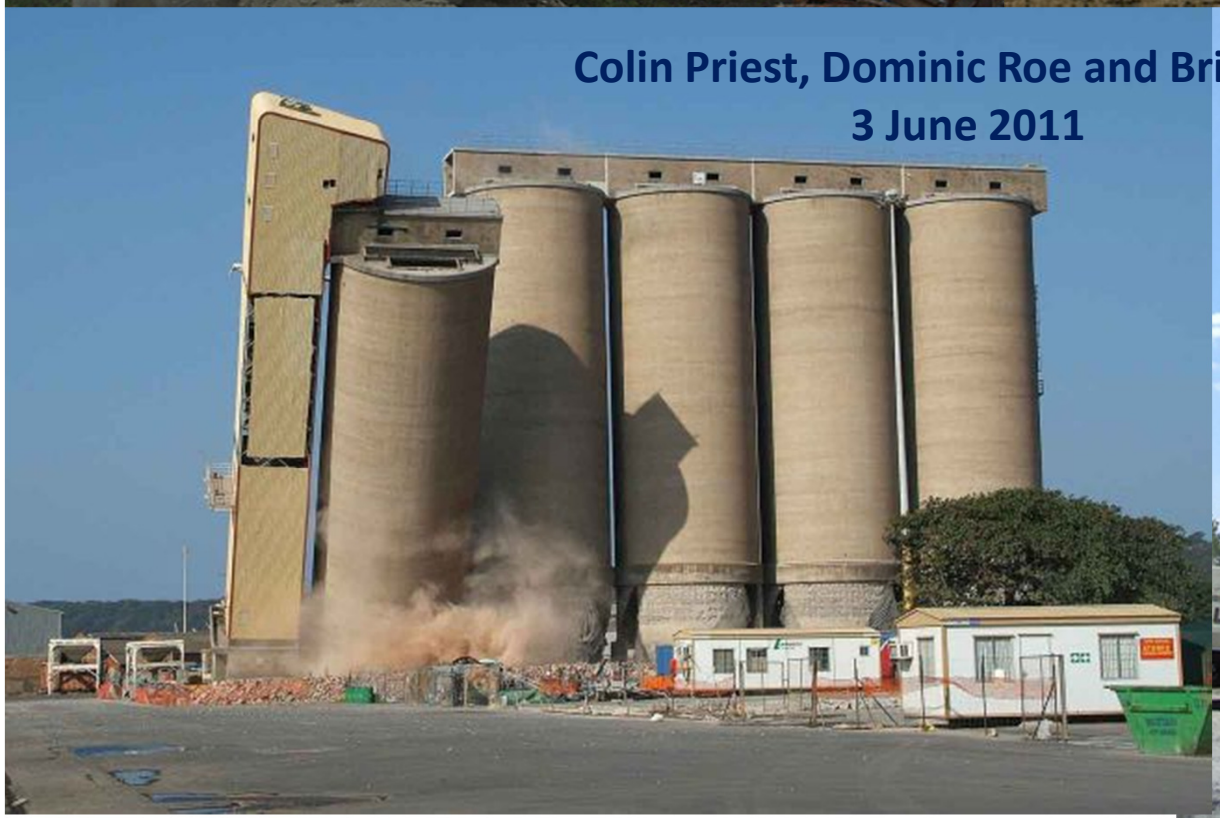
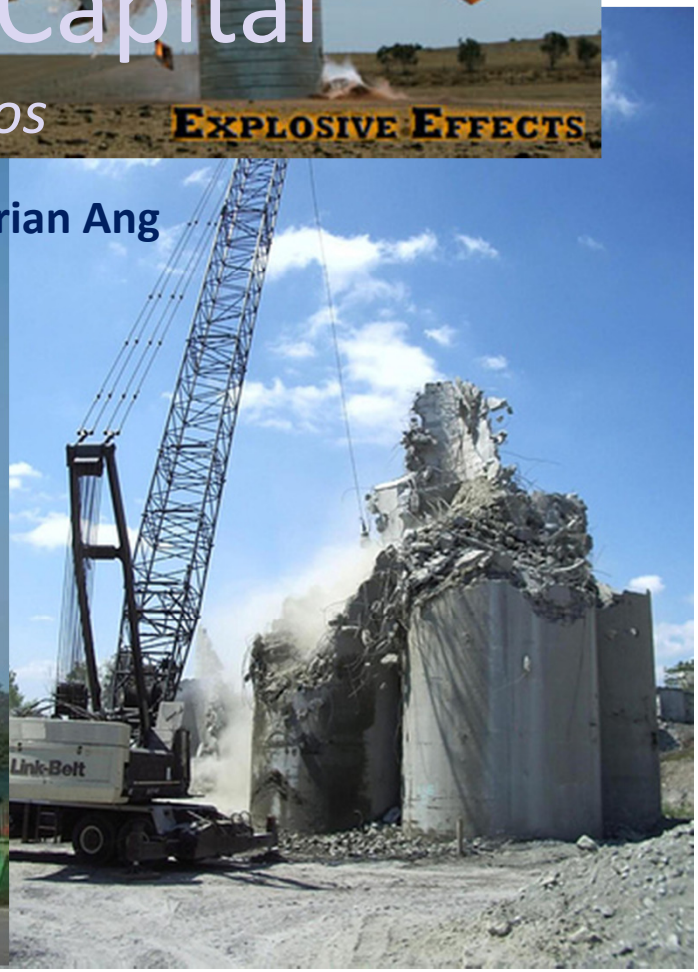
ERM, Pricing and Capital

Breaking down the silos

Colin Priest, Dominic Roe and Brian Ang

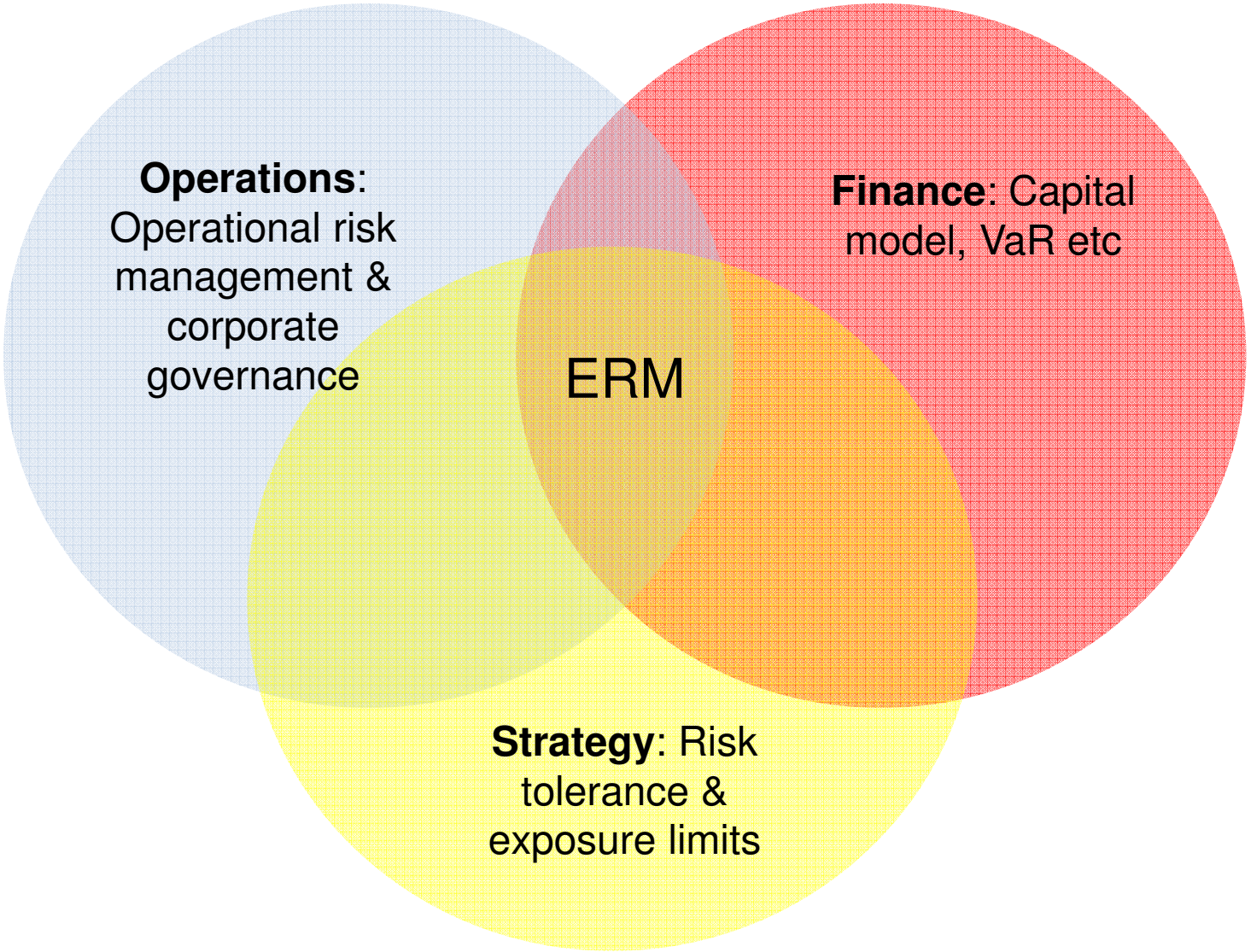
3 June 2011



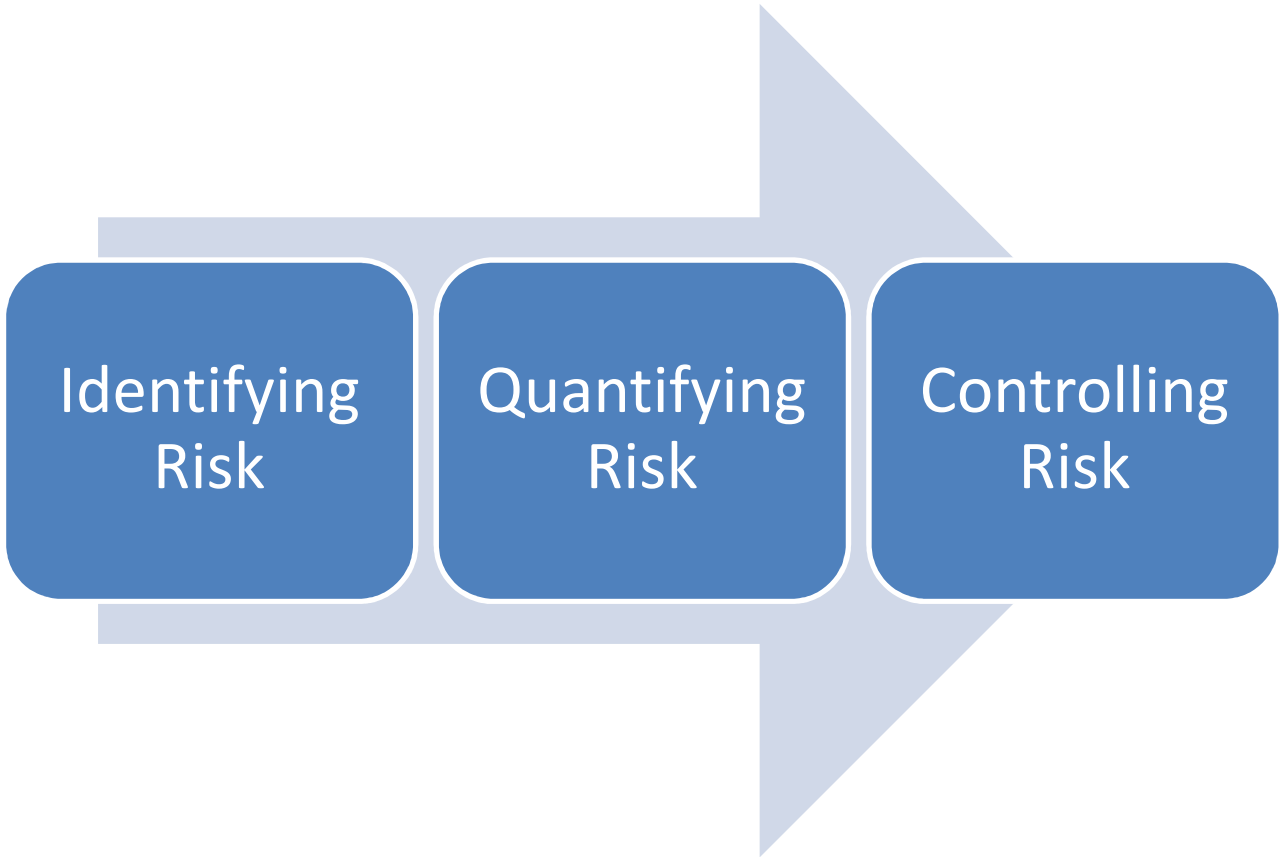


Introduction: ERM

What is ERM?


Operations: Operational risk management & corporate governance
Finance: Capital model, VaR etc
ERM
Strategy: Risk tolerance & exposure limits

What Does ERM Look Like?



Definitions

- **Risk**: any cause of possible volatility or uncertainty in the outcome of the company's processes and results
- **Risk Appetite**: the degree of risk that the company is willing to accept in order to achieve objectives, both in terms of levels and types of risk
- **Risk Limits**: limits on acceptable actions that might be undertaken by a company
- **Risk Tolerance**: a detailed set of statements, many quantitative or statistical in nature, which describes the relative ranking of different risks

How It's Usually Done in Practice

- In SG, both MAS and S&P introduced their own guidelines on risk management to introduce consistency in the interpretation of ERM concepts and terminology.

- ERM, Capital modeling and Pricing are usually done independently by different departments with little interaction between them.

ERM: Risk Tolerance

Setting risk tolerance and using it in the risk register

What It Usually Looks Like

- Ranking / categorisation
- Triggers

HIGH - Report to Board	an unfavourable deviation of > $20m in annual gross premium a single claim that costs > $2m a catastrophe event that costs > $20m net loss of > $0.25m through fraud, misappropriation, or oversight monthly portfolio investment loss > 1% severe or on-going business disruption > 14 days loss of insurance license
MEDIUM - Report to Management	an unfavourable deviation of between $5m and $20m in annual gross premium a single claim that costs between $0.25m and $2m a catastrophe event that costs between $2m and $20m net loss of between $0.01m and $0.25m through fraud, misappropriation, or oversight monthly portfolio investment loss of between 0% and 1% severe or on-going business disruption of between 1 and 14 days restrictions on operations relating to violation of law or regulations
LOW	an unfavourable deviation of < $5m in annual gross premium a single claim that costs < $02.5m a catastrophe event that costs < $2m net loss of < $0.01m through fraud, misappropriation, or oversight monthly portfolio investment return > 0% severe or on-going business disruption < 1 day regulatory non-compliance relating to insurance license that is corrected easily

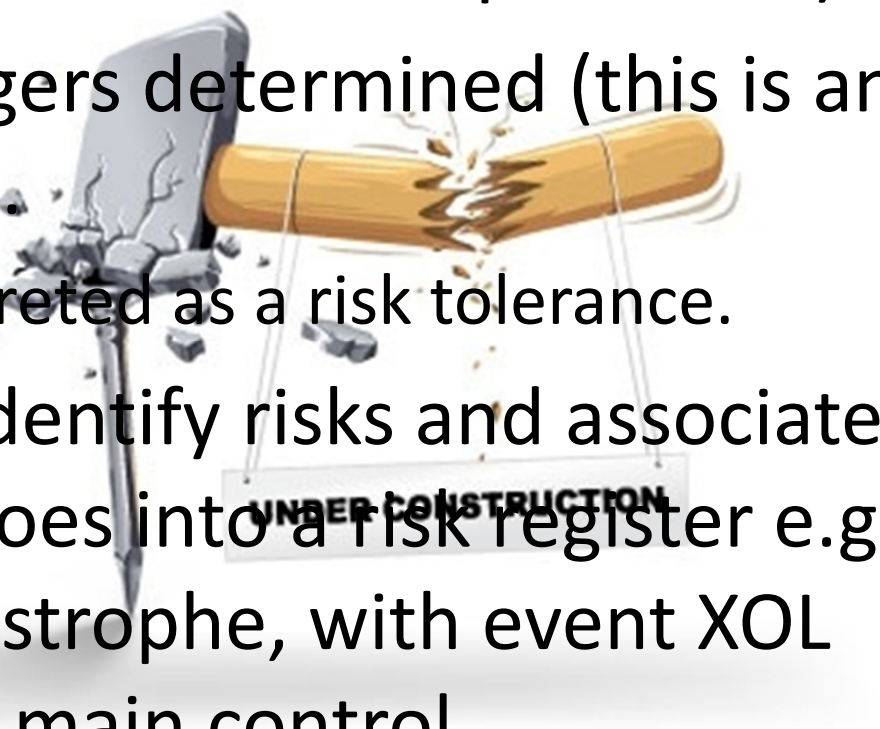
Who Usually Does It?

- Operational risk managers
- Chief Risk Officer

- The Board

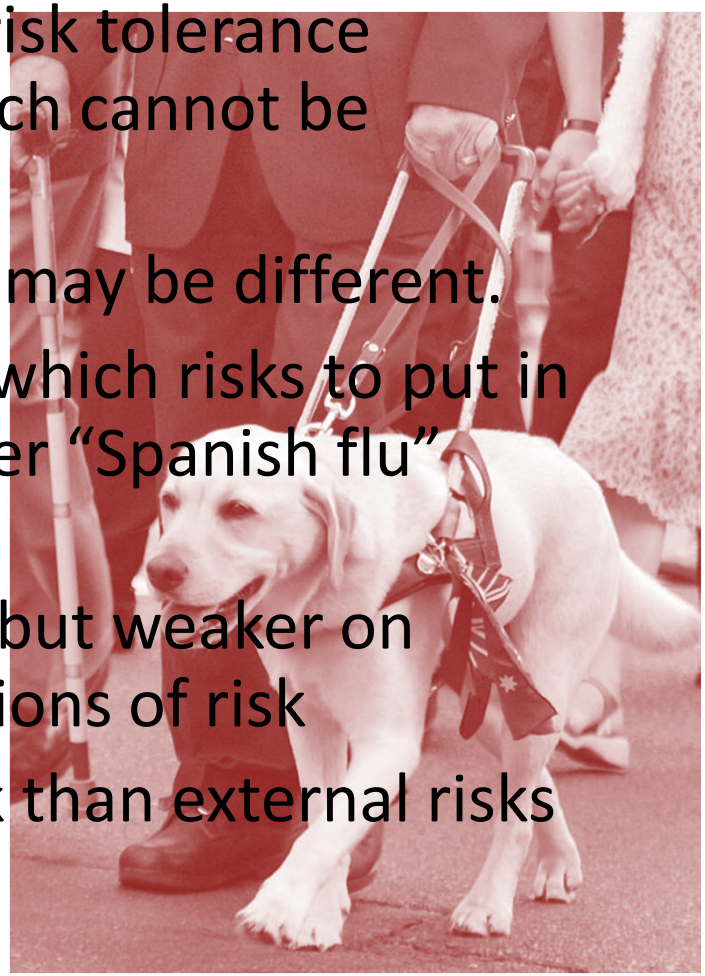
How It's Usually Done in Practice

1. Risk limits set (this is an MAS requirement)
2. Risk reporting triggers determined (this is an MAS requirement).
   1. This can be interpreted as a risk tolerance.
3. Senior managers identify risks and associated controls and this goes into a risk register e.g. risk of natural catastrophe, with event XOL reinsurance as the main control



What Are Its Blind Spots in Practice?

- Not always easy to articulate the risk tolerance statement, especially for risks which cannot be quantified.
- Everyone's understanding of ERM may be different.
- It can be subjective to determine which risks to put in the risk register e.g. should another "Spanish flu" scenario be considered?
- Easier to apply to individual risks, but weaker on interactions between / accumulations of risk
- More focussed on operational risk than external risks



Where Does It Fit in ERM?

- Identifying risks
  - Risk register lists identified risks
- Quantifying risks
  - Risk tolerance ranks risks
- Controlling and Mitigating risks
  - Risk register lists controls and mitigating actions
  - Risk tolerance triggers actions
  - Risk tolerance triggers reporting

Capital Models

Known aliases: DFA, internal model

What It Usually Looks Like

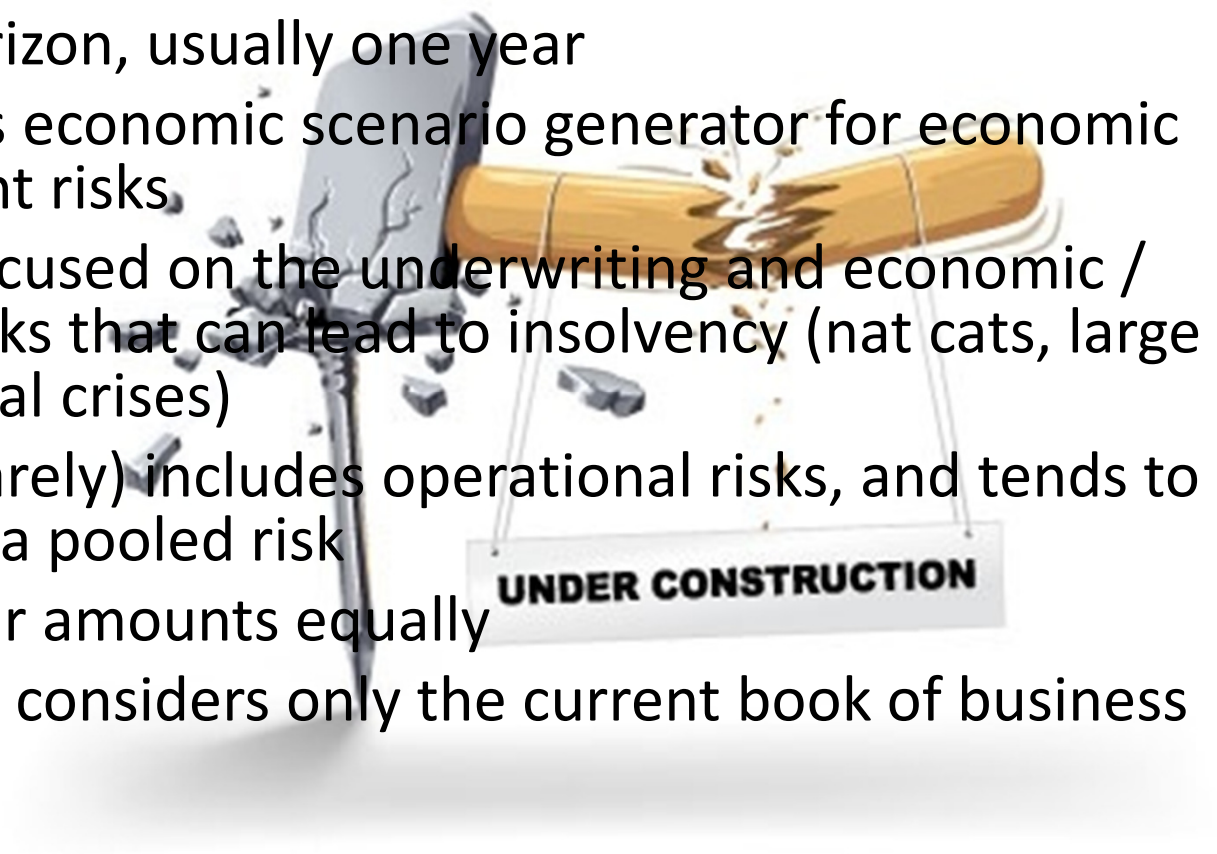
- A black box
- Inputs exposures, investments and economic assumptions
- Outputs multiple scenarios of future profits and solvency and measures of adequacy
- Sometimes measures volatility of results over different return periods
- Probability of insolvency
- Capital allocation to lines of business, products, regions.

Who Usually Does It?

- Capital modelling actuaries
- With assistance from
  - Nat cat modellers
  - Economic models
  - Software developers

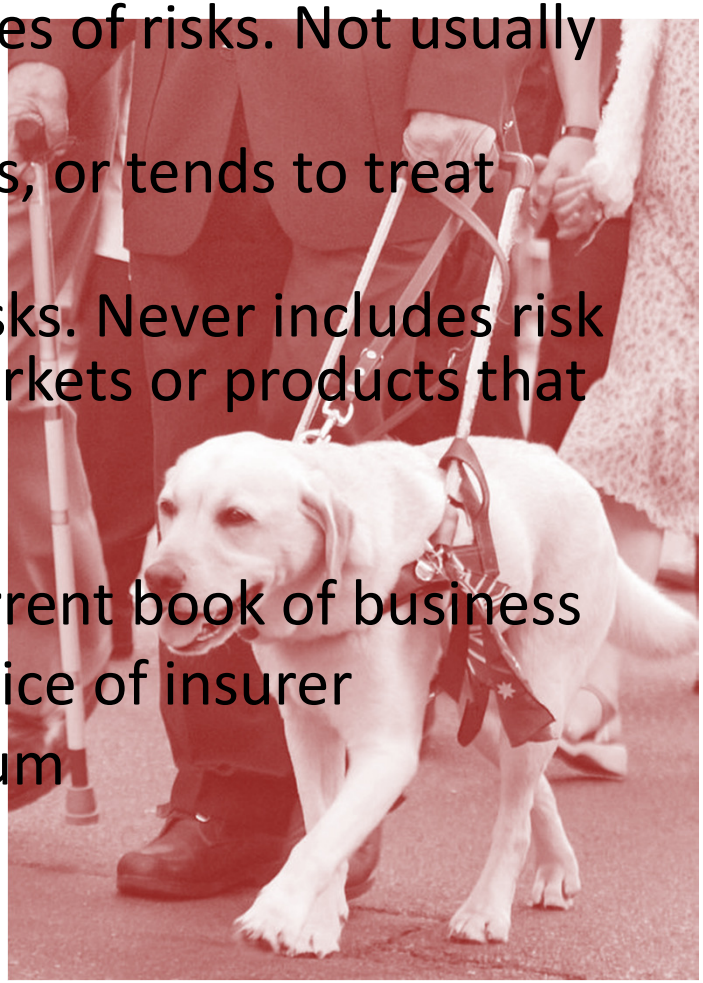
How It's Usually Done in Practice

- Stochastic model, allows for dependence of risks
- Fixed time horizon, usually one year
- Often includes economic scenario generator for economic and investment risks
- Tends to be focused on the underwriting and economic / investment risks that can lead to insolvency (nat cats, large claims, financial crises)
- Sometimes (rarely) includes operational risks, and tends to treat these as a pooled risk
- Treats all dollar amounts equally
- Almost always considers only the current book of business



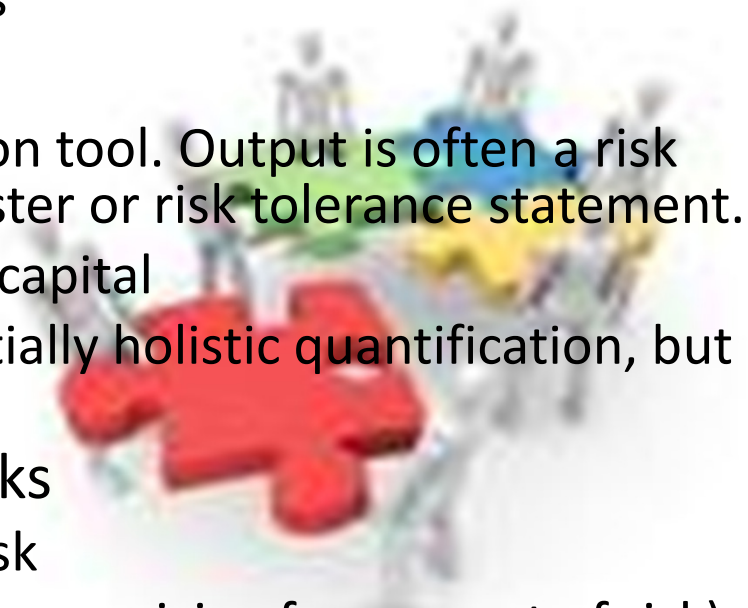
What Are Its Blind Spots in Practice?

- Not holistic – focused on specific types of risks. Not usually related to the risk register
- Sometimes excludes operational risks, or tends to treat these as a pooled risk
- Never includes unidentified latent risks. Never includes risk of wrong strategy (e.g. going into markets or products that are not adequately understood)
- Treats all dollar amounts equally
- Almost always considers only the current book of business
- Does not model effect upon share price of insurer
- Never includes risk to written premium



Where Does It Fit in ERM?

- Identifying risks
  - Creates model risk
  - Doesn't identify any new risks
- Quantifying risks
  - Is primarily a risk quantification tool. Output is often a risk indicator used in the risk register or risk tolerance statement.
  - Quantifies risk of inadequate capital
  - Doesn't quantify all risks. Partially holistic quantification, but with many blind spots
- Controlling and Mitigating risks
  - Is a control for credit rating risk
  - Is a control for pricing risk (allows pricing for amount of risk)



Pricing

In relation to risk and ERM

What It Usually Looks Like

- Rating factors
- Cover details
- Profit targets
- Written premium targets

- A price (premium) quoted to a client

- Typically most of pricing work is on risk premium, but in this presentation we will focus on how pricing considers risk

Where in Pricing Methodology is ERM?

- Big Picture of Pricing
  - Price charged must include amounts for
    - Expected cost of claims
    - Internal and external expenses
    - Cost of capital required to support this business
    - Profit margin
  - Profit margin will include an amount which should account for:
    - Demand loading/discount
    - Long-term or Embedded value
    - The tolerance or appetite the entity has for this risk

Who Usually Does It?

- Pricing actuaries
- Underwriters
- Regulators

How It's Usually Done in Practice

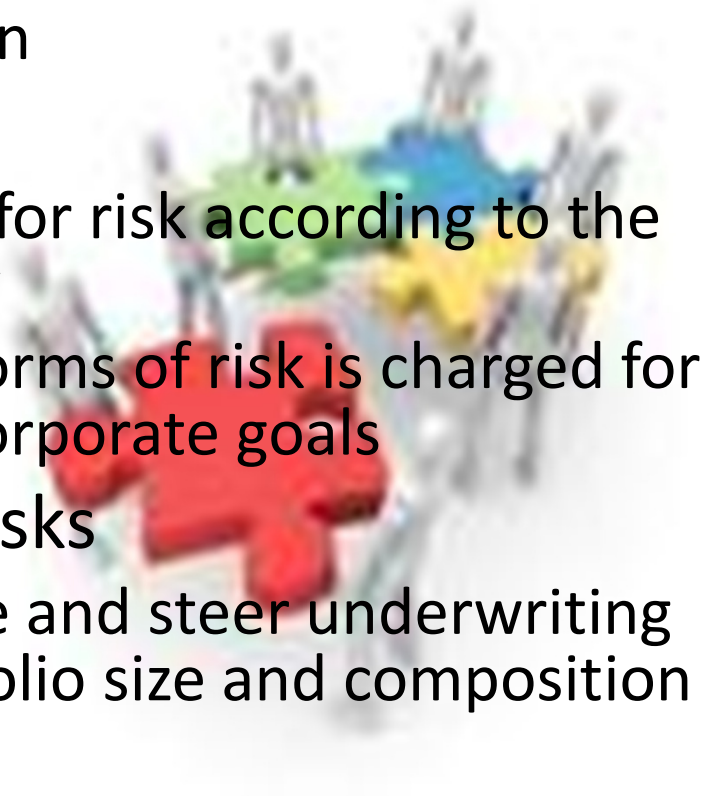
- Pricing must evaluate risks and price for these risks
  - ERM involves the identification, quantification and control/mitigation of risks
  - Unidentified or unassessed risks cannot be appropriately priced for, hence another need for the risk register
- Risk Tolerance statement in ERM
  - Profit margins demanded by the firm will be dependent upon the business strategy which will consider the firm's risk tolerance statement
- Example
  - Reputational risk from pricing policies using a rating factor unused by other competitors and shifting away from the market

What are the Blind Spots in Practice?

- No link with risk register and the assessment of the frequency/severity of the risk
  - Pricing methodology may introduce model risk, reputational risk, amongst other risks
- Systemic risk unaccounted for in embedded value calculations
- Risk tolerance not feeding into profit margin explicitly

Where does Pricing fit in ERM?

- Identifying risks
  - Creates model risk, creates market (pricing cycle) risk
  - May identify adverse selection
- Quantifying risks
  - Pricing should always charge for risk according to the entity's risk appetite or utility
  - The level at which different forms of risk is charged for will help the entity achieve corporate goals
- Controlling and Mitigating risks
  - Pricing is a control to mitigate and steer underwriting risk and thus shape the portfolio size and composition



Interactions

Risk Tolerance vs. Pricing vs. Capital Models

Risk Tolerance and Capital Model

- Capital model is usually measures the probability of a result exceeding a risk limit e.g. solvency level below 120% regulatory minimum
- Risk tolerance usually not considered
- Risk register usually not considered
- Results of capital model may be used as a risk measure within the risk register e.g. “risk of solvency dropping below 120%”

Capital Model and Pricing

- Capital allocation
- -> Cost of capital
- -> Pricing profit target

- Capital allocation
- -> Comparison to profit
- -> Return on capital

Pricing and Risk Tolerance Statement

- The unknown item in the composition of premium is the profit margin
- The optimal profit margin to charge must consider the entity's risk tolerance statement – this will give the appropriate view of:
  - Ability and willingness of the entity to write the business
  - Different risks involved and the sensitivity of the entity to each type of risk, e.g. reputational risk, liquidity risk, systemic risk

Recommendations

More interaction and removing blind spots

Risk Tolerance

- Include underwriting market competition risk
  - Insurance cycle / Increased competition
- Include the impact upon the insurer's value or share price
  - Embedded value
  - Reputation risk
- Consider longer time horizons
  - Strategic planning period

Capital Modelling

- Use a utility function to measure risk
  - Don't treat all dollar amounts the same
  - Translate the risk tolerance into a utility function
- Model underwriting market competition risk
  - Insurance cycle / Increased competition
- Model the impact upon the insurer's value or share price
  - Embedded value
  - Reputation risk
- Consider longer time horizons
  - Strategic planning period
- Model operational risk and effectiveness of controls

Pricing

- For significant risks in the risk register that directly relate to the underwriting of risk, we must charge an explicit amount for, which reflects:
  - The tolerance the entity has to the particular risk
  - Frequency and severity, and volatility of the potential adverse events
- For some form of risk, such as liquidity risk, these are charged in a consistent way across the portfolio according to duration of the claims and thus the charge for this risk is implicit