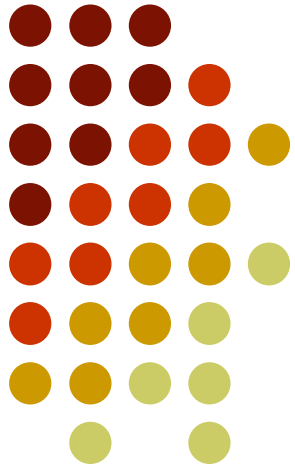
Operational Risk

Chapter 20



Definition of Operational Risk

"Operational risk is the risk of loss resulting from inadequate or failed internal processes, people, and systems, or from external events"

Basel Committee Jan 2001

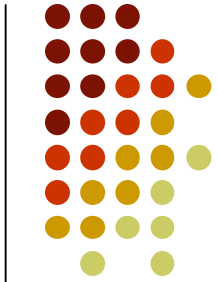
What It Includes

- The definition includes people risks, technology and processing risks, physical risks, legal risks, etc
- The definition excludes reputation risk and strategic risk

The Biggest Risk?

- Operational risk is difficult to quantify but is now regarded as the biggest risk facing banks
- Cyber risk is a huge issue flor financial institutions
- Compliance risks can lead to huge losses (e.g. BNP Paribas's $9 billion loss in 2014)

Categories of Operational Risk



- Internal fraud
- External fraud
- Employment practices and workplace safety
- Clients, products and business practices
- Damage to physical assets
- Business disruption and system failures
- Execution, delivery, and process management

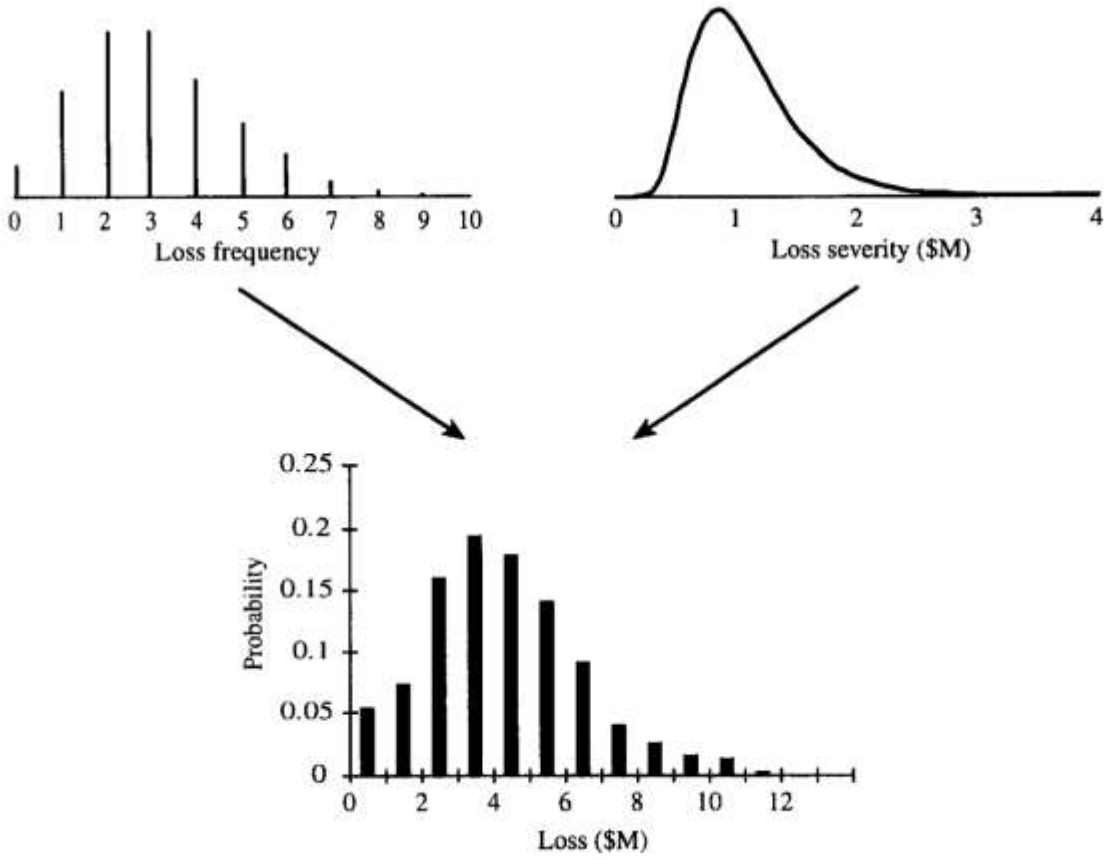
Loss Severity vs Loss Frequency (Section 20.3)

- Loss frequency should be estimated from the banks own data as far as possible. One possibility is to assume a Poisson distribution so that we need only estimate an average loss frequency. Probability of n events in time T is then

$$e^{-\lambda T}\frac{(\lambda T)^n}{n!}$$

- Loss severity can be based on internal and external historical data. One possibility is to assume a lognormal distribution so that we need only estimate the mean and SD of losses.

Using Monte Carlo to combine the Distributions (Figure 20.1)



Monte Carlo Simulation Trial

- Sample from frequency distribution to determine the number of loss events (=n)
- Sample n times from the loss severity distribution to determine the loss severity for each loss event
- Sum loss severities to determine total loss

SMA

- Bank regulators now calculate capital for operational risk using the Standard Measurement Approach (SMA)

SMA: The Business Indicator (BI)

- The business indicator (BI) reflects net interest income, other operating income, the net P&L (see Section 20.4)
- BI Component (BIC) is a piecewise linear function of BI (see Table 20.1)

SMA: The Loss Component

- The Loss Component (LC) is equal to the 15 times the average annual operational research losses over the previous 10 years.
- If 10 years of losses are not available banks can use losses over 5 years during a transition period

SMA: The Internal Loss Multiplier (ILM)

$$\text{ILM} = \ln\left[e - 1 + \left(\frac{\text{LC}}{\text{BIC}}\right)^{0.8}\right]$$

SMA Capital

- The capital is set equal to BIC for small banks and the product of BIC and ILM for large banks
- National regulators have some discretion

Loss Prevention

- Establish causal relationships
- RCSA
- KRI
- Allocate operational risk capital to encourage business units to reduce operational risk
- Educate employees to be careful about what they write in emails and (when they work in the trading room) what they say over the phone

Power Law

$$\text{Prob}\,(v > x) = Kx^{-\alpha}$$

- Research shows that this works quite well for operational risk losses
- Distribution with heaviest tails (lowest α) tend to define the 99.9% worst case result

Insurance (Section 20.8)

- Factors that affect the design of an insurance contract
  - Moral hazard
  - Adverse selection
- To take account of these factors there are
  - deductibles
  - co-insurance provisions
  - policy limits

Sarbanes-Oxley (Section 20.9)

- CEO and CFO are more accountable
- SEC has more powers
- Auditors are not allowed to carry out significant non-audit tasks
- Audit committee of board must be made aware of alternative accounting treatments
- CEO and CFO must return bonuses in the event financial statements are restated