

Enterprise Risk Management

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Enterprise Risk Management (ERM) Key Points

- ERM's role in strategic planning
 - Understand your risk profile
 - Solutions are unique
 - Quantitative/qualitative tools
- ERM is not
 - A checklist exercise
 - A rating agency exercise
 - Just about risk mitigation

Historical View of Risk

- Silo based – one risk at a time
- Driven by models
- Mitigation focus

Global Financial Crisis

- Culture
- Tail risk
- Outsourced decision making
- Misaligned incentives
- Mispriced risk
- Leverage

What to do now?

- What do you think?
 - Fiscal policy – More stimulus?
 - Monetary policy – Any bullets left?
- Lessons learned
 - Credit default swaps

Positive Case Studies

- US Air flight that landed on Hudson River
- Tylenol scare
- Companies that do not make the front page
- Canadian financial services industry

ERM for Honest/Dishonest

- Honest
 - Focus on exposures
 - What ifs
 - Involve strategic planning dept
 - Optimize results
- Dishonest/Clueless
 - Focus on controls
 - What could
 - Run by Internal Audit
 - Limit downside

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.”

Risk Categories

- Credit (C-1 other)
- Equity (C-1 cs)
- Pricing/Insurance/Underwriting/Actuarial
(C-2)
- Interest rate/ALM (C-3)
- Operational (C-4)
- Strategic (C-4)

Key Elements of E-R-M

- Holistic approach to managing risks
 - Risk appetite/alignment
 - Common language
 - Common measurement (leading indicators)
 - Guiding policies and limits
 - Emerging risks
- Alternative – crisis management

Objectives of Risk Management

- Value added
- Knowledge
- Culture
- Compliance

Compliance

- COSO, Sarbanes-Oxley legislation, NAIC
 - Provide building blocks to add value
 - Focus on audit
 - Limited financial value
 - Could easily be viewed as bureaucracy
- There must be more to ERM than this!
- COSO – Committee of Sponsoring Organizations
 - Accountants
- NAIC – National Association of Insurance Commissioners

Culture

- Starts at the top and builds momentum
 - Alignment
 - Integrity – walk the walk
- Customer impact
- Discipline/consistency
- Transparent/Proactive
- Share best practices

Knowledge

- Understand the risks taken
 - Transparency
- Risk
 - Accept risk where you have a competitive advantage (exploit)
 - Mitigate/hedge
 - Avoid
 - Can't transfer risk, can only share it
- Evolution

Value Added

- Building blocks
- Prioritize risks
- Optimize risk/return profile
- Discipline
- Make better decisions

Enterprise Level Constraints

- Align throughout firm
- Publicize constraints
 - Everyone must pull in the same direction
- Determine company's risk appetite
 - Exposure triggers (yellow before red)
- Difference between risk ownership and measurement

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

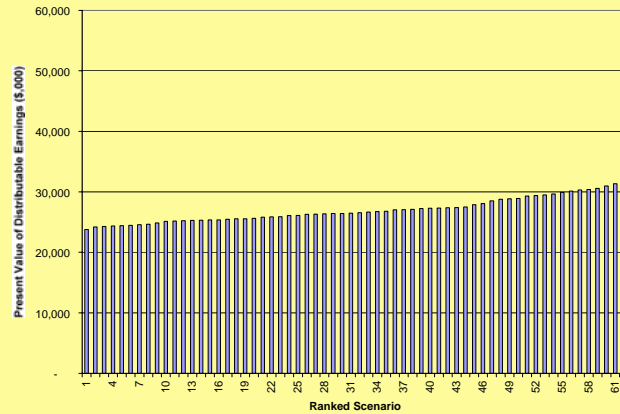
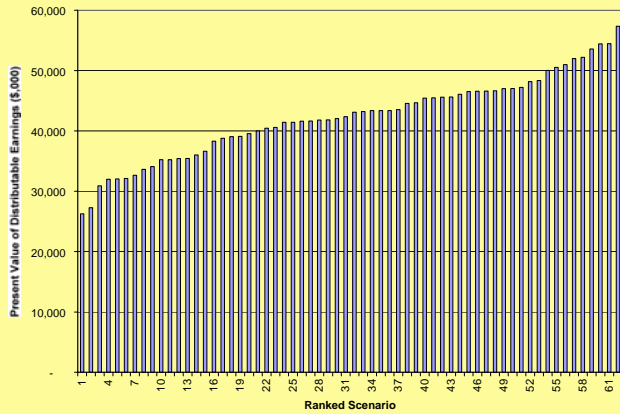
Skepticism

- Encourage challenges
- Listen and brainstorm
- Models have limitations
 - Brownian motion does not define the financial markets
 - Power Laws

Tools

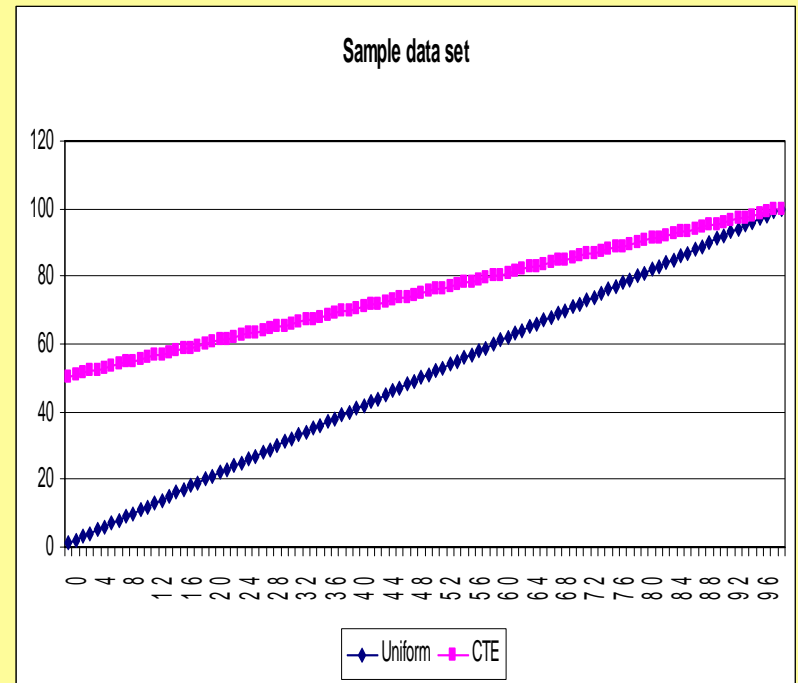
- Graphics/Distributions
- Value at Risk/Conditional Tail Expectation

Risk/Return Profile



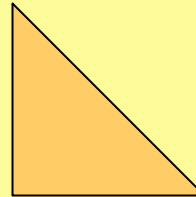
Statistical tools – VaR and CTE

- VaR
 - Value at Risk
 - used by banks
- CTE
 - Conditional Tail Expectation
 - used by insurers
- Graphics
 - Look at entire distribution
- Metric pros and cons

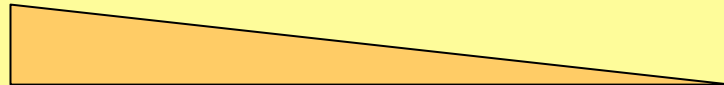


Balance of Risks

- Balanced firm



- Concentrated firm



Economic Capital Models

- Assumptions are being challenged
 - Risks are independent
 - Diversification benefit
 - Correlation is constant
 - Copulas may get us past this constraint
 - Model risk is minimal
 - Limited data points
 - Complexity

Principles-Based Approaches and Enterprise Risk Management

- ...Use the same tools
- ...Leverage existing models
- ...Use stochastic results (sort/graph)
 - Pick a level of conservatism (CTE)
- ...Are built off cash flows
- ...Allow firms to choose risks to exploit
- ...Consistency between pricing, projections, reporting

Practical Uses

- Marginal impact
 - Organic growth
 - Project (aging) current portfolio
 - Introduce new product
 - Reinsurance (with and without)
 - Asset mix/investment strategy
 - Acquisition

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

Typical Insurance Scenarios

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

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/funding risk)
 - Counterparty (reinsurer solvency)

Emerging Risks

- Financial
 - Sub prime resets
 - Municipality credit risk
 - Commercial Mortgages/Junk bonds
 - Energy cost
 - High: economy falters
 - Low: political instability in South America, Russia
 - Inflation
 - Financial services consolidation/Risk concentration
 - Combination of risks
 - Others?

Concentration Risk

- Power at top of organization
- Operating systems
- Power grid
- Monopoly/monopsony

Catastrophic Risks

- RMS Terrorism
 - Anthrax in Chicago
 - Trains in Chicago
 - New York City – water
- Natural
 - California levees
 - New Madrid
 - Hurricanes
- Too Big to Fail

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**

Qualitative/Quantitative

- Model Risk
 - Does the modeler understand the nuances of your business
- Can you explain your risks in 2 minutes?
- Why are you calculating Economic Capital?
 - Stakeholders
 - Should not be driver
 - Internal management
 - Make strategic/tactical strategy decisions

Research Projects

- Emerging risk combinations
- Correlations
- Operational risk modeling
- Risk appetite

Don't reinvent the wheel!!!

- 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

Break

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CERA: An ERM Credential

ERM Credentials

- Society of Actuaries
 - IAA and other actuarial organizations
- PRMIA (Professional Risk Manager PRM)
- GARP (Financial Risk Manager FRM)
- CFA Institute (Chartered Financial Analyst)
- MBA

SOA launches CERA July 2007

- Expand opportunities
 - New roles in traditional markets
 - Non-traditional sectors

Chartered Enterprise Risk Analyst: 1st new credential since SOA inception in 1949

Competitive Positioning

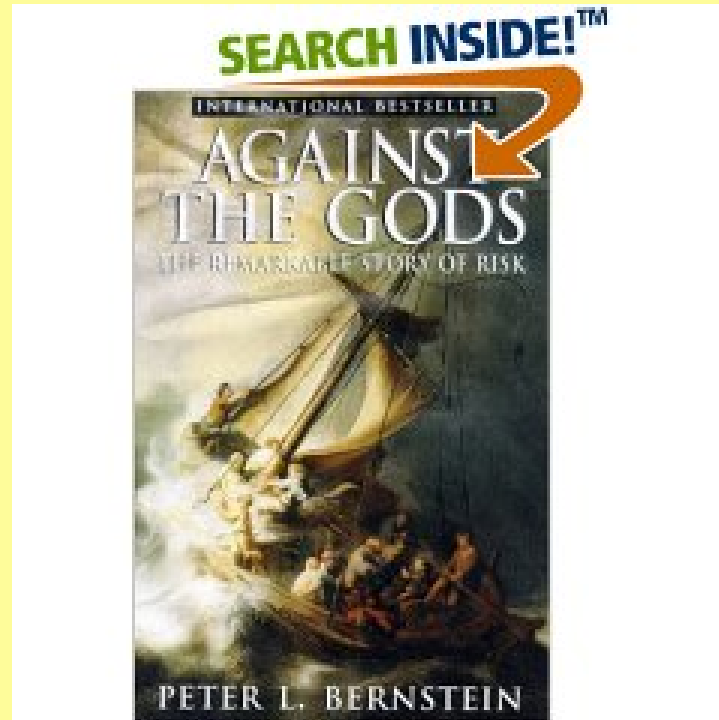
- Actuarial approach to risk
- Ability to apply skills to any risk-bearing enterprise
- Professional
 - Ethical code
 - Professional standards
 - Disciplinary process
 - Education requirements

Risk Management Jobs

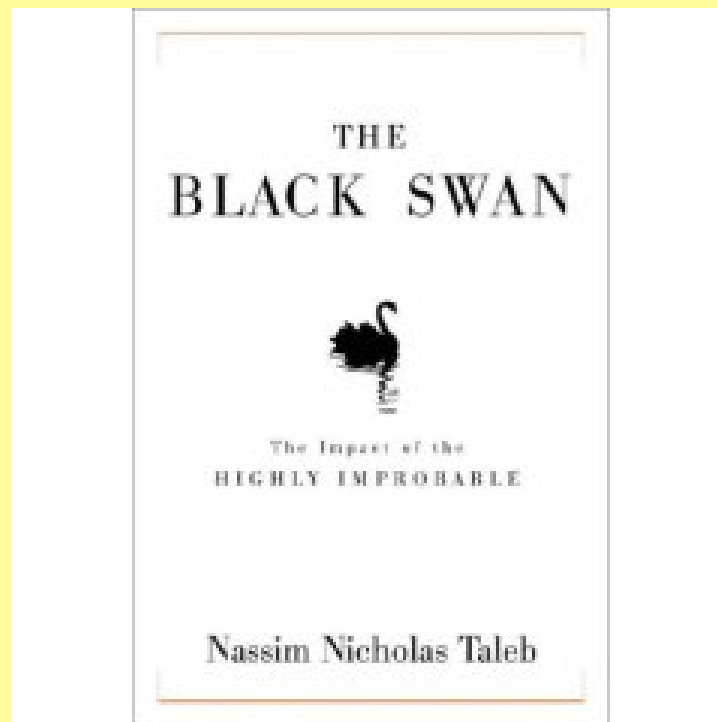
- What you could do
 - ERM department (leads to CRO) rotation
 - Division risk management team
 - Hedging
 - Valuation (leads to Appointed Actuary at insurer)
 - Individual ERM (financial advisor)
- How to prepare
 - Lifelong learner
 - Qualitative and quantitative aspects

Book Recommendations

Peter Bernstein



Nassim Taleb



CATASTROPIC LOSSES AND “THE BLACK SWAN”

- The Black Swan: The Impact of the Highly Improbable
 - By Nassim Nicholas 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.

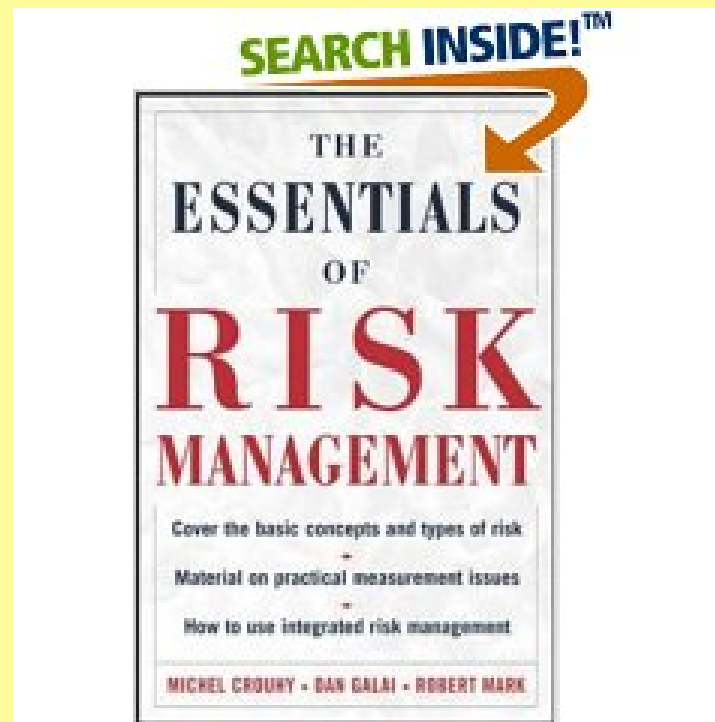
WHAT COULD POSSIBLE GO WRONG?

- 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 by Union Carbide in Bhopal, India

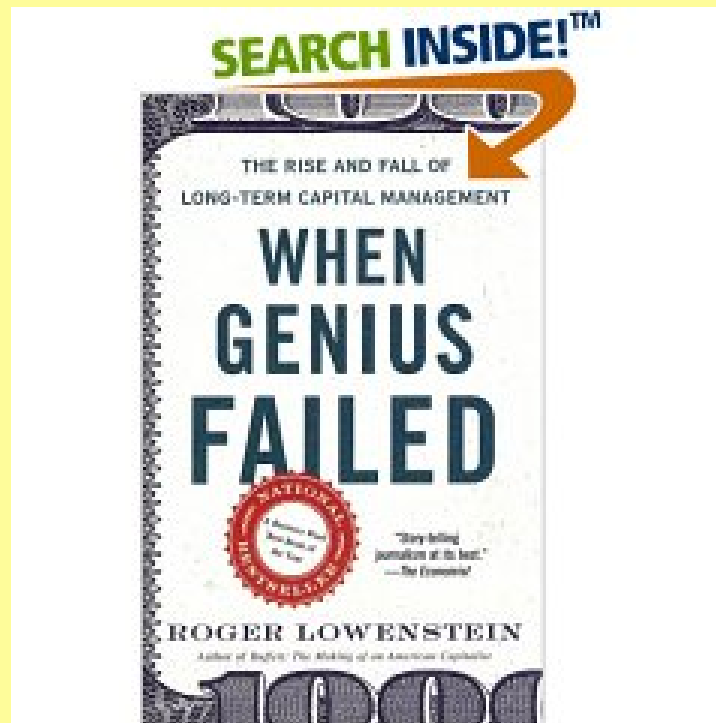
WHAT COULD POSSIBLE GO WRONG?

- 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 20-40 million 1918
- Asteroid (Extinction?)
- Yellowstone eruption
- California levees

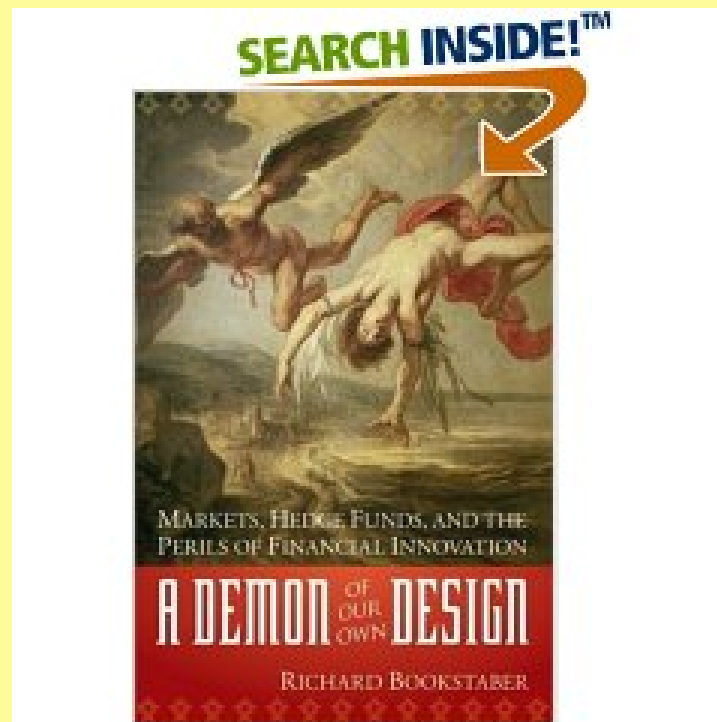
Michel Crouhy, Dan Galai, Bob Mark



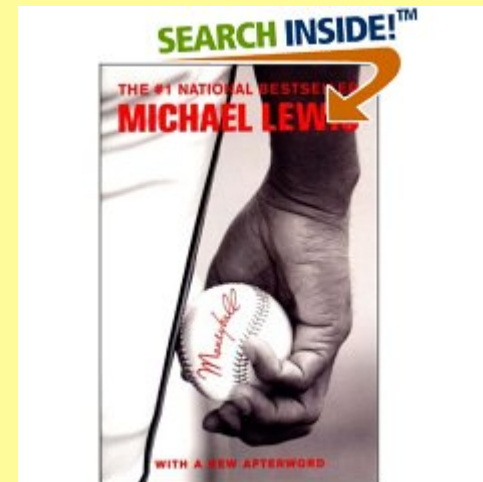
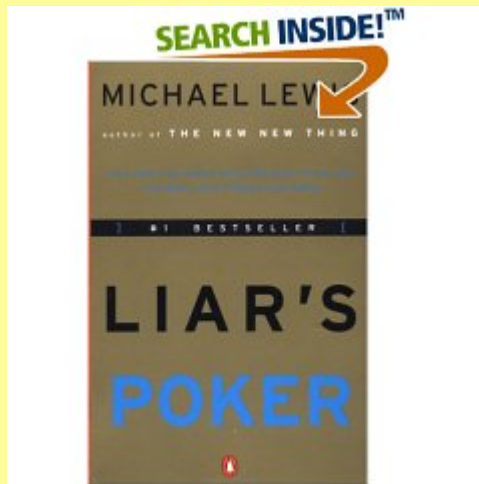
Roger Lowenstein



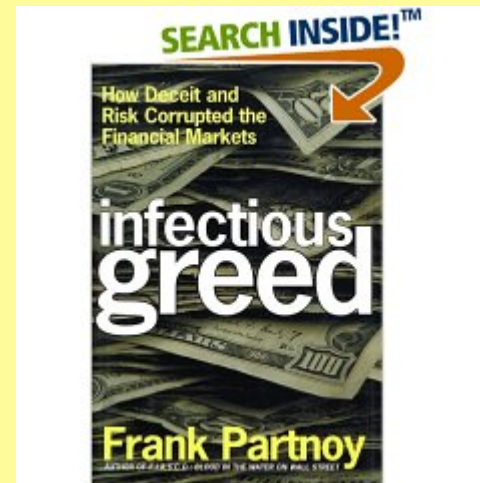
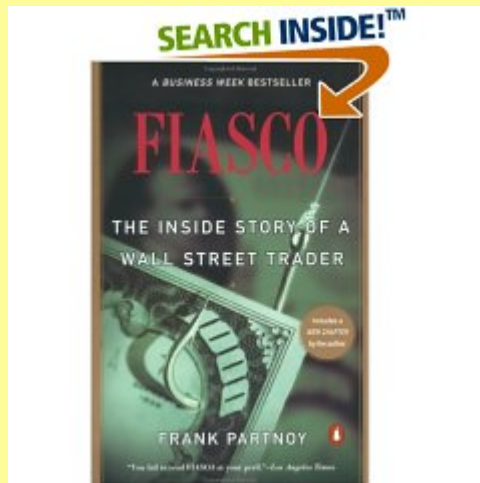
Richard Bookstaber



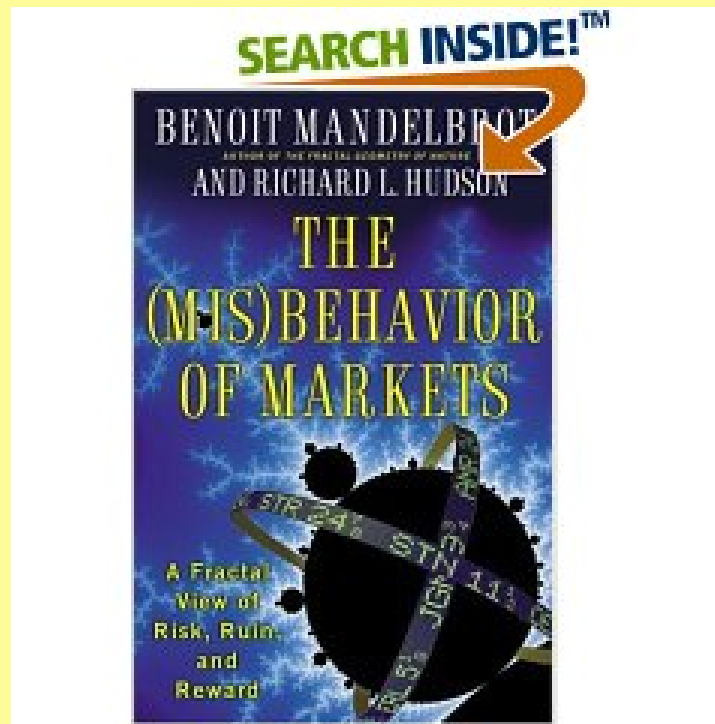
Michael Lewis



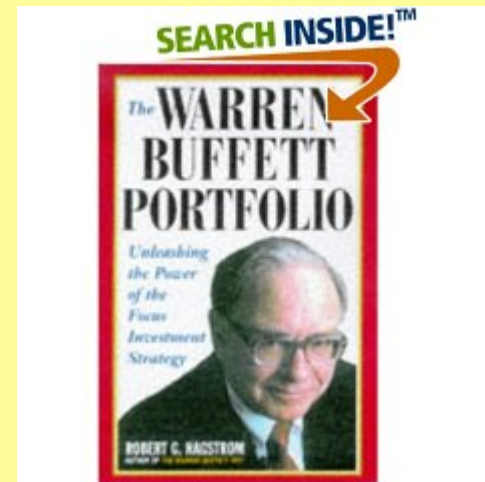
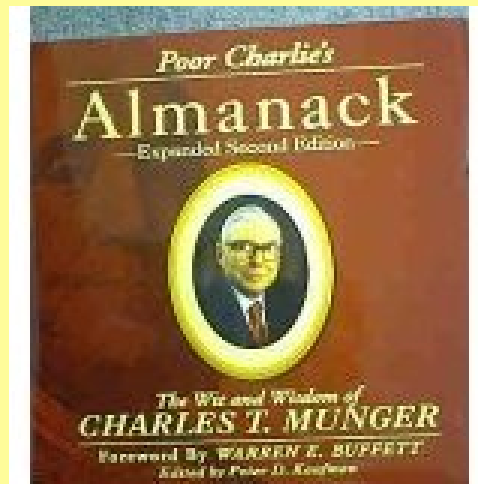
Frank Partnoy



Benoit Mandelbrot



Berkshire Hathaway



Thank you!

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