

ACTUARIES IN ENTERPRISE RISK MANAGEMENT

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Actuarial Institute of Chinese Taipei
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Enterprise Risk Management

What is risk?

The possibility of something going wrong which

- will have unfortunate consequences,
 - will undermine the entity's plans, or
 - will make it less likely that the entity's objectives will be achieved
-
- can also consider both sides of the distribution of outcomes



Enterprise Risk Management

“All of life is the management of risk, not its elimination”

Walter Wriston, former Chairman of Citicorp



Enterprise Risk Management

Definition of risk management

The process of identifying, measuring, controlling and minimizing risks in a particular context, to a level commensurate with the “risk appetite” of the stakeholders.



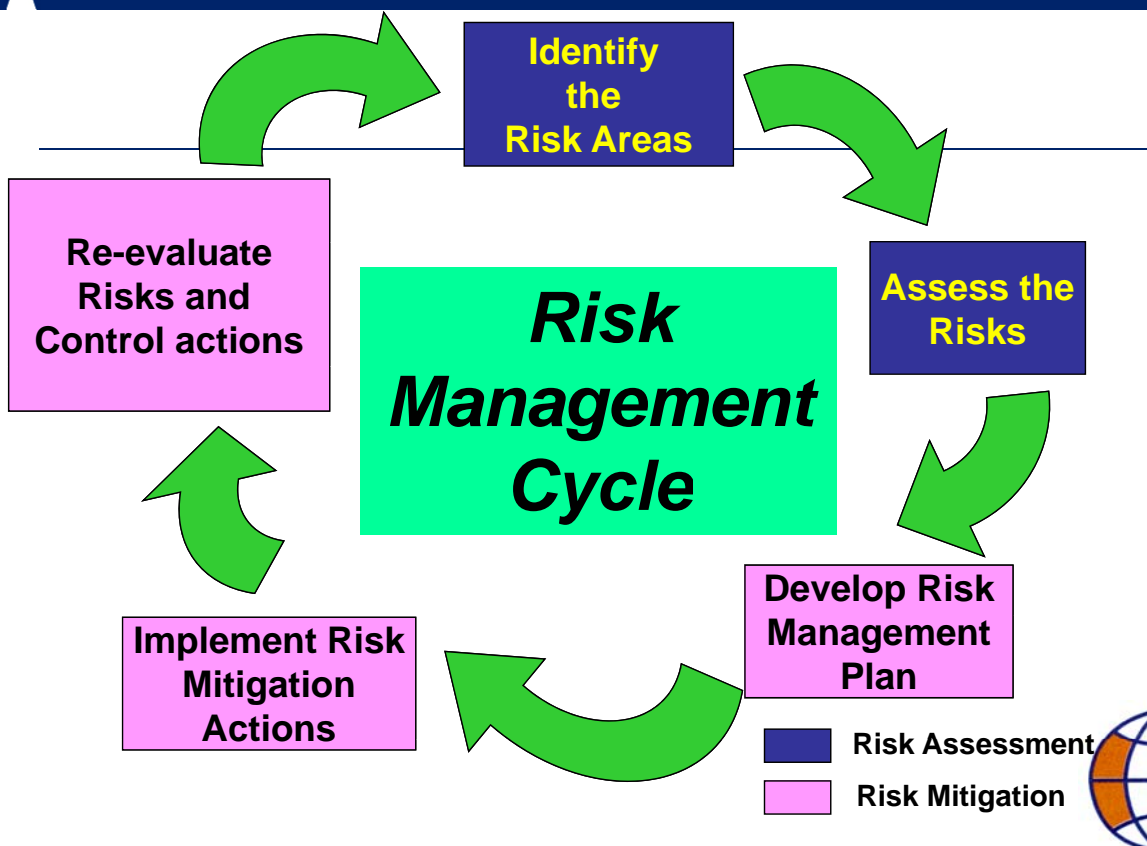
Enterprise Risk Management

Types of risk management

- managing risks to continuing financial soundness
- managing risks which could affect shareholder value
- managing operational risks
- asset-liability management (ALM)
- (total) enterprise risk management (ERM)
 - operational ERM focused on short-term business plan
 - strategic ERM focused on long-term risks to business model



Risk Management Process



Enterprise Risk Management

Four T's of risk management

Tolerate - risk is acceptable, can be monitored, and it would not be cost-effective to take additional control measures

Transform – control the risk by modifying its nature to make it safer or more intrinsically manageable

Terminate – eliminate the risk through control actions

Transfer – contractually shift the risk from the subject organisation to another party

However, an entity may also want to **exploit** some risks and actively encourage exposure in order to make profits



Enterprise Risk Management

Why Enterprise Risk Management (ERM)?

- ERM is a holistic approach to risk management for an enterprise taken as a whole
 - concerned with both sides of the balance sheet
 - tactical short-term and strategic long-term considerations
 - all types of risk considered
 - upside as well as downside risk
 - based on quantitative as well as qualitative assessments
 - measurable and unquantifiable risks
 - integrated into management processes



Enterprise Risk Management

Why ERM?

- ERM should be as much about identifying business opportunities as avoiding or mitigating losses



Enterprise Risk Management

Let's look at some recent failures in ERM



The credit crunch

- exposure (direct and indirect) to sub-prime mortgages caused huge losses for banks worldwide
- many large banks had to seek additional capital to maintain ratings
- government intervention in a number of cases
- major knock-on effects to global economy



Goldman Sachs

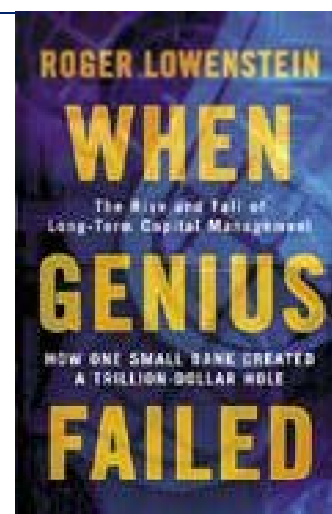


- a flagship global equity fund lost over 30% of its value in a week because of problems with its computer generated trading strategies.
- computers had failed to foresee recent market movements to such a degree that the company labelled them a “25-standard deviation event” – something that only happens once every 100,000 years or more.
- “People say these are one-in-a-100,000-year events but they seem to happen every year,” says Satyajit Das, a consultant to hedge funds and investment banks. “This episode should make people ask questions about models.”



Long Term Capital Management

- hedge fund used sophisticated models to exploit expected narrowing of credit spreads between AAA and low grade bonds
- failed spectacularly when Russian debt crisis caused credit spreads to widen suddenly and unexpectedly



Japan: benefits cut to facilitate restructuring of failing companies

Between 1976 and 1993, individual life policies typically guaranteed accumulation rates of around 5.5% per annum

Interest rates fell sharply in late 1990s and exposed guarantees

Seven life companies became insolvent between 1997 and 2001, but were restructured and sold without ceasing trading



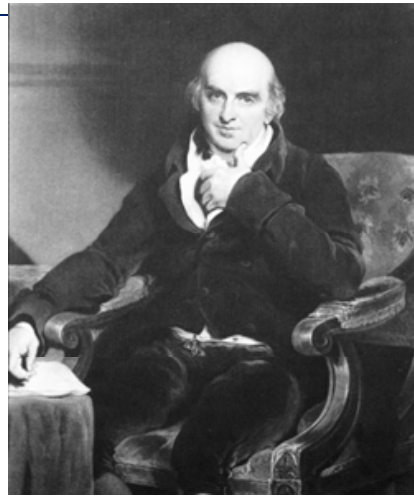
UK: Equitable Life

World's oldest mutual life assurer –
founded 1762

Invented participating life insurance

Ran into serious financial difficulties
in 2000 as a result of generous
guarantees and falling interest rates,
exacerbated by loss of court case

Closed to new business, but has
remained solvent



Dr William Morgan
(Chief Actuary 1775 – 1830)



Global Financial Crisis

What went wrong?

- failures of risk management
- poor underwriting
- credit risk and liquidity risk not well enough understood
- neglect of asset/liability management
- some models not adequate for the job
- inadequate comprehensive ERM
- did not use actuaries...



Global Financial Crisis

Causes of global financial crisis - 1

- troubles in sub-prime mortgage market (especially in US)
- poor underwriting and risk management within the banks
 - lending too much compared to value of underlying assets
 - loans too high relative to borrowers' ability to repay
- risks passed on and accepted through securitisation
- bonus culture encouraged excessive risk-taking



Global Financial Crisis

Causes of global financial crisis - 2

- rating agencies often awarded AAA because of issuer
 - shortcomings in rating agencies' models and analysis
- similarities with reinsurance 'spiral' of the 1980s
- many securities downgraded from end of 2007
- general concerns about the weakness of some banks
- ...and uncertainty about true financial position
- interbank lending dried up



Global Financial Crisis

Causes of global financial crisis - 3

- banks stopped lending to individuals and to businesses
- ...with knock-on effects in the rest of the economy
- write-downs resulting from accounting standards
- property and equity markets over-valued
- global financial interdependence
- ...combination of all these – and other factors as well



Characteristics of Global Financial Crisis

Impact on financial markets - 1

- collapse of equity markets and ensuing volatility
- significant falls in values of property and land
- currency realignments and volatility
- lower risk-free interest rates
 - flight to quality and security
 - interest rates reduced by central banks
- extremely wide credit spreads on corporate bonds
- correlations between major investment markets



Characteristics of Global Financial Crisis

Impact on financial markets - 2

- write-downs on loans and related securities
 - especially asset-backed securities, credit default swaps, etc.
- liquidity squeeze and paralysis within the banking sector
- reduced availability of credit
- severe impact on balance sheets of financial institutions
- demise of some significant financial players



Characteristics of Global Financial Crisis

Consequences for financial regulation - 1

- failure of existing risk management processes
- inadequate modelling of credit risk (and underwriting risk)
- limitations of risk measures such as VaR (value at risk)
 - need better measures of tail risk (and fatter-tailed distributions)
- insufficient consideration of liquidity risk
- risks associated with securitisation
- ... especially through lack of information about risks
- ... and failure to recognise impact of systemic factors



Characteristics of Global Financial Crisis

Consequences for financial regulation - 2

- revisit and review Basel II banking regulation
- need for new risk measures
 - liquidity, gearing and exposure
 - also mismatch risk needs to be better treated
- improve risk management to cope better with extremes
- need to make more use of actuarial skills
- review appropriateness of accounting standards
- better international coordination of regulation needed
- ...and measures to reduce pro-cyclicality



Characteristics of Global Financial Crisis

IAA recommendations to G20 in February 2009

- introduction of more counter-cyclical regulation
- creation of country Chief Risk Supervisor role
- application of comprehensive risk management concepts
- improved risk governance
- need for dynamic risk sensitive framework
- risk modelling and better risk measures
- risk culture and remuneration incentives



Enterprise Risk Management

Actuarial skills for risk management

- quantitative skills
- statistics and data analysis
- understanding of assets as well as liabilities
- asset/liability modelling
- dynamic financial analysis – internal models
- stochastic projection methodologies
- understanding of the broader environment
- professionalism
- reporting and communication skills



Enterprise Risk Management

Simple risk classification

- > credit risk
- > liquidity risk
- > market risk
- > operational risk



Enterprise Risk Management

More extended risk classification

- > credit risk
- > liquidity risk
- > market risk
- > operational risk
- > product/underwriting risk
- > liability risk
- > asset/liability risk
- > reputational risk



Enterprise Risk Management

Risk governance

- > how can the actuarial risk manager contribute to corporate governance?
- > the actuary's skills are well-suited to risk management
- > ...and the actuary's professionalism helps to build trust
- > risk identification, assessment & monitoring
- > modelling combined impact of risks at enterprise level
- > evaluation of impact on all stakeholders
- > protecting the interests of customers



Enterprise Risk Management – CERA treaty



Actuaries

The Best-Kept Secret in Business™

Turn Risk Into Opportunity™



Enterprise Risk Management

Actuarial skills for risk management

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ERM Designations

Enterprise Risk Management designations

- Chartered Enterprise Risk Analyst – CERA (SoA)
- Chartered Enterprise Risk Actuary – CERA
 - global designation to be offered in many countries
- Associate of Institute of Actuaries (or Fellow)
 - with new Specialist Subject in Enterprise Risk Management



ERM Designations

CERA designation

- Treaty signed in November 2009 by 14 associations
- CERA Treaty organisation to be a Swiss Verein...
- ...administered from the UK
- Treaty participants may apply to become awarding bodies...
- ...or simply recognise the CERA qualification
- awarding bodies subject to validation by Review Panel



ERM Designations

CERA treaty participant organisations

Actuarial Society of South Africa (South Africa)
Het Actuarieel Genootschap (Netherlands)
Canadian Institute of Actuaries (Canada)
Casualty Actuarial Society (USA)
Colegio Nacional de Actuarios A.C. (Mexico)
Deutsche Aktuarvereinigung e.V. (Germany)
Institut des Actuaire (France)
Institute and Faculty of Actuaries (UK)
Institute of Actuaries of Australia (Australia)
Institute of Actuaries of Japan (Japan)
Israel Association of Actuaries (Israel)
Society of Actuaries (USA)
Svenska Aktuarietföreningen (Sweden)



ERM Designations

UK Actuarial Profession CERA qualification

Requirements for CERA:

- CT1 to CT8 (core technical) examinations
- CT9 (Business Awareness) two day course and test
- CA1 (Actuarial Risk Management) exam
- CA2 (Modelling) two day course & assessment
- CA3 (Communications) two day course & assessment
- ST9 (Enterprise Risk Management)
- Associateship Professionalism Course (1 day)
- Work-based skills (at least 1 year)



UKAP CERA designation

Correspondence with IAA Core Syllabus

- Financial Mathematics (CT1)
- Probability and Mathematical Statistics (CT3)
- Economics (CT7)
- Accounting (CT2)
- Modelling (CT4 and CA2)
- Statistical Methods (CT6)
- Actuarial Mathematics (CT5)
- Investment and Asset Analysis (CT2, CT8 and CA1)
- Actuarial Risk Management (CA1)
- + Business Awareness, Communications and WBS



UKAP CERA designation

Additional requirements for Fellowship (FIA/FFA)

- one of ST1 to ST8 (specialist technical) examinations
- one of SA1 to SA6 (specialist application) examinations
 - 1 = health and care
 - 2 = life insurance
 - 3 = general insurance (now 7 and 8 for ST instead of 3)
 - 4 = pensions
 - 5 = investment
 - 6 = finance
- Fellowship Professionalism Course (2 days)
- Work-based skills (in total for at least 3 years)



ST9 – Enterprise Risk Management

Aim of Syllabus for ST9

The aim of the Enterprise Risk Management (ERM) Specialist Technical subject is to instil in successful candidates the key principles underlying the implementation and application of ERM within an organisation, including governance and process as well as quantitative methods of risk measurement and modelling. The student should gain the ability to apply the knowledge and understanding of ERM practices to any type of organisation.



ST9 – Enterprise Risk Management

Requirements for ST9:

- ERM concept and framework
- ERM process
- risk categories and classification
- risk modelling and aggregation of risks
- risk measurement and assessment
- risk management tools and techniques
- economic capital



UKAP CERA designation

UKAP CERA qualification – three possible routes

- Standard route – professional examinations
- Exemption route – one or more subjects at university with exemption agreement
 - university must follow UKAP syllabus closely
- Accreditation route – several subjects at university with accreditation agreement CERA
 - university must broadly follow UKAP syllabus across whole course
- exemption and accreditation available for CT1 to 8...
- ...and also for CA1 and ST9 (and other ST subjects)



UKAP CERA designation

UKAP CERA qualification – Exemption route (ERA)

- university must have exemption agreement with UKAP
- applies to individual subjects (1 up to 15)
- university must follow UKAP syllabus closely
- assessment must be by closed book examination
- student must reach university distinction level
 - to be agreed in each case, but considerably higher than a pass
- external examiner acceptable to profession
 - reviews examination papers and marking schedule
 - recommends individuals to the profession for exemption
- on joining the UKAP, students pay exemption fees



UKAP CERA designation

UKAP CERA qualification – Accreditation route (1)

- university must have accreditation agreement with UKAP
- applies to a block of subjects at university
 - university must broadly follow UKAP syllabus across whole course
 - greater breadth or depth acceptable
 - student must reach distinction level overall in course
- Independent Examiner to monitor programme
- ...and recommend students for exemptions
- on joining the UKAP, students pay exemption fees
- annual monitoring of accredited programmes



UKAP CERA designation

UKAP CERA qualification – Accreditation route (2)

- prerequisites to be considered for accreditation
 - identifiable actuarial programme
 - at least one FIA/FFA on the faculty
 - demonstrated teaching capability in relevant disciplines
 - demonstrated commitment to relevant research
 - willingness to work with the profession
 - demonstrated involvement with actuarial employers
- formal submission made to profession



UKAP CERA designation

UKAP CERA qualification – Accreditation route (3)

- accreditation submission requirements
 - aims and objectives of the programme
 - teaching, learning and assessment strategy
 - syllabus content and explanation of variances from profession's
 - assessment and grading processes (at least 70% unseen exams)
 - existing and planned links with employers
 - statement of available resources
 - entry profiles of students
 - statistics on employment of past students
 - processes for quality assurance by university
- initial review, followed by visit and meeting



UKAP CERA designation

UKAP CERA qualification – Accreditation route (4)

- accreditation visit/meeting
 - meeting with management of Faculty/School/Department
 - meeting with Programme team to discuss documentation
 - meeting with students on comparable courses
 - meeting with employer contacts
 - review of resources available for the programme
- report of accreditation meeting
 - confirmed by accreditation panel
 - confirmed by university programme team
- recommendation submitted to Education Committee



UKAP CERA designation

UKAP CERA qualification – Accreditation route (5)

- quality assurance following accreditation agreement
- Independent Examiner has main responsibility
 - review of draft coursework assessments
 - review of draft exam papers
 - review of sample of completed assessments
 - access to the Virtual Learning Environment used on programme
 - review of staff actuary reports on visits to university
 - raising matters of concern with university staff and UKAP
- Independent Examiner is paid an honorarium (£1050 p.a.)
- staff actuary visits to observe tuition
- feedback obtained from students



CERA designation

Application to be able to award CERA designation

- formal written submission with evidence that
 - there are satisfactory governance arrangements
 - necessary steps taken to be able to comply with Treaty
 - provides (itself or through Accredited Education Provider (AEP)) education programmes which...
 - ...cover a sufficient proportion of the ERM syllabus
 - ...include suitable examination or assessment procedures
 - has a CPD strategy in place which includes ERM
- Review Panel will review evidence
- including oversight of AEPs
- annual monitoring material



Enterprise Risk Management

Actuaries and ERM

- the actuary's skills are well-suited to risk management
- ...and the actuary's professionalism helps to build trust
- risk identification, assessment & monitoring
- modelling combined impact of risks at enterprise level
- evaluation of impact on all stakeholders
- protecting the interests of customers



Enterprise Risk Management

Role of Chief Risk Officer

- key adviser to Board of company
- assessment of risk in products and pricing
- evaluation of risk and uncertainty in liabilities
- comprehensive and integrated analysis of risks
- dynamic financial analysis (DFA)
- design of risk mitigation programmes
- ongoing capital requirements
- actuaries are ideal professionals to fulfil such a rôle



Regulation and Risk

Solvency II

- objective is to align capital requirements more closely with the degree of economic risk an insurer faces
- replacement of static rules with an approach which offers incentives for firms constantly to improve their internal governance and management of risk
- regulators will expect to see effective risk management
- actuarial function must contribute to risk management
- internal models encouraged but must pass 'use test'
- and this will also reduce the required level of capital



Enterprise Risk Management

Some conclusions

- risk management should be at the heart of corporate governance
- ...with clear leadership from the Board and the executive
- risk should as far as possible be quantified, monitored and controlled
- actuaries have the technical and professional skills to be risk managers
- globally the actuarial profession must position itself to play a major role in ERM



CERA

Chartered Enterprise Risk Analyst (CERA)一詞，源自於1949年 Society of Actuaries (SOA)為配合ERM領域發展而逐步建立的認證資格，直至2009年11月，於Hyderabad, India舉行的International Actuarial Association (IAA)¹會議中由 Society of Actuaries (SOA)及13個精算組織²共同簽訂成立treaty，正式演變成為國際型認證證照³，而目前已被授與能給予其會員CERA國際風險管理師之資格的，僅有Society of Actuaries (SOA)，且現以考試作為其主要途徑，截至今天約有600名左右的CERA s.

CERA，各國精算組織可透由自辦考試或授權學校(中心)辦理訓練等兩種途徑取得被授與能給予其會員CERA國際風險管理師之資格，除Society of Actuaries (SOA)外，英國與澳洲之精算組織亦正在申請其被授與能給予其會員CERA國際風險管理師之資格，而台灣，因精算人才及資源有限，中華民國精算學會(AIRC)趨向以授權學校(中心)辦理訓練之途徑取得被授與能給予其會員CERA國際風險管理師之資格。

另於Risk Management 領域中，其專業資格認證稱之為風險管理師，由各組織授與資格，例如GARP、PRMIA二組織所授與的FRM, PRM資格，而CERA與具該類資格之風險管理師間主要的差異，即是具有CERA資格之風險管理師較具有數理背景，因其Candidate須符合International Actuarial Association (IAA) Education syllabus所要求具備的知識。

¹ IAA 現有 63 個正會員精算組織，台灣亦是其中之一。

² The organizations signing the treaty include: The Institute of Actuaries of Australia (Australia); Canadian Institute of Actuaries / Institut Canadien des Actuaire (Canada); Deutsche Aktuarvereinigung e.V.(Germany); Institut des Actuaire (France); Israel Association of Actuaries (Israel); Institute of Actuaries of Japan (Japan); Colegio Nacional de Actuarios A.C. (Mexico); Het Actuarieel Genootschap (Netherlands);Actuarial Society of South Africa (South Africa); Svenska Aktuarieföreningen (Sweden); Faculty of Actuaries (United Kingdom); Institute of Actuaries (United Kingdom); Casualty Actuarial Society (USA);Society of Actuaries (USA)

³ 相對於國際型認證證照，現精算證照多屬於區域型認證，如：正精算師，在美國 SOA 稱 FSA，在美國 CAS 稱 FCAS，在台灣中華民國精算學會稱 FAIRC。