



# Emerging Risks Emerging Risk Management



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## Emerging Risk - Definition

- Risks that do not currently exist (S&P Definition)
  - Slow to appear, difficult to identify, represent idea more than factual circumstances
  - Result from changing political, legal, economic, market or physical environment
  - Most industry identified Emerging Risks are already known but their impact on society, economy, and insurance is not known yet

Mention HBR article re cone of uncertainty

## Emerging Risks - Definition

- What about the Emerging Risks we haven't identified?
  - Frequency unknown
    - Normal risk identification and monitoring doesn't work
    - Focus on the tail of curve rather than predictable portion – tail is fatter than we think!
  - When they appear, they have a significant impact
    - Cannot be excluded from risk management program
    - Many have impact on multiple parts of an insurer's balance sheet
  - When they appear we wonder why we didn't see it coming
  - Isn't this the definition of Black Swan?
  
- How do we manage what we don't see coming?

## Classifying Emerging Risks

- Need to understand where Emerging Risks can come from
  - Macroeconomic
  - Political/Legal
  - Physical (weather, etc.)
  - Etc.
  
- Need to understand the process through which Emerging Risks can affect insurer
  - Liability side, asset side, both?
  - One or multiple lines of business affected?
  - One or multiple industries affected (understand streams of commerce)?
  - Does it affect competition, buying patterns and/or entire marketplace?
  - Is future business affected?
  - Are suppliers affected?
  - Is there operational exposure?
  
- Multiple processes require multiple identification and risk management systems

## Traditional Risk Models Fail

- High level of uncertainty in modeling impact of Emerging Risks on insurers
- By definition we do not understand much about the risk
- Experience biases tend to lead to underestimation of risk
- Very little data for parameter estimation – tail is fatter than we think
- Lack of understanding of risk leads to huge model error
- Sensitivity and scenario testing with current models may not be enough

## 3 Prong Approach

- Set up early warning system
- Measure and monitor correlations and accumulations
- Create extreme scenarios and measure impact

## Early Warning System

- Internal / External Sources
  - Newspapers, trade press, claims department, underwriting audits, conferences
  
- Difficult to tie information together and see trends
  - Some trends are so slow they are easily missed
  - China products seen multiple times recently
    - Dog food, baby formula, drywall, lead in paint on toys, chemicals in toys
    - Is this noise or signal re products manufactured in China?
  
- Claims/Actuarial collaboration

## Capture Correlations and Accumulations

- Correlations
  
- Accumulations by
  - Insured
  - Coverage
  - Industry
  - Industries linked via stream of commerce
  
- Issues
  - Occurrence triggers
  - F/X
  - Assumed reinsurance
  - Ceded reinsurance

# Portfolio Management Monitoring Accumulations

Hypothetical D&O Portfolio													
Underwriting Review													
Industry Type	Industry Group	Combined All Coverages		Side A - D & O		Full - D & O		Fiduciary Liability		E & O		E P L	
		Policy Count	Limit	Policy Count	Limit	Policy Count	Limit	Policy Count	Limit	Policy Count	Limit	Policy Count	Limit
(1)	(2)	(4)	(5)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Financial	Asset Mangers	16	290.0	0	0.0	10	175.0	0	0.0	5	100.0	1	15.0
Financial	Banks	12	201.5	4	86.5	3	60.0	2	20.0	1	10.0	2	25.0
Financial	Finance Companies	0	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Financial	Insurance	1	10.0	1	10.0	0	0.0	0	0.0	0	0.0	0	0.0
Financial	Professionals	0	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
		29	501.5	5	96.5	13	235.0	2	20.0	6	110.0	3	40.0

## Modeling Emerging Risk

- Arbitrage Pricing Theory
  - Multi-factor model
  - Factors are systemic risks that we know some or all of our portfolio are correlated to
  - Do not have to identify specific factor
  - Simply need to know correlations
  
- Factor Portfolios
  - Chose general factors which represent different types of emerging risks
  - Create a matrix of correlations between businesses in firm and factors based on impact of each emerging risk
  - Over precision in factor development not practical since we can't identify exactly what the factor is
  
- Incorporate in economic capital model

## Parameterizing Factors

- Factors are systemic to industry, not just to firm
  - Advantage is that as firm's risk profile changes, only need to update correlations
- Frequency
  - Binomial whose mean is a random variable
- Severity
  - Loss ratio approach is most appropriate as size of market and risk profile of firm change over time
- Correlations
  - Measure for all businesses, not just underwriting areas
    - Assets
    - Credit
    - Loss reserves
    - Franchise value

## Parameterization Support

- Past catastrophes
- Schedule P
  - Careful of effect of rate adequacy
  - Net vs. Gross
- Lloyd's Disaster Scenarios
- Cone of Uncertainty!!
- Sensitivity test parameters

# Sample Factor Model

Risk Area	Factor A	Factor B	Factor C
Assets	0	+	+
Credit 1	0	0	+
Credit 2	+	0	+
LOB 1 Current	0	0	+
LOB 1 Reserves	0	0	0
LOB 2 Current	+	0	0
LOB 2 Reserves	0	0	0
LOB 3 Current	0	+	0
LOB 3 Reserves	0	+	0
LOB 4 Current	0	+	0
LOB 4 Reserves	0	+	0
Franchise	+	+	+

## Model Benefits

- APT factor models are used to measure risk premiums
  
- We use them
  - Measure systemic loss as part of an economic capital model
  - Support risk management
  
- Benefits
  - Don't have to identify factors
  - Framework for modeling unknown risks
  - Forces careful evaluation of correlations
    - During calibration
    - By sensitivity testing

## Managing Emerging Risks

- Manage Exposure
  - Do nothing
  - Change pricing
  - Exclude exposure in some or all lines of business
  - Sublimit exposure per policy
  - Set accumulation limits by coverage, insured, industry, and/or territory
  - Restrict types of coverage (occurrence)
  - Exit line of business
  - Hedge asset risk
  
- Estimate impact on existing and future business of risk management actions
- Identify possible opportunities – can deeper understanding of risk allow insurer to provide coverage where no others will? Cautious approach required.
- Different approaches for various stages of understanding of risk
- Consider reputational risk of over-reaction