

Risk Management
and the
Actuarial Profession

May 24, 2006

Doug Brooks, Sun Life

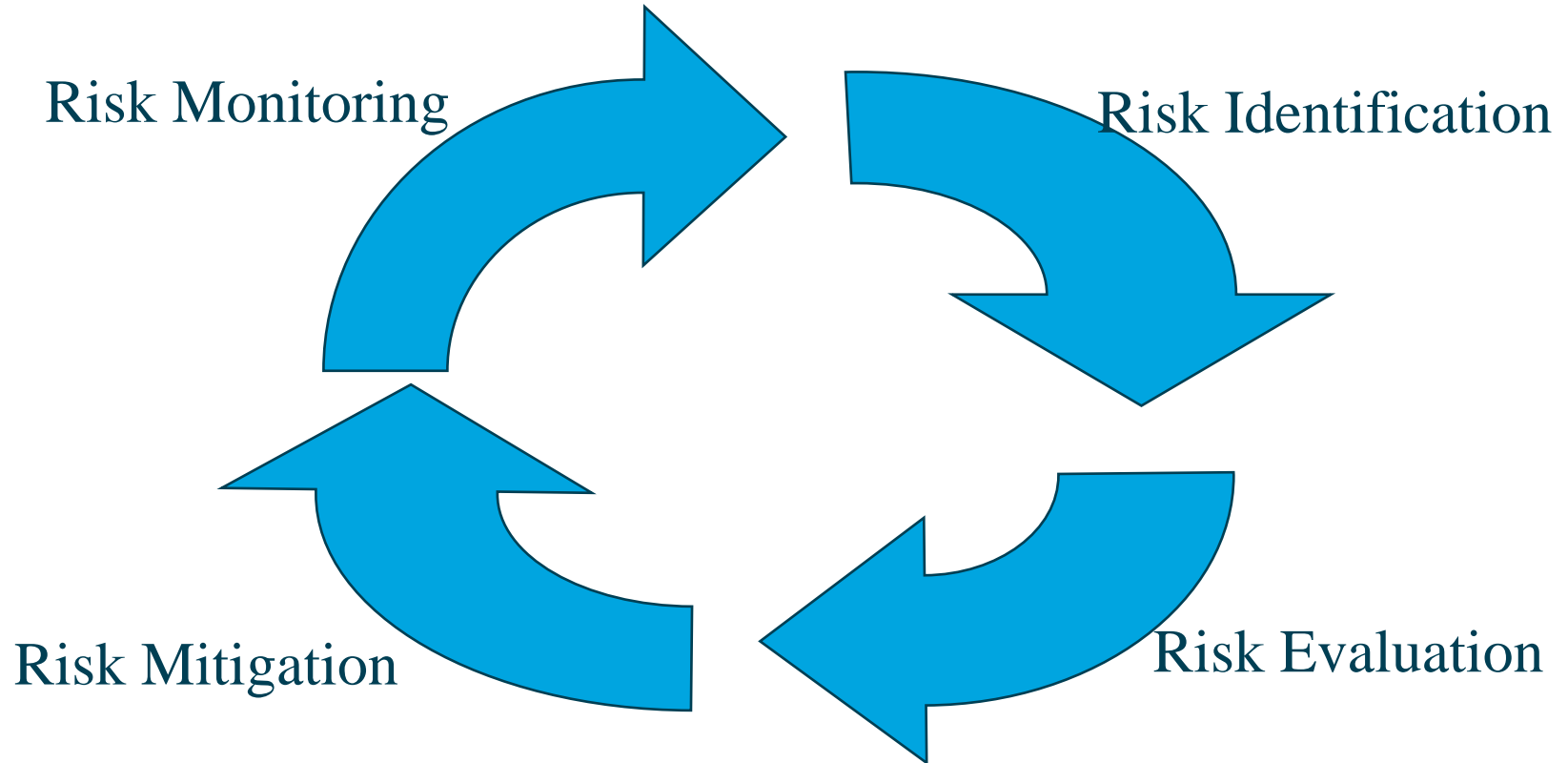
Topics

- **Risk Management - what is it?**
- **Enterprise Risk Management (ERM) - is it different?**
- **Key Elements of an ERM Framework & Role of Corporate Risk Management**
- **Economic Capital and other issues**
- **What is the Actuarial Profession Doing?**
- **How Can We Get Involved?**

What is Risk Management?

- **Management of Risks**
 - **Actuaries (and others) have been managing specific risks as part of business as long as there have been businesses**
 - **Risks have often been managed risk-by-risk, in silos**
- **Management by profession or occupation**
 - **Professions tend to have their own terminology and measures for managing risks**
 - **Different businesses or even departments within an organization may have their own terminology and measures**
- **Focus of risk management:**
 - **Controlling or mitigating vs. managing risk**
 - **Focus on “best estimate” of risk or full distribution**

Risk Management Steps



What is Enterprise Risk Management (ERM)?

- **Comprehensive Management of Risks**
 - Reflects all risks of an organization, whether financial or operational
 - Reflects organization-wide approach, rather than management by silos
- **Consistent Management of Risks**
 - Manage risks in a common framework
 - Common language and classification for risk
 - Consistent measurement of risks
- **Optimize returns on a risk-adjusted basis**

CAS Definition of ERM

“ERM is the discipline by which an organization in any industry assesses, controls, exploits, finances and monitors risks from all sources for the purpose of increasing the organization’s short- and long-term value to its stakeholders”

Why is ERM Important to Actuaries?

- **Rapidly evolving field of practice**
 - Many groups are trying to take leadership in the areas of risk management
- **Actuaries are experts at risk management**
 - Risk management is at the core of actuarial practice
- **Many of the new practitioners are overlapping with areas of traditional actuarial practice**
- **Risk management is a tremendous opportunity for the actuarial profession**
 - Must be proactive

Enterprise Risk Framework: Key Elements

Framework must reflect Business

- **Business Characteristics:**
 - nature of risks, state of risk management
 - diversity of businesses
 - extent of growth (key business objectives)
 - business partners (outsourcing, JVs etc.)
- **Organizational Characteristics:**
 - centralized vs. decentralized
 - culture
 - technical vs. non-technical
 - entrepreneurial
 - incentives

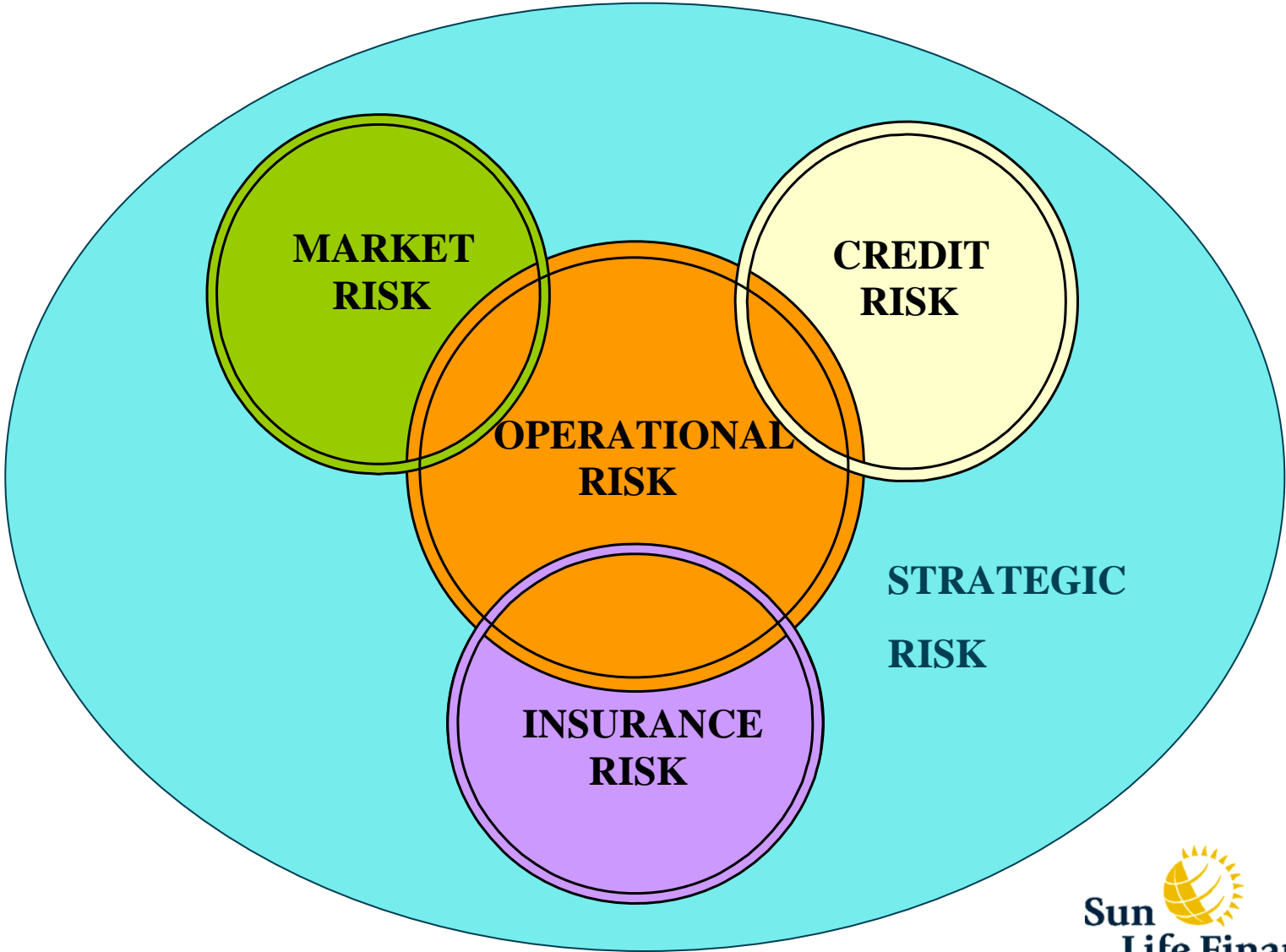
Key Elements of ERM

- **Development of a cohesive and integrated risk management framework**
 - **A common language in which to discuss risk and return**
 - **A common measurement framework for quantifiable risks**
 - **A target risk profile**
 - **Comprehensive risk reporting**
 - **Policies and limits to guide business activities**
- **Risk/Return culture**
- **Continual development of technical tools and processes**

Risk Management Framework



Risk Categorization



Objectives of Risk Management

- **Avoid risks that could materially affect the value of the company**
- **Contribute to sustainable earnings**
- **Take risks that the company can manage in order to increase returns**
- **Provide transparency of the company's risks through internal and external reporting**

“Making better risk-adjusted business decisions”

The Importance of Culture

- **Can't be just an exercise**
 - Not just a report to satisfy requirements and sit on the shelf
- **Must be supported by management**
 - And have management participation
- **Must be a disciplined process**
- **Must be integrated into an overall framework**

Risk Management Reporting

- **Reporting must supplement the risk management framework and enable management to determine if the business is being managed in accordance with the defined risk framework**
- **Reporting on company's risk profile**
 - Sensitivities to financial markets
 - Hedging and other actions to manage within tolerances
 - Credit and other investment risk profile
 - Changes in identified key risks
- **Reporting on risk-adjusted return (economic capital)**
- **Reporting on specific initiatives and plans**
 - Action plans to deal with risks; ad hoc issues
- **Governance reports**
 - Compliance with internal policies
 - Compliance with legislation etc.

Desired Risk Profile

Risk Filter

- **Capability to manage risk**
 - identify and understand risk
- **Appropriate level of monitoring and reporting as well as the infrastructure to support monitoring and reporting**
- **Ability to act on mitigation plans**
- **Adequate return for the risk taken**

Dealing with Risk

Characteristics of Risk

- unacceptable volatility/risk to capital
- not well understood
- no capability to manage

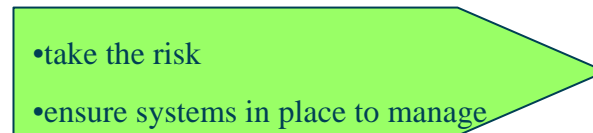
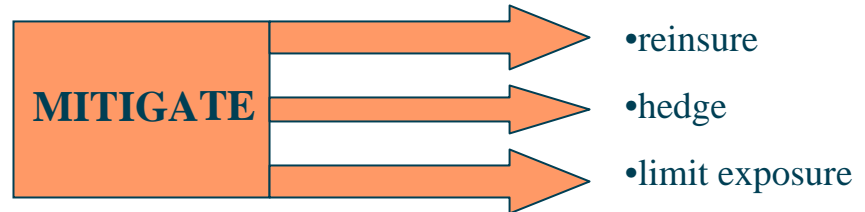
- significant volatility or risk to capital
- lack of experience managing
- lack data, monitoring systems

- some volatility
- some compensation for risk
- some capability to manage

- relatively low volatility or risk
- part of business, good data, monitoring
- fair compensation for risk

- characteristics of risk well-understood
- strong capabilities to manage the risk
- well compensated for the risk

Resolution



Risk Mitigation: Hedging

- **Reinsurance:**
 - **Excess risk**
 - **Expertise**
 - **Capital management**
- **Capital Markets Hedging:**
 - **Derivative instruments**
 - **Example: interest rate floors for minimum interest guarantees**
 - **Example: put options for equity-related guarantees**
- **Hedging instruments have a cost and involve counterparty risk as well as market risk**

Diversifiable and Non-Diversifiable Risks

- Mortality is a “diversifiable” risk – the more we sell, the lower our relative risk
- A non-diversifiable risk is one where risk cannot be lessened in this way; what factors could give rise to this?
 - Giving everyone the same option
 - Skewed distribution of amounts within a portfolio
- What factors exist in our products that create these types of risks?
 - Market-related products (segregated fund guarantees) – market goes up or down for everyone
 - Product features such as resets in segregated fund guarantee products – increases concentration

Corporate Risk Role

Development and Articulation of Company Risk Management Philosophy

Development of Risk Management Framework

Governance of Risk Management

Management of Risks at Corporate Level

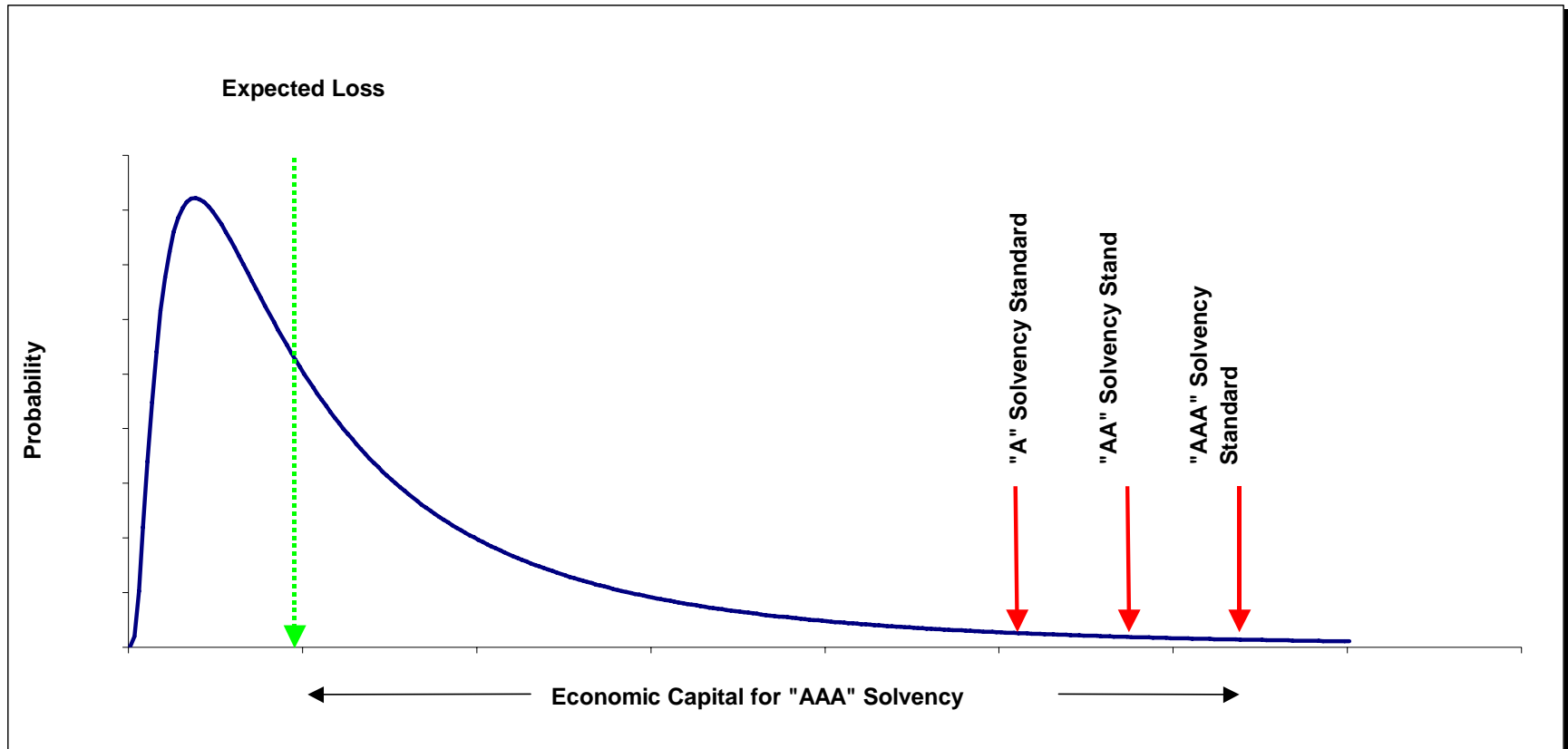
Economic Capital: Rationale for Common Measurement

- ❑ **Help Ensure Solvency and Viability**
- ❑ **Consistent Understanding of Risk & Return**
- ❑ **Understand the Impact of Diversification**
- ❑ **Understand Contributions of Businesses to Value**
- ❑ **Appropriate Arbitrage of Regulatory Capital**
- ❑ **Influence Regulators & Anticipate Regulatory
Direction**
- ❑ **Consistent Disclosure to Stakeholders**

Economic Capital – A Common Risk Measure

- ❑ **Comprehensive coverage of risk types (financial, insurance, credit, operational)**
- ❑ **All risks measured on a consistent basis**
- ❑ **Time horizon harmonized across analysis**
- ❑ **Confidence interval linked to strength**
- ❑ **Forward-looking**
- ❑ **Aggregated across the businesses**

Illustration of Economic Capital



OSFI Progress on Capital

OSFI has put in place a process to develop a revised regulatory capital framework that would move the current MCCSR toward an “economic” basis for assessing capital.

The Advisory Committee has published the principles that would apply. These are listed on the next 2 pages.

Key Principles

On risk measurement

- 1. Consider all risks**
- 2. Determine assets and liabilities on a consistent basis**
- 3. Be practical, but technically sound**
- 4. Reflect existing risks on going concern basis and consider winding-up and re-structuring**
- 5. Use measures (e.g. CTE) that are comparable across risks and products**

On risk management

- 6. Ensure that capital is prudent**
- 7. Encourage good risk management**
- 8. Adapt international principles and best practices**

Key Principles (Cont'd)

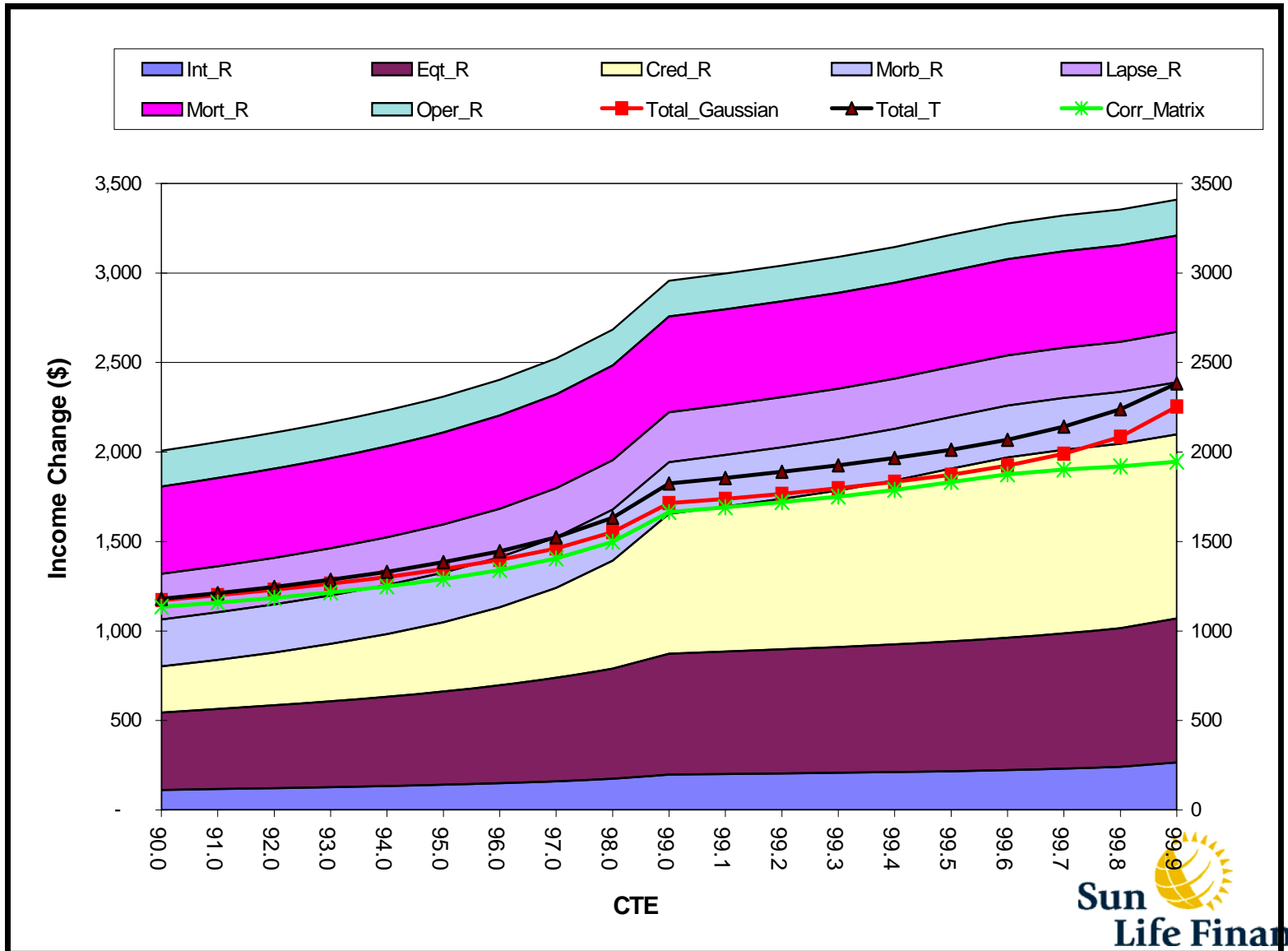
On Risk Monitoring

- 9. Allow comparison of similar risks across financial institutions**
- 10. Be transparent, validated and based on credible data**
- 11. Use reliable processes with assumptions sustainable in times of stress**
- 12. Be part of intervention levels for supervisory action**

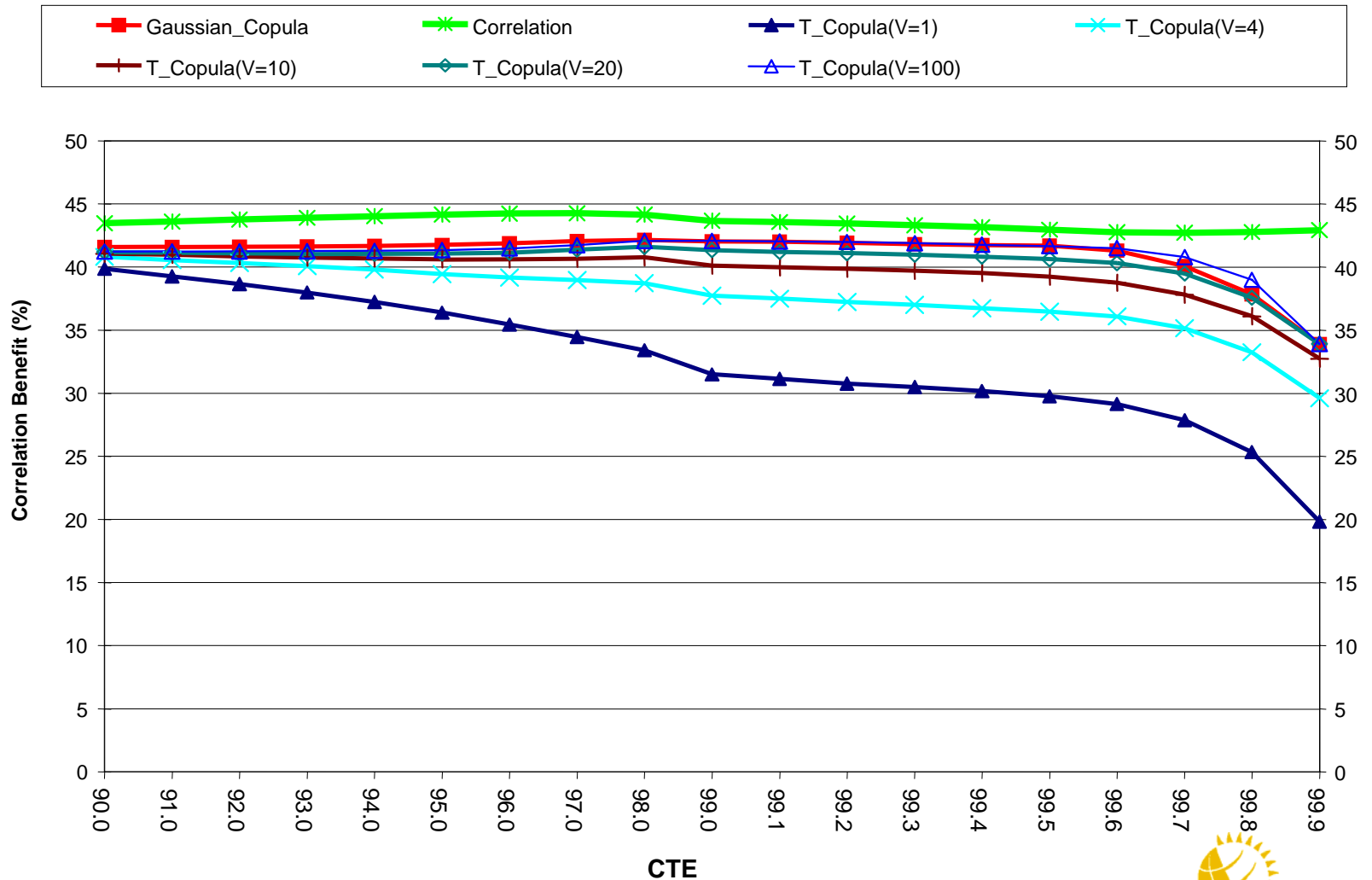
Economic Capital Issues – Aggregation

- The following charts show the significant potential impact of aggregation, as well as the importance of choosing an appropriate method and assumptions for correlation
- The simple correlation approach results in a consistent impact of correlation across different percentiles
- A T-Copula approach recognizes that correlations do not necessarily hold up in extreme situations
- Note that the data in the following charts is partially modelled, but largely hypothetical

Aggregation



Aggregation - Parameters



Other Issues: Model Risk

Model Risk is a very important area for all financial institutions to understand and manage.

Models of increasing complexity are being used for product pricing, development of hedging programs, determination of liabilities and for making business decisions. It is vital that the models used across an organization be robust, reliable and used appropriately.

The following slides provide a very brief overview of some of the aspects of model risk as well as an illustration of one aspect of model risk – use of too few scenarios.

Importance of Model Risk:

Model risk is a general term referring to the possibility of loss or error resulting from the use of models. This risk has a number of components:

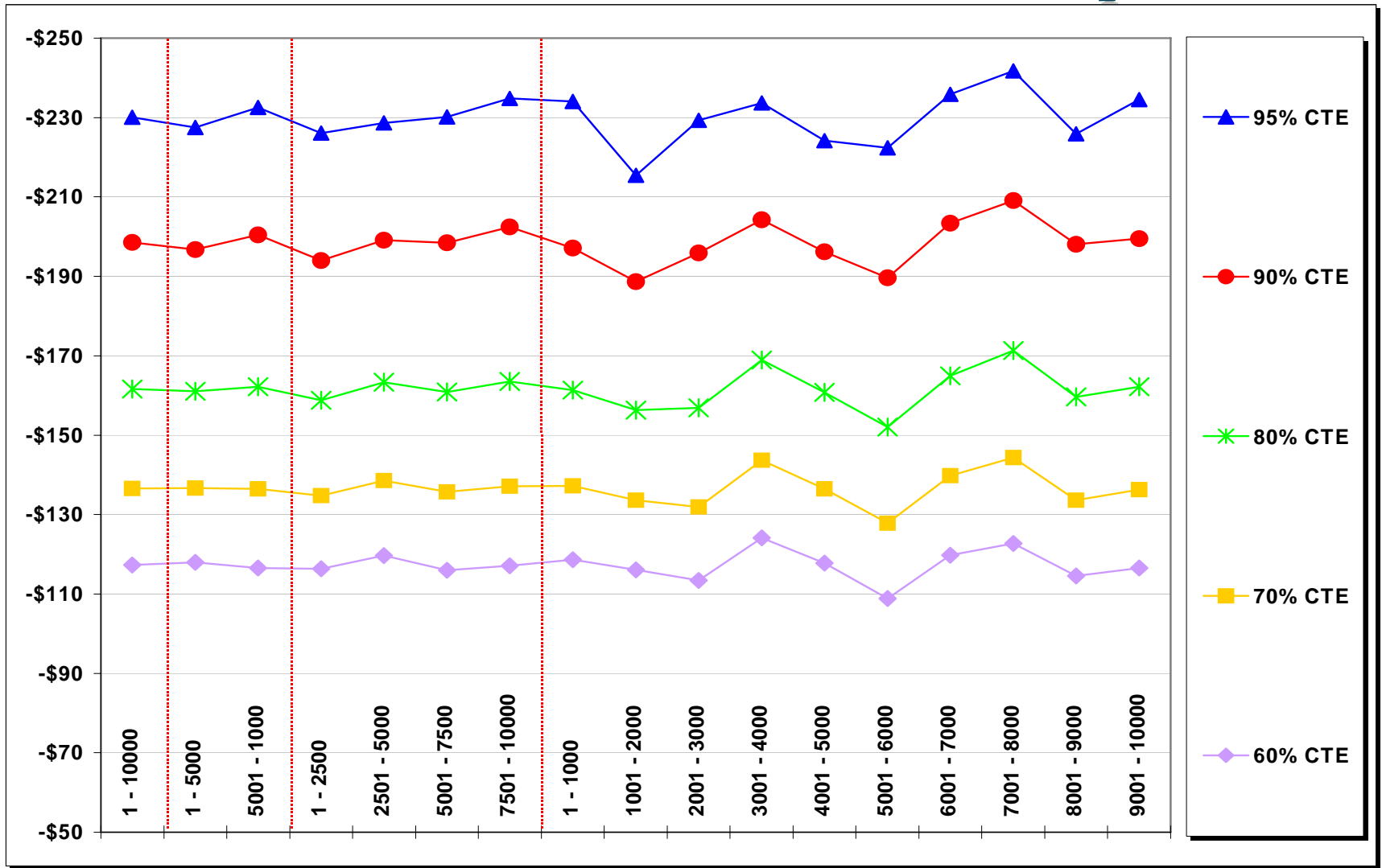
- ❑ **Model misspecification**
- ❑ **Assumption misspecification**
- ❑ **Inappropriate use or application**
- ❑ **Inadequate testing, validation, and documentation**
- ❑ **Lack of knowledge or understanding, user and/or management**
- ❑ **Inadequate systems structure and change management controls**
- ❑ **Error and negligence**

Illustration of Model Risk:

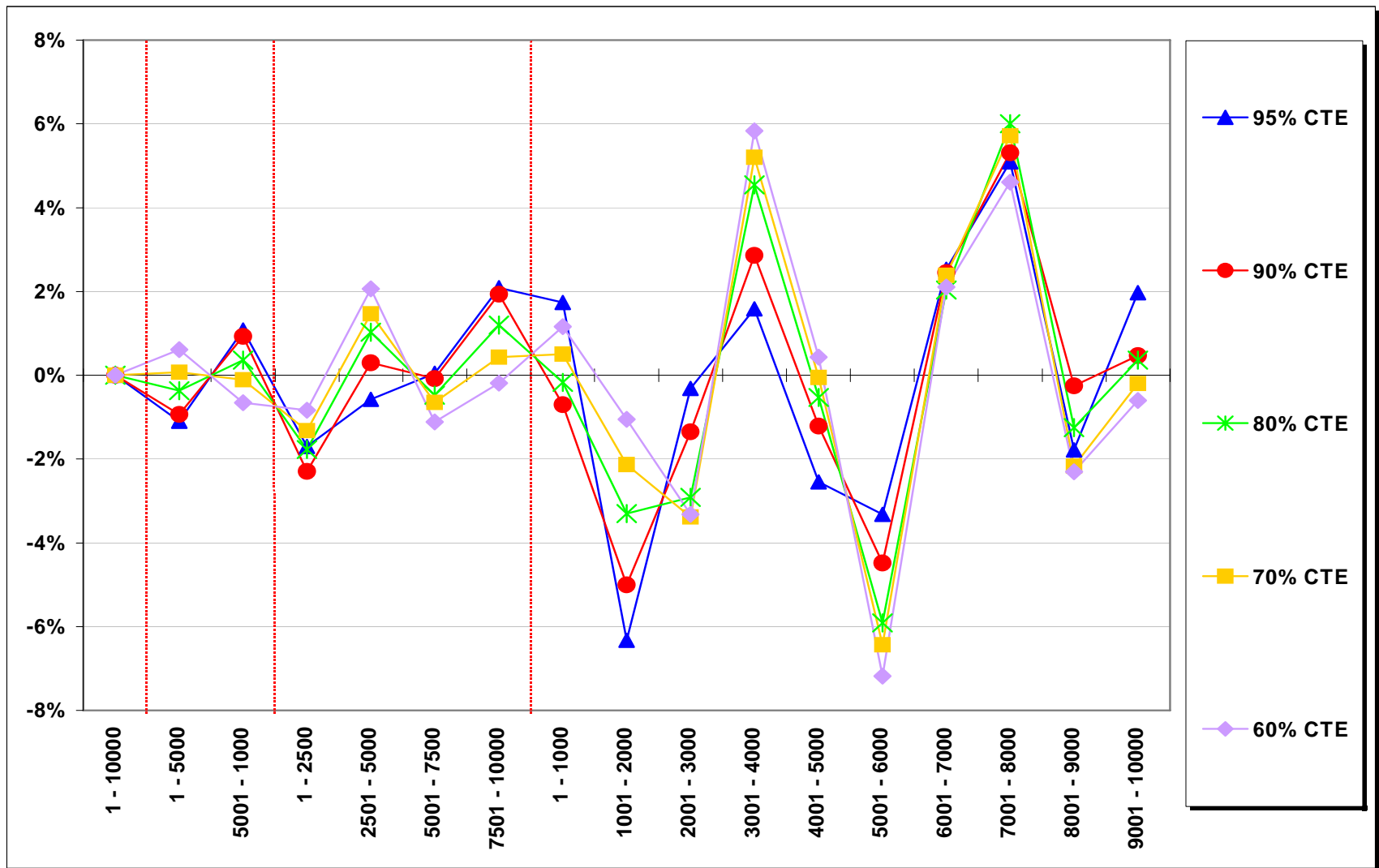
The following charts illustrate one particular type of model risk. It is inappropriate use of a model by using too few scenarios. The product illustrated is a GMIB product, and reserves are calculated using different numbers of scenarios. It is important to note that CIA standards prescribe only 1,000 scenarios. The charts illustrate that blindly following minimum CIA standards can result in substantial volatility.

- **The first chart shows the value of liabilities/capital calculated at different CTE levels (from 60 to 95); the red vertical lines separate sets of runs of 1,000 scenarios (the right-hand set of 10), to 4 sets of 2,500, 2 sets of 5,000 and 1 run of 10,000 (which is a relatively stable value); this illustrates the volatility purely from the number of scenarios**
- **The second chart shows the same information but showing the percentage difference in values; for example, this would say that if a reserve based on CTE(70) is run based on 1,000 scenarios, the result could vary by about 6% on either side of the “true” value**

CAS Stochastic Reserve GMIB Example



“Full Run” Relative Error Plot



Operational Risk

- **Key Risk Identification Processes**
- **Creating Awareness**
- **Managing vs. Measuring**
- **Qualitative vs. Quantitative**

The Importance of Reputation

- **Reputation has always been viewed as an important asset of an organization, particularly one where public trust is at stake**

- **Today it is even more important:**
 - **The bar has been raised**
 - **Media attention and publicity**
 - **“Hindsight”**
 - **Legal environment**

Reputation – a Consequence

- **Reputation is not a risk in and of itself**
- **Reputation is analogous to capital – it is an asset that must be protected, and different risks may threaten it**
- **Therefore, reputational consequences of all risks, whether financial or operational, should be considered**

Foundational Elements

Managing risks to reputation effectively requires:

- **Strong risk culture**
- **Appropriate governance**
- **Risk management processes**
- **Stakeholder relations**

Quantification

Various types of impacts:

- **Share price:**
 - Temporary
 - Permanent
- **Revenue**
 - New business
 - Retention of existing business
- **Direct financial impacts**
 - Fines, penalties
 - Legal settlements

How to Avoid Problems

Customer Viewpoint

- **Always look at products/disclosure from the customer viewpoint**
- **Align interests of company, customer (and distributor)**

Discipline

- **Fully understand a risk before taking it**
- **Don't shortcut processes for market convenience**
- **Understand the weaknesses of measures you're relying on**
- **Don't rely on "standard industry practice"**

Governance

- **Encourage questions and deal with them (avoid groupthink)**
- **Ensure the proper expertise/perspectives for questions**
- **Don't allow "black boxes"**
- **Align Incentives**

Experiences from Implementation

- **Importance of Communication**
 - repeat the key messages
 - find simple ways to illustrate technical concepts
- **Business Involvement and Ownership**
- **Experience is usually the best teacher**
 - Unfortunately often costly, negative
 - Generates attention, focus
 - Often “knee jerk”
- **“Can’t happen here” syndrome**

Risk Management and **Actuaries**

What do Actuaries Offer?

- **Actuarial training includes many elements of risk management**
 - **Mathematical and statistical models of risk**
 - **Probability and statistics**
- **Actuaries are true professionals (unlike the other groups)**
 - **Education and qualification standards**
 - **Standards of practice**
 - **Continuing education requirements**
 - **Discipline processes**
- **Need to enhance business skills to gain credibility**

What is the Profession Doing?

- **Society of Actuaries Task Force**
- **SOA Implementation Committee**
- **SOA/CAS Risk Management Section**

Society of Actuaries Task Force

- **Roles: Risk Mgmt Section, SOA Board, SOA Staff**
- **ERM Best Practices – Documentation and Research**
- **Relationships with Other Organizations**
- **Education and Training**
- **Accreditation and Credentials**
- **Publications**
- **Publicity**
- **Expanding Outside of Traditional Areas**

SOA - Initiatives

- **Joint SOA/CAS Risk Management Section**
- **Education: Inclusion of financial economics material on syllabus**
- **Continue ERM Symposium and other education**
- **Risk Management Newsletter**
- **Publicity: Business Risk Index**

Risk Management

Section

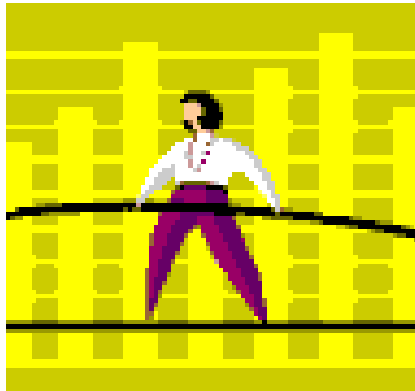
Spring 2006

Status Report

Risk Management Section

- **Jointly Sponsored by SOA & CAS**
- **Adopting the name:**

ERMAP – the ERM Actuarial Professionals



Current Section Membership

- **Total – 2200**
- **SOA – 1650**
- **CAS – 500**
- **Other – 50**

Excellent growth – this is only the third year!

Already, we are one of the 5 largest sections in the SOA

Current ERMAP Council

- **Doug Brooks**
- **Kevin Dickson**
- **Valentina Isakina**
- **Larry Rubin**
- **Dan Guilbert**
- **Frank Sabatini**

CAS Board Liaison

- **Don Mango**
- **John Kollar**

Staff Fellow

- **Michel Rochette**

- **Fred Tavan**
- **Tony Dardis**
- **Ron Harasym**
- **Ken Seng Tan**
- **Hubert Mueller**
- **Dave Ingram (Chair)**

SOA Board Liaison

- **Max Rudolph**

Staff Support

- **Jeremy Weber**

ERMAP Objectives

- 1. Integration with CAS members**
- 2. Member Services**
- 3. Continuing Education**
- 4. Basic Education**
- 5. Research**
- 6. Support of CAS and SOA initiatives**

Active Committees

- **Section Council Executive Committee**
- **Newsletter** ← **Needs Volunteers**
- **ERM Symposium** ← **Needs Volunteers**
- **Continuing Ed** ← **Needs Volunteers**
- **Research** ← **Needs Volunteers**
- **Basic Ed** ← **Needs Volunteers**

Please contact: MRochette@soa.org

Special Projects

- Macro Risk
- Operational Risk ← Needs Volunteers
- Risk Terms ← Needs Volunteers
- Risk Preference (Completed)
- ERM (Completed)
- Extreme Value Modeling
- Policyholder Behavior
- Actuarial Value Proposition
- ERM Online Guide ← Needs Volunteers
- Best Practices ← Needs Volunteers
- Local Networking

Continuing Education

- **Sessions at Spring and Annual Meetings of SOA and CAS**
- **ERM Symposium**
- **GARP Convention**
- **Several Seminars (co-sponsored with other sections)**
- **Webcasts (Pandemic Influenza, ERM, Other)**
- **ERM Online Guide**
- **Local/Regional Meetings**

Risk Management News

- **Next Newsletter – July (Deadline: April 28)**
 - March newsletter (36 pages with 11 articles!)
- **ERM Credential – E&E Committee is defining courses**
- **Risk Management Section talking to CIA about affiliation**
- **FIA Risk Management Committee is talking to Risk Management Section about joint activities**

Summary: Threat and Opportunity

Threat

- **Everyone looking for some of the risk management space**
- **Encroaching on traditional actuarial areas**
- **Others moving fast, globally**
- **Large organizations (GARP, PRMIA)**

Opportunity

- **Actuaries are experts in risk management**
- **Actuaries are professionals**
- **Solid training and education**
- **ERM field is huge**

QUESTIONS & ANSWERS