

Biennial Convention 2007

Adventures in Risk

23-26 September 2007 • Christchurch, New Zealand



Institute of Actuaries of Australia



Repositioning ERM

Are you measuring yesterday's risk?

Stuart Wason



“As we know, there are known knowns. There are things we know we know. We also know there are known unknowns. That is to say, we know there are some things we do not know. But there are also unknown unknowns, the ones we don't know we don't know.”

Feb. 12, 2002, Donald Rumsfeld, US Secretary of Defense at Department of Defense news briefing



ERM Progress

- Widespread introduction of sound governance practices for enterprise risk management (ERM):
 - actuarial control cycle
 - identification, assessment and management of credit, market, underwriting and (increasingly) operational risk
 - embedding ERM throughout the insurer's risk and capital management decisions
 - appointment of chief risk officers (CRO's)
 - increasing use of sophisticated internal models for risk and capital management decisions
 - increasing regulatory acceptance of internal models for capital requirements



Known risks – learning from yesterday

- Actuarial basic training focuses on frequency and severity of “known” risks
- Observed experience used to develop understanding of the risk itself and its key drivers
- Understanding used to determine current estimate, trend, variability etc.
- Challenge of insufficient credible data – especially in the tail



Known risks – learning from yesterday

- Dealing with the lack of credible data:
 - Include experience from relevant market or industry studies
 - Include experience from other “similar” assumed risks
 - Extending the observation period over time to include additional observations
- Each option makes it difficult to truly discern the current estimate of the risk we are studying
- Bigger challenge lies in the assessment of “known” risks based on their past experience is two-fold:
 - Insufficient understanding of risk behavior for low probability events (i.e. events in the tail of the distribution) and
 - Insufficient understanding of how future experience will differ from that of the past.



Known risks – low probability events

- Beyond understanding expected behavior (i.e. current estimate) of “known” risks we also seek to understand their variability
- Unfortunately, low probability or extreme events suffer (by definition) from lack of credible data
- Possible response to lack of data is to assume that risk behaves according to a commonly used statistical distribution
- Taleb in *Black Swan* warns against Gaussian presumption
- “Mediocristan” vs “extremistan”



Known risks – low probability events

- “Mediocristan” - a world in which particular events do not contribute much individually only collectively
- “Extremistan” – a world in which the inequalities between individual events are so great that one single observation can disproportionately impact the aggregate



Known risks – low probability events

- “Mediocristan” – an example
 - People with a net worth higher than €1 million are 1 in 62.5
 - Higher than €2 million are 1 in 127,000
 - Higher than €3 million are 1 in 14,000,000,000
 - Higher than €4 million are 1 in 886,000,000,000,000,000



Known risks – low probability events

- “Extremistan” – an example
 - People with a net worth higher than €1 million are 1 in 62.5
 - Higher than €2 million are 1 in 250
 - Higher than €4 million are 1 in 1,000
 - Higher than €8 million are 1 in 4,000
 - Higher than €16 million are 1 in 16,000



Known risks – future vs past experience

- Are we better in determining the reasoning behind events in retrospect than in their prediction?
- Does history evolve gradually or by jumps?



Known risks – future vs past experience

“But in all my experience, I have never been in any accident...of any sort worth speaking about. I have seen but one vessel in distress in all my years at sea. I never saw a wreck and never have been wrecked nor was I ever in any predicament that threatened to end in disaster of any sort”



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E.J. Smith, 1907, Captain RMS Titanic



Known risks – future vs past experience

- Canadian examples:
 - Continuation of substantial management expense loads on segregated funds
 - Use of mean reversion in stochastic models for investment returns
- Suggest healthy skepticism in discerning how past trends and experience might evolve in the future.
- Ask me about the “bucket of death”



Known risks – risk dependencies

- Early ERM for financial institutions has focused on major types of risks with little consideration of possible risk dependencies (e.g. Basel Accord)
- Increasing awareness of importance of modeling the dependencies between risks
- Recent market events have shown importance of linkage of increasing credit spreads and equity market price decreases
- We are frequently concerned with the behavior of risks under improbable conditions
- Risks which are normally independent of each other suddenly are positively correlated (e.g. pandemic)
- ERM needs to consider behavior of tail risk dependencies



Systemic risks

- Insurers need be concerned with their own specific risks as well as the possible impact of systemic risks
- A working definition of systemic risk might be:
“Systemic risk is the risk of loss of economic value or confidence in a substantial number of insurers such that the financial position of the entire industry is significantly affected.”
- Insurers manage their exposure to systemic risks through product design and pricing, investment policies, and risk management practices.
- Exposure to systemic risk only results in losses as a result of an adverse external event or change in the environment.



Systemic risks

- Some potential external events which may give rise to systemic risk might include:
 - Severe economic downturn
 - Flu pandemic
 - Increased longevity which adversely affects payout annuities
- The long period of global macro-economic stability that we had been enjoying has become unsettled in recent months but how good were we at predicting which specific event (or combination) would trigger the losses in the sub-prime mortgage sector and lead to increased market volatility?



Unknown unknown risks

- We are typically surprised by history and its progression by jumps (Taleb).
- The underlying causes of those jumps (e.g. 9/11, Enron, market crash of October 1987, Titanic etc) tend to be discovered after the fact.
- Have you given thought to these unknown unknown risks and the potential exposures within your own operations that they might affect?
- In this increasingly inter-connected and complex world of ours, your risk management should consider the possibility of unknown unknown risks?



ERM implications

- In conclusion, ERM needs to,
 - Pay close attention to the reasonability of our choices for modeling risk, especially tail risk (i.e. remember “mediocristan” vs “extremistan”).
 - Use healthy skepticism in discerning how past trends and experience might evolve in the future
 - Carefully consider the behavior of risk dependencies in the tail.
 - Give consideration to unknown unknown risks
- Are you measuring yesterday’s risk? If not, perhaps your ERM needs repositioning.

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Questions?