniques that should be used

ISO:31000

- ISO 31000 does not recommend a specific risk classification system and each organisation will need to develop the system most appropriate to the range of risks that it faces.
- ISO 31000 describes a framework for implementing risk management, rather than a framework for supporting the risk management process.
- Information on designing the framework that supports the risk management process is not set out in detail in ISO 31000.
- Framework for managing risk as per ISO 31000


Mandate and commitment
Design of framework
Organisation and its context
Risk management policy
Embedding risk management
Implement risk management
Implement framework
Implement RM process
Monitor and review framework
Improve framework

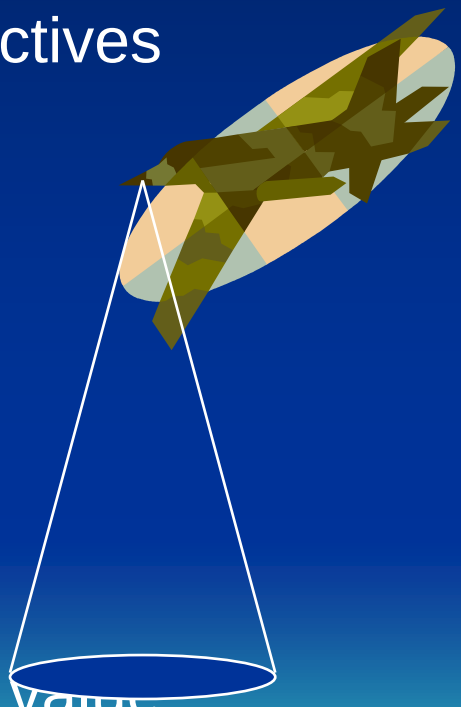
ISO:31000

ISO 31000 recognizes the importance of feedback by way of two mechanisms.

- Monitoring and review of performance and
- Communication and consultation

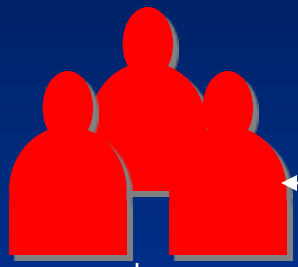
RISKS vs. OPPORTUNITIES

- Risk is a possibility that an event will occur and adversely affect the achievement of objectives



- Opportunity is the possibility that an event will occur and positively affect the achievement of the organization's objectives and creation of value

Types of Risks



External pressure from:

- **Regulators**
- **Shareholders**
- **Trading**
- **partners**
- **Customers**

RISKS

Market

Inherent

Static

Credit

Systematic

Residual

Developments in Enterprise Risk Management

Understanding risks is not new at all

There has always been an inherent understanding of risk ;

e.g. health and safety risk

Risk management concept has been around in investment, banking, insurance, artificial intelligence, and public policy processes

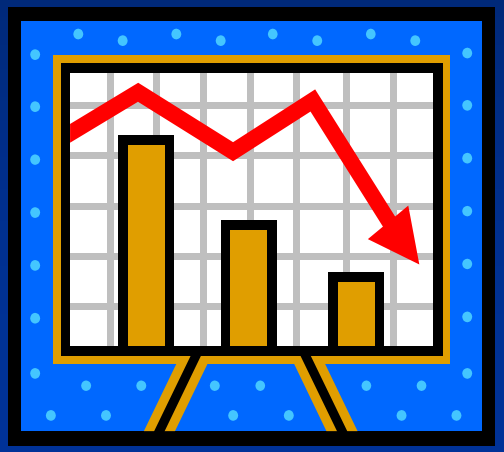
Traditional risk management vs. ERM

- Traditional risk management is more related to financial and hazard risks i.e. transferable risks
- Traditional risk management requires more accounting type skills

- ERM stresses the management of operational and strategic risks
- ERM requires skill in strategic planning, process re-engineering, and marketing

Market risk

It is the risk that the value of on and off-balance sheet positions of a financial institution will be adversely affected by movements in market rates or prices such as interest rates, foreign exchange rates, equity prices, credit spreads and/or commodity prices resulting in a loss to earnings and capital.



Inherent risk

- A risk which it is impossible to managed or transferred away

Static risk

-Risk which is unique to an individual asset

Credit risk

-Failure to meet the obligated payments of counter parties on time

Systematic risk

-The risk of holding Market Portfolio

Residual risk

-That remains after the action to mitigate risk is taken

Are You Prepared?

Too many businesses fail for the wrong reasons.

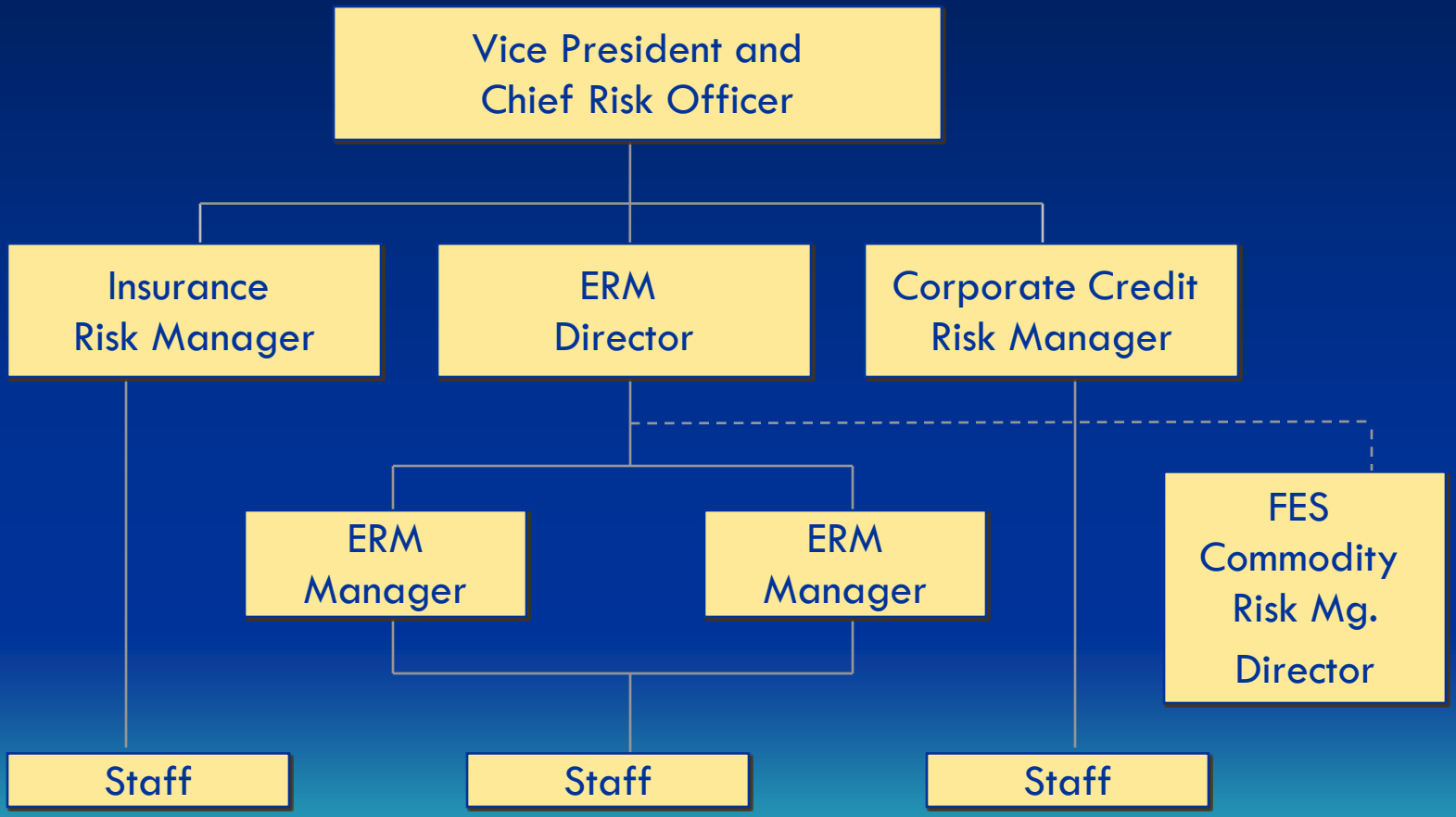
- They don't fail because their products are inferior, because they are bad at marketing, or because they are bad at controlling costs.
- They fail because they do not identify and manage risks.
- When a disaster happens — an incident they should survive — they aren't prepared. They didn't anticipate what could happen, and they certainly didn't plan for it.
- Unprepared businesses suffer badly or fail.

Risk Management and Business Continuity

Risk management is simply a practice of systematically selecting cost effective approaches for minimising the effect of threat realization to the organization.

Business Continuity Planning (BCP) is a methodology used to create a plan for how an organization will resume partially or completely interrupted critical function (s) within a predetermined time after a disaster or disruption

Example: ERM Organization



Challenges

- Data availability & integrity
- Data warehousing/ mining
- Building up processes & systems
- Developing Human Resources
- Strengthening skills
- Model validation – requires greater collaboration with regulator
- Cost - investment in risk analytics and risk technology – getting management buy-in
- Stress testing, scenario analysis – building capabilities

Balancing the Hard and Soft side of Risk Management

Hard Side

- Measures and reporting
- Risk oversight committees
- Policies & procedures
- Risk assessments
- Risk limits
- Audit processes
- Systems

Soft Side

- Risk awareness
- People
- Skills
- Integrity
- Incentives
- Culture & values
- Trust & communication

Implementation Of ERM

The basic elements of an effective risk management program are:

1. **Senior management and board level commitment**
2. **Risk management policies and procedures established in writing for the most prominent risks, with specific objectives and targets**
3. **Clearly defined responsibilities for managing and controlling risk**
4. **Ongoing employee training is essential**
5. **Testing and monitoring of all programs and procedures**
6. **Regular reports including independent audits prepared for review by senior management and board directors**

Corporate Failures

Fudging revenue and capital accounts

Mismanagement and poor decision making

Off Balance sheet entities, SPV's, synthetic leases

Mismanagement and poor decision making

Accounting scandal, overstatement of revenues

False and Misleading Financial Statements

Limitations Of ERM

The inherent limitations include :

- **Realities that human judgment**

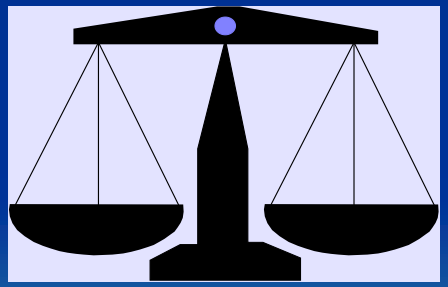
in decision making can be faulty

- **Breakdowns can occur because of human failures such as a simple error or mistake**

- **Controls can be circumvented by the collusion of two or more people**

- **The management has the ability to override the ERM process**

- Need to consider the relative costs and benefits of risk responses.



ERM in Banking Sector

Background – Basel II

- *Pillar I: Minimum Capital Requirement*
  - Banks may choose one of the many approaches to calculate capital for credit, market & operational risk

- *Pillar II: Supervisory Review Process*
  - **Contains the key principles according to which bank supervision should be done:**
    - Board and management
    - Risk management models and process
    - Internal control
    - Stress Testing
  - **One of the targets is also to try motivate banks to hold capital buffers in excess of the minimum requirement.**
  - **Financial Supervision should be proactive before bank capital goes under the minimum requirement**

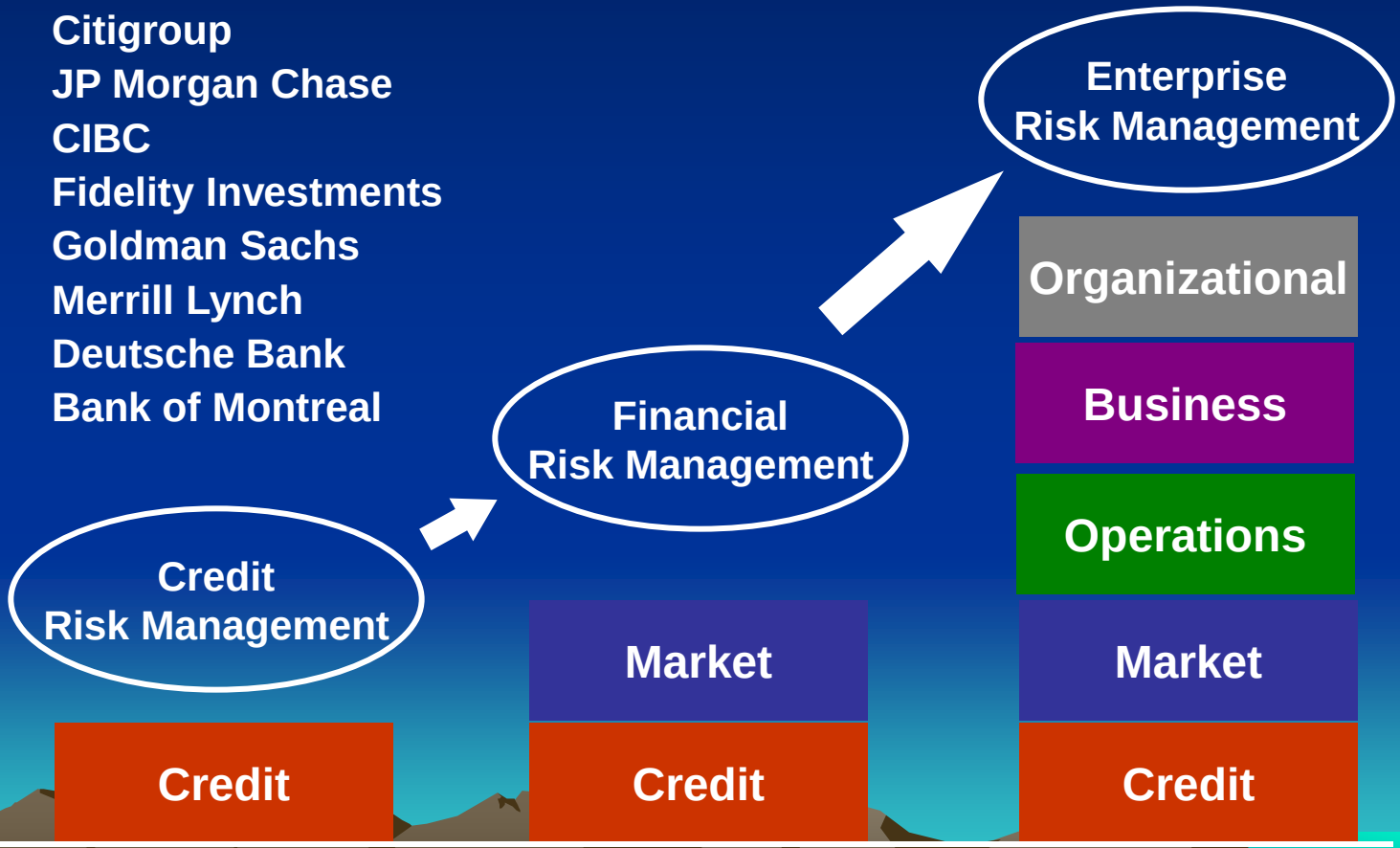
Pillar III: Market Discipline

- **Includes recommendations and requirements especially regarding disclosure information.**

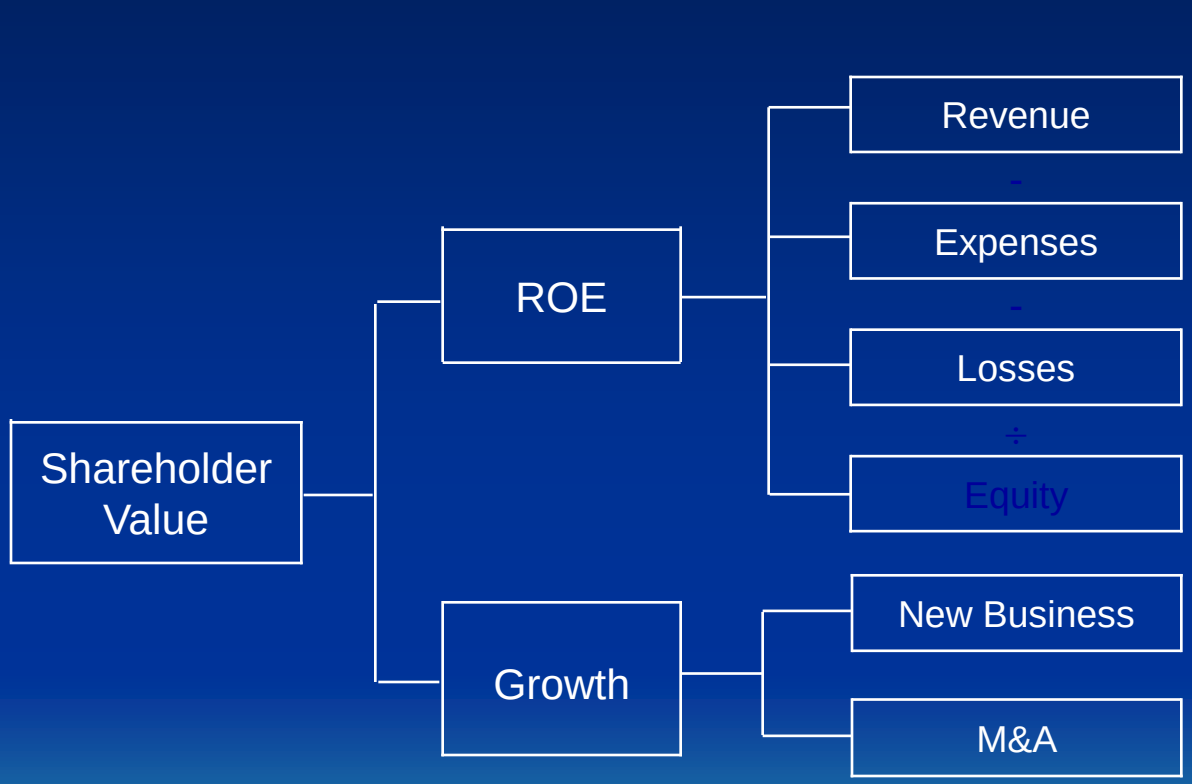
Evolution of Industry Practices

Early Adopters

Barclays
GE Capital
Citigroup
JP Morgan Chase
CIBC
Fidelity Investments
Goldman Sachs
Merrill Lynch
Deutsche Bank
Bank of Montreal



Banks should integrate ERM into Business Processes and Value Drivers



Risk Management Impact

- ✓ **1. Risk-based pricing**
- ✓ **2. Target customer selection**
- ✓ **3. Relationship management**
- ✓ **4. Risk oversight costs**
- ✓ **5. Insurance/hedging expense**
- ✓ **6. Credit, market operational write-offs**
- ✓ **7. Capital management**
- ✓ **8. Risk transparency**
- ✓ **9. New business development**
- ✓ **10. M&A/Diversification strategy**

✓ Risk Management by Silos (5, 6) → ✓ Integrated risk management (4–7) → ✓ Enterprise risk management (1-10)

Basel III

- Basel III framework deals with capital framework and new buffers, leverage ratios, liquidity ratios, framework for dealing with failing banks, higher capital requirement for systemic banks
- Basel III will result in less available capital to cover higher RWA (Risk Weighted Assets) requirements and more stringent minimum overage levels

ERM in Insurance Sector

How Life Insurers View Risk

- Asset default risk

  Asset value may deviate from current level
- Liability pricing risk

  Liability cash flows may deviate from best estimate
- Asset/liability mismatch risk

How Life Insurers View Risk

- Assets and liabilities do not always move together
- Miscellaneous risk
- Beyond insurer ability to predict/manage
- Legal risk, political risk, general business risk

How Property-Liability Insurers View Risk

- Hazard Risk
  Injury, property damage, liability
- Financial Risk
  Interest rates, equity values, commodity prices, foreign exchange
- Operational Risk
  Failed processes, people or systems
- Strategic Risk
  Competition, regulation, business decisions

Insurance Products - Life Insurance

- Pay benefit at uncertain time of death
  - Fixed benefit most common
  - Some benefits tied to investment performance
- Embedded options
  - Settlement options
  - Policy loans
  - Surrender option
- Minimum guaranteed rate of return

Insurance Products - Annuities

- Pay a periodic benefit for an uncertain duration
  - Fixed benefit
  - Variable benefit
    - Indexed to inflation
    - Tied to investment performance
- Embedded options
  - Surrender option on deferred annuities
  - Payout guarantees

Insurance Products - Property-Liability Insurance

- Pay an uncertain amount contingent on the occurrence of an event
  - Multiple events possible
  - Primary risk factors
    - Latent exposures (asbestos, environmental)
    - Claim value escalation
    - Catastrophic losses

Modeling Issues

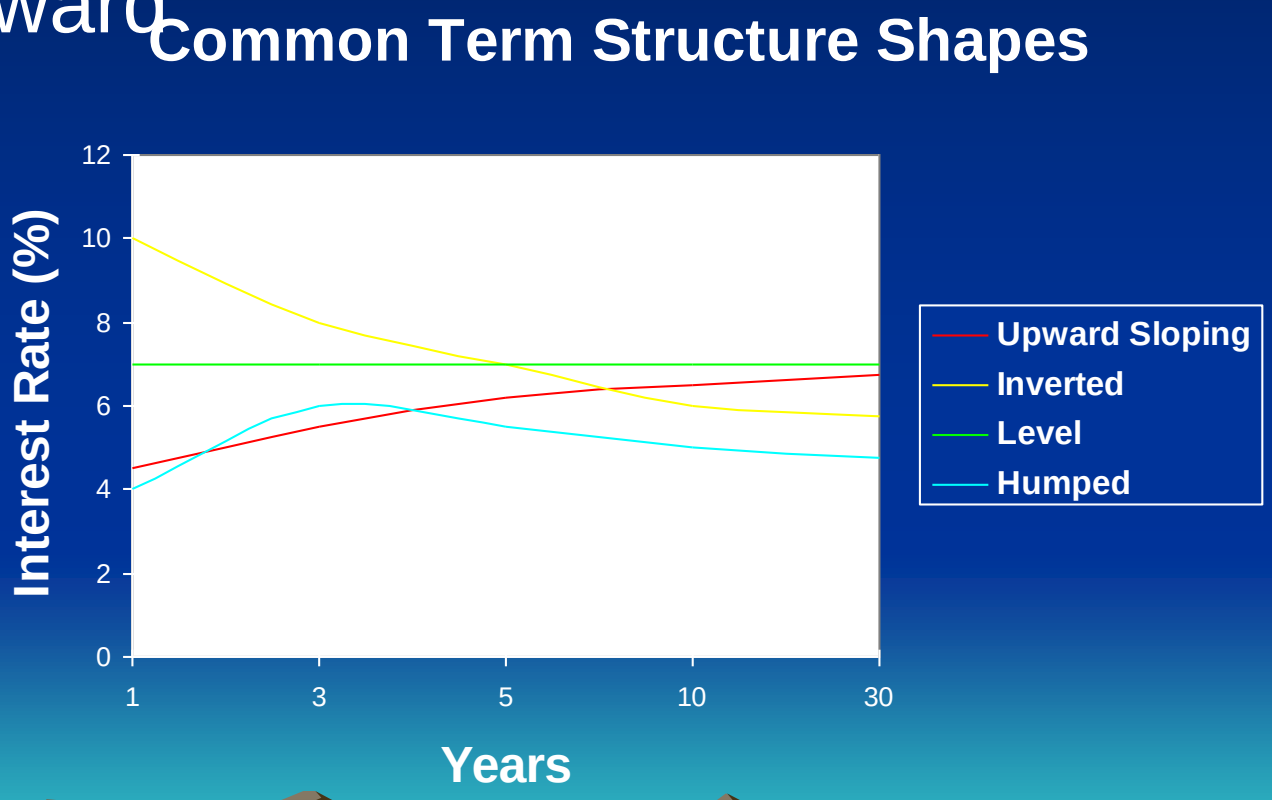
- Property-Liability insurers
  - Model catastrophes well
  - Credit risk not modeled effectively
    - Especially nonperforming reinsurance
  - Dynamic Financial Analysis approach
- Life insurers
  - Use models to value embedded options
  - Interest rate and equity models important
- Banks
  - Model credit risk well
  - Stress testing codified, but not modeled fully
  - Catastrophe models need improvement

Interest Rate Models

- Term Structure of Interest Rate Shapes
- Introduction to Stochastic Processes
- Classifications of Interest Rate Models
- Use of Interest Rate Models

Term Structure of Interest Rates

- Normal upward sloping
- Inverted
- Level
- Humped



Introduction to Stochastic Processes

- Interpret the following expression:

$$dr = \mu\, dt + \sigma\, dz$$

- We are modeling the stochastic process r where r is the level of interest rates
- The change in *r* is composed of two parts:
  - A drift term which is non-random
  - A stochastic or random term that has variance σ^2
  - Both terms are proportional to the time interval

Enhancements to the Process

- In general, there is no reason to believe that the drift and variance terms are constant
- An Ito process generalizes a Brownian motion by allowing the drift and variance to be functions of the level of the variable and time

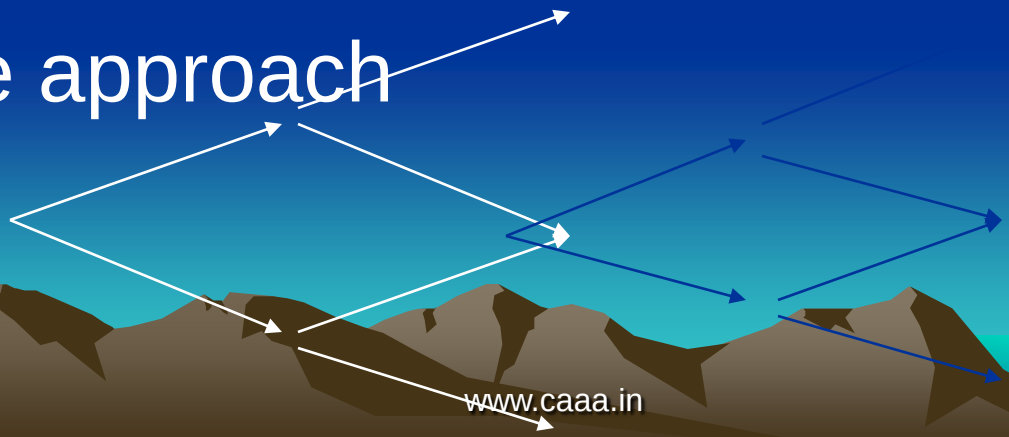
$$dr = \mu(r,t)dt + \sigma(\mathrm{r},t)dz$$

Classifications of Interest Rate Models

- Discrete vs. Continuous
- Single Factor vs. Multiple Factors
- General Equilibrium vs. Arbitrage Free

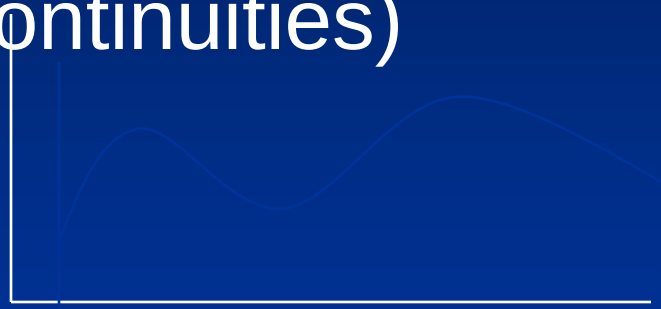
Discrete Models

- Discrete models have interest rates change only at specified intervals
- Typical interval is monthly
- Daily, quarterly or annually also feasible
- Discrete models can be illustrated by a lattice approach



Continuous Models

- Interest rates change continuously and smoothly (no jumps or discontinuities)
- Mathematically tractable
- Accumulated value = e^{rt}



Example

$1 million invested for 1 year at r = 5%

Accumulated value = 1 million x $e^{.05}$ = 1,051,271

Single Factor Models

- Single factor is the short term interest rate for discrete models
- Single factor is the instantaneous short term rate for continuous time models
- Entire term structure is based on the short term rate
- For every short term interest rate there is one, and only one, corresponding term structure

Multiple Factor Models

- Variety of alternative choices for additional factors
- Short term real interest rate and inflation (CIR)
- Short term rate and long term rate (Brennan-Schwartz)
- Short term rate and volatility parameter (Longstaff-Schwartz)
- Short term rate and mean reverting drift (Hull-White)

General Equilibrium Models

- Start with assumptions about economic variables
- Derive a process for the short term interest rate
- Based on expectations of investors
- Term structure of interest rates is a model output
- Does not generate the current term structure

General Equilibrium Models

- Limited usefulness for pricing interest rate contingent securities
- More useful for capturing time series variation in interest rates
- Often provides closed form solutions for interest rate movements and prices of securities

Arbitrage Free Models

- Designed to be exactly consistent with current term structure of interest rates
- Current term structure is an input
- Useful for valuing interest rate contingent securities
- Requires frequent recalibration to use model over any length of time
- Difficult to use for time series modeling

Examples of Interest Rate Models

- One-factor Vasicek

$$dr = \alpha(\hat{r} - r)dt + \sigma dz$$

- Two-factor Vasicek

$$dr_t = \kappa_r (l_t - r_t)\, dt + \sigma_r\, dB_r$$
$$dl_t = \kappa_l (\mu_l - l_t)\, dt + \sigma_l\, dB_l$$

- Cox-Ingersoll-Ross (CIR)

$$dr = \alpha(\hat{r} - r)dt + \sigma\sqrt{r}\,dz$$

- Heath-Jarrow-Morton (HJM)

$$df(t,T) = \mu(t,T,f(t,T))dt + \sigma(t,T,f(t,T))dB_t$$

Which Type of Model is Best?

- There is no single ideal term structure model useful for all purposes
- Single factor models are simpler to use, but may not be as accurate as multiple factor models
- General equilibrium models are useful for modeling term structure behavior over time

Which Type of Model is Best?

- Arbitrage free models are useful for pricing interest rate contingent securities
- How the model will be used determines which interest rate model would be most appropriate

Use of Interest Rate Models

- Property-liability insurers
  - Interest rates are not a primary risk factor
  - Objective is to analyze long term horizon
  - One factor general equilibrium models are adequate
- Life insurers
  - Long term policies, long term horizon
  - Interest rates are key variables
  - Two factor general equilibrium models are appropriate, for now
- Banks
  - Need to evaluate interest rate contingent claims
  - Short term horizon
  - Arbitrage free models necessary

Key Points about: Interest Rate Models

- Interest rates are not constant
- Interest rate models are used to predict interest rate movements
- Historical information useful to determine type of fluctuations
  - Shapes of term structure
  - Volatility
  - Mean reversion speed
  - Long run mean levels

Key Points about: Interest Rate Models

- Don’t assume best model is the one that best fits past movements
- Pick parameters that reflect current environment or view
- Recognize parameter error
- Analogy to a rabbit

Conclusion

- Banks and insurers will have different approaches to ERM, but should understand each other's methods and terminology
- Each type of institution has various strengths that can benefit other industries
- Regulation can generate arbitrage opportunities, internationally or across industries
- ERM is likely to be a growth area in insurance over the next decade

Role Of Various Authorities

ROLE OF THE BOARD

- Provide insight to management
- Understand key elements of ERM.
- Inquire the management about risks.
- Concur on certain management decisions

Role Of Risk Committee

- Participate in risk strategy analysis.
- Develop and refine risk appetite/tolerance.
- Evaluate material risk exposures.
- Oversee the role and responsibilities of the Internal Auditor.
- Review semi-annual and annual consolidated reports

Responsibility for ERM

- Management
- The board of directors
- Risk officers
- Internal auditors

Role of chief executive officer

- Provide direction to the senior managers.
- Setting broad based policies reflecting the entity's risk management philosophy and risk appetite

Role Of Chief Risk Officer

- Establish Corporate-wide risk limit.
- establish risk management standards
- Review and approve policy exceptions

Role of management

- Comply with risk management policies.
- Applying ERM techniques and methodologies.
- Ensuring risks are managed on daily basis
- Provide unit leadership with complete and accurate reports

Role of Internal auditor

Support management by

providing assurance on the

- ERM Process function
- .Effectiveness and efficiency of risk responses and control activities.
- Completeness and accuracy of ERM reporting

Why is ERM important?

- Identify obstacles to achieving business objectives
- Allow management to make/evaluate decisions on a well informed, risk adjusted basis
- Determine accountability/ownership of all key risks
- Enable definition of realistic tolerances and measures of risk to support reasonable budgeting for risk (expected loss) and allocation of capital (unexpected loss)

Why is ERM important?

- Increase risk and control awareness of all employees, at all levels
- Proactively identify potential difficulties
- Business continuity and disaster preparedness in a post-9/11 world
- Regulatory compliance
- Globalization in a continuously competitive environment

Future

- ERM will become the industry standard
- Chief Risk Officer will be a visible figure in risk-sensitive banks
- Audit committees will evolve into risk committees
- Emergence of Economic capital

Future

- Risk transfer executed at Enterprise level
- Technology key to advancement
- Measurement standards will emerge for Operational Risk
- Risk-based/ Economic reporting becomes a Standard

Professional Opportunities in ERM

- Designing the ERM Framework
- Strengthening existing ERM Framework
- Setting up of a Risk Department
- Internal Audit of compliance of the ERM framework
- Training of resources in the ERM department
- Compliance Audit of Basel, ISO 31000, SEBI Framework for MF, RBI Framework for Risk Management.
- Guiding management in the disclosure of ERM policy of the entity in Website and Annual Report

Professional Opportunities in ERM

- Making Risk Management Policy
- Selection of Risk Management Software
- Advising on function specific to ERM – HR, Fin, IPR, Contracts.
- Making Whistle Blower Policy
- Making Code of Conduct for officers of enterprise
- Advising regulators on Risk Management Framework- IRDA SEBI, RBI
- Advising Enterprise in responding to the risk in the most effective manner - transfer, managing, outsource.

Risk management is a

Continuous Journey

About the Author

- *CA. Rajkumar S Adukia is an eminent business consultant, academician, writer, and speaker. He is the senior partner of Adukia & Associates.*
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- *Mr. Adukia, a rank holder from Bombay University completed the Chartered Accountancy examination with 1st Rank in Inter CA & 6th Rank in Final CA, and 3rd Rank in Final Cost Accountancy Course in 1983.*
- *He started his practice as a Chartered Accountant on 1st July 1983, in the three decades following which he left no stone unturned, be it academic expertise or professional development.*

About the Author

- *He has been coordinating with various Professional Institutions, Associations, Universities, University Grants Commission and other Educational Institutions.*

- *Authored more than 50 books on a vast range of topics including Internal Audit, Bank Audit, SEZ, CARO, PMLA, Anti-dumping, Income Tax Search, Survey and Seizure, IFRS, LLP, Labour Laws, Real estate, ERM, Inbound and Outbound Investments, Green Audit etc.*

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Thank You