

Actuaries and Operational Risk Management

Presentation to AAE Webinar 'Update on Risk Management Topics'
5 December 2019

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About the speaker

Malcolm Kemp, *Barnett Waddingham*

- Malcolm Kemp is Chairperson of the AAE Risk Management Committee, Adjunct Professor at Imperial College Business School, member of Advisory Scientific Committee of European Systemic Risk Board, Associate, Barnett Waddingham and Managing Director, Nematrian
- He is an internationally known expert in risk and quantitative finance, with over 30 years' experience in the financial services industry including senior roles in insurance and investment management
- Barnett Waddingham is a leading independent UK consultancy at the forefront of risk, pensions, investment and insurance



About the speaker

Christoph Krischanitz

- Christoph Krischanitz was Chairperson of the former AAE Investment and Financial Risk Management Committee, is now member of the AAE task force Role of Actuaries, has several roles in other actuarial organisations and currently active as lecturer at the Technical University of Vienna
- He is an expert in pensions, Non-life Insurance and Enterprise Risk Management, with over 20 years' experience in the financial services industry thereof 17 years as managing director of an Actuarial Consulting Firm in Austria.



Agenda

- Introduction
- Operational risk management disciplines and techniques
- Relevance of actuaries
- Topics covered in paper's Appendices

Presentation based on Kemp, Krischanitz, de Leval and Van den Borre (2019). “Actuaries and Operational Risk Management”, a paper prepared by some members of the Actuarial Association of Europe’s Risk Management Committee, see e.g.:

www.nematrian.com/Docs/OperationalRiskManagement20190509.pdf

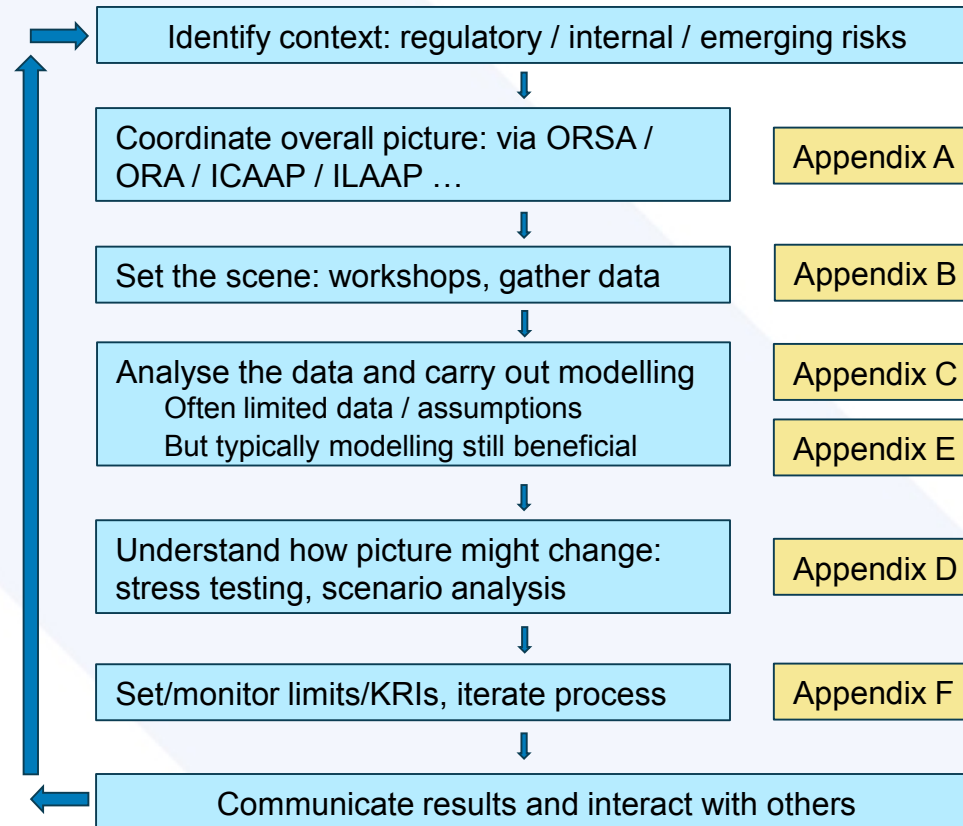
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Introduction

Introduction

- AAE's Risk Management Committee keen to ensure actuarial involvement in all risk management areas
- Paper explores skills and techniques actuaries can bring to **operational risk management**
 - Majority of paper relates to **insurers** (or **IORPs**) but some content is **broader**
- The paper's Appendices explore in more detail many activities that those working in operational risk are likely to get involved with

Main roles of an operational risk manager



Operational risk management disciplines and techniques

Operational risk management disciplines and techniques

- Outside financial sector most risks might be deemed ‘operational’
- Narrower definition used within financial sector:
 - “the risk of loss, arising from inadequate or failed internal processes, people and systems or from external events”
- Usually operational risk is seen as **unrewarded** compared to insurance, market and credit risk
 - Except for outsourcers or for insurers offering insurance against operational risks
 - E.g. cyber insurance coverage

Typical responsibilities of operational risk managers

- a) Formulating and implementing a coherent and effective risk management process
- b) Championing risk management with senior executives and board
- c) Challenging from a risk management perspective the activities and decision-making of others within the organisation
- d) Drafting / updating risk policies including ones on operational risk
- e) Developing and implementing ways to measure and manage operational risk
- f) Formulating and implementing controls
- g) Capturing loss and other relevant business risk management information and preparing and presenting relevant management information and proposals
- h) Coordinating or developing potential operational risk scenarios to use in the firm's Own Risk and Solvency Assessment (ORSA) or for IORPs its Own Risk Assessment (ORA)
- i) Contingency planning and crisis management

Desirable skills

Desirable skills for a good (operational) risk manager

Qualitative skills	Quantitative skills	Softer skills
<ul style="list-style-type: none"> • Risk and Control Self-assessment (RCSA) • Risk maps (risk identification attributing a level of concern on probability and severity) • Business Continuity and Disaster Recovery management • Risk Appetite / tolerance and Key Risk Indicator (KRIs) definition • Quality management (such as COSO, ISO, Six Sigma, Sarbanes-Oxley ...) • Scoreboards • Information security management • Anti-fraud management • Management of insurance taken • Health and safety management 	<ul style="list-style-type: none"> • Risk capital modelling • Loss data collection (internal and external) • Defining loss frequency and severity distributions (with data quality as a challenge) based on techniques such as extreme value theory, simulation, fuzzy logic, neural networks, predictive modelling, ... • Stress testing and scenario analysis • Risk-adjusted return analysis 	<ul style="list-style-type: none"> • Challenging skills • Leadership • Fostering dialogue • Crisis management • Communication • Broad knowledge of the company, its processes and systems • Industry/sector knowledge • Having easy access to people and information • Agility • Project management • Controlling and auditing • Vigilance • Change management • Networking skills

Typical areas where firms are weak

- ORX and McKinsey (2017) think operational risk is the “unloved child of risk management”
 - Too focused on **regulatory capital** and **compliance**
- Areas most needing improvement typically:
 - Sub-optimal management information
 - Minimal integration of advanced analytics
 - Ineffective and inefficient controls
 - Risk culture not sufficiently embedded; and
 - Lack of business and specialist skills

Relevance of actuaries

Relevance of actuaries

- How firms structure operational risk activities **varies considerably depending on firm size, business focus, importance relative to other risks and maturity level**
- Those employed within relevant teams are **equally varied**
 - Advantage of multi-disciplinary teams
- Actuaries **well positioned** to form a core part of such a team
 - Internal analysis by AAE indicates circa one-quarter of European actuaries work in risk management in some form and a high proportion of insurer CROs / RMFs are actuaries

Advantages of actuarial skillset

- Firms should benefit from individuals comfortable with handling data and who understand its limitations
- Actuaries with strong quantitative skills can assist with better integration of advanced analytics
- Actuaries with relevant business expertise and communication skills can marry together qualitative and quantitative perspectives

RMC paper promoting actuaries in RM (1)

The Role of Actuaries

Employing qualified actuaries greatly strengthens a financial institution's risk and capital management, resulting in increased security of policyholders, shareholders and beneficiaries, to the benefit of the institution and its stakeholders. Furthermore, appropriate involvement of qualified actuaries can help supervisors to enhance the effectiveness of the regulatory process.

Actuaries ...

... fulfil many roles in a broad range of environments, including insurance, pensions, regulation, and other fields.

... have a detailed understanding of economic, financial, demographic and insurance risks and expertise in

- developing and using statistical and financial models including modern methods in data science
- informing financial decisions and solving complex financial problems
- pricing, reserving, and setting capital requirements for uncertain future events.

... also provide advice on the implementation of an effective and efficient enterprise risk management, including reinsurance arrangements, investment policies, capital levels and stress testing.

Actuaries deal with risk.

Deep understanding of mathematics, statistics, data science and business management clearly is a strength of the actuarial profession. Furthermore, actuaries are experienced in dealing with uncertainty, including the analysis of future events.

Financial regulation nowadays is principle based.

Risk functions and risk management roles in financial service firms have grown in importance in recent years, due in part to regulatory requirements such as Solvency II. In an effective risk governance, risk managers need to be an integrated part of the business decision process.

New risks need to be managed and opportunities to be understood.

Traditionally, the risk management was seen just as a control function. Now it becomes more and more important that the management follows a balanced approach of understanding both risks and opportunities. Actuaries play an important role in enabling the management to draw informed decisions acknowledging both aspects.

Competences and skills secure leading risk management.

The cornerstones of the actuarial skill set are a thorough education, continuing professional development, and adherence to ethical and professional standards. Professionalism in the form of strong values as accountability, objectivity and integrity is part of their DNA.

RMC paper promoting actuaries in RM (2)



Actuaries enrich the Risk Management due to ...

- **strong analytical skills** including experience in new methods in modern data science and handling huge data sets
- the **ability to distil complex topics and issues** into relatable and simpler term
- hence being **good communicators of complicated topics** across the both sides of the balance sheet
- their **critical thinking** and ability to challenge all aspects of the business model
- however, also being **business minded and solution oriented**
- reliance on **professional code** ensures thoughtful risk managers

Together with other professions actuaries form an integral part of a diverse, heterogeneous group of people to jointly assess relevant risks and provide effective mitigation strategies.

Comprehensive Education and Professionalism.

Different competencies and skills are required to secure for actuaries a leading risk management position in a rapidly changing world of society and work. Professionalism and an outstanding training (e.g. CERA) are inevitable assets and provide stakeholders of actuaries with strengths to rely on:

- Deep understanding of mathematics, statistics, data science and business management ensured by a comprehensive syllabus.
- Experience in dealing with uncertainties and risks by a minimal amount of years of practice
- Professionalism and continuous development

Strong worldwide network.

The strong network of actuaries worldwide gives a great advantage relative to other professions, as it provides for example clear and high professional standards and a wide basis for retrieving information and organizing research and training.

Specifically in Europe well organized local actuarial associations under the umbrella of the AAE (Actuarial Association of Europe) maintain high standards and contacts between markets and regulators.

¹ Certified Enterprise Risk Actuary is a world-wide standardized and accepted trainings program for actuaries in Risk Management

Topics covered in paper's Appendices

A. ORSA vs ORA

Solvency II Directive	IORP II Directive
Maximum harmonisation Directive	Minimum harmonisation Directive
Extensive role for EU Commission and EIOPA in formulating and setting guidelines	Much less scope for EIOPA to create binding guidance
Delegated Regulation (Level 2), implementing technical standards (Level 3), ...	Social and labour law reserved to member states
Harmonises solvency requirements across EU (for single market)	No specific solvency requirements across EU
Own Risk <i>and Solvency</i> Assessment	Own Risk Assessment

- EIOPA-BoS-14/259 includes 20 guidelines for ORSA
- ORSA: dynamic view over multi-year horizon, operational risk often included via **stress tests**
- ORA likely similar except for lack of specific solvency element

B. Operational risk workshops

- Usually aiming to capture the **wisdom of experts**:
 - Target outcome: **list of key risks**, tool to help **monitor changes**, advance the firm's **risk culture**
 - Obtain different perspectives, replay conclusions, be on lookout for cultural failings, maybe use Delphi method or similar

Data being sought	Comment
Risk mapping	I.e. how the risk in question fits into the broader business context
Likelihood	Maybe expressed as a score from e.g. 1 to 5
Severity	Maybe expressed as a score from e.g. 1 to 5
Historical experience	Examples of past losses or near misses
Credible worst-case scenario	Expert judgement is key
Existing mitigations	What mitigations are in place, their likely effectiveness, person(s) responsible for them, documentation (and/or location of documentation)
Planned mitigations	Likely influenced by workshop
Risk owner	E.g. relevant manager
Other	Any other relevant information

C. Quantifying operational risk

- Approaches explored:
 - Frequency-severity / Monte Carlo / Advanced Measurement approach
 - Stress testing / scenario analysis approach and hybrids between this and (1)
 - Bayesian / causal approach (non-linear modelling)
- Nearly all can be viewed as examples of the **Loss Distribution Approach** (LDA) but making greater or lesser use of expert judgement
 - Can therefore benchmark versus peers using a notional LDA
- In future also greater use of **predictive analytics**?

D. Stress testing and scenario analyses

- Potentially more subjective (and more specific to risk being faced), hence particularly dependent on quality of expert judgement
- Benefits:
 - Capture and synthesise diverse opinions and concerns assisting with risk mapping
 - May handle ‘black swans’ better (particularly versus approaches relying largely on past data)
- Many methodologies
 - Ranging from sensitivity analyses for single risk factors, multiple risk factors in a single scenario, multi-scenario, stochastic simulation
- All need: **Adequacy, objectivity, commitment**
 - And scenario identification, quantification, interpretation

Stress testing and scenario analyses (ctd.)

- Structured presentation, i.e. **same from case to case**, is helpful, e.g.

Scenario Cyber attack		Risk owner XXX									
Scenario description Hacker breaches XYZ’s information security controls, ... [narrative describing scenario]		RCSA / Workshop attendees ... RCSA Score [Numerical]									
Financial impact		Rationale for impact ... [Moderate severity and high severity scenarios might be developed separately]	Directional assessment ...								
<table><tr><td>Description</td><td>EUR</td></tr><tr><td>System reviews</td><td></td></tr><tr><td>Legal costs</td><td></td></tr><tr><td>Total</td><td></td></tr></table>				Description	EUR	System reviews		Legal costs		Total	
Description	EUR										
System reviews											
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Risk tolerance		Key controls ... [Description]									
<table><tr><td></td><td>Current Date</td><td>Prior date</td></tr><tr><td>[Risk name]</td><td>GREEN</td><td>AMBER</td></tr></table>			Current Date	Prior date	[Risk name]	GREEN	AMBER				
	Current Date	Prior date									
[Risk name]	GREEN	AMBER									
Internal loss / near loss events over past x years [Details]		External loss events [Hard and soft/reputational]									

E. Coping with limited data

- Stylised split of operational risk into:
 - High frequency, low severity
 - Low frequency, high severity
- Low frequency high severity now seen to dominate in financial sector
 - Influencing regulatory (lack of) enthusiasm for operational risk internal models, c.f. Basel III
- Need to supplement data with expert judgement, i.e. apply credibility theory

$$\alpha \times [\textit{result derived from data}] + (1-\alpha) \times [\textit{result derived from expert judgement}]$$

- Akin to claims reserving, which also implicitly relies on credibility weighting if there is limited data available to estimate future development of cohort

F. Operational risk appetite, limits and KRIs

- Risk appetite represents the **willingness and ability** of the insurer to take **risk**
- For operational risk can be expressed quantitatively or qualitatively (or both)
 - Strong link between operational risk and **franchise value**, hence **reputational risk** important
- Difficult to cascade risk appetite into concrete **limits** that are meaningful for business units
- Key risk indicators (KRIs) may help with **operationalisation** by focusing management attention
 - Examples include: number of complaints, staff turnover ratio, number of employees attending training courses, average IT system down time, net promotor scores, business volumes ...

Summary

- Operational risk management disciplines, techniques and trends
 - Mix of **qualitative**, **quantitative** and **softer skills**
 - “Unloved child of risk management”: often too focused on regulatory capital and compliance and insufficient analytical rigour. A key issue is how to address **shortage of data**
- Relevance of actuaries
 - Skillset **very relevant, if actuary has suitable business experience**
- Topics covered in paper’s Appendices
 - A. ORSA vs ORA
 - B. Operational risk workshops
 - C. Quantifying operational risk
 - D. Stress testing and scenario analyses
 - E. Coping with limited data
 - F. Operational risk appetite, limits and KRIs



Thank you for your attention

Malcolm Kemp

Christoph Krischanitz