

ERM and PBA Managing the Planning Process

**Kansas City Actuaries Club
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ERM - What it is

- Get paid for the risks you take
- Best solutions are unique to your company!

ERM – What it is not

- Bureaucracy
- Designed to trick the rating agencies

Current Case Studies

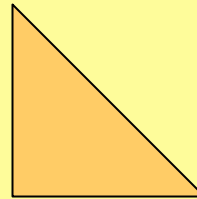
- Societe Generale
 - \$7 billion lost
 - One low level trader
 - Common futures contracts
 - Covered up trades
- Sub prime mortgages
 - What goes in must come out
 - Investor accountability

Definition

- Enterprise Risk Management
 - Casualty Actuarial Society, 2003
- “ERM is the process by which organizations in all industries assess, control, exploit, finance, and monitor risks from all sources for the purpose of increasing the organization’s short and long term value to its stakeholders.”

Balance of Risks

- Balanced firm



- Concentrated firm



Forms of ERM

- Risk Profile

- Focus on exposures
- What ifs
- Planning dept drives
- Optimize results
- Leverages PBA?

- Process Risks

- Focus on controls
- What could happen
- Internal Audit drives
- Limit downside

Key Elements of ERM

- Holistic approach to managing risks
 - Principle-Based
 - Risk appetite
 - Common language
 - Common measurement (leading indicators)
 - Guiding policies and limits
 - Understanding risk combinations

Principle-Based Approaches and Enterprise Risk Management

- Same tools
- Cash flows?
- Graphics of stochastic results
- Allows firm to choose risks to exploit
- Leverage off of existing models
- Weigh run time vs. time spent to explain differences in the models
- Automate - spend time on analysis
- Control cycle - iterative improvement
- Consistency between pricing, projections, reporting

PBA – What it is becoming

- **Conflicting goals**
 - Early goals were to use the same tools to manage the company and report to regulators
 - Transparency
 - Peer review
 - Defend assumptions
 - Recent goals lean toward setting capital so high to effectively guarantee solvency
 - Standard scenarios
 - Prudent best estimates
 - Fewer choices
 - Parallel universe

FSA experience with PBA

- Transparent/Proactive
- Peer review
- Share best practices
- Are the Brits missing some risks?

Leverage

- PBA will be required – why not use it to learn about your risks
- Competitive advantage
 - Accept risk (sometimes seek it out)
- No competitive advantage
 - Mitigate (e.g., hedging, reinsurance)
 - Avoid
- Can't transfer risk, can only share it

Plan Now

- How will you get to 20XX implementation?
 - Start slow and manageable, but start soon
 - Set intermediate deadlines
 - Start learning nuances of products/methods
 - Develop leading indicator metrics
 - Jump start ERM project?

CFT to PBA

- Budget scenario/CFT report
- Add scenario planning across all lines
- Pick option laden product line to test stochastically using AAA scenarios
- Discuss with board
- Test run at least once before formal filing
 - Initially focus on capital

Other Projects

- Marginal capital
- Pricing discipline
- Rating agency reports
- Notional segmentation
- Capital allocation
- ALM
- Exposure report
- Liquidity analysis
- Variance analysis
- GAAP projections
- Risk book
- Leading indicators
- Lagging indicators
- Economic capital

Qualitative Factors

- Model Risk
 - Nuances of portfolio
 - Limitations of model
 - Segregated unit can add risk
 - Fat tails not modeled
 - Emerging risks not in historical data

Risk Committee

- Key product officers from across the company
 - Aids succession planning by providing cross training
 - Builds team that is used to working together
- Chance for other experts to review in advance
 - Avoids some major mistakes
 - Checks and balances
 - Pricing discipline
 - Business units buy in
- Risks debated before accepted
 - Proactive

Scenario Planning

- Deterministic scenarios
 - Worried about specific event
 - What if once per century hurricane or pandemic
 - Modeling constraint
 - I don't know how to do it
 - Time constraint
 - I can't do it based on lengthy run time

Scenario - Event Risk

- Tail risk/Catastrophic risk
- Example – Influenza pandemic
 - 25% morbidity, 0.6% mortality in OECD
- Risk to life insurer
 - Business continuity
 - Claims
 - Liquidity (assets down/claims up/markets frozen)
 - Counterparty (reinsurer solvency)

Typical Insurance Scenarios

- Higher/lower (symmetric)
 - New money rates/Claims/Lapses/Sales
- Higher
 - Defaults/Expenses
- No reinsurance
 - Gross/Net (typical ERM view)

Practical Uses

- Marginal impact on the fly
 - Organic growth
 - Project (aging) current portfolio
 - Introduce new product
 - Reinsurance (with and without)
 - Asset mix
 - Acquisition

Economic Capital Model Skeptics

- Assumes major risks are independent
 - Diversification benefit
- Assumes correlation is constant
 - Copulas may get us past this constraint
- Assumes model risk is minimal
 - Limited data points
 - Complexity
- PBA currently looks at one risk at a time

Emerging Risks

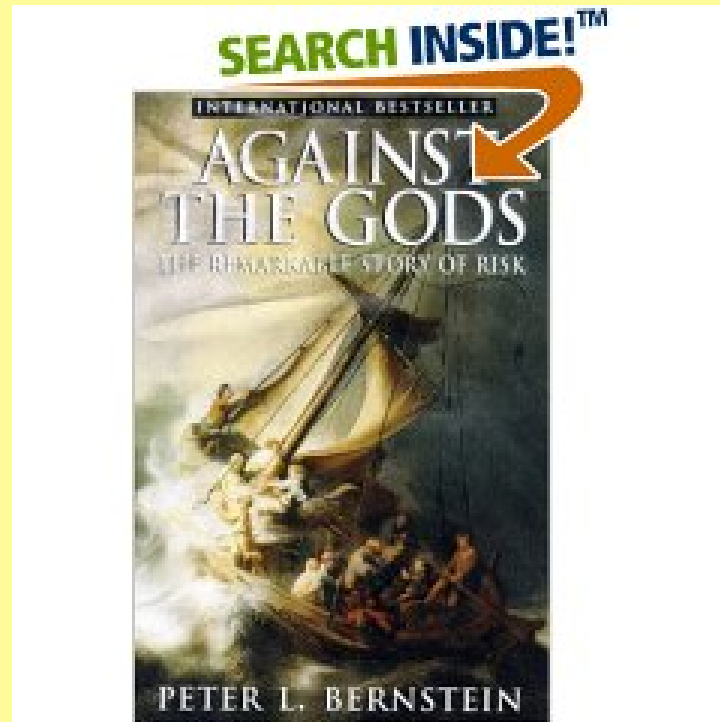
- Financial
 - Sub prime
 - Municipal insurers
 - Commercial Mortgages
 - Credit default swaps
 - Others?
- RMS
 - Anthrax in Chicago
 - Trains in Chicago
 - New York City - water
- Political assassinations

Financial Risk Management Failures

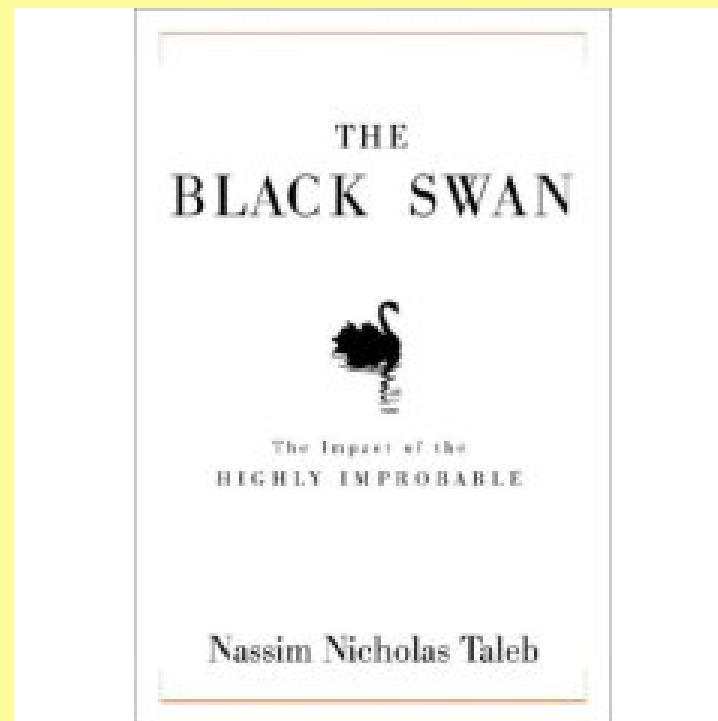
- 1973: Equity Funding Fraud**
- 1983: Baldwin United Shell Game**
- 1984: Continental Illinois Bank Run**
- 1986: The ZZZ Best Carpet Scandal.**
- 1988: Equitable (NY) GIC losses.**
- 1989: The US S&L Crisis.**
- 1991: Salomon Brothers Bond Scandal.**
- 1991: BCCI Scandal.**
- 1991: Executive Life / First Capital Life Junked**
- 1991: Mutual Benefit Liquidity Squeeze**
- 1991 – 1996: Lloyd’s Asbestos Liabilities**
- 1994 – 2002: Japanese Real Estate & Banking**
- 1994: Orange County Default**
- 1994: Kidder Peabody Fiasco.**
- 1994: Confederation Life Failure**
- 1994: Monarch Life Seizure**
- 1995: The Barings Derivatives Scandal.**
- 1996: Sumitomo Copper Scandal.**
- 1997: The Natwest Hole.**
- 1997: The Bre-X Mining Scandal.**
- 1997: Smith Barney Investor Fraud.**
- 1997: Bank of Tokyo-Mitsubishi Derivatives Loss.**
- 1997: UBS Derivatives Model Problems.**
- 1997: Prudential Insurance US Market Conduct**
- 1997: Nissan Mutual ALM Failure**
- 1998: Griffin Trading Bond Futures losses.**
- 1998: Russian Bond Debacle.**
- 1998: The LTCM Risk Model Failure.**
- 1998: Asian Economic Flu Crisis**
- 1999: Toho Mutual & Daihyaju Mutual**
- 1999: General American Liquidity Failure**
- 1999: Korea Life ALM Losses & Failure**
- 1999: Unicover Fiasco**
- 2000: Equitable UK Pension guarantees**
- 2001: American Express CBO Losses**
- 2001: World Trade Center**
- 2002: Enron & Worldcom**
- 2002: Consecoco chokes on Green Tree**
- 2002: HIH Surprise**
- 2002: Amer Skandia VA problems**
- 2003: Parmalat Accounting Scandal**
- 2003: Allmerica VA reserving**
- 2003: Annuity & Life Re Overgrowth**
- 2004: Marsh Contingent Commissions**
- 2005: AIG Finite Re**
- 2006: Scottish Re Tax Asset**
- 2006: Hurricane Katrina**
- 2007: Bear Stearns/Countrywide/??? Sub Primes**

Book Recommendations

Peter Bernstein



Nassim Taleb



CATASTROPHIC LOSSES AND “THE BLACK SWAN”

- The Black Swan: The Impact of the Highly Improbable
 - By Nassim Taleb
- Mediocristan and Extremistan
- Health and Accident Mortality belong in Mediocristan
- Catastrophic events belong in Extremistan
- Biggest problem is that the data aren't any good for predicting the future.

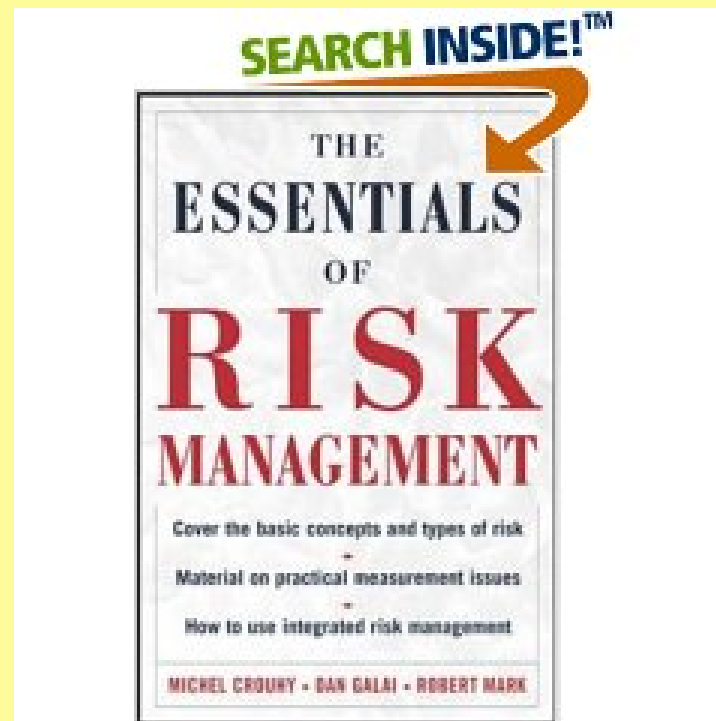
WHAT COULD POSSIBLE GO WRONG?

- Plane Crash ~250 deaths
- Small Pandemic ~800 death from SARS in 2003
- Small Natural Disaster ~2000 Dead from Katrina
- Terrorism ~3000 WTC Dead
- Nuclear Accident 56 plus ~4000 – 100,000 in Chernobyl
- Large Natural Disaster Christmas Tsunami killed ~10,000 in Sri Lanka
- Industrial Accident ~20,000 killed in Bhopal, India

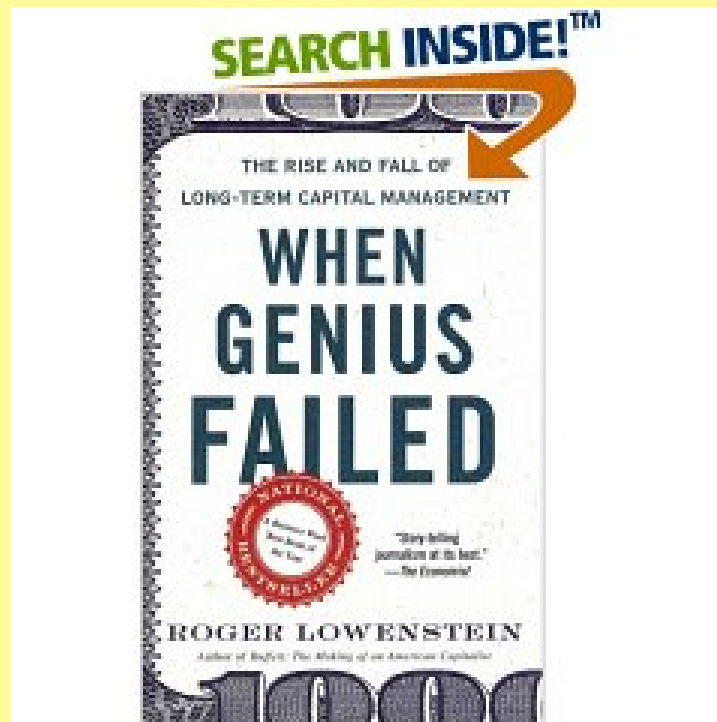
WHAT COULD POSSIBLE GO WRONG?

- Gigantic Natural Disaster: an Isle of Man-sized chunk could fall of Canary Islands
Tsunami
- Major War
 - WWII 40 – 70 million
 - Vietnam 2.5 – 5 million
- Famine
 - Russian 6-8 million 1932
 - Chinese 20-40 million 1960
- Spanish flu up to 100 million 1918-20
- Asteroid (Extinction?)
- Yellowstone eruption
- California levees
- Chinese earthquake/floods

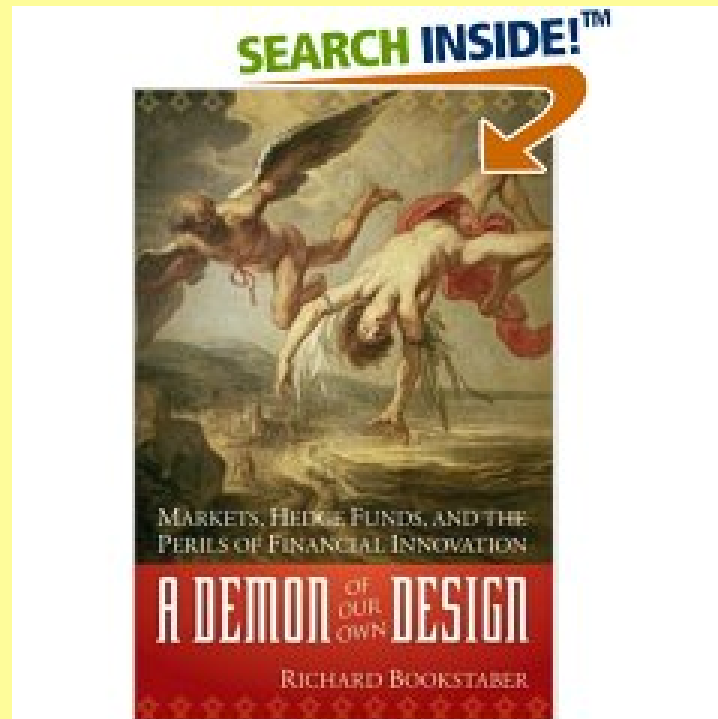
Michel Crouhy, Dan Galai, Bob Mark



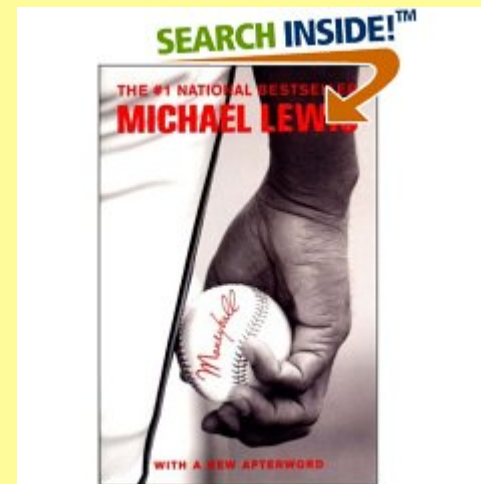
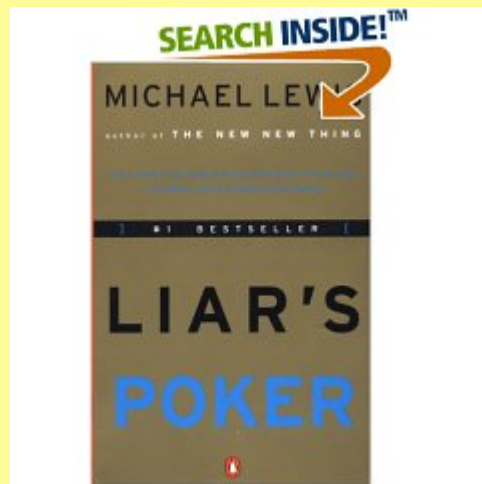
Roger Lowenstein



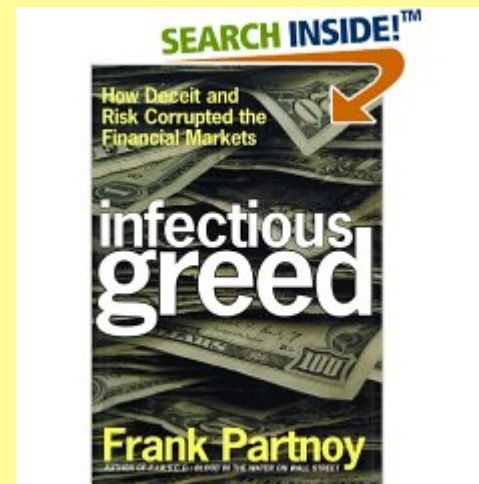
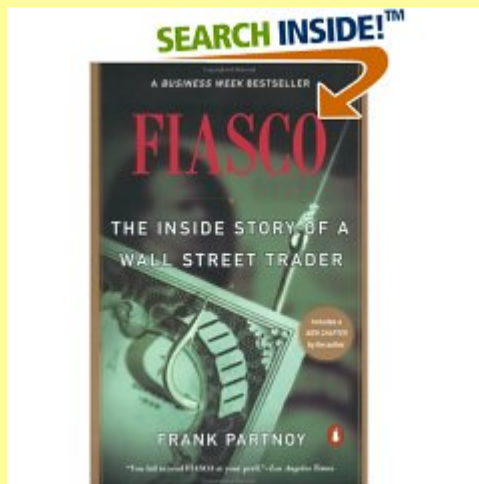
Richard Bookstaber



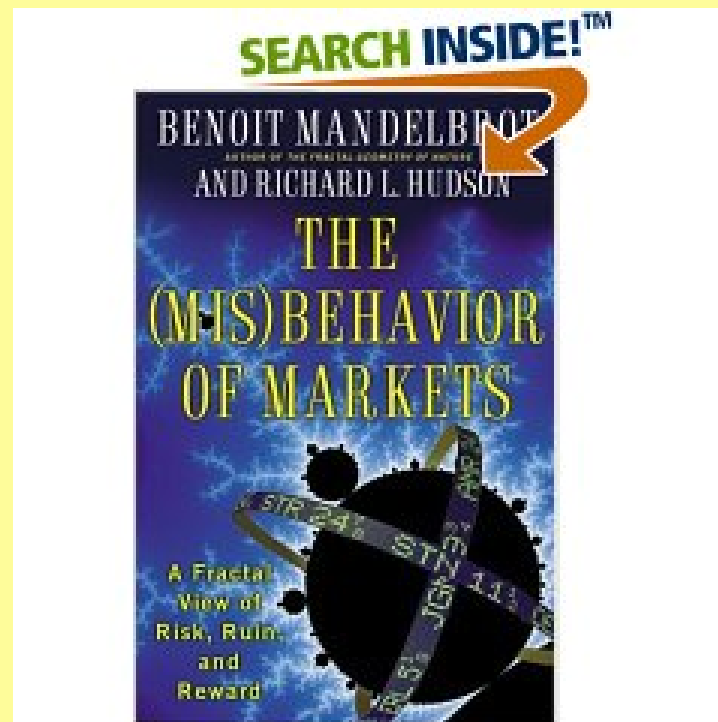
Michael Lewis



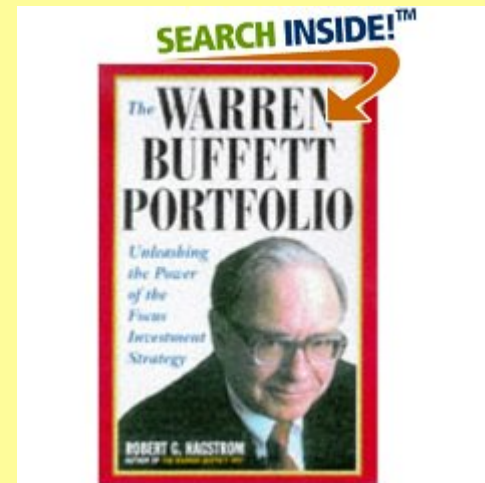
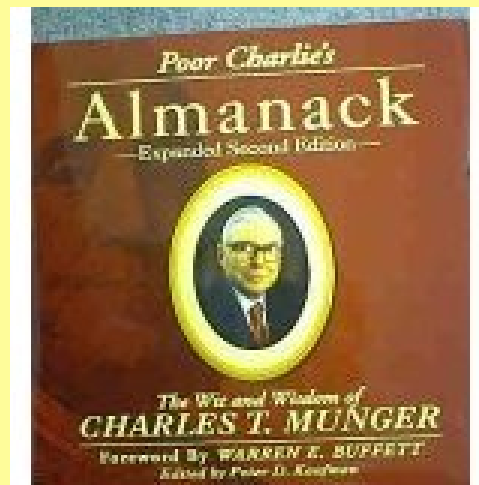
Frank Partnoy



Benoit Mandelbrot



Berkshire Hathaway



Thank you!

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